

Protocol for 5000-count multimeter series

Important info: New 5000-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 5000-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
42h	xx	xx	Get real-time reading from 5000-count multimeter	22
4Eh	xx	xx	Get 5000-count data logger series memory information and data	512
52h	xx	xx	Get 5000-count data logger series memory data	512

*Explanation for "**Command 4eh and 52h**" : Please refer to "**Data logger series memory download.PDF**" file accompanied

If reading is **not OL**, "**Bytes return**" Format for "**Command 42h**" 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 13.77 V**", "Bytes return" will be:

10h	02h	00h	0Fh	05h	00h	00h	00h	20h	31h	2Eh	33h	37h	37h	20h	20h	45h	2Bh	31h	56h	10h	03h	
ACV								(13.77=				1	.	3	7	7	E + 1 =10^+1 x 10^+1)					

Example 2: Reading = "**DCV -382.3 V**", "Bytes return" will be:

10h	02h	00h	0Fh	06h	00h	00h	00h	2Dh	33h	2Eh	38h	32h	33h	20h	20h	45h	2Bh	32h	53h	10h	03h
DCV								(-382.3=		-	3	.	8	2	3	E +		2 =10^+2			
														x 10^+2							

If reading is **OL**, "**Bytes return**" Format for "**Command 42h**" 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 "**42h**"
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 "**42h**"
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.