AURORA 20

2 INCH REMOTE DISPLAY

INSTALLATION & TECHNICAL MANUAL

WESTERN SCALE CO. LTD.

AURORA 20
SUPER BRIGHT REMOTE DISPLAY
INSTALLATION & TECHNICAL MANUAL

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FOR TECHNICAL SUPPORT REGARDING THIS PRODUCT, PLEASE CALL YOUR AUTHORIZED WESTERN DEALER:

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INTRODUCTION

The Aurora Remote Display Series is the latest development from Western, the company which first brought LED remote displays to the weighing industry in the 1980s.

New technologies, materials, and construction methods have allowed a remarkable evolution in remote displays, making them more affordable, easier to read, and a vital part of any scale system. Aurora Remote Displays incorporate the most standard features of any weighing display, making it the best choice for virtually any application.

Like all Western products, Aurora Remote Displays are designed with durability, functionality, and versatility in mind. Users are assured that Aurora Remote Displays meet the specified local Weights & Measures regulations for anywhere in North America.

Western: Engineered for the diversity of the weighing industry.

DISCLAIMER

The following information is for the exclusive use of **WESTERN** Dealers and Customers.

Since Aurora Remote Displays are a valuable component of your weighing system, installation and configuration procedures (as described in this manual) should only be carried out by qualified Scale Service Technicians as authorized by Western.

Scale Service Technicians handling Aurora PCBs must observe proper electrostatic discharge (ESD) handling procedures.

CAUTION! HIGH VOLTAGES are present inside the Aurora enclosure.

ATTENTION! Unauthorized installation and service of this unit may void the warranty.

AURORA FEATURES

HIGH VISIBILITY

- New, brighter LEDs and a smart digit layout (2 inches high) make the Aurora 20 easy to read over wide viewing angles, in foul weather, and in direct sunlight.

EASY TO INSTALL & USE

- Auto-Learn Technology interprets the data format and output string of any scale indicator, reducing set-up time. No digit shifting required.
- Easy-access, spacious enclosure makes installation and service quick and easy.

WIRELESS COMMUNICATIONS

- Go wireless. Make installation easy and use remote displays where you never thought possible.
- The integrated radio option allows communications over several thousand feet.
- No external housings or radio knowledge required.

SAVE ENERGY

- Ultra-efficient LED technology is the smart choice for power conscious users.

MORE…

- Selectable Indoor/Outdoor brightness levels.
- Leading Zero Suppression.
- Multi-drop Communications.
- Selectable Program Modes (Normal Mode, Command Mode, and Freeze Weight).

DISPLAY

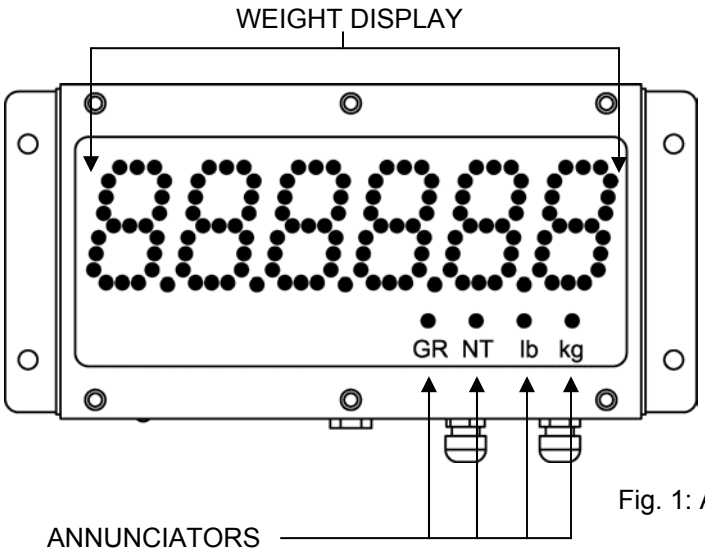


Fig. 1: Aurora 20 Display

WEIGHT DISPLAY: 6 LED digits (7 segments). Up to 5 decimal places.

ANNUNCIATORS:
GR = Gross Weighing Mode
NT = Net Weighing Mode
lb = Pounds
kg = Kilograms

INSTALLATION

PRE-INSTALLATION (Receiving Inspection)

It is always good practice to verify that the Aurora Remote Display is complete and undamaged upon receipt.

- Check over packaging for any signs of damage.
- Remove the Aurora Remote Display from its protective packaging and check for damage.
- Verify that the shipment includes:
    - Aurora 20 Remote Display (complete and intact, with power cord)
    - Aurora 20 Installation / Technical Manual
- Aurora Remote Displays ordered with the Wireless option should include:
    - Integrated Radio Module (mounted on the Controller board)
    - Internal Antenna Cable
    - External Antenna

OPENING THE AURORA 20 ENCLOSURE

1. Make sure the unit is disconnected from power.

2. Remove the 6 screws (with sealing washers) from the front of the enclosure.

3. Guide the front panel away from the main enclosure. Be sure to watch the internal cable connections!

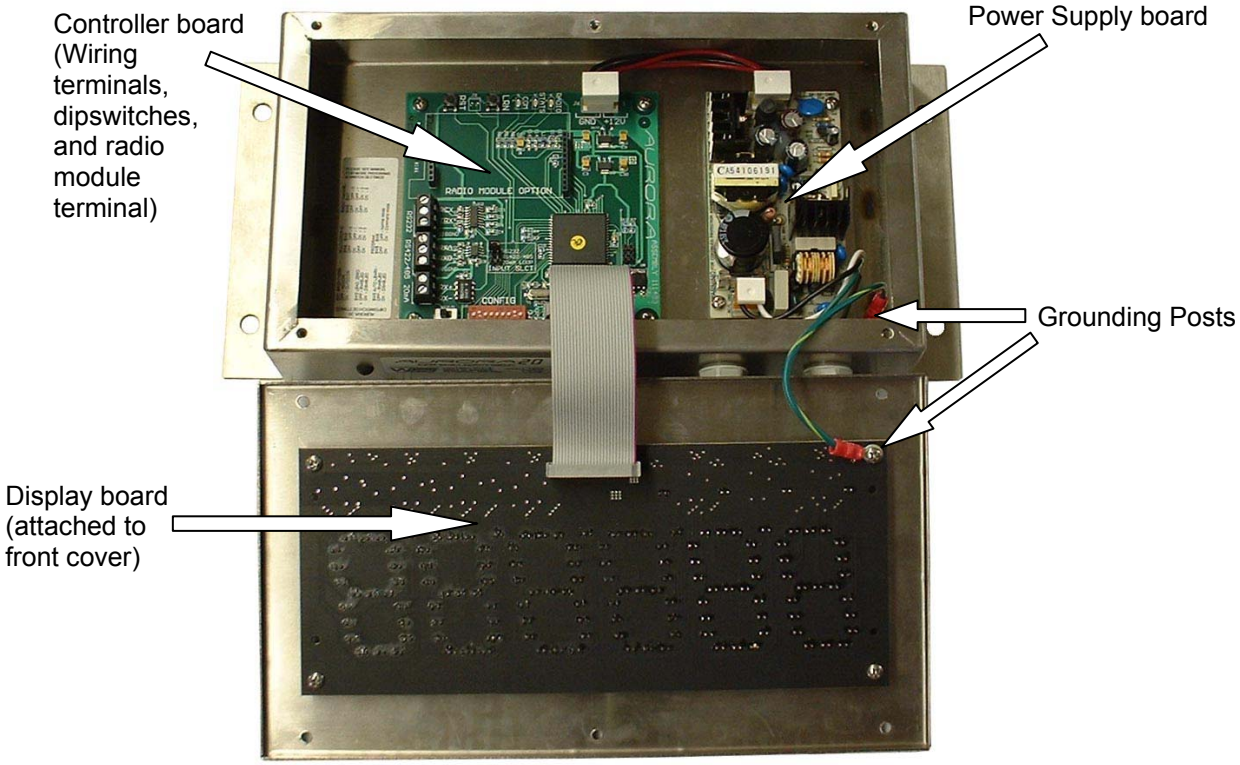


Fig. 2: Open Aurora 20

MOUNTING INSTRUCTIONS

1. Inspect the installation site for properly grounded power.

2. Ensure that mounting structures (walls, posts, etc.) will bear the weight of the display (Aurora 20: 5 lbs).

3. Use proper hardware, including wall anchors where necessary, when mounting the enclosure. Secure the Main Enclosure to wall or pole mounted bracket with 5/16ths bolts.

4. Run power and communication cables into the enclosure via strain reliefs (as required).

WIRING

POWER WIRING

The Aurora 20 is wired for power at the factory. The factory supplied power cord may be removed for direct AC wiring if necessary.

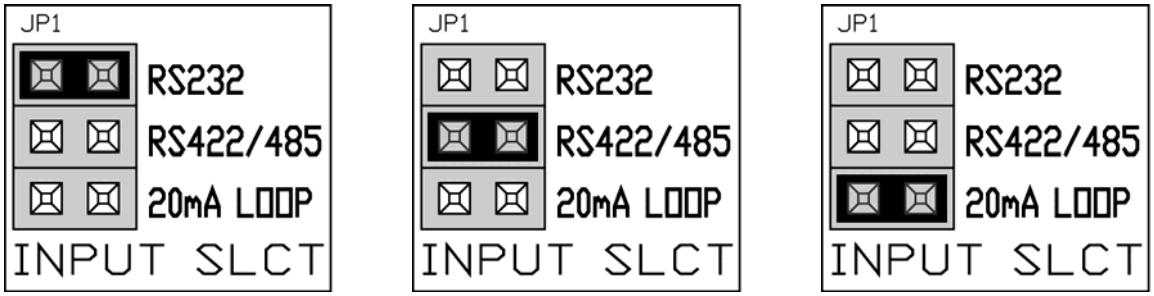
CAUTION! HIGH VOLTAGE! Only trained personnel should attempt power wiring.

COMMUNICATIONS WIRING

All communications wiring terminates at the Controller board. Communications should be wired before applying power to the unit.

Communication Input Jumper

A communications input type (RS 232, RS 422/485, or 20 mA Loop) must be selected by placing the jumper on the appropriate pins.



RS 232 **RS 422/485** **20 mA Current Loop**

Fig. 3: Jumper Positions

NOTE: When the Radio Module option is properly installed, the Communication Input Jumper is over-ridden.

RS 232 Wiring

1. Set the Communication Input Jumper (JP 1) to **RS232**.

2. Terminate the indicator's communication wires at the RS 232 terminal (J3). See table below:

INDICATOR	AURORA REMOTE DISPLAY
TRANSMIT (TX)	RECEIVE (RCX)
RECEIVE (RX)	NO CONNECTION
SIGNAL GROUND (GND)	SIGNAL GROUND (SIG GND)

RS 422 Wiring

1. Set the Communication Input Jumper (JP 1) to **RS422 / 485**.

2. Terminate the indicator's communication wires at the RS 422 / 485 terminal (J4). See table below:

INDICATOR	AURORA REMOTE DISPLAY
TRANSMIT A (TX A)	RECEIVE A (RX A)
TRANSMIT B (TX B)	RECEIVE B (RX B)

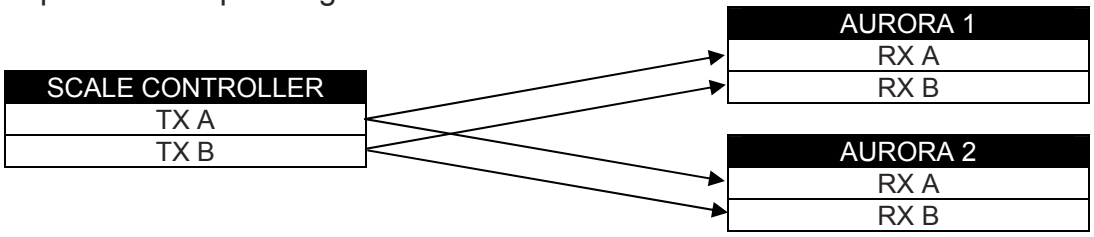
RS 485 Multi-Drop Wiring

1. Set the Communication Input Jumper (JP 1) to **RS422 / 485**.

Parallel Multi-drop wiring

SCALE CONTROLLER	AURORA 1	AURORA 2	AURORA 3	ETC.
TX A	RX A	RX A	RX A	RX A
TX B	RX B	RX B	RX B	RX B

Split Multi-Drop Wiring



NOTE: Multi-Drop IDs are set using the CONFIG Dip-switches. For settings, see Configuration, page 11.

20 mA Current Loop Wiring

1. Set the Communication Input Jumper (JP 1) to **20mA LOOP**.

2. Terminate the indicator's communication wires at the 20 mA Current Loop terminal (J5). See table below:

INDICATOR	AURORA REMOTE DISPLAY
20 mA TX +	RECEIVE POSITIVE (RX +)
20 mA TX -	RECEIVE NEGATIVE (RX -)

20 mA Current Loop Mode Switch

- After the current loop is wired, ACTIVE or PASSIVE mode must be selected (SW 10) on the Controller board.

- Select ACTIVE mode if the Aurora is required to supply the current to the communicating device.

- Select PASSIVE mode if the communicating device (indicator) supplies the current to the Aurora.

- If unsure of these requirements, check the device's manual.

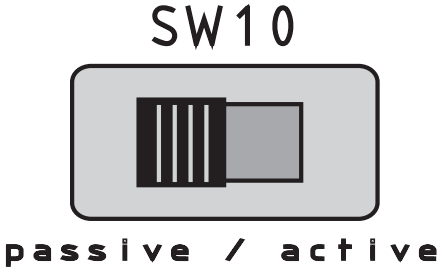


Fig. 4: 20 mA Mode Switch

START-UP

POWER UP

- The Aurora 20 has no ON/OFF button or switch. Plugging the unit into AC power will turn the unit ON.
- Disconnecting AC power will turn the unit OFF.

AUTO-LEARN

- On power up, the Aurora 20 automatically enters Auto-Learn Mode, analyzing the serial communications and string type.
- The indicator's output string must contain number characters. An STX character (ASCII 02) and/or CR character (ASCII 13) must also be included.
- Once Auto-Learn is successful (about 10 seconds after power up) the Aurora will display the current weight.

NOTE: Automatic Start-up Auto-Learn may be disabled for custom applications. See Configuration, page 11.

BUTTONS

LEARN BUTTON

- If Automatic Start-up Auto-Learn is disabled, the LEARN button (**LRN**) on the Controller board must be pressed to enter Auto-Learn Mode.

RESET BUTTON

- The RESET button (**RST**) on the Controller board allows the Technician to cycle power on the unit without disconnecting/connecting AC power.

DIAGNOSTIC INDICATOR LIGHTS

The Aurora 20 has 3 diagnostic indicator lights located on the Controller board.

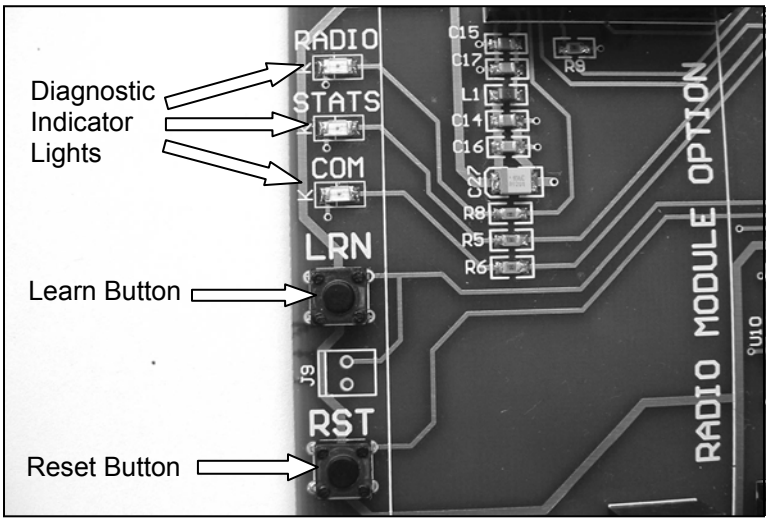


Fig. 5: Indicator Lights & Buttons

STATUS LIGHT (STATS):

- The Aurora's "heartbeat". **BLINKS** when power is applied to the unit.
- Regular blinking (Once per second) indicates that the Aurora has successfully learned a data string and is running properly.
- Rapid blinking (3 times per second) indicates that the Aurora is in Auto-Learn mode, attempting to interpret a data string.

COM LIGHT:

- **FLASHES ON** each time the Aurora receives a character through any of its COM Ports (including the radio).

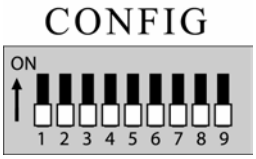
RADIO LIGHT:

- **FLASHES ON** when the Aurora's Radio Module receives data.
- This light will only illuminate if the Radio Module is installed.

CONFIGURATION

The Aurora 20 uses one bank of Dip Switches on the Controller board (SW 3) to set-up the configuration.

NOTE: Dip Switch settings take effect only after the Aurora has been reset (Cycle power directly or press the “RESET” button).



Switch 1: Brightness Level

There are 2 selectable brightness levels: Outdoor (brighter) and Indoor (less bright).

BRIGHTNESS LEVEL	SWITCH 1
Indoor (Default)	OFF
Outdoor	ON

Switch 2: Leading Zeros

In some cases, the scale indicator may transmit leading zeros in the output string. If leading zeros are NOT required, they may be suppressed. The Aurora 20 will automatically remove the leading zeros and replace them with blank spaces on the display.

LEADING ZEROS	SWITCH 2
ENABLED (Default)	OFF
DISABLED (Remove Leading Zeros)	ON

NOTE: Leading Zeros may also be disabled using the scale indicator (if possible).

Switch 3: Start-up Auto-Learn

On power up, the Aurora 20 automatically enters Auto-Learn Mode, analyzing the serial communications and string type. In certain situations, it may be necessary to disable this feature. Once disabled, the LEARN button on the Controller board must be pressed before the Aurora will go into Auto-Learn Mode.

START-UP AUTO-LEARN	SWITCH 3
ENABLED (Default)	OFF
DISABLED	ON

Switches 4 & 5: Multi-Drop ID

Up to four (4) Aurora displays can share a serial or radio connection. Messages are sent to individual displays using control codes and these Multi-Drop IDs. For Multi-Drop instructions, see page 17.

MULTI-DROP I.D.	SWITCH 4	SWITCH 5
0 (Default)	OFF	OFF
1	ON	OFF
2	OFF	ON
3	ON	ON

NOTE: If Multi-Drop is not being used, it is very important that Switches 4 & 5 be set in the OFF position.

Switches 6 & 7: Radio Channel Select

The 900 MHz Radio Module (optional) has 4 frequency channels. If there are multiple scale/remote display installations at a given site, each installation must have its own radio channel selected.

RADIO CHANNEL	SWITCH 6	SWITCH 7
0 (Default)	OFF	OFF
1	ON	OFF
2	OFF	ON
3	ON	ON

NOTE: The Aurora Remote Display must be configured with the same radio channel as the ScaleLink Wireless Transceiver connected to the indicator. See Wireless Set-Up, Page 22.

NOTE: If the wireless connection experiences interference problems from another radio site, switching radio channels will most likely correct the problem.

Switches 8 & 9: Utility Program Select

The Aurora has built-in utility programs that run in conjunction with the normal display functions.

PROGRAM	SW 8	SW 9
1 – NORMAL Mode (No program)	OFF	OFF
2 – FREEZE Weight	ON	OFF
3 – Reserved for future use	OFF	ON
4 – COMMAND mode.	ON	ON

NOTE: Please see the Aurora Utility Program section for program overviews (Page 14).

AURORA UTILITY PROGRAMS

The Aurora 20 has several auxiliary functions that may be activated via the CONFIG dipswitches on the controller board.

PROGRAM	SW 8	SW 9
1 – NORMAL Mode (No program)	OFF	OFF
2 – FREEZE Weight	ON	OFF
3 – Reserved for future use	OFF	ON
4 – COMMAND mode.	ON	ON

PROGRAM 1: NORMAL MODE - NO SPECIAL PROGRAM IS SELECTED.

PROGRAM 2: FREEZE WEIGHT - FOR USE WITH CATTLE AUCTIONS, ETC.

- This program is useful for cattle auctions and other applications where a weight value must be displayed regardless of what is happening on the scale.

- A weigh ticket (using ASCII characters) must be created on the scale indicator that sends the scale weight and a <CR> character to the Aurora display with a button press.

  Example: **123456 lb g<CR>**

- When the Aurora receives this information, it displays the weight and keeps displaying it until another weigh ticket is received.

NOTE: This application assumes a legal-for-trade indicator is used to send the weigh ticket. Please review local Weights and Measures requirements.

PROGRAM 3: RESERVED FOR FUTURE USE

PROGRAM 4: COMMAND MODE

All Aurora displays can be setup to receive commands directly from the scale system or PC. Supported commands include transmitting weights, basic alphanumeric messaging, stoplight relay control, and additional display functions.

Command mode disables Auto-Learn and fixes communications at **9600-N-8-1**. The Aurora looks only for specific commands sent by the indicator or scale controller.

Activating Command Mode

1. To enable command mode, CONGIG dipswitches 8 and 9 on the Controller board must be set as follows:

PROGRAM	SW 8	SW 9
4 – COMMAND Mode	ON	ON

REMEMBER: Switch settings do not take affect until the Aurora is reset or powered up again.

Transmit a Weight String

Use numeric ASCII characters followed by a **<CR>** character.

Example:

- To display “1000”, transmit: **1000<CR>**

Transmit Status Characters

Status characters may be imbedded anywhere in the weight string to control the annunciator lights. Status characters may be upper or lowercase, and in any order, before or after the weight.

STATUS COMMAND	CHARACTER	ASCII
GROSS weight	**G** or **g**	
NET weight	**N** or **n**	
POUNDS	**L** or **l**	
KILOGRAMS	**K** or **k**	

Example:

- To display 1000 lb gross, transmit: **1000LG<CR> -or- GL1000<CR>**

Control Commands

Control commands are single ASCII characters (followed by <CR>) that are transmitted to the Aurora to control additional features such as the built-in traffic light (Aurora 45 SL) and the traffic light relay.

CONTROL COMMAND	CHARACTER	ASCII
RED light – Relay switch RED	**&**	38
GREEN light – Relay switch GREEN	*	42
Turn ON flashing weight display	**(**	40
Turn OFF flashing weight display	**)**	41
FLASH weight display 3 times	**!**	33

Alphanumeric messaging to the scoreboard

All Aurora models can display alphanumeric messages within the limits of a 7 segment digit. When a letter other than **L**, **K**, **G**, or **N** is detected, it assumes that the message is alphanumeric. All characters in the data string are then treated as an alphanumeric message, and not a weight value.

Alphanumeric messages are displayed from left to right.

Sample Command Mode Data Strings

DATA STRING	DISPLAY
0 <CR>	**"0" gross**
1000 <CR>	**"1000" gross**
LN 1234 <CR>	**"1234" lb, net**
1234 GK <CR>	**"1234" kg, gross**
1234 L g <CR>	**"1234" lb, gross**
hello<CR>	**"hELLo"**
***<CR>**	**GREEN light** (Not Available for Aurora 20)
stop &<CR>	**"StoP ", RED light** (Not Available for Aurora 20)

NOTE: Do not transmit Control Commands within a WEIGHT data string. Control Commands should only be sent alone (followed by a <CR>), or within an Alphanumeric data string.

Multi-Drop addressing

Aurora displays using Multi-drop must be in Command Mode. The Multi-drop address (0 to 3) is set using SW4 and SW5 on the CONFIG dipswitch bank (See page 12).

When using Multi-drop, the Aurora will only respond after it has been selected.

To select the display, transmit a "**#**" character (ASCII 35), followed by the correct ID number and a CR (ASCII 13) character. The Aurora will remain selected until it receives a command containing a different address.

Examples:

1. Select multi-drop address 1:

   Transmitting **"#1<CR>"** selects the display with ID #1.

2. Select multi-drop address 3, then send a weight of 1000lb gross:

   "#3<CR>"

   "1000LG<CR>

   The ID number may be embedded with the weight string:
   "#3 1000LG<CR>

3. Send 3 different weights to 3 different scoreboards:

   "#0 2000LG<CR>#1 3000LG<CR>#2 5000LG<CR>"

4. Send the text "hello" to scoreboard address 3.

   "#3 HELLO<CR>

TROUBLESHOOTING & ERROR MESSAGES

PROBLEM	PROBABLE SOLUTIONS
Unit won't power up:	• Verify AC power source (Outlets, breakers, etc.) • Check power cable connection to the Power Supply board. • Check fuse on Power Supply board. • Verify Power wiring from Power Supply board to Controller board.
Unit has power, but there is no display.	• Verify Ribbon Cable connection from the Controller board to the Display board. • If the unit is in COMMAND mode, the display will remain blank until data is received.
Dashes across the display.	• Verify the correct terminal (RS 232, 422/485, 20 mA) is being used and check wiring. • Verify that the Communications "Input Select" jumper is properly set.
Display reads "Err 1".	• Baud Rate Auto-Learn has failed. • Verify that the Communications "Input Select" jumper is properly set. • Verify the correct terminal (RS 232, 422/485, 20 mA) is being used and check wiring. • Verify that data is being sent to the Aurora from the indicator and that the data string contains numeric characters.

PROBLEM	PROBABLE SOLUTIONS
Display reads "Err 2".	• Data String Auto-Learn has failed. • Verify the correct terminal (RS 232, 422/485, 20 mA) is being used and check wiring. • Verify that the Communications "Input Select" jumper is properly set. • Verify that a data string is being sent to the Aurora from the indicator and that the data string contains either an STX character (ASCII 02) or a CR character (ASCII 13).
STATUS light NOT blinking (OFF)	• Verify that unit has power. When powered, if the Status light remains OFF, the processor is not running.
STATUS light blinking fast (3/second) for longer than 30 seconds:	• The Aurora is not able to Auto-Learn the data string or baud rate. See Auto-Learn section.
RADIO light not flashing:	• Check that the Radio Module is properly installed. Ensure that the internal antenna cable is connected to the Radio Module and the external antenna. • No data is being sent from the ScaleLink Radio connected to the scale indicator.
COM light not flashing:	• Verify the correct terminal (RS 232, 422/485, 20 mA) is being used and check communications wiring at the indicator. • Verify that the Communications "Input Select" jumper is set to the proper communication mode (RS 232, 422/485, 20 mA). • Verify that data is being sent to the Aurora from the indicator and that the data string contains numeric characters. • If the Radio Module is being used, also see Probable Solutions for "Radio light not flashing".

WIRELESS SET-UP

AURORA REMOTE DISPLAY

1. With factory installed Radio Modules, the external antenna must be connected to the SMA terminal on the bottom of the Electronics Carriage.

2. Power up the Aurora. **The Aurora is ready to receive radio signals.**

3. If problems are experienced, ensure that the Radio Module hasn't been disconnected in shipping. The Radio Module should be secure in the "Radio Module Option" terminals (J10 & J11) as seen below.

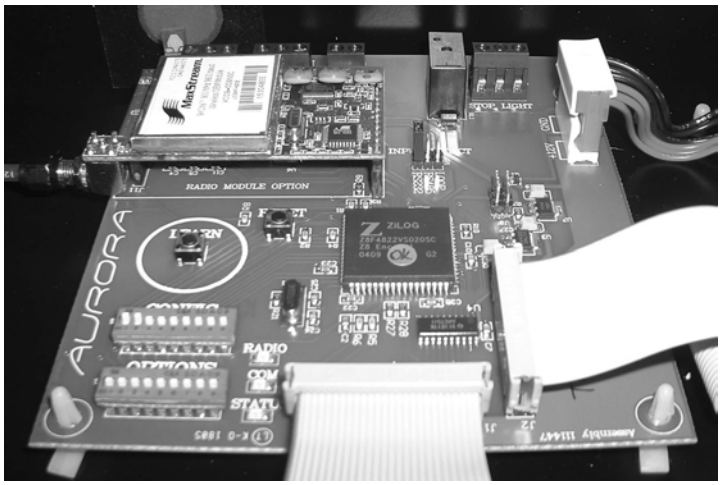


Fig. 6: Radio Module on Controller board

NOTE: Aurora Radio Module Field Installation kits are available. Please contact the factory for more information.

INDICATOR

1. Connect the ScaleLink Wireless Transceiver to the indicator (or other communicating device) as directed in the ScaleLink Start-Up Guide.

2. Ensure the indicator is set-up to output **CONTINUOUSLY**.

NOTE: Note the indicator's communication settings, as the ScaleLink's settings may need to be adjusted to match.

SCALELINK WIRELESS TRANSCEIVER

1. The ScaleLink's default communication settings are:

Baud Rate	9600	Data Bits	8
Parity	None	Stop Bits	1

   If necessary, adjust the ScaleLink's communication settings to match the indicator (or other communicating device).

2. Wire power to the ScaleLink transceiver using the indicator's power supply or the optional 12 VDC power supply.

3. Power up the Indicator and ScaleLink to transmit radio signals.

NOTE: Check with your indicator's manufacturer regarding using "piggy-back" power for the ScaleLink Transceiver.

WIRELESS CONNECTION TEST

1. Verify that both the ScaleLink Wireless Transceiver and the Aurora 20 are set to the same radio channel.

2. Verify that the Transmit LED on the ScaleLink Wireless Transceiver is ON and FLICKERING.

3. Verify that the Radio LED inside the Aurora 20 enclosure is FLASHING.

4. Add weight to the scale.

5. Verify that the Aurora is correctly displaying Weight, Measurement Units (kg, lb), and Weighing Mode (GR, NT) as shown on the scale indicator.

NOTE: If the Aurora's readings are incorrect, erratic, or very slow, a different radio channel may need to be selected.

NOTE: If the indicator's communication settings cannot be set, the ScaleLink's settings must be adjusted. For directions, see the ScaleLink Wireless Transceiver Start-Up Guide.