

PERIPHERAL COMMUNICATION FOR MV1 AND 750 INDICATORS



750 Indicator

750 Serial Port

The serial port on the 750 weight indicator is a bi-directional port and can receive and transmit data (output to a printer as well as communicate to a computer). It is a 9-pin "D" connector located on the rear panel of the indicator and can be connected to a computer for transmission of weight and associated data to an EMR/EHR (electronic medical record/electronic health record) software program. The data can be transmitted manually by pressing the PRINT key or when receiving a command from the computer, known as Weight-On-Demand.

750 Weight on Demand

If the 750 serial port is connected to a computer for transmission of weight data to an EMR/EHR software program, it will transmit a single set of weight data each time the computer sends a weight request "ENQ" (hex 05). When the computer sends the weight request, the 750 will respond by sending data in the following format:

ID, Weight, Units, Mode, BMI, Height

Refer to the Serial Data Format to the right for a breakdown of the response format.

750 Manually Sending Data

If the 750 serial port is connected to a computer for transmission of weight data to an EMR/EHR software program, it will transmit a single set of weight data each time the PRINT key is pressed. When the key is pressed, the 750 will respond by sending data in the following format:

ID, Weight, Units, Mode, BMI, Height

Refer to the Serial Data Format below for a response format breakdown.

750 Serial Data Format

The 750 data format transmitted when the PRINT key is pressed or when it receives a weight request "ENQ" (hex 05) from a computer is as follows:

<xxxxxxxxxx><wwwwww.w><uu><m><BB.B><H' HH.H"><cr><lf>

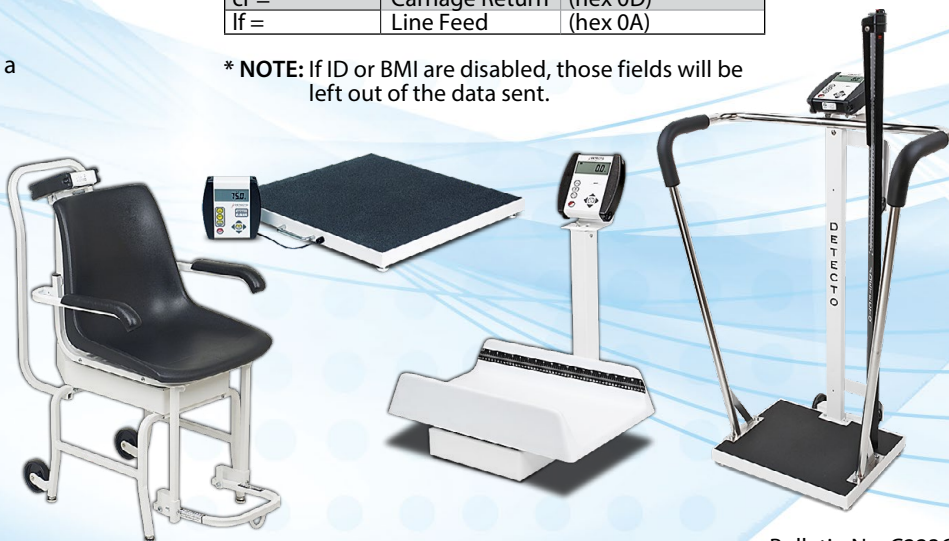
Where:

xxxxxxxxxx	ID*	Up to 11-digit ID number*
wwwwww.w	Weight =	Six digits with a decimal point
uu =	Units	lb or kg
m =	Weight Mode	G = Gross
BB.B	BMI*	Body Mass Index*
H' HH.H"	Height	Height in feet and inches
cr =	Carriage Return	(hex 0D)
lf =	Line Feed	(hex 0A)

* NOTE: If ID or BMI are disabled, those fields will be left out of the data sent.



750 Indicator



MV1 and MV1C Indicators

Serial Port and USB Device Port

Both the serial port and USB device port on the MV1/MV1C are bi-directional ports and can receive and transmit data; however, the USB device port can only communicate with a computer. The serial port can output to a printer as well as communicate to a computer. The serial port is a 9-pin "D" connector located on the rear panel of the indicator. The USB device port is an "upstream" port that uses readily available cables with the industry standard "B" connector and is also located on the rear panel of the indicator. Note that for the computer to communicate to the MV1/MV1C using the USB device port, the remote computer requires the USB driver (MedVue.inf) available on the Detecto Web Site via the following link:

<https://detecto.com/resources/software/detail/medvue-usb-driver>

Weight on Demand

If the MV1/MV1C serial port or USB device port is connected to a computer for transmission of weight data to an EMR/EHR software program, it will transmit a single set of weight data each time the computer sends a weight request "ENQ" (hex 05) or an SMA weight request "W". When the computer sends the weight request, the MV1/MV1C will respond by sending data in the formats explained below.

When the MV1/MV1C receives a weight request "ENQ" (hex 05) from a computer, it will respond by sending data in one of the following formats:

Pxxxxx^UU^M^SS^CR
(no decimal point in weight)

PxxxxxD^UU^M^SS^CR
(decimal point in weight)

Where:

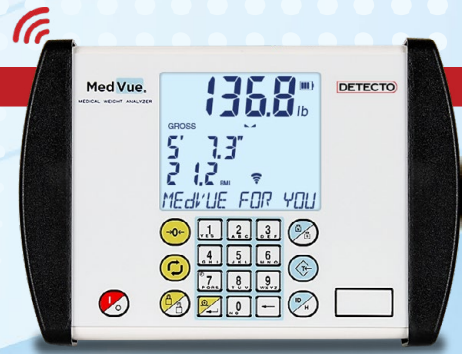
P =	polarity (space if positive, - if negative)		
xxxxxx =	weight with leading spaces		
D =	decimal point (embedded where necessary)		
^ =	space (hex 20)		
UU =	units, upper case (LB or KG)		
M =	mode, upper case (G=gross, N=Net)		
SS =	status, upper case		
	CZ = center-of-zero,	MO = motion,	BZ = gross weight below zero,
	EE=entry - Input in progress,	OC=over capacity	
CR =	carriage return (hex 0D)		

When the MV1/MV1C receives the SMA weight request <LF>W<CR> from a computer, it will respond by sending data in the following format:

<LF>S1GM^DDDDDDDDDUUU<CR>

Where:

<LF> =	Line feed character (hex 0A)			
S =	Status			
	O = Over Cap	Z = Center Zero	U = Below Zero	E = Error
1 =	The number '1'			
G =	G = Mode of operation	G = Gross	N = Net	T = Tare
M =	Motion bit			
	M = Motion		<space> = Settled (no motion)	
^ =	Space			
DDDDDDDDDD =	Weight with a decimal point if necessary			
UUU =	Units, lb or kg			
<CR> =	Carriage return (hex 0D)			



Manually Sending Data

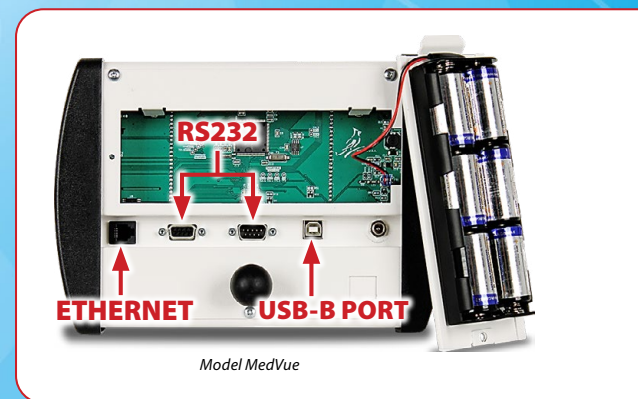
Each time the PRINT key is pressed on the MV1 and MV1C, it will respond by transmitting data using the serial port or USB device port. The data will be transmitted in the following format:

If Pounds was selected for UNITS	
mm/dd/yyyy, HH:MM	
ID:	xxxxxxxxxxxxxxxx
Weight:	xxxxxxxx uu G
	xxxxxxxx uu T
	xxxxxxxx uu N
Height:	F' II.I"
BMI:	BB.B

If Kilograms was selected for UNITS	
dd/mm/yyyy, HH:MM	
ID:	xxxxxxxxxxxxxxxx
Weight:	xxxxxxxx uu G
	xxxxxxxx uu PT
	xxxxxxxx uu N
Height:	HHH.H cm
BMI:	BB.B

Where:

mm/dd/yyyy =	Date, month/day/year (Pounds format)
dd/mm/yyyy =	Date, day/month/year (Kilogram format)
HH:MM =	Time, Hours, Minutes
xxxxxxxxxxxxxxxx =	ID (14 characters)
xxxxxxxx =	Weight
uu =	Units (lb or kg)
G =	Gross
T =	Tare
N =	Net
F' =	Height in Feet
II.I" =	Height in Inches
HHH.H cm =	Height in Centimeters
BB.B =on	Body Mass Index Calculation



BLE/Wi-Fi

The 750C weight indicator and MV1C MedVue® medical weight analyzer have a wireless transmitter inside the indicator enclosure that can be configured for Bluetooth Low Energy (BLE) or Wi-Fi. Widely accepted BLE GATT standard specification profiles are used (those that are adopted by the Bluetooth SIG) to transmit vitals to other devices/software that have implemented these profiles. For both BLE and Wi-Fi, custom services were created to request indicator and scale information whose communication protocol was developed by the Scale Manufacturers Association (SMA). For a complete listing of the SMA commands, refer to the 750C and MV1C BLE, and Wi-Fi SMA Commands on page 6.

Bluetooth Low Energy (BLE)

Data is passed via BLE using the GATT characteristic "Weight_Measurement" (0x2A9D). See page X for the data table about the Weight Measurement Characteristics.

Data includes:

- Weight • Date/Time
- ID • BMI • Height



Wi-Fi

If the wireless module is configured for Wi-Fi instead of BLE, the 750C and MV1C will transmit data using communication protocols developed by the Scale Manufacturers Association (SMA).

To transmit a single set of weight data, the SMA weight request <LF>W<CR> should be sent to the 750C and MV1C. If continuously transmitted weight data is required, the SMA weight request <LF>R<CR> should be sent to the 750C and MV1C. Note that the 750C and MV1C will transmit weight data continually until another SMA command is received.

The SMA format for both commands (<LF>W<CR> and <LF>R<CR>) is:

<LF><s><r><n><m><f><xxxxxx.xxx><uuu><CR>

See the 750C and MV1C SMA Weight Response Table for a breakdown of the response format.

750C and MV1C SMA Weight Response Table

Where:

LF =	Line feed (hex 0A) = Start of response message
s =	Scale Status definition
	Z = Center of Zero <xxxxxx.xxx>= 0.000
	O = Over Capacity <xxxxxx.xxx>= +weight
	U = Under Capacity <xxxxxx.xxx>= -weight
	E = Zero Error (clears when the condition clears)
	<space> = None of the above conditions
	NOTE: For "E" error condition <xxxxxx.xxx>= ----- (center dashes) and "Z", "O", "U" are overridden
r =	Range ("1", "2", "3", etc.) always "1" for a single range
n =	Mode of Operation (Gross/Net status)
	G = Gross normal weight
	T = Tare weight (in response to "M" command)
	N = Net normal weight
	g = gross weight in high-resolution
	n = net weight in high-resolution
m =	Motion status
	M = Scale in Motion
	<space> = Scale not in Motion
f =	Future = Reserved for future or custom use
xxxxxx.xxx =	Weight with a decimal point if necessary
uuu =	Units = lb or kg
CR =	Carriage Return (hex 0D) = End of response message



750C and MV1C Indicators



Bluetooth Characteristic – Weight_Measurement: 0x2A9D

NAMES	FIELD REQUIREMENTS	FORMAT	MIN. VALUE	MAX. VALUE	ADDITIONAL INFORMATION					
Flags	Mandatory	8 bit	N/A	N/A	BIT FIELD					
					Bit	Size	Name	Definition		
								Key	Value	Requires
					0	1	Measurement Units	0	SI (Weight and Mass in Units of Kilogram (kg) and Height in Units of Meter)	C1
								1	Imperial (Weight and Mass in Units of Pound (lb) and Height in Units of inch (in))	C2
					1	1	Time Stamp Present	0	False	C3
					1	True				
					2	1	User ID Present	0	False	C4
					1	True				
					3	1	BMI and Height Present	0	False	C5
					1	True				
4	1	Below Zero	0	Not Below Zero						
			1	Below Zero						
Weight - SI	C1	uint16	N/A	N/A	Information: Unit is in kilograms with a resolution of 0.005 and is determined when bit 0 of the Flags field is set to 0.					
					Unit: org.bluetooth.unit.mass.kilogram					
					Exponent: Decimal, -3					
					Multiplier: 5					
Weight - Imperial	C2	uint16	N/A	N/A	Information: Unit is in pounds with a resolution of 0.01 and is determined when bit 0 of the Flags field is set to 1.					
					Unit: org.bluetooth.unit.mass.pound					
					Exponent: Decimal, 02.					
Time Stamp	C3		N/A	N/A	Information: Smallest unit in seconds					
					Unit: org.bluetooth.characteristic.date.time					
User ID	C4	uint8	N/A	N/A	The special value of 0xFF (255 Decimal) for User ID represents "unknown user".					
					Information: Unit is unitless with a resolution of 1					
							Key	Value		
							255	Unknown user		
					Unit: org.bluetooth.unit.unitless					
Exponent: Decimal, 0										
BMI	C5	uint16	N/A	N/A	Information: Unit is unitless with a resolution of 0.1					
					Unit: org.bluetooth.unit.unitless					
					Exponent: Decimal, -1					
Height - SI	C1 C5	uint16	N/A	N/A	Information: Unit is in meters with a resolution of 0.001 and is determined when bit 0 of the Flags field is set to 0.					
					Unit: org.bluetooth.unit.length.meter					
					Exponent: Decimal, -3					
Height - Imperial	C2 C5	uint16	N/A	N/A	Information: Unit is in inches with a resolution of 0.1 and is determined when bit 0 of the Flags field is set to 1.					
					Unit: org.bluetooth.unit.length.inch					
					Exponent: Decimal, 0-1					



750C and MV1C Indicators

750C and MV1C Additional Bluetooth Services

Note: 16-bit (4-digit) UUIDs are adopted standards. 128-bit (32 digit) UUIDs are custom services or characteristics

Standard Services per Bluetooth SIG

Reference adopted specifications at <https://www.bluetooth.com/specifications/gatt>

Device Information Service (0x180A)

Characteristics	Number	Value(s)	Attributes
Manufacturer Name String	0x2A29	"Detecto"	READ
Model Number String	0x2A24	"750-C" for the 750C ("MedVue" for the MV1C)	READ
Software Revision String	0x2A28	"1.0.XX" software of indicator	READ

Battery Service (0x180F)

Characteristics	Number	Value(s)	Attributes
Battery Level	0x180F	0x00 – 0x64 (uint16), represents 0 – 100 percent	READ

Weight Scale Service (0x181D)

Characteristics	Number	Value(s)	Attributes
Weight Measurement	0x2A9D	<8bit Flag><uint16 weight><uint16 bmi> <uint16 ht> Supported Flags: Flag bit0: 0 = SI, 1 = Imperial bit3: 0 = BMI and Height not present 1 = BMI and Height present bit4: 0 = Not below zero* 1 = Below zero* SI: Wt is KG with resolution of 0.0005 Ht is meters with resolution of 0.001 Imperial: Wt is lbs with resolution of 0.01 Ht is inches with resolution of 0.1	READ INDICATE
Weight Scale Feature	0x2A9E	NOT YET IMPLEMENTED	

* • If the weight is below zero (0), the weight you will see is zero (0).

- If the weight is below zero (0), bit 4 of Weight Measurement will be set to 1, otherwise, bit 4 is set to zero (0).

NOTE: Maximum weight value displayed is 655.35 in both pounds (lb) and kilograms (kg).

750C and MV1C BLE, and Wi-Fi SMA Commands

The format used to send SMA commands to the 750C weight indicator and MV1C MedVue® medical weight analyzer is:

<LF>command<CR>

Where “command” is the ASCII letter(s), or the Hex Rep. listed in the table below. For example, <LF>Z<CR> or 0A5A0D would send the command to “zero” the scale. Note that the response of each command is listed under the Response column of the table.



NOTE: Any invalid command sent will return a question mark for a response.
For example, sending a <LF>XZ<CR> will return 0A 3F 0D (<LF>?<CR>).

Command	Hex Rep.	Response
Z – Zero Scale	0A5A0D	None. You should see scale zero itself.
D – Scale Diagnostics	0A440D	0A 20 20 20 20 0D = means there are no errors, EEPROM error will show an E in the second space and C will show in the third space if there is a calibration error. 20 = SPACE
W – Request Weight	0A570D	0A 5A 31 47 20 20 30 30 30 30 30 30 2E 30 30 6C 62 0D = Z1G 000000.00lb
H – Request High Resolution Weight	0A480D	0A 5A 31 67 20 20 30 30 30 30 30 30 2E 30 31 6C 62 0D = Z1g 000000.01lb
A – About Scale First Line	0A410D	0A 53 4D 41 3A 32 2F 31 2E 31 0D = SMA:2/1.1
B – About Scale Scroll	0A420D	Each time sent you will get the next line of information until there is no longer any information. 1. 0A 4D 46 47 3A 44 65 74 65 63 74 6F 0D = MFG:Detecto 2. 0A 4D 46 44 3A 41 70 65 78 0D = MOD:750-C for the 750C (= MOD:MEDVUE for the MV1C) 3. 0A 52 45 56 3A 31 2E 30 2E 31 34 0D = REV:X.X.XX 5. 0A 45 4E 44 3A 0D = END: 6. If B is sent again you will get the unknown command response until the A command is sent again. 0A 3F 0D = ?
I – Scale Information	0A490D	0A 53 4D 41 3A 32 2F 31 2E 31 0D = SMA:2/1.1
N – Scale Information Scroll	0A4E0D	Each time sent you will get the next line of scale information until there is no longer any information. 1. 0A 54 59 50 3A 53 0D = TYP:S 2. 0A 43 41 50 3A 20 6C 62 3A 36 30 30 2E 30 3A 32 3A 31 0D = CAP: lb:600.0:2:1, this depends on the settings of the indicator. 600.0 – Capacity, 2 – Interval, & 1 – Decimal 3. 0A 43 4D 44 3A 48 52 49 4E 58 0D = CMD:HRINX 4. 0A 45 4E 44 3A 0D = END: 5. If N is sent again you will get the unknown command response until the I command is sent again. 0A 3F 0D = ?
R – Repeat Displayed Weight Continuously	0A520D	0A 5A 31 47 20 20 30 30 30 30 30 30 2E 30 30 6C 62 0D = Z1G 000000.00lb, you should get this continuously until another SMA command is received.
XB – Battery Level Percentage	0A58420D	0A 38 36 2E 32 35 0D = 86.25

DETECTO reserves the right to improve, enhance, or modify features and specifications without prior notice.



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