

## **Communication**

### **A. RS-232 HOST INTERFACE**

Note: The RS-232 interface is still enabled when the scale is connected to and communicating with a USB host. Scale to communicate from serial port and from virtual serial port at the same time.

#### **A.1. Host Data Transmission Format**

Data is transmitted and received asynchronously by the scale via an RS-232 interface. The following format settings are supported:

- Baud Rate (300, 1200, 2400, 4800, 9600, 19200, 38400, 56900)
- Parity (none, even, odd, mark, space)
- ASCII bit string (7 or 8)
- Stop bits (1,2)

There is no minimum time required between commands. The scale will store inputs and respond in order.

#### **A.2. Handshaking Signals**

Hardware flow control is not supported. A Clear To Send (CTS) pin is supplied (pin 8) which is high whenever the scale is in powered up.

No software handshaking has been implemented either. XON/XOFF commands are discarded.

#### **A.3. RS232 Host Communication Protocols**

The scale can be programmed to respond to one of eight defined protocols.

The host sends requests to the scale in the form of ASCII data and control characters, as determined by the protocol selected. The scale responds to the host with a string of ASCII characters and bit encoded status bytes.

CUSTOMER HOST COMMANDS

Command	Command Description	Scale Response
'W'	Send normal resolution weight data.	<p>&lt;STX&gt;YYYlbYY.Yoz&lt;CR&gt; (for lb-oz build with one decimal)</p> <p>&lt;STX&gt;YYlbYY.YYoz&lt;CR&gt; (for lb-oz build with two decimal)</p> <p>&lt;STX&gt;XXXXXX&lt;CR&gt; (for kg/lb/g increment)</p> <p>&lt;STX&gt;?&lt;StatusByte&gt;&lt;CR&gt; (if current weight is invalid)</p>
	Weight and tare,	<stx>XXXXXXG<sp>XXXXXXuuN?<status-byte><cr> uu is unit name "kg/lb/oz/ g", oz will output when lb-oz build
	Label Offset	<stx>XXXXXXG<sp>XXXXXXuu+?<status-byte><cr> uu is unit name "kg/lb/oz/ g", oz will output when lb-oz build
'H'	Send high resolution weight data.	<p>&lt;STX&gt;XXXXXXX&lt;CR&gt; or</p> <p>&lt;STX&gt;?&lt;StatusByte&gt;&lt;CR&gt;(if current weight is invalid)</p> <p>oz will output when lb-oz build</p>
'A'	Perform a confidence test of RAM, ROM and EEPROM. Store results of tests in confidence status byte for later retrieval.	<p>&lt;STX&gt;&lt;CR&gt;</p> <p>The scale responds with &lt;STX&gt;&lt;CR&gt; indicating the command was received</p>
'B'	Send results of confidence test.	<p>&lt;STX&gt;?&lt;Confidence Status byte&gt;&lt;CR&gt;</p> <p>Confidence test status byte</p>
'C'	Initiate host interface scale calibration.	Refer to Section A.1.3 for detailed description
'D'	<p>.Differential Weights (Take away, Prod verification Modes)</p> <p>G=Gross, N= Net, D= differential wt (x10)</p>	<p>Take away, Prod verification Modes;</p> <p>&lt;stx&gt;XXXXXXG&lt;sp&gt;XXXXXXN&lt;sp&gt;XXXXXXuuD?&lt;status-byte&gt;&lt;cr&gt;</p> <p>uu is unit name "kg/lb/oz/ g", oz will output when lb-oz build-</p> <p>All other modes;</p> <p>&lt;STX&gt;?&lt;STATUS BYTE&gt;&lt;CR&gt;</p>
'E'	Enter "echo" serial port test mode. All character sent to the scale will be echoed back to the host. "F" terminates test	<STX>E<CR> The scale echoes back the letter E indicating the command was received.
'F'	Terminate the "echo" serial port test mode.	<STX>F<CR> The scale echoes back the letter f indicating the command was received.
'G'	Not Supported	Not Supported

'L'	Switch to and send avoirdupois (lb) weight.	Same as "W" command above If unit switching mode is disabled in setup or build,; <STX>?<STATUS BYTE><CR>
'K'	Switch to and send metric (kg) weight.	Same as "W" command above. If unit switching mode is disabled in setup or build,; <STX>?<STATUS BYTE><CR>
'S'	Not Supported	Not Supported

Command	Command Description	Scale Response
'P'	Send counting mode data. G=Gross, N=Net, A=Average Piece Weight (must be to 4 decimal places), C=Count	Counting Mode; <stx>XXXXXXG<sp>XXXXXXN<sp>XXXXXXuuA<sp>XXXXXXC?<status-byte><cr> uu is unit name" kg/lb/oz/ g", oz will output when lb-oz build All other modes; <STX>?<STATUS BYTE><CR>
'T'	Take weight on the platter as TARE.	Product Verification, Counting, Wt+Tare, and Lbl Offset modes. <stx>XXXXXXG<sp>XXXXXXuu<sp>?<status-byte><cr> uu is unit name" kg/lb/oz/ g", oz will output when lb-oz build In Basic Weighing and Price modes; <STX>?<status byte><CR>
'Z'	Zero scale unless in motion or out of range under or over capacity.	<STX>?<status byte><CR> Scale status byte

**NOTES:**

1. A status byte message <STX>?<status byte><CR> is sent in place of the requested weight data field if the scale is in motion, under zero or over capacity when the weight data request is sent. See below for status byte definition.
2. Brackets "<>" are used to indicate that the characters within are a description of the transmitted data and are not part of the transmitted data string. <STX> denotes an ASCII Start of Text character (hex 02). <CR> denotes an ASCII Carriage Return (hex 13).
3. If a confidence test results in an error, the scale does not respond to the W, T, Z, L or K command until the error condition is cleared. A confidence test error also causes the scale weighing operation to halt until the error condition is cleared. See below for confidence test status byte definition.
4. An "N" after the weight in response to the W command denotes net weight.

**Scale Status Byte Format - Mettler Toledo**

If weight is requested from the scale during motion or out of range under or over capacity, a status byte is sent in

place of the weight field. The bits of the byte are defined as follows:

Scale Status Byte Bit Definitions

Bit No.	Bit Description
6	1 = Avoir 0 = Metric
5	1 = No tare or lb offset was taken 0 = Tare or lb offset was taken.
4	1 = Center of zero. 0 = Not at center of zero.
3	1 = Outside zero capture range. 0 = Within range.
2	1 = Under Zero 0 = Within weighing range.
1	1 = Over capacity. 0 = Within weighing range.
0	1 = Scale in motion. 0 = Stable weight data.

Scale Status Byte Bit Definitions

**Confidence Test Status Byte Format - Mettler Toledo**

The confidence test status bits are defined as follows. Bit 6 is set to 1 after a confidence test is performed and reset to 0 after the host reads the confidence test status byte.

Bit No.	Bit Description
6	1 = New status data available. 0 = Host has read data.
5	Bit is always a 0.
4	1 = ROM test failed. 0 = ROM test passed.
3	1 = RAM test failed. 0 = RAM test passed.
2	Bit is always a 0.
1	Bit is always a 0.
0	1 = EEPROM test failed 0 = EEPROM test passed.

Confidence Status Byte Bit Definitions

NOTES:

The confidence byte for all tests passed is an ASCII @ (hex 40). Repeated reads of the confidence byte for all test passed without initiating a new confidence test results in an ASCII <NUL> (hex 00)