

2456-LEM communication

with COMPASS for Pressure (or Flow) software (non-Autodetect), or any software that can use Visual Basic script

2456-LEM manual states to use PN 8-826 cable. This is a straight through cable with DB9 female ends. Fluke PN is 3872695. LEM manual incorrectly states that this has M/F ends (not F/F that it actually has).

Set switch on back of LEM to RS232 setting.

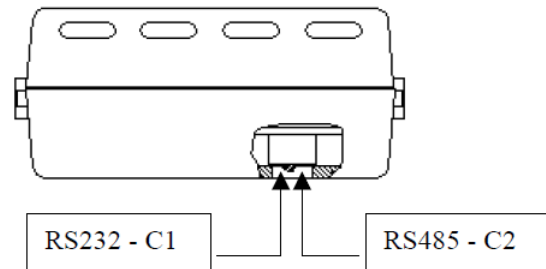


Figure 1-2
LEM Communication Switch

Connect LEM directly to RS232 connection on computer. Connect power adapter included with LEM to power and to LEM. Green light on LEM will come on.

Non-Autodetect Setup, Discrete Outputs Parsed with Macros

See COMPASS for Pressure example with screenshots at end of document

Here is the universal read command and Visual Basic scripts that check/validate the reply and pull the pertinent RH, temp or pressure value from it.

Humidity

Use read command **\$00015275** and Visual Basic script **GetLEM2456RHumidity**

Temperature

Use read command **\$00015275** and Visual Basic script **GetLEM2456Temperature**

Pressure

Use read command **\$00015275** and Visual Basic script **GetLEM2456Pressure**

This is the view in the COMPASS Macro Editor of the Humidity Macro. The text of the macro to copy/paste into a new



macro is on the next page. Select the "ReplyParser" folder and click the "New Macro" icon to create a new macro. Replace all the text in the new macro with the text on the next page. Name the macro in the Title section the same as the function name (as shown below).

The screenshot shows the COMPASS Macro Editor interface. On the left is a tree view of the 'All Code' project, with the 'ReplyParser' folder expanded. The main editor area shows the code for the 'GetLEM2456RHumidity' macro, with line numbers 2229 through 2266. The code is as follows:

```
2229 |
2230 |
2231 | *****
2232 | 'This Function must return the fully formatted response
2233 | 'of a device. The output is used as the Raw output
2234 | 'in the relationship determination of the Final Output.
2235 | '
2236 | 'Reply      :Raw unmanipulated response of a device.
2237 | 'ParamID   :Parameter ID of the device
2238 | 'cRange    :Range class that the output applies to.
2239 | '
2240 | 'The value is returned by setting the function name =
2241 | 'to the calculated value..
2242 | '
2243 | 'For example: ReplyParser64403 = val(mid(rawReply,5))
2244 | *****'*****
2245 | Function GetLEM2456RHumidity(Reply, ParamID, cRange)
2246 | 'Get ambient humidity ready from LEM2456 Reply
2247 |
2248 | 'Command "$00015275"
2249 | 'Character Response "!330772EE089A0D9B26BD"
2250 | 'ASCII decimal Response "21 33 33 30 37 37 32 32 42 30 39 37
2251 | 'ASCII Binary Response "33 51 51 48 55 55 50 50 66 48 57 55
2252 | '
2253 | 'Reply = "!330772EE089A0D9B26BD"
2254 |
2255 |
2256 | 'Make sure that we have a good response format
2257 | if Left(Reply,1) <> "!" then
2258 | 'it is not a valid Response string
2259 |     Exit function
2260 | 'elseif Mid(Reply,2,2) <> "33" then 'specific to address 33
2261 | 'it is not a valid address
2262 | '    Exit function
2263 | elseif Mid(Reply,4,2) <> "07" then
2264 | 'it is not a valid string size
2265 |     Exit function
2266 | elseif Mid(Reply,6,2) <> "72" then
```

Function GetLEM2456RHumidity(Reply, ParamID, cRange)

'Make sure that we have a good response format

if Left(Reply,1) <> "!" **then**

'it is not a valid Response string

Exit function

elseif Mid(Reply,2,2) <> "33" **then**

'it is not a valid address

Exit function

elseif Mid(Reply,4,2) <> "07" **then**

'it is not a valid string size

Exit function

elseif Mid(Reply,6,2) <> "72" **then**

'it is not a valid command (r) in string

Exit function

elseif len(reply) <> 21 **then**

'it is not a valid string len

Exit function

end if

Rh1 = **Mid**(Reply,12,1)

Rh2 = **Mid**(Reply,13,1)

Rh3 = **Mid**(Reply,14,1)

Rh4 = **Mid**(Reply,15,1)

Select Case Rh1

case "A"

Base1 = 10

case "B"

Base1 = 11

case "C"

Base1 = 12

case "D"

Base1 = 13

case "E"

Base1 = 14

case "F"

Base1 = 15

case "9"

Base1 = 9

case "8"

Base1 = 8

case "7"

Base1 = 7

case "6"

Base1 = 6

case "5"

Base1 = 5

case "4"

Base1 = 4

case "3"

Base1 = 3

case "2"

```
Base1 = 2
case "1"
Base1 = 1
case "0"
Base1 = 0
```

End Select

Select Case Rh2

```
case "A"
Base2 = 10
case "B"
Base2 = 11
case "C"
Base2 = 12
case "D"
Base2 = 13
case "E"
Base2 = 14
case "F"
Base2 = 15
case "9"
Base2 = 9
case "8"
Base2 = 8
case "7"
Base2 = 7
case "6"
Base2 = 6
case "5"
Base2 = 5
case "4"
Base2 = 4
case "3"
Base2 = 3
case "2"
Base2 = 2
case "1"
Base2 = 1
case "0"
Base2 = 0
```

End Select

Select Case Rh3

```
case "A"
Base3 = 10
case "B"
Base3 = 11
case "C"
Base3 = 12
case "D"
Base3 = 13
case "E"
Base3 = 14
case "F"
Base3 = 15
```

```
case "9"  
    Base3 = 9  
case "8"  
    Base3 = 8  
case "7"  
    Base3 = 7  
case "6"  
    Base3 = 6  
case "5"  
    Base3 = 5  
case "4"  
    Base3 = 4  
case "3"  
    Base3 = 3  
case "2"  
    Base3 = 2  
case "1"  
    Base3 = 1  
case "0"  
    Base3 = 0
```

End Select

Select Case Rh4

```
case "A"  
    Base4 = 10  
case "B"  
    Base4 = 11  
case "C"  
    Base4 = 12  
case "D"  
    Base4 = 13  
case "E"  
    Base4 = 14  
case "F"  
    Base4 = 15  
case "9"  
    Base4 = 9  
case "8"  
    Base4 = 8  
case "7"  
    Base4 = 7  
case "6"  
    Base4 = 6  
case "5"  
    Base4 = 5  
case "4"  
    Base4 = 4  
case "3"  
    Base4 = 3  
case "2"  
    Base4 = 2  
case "1"  
    Base4 = 1  
case "0"
```

Base4 = 0

End Select

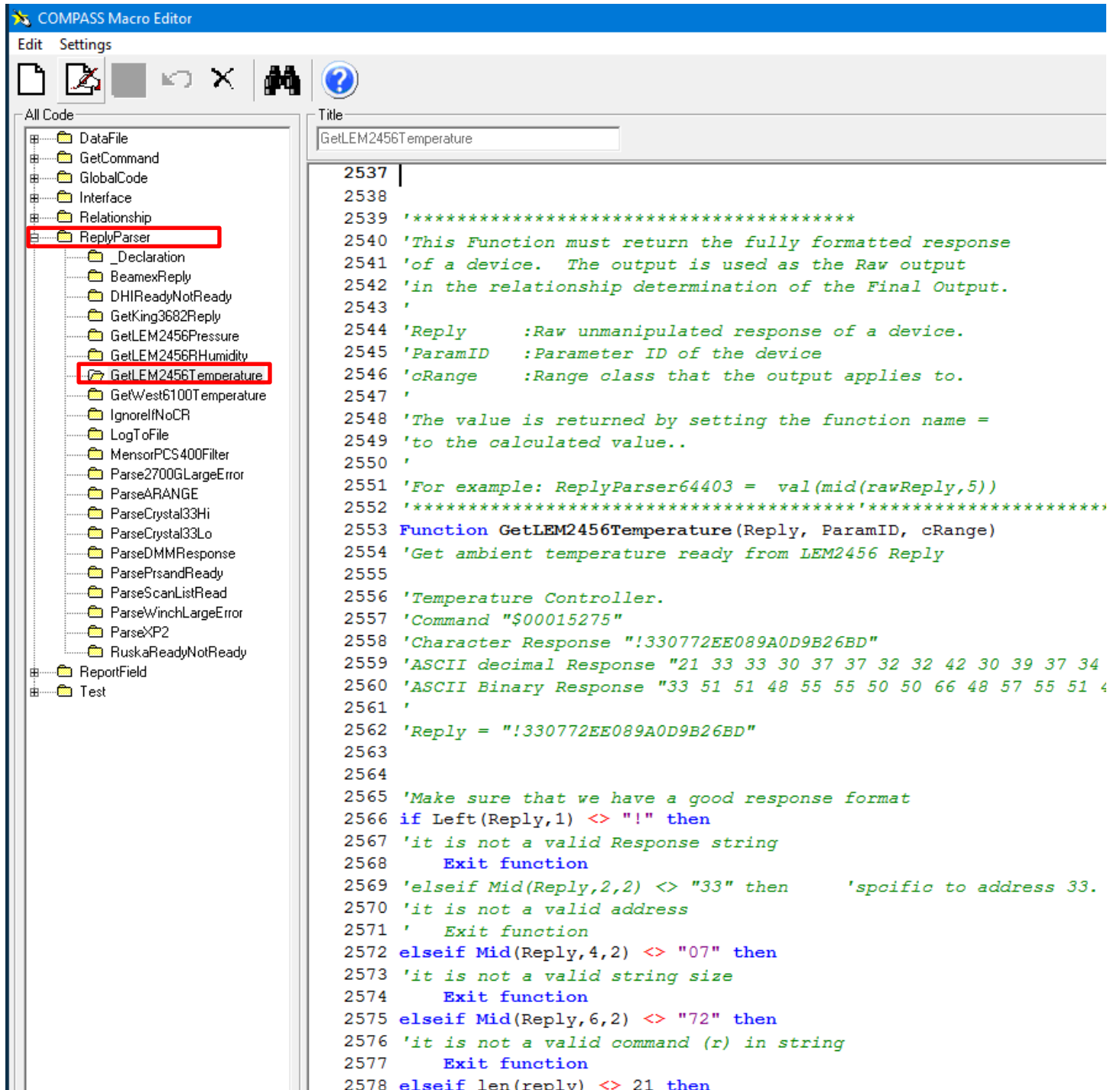
RHumid = (Base1*16)+(Base2*1)+(Base3*4096)+(Base4*256)

'GetLEM2456RHumidity = Base4

GetLEM2456RHumidity = RHumid / 100

End Function

This is the view in the COMPASS Macro Editor of the Temperature Macro. The text of the macro to copy/paste into a new macro is on the next page.



The screenshot shows the COMPASS Macro Editor interface. On the left, a tree view under 'All Code' shows a folder structure with 'ReplyParser' and 'GetLEM2456Temperature' highlighted with red boxes. The main editor area shows the code for the 'GetLEM2456Temperature' macro, starting at line 2537. The code is a VBA-style function that takes 'Reply', 'ParamID', and 'cRange' as arguments and returns a temperature value. It includes several conditional checks to validate the response string format.

```
2537 |
2538
2539 '*****
2540 'This Function must return the fully formatted response
2541 'of a device. The output is used as the Raw output
2542 'in the relationship determination of the Final Output.
2543 '
2544 'Reply      :Raw unmanipulated response of a device.
2545 'ParamID    :Parameter ID of the device
2546 'cRange     :Range class that the output applies to.
2547 '
2548 'The value is returned by setting the function name =
2549 'to the calculated value..
2550 '
2551 'For example: ReplyParser64403 = val(mid(rawReply,5))
2552 '*****
2553 Function GetLEM2456Temperature(Reply, ParamID, cRange)
2554 'Get ambient temperature ready from LEM2456 Reply
2555
2556 'Temperature Controller.
2557 'Command "$00015275"
2558 'Character Response "!330772EE089A0D9B26BD"
2559 'ASCII decimal Response "21 33 33 30 37 37 32 32 42 30 39 37 34
2560 'ASCII Binary Response "33 51 51 48 55 55 50 50 66 48 57 55 51 4
2561 '
2562 'Reply = "!330772EE089A0D9B26BD"
2563
2564
2565 'Make sure that we have a good response format
2566 if Left(Reply,1) <> "!" then
2567 'it is not a valid Response string
2568     Exit function
2569 'elseif Mid(Reply,2,2) <> "33" then      'specific to address 33.
2570 'it is not a valid address
2571 '     Exit function
2572 elseif Mid(Reply,4,2) <> "07" then
2573 'it is not a valid string size
2574     Exit function
2575 elseif Mid(Reply,6,2) <> "72" then
2576 'it is not a valid command (x) in string
2577     Exit function
2578 elseif len(reply) <> 21 then
```

Function GetLEM2456Temperature(Reply, ParamID, cRange)

'Make sure that we have a good response format

if Left(Reply,1) <> "!" **then**

'it is not a valid Response string

Exit function

elseif Mid(Reply,2,2) <> "33" **then**

'it is not a valid address

Exit function

elseif Mid(Reply,4,2) <> "07" **then**

'it is not a valid string size

Exit function

elseif Mid(Reply,6,2) <> "72" **then**

'it is not a valid command (r) in string

Exit function

elseif len(reply) <> 21 **then**

'it is not a valid string len

Exit function

end if

T1 = **Mid**(Reply,8,1)

T2 = **Mid**(Reply,9,1)

T3 = **Mid**(Reply,10,1)

T4 = **Mid**(Reply,11,1)

Select Case T1

case "A"

Base1 = 10

case "B"

Base1 = 11

case "C"

Base1 = 12

case "D"

Base1 = 13

case "E"

Base1 = 14

case "F"

Base1 = 15

case "9"

Base1 = 9

case "8"

Base1 = 8

case "7"

Base1 = 7

case "6"

Base1 = 6

case "5"

Base1 = 5

case "4"

Base1 = 4

case "3"

Base1 = 3

case "2"


```
Base1 = 2
case "1"
Base1 = 1
case "0"
Base1 = 0
```

End Select

Select Case T2

```
case "A"
Base2 = 10
case "B"
Base2 = 11
case "C"
Base2 = 12
case "D"
Base2 = 13
case "E"
Base2 = 14
case "F"
Base2 = 15
case "9"
Base2 = 9
case "8"
Base2 = 8
case "7"
Base2 = 7
case "6"
Base2 = 6
case "5"
Base2 = 5
case "4"
Base2 = 4
case "3"
Base2 = 3
case "2"
Base2 = 2
case "1"
Base2 = 1
case "0"
Base2 = 0
```

End Select

Select Case T3

```
case "A"
Base3 = 10
case "B"
Base3 = 11
case "C"
Base3 = 12
case "D"
Base3 = 13
case "E"
Base3 = 14
case "F"
Base3 = 15
```

```
case "9"  
    Base3 = 9  
case "8"  
    Base3 = 8  
case "7"  
    Base3 = 7  
case "6"  
    Base3 = 6  
case "5"  
    Base3 = 5  
case "4"  
    Base3 = 4  
case "3"  
    Base3 = 3  
case "2"  
    Base3 = 2  
case "1"  
    Base3 = 1  
case "0"  
    Base3 = 0
```

End Select

Select Case T4

```
case "A"  
    Base4 = 10  
case "B"  
    Base4 = 11  
case "C"  
    Base4 = 12  
case "D"  
    Base4 = 13  
case "E"  
    Base4 = 14  
case "F"  
    Base4 = 15  
case "9"  
    Base4 = 9  
case "8"  
    Base4 = 8  
case "7"  
    Base4 = 7  
case "6"  
    Base4 = 6  
case "5"  
    Base4 = 5  
case "4"  
    Base4 = 4  
case "3"  
    Base4 = 3  
case "2"  
    Base4 = 2  
case "1"  
    Base4 = 1  
case "0"
```

Base4 = 0

End Select

temp = (Base1*16)+(Base2*1)+(Base3*4096)+(Base4*256)

'GetLEM2456Temperature = Base4

GetLEM2456Temperature = temp / 100

End Function

This is the view in the COMPASS Macro Editor of the Pressure Macro. The text of the macro to copy/paste into a new macro is on the next page.

The image shows the COMPASS Macro Editor interface. On the left, a tree view under 'All Code' shows a folder structure with 'ReplyParser' selected and highlighted with a red box. Inside 'ReplyParser', the file 'GetLEM2456Pressure' is selected. The main editor area on the right shows the code for this macro, with line numbers 2737 through 2777. The code is a VBA-style function that parses a raw response string for pressure data. It includes comments in green and code in black. The function signature is 'Function GetLEM2456Pressure(Reply, ParamID, cRange)'. The code checks for a valid response format, then uses 'Mid' and 'Len' functions to extract and validate the pressure value. The function returns the pressure value if it is valid, otherwise it returns an empty string.

```
2737
2738
2739 '*****
2740 'This Function must return the fully formatted response
2741 'of a device. The output is used as the Raw output
2742 'in the relationship determination of the Final Output.
2743 '
2744 'Reply      :Raw unmanipulated response of a device.
2745 'ParamID    :Parameter ID of the device
2746 'cRange     :Range class that the output applies to.
2747 '
2748 'The value is returned by setting the function name =
2749 'to the calculated value..
2750 '
2751 'For example: ReplyParser64403 = val(mid(rawReply,5))
2752 '*****
2753 Function GetLEM2456Pressure(Reply, ParamID, cRange)
2754 'Get ambient pressure ready from LEM2456 Reply
2755
2756 'Command "$00015275"
2757 'Character Response "!330772EE089A0D9B26BD"
2758 'ASCII decimal Response "21 33 33 30 37 37 32 32 42 30 39 37 34
2759 'ASCII Binary Response "33 51 51 48 55 55 50 50 66 48 57 55 51 4
2760 '
2761 'Reply = "!330772EE089A0D9B26BD"
2762
2763
2764 'Make sure that we have a good response format
2765 if Left(Reply,1) <> "!" then
2766 'it is not a valid Response string
2767     Exit function
2768 'elseif Mid(Reply,2,2) <> "33" then      'specific to address 33.
2769 'it is not a valid address
2770 '    Exit function
2771 elseif Mid(Reply,4,2) <> "07" then
2772 'it is not a valid string size
2773     Exit function
2774 elseif Mid(Reply,6,2) <> "72" then
2775 'it is not a valid command (r) in string
2776     Exit function
2777 elseif len(reply) <> 21 then
```

Function GetLEM2456Pressure(Reply, ParamID, cRange)

'Make sure that we have a good response format

if Left(Reply,1) <> "!" **then**

'it is not a valid Response string

Exit function

elseif Mid(Reply,2,2) <> "33" **then**

'it is not a valid address

Exit function

elseif Mid(Reply,4,2) <> "07" **then**

'it is not a valid string size

Exit function

elseif Mid(Reply,6,2) <> "72" **then**

'it is not a valid command (r) in string

Exit function

elseif len(reply) <> 21 **then**

'it is not a valid string len

Exit function

end if

P1 = **Mid**(Reply,16,1)

P2 = **Mid**(Reply,17,1)

P3 = **Mid**(Reply,18,1)

P4 = **Mid**(Reply,19,1)

Select Case P1

case "A"

Base1 = 10

case "B"

Base1 = 11

case "C"

Base1 = 12

case "D"

Base1 = 13

case "E"

Base1 = 14

case "F"

Base1 = 15

case "9"

Base1 = 9

case "8"

Base1 = 8

case "7"

Base1 = 7

case "6"

Base1 = 6

case "5"

Base1 = 5

case "4"

Base1 = 4

case "3"

Base1 = 3

case "2"

```
Base1 = 2
case "1"
Base1 = 1
case "0"
Base1 = 0
```

End Select

Select Case P2

```
case "A"
Base2 = 10
case "B"
Base2 = 11
case "C"
Base2 = 12
case "D"
Base2 = 13
case "E"
Base2 = 14
case "F"
Base2 = 15
case "9"
Base2 = 9
case "8"
Base2 = 8
case "7"
Base2 = 7
case "6"
Base2 = 6
case "5"
Base2 = 5
case "4"
Base2 = 4
case "3"
Base2 = 3
case "2"
Base2 = 2
case "1"
Base2 = 1
case "0"
Base2 = 0
```

End Select

Select Case P3

```
case "A"
Base3 = 10
case "B"
Base3 = 11
case "C"
Base3 = 12
case "D"
Base3 = 13
case "E"
Base3 = 14
case "F"
Base3 = 15
```

```
case "9"  
    Base3 = 9  
case "8"  
    Base3 = 8  
case "7"  
    Base3 = 7  
case "6"  
    Base3 = 6  
case "5"  
    Base3 = 5  
case "4"  
    Base3 = 4  
case "3"  
    Base3 = 3  
case "2"  
    Base3 = 2  
case "1"  
    Base3 = 1  
case "0"  
    Base3 = 0
```

End Select

Select Case P4

```
case "A"  
    Base4 = 10  
case "B"  
    Base4 = 11  
case "C"  
    Base4 = 12  
case "D"  
    Base4 = 13  
case "E"  
    Base4 = 14  
case "F"  
    Base4 = 15  
case "9"  
    Base4 = 9  
case "8"  
    Base4 = 8  
case "7"  
    Base4 = 7  
case "6"  
    Base4 = 6  
case "5"  
    Base4 = 5  
case "4"  
    Base4 = 4  
case "3"  
    Base4 = 3  
case "2"  
    Base4 = 2  
case "1"  
    Base4 = 1  
case "0"
```

Base4 = 0

End Select

press = (Base1*16)+(Base2*1)+(Base3*4096)+(Base4*256)

'GetLEM2456Pressure = Base4

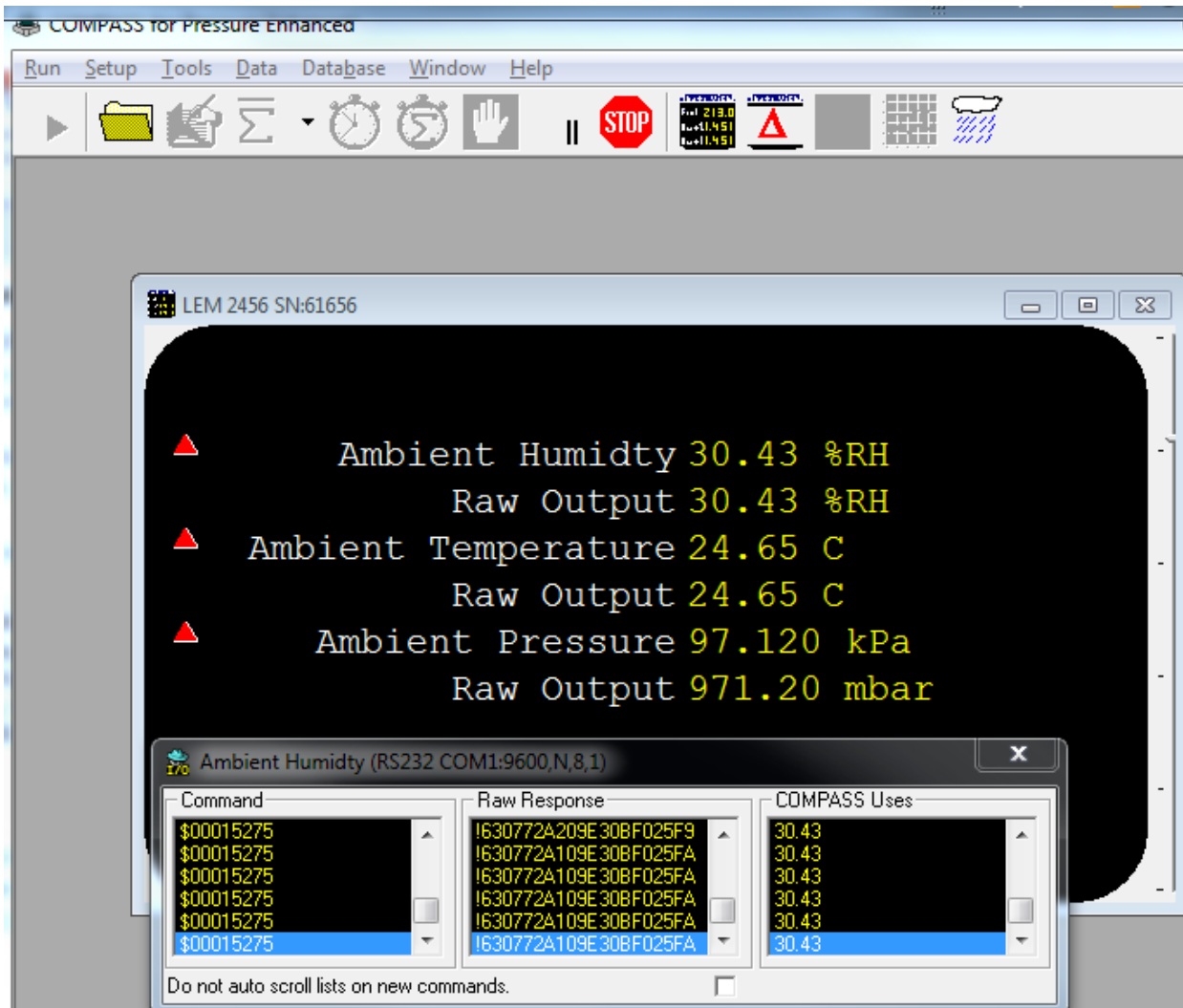
GetLEM2456Pressure = press / 10

End Function

In the below example, the address of the LEM is 63 (second and third characters in the reply). The default address for any new LEM is 33. If the address is different, change the VB script to check for the appropriate address (i.e. change 33 to the correct address).

This line in the VB script checks that the address is correct. If it is not then the script will not process the reply.

elseif Mid(Reply,2,2) <> "33" then



Setup in COMPASS for Pressure


Support Device Editor

Record Label: LEM 2456 7 / 27

Header | Calibration | Communications | Output | Set | Comment

Support Device Type: Advanced Device (>1 Output)

Record Type: Profile w/Range

Manufacturer: Ruska 

Model: LEM 2456 Autodetect setup

Serial Number: 61656

Identification: 7025

Customer ID:

This device can be used as a DUT.

Close

Support Device Editor

Record Label: LEM 2456 7 / 27

Header | Calibration | Communications | Output | Set | Comment

Interface Common read and set interface.

Data Acquisition Type: RS232

RS232 Port: COM1

RS232 Settings: 9600,N,8,1

Handshaking: None

Binary Command Set:

Command Timeout(s): 5

Command Terminator: <CR>

Response Terminator: <CR>

Close

