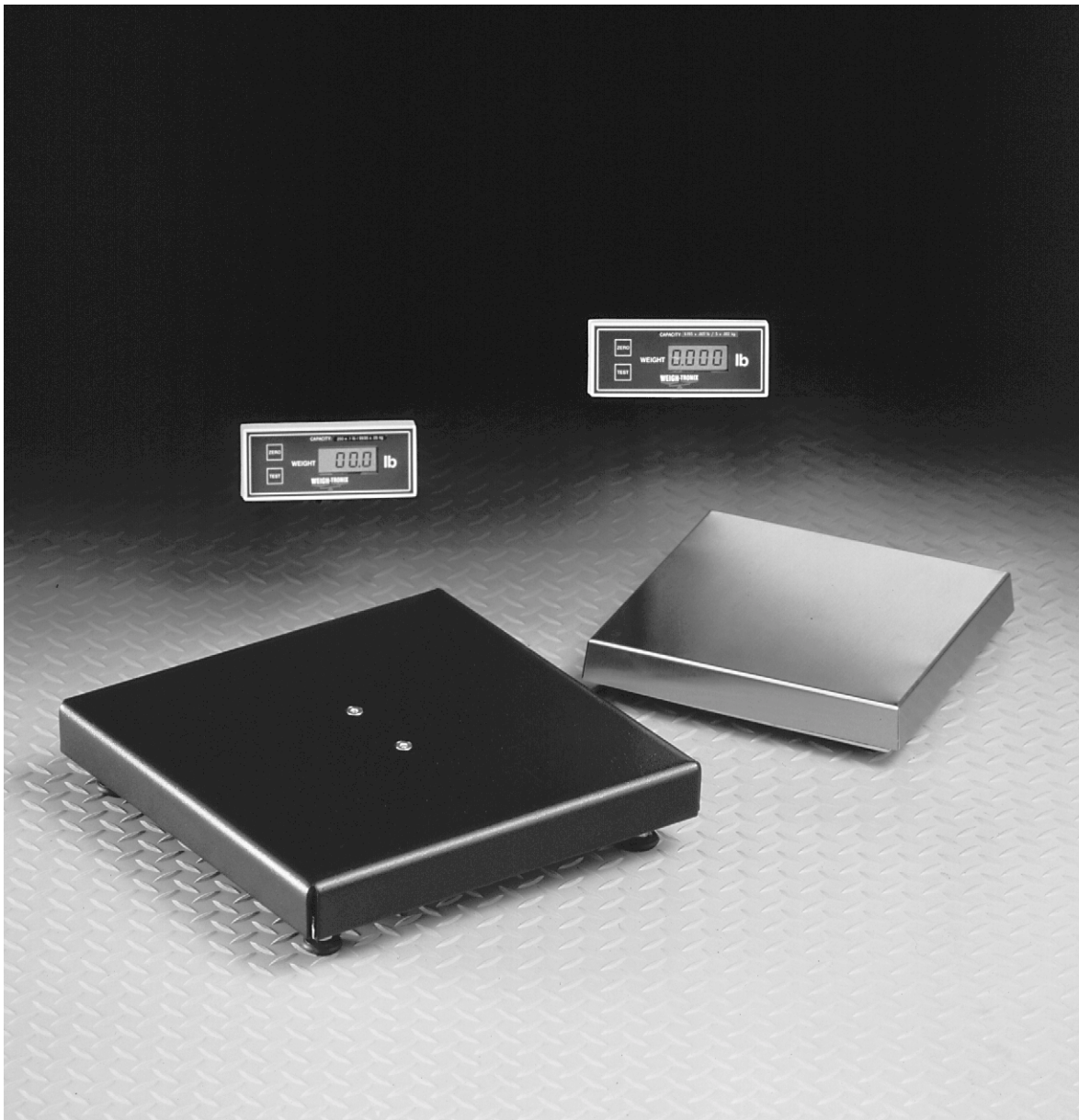
WEIGH-TRONIX



ProBench Series
SC-310/320, 311T/321T
Service Manual

Table of Contents

Specifications

SC-311T Low Capacity (NTEP)
SC-310 Low Capacity
Capacities and Divisions

9.995 x 0.005 lb	5 x 0.002 kg	160 x .1 oz
25 x 0.01 lb	9.995 x 0.005 kg	400 x 0.2 oz
50 x 0.02 lb	25 x 0.01 kg	800 x 0.5 oz

Shroud: Stainless steel

Scale weight: 10 lb (4.54 kg)

Platform size: 10 in. x 10 in. (25.4 cm x 25.4 cm)

Base dimensions: 10.5 in. x 10.5 in. x 2 in. (26.7 cm x 26.7 cm x 5.1 cm)

SC-321T Medium Capacity (NTEP)
SC-320 Medium Capacity
Capacities and Divisions

99.95 x 0.05 lb	50 x 0.02 kg	1600 x 1 oz
250 x 0.1 lb	99.95 x 0.05 kg	4000 x 2 oz

Shroud: Mild steel

Scale weight: 27 lb (12.25 kg)

Platform size: 14 in. x 14 in. (35.6 cm x 35.6 cm)

Base dimensions: 14 in. x 14 in. x 2.75 in. (35.6 cm x 35.6 cm x 7 cm)

Units of measure: Pound, kilogram, or ounce—selectable under *Configuration and Calibration* section

Controls: **ZERO** for zeroing scale or taring out container weights

TEST runs a diagnostics program to assure scale is performing properly.

Display dimensions: 5.5 in. x 2.25 in. x 1 in. (14 cm x 5.7 cm x 2.5 cm)

Power: 120 VAC ±10%, 60 Hz, 5 watt maximum

Environment: 10°C to 40°C (50°F to 104°F)

Introduction

WARNING
All servicing should be performed by a qualified electrical technician. Take all necessary precautions for working with electrical equipment.

This manual gives you the information you need to service the ProBench series of scales. This series is made up of the SC-310/SC-311T and the SC-320/SC-321T models.

The manual covers the following areas:

- Calibration
- Configuration
- Diagnostics
- Installing the RS-232 Interface Option

Calibration

In addition to calibrating the scale, this mode allows you to configure the following parameters:

- Zoning Range: USA or Canada
  100% of cap. 2% of cap.
- Power Line Frequency: 50 Hz or 60 Hz
- Unit of Measure: Pound, Kilogram, or Ounce
- Capacity and Division Size: Selectable (Refer to *Specifications*.)

YOU MAY EXIT *this configuration and calibration procedure at any time by returning switch S2 to the ON position.*

1. Access switch S2 through the hole in the base plate of the scale and set S2 to the OFF position. . .

CAL is briefly displayed, followed by the currently selected option for zoning range—either ***USA*** or ***CAn*** (Canada).

Zoning Range ➡

The Canada option limits the zoning range to +/- 2% of scale capacity. The USA option allows zoning to 100% of scale capacity.

2. Press **ZERO** to toggle between ***USA*** and ***CAn***.

3. Press **TEST** to select the displayed option for zoning range. . .

Four dashes are briefly displayed to indicate the selected option is stored. Then you see the currently selected option for power-line frequency—
either ***50 H*** or ***60 H***.

Power Line Frequency ➡

4. Press **ZERO** to toggle between power-line frequency options, and press **TEST** to select the appropriate frequency. . .

Briefly, four dashes indicate the power-line frequency is stored, then ***Lb***, ***KILO***, or ***OUnC*** is displayed.

Unit of Measure ➡

5. Press **ZERO** to scroll through three unit-of-measure options, and press **TEST** to select the appropriate unit. . .

Briefly, four dashes indicate the selected unit of measure is stored. Then you see the currently selected capacity and division size.

Capacity and Division Size ➡

6. Press **ZERO** to scroll through five capacity and division-size options, and press **TEST** to select the appropriate option . . .

Briefly, four dashes indicate the selected capacity and division size are stored.

Calibration ➡

Now you may calibrate the scale. The display says ***SPan***, then ***LOad***, then shows you the weight required.

7. You may select an alternate calibration weight by pressing **ZERO** to scroll through available options.

   To guarantee accurate weighing, we recommend you select a calibration weight of at least 50% of capacity.

> *If calibrating is not appropriate now, exit this mode by returning switch S2 to the ON position.*

8. To proceed with calibration, press **TEST**. . .

A display of ***LOAd*** alternates with a display of ***0***.

9. Verify that the scale platform is empty, and press **TEST**. . .

A display of ***LOAd*** alternates with a display of the calibration weight value you selected in step 7.

10. Place on the platform calibration test weight(s) equal to the value displayed, and press **TEST**. . .

    Four dashes are displayed while the calibration weight is being stored, followed by display of ***donE***.

11. Exit the calibration mode by returning switch S2 to the ON position.

Configuration

This configuration mode allows you to define two parameters:

- Filtering Rate
- Baud Rate and Parity

Filtering Rate ➡

1. Access switches S1 and S2 through the hole in the base plate of the scale and set S1 and S2 to the OFF position. . .

   ConF is displayed momentarily, then ***FILt*** is displayed.

2. Press **TEST** . . .

   Four dashes, then the currently selected filtering rate, either ***FASt*** or ***SLO***, are displayed.

3. Press **ZERO** to toggle the display to your selection.

*Select slow filtering (**SLO**) when vibration, air current, or electrical noise must be filtered out. Select fast filtering (**FASt**) in applications not affected by these factors.*

4. Press **TEST** to select the displayed filtering rate. . .

   Four dashes briefly indicate your filtering rate selection is stored. ***ConF*** is next displayed momentarily, then ***FILt*** is displayed.

5. With ***FILt*** displayed, press **ZERO**. . .

   bAUd is displayed.

Baud Rate and Parity ➡

Baud rate settings are used if you have the optional interface for serial communication.

6. Press **TEST**. . .

   Four dashes briefly appear, then the current baud rate and parity display code is displayed (See *Table: Baud Rate and Parity Display Codes*).

7. Press **ZERO** repeatedly until you see the display code for the appropriate baud rate and parity (See following table).

Table: Baud Rate and Parity Display Codes

Display Code	Baud Rate and Parity Selection	
12-E	1200 Baud, even Parity	7 databits
48-E	4800 Baud, even Parity	
96-E	9600 Baud, even Parity	
12-o	1200 Baud, odd Parity	
48-o	4800 Baud, odd Parity	
96-o	9600 Baud, odd Parity	
12-n	1200 Baud, no Parity	8 databits
48-n	4800 Baud, no Parity	
96-n	9600 Baud, no Parity	

8. Press **TEST**. . .

   Four dashes briefly indicate your baud rate and parity display code is stored. ***ConF*** is briefly displayed, then ***FILt*** is displayed.

9. Exit the configuration mode by returning switches S1 and S2 to the ON position. . .

   The scale returns to weighing mode.

Diagnostics

It is possible the display will show a different error code number than those shown to the right. If two errors occur the code numbers are added together and displayed. Thus an E 01 error and E 04 error occurring at the same time would show an error code of E 05.

Upon power up, the ProBench undergoes several self tests. If a checksum error exists between the EPROM and one of the components, the scale displays one of the following error codes:

E 01 = Calibration Error
E 02 = ROM Error
E 04 = RAM Error
E 08 = EEPROM Error

A diagnostics mode allows you to troubleshoot with specific tests that you can select and activate. All tests in the diagnostics mode are described following step 3.

1. Access the switches through the hole in the base plate of the scale and set switch S1 to the OFF position . . .	***dIAG*** appears briefly, then ***diSP***, the first test, is displayed.
2. Press **ZERO** to scroll through the test displays. When the test you want is displayed, press **TEST**. . ..	The displayed test is performed as described in the test descriptions following step 3.
3. Exit the diagnostic mode by returning switch S1 to the ON position . . .	The scale returns to weighing mode.

Test Descriptions

diSP Display Test
Shows version and revision of program, followed by a segment test and countdown.

rA RAM Test
Performs a non-destructive test of all locations of RAM in the processor and displays ***PASS*** or ***FAIL***.

rO ROM Test
Performs a checksum of all ROM locations in the processor. This value is compared with a value stored in ROM and displays ***PASS*** or ***FAIL***.

I/O Communication Test
If the scale is equipped with the RS-232 option, install a loopback connector with transmit and receive jumped together on the RS-232 output connector. The display will show ***PASS*** or ***FAIL***.

HI-A High Resolution Test with AZT

Displays ten times normal resolution with AZT enabled and the most significant digit of weight not shown. Press **TEST** to stop this test.

HI-n High Resolution Test without AZT

Displays ten times normal resolution with AZT disabled and most significant digit of weight not shown. Press **TEST** to stop this test.

Cont Continuous Test

Displays, in the following order, Display, RAM, ROM, and I/O tests and repeats testing in this manner until you press **TEST** or return switch S1 to the ON position.

Installing the Optional RS-232 Interface

CAUTION
Handle circuit boards using all the precautions necessary to protect electricostatic discharge (ESD) sensitive devices from damage.

The ProBench scales can be connected to external smart devices if you install the optional RS-232 interface kit. This section of the manual will cover its installing and setup.

Disassembly Instructions

Follow this checklist for disassembly of your ProBench.

WARNING
Be sure to couner the torque force applied when loosening screws connected to the loadcell or loadcell damage may result.

- ❒ 1. Disconnect the scale from the power source.
- ❒ 2. (If applicable) Lift the shroud straight up and off.
- ❒ 3. Disconnect the display interface cable from the scale base.
- ❒ 4. Remove the two socket-head screws securing the top plate to the loadcell. Do not lose the loadcell spacers.
- ❒ 5. Remove the two screws holding the electronics enclosure to the base plate.
- ❒ 6. Carefully lift off the enclosure and remove the loadcell interface cable from the pins on the main PC board. Set the enclosure aside.
- ❒ 7. Remove the plastic hole plug secured in the base plate by a Tinnerman clip. This part may have to be broken to removed.

Installing the Interface Board

Make certain the two boards are on the same level. If they are not the RS-232 option will not work.

Follow these steps to install the RS-232 interface kit shown in Figure 1:

- ❒ 1. Install 2 male/female standoffs to the electronic enclosure using two 6-32 x ¼ machine screws.
- ❒ 2. Connect the interface board from the kit into the motherboard connector J1 being careful to align pin 1 of each. See note at left. Once the connector is seated, slide the interface board mounting holes over the standoffs.
- ❒ 3. Secure the interface board by installing two 6-32 KEP nuts on the standoffs.
- ❒ 4. Reassemble the remaining components by reversing the disassembly instructions.

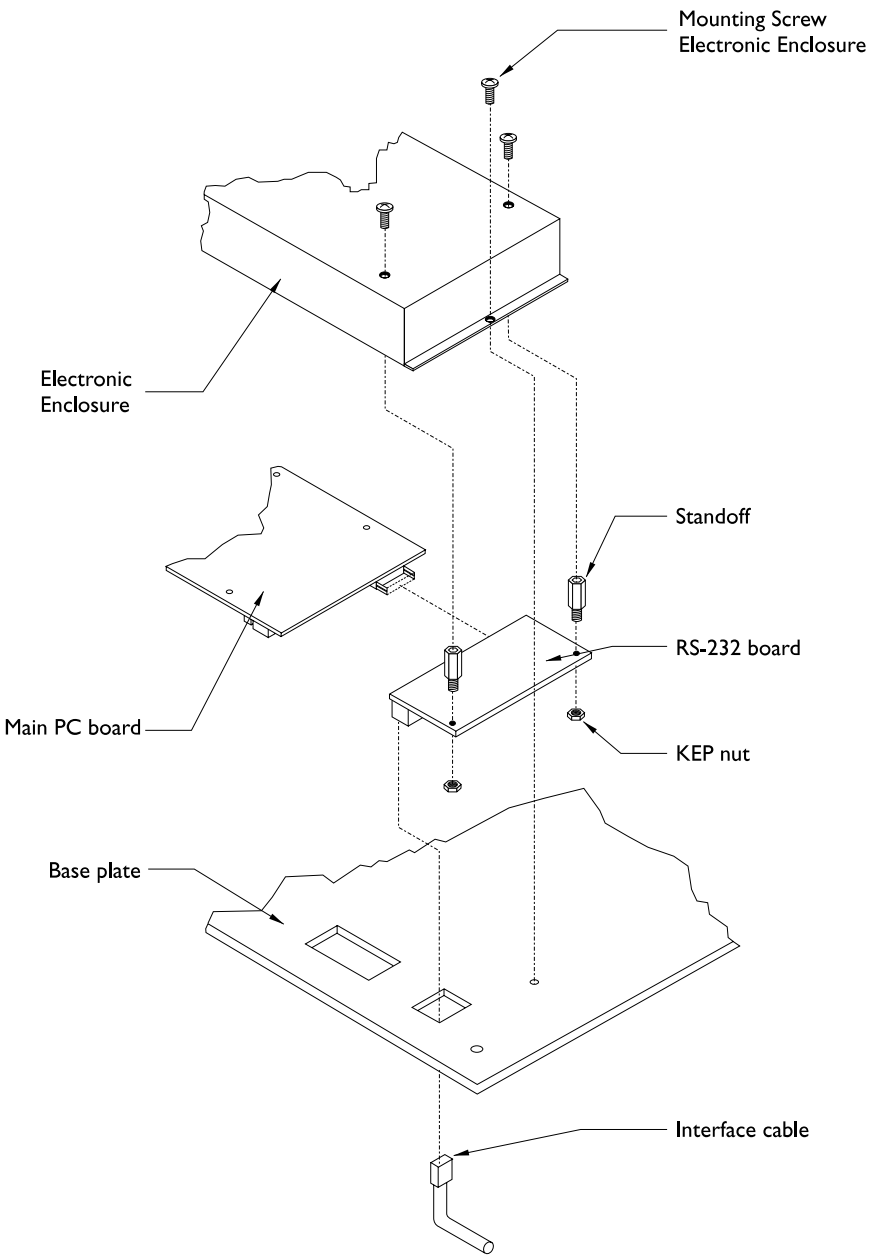


Figure 1
Optional RS-232 board installation

Selecting RS-232 Protocol

The serial data format is
- 1 Start bit
- 7 Data bits (8 with no parity)
- 1 Parity bit
- 1 Stop bit

Computer commands and scale responses are upper and lowercase character strings.
- (CR) is an ASCII carriage return
- (LF) is an ASCII line feed
- (ETX) is an ASCII end of text
- x is a weight digit (0-9)

Select one of four types of RS-232 output protocol:

Type of Protocol	Displayed as
Standard ProBench	***Std***
NCI Model 3825	***3825***
NCI Model 3835	***3835***
Toledo Model 8213	***8213***

See *RS-232 Protocol Tables*, with accompanying legend and notes, for protocol code.

1. Access switches S1 and S2 through the hole in the base plate of the scale and set S1 and S2 to the OFF position . . . — ***ConF*** is briefly displayed, then you see ***FILT***.
2. Press **ZERO** twice . . . — ***Prot*** is displayed, announcing the protocol-select mode.
3. Press **TEST** . . . — The currently selected protocol for RS-232 output is displayed: ***Std*** for a standard ProBench; ***3825*** for NCI Model 3825; ***3835*** for NCI Model 3835; or ***8213*** for Toledo Model 8213.
4. Press **ZERO** to scroll through four protocol options, and press **TEST** to accept the appropriate option.
5. Exit the protocol-select mode by returning switches S1 and S2 to the ON position . . . — The scale returns to weighing mode.

RS-232 Protocol Tables

Legend: The following symbols are used in protocol tables.

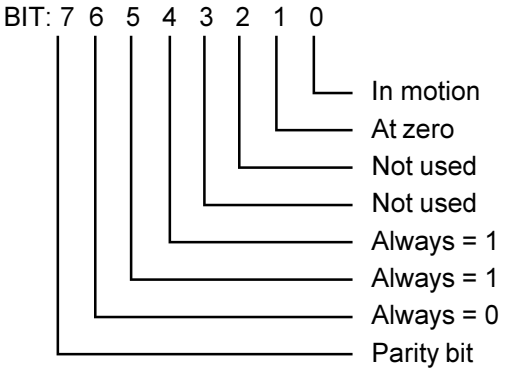
p ..... Polarity of weight
“-” for negative
“ ” (space character for positive)
[CR] ..... ASCII carriage return
[LF] ..... ASCII line feed
[ETX] ..... ASCII end of text
[HL] ..... H = high scale status byte. L = low scale status byte.
[STATUS] ..... Toledo scale status byte
[CONFIDENCE] ..... Toledo confidence test status byte

Notes: Numbers 1 - 4 below are referenced in the protocol tables under *NOTES*:

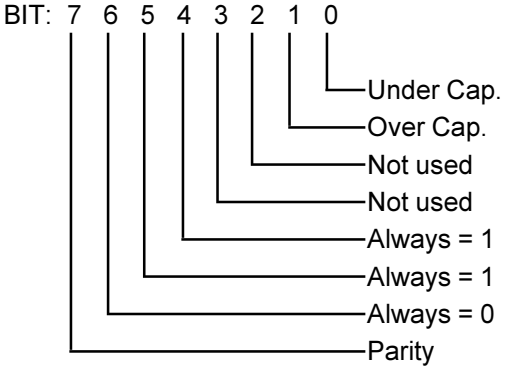
1. The decimal point position may be different depending on selected capacity and division.
2. A fixed leading zero is added to bring character count to the same as capacities with a decimal point.
3. This supports the 1600 x 1 capacity which does not require the decimal point.
4. A status byte is sent if the scale is in motion, under zero, or over capacity.

ProBench Scale Status Byte Formats

High Order Byte [H]



Low Order Byte [L]



Standard ProBench Protocol Displayed as "Std"

Command	Possible Scale Response	Units	Notes
W<CR>	<LF>pXX.XXLB<CR><LF>[HL]<CR><ETX> <LF>pXX.XXKG<CR><LF>[HL]<CR><ETX> <LF>pXX.XXOZ<CR><LF>[HL]<CR><ETX> <LF>p0XXXXOZ<CR><LF>[HL]<CR><ETX>	Pounds Kilos Ounces Ounces	1 1 1 2, 3
Z<CR>	<LF>[HL]<CR><ETX>		Zeros scale
S<CR>	<LF>[HL]<CR><ETX>		
All other	<LF>?<CR><ETX>		Bad command

Model 3825 Protocol Displayed as "3825"

Command	Possible Scale Response	Units	Notes
W<CR>	<LF>p0XX.XXlb<CR><LF>[HL]<CR><ETX> <LF>p0XX.XXkg<CR>LF>[HL]<CR><ETX> <LF>p0XX.XXoz<CR><LF>[HL]<CR><ETX> <LF>p00XXXXoz<CR><LF>[HL]<CR><ETX>	Pounds Kilos Ounces Ounces	1, 2 1, 2 1, 2 2, 3
Z<CR>	No response		Zeros scale
S<CR>	<LF>[HL]<CR><ETX>		
All other	<LF>?<CR>		Bad command

Model 3835 Protocol Displayed as "3835"

Command	Possible Scale Response	Units	Notes
W<CR>	<LF>p0XX.XXLB<CR>[HL]<ETX> <LF>p0XX.XXKG<CR>[HL]<ETX> <LF>p0XX.XXOZ<CR>[HL]<ETX> <LF>p00XXXXOZ<CR>[HL]<ETX>	Pounds Kilos Ounces Ounces	1, 2 1, 2 1, 2 2. 3
Z<CR>	No response		Zeros scale
S<CR>	<LF>[HL]<CR>		
All other	<LF>?<CR>		Bad command

Model 8213 Protocol Displayed as "8213"

Command	Possible Scale Response	Units	Notes
W	<STX>0XX.XX<CR> <STX>0XX.XX<CR> <STX>0XX.XX<CR> <STX>00XXXX<CR> <STX>?[STATUS]<CR>	Pounds Kilos Ounces Ounces	1, 2 1, 2 1, 2 2, 3 4
H	<STX>0XX.XX<CR> <STX>0XX.XX<CR> <STX>0XX.XX<CR> <STX>00XXXX<CR> <STX>?[STATUS]<CR>	Pounds Kilos Ounces Ounces	1, 2 1, 2 1, 2 2, 3 4
Z	<STX>?[STATUS]<CR>		Zeros scale
A	<STX>?<CR>		Scale test
B	<STX>[CONFIDENCE]<CR>		Confidence
E	<STX>E<CR>		Echo on
F	<STX>F<CR>		Echo off
All other	<STX>?[STATUS]<CR>		Bad command

Loadcell Replacement

❒ 1. Follow the steps for disassembly in the previous section and continue with the following steps.

❒ 2. Carefully remove the loadcell interface cable from the pins on the main PC board. Set the enclosure aside.

❒ 3. Remove the two socket-head screws securing the bottom plate to the loadcell. Do not lose the loadcell spacers.

❒ 4. Reassemble in reverse order. Be sure loadcell spacers are reinstalled.

WARNING
Be sure to couner the torque force applied when loosening screws connected to the loadcell or loadcell damage may result.

- For Model 320/321T: Make sure the overload stop screw is not contacting the loadcell when you reinstall it.

- For Model 310/311T: Make sure the center stop screw is not protruding from the loadcell body on the Model 310/311T when you reinstall it.

- Using the appropriate feeler gauge measurement as shown below for each loadcell capacity, set the distance between the overload stop screw and the loadcell.

Weight Sensor Capacity:	Feeler Gauge Distance:
5 kg	.020"
10 kg	.026"
25 kg	.044"
50 kg	.034"
125 kg	.070"

- On a Model 311T, leave the shroud off for easy access to the overload stop screw. Make the adjustments to the overload stop screw through the hole between the load bridge mounting screws.

- The top and bottom mounting screws must be tightened to 80 ±5 inch-pounds.

Cable Assembly

For Rev. A & B boards only:
White (or yellow) and bare wires carry the same signals and should both be connected to the Signal Ground pin of the connector.

Interface Cable for Rev. A or B PC Board (7405-09087)

WIRE	COLOR	SIGNAL	J2 PIN NO.
1	Black	Transmit Data (from scale)	2
2	White or Yellow	Signal Ground	1
3	Red	Receive Data (to scale)	4
4	Green	No connection	3
5	Brown or Blue	Chassis Ground	6
6	Bare	SignalGround	5

For Rev. C & up boards only: *Brown (or blue) and black wires carry the same signals and should both be connected to the Signal Ground pin of the connector.*

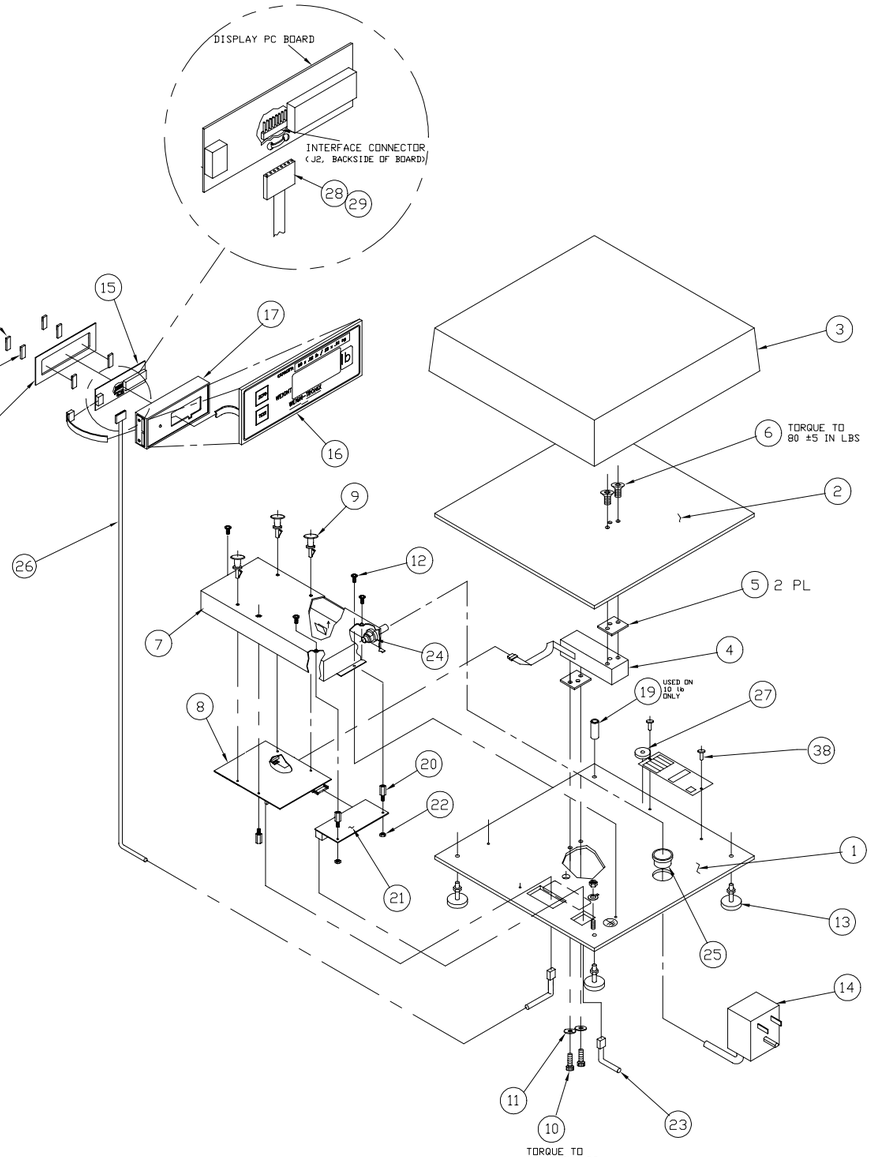
Interface Cable for Rev. C or Later PC Board (7405-09087)			
WIRE	**COLOR**	**SIGNAL**	**J2 PIN NO.**
1	Black	Signal Ground	1
2	White or Yellow	Transmit Data (from scale)	2
3	Red	No connection	3
4	Green	Receive Data (to scale)	4
5	Brown or Blue	Signal Ground	5
6	Bare	Chassis Ground	6

Install the required connector on the unterminated end of the cable in accordance with connector manufacturer instructions.

Install the cable in J2, the modular phone connector under the scale, until it snaps into the locking device. Install the other connector to the remote device.

Power the scale and check for proper operation.

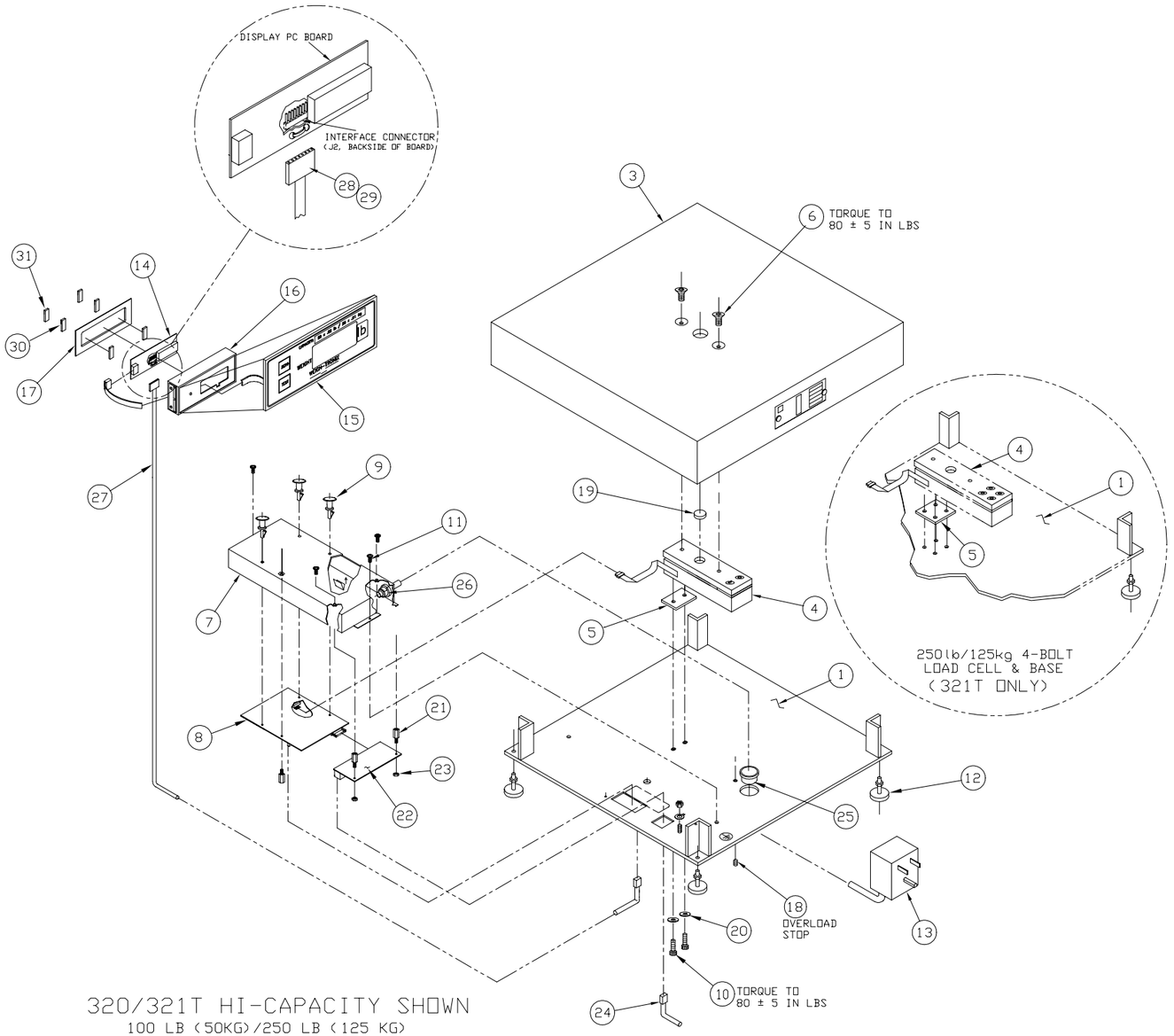
SC-310/311T
BENCH SCALE *LO-CAPACITY*
PARTS AND ASSY



ITEM NO.	DESCRIPTION	W-T P/N	QTY
1	BASE PLATE	1071-10254	1
2	LOADBRIDGE	1066-08889	1
3	SHROUD	1076-08887	1
4	WEIGHT SENSOR 10LB (5KG) (SC-310 ONLY)	7153-09436	1
	WEIGHT SENSOR 25LB (12KG) (SC-310 ONLY)	7153-09437	1
	WEIGHT SENSOR 50LB (25KG) (SC-310 ONLY)	7153-09438	1
5	WEIGHT SENSOR SPACER	1043-08890	2
6	SCREW,FLTHD,HXS,. 25 x .75L	1007-01765	2
7	ELECTRONICS ENCLOSURE	7069-08891	1
8	MAIN PC BOARD ASSY	7405-09079	1
9	PC BOARD SPACER	1043-00748	3
10	CAPSCREW, .25 x .63L	1007-00128	2
11	WASHER (SPECIAL)	1029-80008	2
12	SCREW, #6 x .25L	1009-10039	2
13	FOOT ASSY	7075-10256	4
14	WALL MOUNT PWR SUPPLY, 14 VDC, .73A	1148-11297	1
15	DISPLAY PC BOARD ASSY	7405-09083	1
16	DISPLAY KEYPAD	1163-08884	1
17	DISPLAY ENCLOSURE	1069-80163	1
18	DISPLAY ENCL REAR PANEL	1069-06159	1
19	SPACER, NYLON (10 lb VERSION ONLY)	1043-10409	1
20	STANDOFF, #6 x .25HEX x .25L	1044-00233	2
21	SERIAL PC BOARD ASSY (OPTIONAL)	7405-09087	1
22	LOCK NUT	1021-00100	2
23	EXTERNAL SERIAL INTFC CABLE, 7 ft L	1140-09555	1
24	STRAIN RELIEF	1074-00177	1
25	CABLE BUSHING	1074-11122	1
26	DISPLAY BD INTERFACE CABLE	1140-09570	1
28	CONNECTOR, 8-PIN	1161-00403	1
29	CONNECTOR PINS	1142-00412	8
30	VELCRO STRIP (RIGID)	1042-00206	3 in.
31	VELCRO STRIP (FLEX)	1042-00205	3 in.

Parts Used on SC-311T Only

ITEM NO.	DESCRIPTION	W-T P/N	QTY
4	WEIGHT SENSOR 10LB (5KG)	7153-10018	1
	WEIGHT SENSOR 25LB (18KG)	7153-11048	1
	WEIGHT SENSOR 50LB (25KG)	7153-10021	1
8	MAIN PC BOARD ASSY	7405-10377	1
27	LEVEL BUBBLE	1083-00095	1



320/321T HI-CAPACITY SHOWN
100 LB (50KG)/250 LB (125 KG)

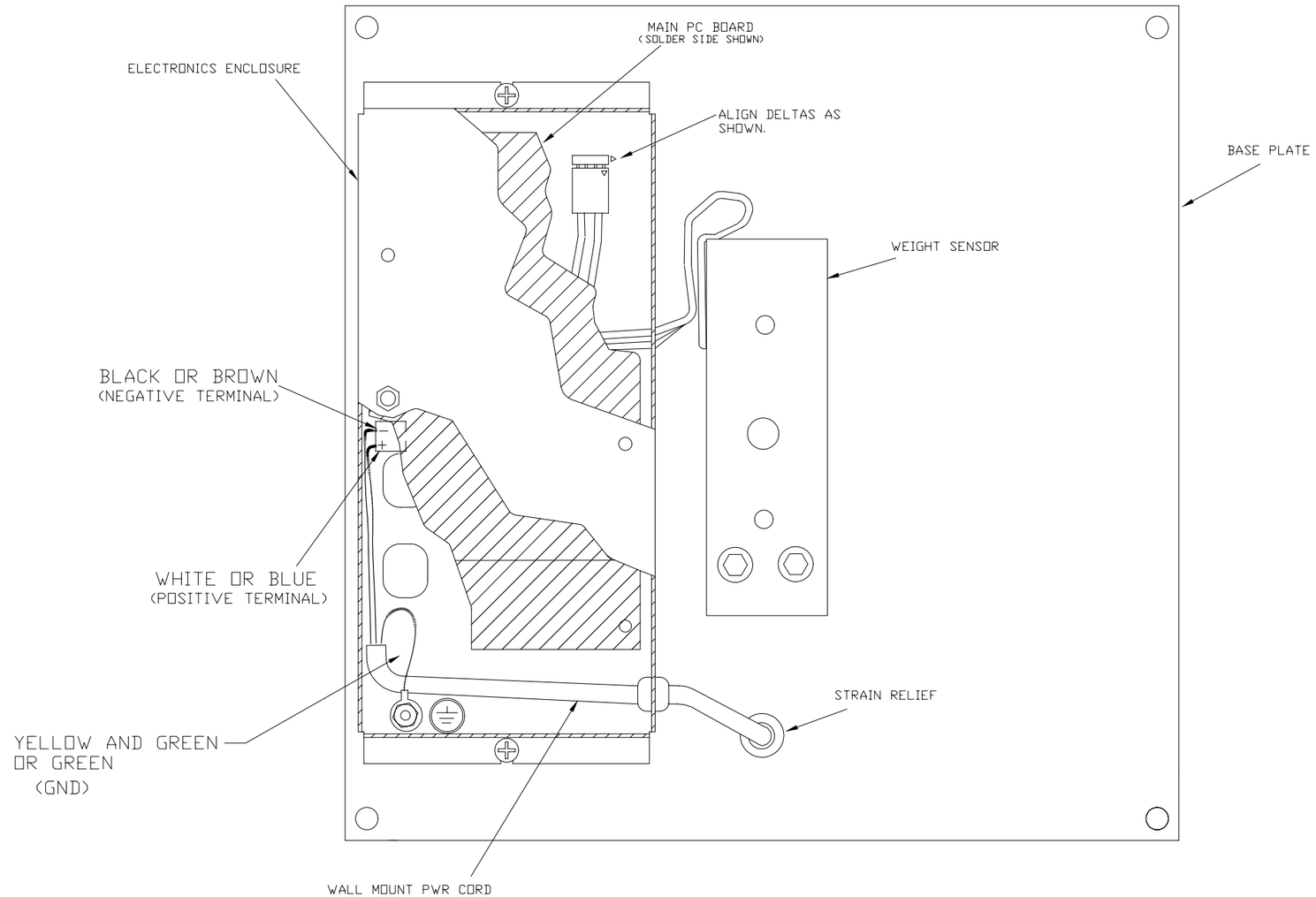
SC-320/321T
BENCH SCALE *HI-CAPACITY*
PARTS AND ASSY

ITEM NO.	DESCRIPTION	W-T P/N	QTY
1	BASE PLATE, (FOR 2-BOLT WEIGHT SENSOR)	7071-09515	1
	BASE PLATE, (FOR 4-BOLT WEIGHT SENSOR)	7071-13990	1
3	SHROUD 100LB (50KG), 250LB (125KG)	1076-09516	1
4	WEIGHT SENSOR 100LB (50KG) (SC-320 ONLY)	7153-09439	1
	WEIGHT SENSOR 250LB (125KG) (SC-320 ONLY)	7153-09887	1
5	WEIGHT SENSOR SPACER	1043-09522	1
6	SCREW,FLTHD,HXS,. 25 x .50L	1007-09873	2
7	ELECTRONICS ENCLOSURE	7069-08891	1
8	MAIN PC BOARD ASSY	7405-09079	1
9	PC BOARD SPACER	1043-00748	3
10	CAPSCREW, .25 x .88L	1007-01264	2
11	SCREW, #6 x .25L	1009-10039	2
12	FOOT ASSY	7075-13082	4
13	WALL MOUNT PWR SUPPLY, 14 VDC, .73A	1148-11297	1
14	DISPLAY PC BOARD ASSY	7405-09083	1
15	DISPLAY KEYPAD	1163-08884	1
16	DISPLAY ENCLOSURE	1069-80163	1
17	DISPLAY ENCL REAR PANEL	1069-06159	1
18	LOCK SCREW	1011-04367	1
20	FLAT WASHER (SPECIAL)	1029-80008	2
21	STANDOFF, #6 x .25HEX x .25L	1044-00233	2
22	SERIAL PC BOARD ASSY (OPTIONAL)	7405-09087	1
23	LOCK NUT	1021-00100	2
24	EXTERNAL SERIAL INTFC CABLE, 7 ft L	1140-09555	1
25	CABLE BUSHING	1074-11122	1
26	STRAIN RELIEF	1074-00177	1
27	DISPLAY BD INTERFACE CABLE	1140-09570	1
28	CONNECTOR, 8-PIN	1161-00403	1
29	CONNECTOR PINS	1142-00412	8
30	VELCRO STRIP (RIGID)	1042-00206	3 in.
31	VELCRO STRIP (FLEX)	1042-00205	3 in.

Parts Used On Sc-321T Only

ITEM NO.	DESCRIPTION	W-T P/N	QTY
1	BASE PLATE, (FOR 4-BOLT WEIGHT SENSOR)	7071-13990	1
3	SHROUD 100LB (50KG)	1076-10028	1
	SHROUD 250LB (125KG)	1076-13104	1
4	WEIGHT SENSOR 100LB (50KG)	7153-10022	1
	WEIGHT SENSOR 250LB (125KG) 4-BOLT	7153-13573	1
5	WEIGHT SENSOR SPCR 250LB (125KG) 4-BOLT	1043-13106	1
8	MAIN PC BOARD ASSY	7405-10377	1
19	LEVEL BUBBLE (SC-321T SERIES ONLY)	1083-00095	1

SC-310/311T 320/321T
TYPICAL POWER / WEIGHT SENSOR CONNEC-
TION



VIEW: TOP SIDE OF BASE PLATE LOOKING DOWN.

310/320 Main PC Board Description

The Main PC Board contains the Power Supply, A/D converter, Microprocessor circuitry and performs all scale functions except weight display and I/O interface.

The Power Supply circuitry converts the +15VDC supplied by the wall mount transformer into analog, digital, and weight cell excitation voltages.

The +5VDC digital voltage is regulated by VR1 which varies the digital virtual ground in response to input voltage fluctuations.

The + and -5VDC analog/weight cell excitation voltages are regulated by VR2. These voltages are referenced to an analog ground established from the weight cell excitation voltages through RP2B and IClIB.

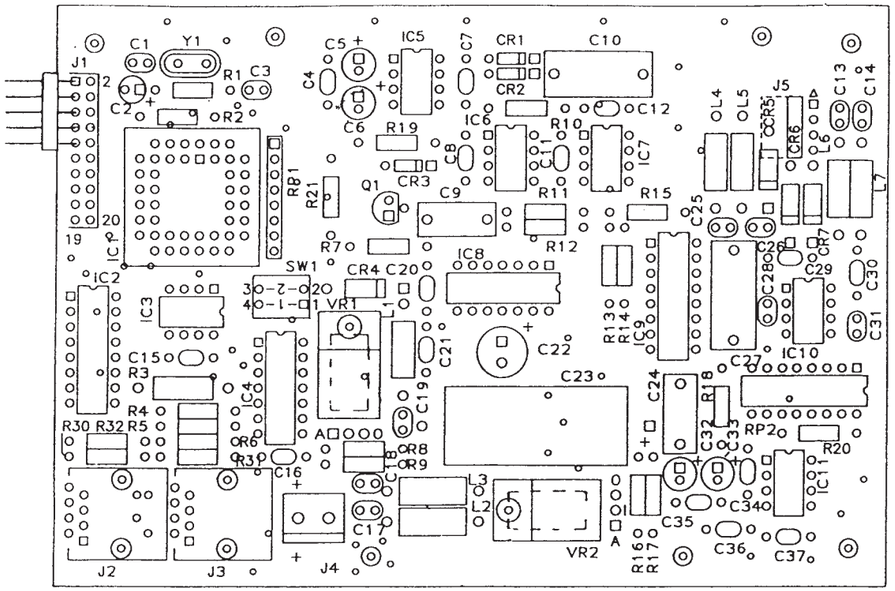
The A/D section consists of an instrumentation amplifier (IC10, 11A), a buffer (IC6A) and a dual slope A/D converter (IC2,5).

Reference voltage is provided by a driver (IC6B).

The digital section uses a 68HC705C8 microprocessor (IC4) which includes 8K bytes of OTP ROM (One Time Programmable Read Only Memory) used for the operating system and 256 bytes of RAM.

An EEPROM (IC3), a non-volatile device, stores the calibration and configuration information.

Connector J1 provides interface to the optional RS-232 PC Board.



Main PC Board Checks

Description	Test Location	Voltage
+5 VDC DIGITAL (GROUND REF AT VRI OUTPUT)	CR4 CATHODE	+5VDC±10%
+5 VDC ANALOG	C23 POS SIDE	+5VDC±10%
-5 VDC ANALOG (GROUND REF AT ICll PIN 7)	VR2 OUTPUT	-5VDC±10%
LOAD CELL OUTPUT BETWEEN PIN 1(+) AND 2(-) OF J5		.1mVDC (NO LOAD) 10.1mVDC (CAP.) (APPROXIMATELY)
AMPLIFIED LOAD CELL OUTPUT (GROUND REF AT IC11 PIN 7)	IC11 PIN 1 IC11 PIN 1	-.12VDC (NO LOAD) -2.15VDC (CAP.) (APPROXIMATELY)

311T/321T Main PC Board Description

The Main PC Board contains the Power Supply, A/D converter, Microprocessor circuitry and performs all scale functions except weight display and I/O interface.

The Power Supply circuitry converts the + 15VDC supplied by the wall mount transformer into analog, digital, and weight cell excitation voltages.

The + 5VDC digital voltage is regulated by VR1 which varies the digital virtual ground in response to input voltage fluctuations.

The + and - 5VDC analog/weight cell excitation voltages are regulated by VR2. These voltages are referenced to an analog ground established from the weight cell excitation voltages through RP2B and IC11B.

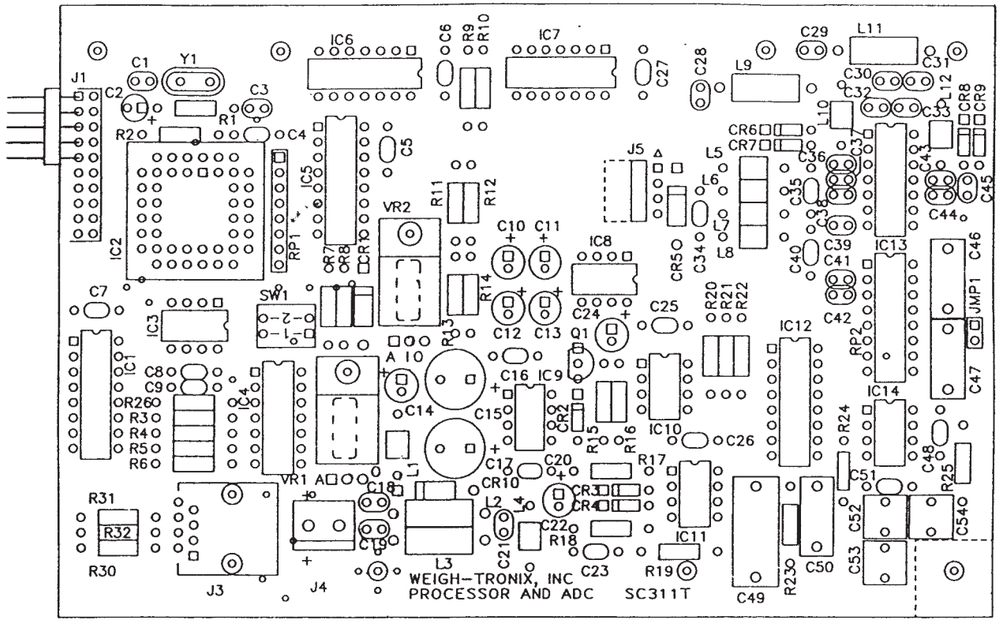
The A/D section consists of an instrumentation amplifier (IC13,14B), a buffer (IC6A) and a dual slope A/D converter (IC9,11).

Reference voltage is provided by a driver (IC6B).

The digital section uses a 68HC705C8 microprocessor (IC2) which includes 8K bytes of OTP ROM (One Time Programmable Read Only Memory) used for the operating system and 256 bytes of RAM.

An EEPROM (IC3), a nonvolatile device, stores the calibration and configuration information.

Connector J1 provides interface to the optional RS-232 PC Board.



Main PC Board Checks

(*Use VR1 for ground reference*)

Description	Test Location	Voltage
+ 5 VDC DIGITAL (GROUND REF AT VRI OUTPUT)	CR1 CATHODE	+ 5VDC±10%
+5 VDC ANALOG	C15 POS SIDE	+5VDC±10%
- 5 VDC ANALOG	VR2 OUTPUT	- 5VDC±10%
LOAD CELL OUTPUT BETWEEN PIN 1(+) AND 2(-) OF J5		.lmVDC (NO LOAD) 10.1mVDC (CAP.) (APPROXIMATELY)
AMPLIFIED LOAD CELL OUTPUT	IC14 PIN 7 ICll PIN 1	-.12VDC (NO LOAD) -2.15VDC (CAP.) (APPROXIMATELY)

Display PC Board Description

The display section consists of a 4-digit liquid crystal display (DS1), a display driver (IC2) and a capacitor (C3) that establishes the internal clock frequency for the display driver.

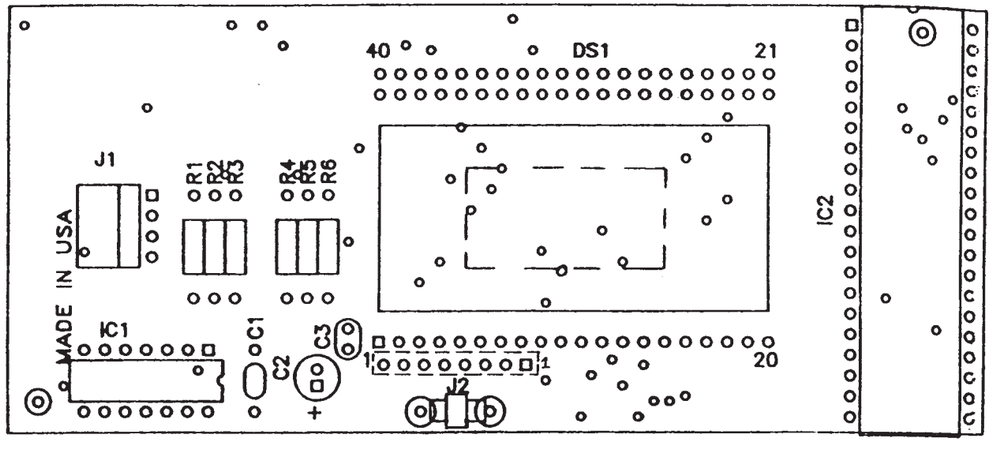
The display driver requires +5VDC, a clock pulse, data input and latch data signals from the microprocessor to drive the display.

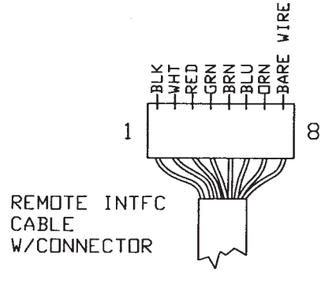
Weight information sent from the microprocessor on the Main PC Board is decoded and displayed.

When a key on the keypad is pressed, this is detected by a schmitt trigger (ICI) and fed to the microprocessor through R4, 5 or 6. Depending on which key is pressed, an approximate voltage will be sent to the microprocessor. The microprocessor identifies the key pressed by he voltage level received.

Display PC Board Checks

Description	Test Location	Voltage
+5 VDC DIGITAL	IC2 PIN 1	+5 VDC_±10%
(GROUND REF AT IC2 PIN 36)		





REMOTE DISPLAY
PC BOARD P/N 7405-09083

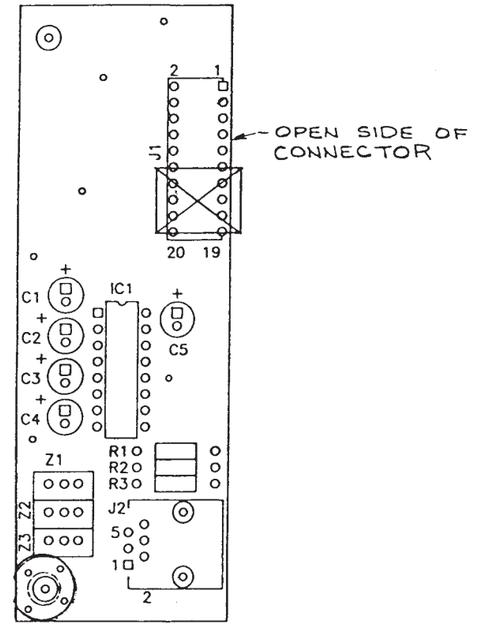
RS-232 PC BOARD
P/N 7405-09087

RS-232 PC Board Description

The transmitted signals from the Microprocessor are fed to the RS-232 option board through J1 and processed by IC1. The signals are then sent to the peripheral device through J2.

RS-232 PC Board Checks

Description	Test Location	Voltage
+5 VDC DIGITAL	IC1 PIN 16	+5 VDC ±10%
(GROUND REF AT IC1 PIN 15)		



J2
Serial I/0

1	GND
2	TXD
3	
4	RXD
5	GND
6	CHASSIS

Pin Modular

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