8618

Scoreboard

User's Guide

B15412200A
(2/99).00

METTLER TOLEDO

Publication Revision History

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

Publication Name:	8618 Scoreboard
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Part Number	Date	Revisions
A15412200A	2/98	Added Remote Power Supply and Protocol P:20 information.
B15412200A	2/99	Added declaration of conformity. Added dimension drawing of 8618 Scoreboard. Changed input voltage range to 6.5 to 30 Volt DC. Added information about programming mode change for version 5.10 to Chapter 5.

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 may be obtained by writing, calling, or faxing:

METTLER TOLEDO
1900 Polaris Parkway
Columbus, Ohio USA 43240
phone: (614) 438-4511
fax: (614) 438-4958
www.mt.com

FCC Notice

This device complies with Part 15 of the FCC Rules and the Radio Interference Requirements of the Canadian Department of Communications. Operation is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

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

Declaration of conformity
Konformitätserklärung
Déclaration de conformité
Declaración de Conformidad
Verklaring de overeenstemming
Dichiarazione di conformitá

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,
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Model/Type: 8618 Auxiliary Display Device

to which this declaration relates is in conformity with the following standard(s) or other normative document(s).
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Auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou au(x) document(s) normatif(s).
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A cui si riferisce questa dichiarazione è conforme alla/e sequente/i norma/e o documento/i normativo/i.

CE Conformity / CE-Konformität / Conformité CE
90/384/EU Nonautomatic Balances and Scales / Nichteselbsttätige Waagen / Balances à Functionnement non automatique
Article 1.2.b.
89/336/EU EMC Directive / EMU-Richtlinie / Directive concernant la CEM
EN50081-1:1992 Immunity
EN50082-2:1994, A Emissions / Funkstörungen
73/23/EU Low Voltage / Niederspannung / basse tension*
EN61010 el. Safety / el. Sicherheit / sécurité el.

* When installed with an approved and compatible external power supply

Other Directives and Standards / Andere Richtlinien und Normen / Autres documents
corresponding to local requirements / entsprechend lokalen Anforderungen / correspondant aux exigences locales

As marked

Darrell Flocken, Manager - Weights & Measures
Office of Weights and Measures
Worthington, Ohio USA
February, 1999

according to EN45014

Precautions

READ this manual BEFORE operating or servicing this equipment.

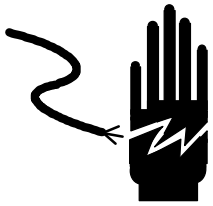
FOLLOW these instructions carefully.

SAVE this manual for future reference.

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

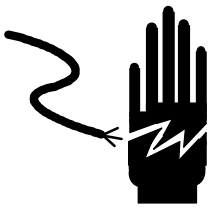
ALWAYS DISCONNECT this equipment from the power source before cleaning or performing maintenance.

CALL METTLER TOLEDO for parts, information, and service.



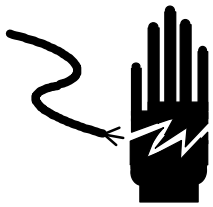
⚠ WARNING

ONLY PERMIT 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 THIRTY (30) SECONDS BEFORE ANY CONNECTIONS OR DISCONNECTIONS ARE MADE. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN DAMAGE TO OR DESTRUCTION OF THE EQUIPMENT OR BODILY HARM.

CAUTION

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.

Contents

1 Introduction

The METTLER TOLEDO Model 8618 Scoreboard provides you with highly visible weight indication at locations other than where the scale indicator is located. The six-digit display features 102-mm (4-inch) digits which can easily be read from 30 m (100 ft) away. Common applications include truck scales, metals charging scales, and livestock scales.

The scoreboard is specifically designed to operate with METTLER TOLEDO digital indicators equipped with continuous serial data output. It meets the requirements of various industrial environments.

WARNING

Note that all approvals and certificates are based on correct mounting, grounding, and connections. Any deviation may result in unexpected performance of the system.

Specifications

The 8618 Scoreboard conforms to the following specifications:

Input voltage range

6.5 to 30 Volt DC

Maximum current consumption

20 mA operation

25 mA powerup

Operating/Storage temperature

-30°C to +70°C (-22°F to +158°F)

Display

Serial; LCD, six character maximum, 4-inch digits

Communication

RS-232
RS-422/485
20mA current loop passive receive
300, 1200, 2400, 4800, 9600, 19200 baud
7 or 8 data bits
Parity is none, even or odd
1 or 2 stop bits

Weight

3.9 kg (8.755 lb)

Enclosure

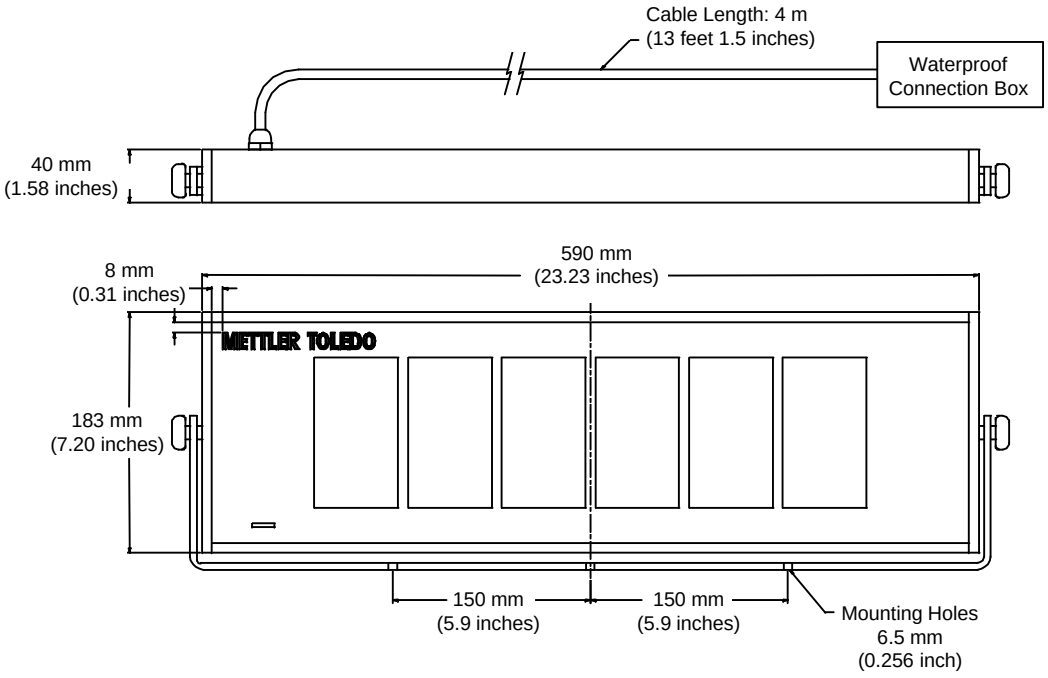
The 8618 Scoreboard is housed in a rain-tight aluminum enclosure and has a glass front panel.

Echo data output

Same data as input. Communication is 20 mA current loop passive.

Dimensions

Dimensions for the 8618 Scoreboard are shown below:



Standards Compliance

The following European compliance standards apply to the 8618 Scoreboard.

Standard	Results
EN 50081-1: 1992	Pass
EN 50082-2: 1994	Pass

2 Installation

⚠ WARNING

This module 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 can result in bodily injury and/or property damage.

Environment

Install the 8618 Scoreboard in a location that permits access for maintenance and inspection. Locate the scoreboard so that dirt, excessive water, and other harmful materials will not fall on or around the enclosure.

Preparation

Make sure you have all the following components before you begin installation:

- 8618 scoreboard
- Cable attached
- J-Box attached
- 2 labels (kg and lb)
- User's Guide

Review the manual carefully. If this is your first time installing a scoreboard, we recommend connecting the equipment on a workbench before installing it in the field.

Remote Power Supply

METTLER TOLEDO part number TA000140 may be used to power the 8618 scoreboard for applications requiring a remote power supply. This power supply is rated 12 VDC at 500 mA and will power up to five scoreboards on one 20-gauge copper wire, twisted-pair, shielded cable (1000 foot run). Such a configuration is the intended worst case and will draw a nominal 100 mA, with a voltage drop on the cable of approximately 2 volts. A 20-gauge, four-conductor, two-twisted-pair, shielded cable would carry power on one pair and signal on the other.

The 8618 scoreboard has a power supply requirement of 6.3 to 30.0 VDC with 25 mA maximum current draw. The installer must use a remote power supply unless the scale

indicator has sufficient power available to drive the scoreboard. When determining power available, you will have to consider all the devices being powered by the indicator and make sure not to overload the supply.

The indicators listed in the following table have been tested in a simple application of one indicator to one scoreboard, with the results noted.

Scale Indicator Model	Power Available for 8618	Remote Power Supply
Jaguar	Yes	Optional
Lynx	Yes	Optional
8530	No	Required
8146	No	Required
Mettler ID Series	No	Required
Panther	No	Required
Puma	No	Required
Spider	No	Required

Label Selection and Attachment

The 8618 Scoreboard includes two labels: kg and lb. You may use either label to display the measurement unit on the right-hand side of the six-digit display. A blank plate for the labels is provided to the right of the sixth digit on the face of the scoreboard.

Note: You may use any label on the 8618 Scoreboard. Just remember to use a good quality foil for a long service life.

Before putting the labels in place, make sure the glass surface is clean and dry. Avoid attaching the labels when the temperature is below 10°C (50°F). Keep the front liner on until the label is properly mounted. Then press the label firmly in place and remove the front liner carefully.

Protocol Selection

For most installations, the 8618 Scoreboard can use its default settings, which means you will not have to make any alterations to the setup when connecting to a standard instrument with Toledo Continuous Protocol. If you are connecting to any other instrument, please refer to Chapter 5 (Setting Operational Parameters) and Chapter 6 (Protocol Selection). Note the standard setup displayed at power-up:

XX.XXN	Version Number
P:21	Protocol Selected 21
C:4800	Baud rate 4800
A:00	Address of the Display 00

Any deviation will require that you edit the operational parameters. For more information, see Chapter 5 (Setting Operational Parameters).

Connection

The default electrical interface is 20 mA current loop passive. You may use RS-232 or RS-485, which require only a simple rewiring of the conductors in the connection box. A description of the conductors terminated in the connection box is shown below.

Terminal No.	Terminal Name	Color	Signal Description
1	+12 V	Pink	Regulated 12 VDC to supply the electronics (6.3 to 30 VDC)
2	GND	Grey	Return line for 12 volt supply (0 volt)
3	20-mA-IN+	White	Input signal for 20-mA-Current loop, relates to IN COM
Optional 3	RS-232-IN+	Blue	Input signal for inverted RS-232C, relates to IN COM
Optional 3	RS-485-A+	Black	Input signal for RS-485 A+, relates to RS-485 B-
4	IN-COM	Brown	Common input signal, relates to 20mA/RS-232 IN+
Optional 4	RS-485-B-	Violet	Input signal for RS-485 B-, relates to RS-485 A+
5	OUT+	Green	Output signal, relates to OUT COM
6	OUT-COM	Yellow	Output signal, relates to OUT+
7	SCREEN	Screen/Earth	Protective ground, Cable Shielding

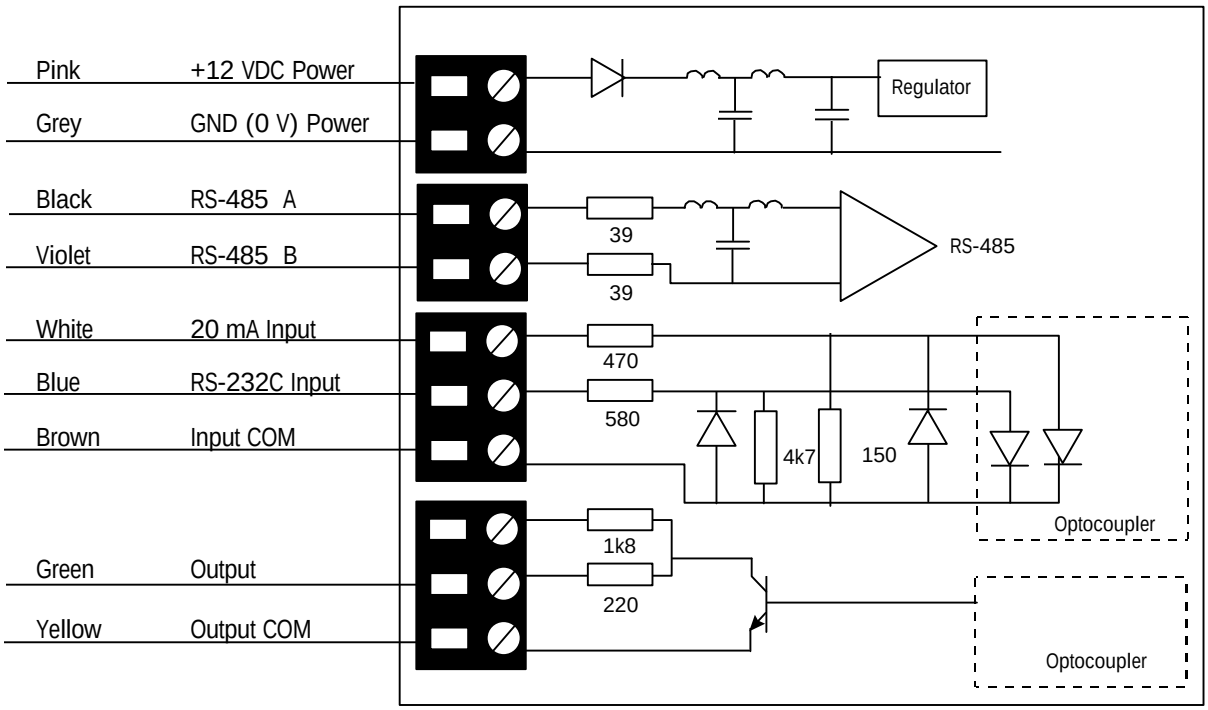


Figure 2-a: Electrical Interface

To simplify the connection scheme, all three variants are shown in Figures 2-b, 2-c, and 2-d.

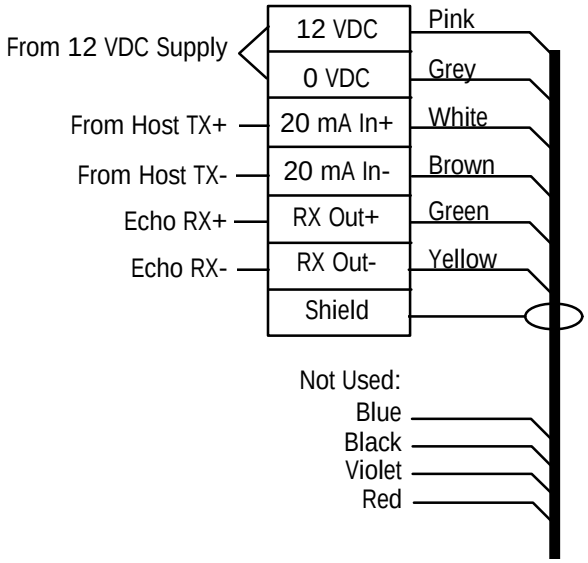


Figure 2-b: 20 mA Connection

The 8618 Scoreboard has a passive receiver as well as a passive transmitter interface. Normally, the RX is not in use. Connections to the green and yellow conductors may be omitted.

Typical Hookup Diagram for 20 mA

Jaguar		8618	
COM 2			
20 V	Pink	+12 VDC	
GND	Grey	0 VDC	
COM 1			
CL T+	White	20 mA In+	
GND	Brown	Input COM	

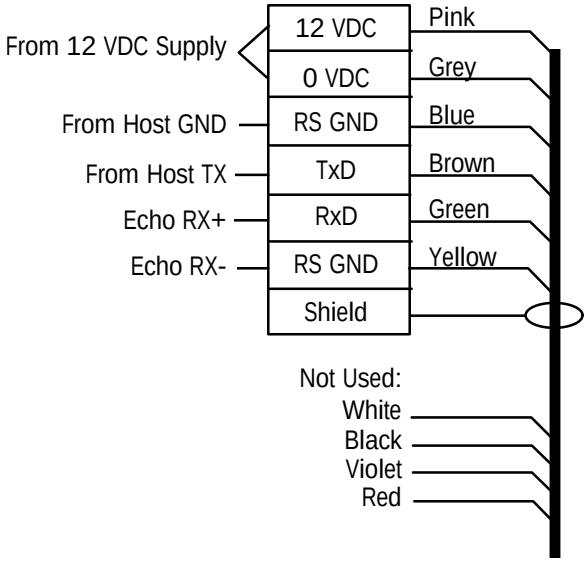


Figure 2-c: RS-232 Connection

Note that the signal is inverted compared to the 20 mA current loop connection, connecting the TxD to the "common" terminal. This can be done due to the galvanically isolated input circuit used. Normally, the RX is not in use. Connections to the green and yellow conductors may be omitted.

Typical Hookup Diagram for RS-232

Jaguar		8618	
COM 2			
20 V	Pink	+12 VDC	
GND	Grey	0 VDC	
COM 1			
T+	Brown	Input COM	
GND	Blue	RS-232 Input	

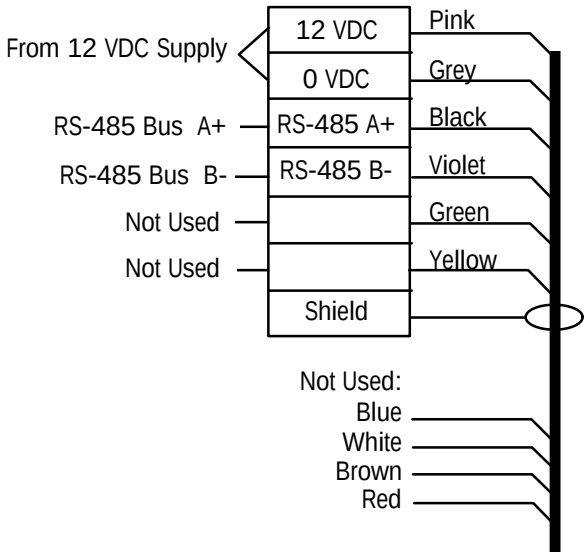
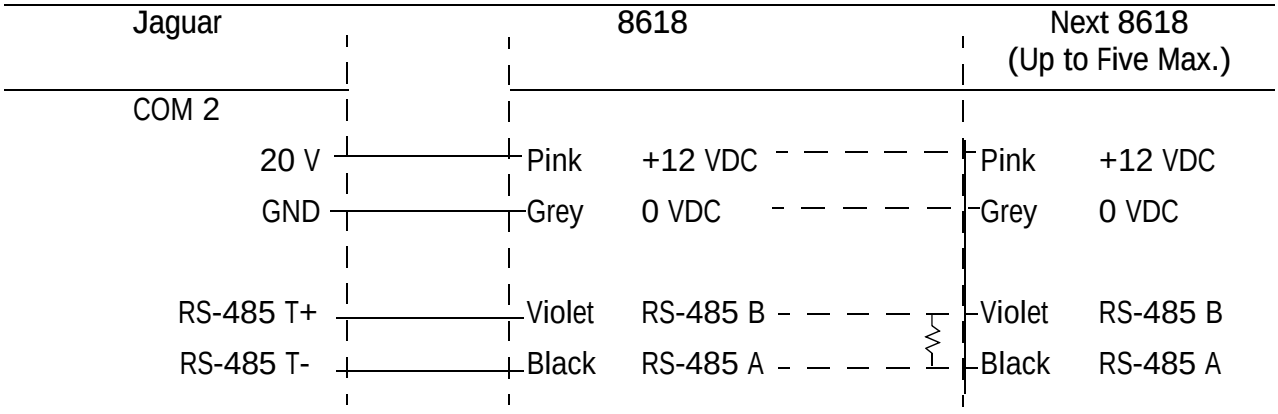


Figure 2-d: RS-485 Connection

To provide a true multi-drop bus solution, the 8618 Scoreboard is equipped with an RS-485 transceiver. Please note:

- The RS-485 bus is not galvanically isolated from the display power. The display casing has a 1-Meg-Ohm resistance to display ground.
- The RS-485 bus needs a terminating resistor at the physical end of the (twisted pair) data cable. The terminating resistor must match the impedance of the interconnecting cable, typically 100 to 120 ohms. Consult specification of cable for information.

Hookup Diagram for RS-485



20 mA Echo Output: For daisy-chaining multiple scoreboards together, the 20mA output circuit can be used to transmit data to the next device. The scoreboard does not know how the data enters the processor, so you can input data to the first display in any format (RS-232, RS-485, RS-422, 20 mA CL) and redistribute it from the output (Echo) port using the current loop connection. Delay on the line is one byte-time per connected display.

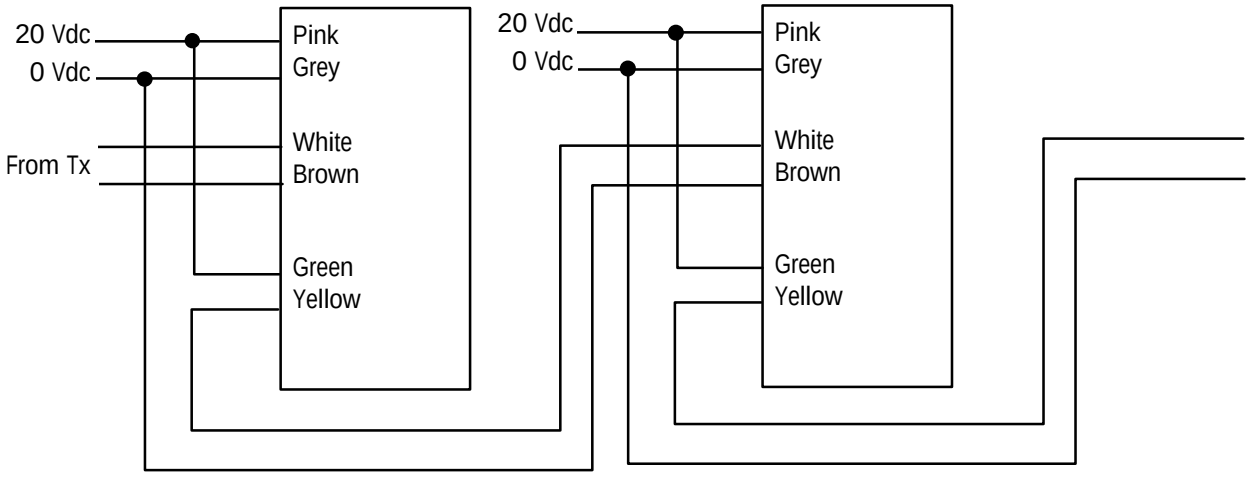


Figure 2-e: 20 mA Echo Output

Mounting

A universal mounting bracket is supplied with the 8618 Scoreboard that is especially suited for ceiling, roof, or wall mounting. Use three 6.2 mm or 1/4 inch screws to attach the bracket to a rigid surface. Evaluate the expected torque applied by wind forces to ensure a safe mount. If the fitted thumb screws are inadequate to firmly hold the scoreboard, replace them with stainless steel bolts M6 x 20 (1.0 mm) and use a torque of approximately 10 nm.

3 8618 Scoreboard Behavior

Power-up

When power is supplied to the scoreboard, all segments on the scoreboard surface will be activated for a few seconds then deactivated for a short period of time. During this sequence, most segment failures can be manually detected.

The display will perform a series of self-diagnostic tests, with error messages such as Err.03 indicating any defects. An initial error condition will be ignored by the system, and normal operation will be continued despite the error.

After the initial tests, the program version number is displayed. This number should be noted and communicated to your supplier in the event of a failure. Options installed are then displayed, followed by P:XX to indicate the active protocol in use, C:XXXX for baud rate setting, and A:XX for address setting.

As the internal checks are completed, the display turns blank with all decimal points turned on to indicate a waiting condition. For some protocols, line status checking is done during initialization of protocol. A non-connected 8618 Scoreboard will not report any error messages after each time-out period.

Time-out

There are two time-outs used with the 8618 Scoreboard: long and short. These functions are enabled for all advanced protocols (P:21, 22, 23). The short time-out may be enabled/disabled for protocol P:20 only by use of the TA000138 IR Remote Control Option.

- The long time-out fully resets the 8618 Scoreboard after approximately 4 minutes without any communication activity. The time-out period is normally reset for each valid message received.
- The short time-out will typically blank the screen to indicate that no activity has occurred during the last few seconds (typically 5-6 seconds). In response to a short time-out, the display becomes blank and the protocol is initiated according to the parameter settings.

All protocols have short time-out enabled as a fixed parameter and cannot be effectively changed. Only protocol P:20 may have short time-out disabled. P:20 protocol does not use long time-out.

4 Error Messages

Error Messages

An error message is briefly displayed when an internal error occurs. Errors are communicated to the 8618 Scoreboard from the connected scale indicator. Typically, this includes over range, instability or host failure. The most common errors or events are represented by symbols.

Waiting for valid data (time-out):	, , , , , ,	All decimal points set
Over range indicated by status bit in the data string:	- - - - - -	All upper segments on
Under range indicated by status bit:	_ _ _ _ _ _	All underscore
Out of range (over or under):	= = = = =	All upper and lower segments
Not stable (indication not verified):	- - - - - - -	All minus signs
Too many digits to present:	- - -	Alternate minus and blank
Error condition:	E r r. X X	XX denotes type of error.

The error codes are grouped together in categories that specify general conditions such as system or communication errors. Errors are decimal, ranging from 00 to 99, and arranged in 10 groups. The first number in each group provides a general indication of the error type. For example, 10 indicates a general communication error while 30 indicates a general conversion error. The most common error conditions are noted in the following list. The system will detect errors and try to reset or correct itself. Therefore, the error codes are normally displayed only for a short period of time.

System Errors	00	General system/internal failure
	01	Reset warm start
	02	Light source failed
	03	Display read back failed
	04	RAM check failed
	05	ROM check failed
	06	Register check failed
Communication Errors	10	General communication error
	11	Time-out occurred
	12	Frame error / baud rate incorrect
	13	Parity error
	14	Receiver overflow (lost characters)
	15	Transmitter overflow (lost characters)
	16	Line break (resting at wrong RXD level)
Protocol Errors	20	General protocol/packet error
	21	Buffer overrun (too long message)
	22	Checksum failed

	23	Byte count error
	24	Illegal command (not known)
	25	Checksum fails
	26	Illegal character in block
Conversion Errors	30	General conversion error
	31	Under scale / out of range
	32	Over scale
	33	Truncation done (lost precision)
	34	Sender fails (unspecified)

5 Setting Operational Parameters

Setting Operational Parameters

Note: Some parameters have no operational effect on the behavior of a particular protocol, while others can disable proper operation. One such parameter is the SYSTEM/ADDRESS, which should be set to 00 when not in use. Any other value will make the display reject all messages except when the address header matches the programmed display address.

Communication parameters such as baud rate, data bits, parity and stop bit are set by an optional TA000138 Infrared Remote Control. All parameters to be selected are stored in an on-board EEPROM. The choice of alterable parameters are listed in the table below.

The 8618 Scoreboard has a small window on the left-hand side of the front panel. This window receives the IR programming signal from the Infrared Remote Control. Effective range of operation for the IR control is 8 inches. For program version 5.10 and later, the programming mode is disabled during normal operation. To enable the programming mode, you will have to disconnect the data line before using the remote control.

To enter the menu system, press the «OPEN» key several times, until the display responds with CodE0. By pressing the programmed 4-digit code (usually 0000), you gain access to the menu. Use arrow keys to traverse and the «YES» key to select. The «NO» key will bring you back to the previous menu item or end the set-up procedure.

DISPLAY*		Set the display type in use by rolling through.
TEST*		Not available.
LINE	BAUD	Setting line parameters such as baud rate.
	DATA	Set the number of data bits.
	PARITY	Set the parity used.
PROTOCOL		Set the protocol number to use.
SYSTEM	ADDRESS	Set address associated with the display.
	DP SET*	Set fixed decimal point (not in use).
	DIGITS*	Set number of digits on display.
	SUP 0**	Set suppression of leading 0's on/off.
	SUP B**	Set suppression of leading blanks on/off.
	TIMEOUT**	Set short time-out on/off (6 seconds).
	ECHO***	Set communication echo function on/off.
	STARTC*	Set start-of-message byte ASCII value.
	STOPC*	Set end-of-message byte ASCII value.
	TSUPRES*	Set text suppression on/off.
	IGNORE*	Not available.
	NET*	Indicate net value on/off.
ANALOG	P1, P2*	Set the A/D parameters and calibration.
PULSE	RESET*	Set the pulse counter variables.
	PER COUNT*	Set the counting rate.
	UP/DOWN*	Set counting to up/down.

*Do not use. **Apply only to P:20.

***Echo always defaults to ON for P21, P22, P23, and P24, disabling the OFF selection.

When pressing «YES» to make a selection, the currently active value will be displayed. Use the arrow keys to roll in the other possible values or type the required parameter number. Press the «YES» key to accept the new choice. There is not a 'Cancel' key, so please program with care. All new parameters take effect immediately after normal operation is resumed. To end the Programming Mode, press the «NO» key repeatedly, until End and Err.11 is displayed. The system will automatically restart.

Notes on IR Remote Control Operation

Pressing the OPEN key while holding down the SHIFT key will force the program to "END" and automatically restart.

When using the IR remote tool, take care that other nearby 8618 scoreboards are protected from the infrared signal, by either shielding the units or removing power from them.

The infrared receiver located on the control board inside the 8618 may be sensitive to certain frequencies emitted from artificial light sources. If the display is operated with the control board exposed to light sources, the following symptoms may occur: intermittent error code and intermittent restart.

6 Protocol Selection

Protocol Selection

To provide support for all widely used METTLER TOLEDO instruments and related systems, one of several protocols may be selected to reflect the connected instrument.

Protocol	Instrument	Description
P:20	Computer	Simple protocol - Receives ASCII text data from a computer
P:21	MT Continuous Data	Default setting, no address (A:00)
P:22	MT 8624 Multi-drop format	Addressed (A:01 to 05)
P:23	MT 8617 Multi-drop format	Addressed (A:01 to 05)
P:24	MT ID series	No address (A:00)

Protocol P:20

Protocol P:20 sets the 8618 scoreboard to receive a simple ASCII string.

The scoreboard has six digits and can display a maximum of six characters from a host device. The data received is filtered so that only specific data will be displayed. The valid data are the ASCII characters: <0>, <1>, <2>, <3>, <4>, <5>, <6>, <7>, <8>, <9>, <-> minus sign, <.> decimal point, and <,> comma. No other ASCII characters will be displayed. Any display characters transmitted before the minus sign will be ignored. One decimal point or comma may be transmitted between any two numeral characters. So you could display a date using a decimal point delimiter, for example, <02.14.98>. Minus sign is displayed left justified and text is displayed right justified. The comma and decimal point both turn on the same element on the display.

The data format is <STX>DDDDDD<CR>, where D is a numeral ASCII character (0 to 9). When the minus sign is used, the maximum of numeral ASCII characters is 5. To blank out the scoreboard in the P:20 protocol, omit data characters in the transmit string: <STX><CR>.

TSUPRES option (this is always enabled, so it is not really optional)

Text suppression (filtering): all invalid text characters are discarded; however, valid text received after invalid text will overwrite the receive buffer.

Examples:

Data	Display
<STX>12QW<CR>	12
<STX>34AS56<CR>	56
<STX>ASDF<CR>	Blanks Display (same as <STX><CR>)

SUP 0 (zero) option

SUP B (blank) option

Suppress leading zeros and leading blanks (spaces) setup features apply only to protocol P:20. If SUP 0 is set to OFF, then leading zeros will be displayed. It does not matter whether SUP B is set to ON or OFF, since the space character is an invalid character and will be discarded.

TIMEOUT option

When TIMEOUT is set to OFF, the scoreboard will continue to display the current message until new data is received. When it is set to ON, the scoreboard will time out and report [, , , , , ,] waiting for data error message. The time-out period is six seconds.

Protocol P:20 with Addressing Feature

The addressing command must reside immediately following the START OF PROTOCOL byte, and the message to be displayed must reside in the same protocol body (prior to the END OF PROTOCOL byte). All addressed displays will be deselected after a message is received, so a new addressing command must be received for each message sent.

Protocol for addressed operation will be the STX-CR delimited string, where:

START OF PROTOCOL = <STX>

END OF PROTOCOL = <CR>

The address command is <SOH><address high><address low><STX>. Address high and low are ASCII characters representing a hex number. For example, an address of ASCII 44 (high = 4, low = 4) represents the hex number 44. Allow a 50 ms delay after each message to an addressed display.

Example transmission for an addressed scoreboard (address is 01 in scoreboard):

<STX><SOH>01<STX>1234.56<CR>

The scoreboard will display the message "1234.56"

All addressed scoreboards will respond to data strings sent with an address of 00. This is useful for occasions where multiple displays should be blanked or tested. Displays with an address of 00 will interpret and display all messages.

7 Accessing Internal Parts

Accessing Internal Parts

WARNING

Opening the enclosure without authorization will affect the guarantee.

WARNING

This module 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 can result in bodily injury and/or property damage.

Before servicing the 8618 Scoreboard, disconnect it from its power source. To access the inner components, such as when replacing the EPROM on the display controller, the correct side panel must be removed. Normally, the panel on the same side as the cable gland is the one that should be removed. There are components attached to the side panel with wires, so you should always handle all parts carefully.

Note that the glass front has sensitive printing on the inside. Scratching this layer may result in severe visual degradation.

When operating in a dusty or wet environment, please take all possible precautions to prevent dust particles or water droplets remaining in the enclosure after servicing. Contamination and humidity may harm the electronics.

To access internal parts:

- Loosen the thumbscrews attached to the mounting bracket.
- Unscrew the four screws in the side panel using a Torx 10 screwdriver, taking care not to lose any of the small O-ring seals under the screw heads.
- Carefully loosen the panel without damaging the cables or components. Disconnect the cables if necessary.

To reinstall the panel, follow the reverse procedure:

- Attach any cables that were loosened.

- Replace the panel in its correct position, making sure that no cable is squeezed in between the panel and the enclosure.
- Fasten the four screws properly.
- Verify that all seals are secure.
- Mount the display case (enclosure) in the bracket.

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Publication Suggestion Report

If you have suggestions concerning this publication, please complete this form and fax it to (614) 481-7295

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PROBLEM(S) TYPE:	DESCRIBE PROBLEM(S):			INTERNAL USE ONLY
☐ **Technical Accuracy**	☐ Text	☐ Illustration		
☐ **Completeness** What information is missing?	☐ Procedure/step ☐ Example ☐ Explanation	☐ Illustration ☐ Guideline ☐ Other (please explain below)	☐ Definition ☐ Feature	☐ Info. in manual ☐ Info. not in manual
☐ **Clarity** What is not clear?				
☐ **Sequence** What is not in the right order?				
☐ **Other Comments** Use another sheet for additional comments.				

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