SBI Protocol Description

for the scale series
PMA.Evolution
PMA7501
PMA35001
PMA7500
PMA7200

Contents

1 General SBI Protocol Information

1.1 SBI protocol

To use the PMA7501 with the SBI protocol, it is necessary to take some precautions:

- Please, take care that the port settings of the PMA and the PC are identical (“Setup-SBI.Set.-...”). The default setting of the PMA is: 2400 Baud, 7 Data Bits, Odd Parity, One Stop Bit, Hardware Handshake.
- The SBI protocol must be activated in the Setup (“Setup-Interf.-Prot-SBI”). This is the default setting.
- The SBI communication can be used with two different modes: Single Print and Auto Print.
  In the Single Print mode the PMA will send a weight value string each time it got a Print command <ESC>P.
  On the other hand, set to Auto Print, it will send a weight value string each time a new one is available. (Changeable by Setup: “Setup-Print-Man.Aut.”).

Remark: If there is done any conversion with the received value it is **strictly recommended** to check the syntax of the received string; at least the length of 16 bytes and the <CR><LF> ending. Otherwise incomplete received weights could cause unpredictable results.

1.2 SBI command syntax

The SBI protocol is an ASCII protocol, that means SBI is using the 7 bit ASCII character set for sending commands and receiving weight values.

1.3 Output format

The following data block format is sent by the PMA scale:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
S	*W*	*W*	*W*	*W*	*W*	*W*	*W*	*W*	*W*		*U*	*U*	*U*	CR	LF

- *S*: +/– sign (possible characters: "+", "–", " ")
- *W*: weight value, right aligned (possible characters: "0" .. "9", ".", " ")
- *U*: unit (possible characters: "a" .. "z", "A" .. "Z", " ")

Example:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
+				*7*	*5*	*0*	*1*	.	*0*		*g*			CR	LF

1.3.1 Unit

- <empty> Weight is not stable
- g Grams
- /lb Parts per pound

1.3.2 Special Codes

The data block may contain special information. This can occur in situations when no valid weight value is available or when an error condition occurred.

Special codes with no valid weight value:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
						S1	*S2*							CR	LF

The following status codes are possible for "S1" and "S2":

- <Empty> Taring
- C Internal calibration
- - - All numerals shown in stable readout
- H Overload
- L Underload

Special error codes:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
			E	*R*	*R*		*N1*	*N2*	*N3*					CR	LF

N1..3: containing an error code of up to 3 digits.

OK message:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
								O	*K*					CR	LF

1.4 Input format

It is possible to send commands to the scale to activate different scale functions. There are available two formats, which are always start with an 'Escape' character and ended with 'Carriage Return' 'Line Feed': The command identifier is either a single upper case character or one lower case character followed by some more characters and a trailing underline:

Format overview:

ESC	*U*	CR	LF

ESC	*lower*	...	_	CR	LF

ESC: Escape
U: Upper case command character
lower: Lower case command character
...: Following character(s), one ore more
_: Underline
CR: Carriage return
LF: Line feed

It is not necessary to transmit the trailing CR and LF characters.

1.5 SBI Commands

PMA7200	PMA7500	7500REC	PMA7501	World/Net	EVO	*SBI Command*	*Function*
*	*	*	*	*	*	<ESC> K	Set ambient conditions to: very stable
*	*	*	*	*	*	<ESC> L	Set ambient conditions to: stable
*	*	*	*	*	*	<ESC> M	Set ambient conditions to: unstable
*	*	*	*	*	*	<ESC> N	Set ambient conditions to: very unstable
*	*	*	*	*	*	<ESC> O	Lock keyboard
*	*	*	*	*	*	<ESC> P	Print or auto print start/stop (depends on menu setting)
*	*	*	*	*	*	<ESC> R	Release keyboard
*	*	*	*	*	*	<ESC> S	Restart
*	*	*	*	*	*	<ESC> T	Start zero-tare
	*	*	*	*	*	<ESC> U	Start tare
	*	*	*	*	*	<ESC> V	Start zero
	*	*	*	*	*	<ESC> W	Start calibration
			*	*	*	<ESC> a1_	Lock scale display
			*	*	*	<ESC> a2<password>_	Release scale display (<password>: password text)
			*	*	*	<ESC> a3<text>_	Write into scale display (<text>: text, scrolling if more than 6 characters)
			*	*	*	<ESC> f0_	Switch weighing mode (switch unit, depends on menu setting)
		*	*	*	*	<ESC> f1_	Set application tare (set to negative weight)
			*	*	*	<ESC> f8<key>_	Executes a key press with the value <key>
		*	*	*	*	<ESC> s3_	Reset application tare to zero (respectively cancel calibration if it is active)
		*	*	*	*	<ESC> t<val>_	Input value (<val>: up to seven digits and dot) usable to set value for '<esc> f1_'
			*	*	*	<ESC> x1_	Show device info
			*	*	*	<ESC> x2_	Show serial number
			*	*	*	<ESC> x3_	Show firmware version
			*	*	*	<ESC> x4_	Show minimum weight value
			*	*	*	<ESC> x5_	Show Maximum weight value
		*	*	*	*	<ESC> x8_	Get last pressed key
					*	<ESC> awJB;<Recipe>	Sends a recipe to the scale *

* The recipe format string consists of a list of concatenated item pairs with the syntax Name=Value, starting with the recipe name and followed by a list of components, each with the three parameters component name, target weight and tolerance.

The delimiter between the items is the ampersand '&'.

R0=<Recipe name>
N1=<Name of the first component>
W1=<Target weight of the first component>
T1=<Tolerance of the first component>
N2=<Name of the second component>
W2=...

Example: <ESC>awJB;R0=Test Recipe&N1=Comp1&W1=17.2&T1=0.2&N2=Comp2&W2=24.9&T2=0.2

1.6 SBI Commands only for PMA.World and PMA.Net

SBI Command	*Function*
<ESC> aw..._	Functions to print at the graphical display of the PMA.World or the PMA.Net. They answer with the text "OK" if they have been executed successful.
<ESC>awac;<x>;<y>;<w>;<h>;<x2>;<y2>_	Copy area with dimensions <x>;<y>;<w>;<h> to <x2>;<y2>;<w>;<h>. Restriction: x2=x
<ESC>awad;<x>;<y>;<w>;<h>;<v>_	Fill area with dimensions <x>;<y>;<w>;<h> with value <v>.
<ESC> awbg;<offset>;<s>;<x>;<y>;<len>;<left>;<target>;<right>;<loga>_	Switches bar graph on at position <x>/<y> with length <len>. The coordinates, length and tolerance values <left>, <target> and <right> are specified in pixels, the offset in grams and the sensitiveness <s> in grams per pixel. The flag <loga> switches on the logarithmic mode if unequal zero.
<ESC> awbg_	Switches bar graph off
<ESC>awbx;<x>;<y>;<w>;<h>;<m>_	Draws box at position <x>/<y> with dimension <w>/<h>. Mode <m>: 0=single frame, 1=double frame
<ESC> awc_	Erases the whole display
<ESC>awch_	Hide cursor
<ESC>awcs;<x>;<y>;<m>;<font>_	Show cursor at position <x>/<y> with size matching <font>. Mode <m> determines the shape: 1: half, 2: full, 3: line.
<ESC> awdw;a;<y>_	Activates weight display at vertical position <y>
<ESC> awdw;o_	Switches weight display off
<ESC> awlh;<x>;<y>;<len>_	Draws horizontal line at position <x>/<y> with length <len>
<ESC> awlv;<x>;<y>;<len>_	Draws vertical line at position <x>/<y> with length <len>
<ESC> awtc;<x>;<y>;<len>;<font>_	Erase text at position <x>/<y> with <font> and length <len>
<ESC> awti;<x>;<y>;<len>;<font>_	Invert text at position <x>/<y> with <font> and length <len>
<ESC> awtw;<x>;<y>;<text>;<font>_	Write <text> at position <x>/<y> with <font>

1.7 Key code table

Table of function “ESC-x8_” return values

Key	Short press	Long press
No key pressed	000	000
Tare	051	053
Toggle	042	044
C	120	122
Enter	119	121
Cursor-up key	123	125
Cursor-down key	124	126
F- key	116	118

Remark: Long key press value = Short key press value + 2.

1.8 Font table

Table of available fonts used by the functions for output on graphical display, which are available only on PMA.World and PMA.Net.

Font No.	Fonts	Line length	No of lines	Full implemented
0	9*7[6] (7*5)	32	7	*
3 6	32*21 (28*14) 16*12 (14*10)	16	4	*
24	13*8	24	4	*

Font example Font 0:

2 Version Changes

2.1 Version 1.05

Version / Date of this paper	V1.05 / February, 02 in 2015
Changes	• Added: New scale PMA.Economy

2.2 Version 1.04

Version / Date of this paper	V1.04 / November, 27 in 2014
Changes	• Compatibility list to older scales (PMA7500, PMA7200) added

2.3 Version 1.03

Version / Date of this paper	V1.03 / August, 25 in 2008
Changes	• New bar graph command <ESC>awbg... for PMA.World and PMA.Net • New key execute command <ESC>f8

2.4 Version 1.02

Version / Date of this paper	V1.02 / April, 26 in 2007
Changes	• New commands <ESC>aw... for PMA.World and PMA.Net

2.5 Version 1.01

Version / Date of this paper	V1.01 / June, 27 in 2006
Changes	• Get key description wrong: Command syntax is ESC-x8_ instead of ESC-s8_ • Key code list added

2.6 Version 1.00

Version / Date of this paper	V1.00 / May, 17 in 2006
Changes	1st version