ADI310

Scoreboard Family

Installation and Service Manual

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METTLER TOLEDO

Publication Revision History

An overview of this manual's revision history is compiled below.

Publication Name: ADI310 Scoreboard Installation and Service Manual

Publication Part Number: 17153600A **Publication Date:** 5/04

Part Number	Date	Revisions
17153600A (.01)	11/04	Updated wiring connections to include IND310 terminal. Added information about multi-drop wiring connections.
A17153600A	10/05	Added information about installing power supply cable and connecting it to new PCB. Added layout for mounting bracket.
B17153600A	4/06	Added declaration of conformity. Added dimensions for optional scoreboards. Added new replacement part numbers. Added new setup options 21, 22, and 23.
B17153600A (.01)	5/07	Revised PCB and configuration information. Revised setup options 12 and 18. Added wireless communication option.
B17153600A (.02)	4/08	Revised information about standard continuous output in configuration, troubleshooting, and setup sections. Added status byte information to Chapter 4.
B17153600A (.03)	6/08	Changed setup options 1, 19, and 20. Added setup options 24 and 25.
B17153600A (.04)	3/09	Added ADI210 and ADI215 scoreboard options.

INTRODUCTION

This publication is provided solely as a guide for individuals who have received Technical Training in servicing the METTLER TOLEDO product.

Information about METTLER TOLEDO Technical Training can be obtained by writing, calling, or faxing:

METTLER TOLEDO
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Columbus, Ohio 43240 USA
Phone: (+1) 614-438-4511
Fax: (+1) 614-438-4958
www.mt.com

WARNING!

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used properly, i.e., in accordance with the instructions manual, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device, pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference to radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

METTLER TOLEDO RESERVES THE RIGHT TO MAKE REFINEMENTS OR CHANGES WITHOUT NOTICE.

DECLARATION OF CONFORMITY

Konformitätserklärung
Déclaration de conformité
Declaración de Conformidad
Conformiteitsverklaring
Dichiarazione di conformità

We/Wir/Nous/Wij/Noi: **Mettler-Toledo, Inc.**
1150 Dearborn Drive
Worthington, Ohio 43085
USA

declare under our sole responsibility that the product,
erklären, in alleiniger Verantwortung, daß dieses Produkt,
déclarons sous notre seule responsabilité que le produit,
declaramos, bajo nuestra sola responsabilidad, que el producto,
verklaren onder onze verantwoordelijkheid, dat het product,
dichiariamo sotto nostra unica responsabilitá, che il prodotto,

Model/Type: ADIxxx

to which this declaration relates is in conformity with the following standard(s) or other normative document(s).
auf das sich diese Erklärung bezieht, mit der/den folgenden Norm(en) oder Richtlinie(n) übereinstimmt.
Auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou au(x) document(s) normatif(s).
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Council directive on the harmonization of the laws of the Member states:	**standards:**	**Certificate number (if applicable)**
relating to electromagnetic compatibility (89/336/EEC) amended by directive (93/68/EEC; 92/31/EEC)	EN61000-4-11 EN61000-3-2 / 3-3 EN61000-4-3 (10 V/m) EN61000-4-6 EN61000-4-2 / 4-4 / 4-5 / 4-11 EN 55022, B	
relating to electrical equipment designed for use within certain voltage limits (73/23/EEC) amended by directive (93/68/EEC)	UL 1433 UL 48	

Worthington, Ohio USA, **Mettler-Toledo, Inc.**

Darrell Flocken, Manager - Weights & Measures
Office of Weights and Measures

Original Issue: November, 2005

According to EN 45014

Precautions

READ this manual BEFORE operating or servicing this equipment.

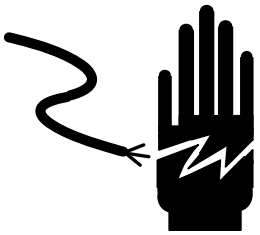
FOLLOW these instructions carefully.

SAVE this manual for future reference.

DO NOT allow untrained personnel to operate, clean, inspect, maintain, service, or tamper with this equipment.

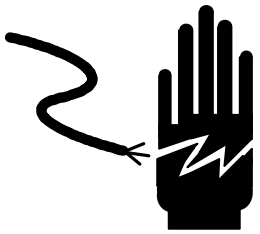
ALWAYS DISCONNECT this equipment from the power source before cleaning or performing maintenance.

CALL METTLER TOLEDO for parts, information, and service.



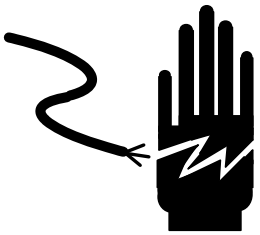
⚠ WARNING

PERMIT ONLY QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS, AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM.



⚠ WARNING

FOR CONTINUED PROTECTION AGAINST SHOCK HAZARD, CONNECT TO PROPERLY GROUNDED OUTLET ONLY. DO NOT REMOVE THE GROUND PRONG.



⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE INSTALLING, SERVICING, CLEANING, OR REMOVING THE FUSE. FAILURE TO DO SO COULD RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

⚠ CAUTION

BEFORE CONNECTING/DISCONNECTING ANY INTERNAL ELECTRONIC COMPONENTS OR INTERCONNECTING WIRING BETWEEN ELECTRONIC EQUIPMENT, ALWAYS REMOVE POWER AND WAIT AT LEAST 30 SECONDS. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN BODILY HARM OR DAMAGE TO OR DESTRUCTION OF THE EQUIPMENT.

⚠ CAUTION

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.

⚠ WARNING

DO NOT USE THE ADI310 SCOREBOARD IN LOCATIONS THAT ARE CLASSIFIED AS HAZARDOUS.

⚠ WARNING

THE SCOREBOARD AND ITS ASSOCIATED EQUIPMENT MUST BE INSTALLED, ADJUSTED, AND MAINTAINED BY QUALIFIED PERSONNEL WHO ARE FAMILIAR WITH THE CONSTRUCTION AND OPERATION OF ALL EQUIPMENT IN THE SYSTEM AND WITH THE POTENTIAL HAZARDS INVOLVED. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN BODILY INJURY AND/OR PROPERTY DAMAGE.

Disposal of Electrical and Electronic Equipment

In conformance with the European Directive 2002/96 EC on Waste Electrical and Electronic Equipment (WEEE) this device may not be disposed of in domestic waste. This also applies to countries outside the EU, per their specific requirements.

Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment.

If you have any questions, please contact the responsible authority or the distributor from which you purchased this device.

Should this device be passed on to other parties (for private or professional use), the content of this regulation must also be related.

Thank you for your contribution to environmental protection.

Contents

1 Introduction

General

The METTLER TOLEDO ADI310 scoreboard is a highly visible weight display for use with vehicle scales and other industrial weighing applications. It displays up to six digits, using light-emitting diodes (LED). There are also indicators for lb (pounds), kg (kilograms), T (tons), t (metric tons), GR (gross weight), and NT (net weight). The scoreboard is compatible with METTLER TOLEDO scale terminals that use continuous serial data output, as well as a variety of other terminals.

Trade Name	Item Number	Description
ADI210	61042037	Scoreboard with 2-inch digits
ADI215	61043160	Scoreboard with 2-inch digits and wireless option
ADI310	61038718	Scoreboard with 4-inch digits
ADI315	61041417	Scoreboard with 4-inch digits and wireless option
ADI320	61040223	Scoreboard with 4-inch digits and traffic light
ADI410	61040386	Scoreboard with 6-inch digits
ADI415	61041418	Scoreboard with 6-inch digits and wireless option
ADI420	61040387	Scoreboard with 6-inch digits and traffic light

Specifications

Power Supply: 110/240 Switching Power Supply

90-264VAC, 40-440 Hz; 1.5A/115VAC, 0.9A/230V

Interface: RS-232, RS-422, 20 mA Current Loop Active/Passive

Protocol:

8 Data Bits, No Parity

7 Data Bits, Odd Parity

7 Data Bits, Even Parity

300 to 19,200 Baud

Environmental Protection: Type 4 (IP56)

Operating Temperature: -40°F to +130°F (-40°C to +55°C)

Storage Temperature: -40°F to +130°F (-40°C to +55°C)

Dimensions

The scoreboard's enclosure is made of a tempered aluminum alloy with a polyester powder coating. The dimensions are shown in Figure 1-1 and Table 1-1.

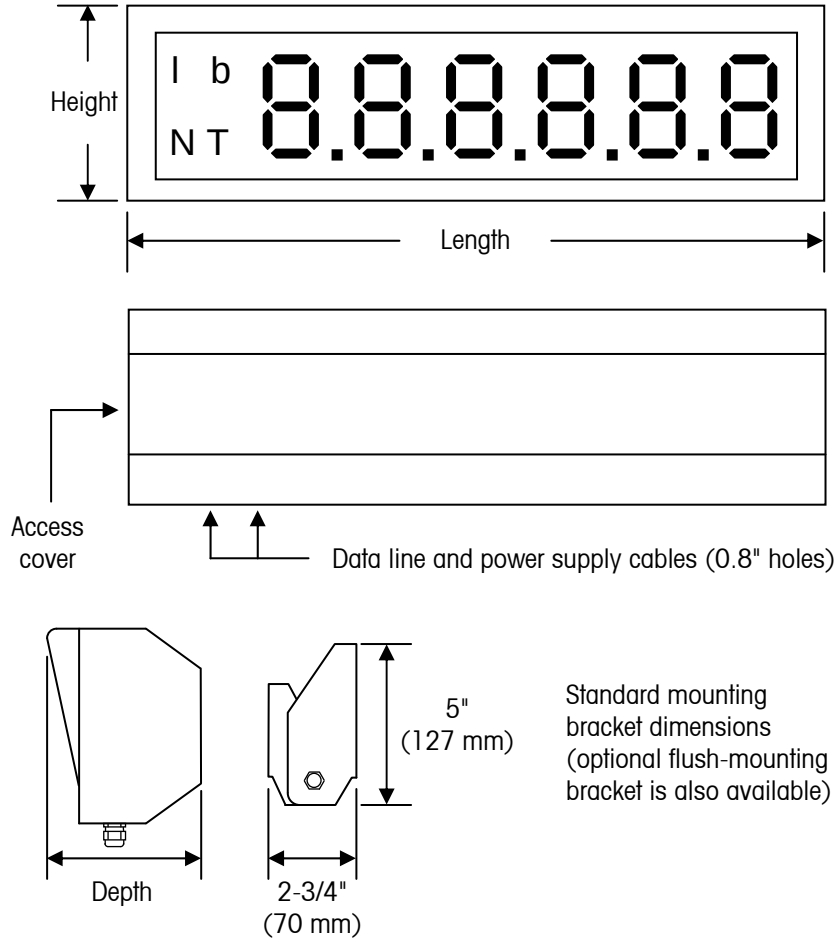


Figure 1-1: Scoreboard Dimensions

Model	Length	Height	Depth	Shipping Weight	Characters
ADI210/ADI215	12 in. (30.5 cm)	4.8 in. (12.2 cm)	5.8 in. (14.8 cm)	9 lb (5 kg)	2 in. (5 cm)
ADI310/ADI315	30 in. (76.2 cm)	8.4 in. (21.4 cm)	6.9 in. (17.6 cm)	25 lb (12 kg)	4 in. (10 cm)
ADI320	34.3 in. (87.2 cm)	8.4 in. (21.4 cm)	6.9 in. (17.6 cm)	29 lb (14 kg)	4 in. (10 cm)
ADI410/ADI415	39.3 in. (100 cm)	10.4 in. (26.5 cm)	6.9 in. (17.6 cm)	41 lb (19 kg)	6 in. (15 cm)
ADI420	43.8 in. (111.3 cm)	10.4 in. (26.5 cm)	6.9 in. (17.6 cm)	33 lb (15 kg)	6 in. (15 cm)

Table 1-1: Scoreboard Dimensions

The standard mounting bracket has four bolt holes (1/4-inch diameter) and four rectangular holes (1/4 x 5/8 inch). The holes are positioned as shown in Figure 1-2.

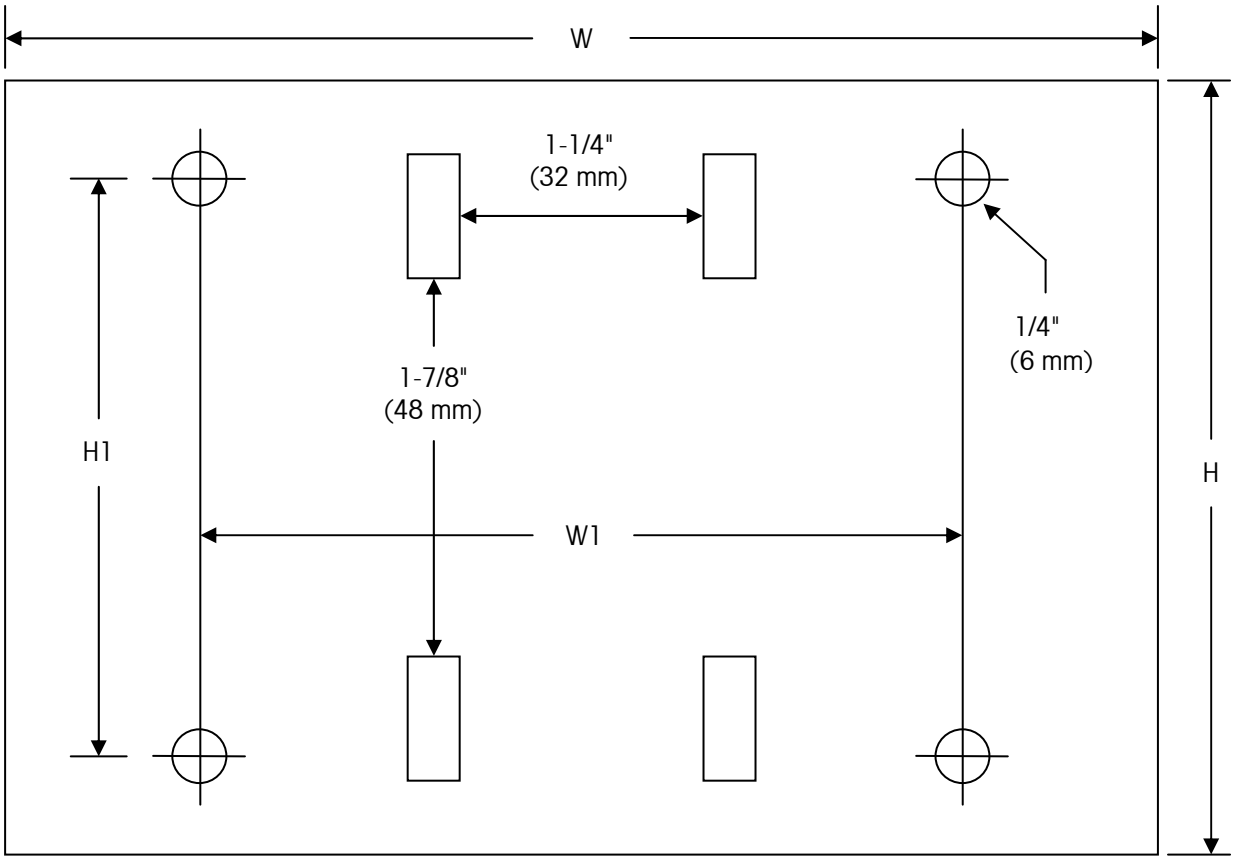


Figure 1-2: Standard Mounting Bracket Layout

Model	H	W	H1	W1
ADI210/ADI215	4" (102 mm)	6" (152 mm)	3" (76 mm)	4" (102 mm)
ADI310/ADI315/ADI320	4" (102 mm)	6" (152 mm)	3" (76 mm)	4" (102 mm)
ADI410/ADI415/ADI420	4" (102 mm)	10" (254 mm)	3" (76 mm)	8" (203 mm)

Table 1-2: Standard Mounting Bracket Dimensions

Standards Compliance

⚠ CAUTION

ALL APPROVALS AND CERTIFICATES ARE BASED ON CORRECT MOUNTING, GROUNDING, AND CONNECTIONS. ANY DEVIATION MAY RESULT IN UNEXPECTED PERFORMANCE OF THE SYSTEM.

The following compliance standards apply to the scoreboard:

Control # 15FS Changing Message Screen

Catalog # UYFS

Approval # E243214

⚠ WARNING

DO NOT USE THE ADI310 SCOREBOARD IN LOCATIONS THAT ARE CLASSIFIED AS HAZARDOUS.

Replacement Parts

The following table lists the replacement parts that are available for the scoreboard.

Trade Name	Description	Quantity
MZ0302000124	ADI310/320 Main Digit Board	1
MZ0302000125	ADI310/320 Slave Digit Board	1
MZ0302000126	110/240 Switching Power Supply	1
MZ0302000127	Annunciator Board	1
MZ0302000130	ADI410/420 Main Digit Board (10's & 1's)	1
MZ0302000131	ADI410/420 Mid Slave Digit Board (1000's & 100's)	1
MZ0302000132	ADI410/420 End Slave Digit Board (100000's & 10000's)	1
MZ0302000133	ADI320/420 Stop and Go Light	1
MZ0302000134	ADIXXX Display Motherboard V4	1
MZ0302000135	ADIXXX Wireless Receiver XR100	1
MZ0302000136	ADIXXX Wireless Transmitter XT100	1
MZ0302000137	ADI310/315/320 Mounting Bracket with Hardware	1
MZ0302000138	ADI210 Main/Digit Board	1

2 Installation

Wiring

⚠ WARNING

THE SCOREBOARD AND ITS ASSOCIATED EQUIPMENT MUST BE INSTALLED, ADJUSTED, AND MAINTAINED BY QUALIFIED PERSONNEL WHO ARE FAMILIAR WITH THE CONSTRUCTION AND OPERATION OF ALL EQUIPMENT IN THE SYSTEM AND WITH THE POTENTIAL HAZARDS INVOLVED. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN BODILY INJURY AND/OR PROPERTY DAMAGE.

The scoreboard can receive data via RS-232, 20 mA current loop, or RS-422 output. The maximum recommended cable lengths are 50 feet (15.24 meters) for RS-232, 1,000 feet (304.8 meters) for 20 mA CL, and 2,000 feet (609.6 meters) for RS-422. Connect the scoreboard to a scale terminal as follows:

1. Remove the access cover located at the end of the scoreboard closest to the power supply cable and data line cable (see Figure 1-1).
2. Wire one end of the data line cable to the terminal strip on the scoreboard's controller printed circuit board (PCB) and the other end to the scale terminal. See Table 2-1 for the correct wiring for each type of terminal.

*Pin 1 is labeled +9 on the wireless transceiver.

Type of Scale Terminal	Terminal	Scoreboard
IND310 Terminal, 20 mA output (use pin J12 on main PCB)	Pin 6: +12V ⇨ Pin 4: +20mA ⇨ Pin 5: -20mA ┐ Jump Pin 3: GND ┘	Pin 6: CL (+) Pin 5: CL (-)
Terminals with Active 20 mA output (for example, LYNX, JAGXTREME, and COUGAR)	+20 mA ⇨ -20 mA ⇨	Pin 6: CL (+) Pin 5: CL (-)
Terminals with Passive 20 mA output	+20 mA ⇨ -20 mA ⇨	Pin 1: VCC* Pin 6: CL (+) Pin 5: CL (-) ┐ Jump Pin 2: GND ┘
Terminals with RS-232 output (IND310, IND560, IND780, LYNX, JAGXTREME, and COUGAR)	TXD ⇨ GND ⇨	Pin 3: 232 RXD Pin 2: GND
Terminals with RS-422 output (IND310, IND560, IND780, LYNX, JAGXTREME, and COUGAR)	RS-422A (+) ⇨ RS-422B (-) ⇨	Pin 7: RX 422A Pin 8: RX 422B

Table 2-1: Data Line Wiring Connections

Power Supply

The scoreboard requires a properly grounded power supply of 110 or 240 Volts AC. You will need to provide a power supply cable (minimum 18 AWG). Route the power supply cable (and conduit) through the cord grip on the back of the scoreboard. Connect one end of the cable to the power supply and the other end to the Line, Neutral, and Ground terminals on the scoreboard's PCB (see Figures 2-1 and 2-2).

Configuration

1. Apply power to the scale terminal and scoreboard. The scale terminal must be transmitting data continuously. If all connections are correct, the green light-emitting diode (LED) next to the corresponding data interface (RS-232, Current Loop, or RS-422) will blink. The red LED will be illuminated if the data line has been inactive for several seconds.
2. Press and release the RESET button on the PCB. The scoreboard will count down from 9 to 0. At the end of the countdown, the scoreboard will flash the word "learn" and then the baud rate. If the learning procedure fails, the scoreboard will display "error # .." with the number of times the learning procedure failed. If Option 2 (METTLER TOLEDO) is not already on, the scoreboard will attempt to determine if the data stream is METTLER TOLEDO standard continuous (or multi-continuous) and will display "Toledo" if that data stream is detected. If METTLER TOLEDO extended continuous output is detected, "Tol 2" will be displayed. Option 2 will be set automatically.
3. If the scoreboard does not automatically detect the Toledo data stream in step 2, then set Option 2 (METTLER TOLEDO) to "1" for standard continuous/multi-continuous data stream or "2" for extended continuous data stream (see Option 2 in Chapter 3).

NOTE: The scoreboard will display the weight units (lb, kg, T, or t) and type of weight (GR or NT) if they are included in the data stream.

4. You might need to shift the data stream so that the weight is displayed properly. To shift the data stream, place a known amount of weight on the scale and then press the LEFT button until the scoreboard displays the weight properly.

Echo Output

The scoreboard has an echo feature that allows you to connect several scoreboards in a series so that they all display the weight reading from the scale terminal. The first scoreboard should transmit the signal and the second one should receive it. For example, wire a pair of scoreboards for 20 mA CL as shown in Table 2-2:

NOTE: By default, the scoreboard displays every other data stream that it receives. If that causes a problem when using echo output, enable Option 4 to display every data stream.

First Scoreboard		Second Scoreboard
TX CL(+)	⇨	CL(+)
TX CL(-)	⇨	CL(-)

Table 2-2: 20 mA CL Wiring for Echo Output

To transmit RS-422, remove the eight-pin DS 75176 from socket U5 and place it in socket U8 (see Figures 2-1 and 2-2).

Multi-Drop Output

You can connect as many as five scoreboards in a multi-drop arrangement so that each scoreboard displays a different weight reading. Wire the scale terminal to the first scoreboard, and wire each additional scoreboard to the one preceding it (as shown in Table 2-3). You must assign a separate address for each scoreboard (see setup option 11). For multi-drop output, set the baud rate to 9600.

First Scoreboard		Second Scoreboard
RX 422A	⇨	RX 422A
RX 422B	⇨	RX 422B

Table 2-3: Wiring for Multi-Drop Output

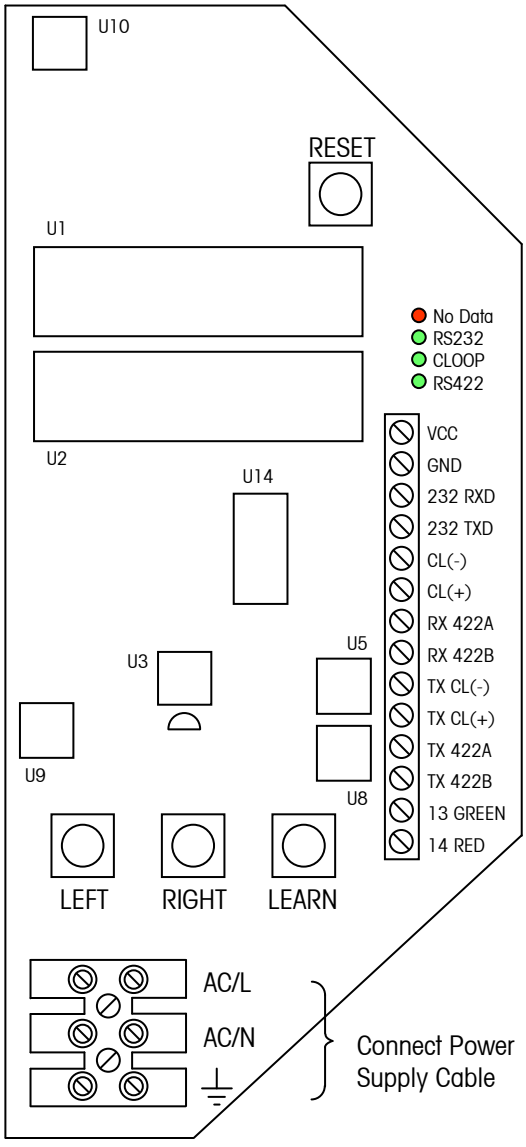
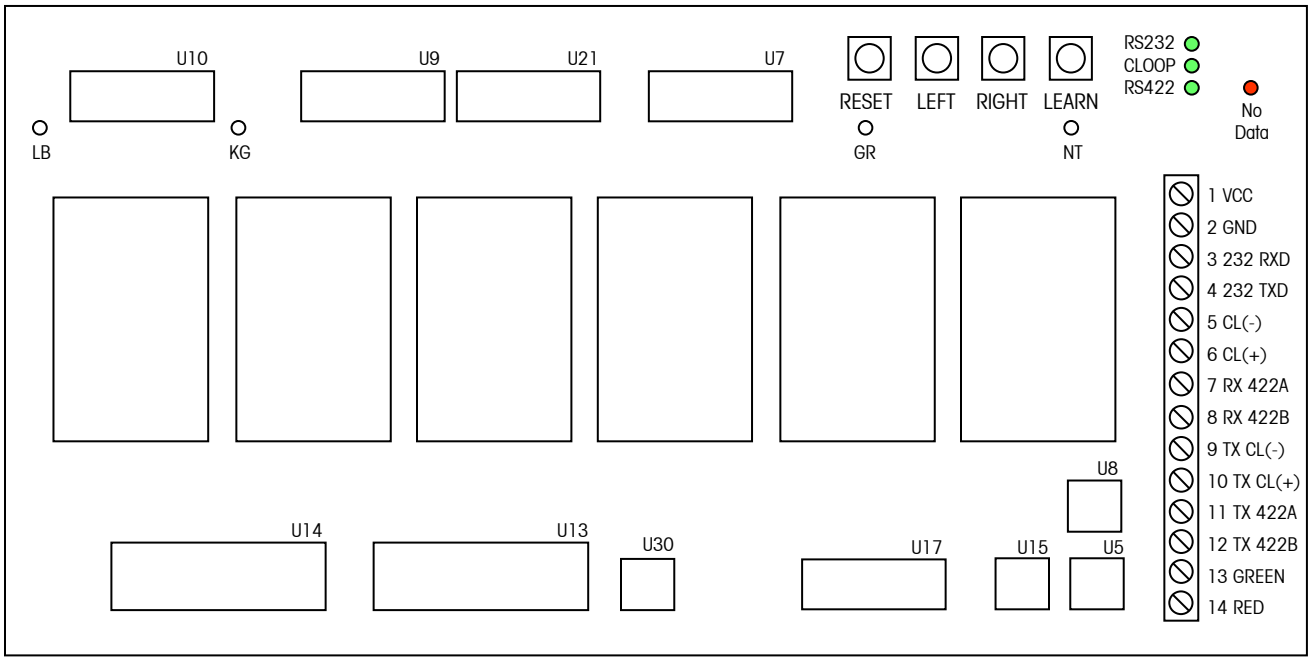
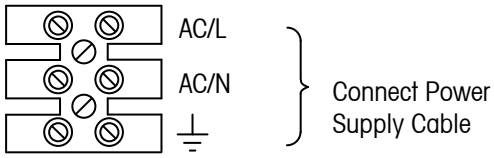


Figure 2-1: Scoreboard PCB (4-inch and 6-inch digits)





Connector Located on Reverse Side of PCB

Figure 2-2: Scoreboard PCB (2-inch digits)

Changing Intensity

The scoreboard has two light intensity settings. To change the intensity, press and release the RESET button, and then hold down the RIGHT button during countdown. At the end of the countdown, the RIGHT button will toggle between displaying "high" and "low" (seven-segment scoreboards will display "lo"). Select the desired intensity and press the LEARN button to save changes. The factory default is "low".

Wireless Option

Model ADI215/315/415 is supplied with a transceiver that enables wireless communication between the scale terminal and the scoreboard at up to one half mile. In order to receive the wireless signal, the scoreboard must be in a direct line of sight with the transceiver. The transceiver has a NEMA Type 4 enclosure in case outdoor installation is required to maintain a direct line of sight.

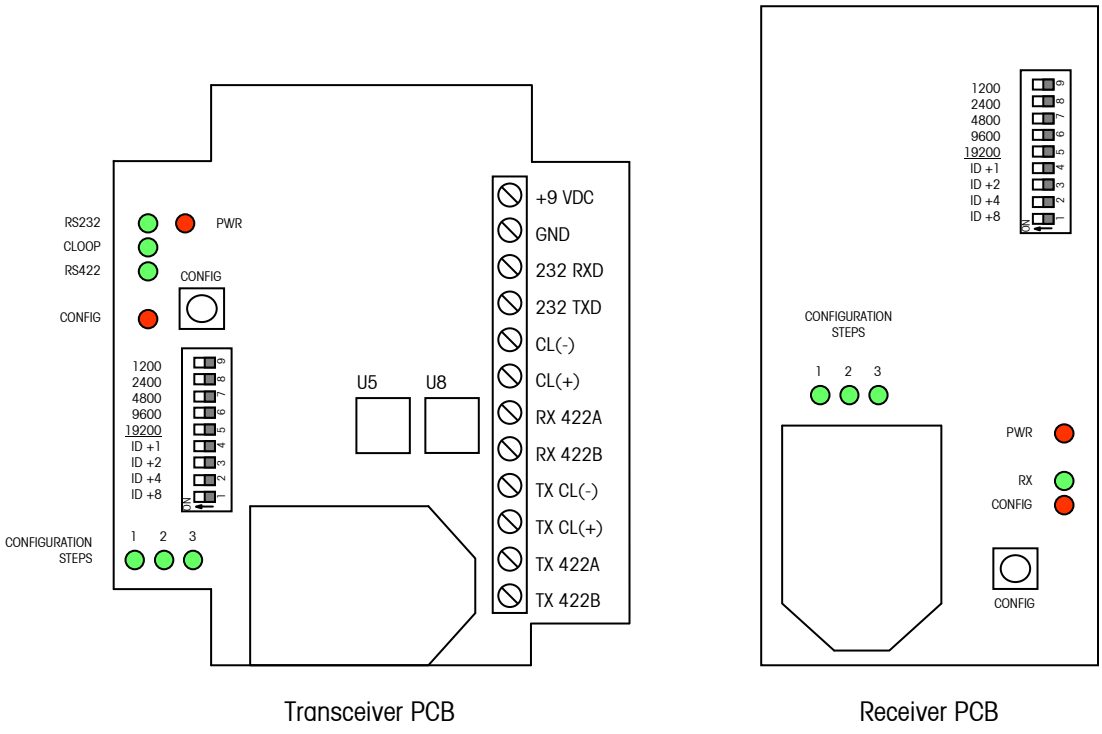
Transceiver Setup

1. Remove the access cover from the transceiver box.
2. Set the transceiver for the same baud rate as the scale terminal by setting dip switches 5 to 9 (see Figure 2-3). The switch for the desired baud rate should be on; the other switches should be off. If all switches are off or more than one switch is on, the unit will operate at the default baud rate (9600).
3. Assign an ID to the transceiver by setting dip switches 1 to 4 (see Figure 2-3). There are 16 possible IDs, ranging from ID 0 (all switches off) to ID15 (all switches on). If you are using more than one wireless transceiver, you will need to assign a different ID to each one.
4. Plug the transceiver's power supply into an electrical outlet (110 volts AC). The red PWR light-emitting diode (LED) will light up to indicate that power is on.
5. Press the CONFIG button on the transceiver's PCB to save the dip switch settings. The three green light-emitting diodes (LED) will light up to indicate how far configuration has progressed. When LED 1 is illuminated, configuration has started. When LED 1 and 2 are illuminated, internal communication has been established. When LED 1, 2, and 3 are illuminated, configuration has been completed. If configuration encounters a problem, the red CONFIG LED will blink once every 5 seconds, up to 6 times, in an attempt to re-establish internal communication. If configuration fails, the red CONFIG LED will blink several times in rapid succession. Wait at least 5 seconds before pressing the CONFIG button again.
6. Wire one end of the data line cable to the terminal strip on the transceiver's PCB (see Figure 2-3) and the other end to the scale terminal. See Table 2-1 for the correct wiring for each type of terminal. The appropriate LED (RS232, CLOOP, or RS422) will blink to indicate that the wireless signal is being transmitted.
7. Replace the access cover on the transceiver box.
8. Mount the transceiver box in a direct line of sight with the scoreboard.

Receiver Setup

1. Mount the scoreboard in a direct line of sight with the transceiver. The transceiver and receiver antennas are hinged, and they should be positioned on the same plane (for example, position both antennas vertically).
2. Remove the access cover from the end of the scoreboard closest to the power supply cable (see Figure 1-1). The receiver is mounted on the scoreboard PCB.
3. Set the receiver for the same baud rate as the transceiver by setting dip switches 5 to 9 (see Figure 2-3). The switch for the desired baud rate should be on; the other switches should be off. If all switches are off or more than one switch is on, the unit will operate at the default baud rate (9600).
4. Assign an ID to the receiver by setting dip switches 1 to 4 (see Figure 2-3). The receiver and transceiver must have the same ID.

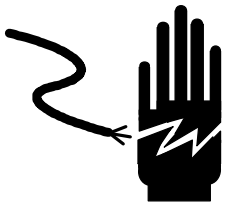
5. A power supply cable must be provided for the scoreboard as described on page 2-2. Connect the cable and apply power to the scoreboard. The red PWR light-emitting diode (LED) will light up to indicate that power is on.
6. Press the CONFIG button on the receiver's PCB to save the dip switch settings. The three green light-emitting diodes (LED) will light up to indicate how far configuration has progressed. When LED 1 is illuminated, configuration has started, When LED 1 and 2 are illuminated, internal communication has been established. When LED 1, 2, and 3 are illuminated, configuration has been completed. If configuration encounters a problem, the red CONFIG LED will blink once every 5 seconds, up to 6 times, in an attempt to re-establish internal communication. If configuration fails, the red CONFIG LED will blink several times in rapid succession. Wait at least 5 seconds before pressing the CONFIG button again.
7. The green RX LED will blink to indicate that the scoreboard is receiving the wireless signal.
8. Configure the scoreboard as described on page 2-2.
9. Replace the scoreboard's access cover.



Transceiver PCB Receiver PCB

Figure 2-3: Printed Circuit Boards for Wireless Option

Troubleshooting



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Problem: The red LED on the PCB is illuminated and the display reads "NoData". Communication has been lost.

Suggestions:

- Make sure the scoreboard has power.
- Make sure the terminal port is enabled.
- Make sure the wiring is correct.

Problem: The scoreboard is displaying incorrect digits.

Suggestions:

- Try shifting the data to the right or left.
- Lower the baud rate.

Problem: The display reads _ _ _ _ _ _ along the top or bottom of the display segments.

Suggestions:

- If the dashes are along the top, the scale is over capacity and the load must be adjusted or moved.
- If the dashes are along the bottom, the scale is behind zero (negative weight) or under the minimum threshold. Re-zero the scale from the terminal, or adjust the load on the scale.

General Purpose Solution

Set the scale terminal to 1200 baud, 8 data bits, no parity (if you are using the scoreboard for multi-drop output, set the baud rate to 9600). If the scale terminal's data stream checksum option is enabled, disable it for testing purposes. Make sure the data stream contains six weight characters followed by a carriage return, line feed, or end of text. Set the scoreboard to factory default and relearn the settings from the data stream.

NOTE: If the delay between data streams is greater than 2 seconds, turn on Option 4.

Wireless Option

Problem: The scale terminal and scoreboard are not communicating.

Suggestions:

- Make sure there is a direct line of sight between the transceiver and scoreboard.
- Make sure the transceiver and receiver have the same System ID.
- Make sure the same baud rate is selected for the scale terminal, transceiver, and receiver.

3 Setup Options

Quick Setup

Use the table shown below for quick reference. Detailed explanations of the setup options are provided on the following pages.

#	Name	Description for "ON" Value
0	Reset	Resets all settings to factory defaults
1	Version	Displays the current software version
2	Toledo	Decodes METTLER TOLEDO status bytes
3	Time-out Length	Maximum time allowed between data transmissions (Default = 5 seconds)
4	Demand	Updates display when a Print button is pressed (for use when transmissions are more than 2 seconds apart)
5	No Data	Set to display "nodata", to blank, or to display the last value when not receiving data
6	Fixed Decimal	Sets a fixed decimal point position
7	No Count Down	Does not count down on startup
8	No Zero Suppression	Does not suppress leading 0's
9	Alpha Characters	Will display alpha and numeric characters
10	Mirror	Displays data to be seen in a rearview mirror
11	Addressable	Makes the display addressable
12	No Auto Shift	Disables auto shifting in "learn" mode
13	Fixed Shift Value	Sets a fixed shift amount
14	Fixed Baud Rate	Sets a fixed baud rate
15	Fixed End Character	Sets a fixed end character
16	Minimum Weight	Sets the minimum weight to display
17	Maximum Weight	Sets the maximum weight to display
18	Blank Out Character	Sets a character to trigger the scoreboard to go blank
19	Blank Out Character	Sets a character to trigger the scoreboard to go blank
20	Blank Out Character	Sets a character to trigger the scoreboard to go blank
21	Traffic Light	Optional traffic light configuration
22	Traffic Light	Optional traffic light configuration
23	Hi-Speed	Configures the scoreboard for Hi-Speed applications
24	Future Op	—
25	Fixed Annunciator	Sets a default weight unit and annunciator (net weight)

Option Details

To enter the Options Setup mode, power-up the scoreboard and hold down the LEFT button while the scoreboard counts down from 9 to 0. The scoreboard will then display "OPTION". In Option Setup mode, press the LEFT button to cycle through the option numbers 0 to 25. The RIGHT button will toggle between On and Off for some options and will enter an advanced menu for more complicated options. Pressing the LEARN button at any time will save the settings and reset the display. Holding down both LEFT and RIGHT buttons while the scoreboard counts down from 9 to 0 will activate Option 0 (will restore the factory default settings).

Option 0: Restore Factory Defaults

Option 0 resets all settings to factory defaults. It sets all options to off and erases all data stored in the non-volatile RAM, including shift amount, baud rate, and end character.

Option 1: Version

Option 1 displays the software version of the scoreboard. It will display the month, followed by the year. This option is used only for troubleshooting purposes.

Option 2: METTLER TOLEDO Continuous Output

Option 2 = 0 (Option is off)

Option 2 = 1 (Decodes METTLER TOLEDO Standard Continuous Output)

Option 2 = 2 (Decodes METTLER TOLEDO Extended Continuous Output)

See the tables in Chapter 4 for information about status bytes.

Option 3: Time-out Length

Option 3 is used to set the time-out length (the maximum amount of time expected between data streams before communication is considered interrupted). The default (0/Off) acts as a 5-second time-out. All other values represent the number of seconds the scoreboard will wait for a new data stream. Press RIGHT to increase the time-out and LEFT to decrease it. The maximum time-out that can be set is 255 seconds.

Option 4: Demand

Option 4 sets the scoreboard to Demand mode. We recommend using Demand mode when the scoreboard is connected to the print button of a scale terminal or when data is sent at intervals of 2 seconds or more. In Demand mode, the scoreboard will wait for and display every data stream. With the default setting (Off), the scoreboard uses every other data stream to ensure data integrity.

Option 5: No Data

Option 5 sets the scoreboard's response after a data stream time-out. The default is to display "NoData". The other two choices are "Clear" (blank the display) and "Hold" (keep the last weight sent). Press RIGHT to cycle through the three choices. Use Option 3 to set the time-out length.

Option 6: Fixed Decimal

Option 6 sets the scoreboard to illuminate a decimal point when it is not present in the data stream. Default (Off) will show a decimal point only where it is located in the data stream. All other values represent the fixed position of the decimal point, starting from right to left.

Value	Decimal Placement
0	Default
1	######
2	#####.#
3	####.##
4	###.###
5	##.####
6	#.#####

Option 7: No Count Down

Option 7 disables the scoreboard from counting down from 9 to 0 when powered up.

Option 8: No Zero Suppression

Option 8 disables the scoreboard's ability to suppress leading 0's. The default (Off) will display a space for all leading 0's except the final two or the one immediately in front of a decimal point. For example, when the option is off, "000000" will be displayed as " 00" and "0000.00" will be displayed as " 0.00".

Option 9: Alpha Characters

Option 9 enables the scoreboard to display both alpha and numeric characters. The default (Off) will replace all non-numeric characters with spaces. A seven-segment display cannot display some alpha characters, for example, "x", "q", "k", "!" or "?".

Option 10: Mirror

Option 10 enables the scoreboard to be read in a rearview mirror. The default (Off) is for direct viewing.

Option 11: Addressable

Option 11 sets the scoreboard to Addressable mode. The scoreboard will ignore all characters until it receives the addressable character, and then it will display the data immediately following that character. The scoreboard can be addressed to any character from 1 to 255. Press RIGHT to increase the value and LEFT to decrease it. The number selected represents the decimal equivalent of the desired character. For example, set the address to 65 to recognize an "A" at the beginning of the data stream. See Chapter 4 for a list of ASCII character values. If the scale terminal is sending 7 data bits even or odd parity, then the parity bit can change the decimal value of the character by adding 128 to it. We recommend setting the terminal to 8 data bits no parity for convenience. The default (Off) uses a standard data stream.

In the standard configuration:

Address 1 is scale A

Address 2 is scale B

Address 3 is scale C

Address 4 is scale D

Address 5 is scale E (sum)

Option 12: No Auto Shift

Option 12 prevents the scoreboard from shifting the data in "learn" mode. Instead, the scoreboard will display the first six characters of the data stream after the LEARN button is pressed.

Option 13: Fixed Shift Value

Option 13 sets a fixed shift amount. Turning this option on will prevent the scoreboard from resetting the shift value when the LEARN button is pressed. It will also disable the LEFT and RIGHT buttons from shifting the data stream. The shift value can be set to any amount between 1 and 255; however, because the length of the data stream is limited, any number over 50 is saved as 50. Press RIGHT to increase the value and LEFT to decrease it.

Option 14: Fixed Baud Rate

Option 14 sets a fixed baud rate. Press RIGHT to cycle through the available baud rates (300, 600, 1200, 2400, 4800, 9600, and 19200). Default (Off) allows the scoreboard to auto-learn the baud rate from the data stream. To auto-learn the baud rate, press LEARN at power-up.

Option 15: Fixed End Character

Option 15 sets a fixed end character. Set the scoreboard to the decimal equivalent of the desired character. Any character from 1 to 255 can be selected (see Chapter 4 for a list of ASCII character values). Press RIGHT to increase the value and LEFT to decrease it. If the scale terminal is sending 7 data bits even or odd parity, then the parity bit can change the decimal value of the character by adding 128 to it. We recommend setting the terminal to 8 data bits no parity for convenience. Default (Off) will allow the scoreboard to auto-learn an end character from the data stream. To auto-learn the end character, press LEARN at power-up. Possible end characters accepted in default mode include end of text (ETX, decimal value of 03), line feed (LF, decimal value of 10), and carriage return (CR, decimal value of 13).

Option 16: Minimum Weight

Option 16 sets the minimum weight that the scoreboard will display. Press RIGHT to select the position of a character, and then press LEFT to select the number to be entered in that position. For example, if you set the minimum weight to "000030", then the display will go blank for any weight under that threshold value.

Option 17: Maximum Weight

Option 17 sets the maximum weight that the scoreboard will display. Press RIGHT to select the position of a character, and then press LEFT to select the number to be entered in that position. For example, if you set the maximum weight to "100000", then the display will go blank for any weight over that threshold value.

Options 18, 19, and 20: Blank Out Character

Each of these options lets you select a character that will cause the scoreboard to go blank when the character is present in the data stream. These options can be used to comply with local Weights & Measures requirements by making the scoreboard go blank when the scale terminal sends characters such as an "m" (Dec 109) for motion or an "o" (Dec 111) for over capacity. Set the scoreboard to the decimal equivalent of the desired character. Any character from 1 to 255 can be selected (see Chapter 4 for a list of ASCII character values). Press RIGHT to increase the value and LEFT to decrease it. If the scale terminal is sending 7 data bits even or odd parity, then the parity bit can change the decimal value of the character by adding 128 to it. We recommend setting the terminal to 8 data bits no parity for convenience.

Options 21 and 22: Traffic Light

Options 21 and 22 are used to configure the built-in traffic light (ADI320 and ADI420 only). Pin 2 (GND) can be used for both the traffic light and the RS-232 signal ground.

IND780drive and Axle with Extended Continuous Output (v 5.1.04 or higher)

Option 21 = 0 (Off)

Option 22 = 0 (Off)

Traffic lights will work automatically when ADI320 and ADI420 scoreboards are set to Extended Continuous Output (Option 2 = 2) and are connected to IND780drive or axle instruments with traffic light controls activated.

Switch

Option 21 = 1

Option 22 = 1

Connect a dry contact switch between pin 13 and pin 2 (GND).

Circuit Logic: Open = Red, Closed = Green

Single-Line TTL

Option 21 = 1

Option 22 = 1

Connect a TTL output to pin 13 and reference a common ground from the transmitting device to pin 2 (GND).

Circuit Logic: High = Red, Low = Green

Dual-Line TTL

Option 21 = 2

Option 22 = 2

Connect TTL Green Control Line to pin 13.

Connect TTL Red Control Line to pin 14.

Reference a common ground between the scoreboard and outputting device.

Result: High turns light on. Low turns light off.

ASCII Control

Option 21 = Any ASCII character from 03 (ETX) to 127 (DEL) for the red light.

Option 22 = Any ASCII character from 03 (ETX) to 127 (DEL) for the green light.

Result: When the character set in Option 21 is in the data stream, the red light will be on; when the character is not in the data stream, the red light will be off. When the character set in Option 22 is in the data stream, the green light will be on; when the character is not in the data stream, the green light will be off.

Option 23: Hi-Speed

Option 23 sets the scoreboard to decode a "Z" or "z" as oz (ounces) and an "M" or "m" as gr (grams). It also sets Option 4 to On Demand, Option 5 to Hold, Option 14 to 9600 baud, and Option 15 to Carriage Return (decimal 13).

Option 24: Future Op

Option 24 is reserved for future use.

Option 25: Fixed Annunciatior

Option 25 is only for scoreboards connected to scale terminals that do not use METTLER TOLEDO Standard Continuous or Extended Continuous Output. If a METTLER TOLEDO terminal is used, this option should be set to the default (Off). When you turn the option on, you are forcing the scoreboard to display the weight unit that you select and the net weight annunciator ("N"). The gross weight annunciator ("G") will be displayed only when there is a "g" or "G" in the data stream.

Option 25 = 0 (Off)

Option 25 = 1 (lb)

Option 25 = 2 (kg)

Option 25 = 3 (gr)

Option 25 = 4 (t)

Option 25 = 5 (T)

Option 25 = 6 (to)

Option 25 = 7 (pw)

Option 25 = 8 (oz)

4 Reference

ASCII Table

Table 4-1 lists the ASCII characters used for some the setup options described in Chapter 3.

Dec	Hex	Char	Dec	Hex	Char
0	0	NUL (null)	32	20	Space
1	1	SOH (start of heading)	33	21	!
2	2	STX (start of text)	34	22	"
3	3	ETX (end of text)	35	23	#
4	4	EOT (end of transmission)	36	24	$
5	5	ENQ (enquiry)	37	25	%
6	6	ACK (acknowledge)	38	26	&
7	7	BEL (bell)	39	27	'
8	8	BS (backspace)	40	28	(
9	9	TAB (horizontal tab)	41	29	)
10	A	LF (line feed, new line)	42	2A	*
11	B	VT (vertical tab)	43	2B	+
12	C	FF (form feed, new page)	44	2C	,
13	D	CR (carriage return)	45	2D	-
14	E	SO (shift out)	46	2E	.
15	F	SI (shift in)	47	2F	/
16	10	DLE (data link escape)	48	30	0
17	11	DC1 (device control 1)	49	31	1
18	12	DC2 (device control 2)	50	32	2
19	13	DC3 (device control 3)	51	33	3
20	14	DC4 (device control 4)	52	34	4
21	15	NAK (negative acknowledge)	53	35	5
22	16	SYN (synchronous idle)	54	36	6
23	17	ETB (end of trans. block)	55	37	7
24	18	CAN (cancel)	56	38	8
25	19	EM (end of medium)	57	39	9
26	1A	SUB (substitute)	58	3A	:
27	1B	ESC (escape)	59	3B	;
28	1C	FS (file separator)	60	3C	<
29	1D	GS (group separator)	61	3D	=
30	1E	RS (record separator)	62	3E	>
31	1F	US (unit separator)	63	3F	?

Table 4-1: ASCII Characters

Dec	Hex	Char
64	40	@
65	41	A
66	42	B
67	43	C
68	44	D
69	45	E
70	46	F
71	47	G
72	48	H
73	49	I
74	4A	J
75	4B	K
76	4C	L
77	4D	M
78	4E	N
79	4F	O
80	50	P
81	51	Q
82	52	R
83	53	S
84	54	T
85	55	U
86	56	V
87	57	W
88	58	X
89	59	Y
90	5A	Z
91	5B	[
92	5C	\
93	5D	]
94	5E	^
95	5F	_

Dec	Hex	Char
96	60	`
97	61	a
98	62	b
99	63	c
100	64	d
101	65	e
102	66	f
103	67	g
104	68	h
105	69	i
106	6A	j
107	6B	k
108	6C	l
109	6D	m
110	6E	n
111	6F	o
112	70	p
113	71	q
114	72	r
115	73	s
116	74	t
117	75	u
118	76	v
119	77	w
120	78	x
121	79	y
122	7A	z
123	7B	{
124	7C	|
125	7D	}
126	7E	~
127	7F	DEL

Table 4-1: ASCII Characters

Status Bytes

Setup Option 2 is used to enable the scoreboard to decode METTLER TOLEDO continuous output. The following tables list the standard status bytes for METTLER TOLEDO standard continuous output.

Bits 2, 1, and 0			
2	**1**	**0**	**Decimal Point Location**
0	0	0	XXXX00
0	0	1	XXXXX0
0	1	0	XXXXXX
0	1	1	XXXXX.X
1	0	0	XXXX.XX
1	0	1	XXX.XXX
1	1	0	XX.XXXX
1	1	1	X.XXXXX
Bits 4 and 3			
4		**3**	**Build Code**
0		1	X1
1		0	X2
1		1	X5
Bit 5			Always = 1
Bit 6			Always = 0

Table 4-2: Status Byte A Bit Definitions

Status Bits	Function
Bit 0	Gross = 0, Net = 1
Bit 1	Sign: Positive = 0, Negative = 1
Bit 2	Out of Range = 1 (Over Capacity or Under Zero)
Bit 3	Motion = 1, Stable = 0
Bit 4	lb = 0, kg = 1 (see also Status Byte C, bits 0-2)
Bit 5	Always = 1
Bit 6	Zero Not Captured = 1

Table 4-3: Status Byte B Bit Definitions

Bits 2, 1, and 0			Weight Description
2	**1**	**0**	
0	0	0	lb or kg, selected by Status Byte B, bit 4
0	0	1	grams (g)
0	1	0	metric tons (t)
0	1	1	ounces (oz)
1	0	0	troy ounces (ozt)
1	0	1	penny weight (dwt)
1	1	0	tons (ton)
1	1	1	custom units
Bit 3			Print Request = 1
Bit 4			Expand Data x 10 = 1, Normal = 0
Bit 5			Always = 1
Bit 6			Always = 0

Table 4-4: Status Byte C Bit Definitions

METTLER TOLEDO

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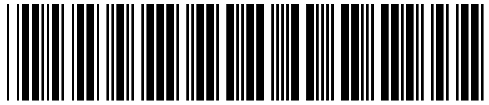

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