

Protocol for 500000-count multimeter series

Important info: New 500000-count **a-version** multimeter (model name with additional "a") can only use new **BC-85Xa** interface cable, and the communication will not work if previous BC-85X or BC-85X-1 interface cable is used. Vice versa, previous 500000-count multimeter can use previous BC-85X or BC-85X-1 interface cable only.

*COM Port communication protocol:
Baud rate:9600
Parity:None parity
Data bits:8
Stop bits:1

* Program initiated procedures for COM port
1. Initiate COM port
2. Wait for 100ms
3. Set RTS=1
4. Wait for 100ms
3. Set RTS=0
4. Wait for 100ms
5. Set RTS=1

Command Format:

DLE	STX	Command	arg1	arg2	ChkSum	DLE	ETX
10h	02h	Cmd	xx	xx	xx	10h	03h

xx: don't care

Command	arg1	arg2	Description	Bytes return
00h	xx	xx	Get Reading from 500000-count multimeter	22

If reading is **not** OL, "Bytes return" Format for "Command 00h" will be:

DLE		STX	Command	DataLen	bFunc0	bFunc1	bFunc2	bFunc3	" +/ - "	D1	" . "	D2	D3	D4	D5	D6	" E "	" +/ - "	Dp	ChkSum	DLE	ETX
10h	02h	00h	15	Function Index					ASCII Code											binary	10h	03h

ChkSum = XOR (bFunc0, bFunc1, bFunc2, bFunc3, "+/-", D1, ".", D2, D3, D4, D5, D6, "E", "+/-", Dp)

*Explanation for "bFunc0, bFunc1, bFunc2, bFunc3": See Table 1 below

Example 1: Reading = "ACV 13.772 V", "Bytes return" will be:

10h	02h	00h	0Fh	05h	00h	00h	00h	20h	31h	2Eh	33h	37h	37h	32h	20h	45h	2Bh	31h	44h	10h	03h
				ACV	(13.772=				1	.	3	7	7	2		E	+	1	=10 [^] +1		

Example 2: Reading = "DCV -382.345 V", "Bytes return" will be:

10h	02h	00h	0Fh	06h	00h	00h	00h	2Dh	33h	2Eh	38h	32h	33h	34h	35h	45h	2Bh	32h	52h	10h	03h
								E + 2 = 10^+2													
DCV								(-382.345= - 3 . 8 2 3 4 5 x 10^2)													

If reading is OL, "Bytes return" Format for "Command 00h" will be:

DLE	STX	Command	DataLen	bFunc0	bFunc1	bFunc2	bFunc3	" +/ - "	O	L	ChkSum	DLE	ETX
10h	02h	01h	7	Function Index				ASCII Code		binary	10h	03h	

ChkSum = XOR (bFunc0, bFunc1, bFunc2, bFunc3, "+/-", "O", "L")

*1. Additional "/10" calculation is required for temperature function if reading is less than 1000°C or 1000 °F

Recommended program flow to get reading

1. Initiate COM port
2. Wait for 100ms
3. Set RTS=1
4. Wait for 100ms
3. Set RTS=0
4. Wait for 100ms
5. Set RTS=1
6. Set (baud rate, parity, data bit, stop bit) = (9600, N, 8, 1)
7. Locate 22 RXD buffers
8. Clear RXD buffers
9. Clear TXD buffers
10. Sending out 1'st command "10h"
11. Wait 1ms or less
12. Sending out 2'nd command "02h"
13. Wait 1ms or less
14. Sending out 3'rd command "00h"
15. Wait 1ms or less
16. Sending out 4'th command "00h"
17. Wait 1ms or less
18. Sending out 5'th command "00h"
19. Wait 1ms or less
20. Sending out 6'th command "00h"
21. Wait 1ms or less
22. Sending out 7'th command "10h"
23. Wait 1ms or less
24. Sending out 8'th command "03h"
25. Wait 1ms or less
26. Check & read RXD buffers
27. Decode RXD buffers according to the principle shown above
28. Repeat step 8 ~ 27 to get new reading

Table 1

Function Bytes [3]~[0] : 4 Bytes																		
bFunc3		bFunc2	bFunc1							bFunc0								Identifier
bit7*	bit6~0	bit7~0	bit7~6	bit5	bit4	bit3	bit2	bit1	bit0	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	
X	0	0	00	dB	0	%	Hz	A	beep	Ohm	TF	TC	Dx	Cx	V	DC	AC	
X	0	0	00	0	0	0	0	0	0	0	0	0	0	0	1	0	1	AcV
X	0	0	00	0	0	0	0	0	0	0	0	0	0	0	1	1	0	DcV
X	0	0	00	0	0	0	0	0	0	0	0	0	0	0	1	1	1	AC+DCV
X	0	0	00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	Cx
X	0	0	00	0	0	0	0	0	0	0	0	0	1	0	1	0	0	Dx
X	0	0	00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	°C
X	0	0	00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	°F
X	0	0	00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	Ohm
X	0	0	00	0	0	0	0	0	1	1	0	0	0	0	0	0	0	Conti
X	0	0	00	0	0	0	0	1	0	0	0	0	0	0	0	0	1	AcA
X	0	0	00	0	0	0	0	1	0	0	0	0	0	0	0	1	0	DcA
X	0	0	00	0	0	0	0	1	0	0	0	0	0	0	0	1	1	Ac+DcA
X	0	0	00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	Hz
X	0	0	00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	Duty%
X	0	0	00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	dB

*If meter is in Low battry, the bit7 of bFunc3 will be set to 1. Otherwise 0.