Intercomp®

advanced weighing technology . . . by any measure

PT20 CPU
Users Manual

Intercomp Co.
3839 County Road 116
Medina, MN 55340, U.S.A.

(763)-476-2531
1-800-328-3336
Fax: 763-476-2613
www.intercompcompany.com

Manual # : 700425-E

Table of Contents

System Description

The PT20 CPU system consists of a main control box, battery charger, and internal printer. The system can use 2 to 12 platforms (1 to 6 pairs), with interconnect cables or utilize wireless scales. In addition it can accumulate a total weight for any number of axle groups.

Features

The PT20 control box (CPU) serves to control each platform as well as display the weight applied to it. The CPU also controls output to both an internal printer and a choice of external outputs. (USB, RS-232, and USB flash drive)

The PT20 can store, recall, and print up to 2047 separately stored weigh records.

The software allows for four optional user selected "USER INFO" fields that will display when printed. (Scales location, Scale User, Supervisor, and one user defined field) These settings will be saved in the registers until the user changes them.

The software also provides seven optional "VEHICLE INFO" fields. (License plate, Plate State, DOT#, Owner/Driver, FHWA Class, Notes, and a user defined field) These fields will clear after next vehicle is pressed.

Internal printer prints all weights including the total weight for up to 6 axles with User and Vehicle information is desired.

Functionality to use a weighed or manual entered tare weight to automatically calculate total Net weight from a weighment.

Provides automatic altitude and latitude corrections.

Can generate time and date stamp if desired.

Declaration of Conformity

$C\!\!\in$

We,   Intercomp Company
       3839 County Road 116
       Medina, Minnesota 55340 USA

Declare under sole responsibility that the PT20 CPU to which this declaration relates meets the essential health and safety requirements and is in conformity with the relevant EC Directives listed below using the relevant section of the following standards and other normative documents.

2009/125/EC - ecodesign requirements for energy-related products (2005/32/EC recast)
(EC) No 278/2009 - no-load condition electric power consumption and average active efficiency of external power supplies
2004/108/EC - relating to electromagnetic compatibility and replacing Directive 89/336/EEC
EN 55011:2009, Class B - Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement
EN61000-6-1:2007 - Generic standards, Residential, commercial and light industry environment
EN 61000-6-2:2005 - Immunity for industrial environments
EN 61000-6-3:2007 - Emission standard for residential, commercial and light-industrial environments
EN 62311:2008 - Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz)
1999/5/EC - on radio equipment and telecommunications terminal equipment
EN 301 489-1 V1.9.2 (2011-09) - Common Technical requirements
EN 300 328 V1.7.1 (2006-10) - Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive
EN60950-1:2006/A12:2011 - Information technology equipment. Safety. General requirements
2012/19/EU - on waste electrical and electronic equipment (WEEE) (Directive 20/96/EC Recast)
2013/56/EU amending Directive 2006/66/EC on batteries and accumulators

This product complies with all safety-relevant provision referring to protection against electrical hazards and other hazards, such as mechanical hazards, fire hazards, noise and vibration. The safety issues of this measurement equipment have been evaluated under the self-certification provisions of the relevant directives.

The related technical construction files are held for inspection in the U.K. at Intercomp Europe Limited.

The CE mark and WEEE marks must be affixed as required in the directives.

Mark Browne / Quality Manager
June 19, 2014

PT20 Specifications

Controls

Keys	41 control keys: ON/OFF, RESET, lb/kg, ZERO, CLEAR, ENTER, a numeric key pad, ADJUST SCREEN, BACK LIGHT, TIME/DATE, EXIT, MENU, four arrow keys, AXLE ACCUM, NEXT GROUP,PRINT, SAVE, NEXT VEHICLE, USER INFO, VEHICLE INFO, SET TARE, SHOW WEIGHT, SHOW ARM/CG, SET ARM, RECALL SAVED DATA, CLEAR SAVED DATA, AND OUTPUT SAVED DATA.
Display	5.7 inch graphic LCD with backlight. Most screens arranged into 5 rows of (15) 0.43" characters.

Electrical

Batteries	6 'D' cell alkaline or NiMH rechargeable cells.
Battery life	40 to 200 hours: dependent on system detail, printer, and back light use.
Charging power	100 to 240 VAC, 50 to 60 Hz universal plug kit included.
Charging current	470 mA.
Charge time	24 hours.
Auto shut off	Under low battery condition.
Time/Date Battery	(1) CR2032 lithium button cell.
Output	USB, RS485/ANALOG, and USB Flash Drive.
Relay Output	2 outputs, each with C/NO/NC contacts, 5A @ 250VAC or 30VDC
Analog output	(16-bit): 0-10V, 4-20mA, 0-5V, +/-5V, +/-10V, 0-20mA.
Channel power	Drive up to (36) 350 Ohm load cells. (6 channels with up to 6 load cells each.)

Performance

Scale inputs	Six channels that support analog, wired digital or wireless scales
Data storage	Capacity of 2047 weigh records
Data recall	All stored records can be recalled to view or print
Data export	All records can be exported via USB, RS232, or USB flash drive
Cal protection	Cal strap on circuit board locks out calibration features.
Tamper proofing	Front panel has two lead-wire screws for sealing.

Environmental

Hardened Case	Rated IP67 when closed, IP52 when opened and operational)	
Humidity	10 to 95% non-condensing.	
Temperature		
	Operating	-4 F to 140 F. (printer 32F to 122F / 0C to 50C) -20 C to 60 C.
	Storage	-4 F to 140 F. -20 C to 60 C.

Dimensions

Length	16.5 inches (420mm)
Width	13 inches (330mm)
Height	6.75 inches (170mm)

Radio

Radio frequency	ISM 2.4GHz, 802.15.4 DSSS*
License requirements	None. Pre-approved US/FCC, CAN/IC, EUR/CE
Range	200' / 60m indoor, 300' / 90m line of sight

> **!** WARNING: To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended. The antenna used for this transmitter must not be co-located in conjunction with any other antenna or transmitter.

* Radio notes: Frequency: ISM 2.4GHz (2.400GHz - 2.483GHz), with 12 channels (CH 1-12) within that range with each center frequency = 2405MHz + (CH * 5) MHz.Power output 63mW (18dBm), 10mW (10dBm) for international variant. Antenna is internal surface mount with -1.5dbi gain, omni-directional.

Operation

Assembly (Platform Scales AX900)

Note: These instructions are for the systems that are not pre-assembled and loaded on a trailer. If your system is already assembled continue to the setup section that follows.

Depending on your system configuration and components, the following gives you the instructions for assembling the AX900 scale platforms. Some systems may have Dummy Pad Axle Spacers. All systems will include ramps and AX900 scale platforms.

1. Unpack the AX900 assembly from the wooden crates.
   - AX900-LAW Scale Platforms
   - AX900 Ramps
   - AX900 Standard Scale-to-Scale & Scale-to-Ramp Connecting Links.
   - .625-11 x 1.5" Long Plated Flat Socket Head Bolts (For Links).
   - 1-each: Tube of Blue Loctite (For Bolts)

2. Position AX900 Platforms end to end with summing box connections on the same side facing towards the middle of the lane of travel. Align scale number 1 (Left Front) and scale number 3 (Left Rear) end to end on the left side of traffic flow direction. Then align scale number 2 (Right Front) and scale number 4 (Right Rear) end to end on the opposite side of traffic flow. When the complete system is laid out, scale number 1 should be directly across from scale number 2, and scale number 3 should be directly across from scale number 4.
3. Fasten two (2)-standard connecting links, with 5/8"-11 flat socket head bolts, on each side of the center AX900 platforms. **Apply blue Loctite to the threads of all bolts prior to installation.**
4. Position the four (4)-AX900 Ramps at the ends on both sides of the AX900-LAW scale platform assemblies.
5. Fasten two (2)-standard connecting links, with 5/8"-11 flat socket head bolts, on each end of the scale system between the scale platforms and the ramps. **Apply blue Loctite to the threads of all bolts prior to installation.**
6. Repeat process if applicable.
7. Connect the interconnect cables from platform to platform and then to **any channel (CH 1 – CH 6)** on the PT20 CPU. Each platform has its own electronics with memory, and sends its own identification data. This means the weight from each platform will appear in its appropriate location on the screen no matter which connector it is plugged into.

Platforms

Ramps

3

1

4

2

PT20
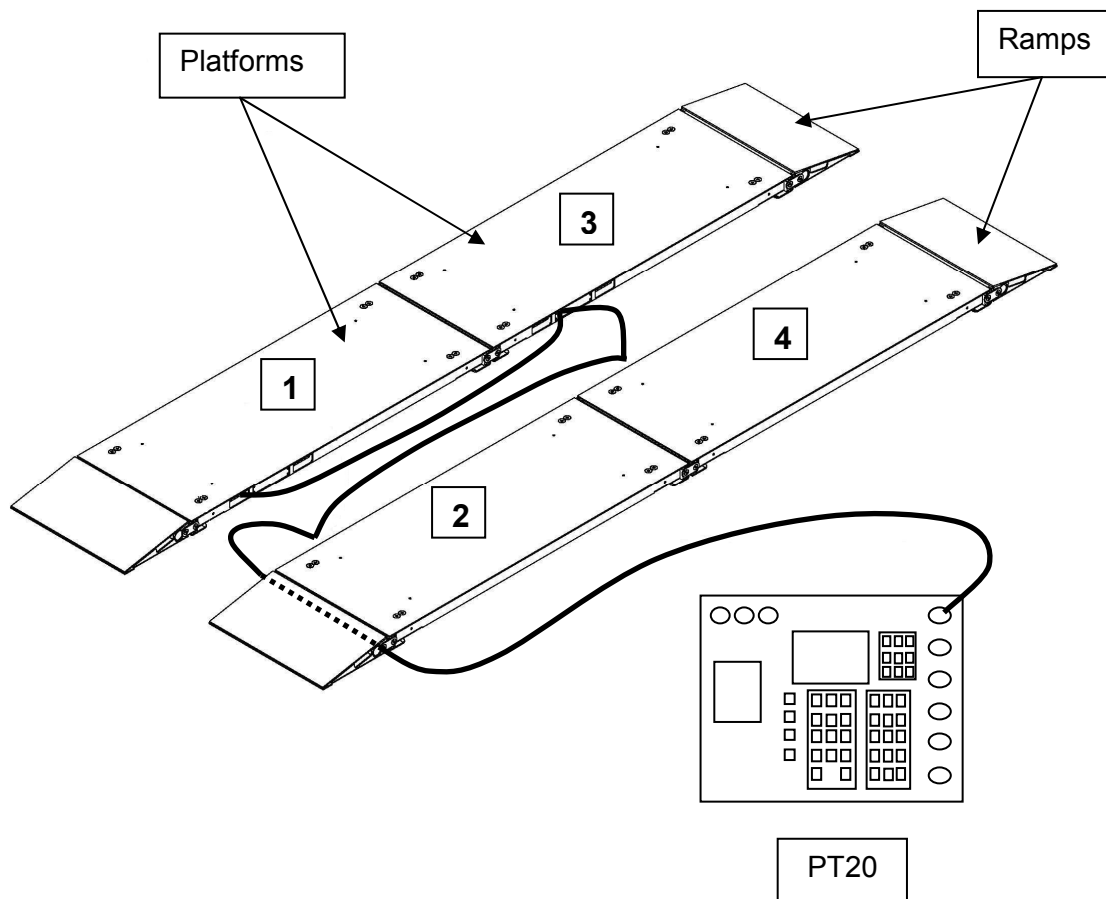
AX900 Replaceable Parts

Part Number	Discription
603131	AX900 load cell and foot
160085	AX900 15 foot interconnect cable
160089	AX900 to CPU 50 foot homerun cable
810032	AX900 summing board assembly
810033	AX900 XRF circuit board assembly
000861	AX900 summing box pigtail cable assembly

Set-up (Wired Wheel Load Scales)

Lay the scales out in the desired configuration. Connect the scales in pairs to the PT20. Ensure that the pairs are connected as shown below. (If 6 scales are used, pair scales 5 and 6 to make up the third axle)
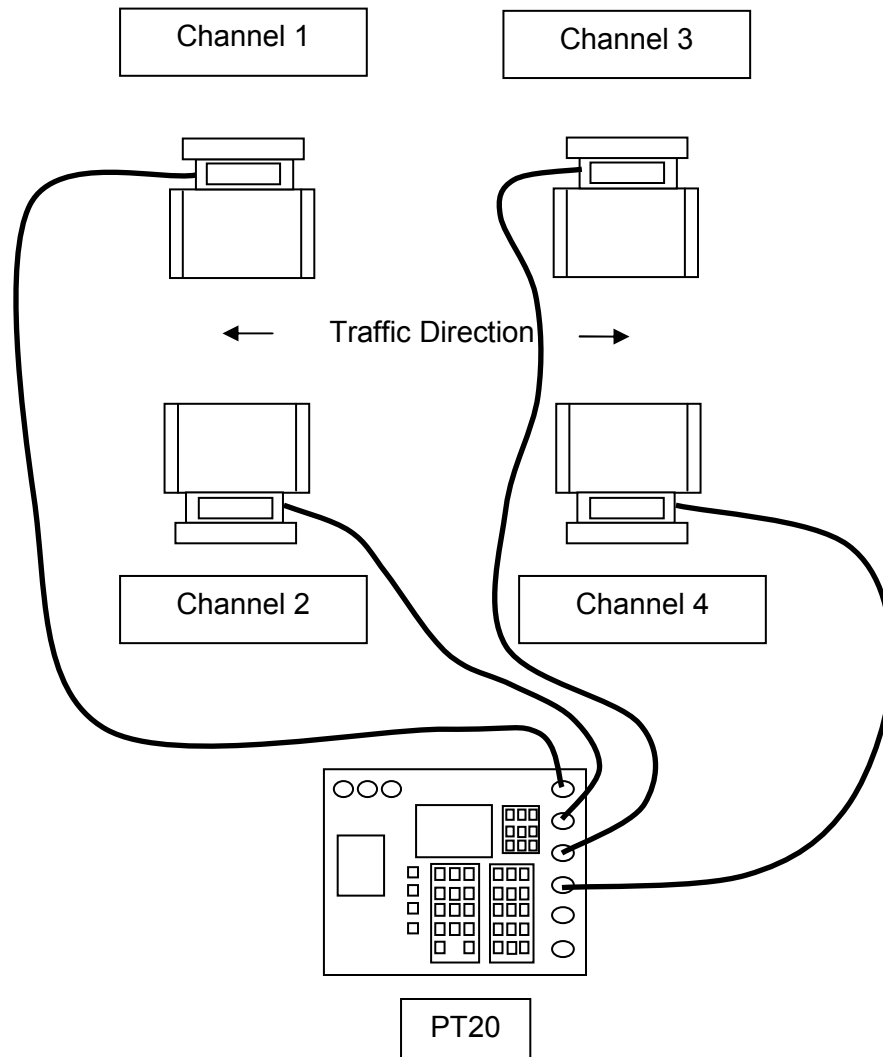
Set-up Wireless Scales

Lay out the scales as shown in the wired set-up section above. The scales need be numbered and paired to weigh axels. (Pair 1-2, 3-4, 5-6, and so on) The PT20 can use up to 6 pairs of wireless scales. (12 scales total)

Weighing

Set up and turn on the system as described in the previous "Setup" section of this manual. When the "ZERO" key is pressed the PT20 will ask you to press "ZERO" key a second time to zero all platforms or enter the scale's channel number to zero one channel when prompted. Some systems may be configured such that each pad retains its zero condition even when the power is removed. If this is not the case the PT20 CPU will automatically zero the pads when it is turned on.

Once the pads have been zeroed, a load can now be applied. As the load is applied, the display screen will display the corresponding weight of each platform. See the "Axle Accumulation (Example)" section in this manual for step-by-step instructions on how to accumulate and print the individual axle weights and the total weight for a vehicle.

Display (AXLE ACCUM MODE)

In Axle Accumulation display mode, the display will show each axle's current weight, the current group weight, and the total accumulated weight:

- Each current axle weight is shown labeled "AXL 1", "AXL 2", "AXL 3", "AXL 4", "AXL 5" or "AXL 6". Depending on the system set-up all of these might not be shown. "AXL X" (X = channel number) is the total weight of the left platform and the right platform.
- The total of AXL 1-6 is the current group weight and is labeled "GRP x", with x being the current group # being displayed. This number will increase by 1 each time you press "Next Group". (see the "Axle Accumulation (Example)" section in this manual).
- The total accumulated weight is shown on the last line of the display and is labeled: "TOT". This is the accumulating total vehicle weight, which includes the current group weight and any previous group weights for the vehicle.
- The units of display (lb/kg) are indicated vertically on the right hand side of the display after the total weight.

Display (ARM/COG MODE)

In ARM / Center of Gravity display mode, the display will show each axle's current weight, the total weight, and the Center of Gravity (COG) of the vehicle. In this mode the user can also display the ARM of each axel by pressing the "SHOW ARM" key and set the ARM distance by pressing the "SET ARM" key and then follow the prompts to enter the ARM distances for each scale.

Axle Accumulation (Example)

This example uses a vehicle weighing with 3 axle groups.
1. Press "USER INFO" if you want to enter user and scale location info. The fields are: Scale Location, Scale User, Supervisor, and a user defined field. These fields stay saved for this and future weighings until you clear them.
2. Position the scales as described in the "SETUP" and "Weighing" sections in this manual.
3. Press "VEHICLE INFO" if you want to enter information for the vehicle being weighed. There are fields for License Plate, Plate State, DOT#, Owner/Driver, FHWA Class, Notes, and a user defined field. These fields automatically clear when starting a new vehicle.
4. Press '"SET TARE" if you want to enter in a tare weight for the vehicle.
5. Press "ZERO" twice to zero all platforms.
6. Move the vehicle's first axle(s) into place on the weighing platforms.
7. When the weight stabilizes, press "AXLE ACCUM" to accumulate the current axle group, and then press "NEXT GROUP" to indicate this axle group is finished. The PT20 instructs the user to: "ROLL ON NEXT AXLE GROUP". The display is then updated to show the next axle group number: "GRP2"
8. Move the vehicle's second axle group into place on the weighing platforms.
9. When the weight stabilizes, press "AXLE ACCUM" and then "NEXT GROUP" to accumulate the current axle group.
10. Move the vehicle's third and final axle group into place on the weighing platforms.
11. When the weight stabilizes, press "AXLE ACCUM" to accumulate the last axle group. The total vehicle weight is shown in the lower right corner of the display. At this point the vehicle can be moved off the scales. Now you have the option to save and/or print the vehicle ticket:
    a. To **print the full vehicle weight ticket** including all three axle groups, press "PRINT" and then "1". The printer will also print any "USER" and "VEHICLE" fields entered by the user, the tare (if a tare has been set) and computed net weight.
    b. To **save the vehicle to memory**, press the "SAVE" key. The PT20 will ask you to confirm the save, showing you the register number that the vehicle ticket will be saved to. You have the option here to change the register number (1-2047) if desired.
12. Once finished with the vehicle, press "NEXT VEHICLE" and you are ready for the next vehicle.

Note: If you hit AXLE ACCUM or NEXT GROUP unintentionally, you can back up either by hitting the "CLEAR" key. It will give you the choice to undo an "ACCUM" or a "GROUP".
Note: There is a "SAVE ON PRINT" options that if set, will automatically save any weighing that is printed to the next available register. The register number assigned will be on the printed ticket.
Note: You can view the ticket before saving or printing. Press "PRINT" followed by "2" to view the print preview. Use the arrow keys if necessary to see the entire preview.

PT20 displays

1st axle group:

```
AXL1:        00
AXL2:     10650
AXL3:        00
GRP1:     10650
TOT :     10650 lb
```

2nd axle group:

```
AXL1:     17150
AXL2:     17200
AXL3:        00
GRP2:     34350
TOT :     45000 lb
```

3rd axle group:

```
AXL1:     16250
AXL2:        00
AXL3:     15550
GRP3:     31800
TOT :     76800 lb
```

2nd axle group (expanded from scrolling)

```
CH 1:     10000 lb
CH 2:      7150
CH 3:     10000
CH 4:      7200
CH 5:        00
CH 6:        00
AXL1:     17150
AXL2:     17200
AXL3:        00
GRP2:     34350
TOT :     45000 lb
```

* Above shows expanded view from scrolling up and down with the arrows. **The display only shows 5 lines at a time.**

- The 3 blocks on the left show the typical screen views for a 3 axle-group vehicle weighing.
- The 1 block on the right shows the lines that are available if the user scrolls up using the arrow keys to view individual CH weights.

PT20 displays – extended overview

The display starts like this. (Press 'NEXT VEHICLE' if there is still a total showing from the previous weighing).

```
AXL1:        00
AXL2:        00
AXL3:        00
GRP1:        00
TOT :        00 lb
```

Move the vehicle's first axle(s) group into place on the weighing platforms. The display represents 1 axle on the second set of scales.

```
AXL1:        00
AXL2:     10650
AXL3:        00
GRP1:     10650
TOT :        00 lb
```

When the weight stabilizes, press 'AXLE ACCUM' to accumulate the current axle group.

```
AXL1:        00
AXL2:     10650
AXL3:        00
GRP1:     10650
TOT :     10650 lb
```

Press 'NEXT GROUP' to indicate this axle group is finished. The display will show ROLL ON NEXT AXLE GROUP for a couple seconds. Move the vehicle's second axle(s) group into place on the weighing platforms. The display represents 2 axles on the first and second sets of scales.

```
AXL1:     17150
AXL2:     17200
AXL3:        00
GRP2:     34350
TOT :     10650 lb
```

When the weight stabilizes, press 'AXLE ACCUM' to accumulate the current axle group.

```
AXL1:    17150
AXL2:    17200
AXL3:       00
GRP2:    34350
TOT :    45000 lb
```

Press 'NEXT GROUP' to indicate this axle group is finished. The display will show ROLL ON NEXT AXLE GROUP for a couple seconds. Move the vehicle's third and final axle group into place on the weighing platforms. The display represents 2 axles on the first and third sets of scales.

```
AXL1:    16250
AXL2:       00
AXL3:    15550
GRP3:    31800
TOT :    45000 lb
```

When the weight stabilizes, press 'AXLE ACCUM' to accumulate the last axle group.

```
AXL1:    16250
AXL2:       00
AXL3:    15550
GRP3:    31800
TOT :    76800 lb
```

Vehicle weighing complete. At this point the vehicle can be moved off the scales. Now you have the option to save or print the vehicle ticket. Then press 'NEXT VEHICLE'.

To **print the full vehicle weight ticket** including all three axle groups, press "PRINT" and then "1". The tare (if a tare has been set) and computed net weight will be printed here as well.

To **proceed to the next vehicle without printing**, press "NEXT VEHICLE" and then the "CLEAR" key to reset the total vehicle weight and move to the next vehicle.

Front Panel Controls

On/Off

Cycles power to the PT20 when pressed.

Reset

When pressed, the PT20 will reset to initial power up condition.

lb/kg

When pressed, the units toggle from lb to kg and vice versa. Press the "lb/kg" button. Press the "ENTER" button to toggle the setting.

NOTE: Whenever you change units, any tare weight or accumulated total you currently are using will be reset to "0".

Zeroing of Platforms

When the "ZERO" key is pressed the PT20 will ask you to press "ZERO" a second time to zero all scales or "ENTER" and prompt the user in zeroing an individual scale.

Numeric keypad

The keypad is used to enter the numbers and enter the corresponding letters when needed. To enter letters, enter them as you would with a cell phone. Example: Press the number "2" in quick succession to enter a "B".

Clear

If you hit AXLE ACCUM or NEXT GROUP unintentionally, you can back up either entry by hitting the CLEAR key. It will give you the choice to undo an "ACCUM" or a "GROUP".

Enter

Press the "ENTER" key when you are finished manually entering a number or word.

Axle Accum

When the weight stabilizes, press "AXLE ACCUM" to accumulate the axle group currently on the weigh pads.

Next Group

Press "NEXT GROUP" to indicate the current axle group is finished. The PT20 instructs the user to: "ROLL ON NEXT AXLE GROUP".

Print

Ticket "1"

To print the full vehicle weight ticket, including all three axle groups, press "PRINT" and then "1". The printer will also print any "USER" and "VEHICLE" fields entered by the user, the tare (if a tare has been set), and the computed net weight.

Preview "2"

To preview the ticket to be printed press "PRINT" and then "2". The display will show the user what will be printed.

Print options "3"

The print options allow the user to disable the printer and customize what information is printed.

1. To disable/enable the printer press "PRINT" and enter the print options (3). Select "1" and use the arrow keys to toggle the printer power on or off. "Yes" will enable the printer and "No" will disable it. When the desired state is shown press the "ENTER" key.
2. To print time/date on the ticket press "PRINT" and enter the print options (3). Select "2" and use the arrow keys to toggle the "TIME/DATE" on or off. "Yes" will print the time/date on the ticket and "No" will omit it. When the desired state is shown press the "ENTER" key.
3. To print the registry number (REG#) on the ticket press "PRINT" and enter the print options (3). Select "3" and use the arrow keys to toggle the "REG#" on or off. "Yes" will print the registry number on the ticket and "No" will omit it. When the desired state is shown press the "ENTER" key.
4. To print the ticket with individual pad weights (left and right) press "PRINT" and enter the print options (3). Select "4" and use the arrow keys to toggle the "LEFT/RIGHT" on or off. "Yes" will print the left/right weights on the ticket and "No" will axle weights only. When the desired state is shown press the "ENTER" key. See Printer Ticket Examples in the Printer section of the manual.

Save

To save the vehicle to memory, press the "SAVE" key. The PT20 will ask you to confirm the save, showing you the register number where the vehicle ticket information will be saved to. You have the option here to change the register number (1-2047) if desired.

Next Vehicle

Once finished with the vehicle, press "NEXT VEHICLE" and you are ready for the next vehicle. If the current vehicle has not been saved in the database the PT20 will prompt the user to save if desired.

User Info

Press "USER INFO" if you want to enter user and scale location info. The fields are: Scale Location, Scale User, Supervisor, and a user defined field. These fields stay saved for this and future weighings until you clear them.

Vehicle Info

Press "VEHICLE INFO" if you want to enter information for the vehicle being weighed. There are fields for License Plate, Plate State, DOT#, Owner/Driver, FHWA Class, Notes, and a user defined field. These fields automatically clear when starting a new vehicle.

Setting Tare

You can set a tare weight which will be computed into the total weight for a vehicle. Press the "SET TARE" button. You will be prompted to "SET TO CURRENT WEIGHT" (1) or use "KEY ENTRY" (2) to enter a desired weight. This number will be saved until you press "NEXT VEHICLE".

NOTE: Changing lb-kg will reset the tare to "0".

NOTE: The "SHOW WEIGHT", "SHOW ARM/CG", and "SET ARM" keys are only active when the PT20 is in the "CG/ACCUM MODE". This can be selected in the "MENU" function under "OPTIONS".

Show Weight

When in the "CG/ACCUM MODE" and the ARM distance entries are displayed, this key will toggle the display back to showing the weight on each scale. This key has no effect when in the "ACCUM MODE".

Show Arm/CG

When in the "CG/ACCUM MODE" and the weight on the scales are displayed, this key will toggle the display back to showing the ARM distance set for each axle along with the total (TOT) weight on all scales. This key has no effect when in the "ACCUM MODE".

Set Arm

When in the "CG/ACCUM MODE" this key will enable the user to enter ARM distances for all axles connected. When selected, the display will prompt the user in entering ARM distances. This key has no effect when in the "ACCUM MODE".

Recall Saved Data

When selected, the user will be prompted to enter the register that the desired data is saved in. Once the register number is entered the data stored in that location will be displayed.

NOTE: If the data has been stored in the "ARM/COG" mode all of the fields will display the data that was saved and have a "SAVED DATA" icon after the weight displays. If the data was saved in the "ACCUM" mode the total will be displayed from the saved data and the axle weights will display active weights.

Clear Saved Data

If the user has saved data currently displayed the indicator will clear the data and return to the display screen previously loaded. If not displaying saved data on the screen, the user will be prompted to enter the register that the user desires cleared. Once the register number is entered the data stored in that location will be cleared and the register available for future use.

Output Saved Data

The user can output the saved data in three different ways.
1. USB flash drive- Press the "OUTPUT SAVED DATA" key. Place a flash drive into the front panel connection. Wait for the light to turn green and press the "1" key to send the data to the drive. The information can now be transferred to another device via the flash drive.
2. USB Output- Press the "OUTPUT SAVED DATA" key. Connect an external device to the USB output port on the front panel and press "2". The information will transfer to the connected device.
3. RS232 Output- Press the "OUTPUT SAVED DATA" key. Connect an external device to the 232/Analog output port on the front panel and press "3". The information will transfer to the connected device.

Menu

See 'MENU' in the 'Configuring the System' section for more details.

Time/Date

When the "TIME/DATE" key is pressed, the current time and date will be displayed. To change, press "TIME/DATE" again or press any key to return to normal operations. If "TIME/DATE" is pressed a second time, you begin by entering the date; month first, day, and then year. The months are numbered from 1 to 12. The date is a number from 1 to 31 representing which day of the month. The year is from 92 to 99 representing the 20th century of 0 to 91 representing the 21st century. To be precise, you can enter a time slightly in the future. You will be allowed to wait to start the time going. The hour is entered as a number from 1 to 12. Next the minutes are entered as a number from 0 to 59. Then the seconds are entered as a number from 0 to 59. Finally you are asked to enter AM or PM. The PT20 will then wait for you to press "ENTER" to start the clock running.

Screen Contrast

Press the "ADJUST SCREEN" key to adjust the display screen contrast. Use the up arrow to darken the display, and the down arrow to lighten it. When you have finished press "ENTER" to return to normal weighing.

Back Light

Press the "BACK LIGHT" key to toggle the back light on and off.

Exit

Press the "EXIT" key to get out of any of the menu screens. This function will allow the user to exit out of any menu that was inadvertently entered into.

MENU

The following table is a guide for the menu options. A more in-depth description of each function follows the table.

Menu		Parameter	Notes	Default
1		**SETTINGS**		
	1	# OF SCALES	1-12	2
	2	RENUM SCALE	Renumber individual scale (1-12)	1
	3	AVERAGE RATE	1-150	2
	4	LAT/ALT	Latitude 0-90deg, altitude 0-7000ft	45 deg, 0 ft
	5	SETPOINTS		
		ENABLE SETPOINT	4 set points available 0-999999	0 (all)
		AUDIO ALARM	Available on all set points, Yes or No	no (all)
	6	AUTO OFF	0-240 (in minutes, 0=off)	0
	7	ANALOG OUTPUT		
		1: SET CAPACITY	0-999999 (in current units, lb or kg)	0
		2: OUTPUT TYPE	6 mA and V options, 0=disabled	0
	8	SETTINGS VIEW	0-42	1
2		**OPTIONS**		
	1	INPUT MODE	For CH1-6: Analog or Digital	Digital (all)
	2	PROTOCOL MODE	Standard, Low Power, or None	Standard
		INTERFACE BAUD	9600 or 115200	9600
	3	CG/ACCUM MODE	Axle Accum or ARM/COG Mode	Axle Accum
	4	TOTAL ALWAYS	Yes or No	Yes
	5	MOTION CHECK	Yes or No	Yes
	6	SAVE ON PRINT	Yes or No	Yes
	7	lb/kg ENABLE	Yes or No	Yes
	8	LAT/ALT PROT	Yes or No	Yes
	9	REMOTES OFF	Yes or No	No
	0	READ-ONLY	Yes or No	No
3		**USB/RS232**		
	1	USB OUTPUT	off, continuous, ticket print	Off
		USB BAUD RATE	selectable from 1200 - 921600	115200
		USB-CTS ENABLE	Yes or No	No
		USB CONT. DATA	current tot, accum tot, muti-line	Current Total
	2	RS232 OUTPUT	off, continuous, ticket print	Off
		RS232 BAUD RATE	selectable from 1200 - 921600	9600
		232-CTS ENABLE	Yes or No	No
		RS232 CONT. DATA	current tot, accum tot, muti-line	Current Total
4		**RADIO OPTIONS**		
	1	ENABLE WIRELESS	Yes or No	Yes
		RF CHANNEL	1-12	1
		PAN ID	0-65534	8000
		ENCRYPTION KEY	0-65534, 0=no encryption	0

5	CALIBRATION		
1	GRADS	Selectable	1 lb
2	GRAD BREAKPOINT	Three breakpoints 0-199999	0, 0, 0
3	ADJ CAL/CAP	See description in calibration section	
4	AZT	off, 0.6, 1.0, 3.0, or 0.5 grads	1.0 grad
5	ZERO RANGE	off, 1%,2%,5% (w/ err msg choices)	Off
6	RAW COUNTS	Factory diagnostics use only	
7	LOADCELL TYPE	For CH1-6: 4-wire or 6-wire	4-wire (all)
8	DUAL CHANNEL	Yes or No	No
9	DEFAULT CPU	See description in calibration section	

SETTINGS

```
1: # of SCALES
2: RENUM SCALE
3: AVERAGE RATE
4: LAT/ALT
5: SETPOINTS  ↓
```

OF SCALES

Enter the number of scales that you are using in the system. You can have 1 to 12 scales entered. (Default 2)

RENUM SCALES

This function will renumber a specified scale to a desired number.

AVERAGE RATE

This function controls the number of reads that are averaged together before the number is displayed. Enter higher numbers for a more stable reading. The tradeoff is it will take longer for the display to reach the final weight. Available filter size is 1 - 150. (Default 2)

LAT/ALT

The "LAT/ALT PROT" must be turned off in the options menu to enable the user to change the settings in this menu. This function allows the user to set the current latitude and altitude that the scales are being operated at.
Available settings are: Latitude: 0 – 90 degrees, in 5 degree steps,
Altitude: 0 – 7000 ft, in 1000 ft steps. (Default 45/0)

SETPOINTS

The PT20 has the ability to monitor four set points, set point 1, 2, 3, and 4. The user can enable an internal audible alarm with each of them. The settings available are 0 – 199999. (Default 0 all)

```
6: AUTO OFF
7: ANALOG OUTPUT
8: SETTINGS VIEW


                        ↑
```

AUTO OFF

This function will automatically turn the unit off after an entered amount of time. The time available is from 0 – 240 minutes. A setting of zero disables this function. (Default 0)

ANALOG OUTPUT

This setting allows you to program an industrial analog output. The choices are: 4-20mA, 0-20mA, 0-10V, +/-10V, 0-5V, and +/-5V. The output of the analog output will scale to the capacity you enter in option: "1:SET CAPACITY". For example, if you enter a capacity of 20,000 lb and select 4-20mA output, a total weight of 10,000 lb will set the analog output to 12mA (mid-point of the 4-20mA range).

SETTINGS VIEW

This is a diagnostic tool to read the settings from any scale in the system. Select the scale you want to read the settings from and press ENTER.

Options

There are 10 options that can be set.

```
1: INPUT MODE
2: PROTOCOL MODE
3: CG/ACCUM MODE
4: TOTAL ALWAYS
5: MOTION CHECK↓
```

INPUT MODE

This option allows the user to indicate the type of load cell (digital or analog) connected to the different channel connectors of the indicator. (1-6)

To change the load cell type for the channels of the indicator, press the "MENU" key and select 2 (OPTIONS). Once in the options menu select 1 (INPUT MODE). Press the number of the channel you wish changed to toggle that channel to the desired setting. Once channel 1-3 are set press the "ENTER" key and set channels 4-6 to the desired setting by toggling the settings with the corresponding number. (4-6) After channels 4-6 are set, press the "ENTER" key to exit out of the menu.

PROTOCOL MODE

The protocol mode sets the radios to the desired settings. Once in the options menu select 2 (PROTOCOL MODE). Toggle through the protocol choices by pressing any of the arrow keys. When the mode desired is displayed press the "ENTER" key and the PT20 will send the command to set all connected radios to that mode.

CG/ACCUM MODE

The CG/ACCUM mode will toggle the PT20 to display in either the "ARM/COG" or the "ACCUM" mode.

TOTAL ALWAYS

If yes, the total line will display the total for all pads; even if an error exists on one (including 'off'). Weight on a pad in an error condition will not be included in the weight total. Default Yes.

MOTION CHECK

If the weight from the scale is not stable, then there is "motion". The PT20 CPU will not print or accumulate if there is motion. When motion is detected, the CPU will wait for stable weight for approximately 15 seconds. If the weight does not stabilize before the motion detection times out, then the print or accumulate action will not occur and the CPU will return to normal weighing mode. To disable the motion detection, enter '1' for yes.

```
6: SAVE ON PRINT
7: lb/kg ENABLE
8: LAT/ALT PROT
9: REMOTES OFF
0: READ-ONLY    ↑
```

SAVE ON PRINT

When selected, the indicator will save the data automatically when a record is printed.

lb/Kg switch

If yes, the lb/kg key is enabled; allowing the user to toggle units. Default Yes.

LAT/ALT PROT

If yes the latitude and altitude setting protection will be enabled. The user will be unable to change either setting via the PT20 indicator in the "SETTINGS" menu.

REMOTES OFF

If yes, the PT20 will turn off all platform scales that are connected to it when it is turned off and turn them on when the PT20 is turned on. Default Off.

USB/RS232

USB Output

To set the USB output following the following sequence:
1. Press the "MENU" key and select "3" (USB/RS232). Select "1" (USB OUTPUT).
2. Use any of the arrow keys to scroll through the 3 options (Off, Continuous, and Ticket Print)
3. Select USB Baud Rate- Use any of the arrow keys to scroll through the baud rates. When the desired baud rate is displayed press the "ENTER" key.
4. Enable CTS Line for USB- Activates a "Clear to Send" line for the USB output.

RS232 Output

To set the RS232 output following the following sequence:
1. Press the "MENU" key and select "3" (USB/RS232). Select "2" (RS232 OUTPUT).
2. Use any of the arrow keys to scroll through the 3 options (Off, Continuous, and Ticket Print)
3. Select RS232 Baud Rate- Use any of the arrow keys to scroll through the baud rates. When the desired baud rate is displayed press the "ENTER" key.
4. Enable CTS Line for RS232- Activates a "Clear to Send" line for the RS232 output.

RADIO OPTIONS

When setting the radio settings the user will be prompted through the process as follows:

1. Enable Wireless- To enable wireless operation the "ENABLE WIRELESS" options needs to be "YES". To change the setting press the "MENU" key, select "4" (RADIO OPTIONS). Toggle the settings on the enable radio screen by pressing any of the arrow keys. When the choice desired is shown press the "ENTER" key.

   NOTE: If no is selected the display will return to the prior display screen.

2. Enter Wireless Channel- Enter the channel that the radios will be set to (1-12). Once the number is entered press the "ENTER" key.
3. Enter Wireless Pan ID- Enter the Pan ID that the scales will be operating on (0-65534). Once the number is entered press the "ENTER" key.
4. Enter Wireless Encryption Key- Enter an encryption key (1-65534) if one is going to be used. If no encryption is desired enter a "0". Once the desired number is entered press the "ENTER" key.
5. The display will now give the user 3 choices:
   1: SET TO CPU- This will only load the settings to the PT20.
   2: SET TO CPU AND SCALES- This will load the settings to the PT20 and the connected scales.
   3: SET TO CPU AND PB SCALES. This will load radio setting to the PT20 and push button (PB) scales. (Example: Intercomp racing scales). After selecting '3', you will be asked to 'PRESS AND HOLD SCALE BUTTONS'. At this time press and hold the buttons on the scales to get the scales in radio programming mode. Then press "ENTER" to load the settings to the PT20 and the connected scales.
6. Once you enter one of the choices the PT20 will write the settings and return to the previous display screen.

Calibration

Note: To enter into the calibration mode some scales require that their calibration menu is enabled. Refer to the individual scale's user manual to access the scale's calibration menu.

GRADS

To change the graduation breakpoints, press the "MENU" key and select 5 (CALIBRATION). Once in the calibration menu select 1 (GRADS). Enter the scale number that you want to change the graduation size on or enter "0" to change all scales connected to the indicator. Use the up and down arrow on the indicator to scroll to the desired graduation size and press the "ENTER" key. The indicator will program all selected scales to the chosen graduation size.

GRAD BKPOINTS

To change the graduation breakpoints, press the "MENU" key and select 5 (CALIBRATION). Once in the calibration menu select 2 (GRAD BKPOINTS). Enter the scale number that you want to change the break points on or enter "0" to change all scales connected to the indicator. You will be prompted to enter the desired breakpoints for the scales. You can set three weight values (in lb) at which the graduation size increases one level.

As an example: Say a pad has a capacity 100K pounds with a graduation of 1 lb. If the graduation break points were set at 10000, 20000, and 50000 lb; the pad would display the following ranges: 0 to 10000 by 1 lb, 10000 to 20000 by 2 lb, 20000 to 50000 by 5 lb, and 50000 to 100000 by 10 lb. All pads currently plugged in will have their graduation break points changed to the new value. Default 0 for each.

ADJ. CAL/CAP

Set capacity and (adjust) calibration: The indicator is capable of setting 10 calibration points. If using less than 10 points, when you have completed setting the last calibration point desired press the "EXIT" key to store the calibration settings and exit out of the menu.

Refer to the "Calibration of a Pad" section for further information.

AZT

The Automatic Zero Tracking (AZT) size is the maximum amount of weight, in grad divisions, that the PT20 can zero off. If a weight under the AZT size is present on the scale it will be zeroed off. To change the AZT size, press the "MENU" key and select 5 (CALIBRATION). Once in the calibration menu select 4 (AZT). Use any of the arrow keys to toggle through the choices of grad divisions that are available. (choices are off, 0.6, 1, or 3)

All pads currently plugged in will have their AZT sizes changed to the new value.

ZERO RANGE

The zero range is the maximum percentage of full capacity that can be zeroed off without an error. To change the zero range size, press the "MENU" key and select 5 (CALIBRATION). Once in the calibration menu select 5 (ZERO RANGE). Use any of the arrow keys to toggle through the choices of grad divisions that are available. (choices are off, 1%, 2%, 5%, 1% NO ERR MSG, 2% NO ERR MSG or 5% NO ERR MSG) Default: OFF

All pads currently plugged in will have their zero range changed to the new value. The zero key will not work if the reading is outside the zero range; and the display will show "ZERO" on the display, indicating zero error, if the zero range is set to 1%, 2% or 5%. If one of the "NO ERR MSG" options is chosen, the zero button will simply not function when an attempt is made to zero the scale outside the Zero Range.

RAW COUNTS

The pad can be toggled back and forth from displaying raw counts versus weight. The raw counts is the number coming from the A/D chip. This is for diagnostic purposes only. To toggle the scales to the raw counts mode, press the "MENU" key and select 5 (CALIBRATION). Once in the calibration menu press any of the arrow keys to proceed to the expanded menu and select 6 (RAW COUNTS). Once "6" is selected the connected pads will toggle to the raw counts mode.

LOADCELL TYPE

This option allows the user to indicate the type of load cell (4-wire or 6-wire) connected to the different channel connectors of the indicator. (1-6)

To change the load cell type for the channels of the indicator, press the "MENU" key and select 5 (CALIBRATION). Once in the calibration menu press any of the arrow keys to proceed to the expanded menu and select 7 (LOADCELL TYPE). Press the number of the channel you wish changed to toggle that channel to the desired setting. Once channel 1-3 are set press the "ENTER" key and set channels 4-6 to the desired setting by toggling the settings with the corresponding number. (4-6) After channels 4-6 are set press the "ENTER" key to exit out of the menu.

DUAL CHANNEL

When enabled, this will take each connected scale and split it into two internal channels. Only enable this mode if you will be connecting both scales of an axle pair to a single channel input at the PT20. This is typically setup at the factory and won't need to be changed. Default: No.

DEFAULT CPU

Warning: All of the following involve clearing a portion of the PT20's memory. They should only be accessed if it is your intent to change operating parameters of the connected scale or stored data in the PT20. Call Intercomp Service if you are not sure: (763) 476-2531.

The "DEFAULT CPU" menu has three options that are used to clear portions of the indicator memory to factory default settings.

1: SETTINGS: This will reset all internal settings.
2: CALIBRATION: This will reset all internal calibration settings.
3: REGISTERS: This will reset all internal registers of all saved data.

After selecting any of the above defaults, the screen will ask you to confirm your choice by entering a specific number.

Calibration of a pad

Warning: The following will clear the current calibration of a pad and replace it with a new calibration. Do not continue unless you are sure you want to do this. If you are unsure, press the "EXIT" key to exit the calibration mode or call Intercomp Service at (763) 476-2531.

> **Note: To enter into the calibration mode some scales require that their calibration menu is enabled. Refer to the individual scale's user manual to access the scale's calibration menu.**

Notice: All pads shipped from the factory are already calibrated.

Notice: If a pad is calibrated using dead weights the correct altitude and latitude must be set. If it is calibrated using a force calibration press the altitude should be set to 0 feet and the latitude set to 45 degrees.

Notice: The calibration will be most accurate if calibration loads are applied to the platform through a metal block separated from the platform by a thick piece of hard rubber; this setup best simulates the load applied by a tire.

> The indicator has a 1 to 10 point calibration feature that reduces the effects on non-linearity in the pads. This requires that you place up to 10 weights on the pad during calibration. The first weight must be greater than zero, the second greater than the first, and so on with the final weight less than or equal to the capacity. If less than 10 calibration points are desired, press the "EXIT" key when the indicator prompts you to enter the next calibration weight. This will save the calibration and exit you out of the menu.

Procedure:
1. Enable the calibration menu items by moving the RUN/CAL strap from RUN to CAL. Remove the 10 screws along the outside of the top plate. Lift up the top plate to access the main UCPU circuit board. The RUN/CAL jumper is located near the center of the circuit board.

2. Press the "MENU" key and select 5 (CALIBRATION). Once in the calibration menu select 3 (ADJ. CAL/CAP).
3. Enter the scale number you wish to calibrate. (Enter "0" to calibrate all scales connected)
4. Follow the prompts on the indicator's screen.
5. After all of the points desired have been applied and entered press the "EXIT" key to save the calibration and exit the menu. The indicator will automatically exit out of the menu after the 10th point has been stored.
6. After completing your 1-10 point calibration, turn off and then back on the scale you were calibrating.
7. Check the new calibration.
8. Move the RUN/CAL strap back to RUN to prevent accidental entry.

Printer Details

The PT20 comes standard with a 24 character roll printer installed. Under printer options the user can disable the printer power if the application doesn't use the printer. This will extend the battery life. When enabled there is a blue LED that will blink on power up. It will continue to blink if the cover is open or the printer is out of paper. The printer has a button on the right front of the unit to engage a paper feed.

Printer Ticket Example

Example shown below is for 3 axles. Note that the printout length will vary depending on how many pads your system has and also by how many axle groups you have accumulated for the vehicle printout.

'Print left/right' off (default)

```
MAR 15, 2010  1:32PM
REG:    6
LOC:    HWY 55
USER:   Joe Smith
SUPV:   John Doe
COLOR:  RED
PLATE:  ABC123
STATE:  MN
DOT#:   125065K
OWNER:  Intercomp
CLASS:  3
NOTES:  TRIP-AXLE

AXL1:    00 lb
AXL2: 10650 lb
AXL3:    00 lb
GRP1: 10650 lb

AXL1: 17150 lb
AXL2: 17200 lb
AXL3:    00 lb
GRP2: 34350 lb

AXL1: 16250 lb
AXL2:    00 lb
AXL3: 15550 lb
GRP3: 31800 lb

TOTAL:   76800
```

'Print left/right' option on

```
MAR 15, 2010  1:32PM
REG:    6
LOC:    HWY 55
USER:   Joe Smith
SUPV:   John Doe
COLOR:  RED
PLATE:  ABC123
STATE:  MN
DOT#:   125065K
OWNER:  Intercomp
CLASS:  3
NOTES:  TRIP-AXLE

CH 1:    00 CH 2:    00
AXL1:    00 lb
CH 3:  5300 CH 4:  5350
AXL2: 10650 lb
CH 5:    00 CH 6:    00
AXL3:    00 lb
GRP1: 10650 lb

CH 1:  8550 CH 2:  8600
AXL1: 17150 lb
CH 3:  8600 CH 4:  8600
AXL2: 17200 lb
CH 5:    00 CH 6:    00
AXL3:    00 lb
GRP2: 34350 lb

CH 1:  8100 CH 2:  8150
AXL1: 16250 lb
CH 3:    00 CH 4:    00
AXL2:    00 lb
CH 5:  7775 CH 6:  7775
AXL3: 15550 lb
GRP3: 31800 lb

TOTAL:   76800 lb
```

Continuous Serial Output

The PT20 can be set to output continuous data on USB and/or RS232 (enabled in the "USB/RS232" section of the MENU options). The following line or lines will be output about once per second. The format for the continuous output follows. In this example the total weight currently on the scales is 14000 lb, and the accumulated total is 25000 lbs.

If "Current total" selected:
      14000 lb<CR><LF>

If "Accumulated total" selected:
      25000 lb<CR><LF>

If "Multi-line" is selected:
      <ESC>~0 14000 lb<CR><LF>   (Current total)
      <ESC>~1 25000 lb<CR><LF>   (Accumulated total)

The **adjustable baud rate** and other details can be changed in the "USB/RS232" section of the MENU options. The data format is otherwise fixed at **no parity, 8 data bits, and 1 stop bit**. The USB connector is located below the printer and is labeled "USB OUTPUT". The RS-232 connector is located above the printer and is labeled "232/ANALOG. Pin C is the signal wire (TXD) and pin D is the ground (GND).

The connection to an Intercomp S400 display is:

232/ANALOG (PT20)	S400
C (TXD)	2
D (GND)	7

The connection to an Intercomp SA2000 display is:

232/ANALOG (PT20)	SA2000
C (TXD)	3
D (GND)	7

The connection to a 9-pin PC communication port is:

| 232/ANALOG (PT20)	PC 9-pin
C (TXD)	2
D (GND)	5

Note: For some setups it may be necessary to jump pins [6, 1, and 4] together, and pins [7 and 8] together on the PC port connector.

The connection to a 25-pin PC communication port is:

232/ANALOG (PT20)	PC 25-pin
C (TXD)	3
D (GND)	7

Note: For some setups it may be necessary to jump pins [6, 8, and 20] together, and pins [4 and 5] together on the PC port connector.

The serial output is designed to work with Intercomp's S400 (4 inch) and SA2000 (2 inch) scoreboards. The following describes how to configure the S400 or SA2000 to work with the scoreboard output.
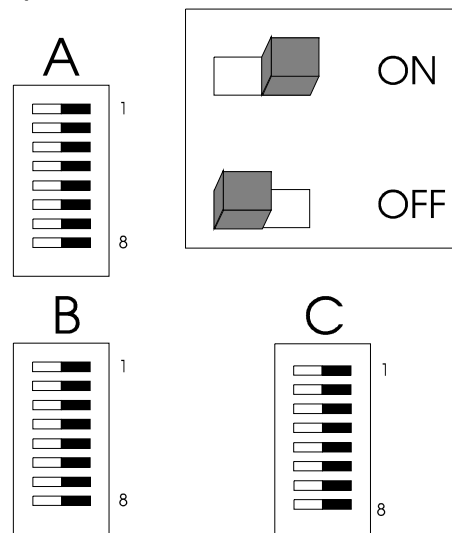
The above diagram is the S400 switch pack layout. The SA2000 has pack C which is below pack B instead of to the right of pack B. The switch is to the right for on, and to the left for off.

S400 and SA2000 Settings

Switch #	Pack A	Pack B	Pack C
1	OFF	OFF	OFF
2	ON	ON	OFF
3	ON	OFF	ON
4	ON	OFF	OFF
5	ON	*see below*	OFF
6	OFF	ON	ON
7	OFF	ON	OFF
8	ON	ON	OFF

The above switches should be set on switch packs A, B, and C.

If 'multi-line' output is selected, switch 5 on switch pack B selects what weight will be displayed (see below). This will program the S400 or SA2000 to accept the PT20 serial output at 1200 baud. Separately check the baud rate setting of the PT20 and set it to 1200 (see the USB/RS232 section in the MENU options).

Display Choice	Pack B-5
Current Total Weight on Scales	ON
Total Accumulated Weight	OFF

A   B   C
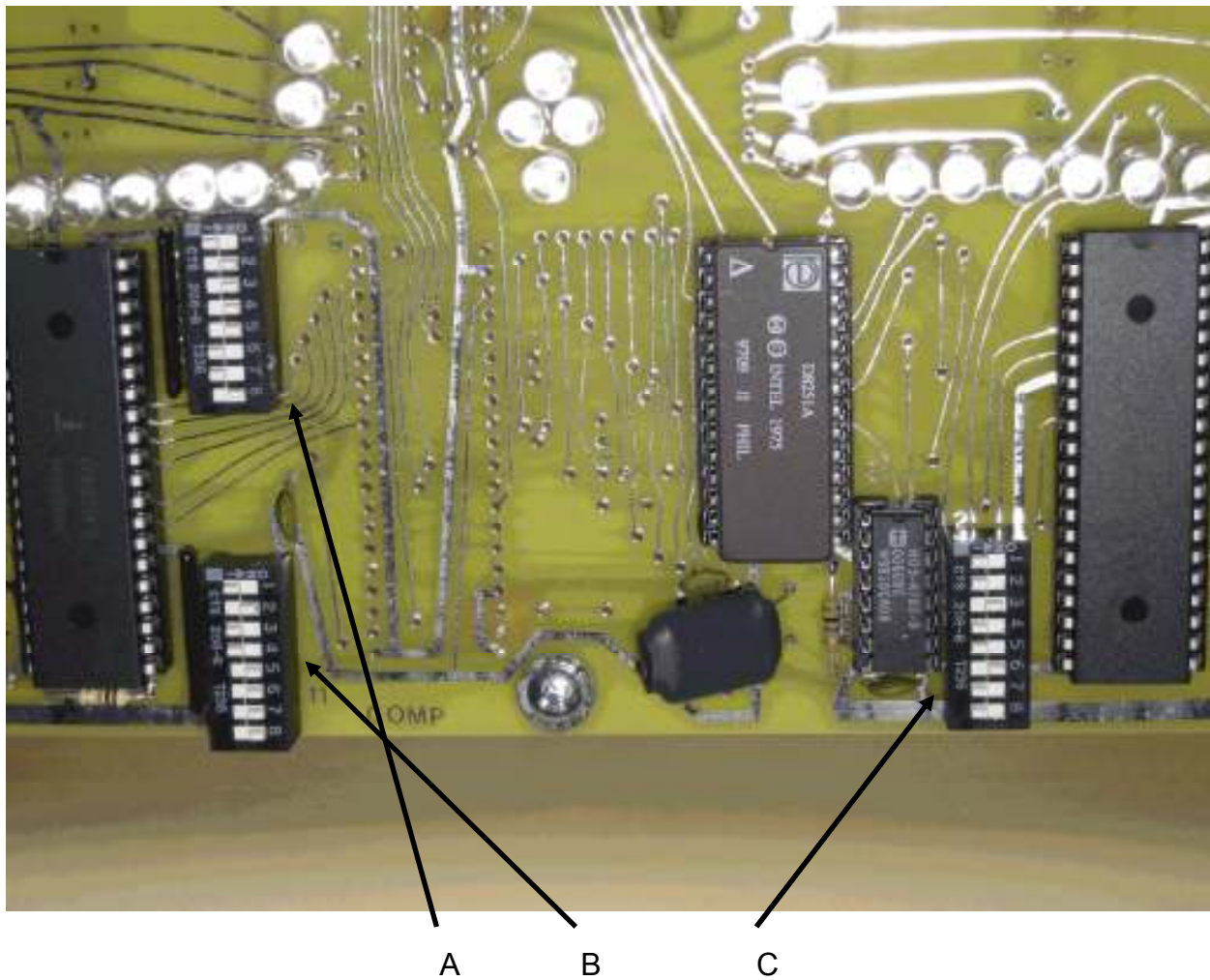
Sample Switch Setting
(1200 baud, 8N1, print "Total Weight on Scales")

External Connections

Relay outputs. The PT20 has two integrated relays, controlled by setpoints #1 and #2 (see SETPOINTS section).
Each relay has C/NO/NC contacts, rated at 5A @ 250VAC or 30VDC.

Relay Connector	Function
A	#1 C (Common)
B	#1 NC (Normally Closed)
C	#1 NO (Normally Open)
D	#2 C (Common)
E	#2 NC (Normally Closed)
F	#2 NO (Normally Open)
G	-NA-
H	-NA-

RS232/Analog outputs

RS232/ANALOG	Function
A	Setpoint#1 (3.3V LL)
B	Setpoint#2 (3.3V LL)
C	RS232 TX
D	GND
E	Vout (Analog Output)
F	Shield
G	Iout (Analog Output)
H	-NA-

Analog load cell / RS485 digital scale interface connections

CH1 – CH6 Connectors	Function
A	+ Excitation
B	+ Signal
C	- Signal
D	- Excitation / GND
E	RS485-A
F	Shield
G	Digital cell power 7-12VDC
H	RS485-B

Appendix A: Error Messages

PT20 CPU error messages

EEPROM ERROR, ENTER CODE: Information saved within the system has been lost or corrupted, the PT20 needs to be configured: Enter 911 to reset all internal calibration. Enter anything else to skip to normal mode without resetting calibration.

LOW BATTERY: The voltage the batteries are providing is to low. Turn off the unit and charge the batteries.

CAL FEATURES DISABLED. CHECK [RUN/CAL] STRAP: You have attempted to use a feature that has been safety locked out by a jumper inside the CPU. See the "Calibration of a pad" section of this manual for instructions on changing the position of this jumper.

[Blank display]: If when you turn on the PT20 nothing shows on the display but you can still hear a beep when you press a key, try the following:
      1. Press the [RESET] key.
      2. Press the [ADJUST SCREEN] key.
      3. Press and hold the [up arrow] key for approximately 40 seconds.

[Blank display] or [Display lock-up]: No beeps.
      1. Press the [RESET] key.

PT20 Pad error messages

(Displayed for a specific pad number. Press the up arrow key a few times to see individual pad weights or error messages.)

OFF   No pad has been detected.

LOST   A pad had been detected, but is no longer responding.

––––   The pad has not responded yet since being issued a command.

EEPROM   The pad's calibration has been lost or corrupted. The pad needs calibration.

BADREF   Bad reference. Analog sense leads not detected. If '6-wire' load cell mode is selected, check sense leads.

BATT   The pad is not getting sufficient power or has a low battery.

ZERO   The pad is zeroed outside the limit set by "zero range".

CAP   The pad is over the calibrated capacity (+ 9 divisions).

LATALT   Pad latitude/altitude settings do not match PT20

UNITS   The units the pad is set to do not match the units the PT20 is set to. Toggle lb/kg.

How to reach Intercomp Service

Things to know:

1. The service is for a PT20 CPU.
2. When did you purchase your PT20 CPU?
3. What is your serial number?
4. Whom did you purchase the scale through?

For Intercomp Service call or fax:

> FAX # (763)-476-2613
> (763)-476-2531
> **1-800-328-3336**

or fill out Service Support form at:

> www.intercompcompany.com