ADDENDUM : APPA RS-232 PROTOCOL FOR DMM 301, 303, 305 USING WITH APPA RS-232 CABLE

SOFTWARE LICENSE AGREEMENT FOR APPA WinDMM300 95 / 98 / NT

IMPOTANT :
Please read carefully before using the Software Protocol.

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The RS-232 protocol is one part of the APPA WinDMM and is exactly and completely the same as the APPA WinDMM, but no other warranties for the end user to write a driver using this RS-232 protocol.

The RS-232 protocol :

1. Communication Type : RS-232C
2. Communication protocol :
   - A : Baud Rate : 9600 bps
   - B : Data length : 8 bits
   - C : Parity check : None
   - D : Stop bit : 1 bit
3. Data format : The data format is ASCII code.

A. PC sends a command to DMM for requesting to read as follow :

55H	55H	00H	00H	AAH

After sending the command, wait for receiving data format from DMM, the time out setting must be bigger than 450ms.

B. When DMM receives the command from PC, will send the data format to PC as follow :

55H	55H	00H	36H	Model Name (8 bytes)					

	Series Number (8 bytes)								

S/W Version (7 bytes)					Switch Code	Blue code	Key Code	Range code	Reading of A/D Convert

	Data of Main Display (6 bytes)						Data of Left Display (6 bytes)		

		Data of Right Display (6 bytes)						Reading(DC) of (AC+DC) (3 bytes)	

Reading(AC) of (AC+DC) (3 bytes)			Check sum

4.

a. Model Name

41H (A)	30H (0)	42H (B)	31H (1)	43H (C)	32H (2)	44H (D)	33H (3)

b. Series Number

45H (E)	34H (4)	46H (F)	35H (5)	47H (G)	36H (6)	48H (H)	37H (7)

c. S/W Version

30H (0)	2EH (.)	30H (0)	30H (0)	2EH (.)	30H (0)	36H (6)

d. Switch code

00H	01H	02H	03H	04H	05H	06H	07H	08H	09H
OFF	V	mV	Ohm	Diode	mA	A	Cap.	Hz	Temp.

e. Blue code

	V	mV	Ohm	Diode	mA	A	Cap.	Hz	Temp.
00H	DC	DC	Ohm	Diode	DC	DC	Cap	Hz	deg.C
01H	AC	AC	Low Ohm	Beeper	AC	AC	-------	Duty Factor	deg.F
02H	AC+ DC	AC+ DC	-------	-------	AC+ DC	AC+ DC	--------	--------	--------

f. Key code

01H	02H	03H	04H	05H	06H	07H	08H	09H	0AH
F1	F2	F3	F4	Light	Bar	Digit	Range	O	Blue

g. Range code

	DC V	AC V	(AC+DC) V	DC mV	AC mV	(AC+DC) mV
00H (auto)	4V	4V	4V	40mV	400mV	400mV
01H (auto)	40V	40V	40V	400mV		
02H (auto)	400V	400V	400V			
03H (auto)	1000V	750V	750V			
80H (manual)	4V	4V	4V	40mV	400mV	400mV
81H (manual)	40V	40V	40V	400mV		
82H (manual)	400V	400V	400V			
83H (manual)	1000V	750V	750V			

	DC mA	AC mA	(AC+DC) mA	DC A	AC A	(AC+DC) A
00H (auto)	40mA	40mA	40mA	4A	4A	4A
01H (auto)	400mA	400mA	400mA	10A	10A	10A
80H (manual)	40mA	40mA	40mA	4A	4A	4A
81H (manual)	400mA	400mA	400mA	10A	10A	10A

	Ohm	Low Ohm	Cap	Hz	Diode	Temp

00H (auto)	400Ohm	4kOhm	4nF	400Hz	Diode	Temp
01H (auto)	4kOhm	40kOhm	40nF	4kHz		
02H (auto)	40kOhm	400kOhm	400nF	40kHz		
03H (auto)	400kOhm	4MOhm	4μF	400kHz		
04H (auto)	4Mohm	40MOhm	40μF	4MHz		
05H (auto)	40Mohm		400μF			
06H (auto)			4mF			
07H (auto)			10mF			
80H (manual)	400Ohm	4kOhm	4nF	400Hz	Diode	Temp
81H (manual)	4kOhm	40kOhm	40nF	4kHz		
82H (manual)	40kOhm	400kOhm	400nF	40kHz		
83H (manual)	400kOhm	4MOhm	4μF	400kHz		
84H (manual)	4Mohm	40MOhm	40μF	4MHz		
85H (manual)	40Mohm		400μF			
86H (manual)			4mF			
87H (manual)			10mF			

h. Reading of A/D Convert

Low Byte	High Byte	Pole Byte

If pole byte > 7FH then Reading = [(Low byte)+(High byte x 256)] x (-1)
other Reading = (Low byte)+(High byte x 256)

i. Main display

Low Byte	High Byte	Pole Byte	Point	Unit	Sub code

If pole byte > 7FH then Reading = [(Low byte)+(High byte x 256)] x (-1)
other Reading = (Low byte)+(High byte x 256)

j : left display

Low Byte	High Byte	Pole Byte	Point	Unit	Sub code

If pole byte > 7FH then Reading = [(Low byte)+(High byte x 256)] x (-1)
other Reading = (Low byte)+(High byte x 256)

k. Right display

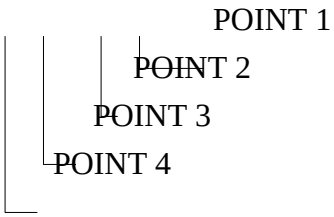
Low Byte	High Byte	Pole Byte	Point	Unit	Sub code

If pole byte > 7FH then Reading = [(Low byte)+(High byte x 256)] x (-1)
other Reading = (Low byte)+(High byte x 256)

POINT CODE :

CODE	POINT
00H	NONE
01H	POINT 1
02H	POINT 2
04H	POINT 3
08H	POINT 4

Remark : 4 . 0 . 0 . 0 . 0



2.UNIT CODE :

CODE	UNIT	CODE	UNIT
00H	NONE	0EH	Delta
01H	V	0FH	Hz
02H	mV	10H	kHz
03H	A	11H	MHz
04H	mA	12H	deg.C
05H	dB	13H	deg.F
06H	dBm	14H	s
07H	nF	15H	ns
08H	μF	16H	μs
09H	mF	17H	ms
0AH	Ohm		
0BH	kOhm		
0CH	MOhm		
0DH	%		

3.SUBFUNCTION CODE :

CODE	DATA
00H	NONE
01H	Input Reading
02H	Freq.
03H	Period
04H	Duty Factor
05H	Ambient Temperature
06H	Time Stamp
07H	Load
08H	Number (Store, Recall)
09H	Store
0AH	Recall
0BH	Reset
0CH	Auto Hold
0DH	Max
0EH	Min
0FH	Max-Min
10H	Peak Hold Max
11H	Peak Hold Min
12H	Peak Hold Max-Min
13H	Set High “Indication”
14H	Set Low “Indication”
15H	High
16H	Low
17H	Delta
18H	%
19H	Ref
1AH	dBm
1BH	dB
1CH	Send
1DH	Setup “Indication”
1EH	Set Beeper “Indication”

CODE	DATA
1FH	Set Auto Power off “Indication”
20H	Set Back Light “Indication”
21H	Set Hazard “Indication”
22H	Set Line Frequency “Indication”
23H	Set dBm Load “Indication”
24H	Set Reset “Indication”
25H	
26H	Probe “Indication”
27H	Error “Indication”
28H	Fuse “Indication”

Checksum:

The last byte is the SUM of every byte in the received data format except Checksum itself, you can use the Checksum (using the last tow digits) to check the data receiving from DMM is correctly or not.

Example for Checksum :

55+55+0+36+41+50+50+41+33+30+35+20+53+61+6E+64+72+61+20+20+30+2E+30+30+2E+30+36+1+0+0+0+1+0+80+1+0+0+8+1+1+0+0+0+0+0+0+0+0+0+0+0+0+0+0+0+0+0+0 = 732

Checksum = 32