

# MSI 3360

RS-232 I/O Option



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## COMMUNICATION PORTS

- The MSI-3360 is equipped with a single RS-232 serial input/output. The Comm Port is intended for interfacing printers, data loggers, scoreboards, and computers to the 3360 Crane Scale.
- Data output is selectable from 5 pre-formatted strings and 1 fully formattable string. The 3360, under menu control will print control characters for easy interfacing to any label printer. An initialize string combined with start string, user programmable data, weight data, and end strings, provides complete control over printed data.
- Many scales and weigh meters suspend weighing operation while printing and will not function until a print job is completed. The MSI-3360 RS-232 option uses advanced DMA (direct memory access) techniques for transmitting the print strings. This prevents long print jobs from interfering with scale operation.

### Comm Port Function

The RS-232 input/output is used to output weight and total data to a printer or it can be used for 2-way communications with a computer. In addition there are several automatic print modes including print on Total, when there is a weight change, or when a set point is reached. Interval and continuous printing is available for data logging or interfacing Scoreboard displays.

Note: The following RS-232 Menu is entered via the User Setup Menu (when calibrated to Industrial or One Unit modes) or the Calibration Setup Menu (when calibrated to NIST or European modes).

| Menu  | Sub-Menu   | Display Definition   | Comments  |
|-------|--|--|---|
| For   | dAtA<br>StLin<br>EndLn<br>E-Chr  | Format<br>Data string 60 bytes<br>Start line 4 bytes<br>End line 4 bytes<br>Expect char 1 byte   | <ul style="list-style-type: none"> <li>To enter data strings, the left 2 digits of display show the string position you are editing. The right 2 digits show the current value of that string position in HEX.</li> <li>The flashing cursor shows which digit is being edited.</li> <li>&lt;USER&gt; cycles the digit 0-F.</li> <li>&lt;TARE&gt; accepts the entry.</li> <li>&lt;ZERO&gt; exits this routine.</li> <li>Reaching the end of this string also exits this routine.</li> <li>0 0 HEX is the string terminator.</li> </ul> |
| StrnG | Str 1<br>Str 2<br>Str 3<br>Str 4<br>Str 5<br>Str U                         | Print string<br>String 1<br>String 2<br>String 3<br>String 4<br>String 5<br>User-defined string  | Selects which output format will be sent — print string 1,2,3,4,5 or the user-defined string.   |
| odE   | OFF<br>OutPt<br>LISTn<br>dUPL  | Printer mode<br>Disabled<br>Output only<br>Listen only<br>Duplex (output and listen)   |   |
| Cntr  | USEr<br>Cont<br>OCtS<br>OnSP1<br>OnSP2<br>SP1-2<br>OnChG<br>OnLod<br>OnttL | Printer control<br>User key<br>Continuous<br>On CTS<br>On setpoint 1<br>On setpoint 2<br>On setpoint 1 and 2<br>On change<br>On load<br>On total         | Selects the trigger that sends the output string.   |
| otion | OFF<br>On  | Motion<br>Motion off<br>Motion on  | Always on in NIST mode.   |
| IntEr | OnCE<br>On   | Print time interval  | Allows output at a regular time interval. Activates the print interval command. Prompts user to enter a value from 0 to 28,800 seconds.   |
| SEt   | bAud<br><br>StoP<br><br>dbitS<br><br>PAr<br><br>HAnd                       | 300<br>600<br>1200<br>2400<br>4800<br>9600<br>19200<br><br>1 bit<br>2 bit<br><br>7 bit<br>8 bit<br><br>nonE<br>EvEn<br>Odd<br><br>nonE<br>C-rtS<br>onOFF | Baud Rate<br><br>Stop Bits<br><br>Data Bits<br><br>Parity<br><br>Handshaking<br><br>CTS/RTS<br>XON/XOFF   |

Chart 5: RS-232 Menu Structure

ELECTRICAL CONFORMANCE

COMM PORT 1

The electrical characteristics of the serial input/output conform to the EIA Standard EIA-232-D (downward compatible with RS-232-C). The Comm Port is configured as DCE. Cable connections include RXD (input), TXD (output), Ground, CTS (input), RTS (output), and Shield Ground (also known as Frame Ground). CTS/RTS handshaking is optional and the lines do not need to be connected.

COMM PORT CABLING

The Comm Port RS-232 connections are made into TB3 found on the circuit board internal to the MSI 3360. Due to washdown requirements, no interface cable is supplied. Cables with an outside diameter of .187” to .300” (5mm to 7.5mm) are sealable with the watertight fitting. Preferably, cables should have twisted pair connections with an over shield. In the table below, twisted pairs are represented by A, B, and C.

| COMM PORT MODE | HAND-SHAKING | MIN # OF CONDS | W 1A | W 2A | W 1B | W 2B  | W 1C | W 2C  |
|----------------|--------------|----------------|------|------|------|-------|------|-------|
| TALK only      | None         | 2 + shield     | TXD  | GND  | -    | -     | -    | -     |
| LISTEN only    |              |                | RXD  |      |      |       |      |       |
| TALK only      | CTS/RTS      | 4 + shield     | TXD  | GND  | HSIN | HSOUT | -    | -     |
| LISTEN only    |              |                | RXD  |      |      |       |      |       |
| DUPLEX         | None or SW   | 4 + shield     | TXD  | GND  | RXD  | GND*  | -    | -     |
| DUPLEX         | CTS/RTS      | 6 + shield     | TXD  | GND  | RXD  | GND*  | HSIN | HSOUT |

\* If your cable does not have twisted pairs, eliminate one of the ground leads.

Chart 6: Recommended Cable Configurations

RS-232 Cable Installation

- 1) Remove the 3360 Battery. Remove the screws holding the front panel on.
- 2) Strip the outer insulation 1.5” (40mm) from the RS-232 cable. Peel back the foil shield (if any) being careful not to nick the conductors. Cut off the foil shield leaving the drain wire intact. Strip 3/16” (5mm) from each conductor. Slip a 1-5/16” (33mm) piece of sleeving over the drain wire and tin the end of the drain wire. It is also wise to shrink a short piece of heat shrink tubing over the end of the outer jacket to further insulate the Shield.
- 3) Loosen the watertight feedthrough. Remove the white plug. Feed the RS-232 cable through the watertight feedthrough.
- 4) The terminal block uses push levers. Insert the wires as shown in the following diagram. Insert a small flat bladed screwdriver in the white lever and push down to insert the wire. Use only the wires necessary for your application per Chart 6. Be sure to terminate the shield wire in position 1 (Shield Ground or Frame ground). In the Duplex with CTS/RTS mode where there are two signal grounds, connect both signal grounds to pin 6. After all the pins are connected, lightly wiggle and tug on each wire to ensure that they are securely attached. Reset or reposition the wires as necessary.
- 5) Replace the front panel being careful to seat the gasket evenly around the lip of the cabinet. Screw down the panel screws in a criss-cross pattern to seat the gasket evenly.
- 6) Tighten the watertight feedthrough around the outer insulation to ensure the water seal.

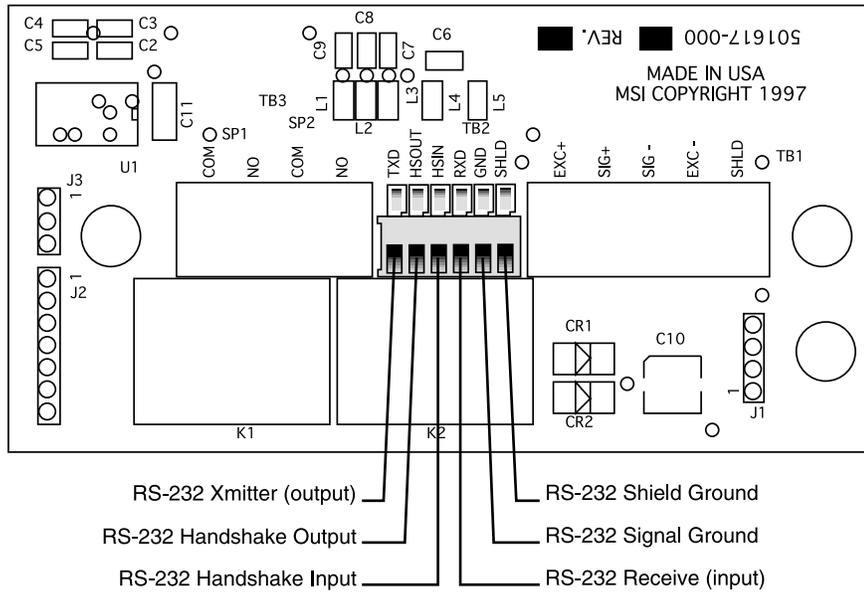


Figure 8: RS-232 Diagram

**DATA CONFIGURATION**

The 3360 serial port options are configured with the “PRINT” Menu. Standard data configuration is:

| PARAMETER          | DEFAULT | MENU CHOICES                            |
|--------------------|---------|---|
| <b>Baud Rate:</b>  | 9600    | 300, 600, 1200, 2400, 4800, 9600, 19200 |
| <b>Data Bits:</b>  | 8       | 7 or 8                                  |
| <b>Parity:</b>     | None    | None, Even, Odd                         |
| <b>Start Bits:</b> | 1       | 1 (can't be changed)                    |
| <b>Stop Bits:</b>  | 1       | 1 or 2                                  |

Chart 7: Data Configuration

**Data String Buffers**

A Data String is simply a collection of characters stored in memory, that are used to format the Comm Port output. Data Strings are defined by the user. The length of the formatting strings are limited per the following table. However, since 3 or 4 character commands can cause an output of up to 99 characters in length, the following numbers do not represent the maximum size of the data output. The 3360 offers the programmer the ability to print any and all weight data utilizing format controls suitable for even the most complex bar code printer.

| String      | Comm Port Max. Characters |
|-------------|---------------------------|
| Data:       | 60                        |
| Start Line: | 4                         |
| End Line:   | 4                         |
| Wait Char:  | 1                         |

Chart 8: Data String Buffers

**Data Format**

Each transmitted reading consists of a number of programmable character strings. Data is completely user programmable and can include formatting characters and text in addition to all weight parameters. The End-of-Line string is used for carriage return or other end-of-line control characters. These are entered through the print menu or downloaded through a computer.

### Output Control

The MSI 3360 serial port functions in any of 10 modes:

- 1) Front Panel User Key or IR Remote Print Key:  
This is a print on command mode which works when the USER button on the front panel is pushed (it must be set to Print). The “(m)otion” menu determines if printing is allowed or disallowed when the weight is in motion and/or not stable.
- 2) Computer Control:  
A computer can control and receive data from the MSI-3360 through the use of simple ASCII commands. These commands can be sent through the use of a data communications terminal, or a custom computer program. The “(m)otion” menu determines if printing is allowed or disallowed when the weight is in motion and/or not stable.
- 3) Print on Total:  
When the weight is totaled, one transmission of data will occur. Once transmitted, the scale must return below the total threshold (see Total Setup) to re-enable the transmission. Interval has no effect in this mode.

*Note:* Using Print on Total with the Auto Total enabled should not be used with any weight printout other than W7. Use “Print on Load” to print the totaled weight.

#### (4,5 & 6) Print on Set-Point:

Set-point1, Set-point2, or Set-point 1&2 can be configured to trigger a data print. Once transmitted, the set-point must go off then on again to transmit again. Print on a set point can also be configured to print when two set-points are true. This configuration allows printing when the weight is outside two limits or when the weight is inside two limits (windowed). The “(m)otion” menu determines if printing is allowed or disallowed when the weight is in motion and/or not stable.

- 7) Print On Change:  
Every time the weight changes 1 full display count or more, one transmission of data will occur. The “(m)otion” menu determines if printing is allowed or disallowed when the weight is in motion and/or not stable. Interval has no effect in this mode.
- 8) Print on Load Change:  
When the load weight exceeds the total threshold and motion ceases, one transmission of data will occur. Once transmitted, the scale must return below the total threshold to re-enable the transmission. Interval has no effect in this mode.
- 9) Print Continuous or on Intervals:  
The Data String can be transmitted continuously for driving scoreboards. The “MOTN DET” menu determines if printing is allowed or disallowed when the weight is in motion and/or not stable.
- 10) Print on CTS (Clear to Send, a RS-232 handshake line):  
By toggling the CTS line from space to mark, the print string will be transmitted. If the interval is set, the string will continue to print as long as CTS is asserted.

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## PRINTER/OUTPUT FORMATTING

The MSI-3360 is equipped with an RS-232 input/output that can format virtually any printer or serial data device. It also allows two-way communication with personal computers.

There are six printer/output formats on the MSI-3360. Five of them are pre-formatted to provide a simple method of output. The sixth string, String U, is defined by the user and may contain up to 60 bytes of text, numbers, symbols and weight data. However, since 3 or 4 character commands can cause an output of up to 99 characters in length, 60 bytes does not represent the maximum size of the data output. The 3360 offers the programmer the ability to print any and all weight data, and formatting controls suitable for even the

most complex bar code printer.

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## PRINTER/OUTPUT STRINGS 1 THROUGH 5

### String 1:

Sends simple output of current weight, units and weigh mode, and places a blank line under the data.

```
2001 LB GROSS
```

Note: String 1 outputs the current units and weigh mode.

### String 2:

Sends output of current gross weight, net weight, and tare weight with units and weigh mode, then places a blank line under the data.

```
2001 LB GROSS
1501 LB NET
500 LB TARE
```

Note: If net weight is not enabled, output will be dashes.  
If no tare weight was input, output will be dashes.

### String 3:

Sends output of current gross weight, net weight, tare weight, total weight and number of totals with units and weigh mode, then places a blank line under the data.

```
2001 LB GROSS
1501 LB NET
500 LB TARE
10200 LB TOTAL
4 T-CNT
```

Note: If net weight is not enabled, output will be dashes.  
If no tare weight was input, output will be dashes.

### String 4:

Sends output of current displayed weight and mode, total weight with units followed by "TOTAL", and number of totals, then places a blank line under the data.

```
2001 LB GROSS
10200 LB TOTAL
4 T-CNT
```

### String 5:

String 5 is set up for scoreboard applications. It sends a user-defined communications command to the scoreboard, and then outputs the current weight.

```
2001
```

---

## STRING U — THE USER-DEFINED PRINTER/OUTPUT STRING

String U allows the user to customize the output format for up to 60 bytes of information. Output may consist of letters, numbers, symbols or weight data.

- The character set includes all upper case letters, lower case letters, numbers, and most of

- the rest of the standard ASCII set (see Appendix A for a complete listing).
  - All scale data can be accessed.
- Output “@” commands control the output format. To use this versatile feature, the user must input command codes and data in a specific manner. Each command code consists of a 2 letter mnemonic. Some command codes also require a numeric suffix. See PRINTER CONTROL “@” COMMANDS for a complete list of data and formats.

A simple example of this structure is Print String 1, which outputs current weight, units and weigh mode, and places a blank line under the data. Its command structure is @W1@E@E. The “@W” command code means to print weight. The “1” suffix means print the current display mode. The “@E” will cause the end-of-line string to be printed. It acts like the Return key on a computer keyboard. The second “@E” sends another Return to achieve a blank line before the next data output. By combining the “@” commands with standard ASCII characters, control characters, etc., any data available from the scale, plus any additional text, can be printed in any order desired.

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## PRINTER/OUTPUT STRING ENTRY AND EDITING

There are two ways to enter the commands into String U: use either the front panel keys of the 3360 or use a computer. Of the two, computer input is considerably easier. If a computer is not available, follow the procedure below for front panel entry.

### Front Panel Entry:

- 1) Hold down the USER key and turn on the POWER.
- 2) Push **USER** to scroll to “rS232”. Press **TARE** to enter.
- 3) Push **USER** to scroll to “StrnG”. Press **TARE** to enter.
- 4) Push **USER** to scroll to “Str U”. Press **TARE** to enter.
- 5) Push **USER** to scroll to “For”. Press Push **TARE** to enter.
- 6) Push **USER** to scroll to “dATA”. Press **TARE** to enter.
- 7) The display switches to Command Entry Mode (see illustration below). Output commands are entered one byte at a time. The left two digits of the display show the byte number you are editing. There is a space, then two digits at right show the current ASCII (HEX) code number.

You will change one HEX digit at a time. The flashing digit is the current editable digit. To edit each digit, use **USER** to scroll up through the character set (0-9, A-F). Use **TARE** as enter. Use **ZERO** as exit.

Note: You can only scroll up through the characters, they repeat in a loop. You cannot go to previous digits or previous bytes, you must Exit the Command Entry Mode.

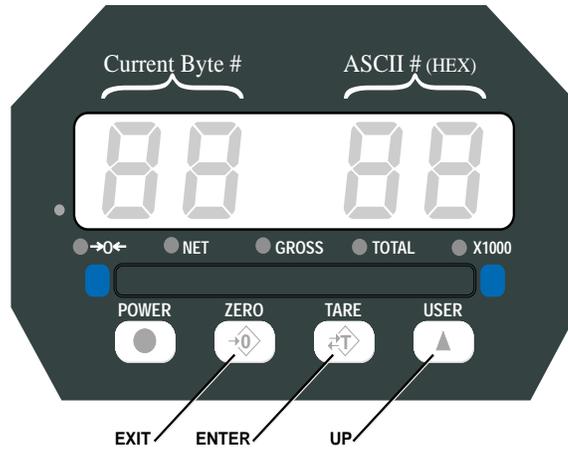


Figure 9: Display in Command Entry Mode

Refer to the ASCII Table Appendix. In the table, output characters are in the CHAR column. For commands, you will enter the corresponding two-character code from the HEX column. So if your screen reads 01 40, that means you are editing byte 1 and it is currently the character that corresponds to HEX 40 (@).

Example:

To output the words “SCALE 1” along with the total weight with units and total number of weighments:

- 1) Go to the Command Entry Mode (follow steps 1-5 above).
- 2) To output “SCALE 1”, you will need to enter each character separately. Byte 1 will be the letter “S”, byte 2 “C” and so on. According to the ASCII Table, the capital S (from column CHAR) corresponds to HEX code 53. Your display reads “01 xx” where xx is a HEX code. The left x flashes first to indicate that it is editable. First push **USER** to scroll up until 5 appears. Push **TARE** to enter. The right x flashes. Push **USER** to scroll up until 3 appears. Push **TARE** to enter. Push **TARE** again to go to the next byte, or push **ZERO** to exit without changes.
- 3) Byte 2 should be the letter “C”, or HEX code 43. Push **USER** to scroll up until the left digit is 4, then push **TARE** to enter. Change the right digit to 3 and push **TARE** to enter, push it again to go to the next byte. Follow the same procedure for “A” “L” and “E” in bytes 3, 4 and 5. Their HEX codes from the ASCII table are 41, 4C and 45.
- 4) To enter a space between E and 1, use HEX code 20 (SPC) for byte 6.
- 5) Byte 7 is the number “1”, or HEX code 31.
- 6) If you want the output to go to the beginning of the next line after SCALE 1, you need to enter an end-of-line string “@E”. Use HEX 40 for @ in byte 8 and HEX 45 for E in byte 9.
- 7) To output the total weight with units and the total number of weighments, use @W7 for byte 10, 11 and 12. To place an end-of-line string after the data, input @E for byte 13 and 14. You may wish to add another @E to place a blank line below your output.

Output:

```
SCALE 1
10200.00 LB  TOTAL,  4 T-CNT
```

The entire command string is as follows:

|             |           |           |           |           |           |            |           |           |           |           |           |           |           |           |
|-------------|-----------|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>BYTE</b> | <b>1</b>  | <b>2</b>  | <b>3</b>  | <b>4</b>  | <b>5</b>  | <b>6</b>   | <b>7</b>  | <b>8</b>  | <b>9</b>  | <b>10</b> | <b>11</b> | <b>12</b> | <b>13</b> | <b>14</b> |
| <b>CHAR</b> | <b>S</b>  | <b>C</b>  | <b>A</b>  | <b>L</b>  | <b>E</b>  | <b>spc</b> | <b>1</b>  | <b>@</b>  | <b>E</b>  | <b>@</b>  | <b>W</b>  | <b>7</b>  | <b>@</b>  | <b>E</b>  |
| <b>HEX</b>  | <b>53</b> | <b>43</b> | <b>41</b> | <b>4C</b> | <b>45</b> | <b>20</b>  | <b>31</b> | <b>40</b> | <b>45</b> | <b>40</b> | <b>57</b> | <b>37</b> | <b>40</b> | <b>45</b> |

To clear codes:

To clear codes, type the string terminator HEX 00 (two zeros) in the byte position immediately prior to the information you wish to clear. Any coded information that follows two zeros is ignored by the processor.

**Computer Entry:**

If you use a computer to format output, you simply type “CD” followed immediately by the non-ASCII command codes (CHAR line above). The output string must end with a semicolon (;). Here is the line you type:

CDSCALE 1@E@W7@E;      Note: There is a space between E and 1.

**PRINTER CONTROL “@” COMMANDS**

The printer formatting “@” commands and their data configurations are as follows:

**@@ PRINT AN “@”**

Purpose:

Use the @@ command to cause the output to send an “@” sign. Since this character is normally used for printer formatting, this is the only way to output the @ sign by itself.

**@B PRINT BLANK SPACES**

Purpose:

Use the @B command to cause the output to send a series of spaces. Can be used to position data on a label without having to enter multiple spaces.

Input Data Form:

@Bxx where xx is any number from 01 to 99 which equals the number of spaces desired.

*Note:* Exactly two digits must follow the “@B” command.

Output Data Form:

x spaces are output limited to 99. For more spaces use two @B commands in series.

*Note:* For spaces fewer than five, it is more code efficient to enter spaces instead of the @B command.

**@E PRINT End of Line (EOL)**

Purpose:

Use the @E command to output the end-of-line string. The EOL string is entered in the printer Format section.

Input Data Form:

@E

**Output Data Form:**

Sends out the EOL string. Usually a Carriage Return or Line Feed, or both, CR/LF, ETX, etc. Can include formatting commands. See Format.

**@H PRINT HORIZONTAL TABS**

**Purpose:**

Use the @H command to send a series of Tabs. Can be used to position data on a label without having to enter multiple spaces. Not all printers support tabs. Check with printer manual for proper application of tabs in printer formatting.

**Input Data Form:**

@Hxx where x is any number from 01 to 99 which equals the number of tabs desired.

*Note:* You must enter two digits following the “@H”.

**Output Data Form:**

x tabs are printed (limited to 99). For more tabs use two @H commands in series.

**@M PRINT WEIGHING MODE**

**Purpose:**

Use the @M command to print either the current weighing mode or to print the internal mode strings.

**Input Data Form:**

- @M1 Print current displayed weighing mode
- @M2 Print “GROSS”
- @M3 Print “NET”
- @M4 Print “TARE”
- @M5 Print “TOTAL”
- @M6 Print “T CNT” (Total CouNT = number of weighments totalized)
- @M7 Print “TOTAL T CNT”

**Output Data Form:**

@M 1

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| * | * | * | * | * | * |
| 1 | 2 | 3 | 4 | 5 | 6 |

Length: 6 Justification: left.

\*\*\*\*\* = Current Displayed mode, see @M2, @M3, @M4, @M8

@M 2

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| G | R | O | S | S |   |
| 1 | 2 | 3 | 4 | 5 | 6 |

Length: 6 Justification: left.

@M 3

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| N | E | T |   |   |   |
| 1 | 2 | 3 | 4 | 5 | 6 |

Length: 6 Justification: left.

@M 4

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| T | A | R | E |   |   |
| 1 | 2 | 3 | 4 | 5 | 6 |

Length: 6 Justification: left.

@M 5

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| T | O | T | A | L |   |
| 1 | 2 | 3 | 4 | 5 | 6 |

Length: 6 Justification: left.

@M 6 

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| T |   | C | N | T |   |
| 1 | 2 | 3 | 4 | 5 | 6 |

Length: 6 Justification: left.

@M 7 

|   |   |   |   |   |   |   |   |   |    |    |    |
|---|---|---|---|---|---|---|---|---|----|----|----|
| T | O | T | A | L |   | T |   | C | N  | T  |    |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

Length: 12 Justification: left.

**@S PRINT STRING**

Purpose:

Use the @S command to output the preprogrammed strings. See FORMAT in the PRINT SETUP menu.

Input Data Form:

@S Print SOL String

Output Data Form:

Sends out the SOL string, a maximum of 4 bytes.

**@U PRINT CURRENT UNITS**

Purpose:

Use the @U command to output the current weight units.

Input Data Form:

@U

Output Data Form:

@U 

|   |   |
|---|---|
| L | B |
| 1 | 2 |

|   |   |
|---|---|
| K | G |
| 1 | 2 |

Length: 2 Justification: left

**@V PRINT WEIGHT VALUE**

Purpose:

Use the @V command to print the current weight without units or mode printed.

Input Data Form:

@V1 Displayed weight (GROSS, NET, DEV, %DEV)

@V2 Gross weight

@V3 Net weight

Note: will print dashes if NET mode is not enabled

@V4 Tare weight

Note: will print dashes if no TARE value has been established

@V5 Total weight

@V6 n Totals (weighments counter)

@V7 Total + n Totals (combined @V5 and @V6)

Output Data Form:

@V1, @V2, @V3, @V4 

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
|   |   | 2 | 0 | . | 5 | 0 | 2 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

Length: 8 Justification: right justified.

@V5

|   |   |   |   |   |   |   |   |   |    |
|---|---|---|---|---|---|---|---|---|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | . | 8 | 9  |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Length: 10 Justification: right, leading zeros suppressed.

@V6

|   |   |   |   |   |
|---|---|---|---|---|
|   | 1 | 2 | 3 | 4 |
| 1 | 2 | 3 | 4 | 5 |

Length: 5 Justification: right, leading zeros suppressed.

@V7

| TOTAL VALUE |   |   |   |   |   |   |   |   |    | # OF WEIGHMENTS |    |    |    |    |    |
|-------------|---|---|---|---|---|---|---|---|----|-----------------|----|----|----|----|----|
| 1           | 2 | 3 | 4 | 5 | 6 | 7 | . | 8 | 9  | ,               |    | 1  | 2  | 3  | 4  |
| 1           | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11              | 12 | 13 | 14 | 15 | 16 |

Length: 16 Justification: each number field - right, leading zeros suppressed.

**@W PRINT WEIGHT FULLY**

Purpose:

Use the @W command to print the current weight with units and mode printed.

Input Data Form:

- @W1 Displayed weight
- @W2 Gross weight
- @W3 Net weight  
Note: will print dashes if NET mode is not enabled.
- @W4 Tare weight  
Note: will print dashes if no Tare value has been established.
- @W5 Total weight
- @W6 n Totals (weighments counter)
- @W7 Total with n Totals (combined @W5 and @W6)

Output Data Form:

@W1

| WEIGHT |   |   |   |   |   |   |   |   | UNITS |    |    |    | MODE |    |    |    |    |    |    |
|--------|---|---|---|---|---|---|---|---|-------|----|----|----|------|----|----|----|----|----|----|
|        |   | 2 | 0 | . | 0 | 0 | 2 |   | L     | B  |    |    |      | *  | *  | *  | *  | *  |    |
| 1      | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10    | 11 | 12 | 13 | 14   | 15 | 16 | 17 | 18 | 19 | 20 |

Length: 20 Justification: Weight - right justified, Units - left justified, Mode - left justified, \*\*\*\*\* = Current Scale Display mode (GROSS, NET, PK GRSS, or PK NET) Does not include Total, Tare, or Target.

@W2

| WEIGHT |   |   |   |   |   |   |   |   | UNITS |    |    |    | MODE |    |    |    |    |    |    |
|--------|---|---|---|---|---|---|---|---|-------|----|----|----|------|----|----|----|----|----|----|
|        |   | 2 | 0 | 5 | . | 0 | 8 |   | K     | G  |    |    |      | G  | R  | O  | S  | S  |    |
| 1      | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10    | 11 | 12 | 13 | 14   | 15 | 16 | 17 | 18 | 19 | 20 |

Length: 20 Justification: Weight - right justified, Units - left justified, Mode - left justified.

@W3

| WEIGHT |   |   |   |   |   |   |   |   | UNITS |    |    |    | MODE |    |    |    |    |    |    |
|--------|---|---|---|---|---|---|---|---|-------|----|----|----|------|----|----|----|----|----|----|
|        | 9 | 5 | - | 1 | 5 | . | 5 |   | L     | B  | O  | Z  |      | N  | E  | T  |    |    |    |
| 1      | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10    | 11 | 12 | 13 | 14   | 15 | 16 | 17 | 18 | 19 | 20 |

Length: 20 Justification: Weight - right justified, Units - left justified, Mode - left justified.

@W4

| WEIGHT |   |   |   |   |   |   |   |   | UNITS |    |    |    | MODE |    |    |    |    |    |    |
|--------|---|---|---|---|---|---|---|---|-------|----|----|----|------|----|----|----|----|----|----|
|        |   | 1 | 0 | . | 5 | 0 | 2 |   | L     | B  |    |    |      | T  | A  | R  | E  |    |    |
| 1      | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10    | 11 | 12 | 13 | 14   | 15 | 16 | 17 | 18 | 19 | 20 |

Length: 20 Justification: Weight - right justified, Units - left justified, Mode - left justified.

@W5

| TOTALLED WEIGHT |   |   |   |   |   |   |   |   |    | UNITS |    |    |    | MODE |    |    |    |    |    |    |    |
|-----------------|---|---|---|---|---|---|---|---|----|-------|----|----|----|------|----|----|----|----|----|----|----|
|                 | 4 | 3 | 2 | 5 | 3 | 4 | . | 8 | 5  | K     | G  |    |    |      | T  | O  | T  | A  | L  |    |    |
| 1               | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11    | 12 | 13 | 14 | 15   | 16 | 17 | 18 | 19 | 20 | 21 | 22 |

Length: 22 Justification: Weight - right justified, Units - left justified, Mode - left justified. Character 22 always a space.

|     |            |   |   |   |   |               |   |   |   |    |    |    |
|-----|------------|---|---|---|---|---------------|---|---|---|----|----|----|
|     | WEIGHMENTS |   |   |   |   | "TOTAL COUNT" |   |   |   |    |    |    |
| @W6 | 1          | 2 | 3 | 4 | 5 | T             |   | C | N | T  |    |    |
|     | 1          | 2 | 3 | 4 | 5 | 6             | 7 | 8 | 9 | 10 | 11 | 12 |

Length: 12 Justification: Counts - right justified, Mode - left justified, characters 1, 6 and 12 always a space.

|     |                 |    |    |    |    |               |    |    |    |    |       |    |    |    |    |      |    |    |    |    |    |    |
|-----|-----------------|----|----|----|----|---------------|----|----|----|----|-------|----|----|----|----|------|----|----|----|----|----|----|
|     | TOTALLED WEIGHT |    |    |    |    |               |    |    |    |    | UNITS |    |    |    |    | MODE |    |    |    |    |    |    |
|     | 4               | 3  | 2  | 5  | 3  | 4             | .  | 8  | 5  | K  | G     |    |    |    | T  | O    | T  | A  | L  | ,  |    |    |
| @W7 | 1               | 2  | 3  | 4  | 5  | 6             | 7  | 8  | 9  | 10 | 11    | 12 | 13 | 14 | 15 | 16   | 17 | 18 | 19 | 20 | 21 | 22 |
|     | WEIGHMENTS      |    |    |    |    | "TOTAL COUNT" |    |    |    |    |       |    |    |    |    |      |    |    |    |    |    |    |
|     | 1               | 2  | 3  | 4  | 5  | T             |    | C  | N  | T  |       |    |    |    |    |      |    |    |    |    |    |    |
|     | 23              | 24 | 25 | 26 | 27 | 28            | 29 | 30 | 31 | 32 | 33    | 34 |    |    |    |      |    |    |    |    |    |    |

Length: 34 Justification: Weight - right justified, Units - left justified, Mode - left justified, Weighments right justified, "T CNT" left justified.

## COMPUTER OPERATION

The MSI-3360 can interface to computers via the RS-232. All functions can be controlled remotely and all setups can be downloaded automatically. The computer can query the scale at any time to get status, weight, or accumulated totals.

### General Protocol

The MSI-3360 responds to ASCII commands that consist of a two letter mnemonic. Depending on the command, a 1 or 2 digit item selection (sub-code) may be required. Certain commands require user-supplied data. Commands sent from a host computer can be chained together in any order. Commands are terminated by another command or by a semicolon (;). It is necessary to end a multiple command string with the semicolon as a terminator. Variable length numeric data must be terminated by a semicolon or by another command. Variable length alphanumeric data must be terminated by a semicolon before adding additional commands. The 3360 will not accept commands if it is in any setup mode caused by pushing the **USER** key when powering on.

*Note:* It is important that the final character sent to the 3360 is a semicolon (;).

| Command | Description               | Suffix<br>(Bold text indicates default)  | Comments   |
|---------|---------------------------|--|--|
| AO      | Auto Off                  | <b>1=Off</b><br>2=12 Min.<br>3=1 Hour  | Once the scale is off, the computer will not be able to talk to the 3360   |
| CD      | Comm Port Data            | Up to 60 characters  | Send CD followed by all "@" commands + text. Must be ended with a semicolon ";"  |
| D       |                           |  | Display the contents of the user-defined print string  |
| EM      | Total Mode                | <b>1=Disabled</b><br>2=Manual<br>3=Auto  |  |
| FL      | Filter                    | <b>1=Low Filter</b><br>2=Med Filter<br>3=High Filter   |  |
| KE      | Keyboard                  | 1=Disabled<br>2=Enabled  | Disables all front panel switches.   |
| KF      | Keyboard Function Emulate | 1=Power<br>2=Zero<br>3=Gross<br>4=Net<br>5=Tare<br>6=Total<br>7=View Total<br>8=Clear Last Total<br>9=Clear All Totals<br>10=Clear All Totals<br>11=Print<br>12=Peak Hold On<br>13=Peak Hold Off | Terminate Value with any command or a ";" (semicolon).<br><br>KF01, KF02, etc. also works and eliminates the need for the semicolon following these commands |
| PK      |                           | 1=String 1<br>2=String 2<br>3=String 3<br>4=String 4<br>5=String 5<br>6=String User  | Causes the printer output to be directed by print string 1-5 or user-defined print string  |
| PR      | Print                     | 1=Print Comm Port 1 string   | Causes the current print string format to be printed   |

Chart 9: Computer Control Commands

| Command | Description                   | Suffix<br>(Bold text indicates default)  | Comments  |
|---------|-------------------------------|--|---|
| S#      | Set Point Receive Data Enable | 1 or 2 for appropriate Set Point   | S#1 and S#2 enable each setpoint. The last enabled set point receives any set point data or parameters. |
| SV      | Set point Value               | > or< followed by Weight in current units, or 0 to disable the setpoint            | Terminate weight value with a semicolon or another command.   |
| TA      | Tare                          | Input Tare Value in displayed units  | See "KF5" for Auto Tare   |
| UM      | Units print mode              | 1=upper case<br>2=lower case   |   |
| UN      | Set Units                     | 1=lb<br>2=kg   |   |
| US      | Set User Key                  | 1=Disabled<br>2=Test<br>3=Total<br>4=Units<br>5=Peakhold<br>6=Net/Gross<br>7=Print |   |

Chart 9: Computer Control Commands (continued)

## "@" COMMANDS UNDER COMPUTER CONTROL

The "@" commands also function under computer control, however they act differently than standard computer commands. The "@" commands, when received by the 3360, will cause the immediate transmission of the asked for data type out the same port. The ";" delimiter is usually not necessary unless the "@" commands are combined with the standard computer commands. The preferred way to get data from the 3360 is to use the "CD" command, set up a print string with all the @ codes desired, then use the "PR1" command to cause a data transmission. Once the print string is set up with the desired data, only the PR command is needed.



