 Guidance for Creating a Balance Communication Program Using Visual Basic Ver. 6 Professional Edition or Microsoft Excel 2003 (Visual Basic for Applications (VBA))

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0. Introduction
With the increasing use of computers, demands such as "I want to connect the electronic balance to a computer and capture the measurement data with the computer" or "I want to control the electronic balance from a computer" are increasing. Shimadzu balances include the excellent Windows® Direct function that eliminates the need to create a balance communication program. However, the use of older balances such as the EB Series and AEG Series and the use of functions such as continuous measurement and connection of multiple balances do require the creation of a communication program. In response to such situations, compiled in this document is a method for confirming communication between balances and PCs and guidance for the creation of a simple program. The objective of this document is to confirm communication between a balance and a PC using the minimum amount of software and manipulation. We hope this document will enable the creation of software that allows more practical control over measurement. Thank you for your interest.

Operation of the software described in this document is confirmed for the operating environment below.

<table>
<thead>
<tr>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS: Windows 2000/XP</td>
</tr>
<tr>
<td>Development language: Visual Basic Ver. 6 Professional Edition</td>
</tr>
<tr>
<td>Application: Microsoft Excel 2003</td>
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</tbody>
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Note
* The communication program described in this document does not operate with Visual Basic Learning Edition.
* The communication program described in this document does not operate in Windows Vista or later.

1. Windows Communication Check
Serial communication may be disabled in the settings of your PC. To begin with, always confirm your Windows is set to allow serial communication.
To do this you will use the Windows tool, [HyperTerminal].
Click [Start], point to [All Programs] – [Accessories] – [Communications], and click [HyperTerminal]. A window like the one shown below is displayed.
Enter any name and click [OK].
(For example purposes, the name "TEST EB" is used.)

Click the (Properties) button to the far left of the tool bar. A window like the one shown below is displayed. Each of the communication settings can be configured here.

Select [Com 1] on the [Connect using:] drop-down menu and click [OK].
A settings window like the above is displayed. Confirm each setting for the balance, such as baud rate and the like, and click [OK].
In the [TEST EB Properties] window, click [ASCII Setup] on the [Settings] tab page.

Configure as shown below.

The settings are now complete.
Confirm the communications (IO) connector on the back of the PC is connected via a cable to the balance. Set the balance to the weighing display, and send "D05(\n)" to the balance as shown below.

Click this button.
If weighing data returns from the balance as shown below, you have confirmed your Windows is able to communicate with the balance.

![Terminal window with 2.0g data]

[If communication is not confirmed]
The following are possible reasons for failure to confirm communication.

1. Incorrect communication settings (baud rate, parity, etc.)
2. There is a problem in the wire connection in the RS-232C communication cable (crossover) used to connect the balance and PC.
   As a minimum, confirm the following for the wire connection.
   (RD and SD are substituted if there is a male D-Sub 25 Pin on the PC side)

<table>
<thead>
<tr>
<th>PC side</th>
<th>Balance side</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD (2)</td>
<td>(2) RD</td>
</tr>
<tr>
<td>SD (3)</td>
<td>(3) SD</td>
</tr>
<tr>
<td>SG (5)</td>
<td>(7) SG</td>
</tr>
<tr>
<td>[Female D-Sub 9 Pin]</td>
<td>[Male D-Sub 25 Pin]</td>
</tr>
</tbody>
</table>

3. The communication port device is not operating normally in the Windows system settings. Click [Start], point to [Settings], and select [Control Panel]. Double-click [System], and on the [Hardware] tab page, click [Device Manager]. Click [Ports (COM & LPT)] to display the details. Confirm that "(COM?)" is present.

   ![Device Manager screen]

If communication is not confirmed as shown, no program created using Visual Basic (VB) will communicate normally. Be sure to confirm communication before creating a program.
[Saving data to file]
When you want to save data captured from a balance to file, click [Transfer] and [Capture Text] on the drop-down menu. A window like the following is displayed. Enter a file name and click the [Start] button to create a file with that name into which transferred data will be added and saved.

If you want to finish transferring data, click [Transfer], point to [Capture Text], click [Stop], close the data file and save the text. The transfer of data is now stopped.

2. Starting Up VB
Click [Start], point to [All Programs] – [Microsoft Visual Basic 6.0] and click [Visual Basic 6.0] to start up the VB installed.
Double-click [Standard.EXE] on the [New] tab page to display a window like the one shown on the following page.
3. Inserting a Communications Control (MsComm32.ocx)
On the menu in the above figure, Click [Project], click [Components] on the drop-down menu and, as shown in the figure below, select the [Microsoft Comm Control 6.0] checkbox to select the communications control "MsComm32.ocx."
(This control is not available in the Learning Edition of Visual Basic.)

Click [OK] and a control button like the one shown below will appear in the toolbox on the left.
4. **Adding Each Control**

Add the minimum number of three required controls (Label, Command button and Communications control) in the [Form1] window as shown below.
5. Setting the Properties for Each Control
Set the properties for the Label and Command button controls in the [Properties] window on the right. For the Communications control (MsComm32), open the [Property Pages] window that is shown below (right-click on the Communications control and click [Properties] on the drop-down menu).

![Property Pages window](image1)

If the baud rate of the balance is 1200 bps, enter "1200,n,8,1" in the [Settings] field and click [OK].

6. Creating a Program
Now create a program for the form area and for two controls (Command button, Communications control (MsComm32)). First, double-click the Command button and create the following program.

```vba
Private Sub Command1_Click()
    'Transmit a data request command
    MSComm1.Output = "D05" & vbCr 'Transmit D05
End Sub
```

Next, double-click the Communications control (MsComm32) and create the following program.

```vba
Private Sub MSComm1_OnComm()
    Select Case MSComm1.CommEvent 'Event
        Case comEvReceive 'Receipt (Receive,=2) event
            D$ = MSComm1.Input 'Store received data in a character string (D$)
            Label1.Caption = D$ 'Display in the Label
    End Select
End Select
```

End Sub
Lastly, double-click on the form area and create the following program.

```vba
Private Sub Form_Load()
    'Open a port.
    MSComm1.PortOpen = True
    'Generate an OnComm event for each receipt of balance data (12 bytes).
    MSComm1.RThreshold = 12
End Sub
```

7. **Running the Program**

Press the f5 key to run the program.
Connect a RS-232C crossover cable between the balance and PC and click the Command button.
If balance data is displayed in the Label as shown below, the program is operating correctly.

![Form1 window with balance data](image)

Click the [×] button in the top right corner of the [Form1] window to end the program.

If you want to compile the program and create an executable file in the .EXE format, click [File] and click [Make Project1.exe] on the drop-down menu.
Note: the "Project1" name will differ depending on what is set.
8. Creating a VBA Communications Program in Excel 2003

Create a program by following the procedure below.

(1) Open the Excel 2003 VBA
   Click [Start], point to [All Programs] – [Microsoft Office], and click [Microsoft Office Excel 2003] to run Excel 2003.
   Next, either press Alt+F11, or click [Tools], point to [Macro] on the drop-down menu, and click [Visual Basic Editor] to run Excel 2003 VBA.

(2) Creating a Form
   Click [Insert], and click [User Form] on the drop-down menu to create a User Form as shown below.
(3) Inserting a Communications Control (MsComm32.ocx) in VBA
Click [Tools] and [Additional Controls] to display the [Additional Controls] window as shown below.

(4) Confirming the Communications Control (MsComm32.ocx)
Click [OK] in the window shown above to display a control button in the toolbox as shown below. Hereafter, create a program as previously described in sections 4 to 6.
If Visual Basic Professional Edition is not installed, you may not be able to open the Communications control (MSComm32.ocx).

Configure the Communications control settings as shown below.
Baud rate: 1200, Parity: None, Data length: 8 bit, Stop bit: 1 bit, Handshake: None

Remarks
- All information in this instruction manual has been carefully verified to ensure its accuracy. Any errors or missing information, should any be found, may not be corrected immediately.
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