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## Programming Interface Problems (as opposed to functionality issues, which most folks are more likely to care about)

In this section are some screen captures of Excel. The custom Ribbon buttons which appear in those screen captures are part of my custom programming for Excel 2007 and Word 2007. This custom program started off as a simple insertion of the volt and/or amp readings from some of my instruments and has grown more sophisticated over time.

20170420: Fluke states "The serial interface protocol is not formally documented nor supported with the product. The comments for improvement are very valid but at this moment there is no committed plan to improve this."

20170421: My thoughts: I reluctantly agree. In a draft of v09 of this pdf, I had created then deleted a similar thought. Fluke has never documented nor committed to support the 120B series programming interface or implied that end users should invest in custom programming. I expect changes only as Fluke needs to fix issues which interfere with FV2. But I wanted to document these issues just in the case it is ever in Fluke's interest to modify a particular section of code. And, despite the deficiencies listed below, my capture program is quite robust and does most of what I want it to do.

### *Bug: WD (Write Date) only accepts yyyy of 2000*

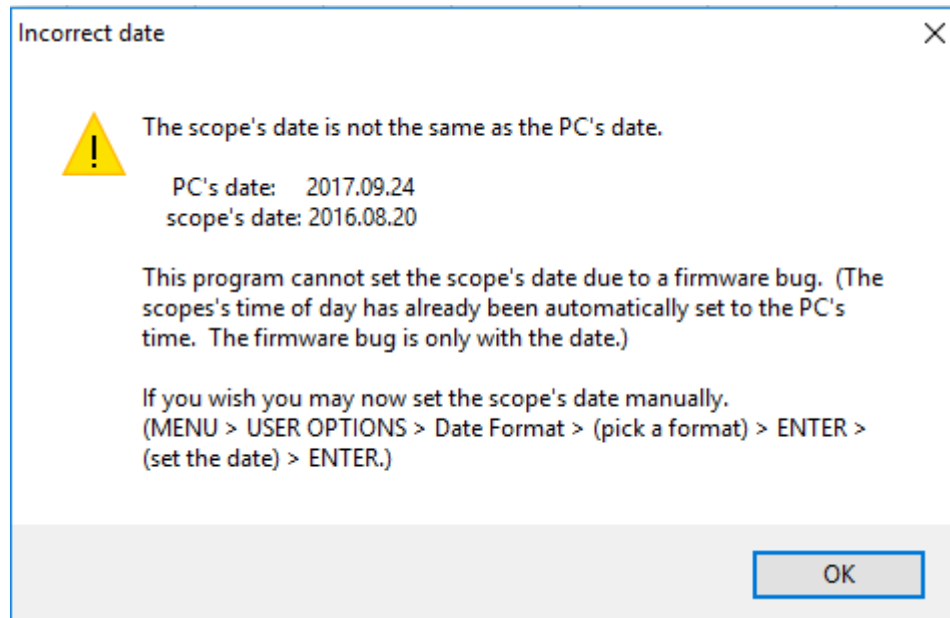
The WD (Write Date) command only accepts a yyyy of 2000. The 125B converts 2000 to 2016. WT (Write Time) works correctly.

```
00r
FLUKE 125B;01.11.01;;English,French,German,Dutch,Spanish,Portugese,Italian,Japan
ese,Korean,Chinese0r
wd 2017,9,230r
20r
rd0r
00r
2000,1,10r
wd 2001,09,230r
20r
wd 2000,1,30r
00r
wd 2001,1,30r
20r
wd 2016,1,30r
20r
```

o The '2' response means Execution Error.

o 20170923: With firmware 1.11.01 the only accepted year is 2000. Previous firmwares accepted 2001 and converted it to 2017. So, prior to firmware 1.11.01 it was possible to subtract 16 from the PC's yyyy to get the desired result. But that was going to stop working in 2018 anyway.

- o An incorrect date will affect the timestamps for Min/Max/Avg and will affect the date shown on screen captures.
- o For all of my other instruments with a date/time clock, my custom control program for that instrument is able to sync that instrument's date/time to the PC. The 125B will be the exception. I have added logic to compare the PC and 125B dates and pop an error dialog. While this issue has been a PITA from a programming standpoint, setting the date manually should only be necessary hassle if the lithium battery dies.



*Bug: ID does not return the firmware version*

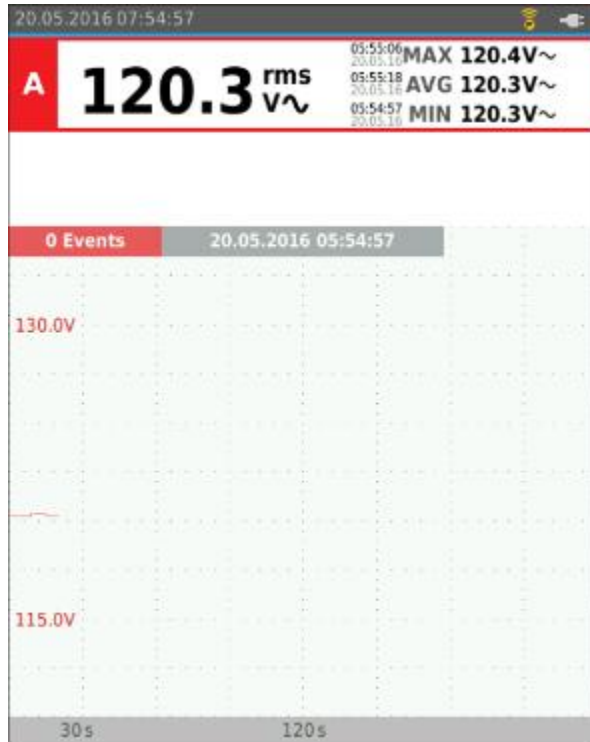
20170923: This bug was fixed by firmware 1.11.01.

*Bug: ID does not return the unit's serial number*

Refer to the screen capture above (not the 'Incorrect date' dialog).

*Bug: QM when reviewing RECORD session crashes 125B*

- o Most times the QM command (without parameters) will crash the 125B when on the RECORD screen reviewing a previous or stopped recording. The QM command is acknowledged ("0") as a valid command but there is no other response from the 125B. After 25 seconds the 125B goes black then reboots. This has the symptoms of an infinite loop which terminates when memory is exhausted. My SD card is 32GB if that makes a difference to the timing.
- o 20170923: crash still occurs with firmware 1.11.01.



However, my QM command while recording does not crash the 125B:

```
WriteCommandSucceeded(QM, 300)
Acknowledge(False, 300): buffer[0]=0x30 buffer[1]=0x0d
ReadResponse():
11, 1, 1, 1, 2, 4, 0. 1E+00, 12, 1, 1, 1, 1, 4, 0. 1E+00, 13, 1, 1, 1, 2, 4, 0. 1E+00, 14, 1, 1, 1, 2, 4, 0. 1E+00, 15, 1, 1, 1, 2, 4, 0. 1E+00, 16, 1, 1, 7, 0, 0, 0. 1E+00,
17, 1, 1, 7, 0, 0, 0. 1E+00, 18, 1, 1, 7, 0, 0, 0. 1E+00, 21, 1, 2, 2, 2, 4, 0. 01E+00, 22, 0, 2, 0, 0, 0, 0. 000E+03, 23, 1, 2, 2, 2, 4, 0. 01E+00, 24, 1, 2, 2, 2, 4, 0. 01E+00,
25, 1, 2, 2, 2, 4, 0. 01E+00, 26, 1, 2, 7, 0, 0, 0. 01E+00, 27, 1, 2, 7, 0, 0, 0. 01E+00, 28, 1, 2, 7, 0, 0, 0. 01E+00
```

## Fluke 125B/NA/S Considerations

```
GetReading() No[11] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[1(V)] Type[2(RMS (ac only))] Pres[4(Absolute(4))]  
GetReading() No[12] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[1(V)] Type[1(dc)] Pres[4(Absolute(4))]  
GetReading() No[13] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[1(V)] Type[2(RMS (ac only))] Pres[4(Absolute(4))]  
GetReading() No[14] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[1(V)] Type[2(RMS (ac only))] Pres[4(Absolute(4))]  
GetReading() No[15] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[1(V)] Type[2(RMS (ac only))] Pres[4(Absolute(4))]  
GetReading() No[16] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[7(s)] Type[0(None)] Pres[0(Timestamp)]  
GetReading() No[17] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[7(s)] Type[0(None)] Pres[0(Timestamp)]  
GetReading() No[18] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[7(s)] Type[0(None)] Pres[0(Timestamp)]  
GetReading() No[21] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[2(A)] Type[2(RMS (ac only))] Pres[4(Absolute(4))]  
GetReading() No[22] Valid[0] Source[2(FLUKE 125B: Channel B)] Unit[0(None)] Type[0(None)] Pres[0(Timestamp)]  
GetReading() No[23] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[2(A)] Type[2(RMS (ac only))] Pres[4(Absolute(4))]  
GetReading() No[24] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[2(A)] Type[2(RMS (ac only))] Pres[4(Absolute(4))]  
GetReading() No[25] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[2(A)] Type[2(RMS (ac only))] Pres[4(Absolute(4))]  
GetReading() No[26] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[7(s)] Type[0(None)] Pres[0(Timestamp)]  
GetReading() No[27] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[7(s)] Type[0(None)] Pres[0(Timestamp)]  
GetReading() No[28] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[7(s)] Type[0(None)] Pres[0(Timestamp)]  
WriteCommandSucceeded(QM 11, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 120.2E+00  
WriteCommandSucceeded(QM 12, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 0.1E+00  
WriteCommandSucceeded(QM 13, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 120.6E+00  
WriteCommandSucceeded(QM 14, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 120.2E+00  
WriteCommandSucceeded(QM 15, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 119.7E+00  
WriteCommandSucceeded(QM 16, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 958.8E+06  
WriteCommandSucceeded(QM 17, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 958.8E+06  
WriteCommandSucceeded(QM 18, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 958.8E+06  
WriteCommandSucceeded(QM 21, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 0.28E+00  
WriteCommandSucceeded(QM 23, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 0.28E+00  
WriteCommandSucceeded(QM 24, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 0.28E+00  
WriteCommandSucceeded(QM 25, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 0.27E+00  
WriteCommandSucceeded(QM 26, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 958.8E+06  
WriteCommandSucceeded(QM 27, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 958.8E+06
```

## Fluke 125B/NA/S Considerations

```
WriteCommandSucceeded(QM 28, 200)
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d
ReadResponse(): 958.8E+06
```

The above translates to:

The screenshot shows the settings for the data table: 'Only Primary values and units' is unchecked, 'All readings but minimal attributes' is unchecked, and 'All readings and all attributes' is checked. The table below shows data for two channels, A and B, with various measurements and timestamps.

	A	B	C	D	E	F
1	120.2 V		FLUKE 125B: Channel A	RMS (ac only)	Channel A Main	Absolute(4)
2	0.1 V		FLUKE 125B: Channel A	dc	Channel A Sub	Absolute(4)
3	120.6 V		FLUKE 125B: Channel A	RMS (ac only)	Channel A Max	Absolute(4)
4	120.2 V		FLUKE 125B: Channel A	RMS (ac only)	Channel A Avg	Absolute(4)
5	119.7 V		FLUKE 125B: Channel A	RMS (ac only)	Channel A Min	Absolute(4)
6	958800000 s		FLUKE 125B: Channel A	None	Channel A Max Timestamp 20000520 052000	Timestamp
7	958800000 s		FLUKE 125B: Channel A	None	Channel A Avg Timestamp 20000520 052000	Timestamp
8	958800000 s		FLUKE 125B: Channel A	None	Channel A Min Timestamp 20000520 052000	Timestamp
9	0.28 A		FLUKE 125B: Channel B	RMS (ac only)	Channel B Main	Absolute(4)
10	0.28 A		FLUKE 125B: Channel B	RMS (ac only)	Channel B Max	Absolute(4)
11	0.28 A		FLUKE 125B: Channel B	RMS (ac only)	Channel B Avg	Absolute(4)
12	0.27 A		FLUKE 125B: Channel B	RMS (ac only)	Channel B Min	Absolute(4)
13	958800000 s		FLUKE 125B: Channel B	None	Channel B Max Timestamp 20000520 052000	Timestamp
14	958800000 s		FLUKE 125B: Channel B	None	Channel B Avg Timestamp 20000520 052000	Timestamp
15	958800000 s		FLUKE 125B: Channel B	None	Channel B Min Timestamp 20000520 052000	Timestamp

### *Bug: QM Min/Max/Avg timestamps are incorrect*

In the previous bug section (immediately above) note that all of the Timestamp values are the same.

- o There should be multiple timestamp values for A vs B and Max vs Avg vs Min (just like the 289).

- o If 958800000 is Unix time, the date/time is 20000520 052000. Because the current date is 5/20 it appears that MMDD is correct but the year and time are incorrect. (If you look closely at the 125B screen capture above you can see the individual timestamps for Max, Avg, and Min.)

- o Unix time is the number of seconds from 19700101. It seems like the 125B is using the number of seconds from 19860101.

- o 20170118: A yyyy of 2000 means 2016 and 2001 means 2017. I could programmatically work around that. But the time is incorrect. Here's a similar example from 20170118:

### Fluke 125B/NA/S Considerations

Settings						
<input type="checkbox"/> Only Primary values and units	<input type="checkbox"/> All readings but minimal attributes	<input checked="" type="checkbox"/> All readings and all attributes				
Settings			Insert 125B Reading Fluke	Insert 289 Reading Fluke	Insert 196 Reading Fluke	Insert 125B Harmonics 125B Harmonics
			Insert 125B Screen 125B Screen	Insert U1461A Reading Keysight		
D25						
A	B	C	D	E		F
1	118.9 V	FLUKE 125B: Channel A	RMS (ac only)	Channel A Main		Absolute
2	0.1 V	FLUKE 125B: Channel A	dc	Channel A Sub		Absolute
3	119 V	FLUKE 125B: Channel A	RMS (ac only)	Channel A Max		Absolute
4	118.9 V	FLUKE 125B: Channel A	RMS (ac only)	Channel A Avg		Absolute
5	118.7 V	FLUKE 125B: Channel A	RMS (ac only)	Channel A Min		Absolute
6	979800000 s	FLUKE 125B: Channel A	None	Channel A Max Timestamp 20010118 064000		Time
7	979800000 s	FLUKE 125B: Channel A	None	Channel A Avg Timestamp 20010118 064000		Time
8	979800000 s	FLUKE 125B: Channel A	None	Channel A Min Timestamp 20010118 064000		Time
9	0.27 A	FLUKE 125B: Channel B	RMS (ac only)	Channel B Main		Absolute
10	0.27 A	FLUKE 125B: Channel B	RMS (ac only)	Channel B Max		Absolute
11	0.27 A	FLUKE 125B: Channel B	RMS (ac only)	Channel B Avg		Absolute
12	0.26 A	FLUKE 125B: Channel B	RMS (ac only)	Channel B Min		Absolute
13	979800000 s	FLUKE 125B: Channel B	None	Channel B Max Timestamp 20010118 064000		Time
14	979800000 s	FLUKE 125B: Channel B	None	Channel B Avg Timestamp 20010118 064000		Time
15	979800000 s	FLUKE 125B: Channel B	None	Channel B Min Timestamp 20010118 064000		Time

o 20170121: For reference, here's what the 289 looks like. The 289 responds correctly to the QDDA command. It has only one channel so there are fewer rows.

Settings						
<input type="checkbox"/> Only Primary values and units	<input type="checkbox"/> All readings but minimal attributes	<input checked="" type="checkbox"/> All readings and all attributes				
Settings			Insert 125B Reading Fluke	Insert 289 Reading Fluke	Insert 196 Reading Fluke	Insert 125B Harmonics 125B Harmonics
			Insert 125B Screen 125B Screen	Insert U1461A Reading Keysight		<input type="checkbox"/> Include menu bar
E21						
A	B	C	D	E		F
1	119.74 Vac	Fluke 289	NONE	Live 20170121 064121		NORMAL
2	119.74 Vac	Fluke 289	NONE	Primary 20170121 064121 V_AC		NORMAL
3	119.71 Vac	Fluke 289	NONE	Min 20170121 064119 E.T.=00:00:35.9090000		NORMAL
4	120.26 Vac	Fluke 289	NONE	Max 20170121 064044 E.T.=00:00:00.3020000		NORMAL
5	119.92 Vac	Fluke 289	NONE	Avg 20170121 064121 E.T.=00:00:37.6190000 Start 20170121 064043		NORMAL

*Bug: QM does not return cursor measurements*

QM does not return a measurement record for any of the cursor measurements.

o 20170118: No change.

QM responds as if cursors do not exist. Below are the results for the various types of cursors (|, ||, =, rising, falling).

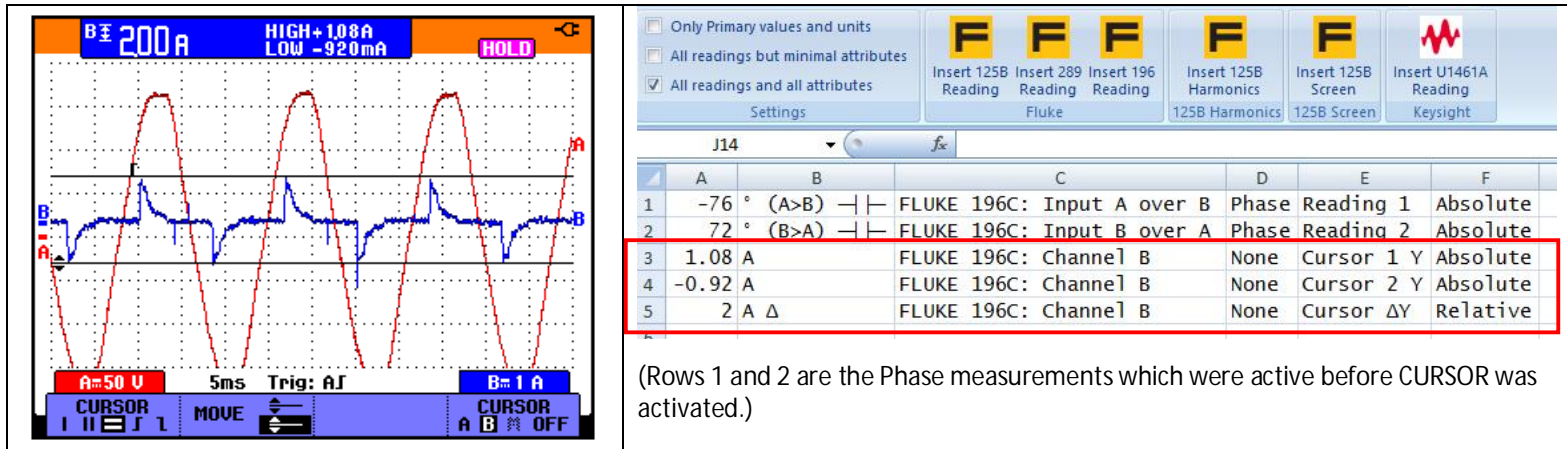
	A	B	C	D	E	F
1						
2	120.5 V	FLUKE 125B: Channel A	RMS (ac only)	Channel A Main	Absolute	
3	0 V	FLUKE 125B: Channel A	dc	Channel A Sub	Absolute	
4	0.27 A	FLUKE 125B: Channel B	RMS (ac only)	Channel B Main	Absolute	
5						
6						
7	120.5 V	FLUKE 125B: Channel A	RMS (ac only)	Channel A Main	Absolute	
8	0 V	FLUKE 125B: Channel A	dc	Channel A Sub	Absolute	
9	0.3 A	FLUKE 125B: Channel B	RMS (ac only)	Channel B Main	Absolute	
10						
11	=					
12	120.4 V	FLUKE 125B: Channel A	RMS (ac only)	Channel A Main	Absolute	
13	0.1 V	FLUKE 125B: Channel A	dc	Channel A Sub	Absolute	
14	0.29 A	FLUKE 125B: Channel B	RMS (ac only)	Channel B Main	Absolute	
15						
16	rising					
17	120.9 V	FLUKE 125B: Channel A	RMS (ac only)	Channel A Main	Absolute	
18	0 V	FLUKE 125B: Channel A	dc	Channel A Sub	Absolute	
19	0.29 A	FLUKE 125B: Channel B	RMS (ac only)	Channel B Main	Absolute	
20						
21	falling					
22	120.4 V	FLUKE 125B: Channel A	RMS (ac only)	Channel A Main	Absolute	
23	0 V	FLUKE 125B: Channel A	dc	Channel A Sub	Absolute	
24	0.28 A	FLUKE 125B: Channel B	RMS (ac only)	Channel B Main	Absolute	
25						

```
WriteCommandSucceeded(QM, 300)
Acknowledge(False, 300): buffer[0]=0x30 buffer[1]=0x0d
ReadResponse(): 11, 1, 1, 1, 2, 4, 0. 1E+00, 12, 1, 1, 1, 1, 4, 0. 1E+00, 21, 1, 2, 2, 2, 4, 0. 01E+00, 22, 0, 2, 0, 0, 0, 0. 000E+03
GetReading() No[11] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[1(V)] Type[2(RMS (ac only))] Pres[4(Absolute)]
GetReading() No[12] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[1(V)] Type[1(dc)] Pres[4(Absolute)]
```

## Fluke 125B/NA/S Considerations



```
GetReading() No[21] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[2(A)] Type[2(RMS (ac only))] Pres[4(Absolute)]
GetReading() No[22] Valid[0] Source[2(FLUKE 125B: Channel B)] Unit[0(None)] Type[0(None)] Pres[0(Timestamp)]
```

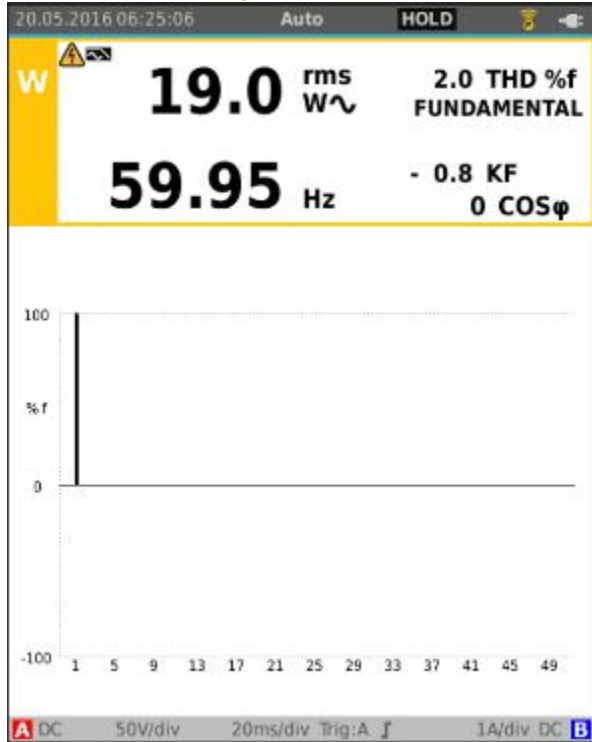
For reference: In contrast to the 125B, the 196 responds correctly to the QM command when cursor measurements are active – for the most part. The 196 response has one bug where the No 71 measurement record (Cursor  $\Delta X$ ) will be missing when the cursor mode (F3) is not time. Other than that, it works perfectly.



```
Entering WriteCommandSucceeded(QM, 300) Port COM7 is open.
Acknowledge(False, 300): buffer[0]=0x30 buffer[1]=0x0d bytesRead=2
ReadResponse(): 11, 1, 12, 11, 14, 0, 0.001E+03, 21, 1, 21, 11, 14, 0, 0.001E+03, 31, 1, 2, 2, 0, 0, 40.00E-03, 41, 1, 2, 2, 0, 0, 40.00E-03, 53, 0, 2, 2, 0, 0, 40.00E-03, 54, 0, 2, 2, 0, 0, 40.00E-03, 55, 0, 2, 2, 0, 0, 40.00E-03, 56, 0, 2, 2, 0, 0, 40.00E-03, 61, 1, 2, 2, 0, 1, 40.00E-03, 71, 0, 2, 7, 0, 1, 200.0E-06
GetReading() No[11] Valid[1] Source[12(FLUKE 196C: Input A over B)] Unit[11(°)] Type[14(Phase)] Pres[0(Absolute)]
GetReading() No[21] Valid[1] Source[21(FLUKE 196C: Input B over A)] Unit[11(°)] Type[14(Phase)] Pres[0(Absolute)]
GetReading() No[31] Valid[1] Source[2(FLUKE 196C: Channel B)] Unit[2(A)] Type[0(None)] Pres[0(Absolute)]
GetReading() No[41] Valid[1] Source[2(FLUKE 196C: Channel B)] Unit[2(A)] Type[0(None)] Pres[0(Absolute)]
GetReading() No[53] Valid[0] Source[2(FLUKE 196C: Channel B)] Unit[2(A)] Type[0(None)] Pres[0(Absolute)]
GetReading() No[54] Valid[0] Source[2(FLUKE 196C: Channel B)] Unit[2(A)] Type[0(None)] Pres[0(Absolute)]
GetReading() No[55] Valid[0] Source[2(FLUKE 196C: Channel B)] Unit[2(A)] Type[0(None)] Pres[0(Absolute)]
GetReading() No[56] Valid[0] Source[2(FLUKE 196C: Channel B)] Unit[2(A)] Type[0(None)] Pres[0(Absolute)]
GetReading() No[61] Valid[1] Source[2(FLUKE 196C: Channel B)] Unit[2(A  $\Delta$ )] Type[0(None)] Pres[1(Relative)]
GetReading() No[71] Valid[0] Source[2(FLUKE 196C: Channel B)] Unit[7(s  $\Delta$ )] Type[0(None)] Pres[1(Relative)]
```

*Bug: QM does not return  $\cos\phi$*

- o QM on the   screen does not return a measurement record for COS $\phi$ .
- o 20170118: No change.

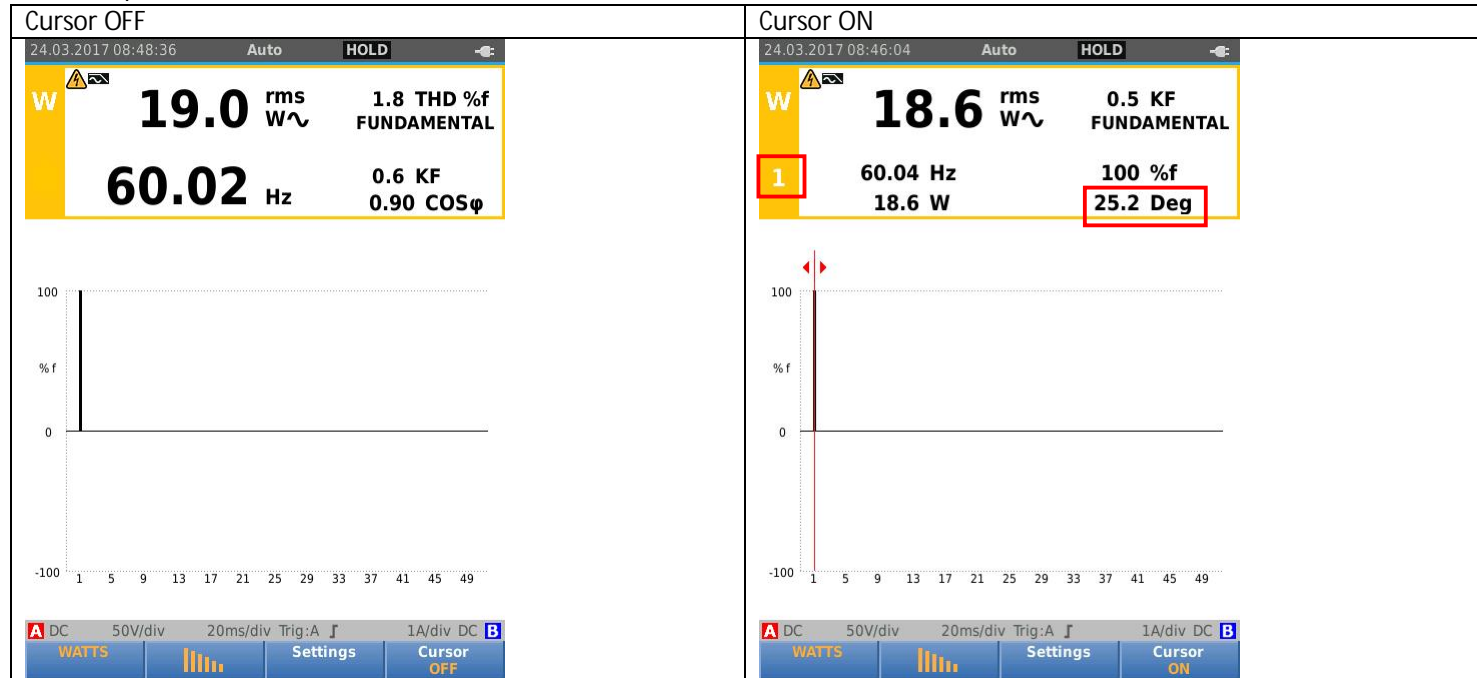


```

WriteCommandSucceeded(QM, 300)
Acknowledge(False, 300): buffer[0]=0x30 buffer[1]=0x0d
ReadResponse():
11, 1, 1, 4, 21, 4, 0. 1E+00, 12, 1, 1, 25, 0, 4, 0. 1E+00, 21, 1, 2, 10, 11, 4, 0. 01E+00, 22, 1, 2, 24, 0, 4, 0. 1E+00, 81, 0, 1, 0, 0, 0, 9. 91E+37, 82, 0, 1,
0, 0, 0, 9. 91E+37, 91, 0, 1, 0, 0, 0, 9. 91E+37, 92, 0, 1, 0, 0, 0, 9. 91E+37
GetReading() No[11] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[4(W)] Type[21(Real Power)] Pres[4(Absolute(4))]
GetReading() No[12] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[25(% THD)] Type[0(None)] Pres[4(Absolute(4))]
GetReading() No[21] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[10(Hz)] Type[11(Freq)] Pres[4(Absolute(4))]
GetReading() No[22] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[24(KF)] Type[0(None)] Pres[4(Absolute(4))]
GetReading() No[81] Valid[0] Source[1(FLUKE 125B: Channel A)] Unit[0(None)] Type[0(None)] Pres[0(Absolute(0))]
GetReading() No[82] Valid[0] Source[1(FLUKE 125B: Channel A)] Unit[0(None)] Type[0(None)] Pres[0(Absolute(0))]
GetReading() No[91] Valid[0] Source[1(FLUKE 125B: Channel A)] Unit[0(None)] Type[0(None)] Pres[0(Absolute(0))]
GetReading() No[92] Valid[0] Source[1(FLUKE 125B: Channel A)] Unit[0(None)] Type[0(None)] Pres[0(Absolute(0))]
    
```

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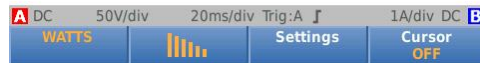
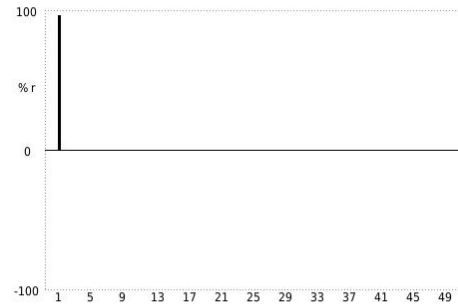
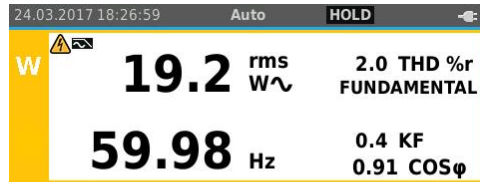
o 20170324: The workaround is to retrieve  $\phi$  as the phase angle of harmonic 1. In the following example we see that  $\phi$  is  $25.2^\circ$  so we can calculate that  $\cos\phi$  is 0.9048.



Fluke 125B/NA/S Considerations



(continued)

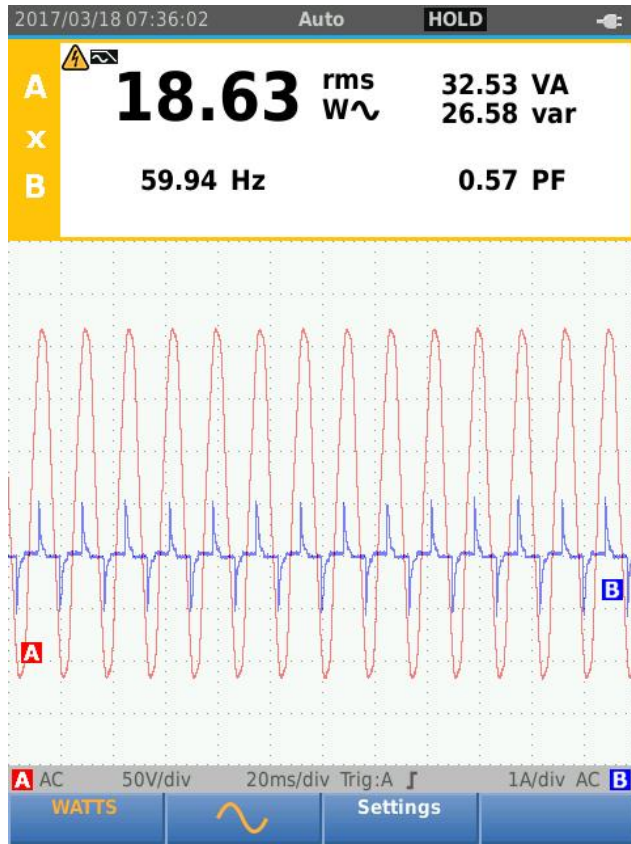
The program would have to determine that the 125B is on the **WATTS** screen by issuing a QH command to determine if watt harmonics are available. Then all watt harmonics would have to be retrieved. Here is the result:



19.2 W	FLUKE 125B: Harmonics	Real Power	Harmonics Reading 1 Main	Absolute
2 % THD	FLUKE 125B: Harmonics	None	Harmonics Reading 1 Sub	Absolute
Warning: 125B firmware bug prevents detecting whether THD setting is %r rather than %f				
59.98 Hz	FLUKE 125B: Harmonics	Freq	Harmonics Reading 2 Main	Absolute
0.4 KF	FLUKE 125B: Harmonics	None	Harmonics Reading 2 Sub	Absolute
0.9 None (cosφ)	From Harmonic1 φ=25.2°	Displacement PF	Harmonics Reading 2 Sub	Absolute

*Bug: QM does not return VA*

QM on the   screen does not return a measurement record for VA.  
 o 20170118: No change.



```

ReadResponse(): 11, 1, 1, 4, 21, 4, 0.01E+00, 12, 1, 1, 21, 19, 4, 0.01E+00, 21, 1, 2, 10, 11, 4, 0.01E+00, 22, 1, 2, 20, 22, 4, 0.01E+00
GetReading() No[11] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[4(W)] Type[21(Real Power)] Pres[4(Absolute)]
GetReading() No[12] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[21(VAR)] Type[19(Reactive Power)] Pres[4(Absolute)]
GetReading() No[21] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[10(Hz)] Type[11(Freq)] Pres[4(Absolute)]
GetReading() No[22] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[20(None(PF))] Type[22(Power Factor)] Pres[4(Absolute)]
    
```

Fluke 125B/NA/S Considerations

(continued)

20170324: The missing measurement record probably should have a Type of 20 (Apparent Power) and probably should have a Unit of 22 (VA).

o Type:

Type: 43B and 190 series	Type: 125B (as best I can determine)
0 None	"None", // 0
1 Mean	"dc", // 1 125B verified -- could be V or A or when measuring resistance or capacitance
2 Rms	"RMS (ac only)", // 2 125B verified
3 True rms	"TRMS (ac+dc)", // 3 125B verified
4 Peak peak	"Peak Peak", // 4 125B verified
5 Peak maximum	"Peak Max", // 5 125B verified
6 Peak minimum	"Peak Min", // 6 125B verified
7 Crest factor	"Crest Factor", // 7 125B verified
8 Period	"Period(8)", // 8
9 Duty cycle negative	"Duty Cycle Neg", // 9 125B verified
10 Duty cycle positive	"Duty Cycle Pos", // 10 125B verified
11 Frequency	"Freq", // 11 125B verified
12 Pulse width negative	"Pulse Width Neg", // 12 125B verified
13 Pulse width positive	"Pulse Width Pos", // 13 125B verified
14 Phase	"Phase", // 14 125B verified
15 Diode	"Diode", // 15 125B verified
16 Continuity	"Continuity", // 16 125B verified
----- 17 unassigned -----	"Unassigned(17)", // 17
(inconsistency starts here)	(inconsistency starts here)
18 Reactive Power	"Unassigned (18)", // 18 Reactive power for 43B and 190 series
19 Apparent Power	"Reactive Power", // 19 125B verified VAR
20 Real Power	"Apparent Power", // 20 125B not verified VA
21 Harmonic Reactive Power	"Real Power", // 21 125B verified W. There is no way to distinguish between Fundamental and Full.
22 Harmonic Apparent Power	"Power Factor", // 22 125B verified
23 Harmonic Real Power	"Harmonic Real Power(23)", // 23
24 Harmonic rms	"RMS(ac only) PWM", // 24 125B verified
25 Displacement Power Factor	"TRMS (ac+dc) PWM", // 25 125B verified
26 Total Power Factor	"Total Power Factor(26)", // 26
27 Total Harmonic Distortion	"RPM 2 rotations = 1 pulse", // 27 125B verified
28 Total Harmonic Distortion with respect to Fundamental	"RPM 1 rotation = 1 pulse", // 28 125B verified
29 K Factor (European definition)	"RPM 1 rotation = 2 pulses", // 29 125B verified
30 K Factor (US definition)	"RPM 1 rotation = 4 pulses", // 30 125B verified
31 Line Frequency	"Line Freq(31)", // 31
32 AC average	"PWM(32)", // 32
	"Rise Time(33)", // 33
	"Fall Time(34)", // 34
	"Data Rate", // 35 125B verified - BusHealth
	"Rise/Fall Time", // 36 125B verified - BusHealth
	"Level", // 37 125B verified - BusHealth
	"Amplitude", // 38 125B verified - BusHealth
	"Jitter", // 39 125B verified - BusHealth
	"Ringing", // 40 125B verified - BusHealth

Fluke 125B/NA/S Considerations

(continued)

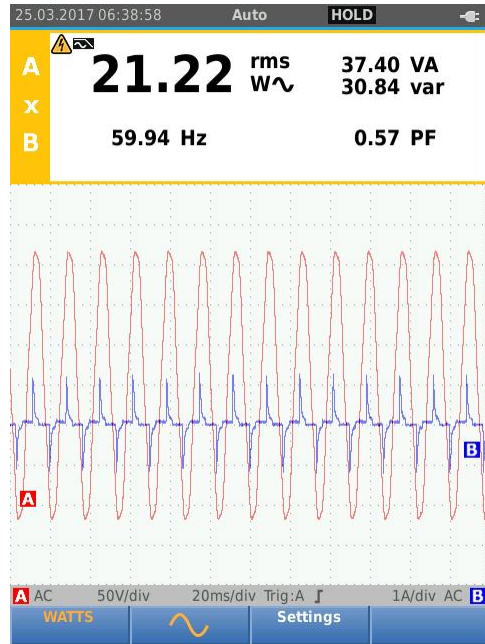
o Unit:

Units: 43B and 190 series	Units: 125B (as best I can determine)
0 None (off)	"None", // 0
1 Volt	"V", // 1 125B verified
2 Ampere	"A", // 2 125B verified
3 Ohm	"Ω", // 3 125B verified
4 Watt	"W", // 4 125B verified
5 Farad	"F", // 5 125B verified - Farad
6 Kelvin	"°K(6)", // 6
7 seconds	"s", // 7 125B verified - Type 12 & 13 (Pulse Width) and Type 35 (BusHealth Data Rate, which is sent as seconds/bit but appears on screen as bits/second.)
8 hours	"h(8)", // 8
9 days	"d(9)", // 9
10 Hertz	"Hz", // 10 125B verified
11 Degrees	"°", // 11 125B verified
12 Celsius	"°C", // 12 125B verified
13 Fahrenheit	"°F", // 13 125B verified
14 percentage (%)	"%", // 14 125B verified - used for Duty Cycle and BusHealth % for risetime, falltime, jitter, ringing
15 dBm 50 Ohm	"dBm 50Ω", // 15 125B verified
16 dBm 600 Ohm	"dBm 600Ω", // 16 125B verified
17 dB Volt	"dBV", // 17 125B verified
18 dB Ampere	"dBA(18)", // 18
19 dB Watt	"dBW(19)", // 19
(inconsistency starts here)	(inconsistency starts here)
20 Volt * Ampere Reactive (VAR)	"None(PF)", // 20 125B verified - Power Factor is unitless but "PF" will probably reduce ambiguity.
21 Volt * Ampere (VA)	"VAR", // 21 125B verified
	"VA", // 22 125B not verified. VA not returned by 125B.
	"RPM", // 23 125B verified
	"KF", // 24 125B verified
	"% THD" // 25 125B verified

Fluke 125B/NA/S Considerations

(continued)

20170324: The workaround for the missing VA measurement record is to compute  $VA = W \div PF$ .



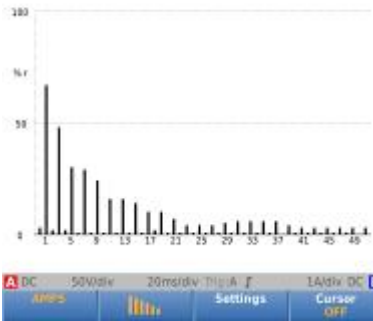
21.22 W	FLUKE 125B: Channel A	Real Power	Channel A Main	Absolute
30.84 VAR	FLUKE 125B: Channel A	Reactive Power	Channel A Sub	Absolute
59.94 Hz	FLUKE 125B: Channel B	Freq	Channel B Main	Absolute
0.57 None(PF)	FLUKE 125B: Channel B	Power Factor	Channel B Sub	Absolute
37.23 VA	Calculated (W÷PF)	Apparent Power	Channel A Sub	Absolute

o The on-screen VA (37.40) and the calculated VA (37.23) don't quite match because the 125B measurement records usually contain the on-screen value rather than the value measured by the 125B before rounding (in this case for W and PF).

*Bug: QM THD Type is missing*

The QM response for harmonic THD returns Type of '0' (None). The 43B programming manual says the results should be a Type of 27 for THD %r or a Type of 28 for THD %f -- but Types 27 and 28 have been reassigned on the 125B. Without the correct type, there is no way to programmatically determine whether the setting is %r or %f.

20170118: No change.



```
WriteCommandSucceeded(QM, 300)
Acknowledge(Fal se, 300): buffer[0]=0x30 buffer[1]=0x0d
ReadResponse():
11, 1, 1, 10, 11, 4, 0. 01E+00, 12, 1, 1, 24, 0, 4, 0. 001E+00, 21, 1, 2, 2, 2, 4, 0. 001E+00, 22, 1, 2, 25, 0, 4, 0. 001E+00, 81, 0, 1, 0, 0, 0, 9. 91E+37, 82, 0, 1, 0,
0, 0, 9. 91E+37, 91, 0, 1, 0, 0, 0, 9. 91E+37, 92, 0, 1, 0, 0, 0, 9. 91E+37
GetReadi ng() No[11] Val id[1] Source[1(FLUKE 125B: Channel A)] Uni t[10(Hz)] Type[11(Freq)] Pres[4(Absol ute)]
GetReadi ng() No[12] Val id[1] Source[1(FLUKE 125B: Channel A)] Uni t[24(KF)] Type[0(None)] Pres[4(Absol ute)]
GetReadi ng() No[21] Val id[1] Source[2(FLUKE 125B: Channel B)] Uni t[2(A)] Type[2(RMS (ac only))] Pres[4(Absol ute)]
GetReadi ng() No[22] Val id[1] Source[2(FLUKE 125B: Channel B)] Uni t[25(% THD)] Type[0(None)] Pres[4(Absol ute)]
GetReadi ng() No[81] Val id[0] Source[1(FLUKE 125B: Channel A)] Uni t[0(None)] Type[0(None)] Pres[0(Ti me)]
GetReadi ng() No[82] Val id[0] Source[1(FLUKE 125B: Channel A)] Uni t[0(None)] Type[0(None)] Pres[0(Ti me)]
GetReadi ng() No[91] Val id[0] Source[1(FLUKE 125B: Channel A)] Uni t[0(None)] Type[0(None)] Pres[0(Ti me)]
GetReadi ng() No[92] Val id[0] Source[1(FLUKE 125B: Channel A)] Uni t[0(None)] Type[0(None)] Pres[0(Ti me)]
```

*Bug: QM Type is "Real Power" regardless of FUNDAMENTAL vs FULL*

QM always returns a Type of 21 (Real Power) regardless of the Power setting. So there is no way to programmatically document the setting or to automatically warn the user if the setting does not meet the test criteria.

