GETTING STARTED

OPC MODBUS SIMULATOR FOR WINDOWS 98/NT/2000/XP/Vista/7

Modicon, An AEG Company, Modicon Modbus Protocol Version

Mdbus About
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Ok   Mdbus Rev. 4.02 2011-Aug-19
     Demo Version
        Calta Demo

 Calta
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General

The program can be installed on any IBM or compatible PC. The machine must be running Windows 95, 98, NT, 2000, or XP with at least one available serial communications port or a network card. The 3 1/2 inch floppy (version 3.53) contains an installation program which can invoked via the "Start - Run" option of the DeskTop Manager by typing either A:\setup or B:\setup in the open space as required. Version 4.00 is supplied on CD.

For familiarization purposes, two instances of Mdbus can be run at the same time in the same machine and be made to communicate if two serial ports are available and TX and RX are crossed from one serial port to another. The two instances can also communicate via Internet Protocol (IP). One instance should be configured as a Master and the other as a Slave. It is possible to invoke up to ten instances of the program simultaneously if memory and serial ports or network cards are available. The first instance of MDBUS is named MDBUS, the second - MDBUS0, the third MDBUS1, the fourth - MDBUS2, and so on.

When the program is invoked for the first time, the Configuration Window will appear. If the Ok button is pressed, the following conditions will apply. The Mode will be MASTER (ie. will poll a Slave). The Slave will be polled via communications port one at 1200 baud with no parity and RTU format. The Slave polled will have an address of 1. MDBUS will raise RTS for 55 milliseconds before any characters are transmitted (in case communications is via a 202 type modem or Radio link). It will poll for 200 coil status starting at point 1 (index 0), 200 input status starting at point 1 (index 0), 30 input registers starting at register 1 (index 0), 100 holding registers starting at register 1 (index 0), and no floating point or long integer values. **Note that Mdbus takes the starting point number for each Data Type, subtracts 1, and uses this as the start register address in its poll requests**. It will attempt each poll three times if necessary for a successful response. If the default configuration is not suitable, it can be modified. Pressing the Help button will bring up the Windows Help Facility program. Via the Search feature of this window, a full explanation of each configuration item can be obtained. If the "Main Always On Top" box is checked, the Main MDBUS Window will always be on Top of all Windows for quick reference. Unique Configurations can be kept via the Master/Slave Configuration-Database File (i.e. enter master1 for the File Ident. and press the Save File(s) button. This file can be later recalled by entering master1 in the File Ident. edit box and pressing the Load File(s) button.

If the On menu item on the Main Window is invoked, MDBUS will begin polling the Slave. The word after Comm. on the second line of the Main Window should be Nrml (steady). If it is Fail (steady), no successful communications is occurring. If it alternates between Fail and Nrml, one or more of a Database type's configuration is wrong for the slave being polled. To determine the problem, select Off on the Main Window. Under the Display Menu, the various Windows for displaying the values for the different Data Types can be invoked. If the Header line of a Window is displayed in Red, the data was not successfully retrieved. The Configuration should now be checked to ensure that the number and start of the errant Data Type is correct.

The data retrieved from a Slave can be viewed by invoking the appropriate Window via the Displays menu item. Any Data type with a number of zero will be grayed. Communication statistics can be viewed by invoking the Statistics Menu item. Statistics can be reset by Double clicking anywhere on the Statistics Window. Transmitted and received messages can be viewed by selecting the Monitor Display. Data in any Display Window can be viewed by using the scroll buttons, the page up/down keys, the cursor up/down/right/left keys, tab, and the ctrl home/end keys. Clicking on the icon in the upper left-hand corner of a Display Window and selecting the

Print Item Menu selection will print a displayed window.

Controls (Coil, Holding Register, Floats, and Longs) can be sent to the Slave by selecting the Control menu item.

Host Mode

In Master Mode, Mdbus is set up to poll one Slave. However, Mdbus can be configured to poll multiple Slaves. On the Main Mdbus Window is the Menu item "Host". It is only enabled when Mdbus is Off. Clicking on this item will bring up the Host Configuration Window. There are 32 slots available for defining the File Ident. configuration of a Slave to be polled. The Idents. must have been saved via the Main Configuration Window. The Idents. could have been set up for 32 different Slaves or 32 different configurations for the same Slave or any combination. Clicking on a slot will bring up a File Dialog for selecting the Ident. of a configuration to poll. If the Cancel button is selected in the File Dialog instead of a configuration, the slot will be cleared. A saved File used as an Ident. in the Host Configuration Window must be defined as Master, Normal type, and not have the Invalid CRC/LRC box checked.

If the "Prime" box is checked, the following parameters from the first configuration are used for polling all configurations:

Comm. Port, Fmt./Bd./Py., RTS/TX Delay, No Resp. T.O., Fail Try Count, Poll Delay, Excel DDE, Excel Sprdsht, DDE T.O., Macro DDE, Appl,Topic, Macro, IP Commun. Enable, IP Address, Modbus IP, IP Port No., Regs./Request, RTS Extra, and CTS Enable.

If the "Excel DDE" box is checked, all data from all configurations will be dumped into Excel after all configurations are polled. The first configuration's data goes into columns 1 to 6, the second's into columns 7 to 12, etc.

If the "Prime" box is unchecked, each configuration is standalone. After a Poll, each configuration's data is dumped into the specified spreadsheet if the Excel DDE box is checked.

If the "One Scan" box is checked, only one poll of all configurations will be done and then Mdbus will turn off automatically.

The "DCD Alerts" box has meaning only if an AT modem is being used for communicating with Slaves. If the box is checked, Mdbus will produce an Alert Box and turn Off if DCD (Data Carrier Detect) is not obtained upon dial out or if DCD is lost after a successful dial out to a Slave.

When the "Poll Configurations" box is checked, Mdbus is now in Host Mode. When Mdbus is turned On, The Host Control/Display Window will appear. This window allows a configuration in the poll list to be selected. **Once a configuration is selected, data can be viewed from and controls can be sent to the selected configuration**.

Please note that when sending commands to Mdbus via DDE in Host mode you must also select the configuration to which the control is being sent. See DDE POKE and the CONTROL Item (page 10).

In Host mode, the configuration currently being polled is shown on the Main Window.

A particular configuration can be enabled or disabled from polling via DDE the poke commands HOSTENAB and HOSTDISB. If the Host Window is shown, a disabled from polling configuration is shown in red.

Slave Mode

If MDBUS is configured as a SLAVE and the appropriate serial port is specified or IP Comm. is enabled, it will respond to requests from a Master. It responds to requests for the address contained in the Modbus Slave No. in the Configuration Window when the On menu item is invoked. A Modbus Slave No. of 255 is a special case. For this value, Mdbus will respond to all addresses received from a Master. Data sent to the Master can be changed via a data display. Double clicking on a point in a Data Display Window will bring up a Change Window for altering the value. The Change Window also allows data values to be perturbed for a few scans or continuously for testing the way a Master responds to changes. If the Control Menu item is selected, the Coil, Holding register, Floats, and Long Controls sent from a Master can be viewed in a Window. The Control messages are tagged with the current time.

In Slave Mode, Mdbus can provide a simple Modbus Interface to another computer system via a serial interface or IP connection. Data to be sent by Mdbus can be supplied via DDE pokes by another application. Up to 1000 values of one data type can be updated in Mdbus by the application with one DDE poke.

Monitor Mode

If MDBUS is configured for MONITOR mode (serial communications only), messages incoming on the RX line of a serial port can be viewed in Hex using RTU protocol and in ASCII using ASCII protocol. Both TX and RX lines of a communications port can be monitored if they are diode coupled before being connected to the RX of the communications port configured to monitor. Selective messages can be configured for viewing based upon Slave number, function code, and CRC errors. Messages can also be logged to a capture file. **Please review "FIFO Notes" (click on Icon in mdbus folder) or Help on FIFO for information on detecting messages.**

Taskbar Status Tray Area

The Main Window of Mdbus can be hidden. If the right mouse button is clicked when the cursor is in the two-line status area of the Main Window, Mdbus will be reduced to an icon in the Taskbar Status area. Passing the cursor over the Taskbar icon will display a line of status concerning Mdbus. Clicking the right mouse button over the Mdbus icon in the Taskbar Status area will unhide Mdbus. Clicking the left mouse button will bring up the display menu for selecting displays while Mdbus has been reduced to a Taskbar icon. If Mdbus is hidden via a DDE command it cannot be unhidden except via a DDE command. In this case, if Mdbus is in Host mode, right clicking on the icon will bring up the Host Control/Display window to select the data to be displayed. Right clicking on the icon again, will hide the Host Control/Display window.

Internet Protocol Communications

Mdbus can communicate using Modbus RTU (ASCII not implemented) via Internet Protocol using three different methods. Method one is "RTU TCP". This is the standard for Modbus RTU protocol using TCP/IP and was formulated by Schneider Electric. By default, IP Port 502 is the port to be used. The IP message in this implementation has header bytes and no CRC except for that inherent in TCP/IP communications. The other method for implementing Modbus over the Internet is by utilizing devices that take the standard serial Modbus message including CRC and encapsulate it. Method two uses this for "RTU Via TCP" and method three uses this for "RTU via UDP". Methods two and three can be used with a CDPD modem, a serial Modbus device, and the cellular network.

Please note when utilizing IP Protocol Communications and "RTU TCP" Modbus IP type is selected, Mdbus calculates and displays a CRC in the Monitor Window even though it is not included in the actual transmission.

Mdbus can be a Master or a Slave utilizing IP communications. To enable IP communications, the IP Comm. Enable Box should be checked. When this is done, all serial communication parameters are grayed. In Master mode, the IP address of the TCP or UDP device to be polled is required. Two instances of Mdbus (one set as Master, the other as Slave) can communicate using TCP or UDP over IP on the same machine for testing. The IP addr. 127.0.0.1 should be set on the instance that is Master.

DDE General

Mdbus in Master Mode can be easily set up to poke its data into an Excel SpreadSheet. This includes all the Database values as well as Time and Poll Statistics. Each Database type is stored in a column under a heading defining the Mdbus Instance and the type.   A cell with the word "End" terminates a column. If the Heading includes a *, the data has not been successfully retrieved from the Slave. To enable this feature, check the Excel DDE box and supply an Excel spreadsheet name in the Configuration Window. When Mdbus has data to be sent to Excel, it will make a DDE connection to Excel. Excel must be up and running with the specified spreadsheet. In both Master and Slave mode, Mdbus can be made to turn On or Off via pokes from Excel or any other program supporting DDE pokes. The Slave number and the Database points (start and number) can also be changed. These changes are temporary and are not saved but remain in effect until Mdbus is closed. Via pokes, Mdbus in Master Mode can be made to send out Coil, Holding Register, Floating Point, and Long Integer control commands. Mdbus can execute a Macro in another application that supports DDE Execute. Examples of supporting applications are Excel, Access, and Word for Windows. Mdbus will also respond to DDE Requests for data. Requested data can be Database values, time, polling statistics, and communication status. Mdbus does not support DDE Hot Links.

For all poke/request commands the DDE application name is MDBUS, MDBUS0, MDBUS1, and MDBUS2 depending on the instances in use. The DDE topic is always POKE.

A problem exists with the DDE connection between Mdbus and Excel when dumping data into Excel (Excel DDE box is checked) and also running an Excel macro (Macro DDE box is checked). The spreadsheet that Mdbus dumps its data into should not be the first sheet on the sheet tab.

Mdbus can be made hidden via a DDE poke command. When this happens, an icon is added to the Taskbar Status tray. Moving the mouse cursor over the icon will produce a tooltip text box. The text will indicate whether Mdbus is On or Off, its communication state, and the number of polls and errors. Clicking the left mouse button will bring up a menu for display selection. When Mdbus is unhidden, the Taskbar Status tray icon will be removed.

DDE Poke Commands

The following details the DDE POKE commands (Item and Data) which Mdbus will accept.

Item	Data	Meaning
STATE	ON	Turns Mdbus on
STATE	OFF	Turns Mdbus off
STATE	CLOSE	Closes out Mdbus
STATE	HIDE	Hides Mdbus(icon added to the Taskbar Status tray)
STATE	UNHIDE	Unhides Mdbus
SHCONF	ON	Brings up Mdbus Configuration Window
SLAVE	xxx	Sets Slave number to xxx (0 to 255)
PHONE	ATxxxxxxx	Sets Phone no. - must start with AT
STATISTICS	1	Clears Statistics
COIL yyy	x,x,x	Sets Coil yyy, yyy+1, etc. to x (either 1 or 0) (Mdbus in Master Mode is limited to 60 values and must be ON)
HREG yyy	xxxx,xxxx	Sets Holding Reg. yyy, yyy+1, etc. to xxxx (+ or – 32767)(Mdbus in Master Mode is limited to 60 values and must be ON)
FLOA yyy	xxx.xxx,xx.xx	Sets Float yyy, yyy+1, etc. to xxx.xxx, xx.xx, etc. (Mdbus in Master Mode is limited to 60 values and must be ON)
LINT yyy	xxx,xxx	Sets Long yyy, yyy+1, etc. to xxx (+/- 2147483647) (Mdbus in Master Mode is limited to 60 values and must be ON)
STAT yyy	x,x,x	Sets Status yyy, yyy+1, etc. to x (either 1 or 0)(Mdbus must be in Slave Mode)
IREG yyy	xxxx,xxxx,xxxx	Sets Input Reg. yyy, yyy+1, etc. to xxxx (+ or – 32767) (Mdbus must be in Slave mode)
NOCOIL	xxxx	Sets no. of Coils to xxxx
STCOIL	xxxx	Sets start no. of Coils to xxxx
NOSTATUS	xxxx	Sets no. of Status to xxxx
STSTATUS	xxxx	Sets start no. of Status to xxxx
NOIREG	xxxx	Sets no. of Input Regs. to xxxx
STIREG	xxxx	Sets start no. of Input Regs. to xxxx
NOHREG	xxxx	Sets no. of Holding Regs. to xxxx
STHREG	xxxx	Sets start no. of Holding Regs. to xxxx
NOFLOAT	xxxx	Sets no. of F.P. Regs. to xxxx
STFLOAT	xxxx	Sets start no. of F.P. Regs. to xxxx
NOLINT	xxxx	Sets no. of L.I. Regs. to xxxx
STLINT	xxxx	Sets start no. of L.I. Regs. to xxxx
AT212	ON	Enables 212 AT modem
AT212	OFF	Disables 212 AT modem
CONFIG	xxxxxxxx	Where xxxxxxxx is the File Ident. Config. to load. xxxxxxx must have been previously saved via the Configuration Window. (Mdbus must be OFF, and the Configuration Window must be closed.)

```
HOST              ON          Turns Host mode on
HOST              OFF         Turns Host mode off
CONTROL           xxxxxxxx    Where xxxxxxxx is the File Ident. configuration used
                              for Control and Display in Host mode.  xxxxxxx must
                              have been previously saved via the Configuration
                              Window. (Mdbus must be ON and in Host Mode.)
MUCO              ON          Sets function code 15 for Coil commands
MUCO              OFF         Sets function code 5 for Coil commands (default)
MUHR              ON          Sets function code 16 for H.R. commands
MUHR              OFF         Sets function code 6 for H.R. commands (default)
HOSTDISB          x           This disables a configuration from polling in Host
                              Mode.  x is the configuration slot to disable (0 to
                              31).
HOSTENAB          x           This enables a configuration from polling in Host
                              Mode.  x is the configuration slot to enable (0 to
                              31).
TMDN 4995         0           Send time to a Daniel's Flow Computer
```

DDE Request Commands

The following details the valid DDE REQUEST commands that Mdbus will accept. Some request commands support multiple values. In multiple value cases, commas separate the values.

Item	Meaning
TIME	Returns time in the following format dd-mmm-yyyy hh:mm:ss.
ONOF	Returns the state of Mdbus, either ON or OFF.
HOST	Returns the Host state of Mdbus, either ON or OFF.
MUCO	Returns the state of Coil function code 15, either ON or OFF.
MUHR	Returns the state of H.R. function code 16, either ON or OFF.
STTS x y	Returns Communication Statistics where x=1, 2, 3, or 4 for Requests, Incompletes, CRC errors, No Responses respectively and y is the number to return. If all are required, set x to 1 and y to 4. If only requests are required, set x to 1 and y to 1.
COMM xxxx	Returns Communication state where xxxx is COIL, STAT, IREG, HREG, FLOA, or LINK. A 0 (comm. O.K.) or a 1 (comm. bad) is returned for the database type selected.
COIL xxxx yyy	Returns the database values starting at Coil point xxxx. The values are 0 or 1. yyy is the number of Coils requested.
STAT xxxx yyy	Returns the database values starting at Status point xxxx. The values are 0 or 1. yyy is the number of Status requested.
IREG xxxx yyy	Returns the database values starting at Input reg. point xxxx. The values range from a maximum /minimum of + or - 32767. yyy is the number of Input registers requested.
HREG xxxx yyy	Returns the database values starting at Holding reg. point xxxx. The values range from a maximum /minimum of + or - 32767. yyy is the number of Holding registers requested.
FLOA xxxx yyy	Returns the database values starting at Floating reg. point xxxx. The values consist of a maximum of 15 digits. yyy is the number of Floating Point values requested.
LINT xxxx yyy	Returns the database values starting at Long Integer point xxxx. The values are + or - 2147483647. yyy is the number of Long Integer values requested.
CMND	Returns the number of controls in the queue to be sent. If this number is 100 (the queue size), and controls are sent, they will overwrite those currently in the queue.

Excel Examples

This following is an example of an Excel spreadsheet showing the data that has been poked into it by Mdbus.

	1	2	3	4	5	6
1	Time	No. of Requests	No. of Incompletes	No. of CRC Errors	No. of No Resp./Inv.	Slave
2	13-Aug-1997 09:13:18	132	0	0	0	1
3	Mdbus Coils	Mdbus Status	Mdbus Input Regs.	Mdbus Holding Regs.	Mdbus Floats	Mdbus Long Ints.
4	1	0	0	0	0	0
5	0	0	0	0	0 End	
6	0	0	0	0	12345	
7	0	0	0	0 End		
8	0	0	0	0		
9	0	0	0	0		
10	0	0	0	0		
11	0	0	0	0		
12	0	0	0	0		
13	0	0	0	0		
14	0	0	0	0		
15	0	0	0	0		
16	0	0	0	0		
17	0	0	0	0		
18	0	0	0	0		
19	0	0	0	0		
20	0	0	0	0		
21	0	0	0	0		
22	0	0	0	0		

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The following is an example of an Excel auto open macro used to start up Mdbus and obtain the DDE identification of Mdbus.

```
Dim channel
'
' auto open macro
'
Sub auto_open()
    Shell ("c:\mdbus\mdbus.exe")                    'start up mdbus
    channel = DDEInitiate("mdbus", "poke")          'initiate dde channel to mdbus
End Sub
```

Excel Macros

The following are examples of Excel macros used to poke commands into Mdbus.

```
'
'Turn Mdbus On
'
Sub mdbus_on()
    DDEPoke channel, "state", "definitions!r3c1"     'turn mdbus on
End Sub
'
'Turn Mdbus Off
'
Sub mdbus_off()
    DDEPoke channel, "state", "definitions!r4c1"     'turn mdbus off
End Sub
'
'Close Mdbus
'
Sub auto_close()
    DDEPoke channel, "state", "definitions!r2c1"     'tell mdbus to close
    DDETerminate channel                             'close dde channel to mdbus
End Sub
'
' set f.p. value
'
Sub set_fp()
Dim fpval
Dim fpno
    fpno = Application.InputBox("Enter Floating Point Register No.", "Floating Point
Change", , , , , , 2)
    fpval = Application.InputBox("Enter Floating Point Register value", "Floating Point
Change", , , , , , 1)
    Worksheets("definitions").Cells(2, 2).Value = fpval
    DDEPoke channel, "FLOA " + fpno, "definitions!r2c2"   'set f.p. value
End Sub
'
' set coil value
'
Sub set_coil()
Dim coilval As Integer
Dim coilno
    coilno = Application.InputBox("Enter Coil Point No.", "Coil Change", , , , , , 2)
    coilval = Application.InputBox("Enter Coil value (either 0 or 1)", "Coil Change", , ,
, , , 1)
    Worksheets("definitions").Cells(3, 2).Value = coilval
    DDEPoke channel, "COIL " + coilno, "definitions!r3c2"   'set coil value
End Sub
```

```vba
'
' set holding register value
'
Sub set_hr()
Dim hrval As Integer
Dim hrno
    hrno = Application.InputBox("Enter Holding Register Point No.", "Holding Register
Change", , , , , , 2)
    hrval = Application.InputBox("Enter Holding Register value (+ or - 32767)", "Holding
Register Change", , , , , , 1)
    Worksheets("definitions").Cells(4, 2).Value = hrval
    DDEPoke channel, "HREG " + hrno, "definitions!r4c2"   'set holding register value
End Sub
'
' Set Slave Address to value in definitions sheet row 5 column 1
'
Sub set_slave()
    DDEPoke channel, "slave", "definitions!r4c1"     'set slave address
End Sub
'
' Miscellaneous Sample Initialization (See Load Test Config. below for an easier way)
'
Sub misc_init()
    mdbus_off                                  ' turn mdbus off
    DDEPoke channel, "slave", "definitions!r2c5"     'set slave address to 3
    DDEPoke channel, "nocoil", "definitions!r3c5"    'set no. of coils to 5
    DDEPoke channel, "stcoil", "definitions!r4c5"    'set start coil to 2
    DDEPoke channel, "nostatus", "definitions!r5c5"  'set no. of status to 11
    DDEPoke channel, "ststatus", "definitions!r6c5"  'set start status to 3
    DDEPoke channel, "noireg", "definitions!r7c5"    'set no. of status to 12
    DDEPoke channel, "stireg", "definitions!r8c5"    'set start status to 4
    DDEPoke channel, "nohreg", "definitions!r9c5"    'set no. of status to 13
    DDEPoke channel, "sthreg", "definitions!r10c5"   'set start status to 5
    DDEPoke channel, "nofloat", "definitions!r11c5"  'set no. of status to 14
    DDEPoke channel, "stfloat", "definitions!r12c5"  'set start status to 6
    DDEPoke channel, "phone", "definitions!r13c5"    'set phone no. to atdt-403-555-1212
    DDEPoke channel, "statistics", "definitions!r14c5" 'clear statistics
    mdbus_on                                    'turn mdbus on
End Sub
'
' Load Test Configuration (Note!!! This is the easiest way of changing Mdbus's config.)
'
Sub load_test()
    mdbus_off                                  'turn mdbus off
    DDEPoke channel, "config", "definitions!r6c1"   'load configuration test
    mdbus_on                                    'turn mdbus on
End Sub
```

The following is an example of an Excel macro used to set up the Control Configuration. This is required for all Control from Excel in Host mode.

```
'
' Set Host Control/Display Configuration
'
Sub control_display()
    DDEPoke channel, "control", "definitions!r6c1"    'Set Host Control/Display
End Sub
```

The following are examples of Excel macros used to request data from Mdbus. <u>Please note that for these examples to work, you must have at least 20 holding registers starting at 1 and 15 coils starting at 1 configured in Mdbus.</u>

```
'
' request holding reg. macro
'
Sub request_hreg()
Dim datamg
Dim i As Integer
datamg = DDERequest(channel, "hreg 1 20")     'get data array from mdbus
For i = LBound(datamg) To UBound(datamg)
    Worksheets("data request").Cells(i + 1, 1).Formula = datamg(i)  'xfer data to data
request
Next i
End Sub
'
' request coils macro
'
Sub request_coil()
Dim datamg
Dim i As Integer
datamg = DDERequest(channel, "coil 1 15")      'get data array from mdbus
For i = LBound(datamg) To UBound(datamg)
    Worksheets("data request").Cells(i + 1, 2).Formula = datamg(i)  'xfer data to data
request
Next i
End Sub
```

The following details the values from the definition spreadsheet used in the previous Excel macros.

	1 Variables	2 Used By Sub	3 Temp. Variables	4 Used By Sub	5 Temp. Variables	6 Used by Sub
2	close	FALSE	2	set_fp	3	misc_init
3	on	mdbus_on	0	set_coil	5	misc_init
4	off	mdbus_off	1234	set_hr	2	misc_init
5	1	set_slave			11	misc_init
6	test	load_test			3	misc_init
7					12	misc_init
8					4	misc_init
9					13	misc_init
10					5	misc_init
11					14	misc_init
12					6	misc_init
13					atdt-403-555-1212	misc_init
14					1	misc_init
15						
16						
17						
18						
19						

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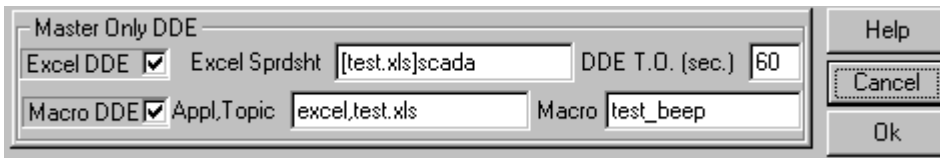The following is an example of Excel macro that can be called from Mdbus.

```
'
' test_beep
'
Sub test_beep()
    Beep
End Sub
```
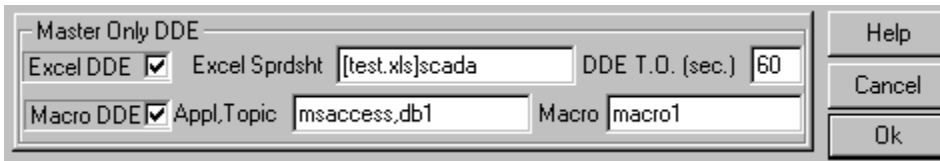
Excel Language Configuration

The following portion from the Configuration Window shows that data will be poked into an Excel Workbook test.xls and Worksheet scada and an Excel macro called test_beep will be executed. **Different language versions of Excel abbreviate row and column with different letters than R and C**. For instance, the French version of Excel uses letters L and C, the German version uses letters Z and S, the Spanish version uses letters F and C, etc. Mdbus needs this information to successfully poke data into an Excel spreadsheet. The French version of Excel requires [test.xls]scada,1, the German version of Excel requires [test.xls]scada,2, the Spanish version of Excel requires [test.xls]scada,3, the Dutch version of Excel requires [test.xls]scada,4, and the Polish version of Excel requires [test.xls]scada,5 instead of [text.xls]scada (English default) in the Excel Sprdsht edit box.
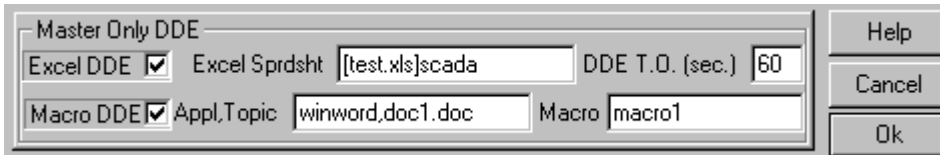
```
┌─ Master Only DDE ──────────────────────────────────────┐   ┌─ Help ──┐
│ Excel DDE ☑   Excel Sprdsht │[test.xls]scada      │ DDE T.O. (sec.) │60│   ├─ Cancel ┤
│ Macro DDE☑ Appl,Topic │excel,test.xls    │ Macro │test_beep    │   └─ Ok ────┘
└────────────────────────────────────────────────────────┘
```

The following portion from the Configuration Window shows that data will be poked into an Excel Workbook test.xls and Worksheet scada and an Access macro called macro1 will be executed in the database db1.mdb. Note that the database extension is not used.

```
┌─ Master Only DDE ──────────────────────────────────────┐   ┌─ Help ──┐
│ Excel DDE ☑   Excel Sprdsht │[test.xls]scada      │ DDE T.O. (sec.) │60│   ├─ Cancel ┤
│ Macro DDE☑ Appl,Topic │msaccess,db1     │ Macro │macro1      │   └─ Ok ────┘
└────────────────────────────────────────────────────────┘
```

The following portion from the Configuration Window shows that data will be poked into an Excel Workbook test.xls and Worksheet scada and a Word macro called macro1 will be executed in the document doc1.doc.

```
┌─ Master Only DDE ──────────────────────────────────────┐   ┌─ Help ──┐
│ Excel DDE ☑   Excel Sprdsht │[test.xls]scada      │ DDE T.O. (sec.) │60│   ├─ Cancel ┤
│ Macro DDE☑ Appl,Topic │winword,doc1.doc   │ Macro │macro1      │   └─ Ok ────┘
└────────────────────────────────────────────────────────┘
```

OPC Server

Mdbus can become an OPC Server in Master and Slave modes. There is a checkbox labelled OPC Server in the Configuration Window that implements this feature. If this feature is implemented, Mdbus upon startup will register the four Dll OPC Proxy Stubs (opccomn_ps.dll, opcproxy.dll, opc_aeps.dll, and opchda_ps.dll as provided by the OPC Foundation. It will then make the additions to the Registry that are required of an OPC Server. Finally, all the tags that can be accessed from an OPC Client are created. Most of the tags created are the result of the Configuration Window Database Points settings. Whenever changes are made to the Database Points, Mdbus must be closed out and restarted if the OPC Server functionality is implemented.

Mdbus can operate in Standalone (Master and Slave) and Host Mode (Master) with OPC enabled. There are sets of Common Tags that are created whether in Standalone or Host mode. They are as follows:

Tag	Purpose	Value	Data Type	R/W
STATE	Turn Mdbus On, Off, Hide, and Close	On, Off, Hide, Close	VT_BSTR	W
SLAVE	Change Slave number	1 to 255	VT_UI2	R/W
STATISTICS	Reset Statistics	1	VT_UI2	W
HOSTDISB	Disable Host Config.	0 to 31	VT_UI2	W
HOSTENAB	Enable Host Config.	0 to 31	VT_UI2	W
TMDN	Send All Stn. Time to Daniel's Flow Comp.	0	VT_UI2	W
TIME	Return Mdbus Time	dd-mmm-yyyy hh:mm:ss	VT_BSTR	R
ONOF	Return Mdbus State	On or Off	VT_BSTR	R
CMND	Return no. of pending commands	0 to 100	VT_UI2	R

The rest of the tags relate to database items for the Standalone and Host Modes. For the Database Tags, the format is Database type followed by the point number (XXXXX). Host Mode Database Tags are preceded by the configuration name (YYYYY).

Tag	Purpose	Value	Data Type	R/W
COIL.XXXXX YYYYY.COIL.XXXX	Coils	0 or 1	VT_UI2	R/W
STATUS.XXXXX YYYYY.STATUS.XXXXX	Status	0 or 1	VT_UI2	R
IREG.XXXXX YYYYY.IREG.XXXXX	Input Registers	+/- 32767	VT_I2	R
HREG.XXXXX YYYYY.HREG.XXXXX	Holding Registers (Value dependent upon configuration)	+/- 32767 or 0 to 65535	VT_I2 VT_UI2	R/W R/W
FLOA.XXXXX YYYYY.FLOA.XXXXX	Floating Point	$+/- 3.402823E+38$	VT_R4	R/W

Tag	Purpose	Value	Data Type	R/W
LINT.XXXXX YYYYY.LINT.XXXX	Long Integers	+/- 2147483647	VT_I4	R/W
COMM.COIL YYYYY.COMM.COIL.XXXXX	Communication status for Coils	0 (Normal) or 1 (Fail)	VT_UI2	R
COMM.STAT YYYYY.COMM.STAT.XXXXX	Communication status for Status	0 (Normal) or 1 (Fail)	VT_UI2	R
COMM.IREG YYYYY.COMM.IREG.XXXXX	Communication status for Input Registers	0 (Normal) or 1 (Fail)	VT_UI2	R
COMM.HREG YYYYY.COMM.HREG.XXXXX	Communication status for Holding Registers	0 (Normal) or 1 (Fail)	VT_UI2	R
COMM.FLOA YYYYY.COMM.FLOA.XXXXX	Communication status for Floating Point Values	0 (Normal) or 1 (Fail)	VT_UI2	R
COMM.LINT YYYYY.COMM.LINT.XXXXX	Communication status for Long Integer Values	0 (Normal) or 1 (Fail)	VT_UI2	R
STTS.REQUESTS YYYYY.STTS.REQUESTS	Number of Requests	0 to 4294967295	VT_UI4	R
STTS.INCOMPLETES YYYYY.STTS.INCOMPLETES	Number of Incomplete RX messages received	0 to 4294967295	VT_UI4	R
STTS.CRCERRORS YYYYY.STTS.CRCERRORS	Number of RX messages with an invalid CRC	0 to 4294967295	VT_UI4	R
STTS.NORESPONSES YYYYY.STTS.NORESPONSES	Number of messages with did not receive a Response	0 to 4294967295	VT_UI4	R

If Mdbus is used as an OPC Server on a remote PC, DCOM security as configured by dcomcnfg.exe may need investigation.

The following is a link that explains some of the intricacies of OPC and DCOM Security

http://www.gefanucautomation.com/opchub/opcdcom.asp

Vista/Excel 2007

OPC Mdbus must add entries to the Registry to be registered as an OPC Server. When run under Vista after being made an OPC Server (OPC Server Checkbox checked), Mdbus must run with Administrator Privileges. This can be done by right clicking on the icon to run Mdbus and left clicking on the "Run as an Administrator" menu item. This need be done only once. If it is desired to remove OPC Mdbus as an OPC Server, Mdbus must be run with Administrator Priviledges before the OPC Server Checkbox is unchecked.

If a spreadsheet is saved in Excel 2007 format, the spreadsheet (say Book1.xls) is referred to as Book1.xls.xlsx when entered into the "Excel Sprdsht" textbox in the Mdbus Configuration Window if using Excel DDE.

Test Scada Mode

The File Ident. is also used to turn On/Off a Test Scada Mode for Mdbus. Mdbus must be in Slave mode to implement Test Scada.

The Test Scada Mode would work as follows:

1.   The mode would be turned on by putting tstscada in the File Ident text box in the Configuration Window and clicking Load Ident. A popup would appear saying Test Scada Mode On.
2.   The mode would be turned off by putting tstscada in the File Ident text box in the Configuration Window and clicking Load Ident. A popup would appear saying Test Scada Mode Off.
3.   In Test Scada mode the first data request would result in Mdbus populating data for the polled station if the Slave address matches the configured one or the configured Slave address is 255.
4.   The Polled station address the Slave receives (odd or even) from the Master would determine whether the first bit of implemented status or coil values is a 1 or 0. Subsequent bits would alternate ie 10101010.. or 01010101..
5.   Holding register and Input register values would consist of 2 LS digits matching the last 2 digits of the point number and up to 3 MS digits for the Slave address.
6.   Long Integers and F.P. register values would consist of 4 LS digits matching the last 4 digits of the point number and up to 3 MS digits for the Slave address.
7.   When Test Scada Mode is implemented, slv no. is shown is all capitals (SLV NO.)

Contact Information

For technical support or suggestions for future enhancements, please contact

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Monitor Connection Drawing

Monitor Interconnect Assembly

To PLC

DB9M

1
6
2
7
3
8
4
9
5

TX

RX

GND

5
9
4
8
3
7
2
6
1

To PC

DB9F

1 6 2 7 3 8 4 9 5

DB9F

To Monitor PC running MDBUS

Calta Computer Systems Limited		
Title		
MDBUS Monitor Configuration		
Size	Document Number	REV
A	CABLE INTERCONNECT	1.0
Date:	June 18, 1997	Sheet 1 of 1