

UniLink Manual

For more help: Please read the advanced help section in the UniLink\Help folder.
www.unimeter.com

Uni-Link ‘Window SCADA’

SCADA, MIS, MES - Jargon, acronyms and blindfolds.

Just because I know doesn't mean that You know. So what does all this stand for and what can you use it for? Well, it all means more or less the same thing. SCADA stands for 'Supervisory Control and Data Acquisition'. MIS is an acronym for 'Management Information System' and MES stands for 'Manufacturing Information System'. Generally, all this is about getting information into a computer in order to optimise, improve and to control processes such as manufacturing.

What's it all about?

In essence, Uni-Link is software that has been developed to 'piggy-back' on the vast power of the existing Microsoft programs. It operates within the Windows 95 environment. In its simplest form it can be described as removing the need to enter information or data via the computer keyboard. Uni-Link puts the information directly and in 'real-time' into Microsoft programs such as Access and Excel.

Uni-Link can automatically get information of any kind from a factory, laboratory or from anywhere in the world. This information or data will then appear in 'real-time' in the computer for analytical and recording purposes.

With Uni-Link, the user is not only able to gather information but also control processes to influence the information. Not enough, the vast power of Microsoft and Windows 95 enables the user to monitor and control many independent locations at the same time and still allow use of the computer for other tasks.

How much, How fast?

Sure it is impressive to do all this, but, how fast and how many channels can be handled in a given period? This question is somewhat like the proverbial question about the length of a piece of string. Nevertheless, with good design, Uni-Link can handle an almost unlimited number of channels, analog or digital, at rates of hundreds or even thousands of channels per second.

What about on-going costs?

Here too, Uni-Link scores maximum points. The system can be expanded or modified by the user at no cost. Uni-Link 'Window SCADA' is a 'Zero Cost of Ownership' system.

What 'Aim' - What 'Game'?

The complexity of computer programs is daunting. Many software programs require the users to be an expert. While some installation selections are unavoidable, we are confident that this installation procedure and the subsequent creation of a SCADA system will allow the user with only minimal computer skills to succeed. The following step by step instructions will install the Uni-Link software on your computer, create a SCADA system in Microsoft Access with graphics and readings and also link a Microsoft Excel spreadsheet to the database with display of graphs and real time trends. Further, at the end of the exercise we will show you how to uninstall the software, if required. The installation and SCADA creation will be in 5 steps:

- 1 - Installing Uni-Link.
- 2 - Installing the RS 485 communications driver.
- 3 - Installing additional devices and channels.
- 4 - Installing the Uni-Link Access Wizard.
- 5 - Installing the Uni-Link Excel Link to Access.

At the end of this installation exercise you will have a fully blown SCADA, MIM or MES system that you can then apply real time to any application by simply modifying and adding to the existing system. This simple two device system can be expanded to hundreds or even thousands of channels.

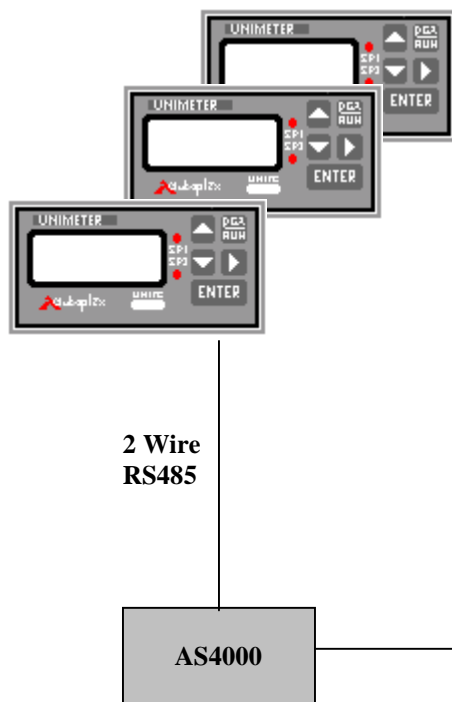
Uni-Link - Hardware requirements -

- Pentium 166 processor (or better)
- 100 Mb free disk space
- 32Mb Ram
- 1 only unused 16550 communications port
- Unimeter devices, PLC as required

Uni-Link - Software requirements -

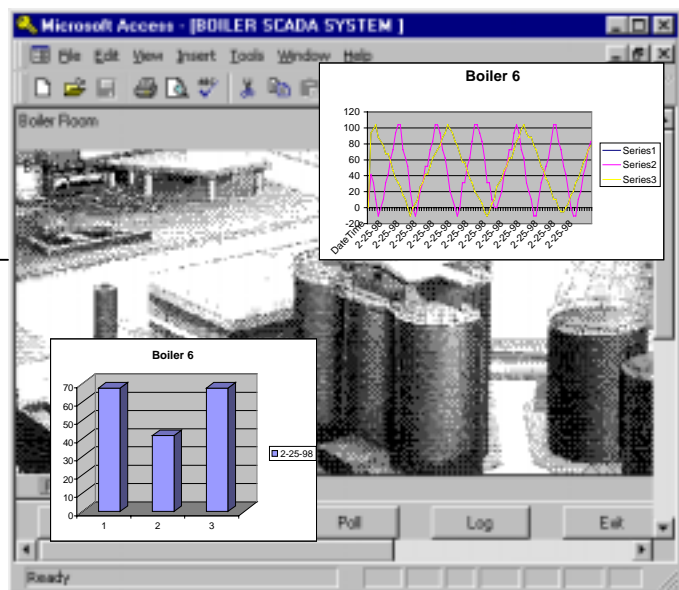
- Uni-Link software
- Microsoft Office 97 (not 95)
- Windows 95 operating system

System Overview



Unimeter Devices

- Unimeter
- Uni-Mux
- Digital Input
- Digital Output
- Unimeter HF



Uni-Link-Access-Excel-SCADA-MIS-MES

Uni-link Installation

Note: At this point we will assume that you have a P.C. with the required hardware specifications and Office 97 fully installed and running!

The following instructions will lead you through a simple 'point and click' procedure to install Uni-Link on your computer and also create a SCADA system to receive, display, graph and control information. This simple SCADA system can then be used and adapted or expanded to any future requirements. At various points of the following step by step installation procedure you will be required to type the text shown in *italic* form. The text shown by the computer will also be shown here in *italic* form. The rest of your task will be a 'point and click' operation.

Let's get started!

Step 1- Installing Uni-Link

Note: Close all Windows 95 programs before starting the installation process.

You will have received several 3.5" floppy diskettes with your Uni-Link package. Insert the disk number 1 in your floppy drive and go to the bottom task bar of Windows 95 and click 'Start'. A window will appear with several options. Select the 'Run' option and type 'A:\setup' in the selection window, then click 'OK'. The computer will now copy some information from the floppy drive and present some Uni-Link information windows. Please read the information and select your choices.

Note: One of the selection choices will be the destination directory (folder) for Uni-Link. We strongly recommend that you accept the default selection of 'C:\UniLink'.

Following your selections, the computer will copy information from disk number 1 and request disk number 2 when ready. Two icons, Uni-Link and Unitools will automatically be created and will be available via the Windows 95 bottom task bar in due course. Click 'Finish' on the final window presented. Uni-Link is now installed. Let's get on with the next step!

Step 2 - Installing RS 485 communications driver

Note: This must be done for a type 16550 RS232 port with an AS4000 serial converter connected only and not for a Uni-Modem port!

The RS485 driver is a Windows 95 'VXD driver' and handles the communications port RS 485 protocol for the AS 4000 adapter and the RS485 connected Unimeter devices. The driver has to be installed to allow Windows 95 to directly control the connected RS 485 devices and should be installed on all ports with an AS4000 adapter connected. This driver must not be installed on any ports without the adapter. The RS485 driver is usually installed in one communications port only and this will be our exercise here.

Let's go!

Double click on the Windows 95 'My Computer' icon.

Double click on 'Control Panel'.

Double click on 'System'.

Select the 'Device Manager' tab.

Double click on 'Ports (COM&LPT)'.

Double click on the 'Communications Port (COM?)' (select port number to which the AS 4000 is or will be connected).

Select the 'Drivers' tab.

Click on 'Update Driver'.

Place the Uni-Link drivers disk in the floppy drive.

Select 'Yes (recommended)'.

Click on 'Next'.

If the driver is found, the following window will be displayed. Click on 'Finish' to complete the installation of the RS485 driver.

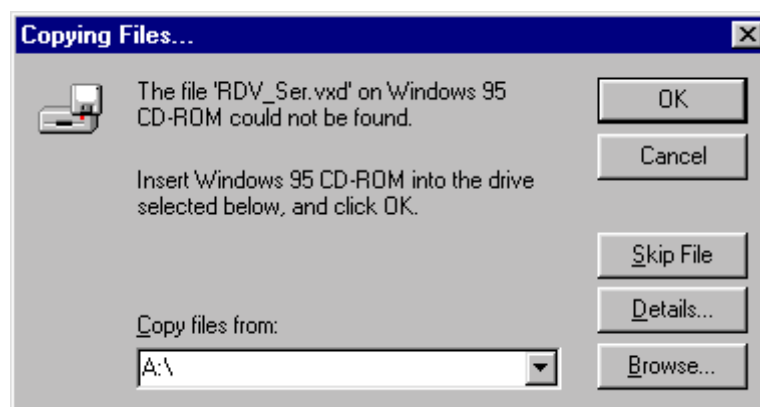


Note: If Windows 95 searches on the wrong diskette or CD Rom, click on 'Other Locations' and Type A:\ followed by click 'OK'. (This is assuming that the floppy drive with the driver is in drive A:)

A window will appear and ask for the Windows 95 CD Rom.

Click on 'OK'. There is no need to insert the CD Rom here.

When the following window appears, type 'A:\' and click on 'OK'.



Windows 95 will now copy the driver file and complete the RS485 driver setup.

Following this, click 'Close' on two windows, exit the 'Control Panel', exit 'My Computer' window. Remove the floppy disk from the 'A:' drive.

You must now restart your computer from the Windows 95 bottom command bar by clicking 'Start/Shut Down/Restart the computer/Yes'.

This will effect all the necessary changes and convert the selected communications port to the RS485 format. It should be realised here that this communications port can now only be used for the RS485 format and not for general modem or mouse connection. To restore the RS232 format, you must uninstall the RS485 driver. See section 'Uninstalling the RS 485 Comms Driver' in appendix 'B' in this manual.

Step 3 - Installing additional devices and channels

At this point you will have installed the Uni-Link software and the RS485 communications driver on one of your P.C. communications ports. We will now look at Uni-Link and add an additional Unimeter to the already installed channel.

Go to the Windows 95 bottom task bar and:

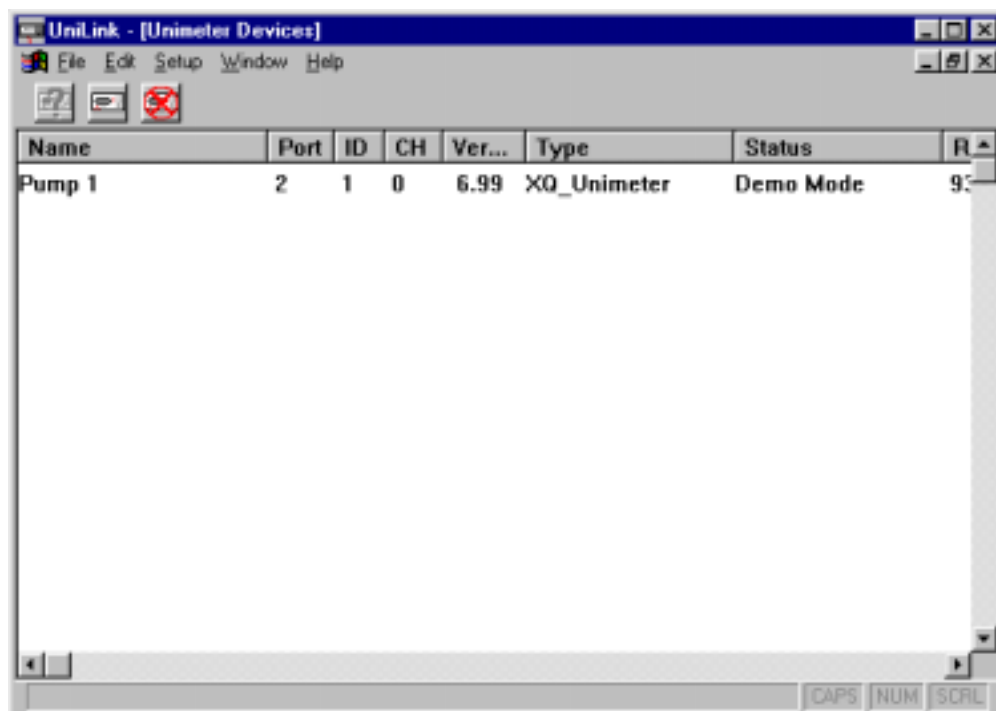
Click 'Start'.

Click 'Programs'.

Click 'UniLink' via the fold out windows on the UniLink icon bar (UNITOOLS is also shown).

(If the system complains about not finding the AS4000 adapter, select the 'Demo Mode').

The 'UniLink - [Unimeter Devices]' window will appear as shown below.



You will notice that a single device by the name of 'Pump 1' with an ID number of 1 has been installed on the RS485 communications port of your choice. (The 'Type' classification will probably show 'Type Unknown'). This window now offers you three options.

- 1 - 'Unimeter Icon (with Cross)' - This will stop and start the RS 485 communications process.
- 2 - 'Unimeter Icon' - This will enable you to install or remove additional channels.

3 - 'Setup' - This will program and select the communications ports and speed (baudrate).

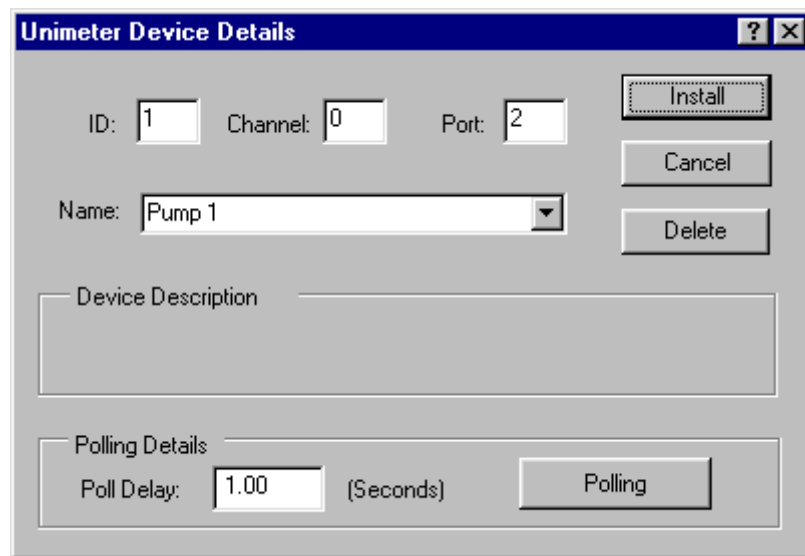
'Unimeter Icon (with Cross)'

To avoid unnecessary communications during this selection process, click on the 'Unimeter Icon (with Cross)' to stop the polling activity. This can easily be reversed and the polling started when you are finished with this activity.

Now you will install an additional Unimeter channel.

'Unimeter Icon'

Click on the 'Unimeter Icon' a new window will appear as shown below.



The screenshot shows a dialog box titled "Unimeter Device Details". It has a title bar with a question mark and a close button. The dialog contains several input fields and buttons. The "ID" field is set to "1", "Channel" is "0", and "Port" is "2". There are "Install", "Cancel", and "Delete" buttons. The "Name" dropdown menu is set to "Pump 1". Below it is a "Device Description" text area. At the bottom, there is a "Polling Details" section with a "Poll Delay" field set to "1.00" (Seconds) and a "Polling" button.

Now let us install a new device, another Unimeter, to measure the temperature of a boiler called 'Boiler 6'. I.D. (identification) number 1 has been used for the previously installed channel and can not be used on the same communications port again. So let us choose ID number 2.

Click on the ID box and enter '2'.

Note: The Unimeter is not a multiple channel device and does not require a channel number entered. If the device was a Uni-Mux or similar, the channel number would have to be entered in the 'Channel' box.

Now enter the communications port number where the new Unimeter will be connected.

Click on the 'Name' box and enter the name of your choice. In this case 'Boiler 6 Temp' would be appropriate.

Warning: You must not use any exclamation or punctuation characters in any of the device names. It is best to avoid these in all strings entered!

Click on the 'Poll delay' box and enter '1'. This will tell Uni-Link that the new device has to be polled (information acquired from device) every second.

Note: When 'Polling' is clicked, it will change to 'Not Polling'. This would mean that the installed Unimeter would not be 'polled' until the selection is reversed. This is useful if a channel needs to be temporarily disconnected from the SCADA system.

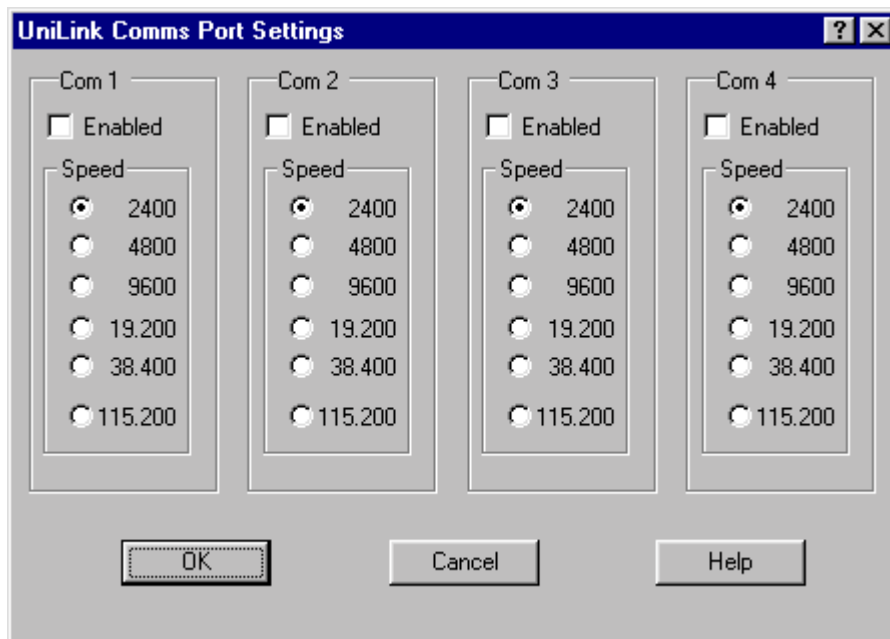
Now click 'Install' to complete the installation process.

The 'Delete' option will uninstall the channel shown, if required.

'Setup'

Let's select the communications parameters.

Click on 'Setup/Comms'. A new window will appear with the communications option as shown below.



If you have the AS4000 adapter connected to the installed port, select this port for communication with the connected device(s) on this adapter by clicking and ticking the 'Enable' box. If there is no hardware on the ports, do not select the option. For now, disable all 4 communications ports!

Now choose a baudrate by selecting the appropriate circle. (We suggest you initially select 2400 baud, the Unimeter default setting.)

Click 'OK' to confirm your choice and to finish the process.

You may now close the 'Uni-Link' [Unimeter Devices] window. At this point we have two devices called 'Pump 1' and 'Boiler 6 Temp', both Unimeter devices, installed. Uni-Link will now disappear into the background and will not be further run or used by the user unless additional devices are installed, renamed or removed. The names given to the devices or channels will be the only reference used in all further activities. This will ensure that the user can identify the various devices by their 'real' or 'common' names without having to deal with technical terms such as 'tags', 'channels' 'objects' or 'links'. All further Uni-Link activity will now be hidden behind the powerful environment of Windows 95. When required, Uni-Link will be invoked and run by Microsoft Access after the installation of the Access wizard and this is our next task.

Microsoft Access 97, Uni-Link Wizard Installation.

This is a once only installation to inform Access of the Uni-Link Wizard. You must have the full Access package including 'Advanced Wizards' installed for this. If the next step informs you that this is required, go to appendix 'A' for the advanced installation before re-starting this section again.

Let's move on.

Run up and start Access the normal way.

Select and open a blank database.

Click 'O.K'.

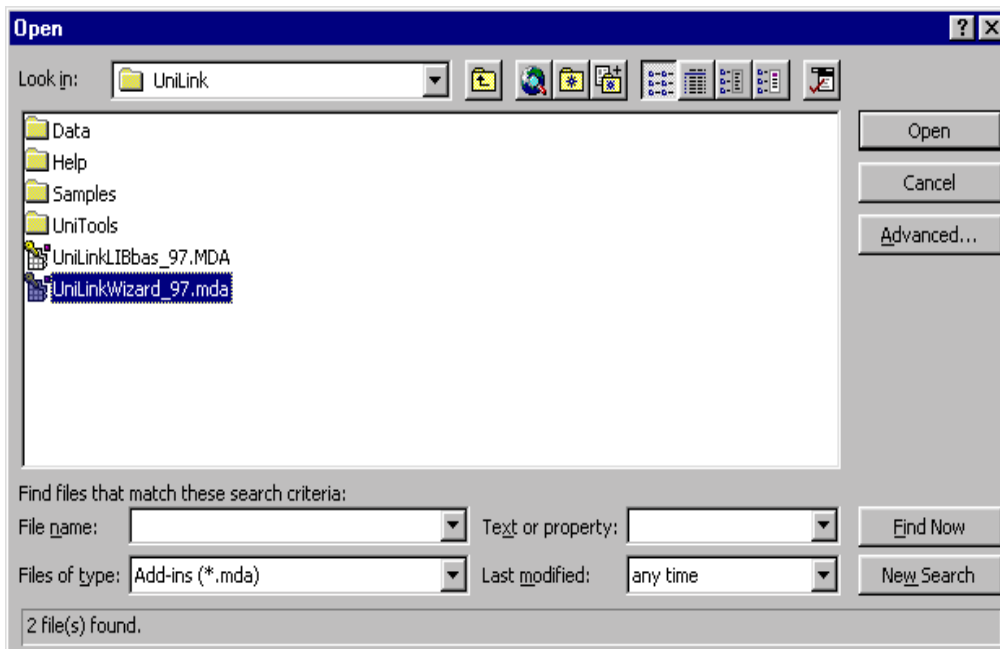
Enter 'File name: BoilerSCADA.mdb (or BoilerSCADA)

Click on 'Create'. A new data base window called *BoilerSCADA* will appear. This database is needed for the initial Wizard installation. We will also use this database to create our real SCADA system in a moment.

Now go to the Access top title bar and select the following menu item.

'Tools/Add-Inns/Add-In Manager'.

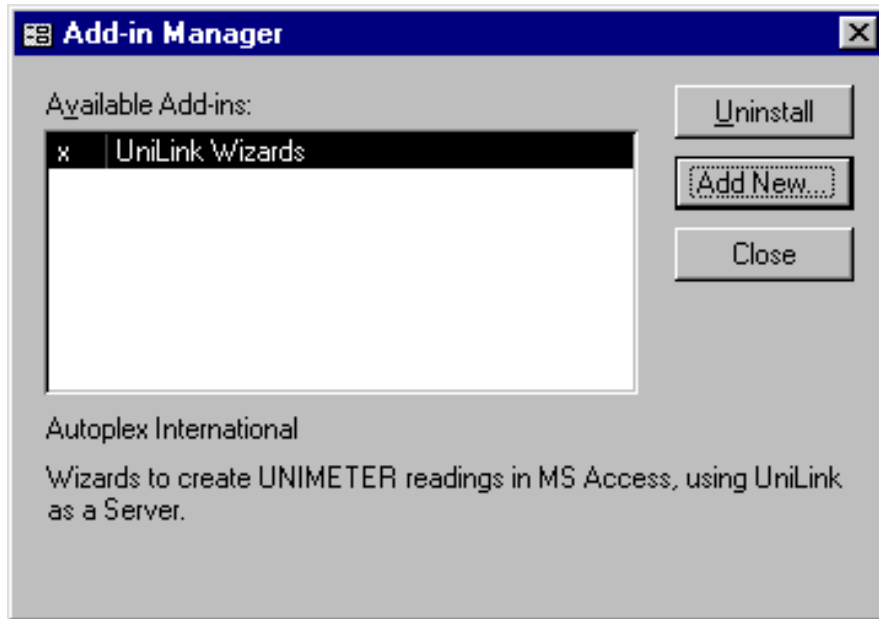
Select 'Add New' on the displayed window. The window below will appear.



In 'Look in:' select *C:\UniLink* and ensure that 'Files of Type:' is set to 'Add-inns (*.mda)'.

Select '*Unlinkwizard_97.mda*' (not '*UniLinkLIBas_97.MDA*').

Click 'Open'. The 'Add-inn Manager' will appear as shown below.



Click 'Close'.

You are now ready to create the first real SCADA system using the two previously installed devices and graphics to reflect the real world.

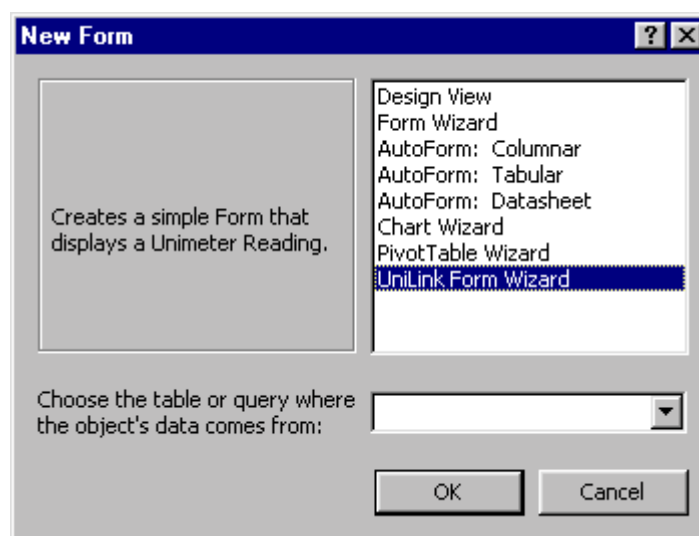
Access 97 SCADA

You will still have the just created BoilerSCADA database window open. If not, open this database.

In its simplest form Access will now require a 'Form' and one or more 'Sub-Forms' to be created. The sub-form(s) will be used to display the SCADA graphics and all the readings and controls.

Let's do it!

On the BoilerSCADA database select 'Forms' followed by 'New'. The window shown below will appear and display the 'Uni-link Form Wizard' as an option. Select this Wizard and click 'OK'.



The 'UNILINK WIZARD' window will appear. Select 'Master form' and click on 'Next'. Now the 'MASTER FORM' window will be shown. Enter the text string 'BoilerSCADA Master' in the 'Name to save Master Form as:' window. Enter the text string 'BOILER SCADA SYSTEM' in the 'Enter Caption for the master Form' window. Any other suitable text may be entered here. These captions will later be displayed on the master form. Further, you may also enter some string in the 'Enter any message you wish to display near the top of the form:' window for additional information. Let's enter 'Boiler Room' for this exercise.

Click 'Next'.

Now the 'SUB FORM' window will appear. Again, we will enter some text strings as per the master form. Enter 'BoilerSCADA Sub 1' in the top window, 'Boiler SCADA Display' in the middle window and 'Boiler 6 Display' in the bottom window. Ensure that the 'Normal Sub-form with Readings, Bitmaps and Controls' option is ticked.

Click 'Next'.

The 'Unimeter Device' window will appear.

Click on the little arrow in the 'Unimeter Name' window and the two previously installed devices, 'Pump 1' and 'Boiler 6 Temp.' will appear in a drop down window. You will now select one device for display in Sub Form 1 of the SCADA system.

Select and click on 'Pump 1'.

Enter '1' in the 'Refresh Time:' window. (This is the time at which rate the reading will be updated in the Sub Form 1.)

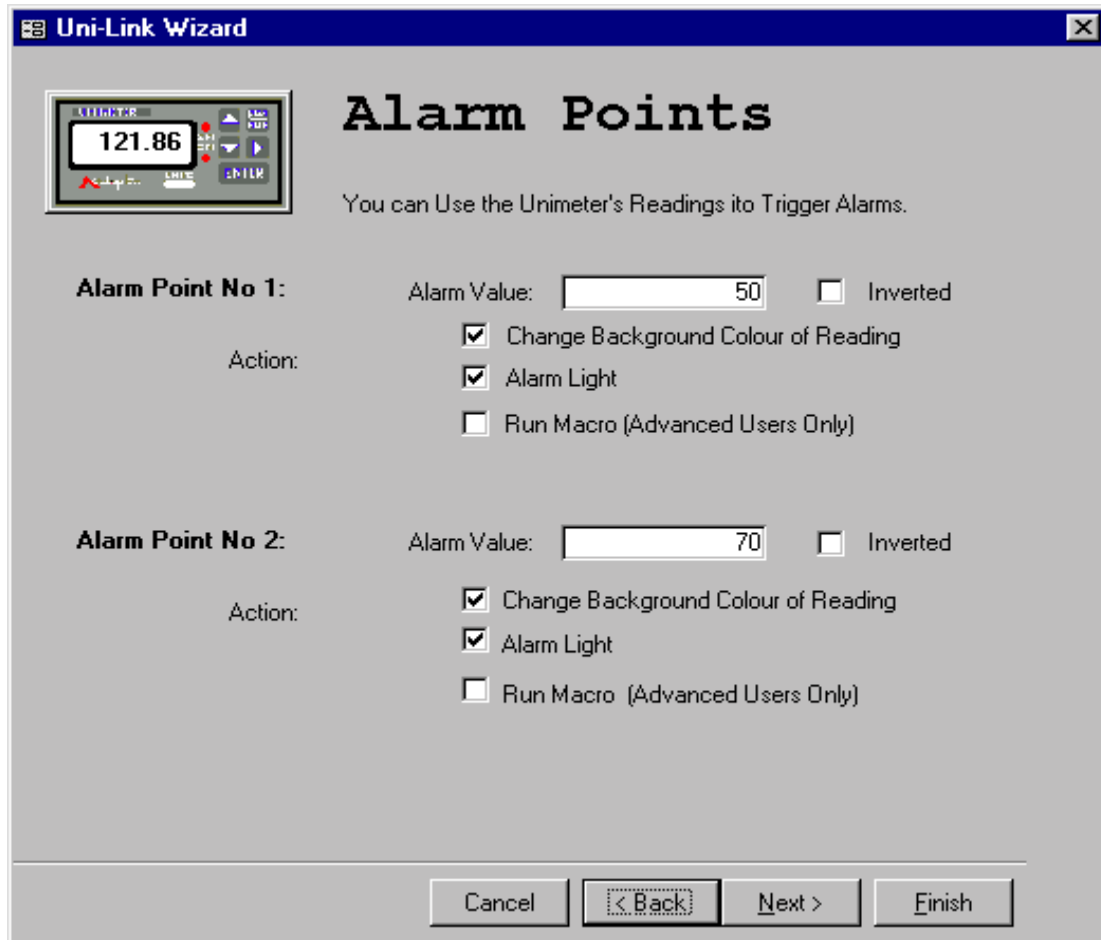
Select and tick the 'Log Reading' option. (This will ensure that the selected device Pump 1 reading will be data logged.)

Select and tick the 'Bar Graph' option. (This will provide a bar graph representing the Pump 1 value on the Sub Form 1.)

Note: Here we have chosen to select all options, the device, the refresh time, the logging option and the bar graph option. However, the user can chose to show a reading of a device only, by not selecting the 'Log reading' and the 'Bar Graph' options.

Click 'Next'.

The 'Alarm Points' window shown below will appear.



Here we have some options to enable us to get two alarm indications and colour changes at any value of a device reading. The 'Alarm Value' is the value at which the alarm occurs. The 'Inverted' option, if selected will invert the background colour sequence of the reading, the 'Change background Colour of Reading' box will select this option, the 'Alarm Light' option will present a rectangular graphic that can be adjusted to any size, as required. This alarm light will turn on and off at the selected alarm value. The 'Run Macro' option is for advanced use and will be described in appendix 'C' of this manual.

Enter the values and select the options on the 'Alarm Points' window as shown above.

Click 'Next'.

The 'Data Logging' window will appear and show the name of the table ('UniData' in this case, however, any name can be chosen for this purpose) to which the data will be logged. You can now chose the data logging period by entering a time in the 'Seconds' window. Please enter '1' for now.

Click 'Next'.

The 'Finished' window will appear.

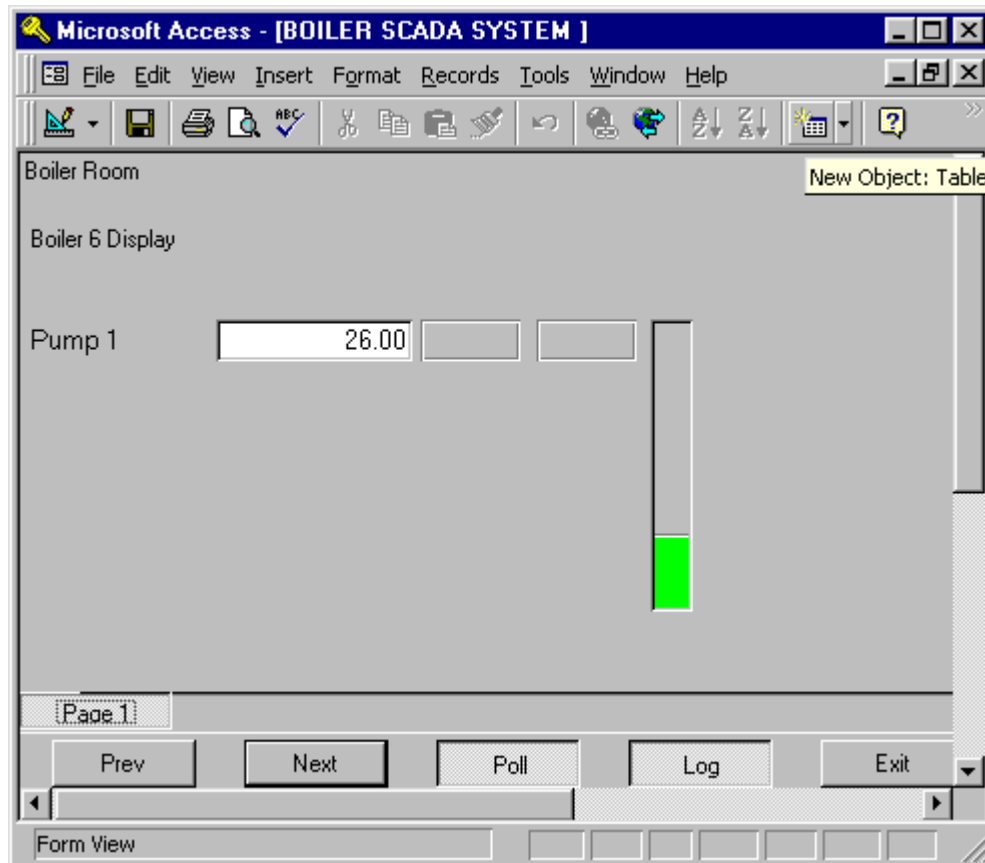
Click 'Finish'.

The system will now create the master form and sub form and will install the device and all it's associated chosen controls in the sub form. The main database window will now appear and show the master form name and the sub form name that you have chosen.

Click on *'Boiler SCADA Master'*

Click on *'Open'*.

The *'Boiler SCADA'* database will now run and show the following display. You will notice that the *'Pump 1'* reading, two *'Alarm Lights'* and a *'Bar Graph'* will appear and display data automatically generated for the *'Demo Mode'* which was earlier selected .

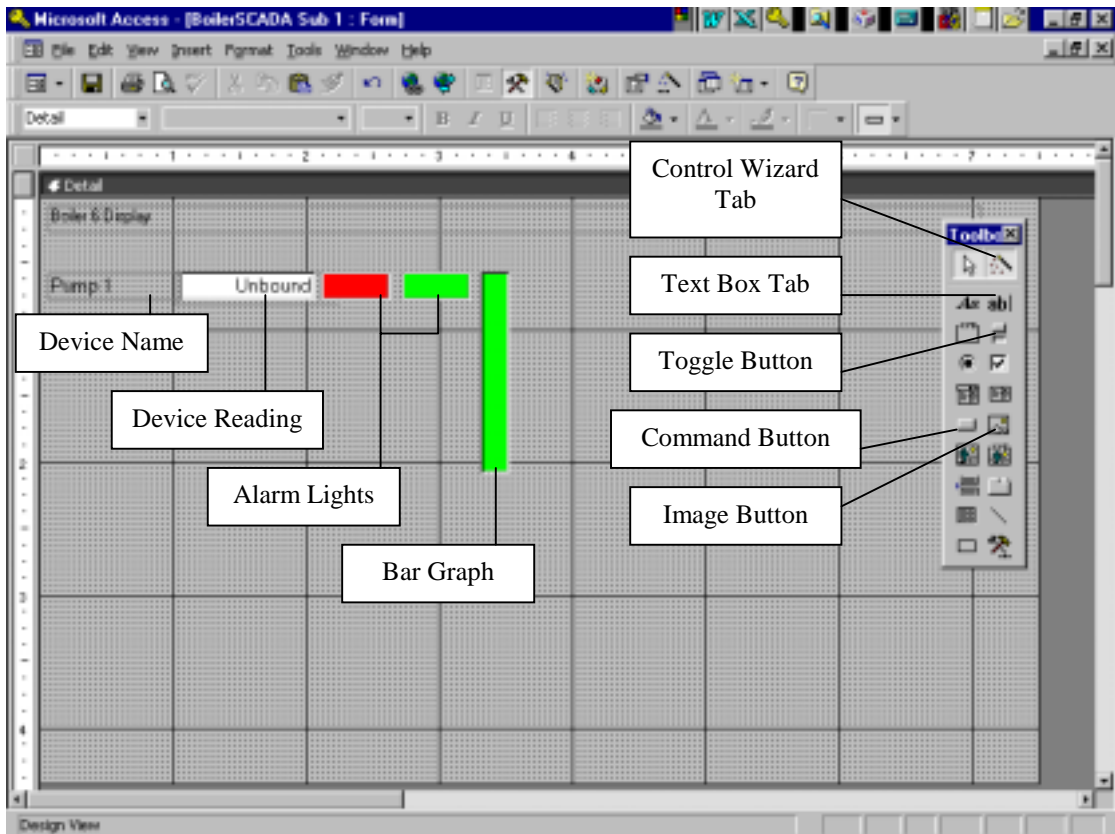


Close the *'Boiler SCADA'* form by clicking on the bottom cross in the upper right corner of the monitor display.

Let's get into the design mode to enable us to create the picture we wish to see.

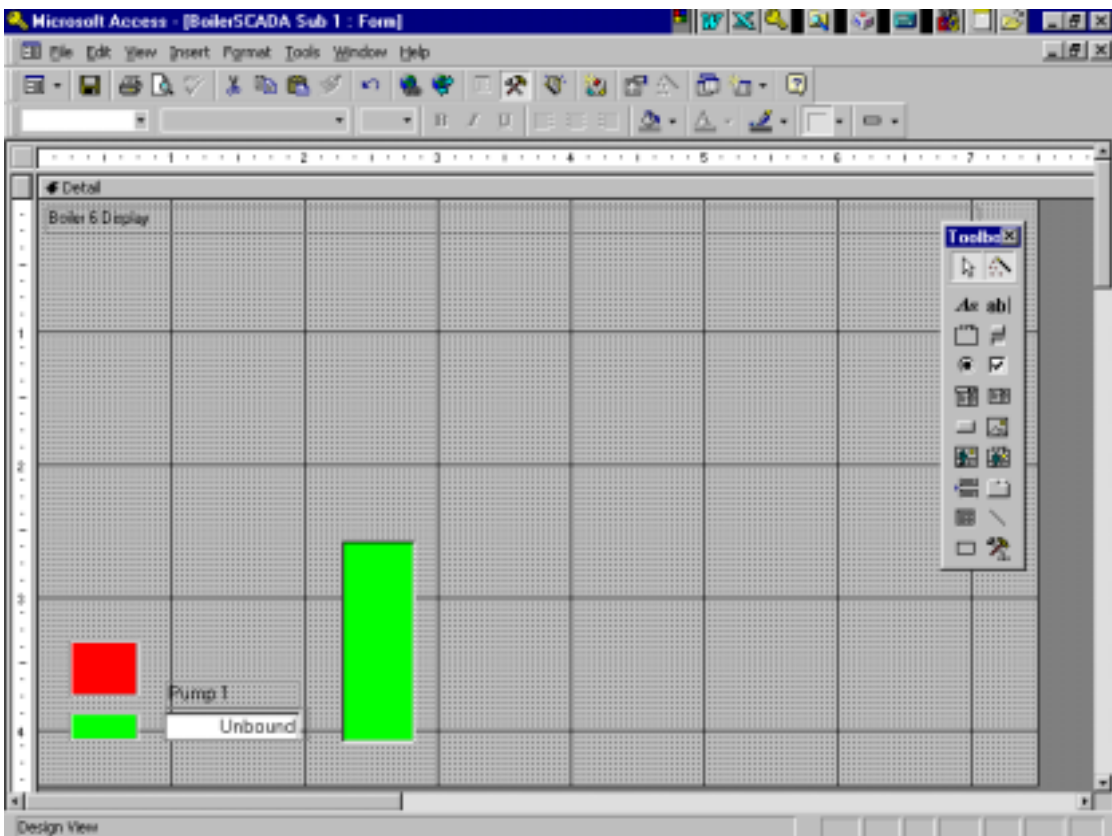
Select *'Boiler SCADA Sub 1'* and click *'Design'*.

Access will now go into the design mode and display the window shown below. Here we are totally in the normal Microsoft Access environment and can chose to modify and add graphics, text and colour, as we desire. Ensure that the Access design Toolbox is displayed.



Move and change the Pump 1 reading and display using the normal Windows 95 Access tools generally as shown in the window below.

Note: The precise appearance of this is not important. You should simply become aware that you could create anything you wish to see.



Now let us add a *'Toggle' control button to turn on 'Setpoint 1'* in the 'Pump 1 Unimeter 'On' and 'Off' by clicking on that button when we return to the run mode later.

Firstly, ensure that the 'Control Wizard Tab' is depressed (light colour) and selected. (Please keep this selected from now on.)

Click on the *'Toggle Button'* on the *'Toolbox'* and then place the button somewhere next to the Pump 1 bar graph.

The *'UNI-LINK WIZARD Toggle Button Control'* window will appear. Click and select the *'To Toggle Setpoint 1 On/Off'* option.

Click *'Next'*. The *'Unimeter Control'* window will appear.

Select *'Pump 1'* in the *'Unimeter Name'* drop down window.

Click on the *'Finish'* option tab.

The wizard will now install the *'Toggle Button'* and display this with a *'Pump 1 SetPoint 1'* caption.

You can now change size, colour, text or position of the button as required.

Now to some background graphics.

Select the *'Image'* button on the Access *'Toolbox'* and place the image cursor somewhere in the top left hand corner of the sub form and click. A *'Insert Picture'* window will appear. This will now enable you to load any bitmap graphics file stored. We will select the *'Boiler.bmp'* file in the *'UniLink/Samples'* folder, as shown below.



Click 'OK' on the 'Insert Picture' selection window. The Boiler.bmp picture will now appear on your Access sub form and cover all other graphics. To place this graphic into the background simply click on the graphic to select it, choose the 'Format/Send to Back' option on the top Access task bar and the Boiler SCADA picture will move to the background and again display the other objects.

Save the design work by clicking on the 'Save' icon and close the form but not Access. (Click bottom cross).

You will now be back in the main Access display showing the master and sub form options.

Select the "Boiler SCADA Master" and click on 'Open' to once again run the SCADA system. The new and modified display will appear with the new control button.

You can now click on the 'Toggle Button' however, nothing will happen as we are still in the 'Demo' mode. We will revisit this when we move to the real time mode with a Unimeter connected.

Before we leave this part of the SCADA system, let us install a second device, namely, the 'Boiler 6 Temp.' device.

Exit the run mode by clicking on the bottom cross. (Do not exit MS Access!)

Select 'Boiler SCADA Sub 1' and 'Design'.

Click the 'Text Box' tab on the design toolbox.

Place the cursor anywhere on the form display and click.

The 'Unimeter Device' 'Text Box Wizard' will appear.

Select the 'Boiler 6 Temp.' device in the 'Unimeter Name:' window.

Select the 'Log Reading' option.

Click 'Next'.

The 'Alarm Points' window will appear.

Click 'Next'.

The 'Data logging' window will appear.

Select '1' for logging rate

Click 'Finish'.

Note: This time you have chosen to display the reading of boiler 6 temperature only and bypassed all bar graph and alarm options. The Refresh time was left as selected, at 1 second for both display and logging.

The new reading will be placed into the sub form and can now be modified as required.
Save the form to retain your modifications.

Exit the design mode and run the master once again. The SCADA will now show the additional boiler 6 temperature reading.

Note: You can go on adding and modifying the SCADA as you wish, simply by revisiting some of the previous steps. Any device can be installed one or many times ie you could show Boiler 6 Temp or Pump 1 several times on the same sub form or indeed create new sub forms with other displays and graphics as you wish. There are practically no limits to what you can create within this powerful Microsoft environment. To demonstrate one more expansion feature let's create an additional sub form and insert the Pump 1 reading and a 'Sub Form Toggle Button' to allow us to switch from our new sub form 2 to sub form 1 by simply clicking on this new button.

Exit the active master.

In the Access 'Forms' display select 'BoilerSCADA Master'.

Click 'New'.

On the 'New Form' window select the 'UniLink Form Wizard' option again and click 'OK'.

Select the 'Sub Form' option.

Click 'Next'

Click 'Next' to confirm the 'BoilerSCADA Master' form to which the new sub form will be added.

Give the new sub form a name eg 'BoilerSCADA Sub 2'.

Click *'Next'*.
Select *'Pump 1'*.
Click *'Finish'*.

This procedure was a repeat of what you did earlier and will not change for any additional additions of sub forms.

You will notice that the wizard has installed an additional sub form. Select this new sub form and go into the design mode once again.

Pump 1 will appear without any alarm graphics or bar graph.

Select the *'Command Button'* on the Access *'Toolbox'* and place the cursor somewhere on the new form. The *'Choose Builder'* window will appear. Select the *'Unimeter Control Command Button'* option and click *'OK'*.

The *'Command Button Wizard'* *'UNI-LINK WIZARD'* will appear.

Select the *'To Provide a Button to ZOOM'* option.

Click *'Next'*.

On the next window display choose the sub form number you wish to zoom to. In this case number 1.

Click *'Finish'*.

The wizard will place a *'hidden button'* outline on the sub form. You can now move this to any point of the sub form and cover it with text or graphics if required. You can also choose to enlarge it and place it over an existing graphic display. The outline area of this button defines the sensitive region for the click selection by the mouse. Also, this button can overlay the whole form and this would enable execution of the zoom command within the total sub form.

Enlarge the button and place a red rectangle on top of it. Go to *'Format'* and *'Send to Back'* the graphics covering the zoom button to ensure that the mouse can click on the button when running the system.

Save the form and return to the main database menu.

Run the SCADA by selecting *'Boiler SCADA Master'* and clicking on *'Open'*. The sub form 1 will once again appear with all the installed functions and features.

Select *'Page 2'* or *'Next'* at the bottom. The sub form 2 will now be displayed showing a reading of Pump 1 and the *'Zoom button'*.

Click anywhere on the zoom button and the sub form number 1 will again appear.

Note: The zoom button can be employed to page to any form within Access. This enables the user to create features such as information forms, parts lists, technical descriptions of plant, or simply record day to day maintenance comments. Naturally, if several SCADA systems are within the same database, the user can page from one to the next.

This concludes the installation of the Access wizards and the creation of a simple SCADA system. We will now move to the installation of the Excel Wizard and link to the Boiler SCADA system. This will provide us with the full power of the Excel graphing and statistical analysis features. Close the BoilerSCADA database but not MS Access.

Microsoft Excel 97, Uni-Link Wizard Installation.

Note: Before we start with Excel you must first copy a file. Using the MS Explorer, copy 'Unitrends.xlt' from the 'C:\UniLink' folder to the 'C:\Program File\Microsoft Office\Templates' folder.

Also, there is a potential problem with the Access database exclusivity and to ensure this is not a problem close the 'Boiler SCADA' database and do the following in the precise order shown:

Select 'File/Open Database' on the Access top task bar (do not use the blank page on the tool bar). A window will appear with an 'Exclusive' option. Select the 'BoilerSCADA' database and then select and de-select the 'Exclusive' tick. Ensure this option is not selected (no tick) and then click 'Open'. and run the Boiler SCADA database. (This fix should only be required once!)

(Note: If, during this installaytion, a compile error occurs when you open the Excel 'UniTrends' template or 'UniTrends' workbook, see appendix 'E'.

All should be well, here we go again !

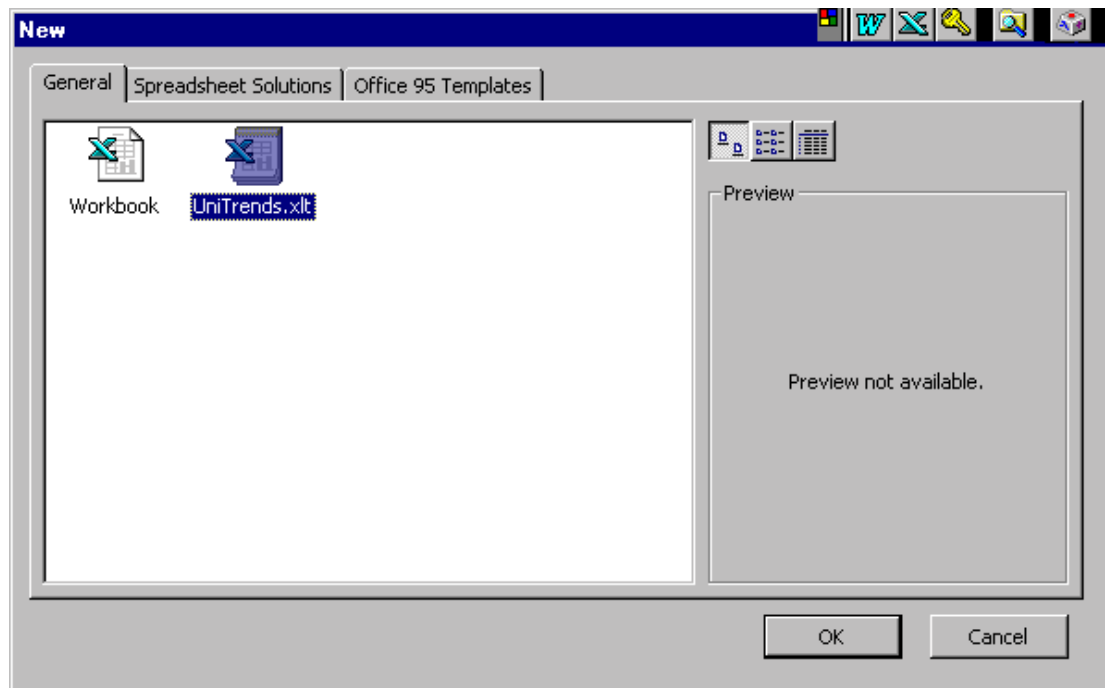
The Access database Boiler SCADA will still be open and running at this point, this is required to enable the link from Excel to Access!

Open Microsoft Excel.

Close the Workbook that was automatically opened for you.

Select the 'File/New' option from the Excel tool bar to open a new Workbook (not the new Icon!).

The following graphic will appear.



In 'General' select the 'UniTrends.xlt' icon

Click 'OK'.

(If a Macro warning window appears select 'Enable Macros' and move on.)

A 'Uni-Link Trending Chart Control' window will appear.

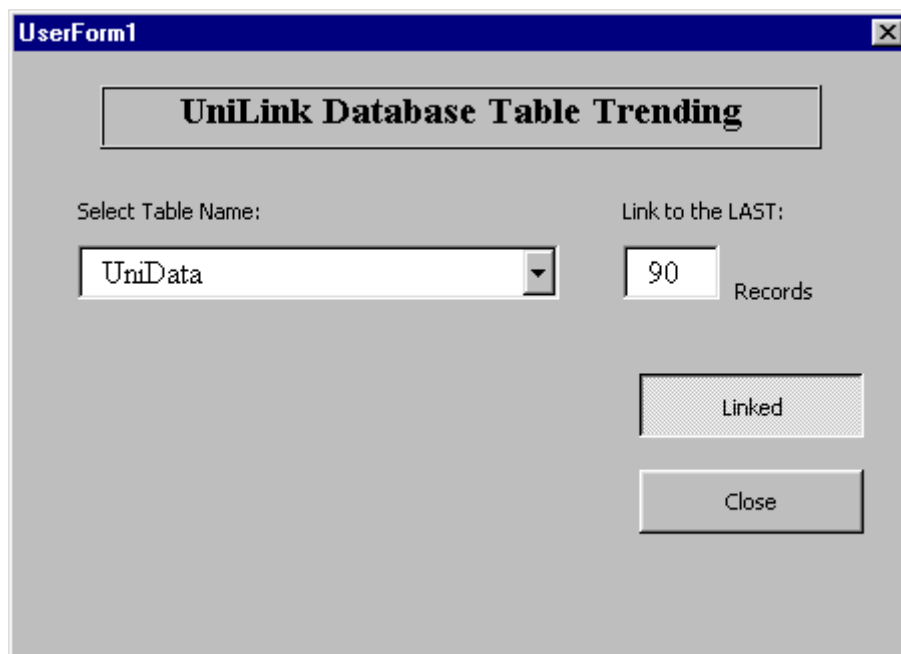
Click on 'New File Name' and browse to where the 'BoilerSCADA.mdb' is located. Select this file and click 'Open'.

The database name will now appear in the 'Access Database Name' box and the table name that is used to store the logged Access data will appear in the 'Data Logging Table Name(s)' box. In this box you will also find the 'No. of Records' option. This selects the number of last data logged records of each of the installed devices (Pump 1 and Boiler 6) you wish to appear in Excel for graphing and analysing. The default setting is 100 records.

Number of records change

To change the number of records setting, click on the 'Change Selection' tab and change the number in the 'Records' tab to 90 and click 'Close'.

Note: For maximum speed and throughput, the number of last records linked to Excel should be kept to minimum to give satisfactory resolution and results. For a bar graph or pie chart you will only need the last record (1), for a line chart anything from 10 to 100 is usually suitable.



Disabling a data logging table

In an Access SCADA system you may choose to have several separate data logging tables to perhaps have some with very slow data logging activity and some with fast logging selection. You do not require to show all of these tables and their data in Excel. To disable a table you can simply select the table in the 'Uni-Link Trending Chart Control' window and click on the 'Change Selection' tab. In the new window then displayed, de-select the 'Link' option and 'Close' Naturally, the table can be re-enabled by reversing this procedure.

Changing the refresh rate

The '*Refresh Rate:*' is the rate at which data is shifted from Access into the Excel cells. To modify this rate simply click on the up/down arrows. As a guide, the selected rate should be the same or less than the sample rate in Access. Select refresh rate = '1'.

Activating the link to Access

Click on the '*Link*' button to activate or de-activate the link from Excel to Access. When activated, the Access database records will be copied to the Excel worksheet at the selected '*Refresh Rate*'.

Automatically show trending when Workbook is opened

If you tick the '*Auto Start When Worksheet Opened*' box, the link will automatically be established to the worksheet every time it is opened. Tick the '*Auto Start When Worksheet Opened*'.

Now close the '*Uni-Link Trending Chart Control*' window by clicking on the bottom cross. The '*Save As*' window will appear. Save the worksheet as '*Boiler SCADA.xls*'.

Note: The '*Control*' and table name worksheets ('*UniData*' in this case) must NOT have their names changed at any time!

Open the '*Boiler SCADA*' workbook and you will see that Excel will reopen to the same '*Control*' page. Excel will now always reopen to the place from where you closed it. This will be handy for returning to say a page with the most used graphs.

Select the '*UniData*' page option at the bottom. You will now see the data flowing into the Excel cell from Access.

Note: At this point you can use the Excel features as you would normally do. The only difference is that you do not need to enter data into the cells. The data is now delivered via the OLE link from Access directly into the Excel cells. There are practically no restrictions on what you can now do with the data. Naturally, some familiarity with Excel will be of help. However, let us now create an additional page with some real time graphing.

Showing real time graphs in Excel

Note: Any design in Excel can be carried out while the worksheet is linked to Access, however, it is best to unlink via the '*Control*' page while programming. Please ensure that sufficient time has elapsed to have 100 readings in the '*UniData*' page.

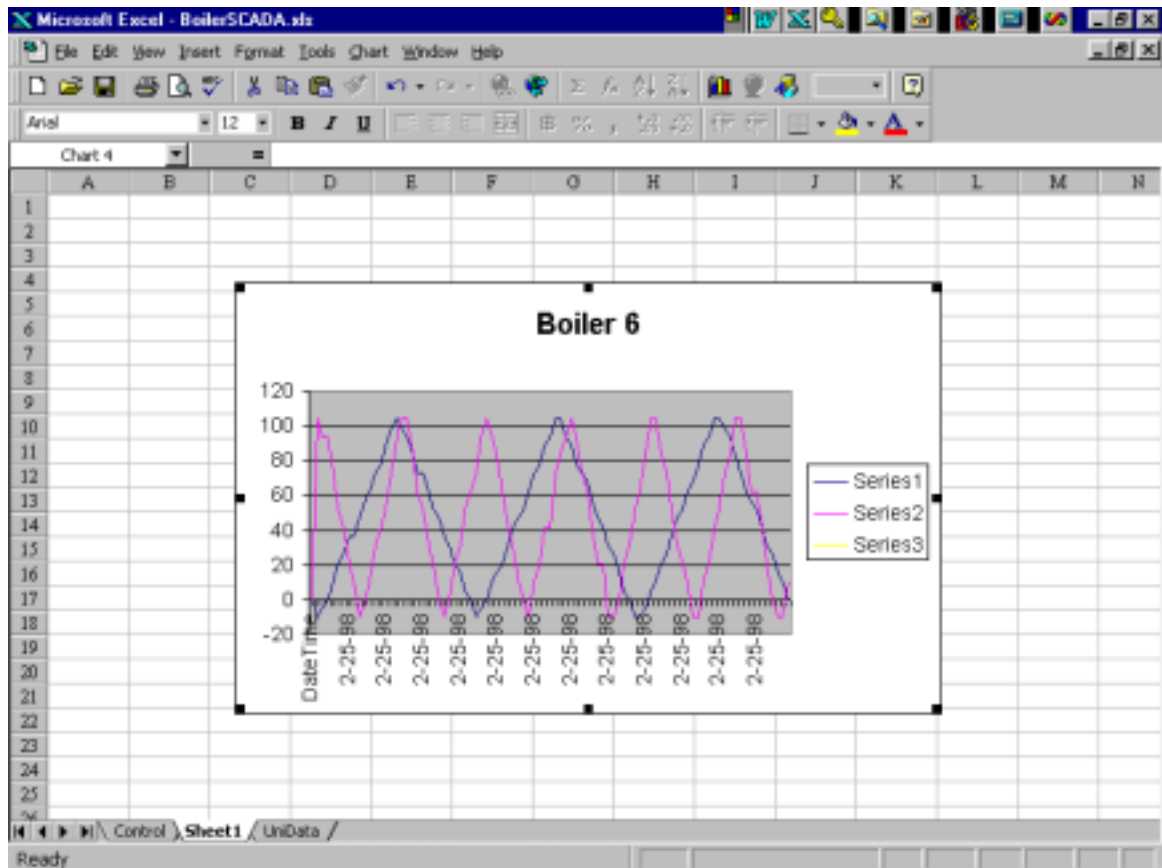
Let's do it!

Click on '*Insert/ Worksheet*' on the top tool bar and create a new page (*Sheet 1*) for the graph to be created on. This name '*Sheet 1*' can be changed to suit at any time.

Click on the bottom '*Control*' page. The '*Uni-Link Trending Chart Control*' window will appear.

Click on '*Link*' to de-select the option and go back to the '*UniData*' page.

Click on the blank tab separating columns 'A' and row '1'. This will highlight all cells including the three columns of data which are made up of column 1 = data and time, column 2 = Pump 1 readings and column 3 = boiler 6 temperature readings.



Click on the Excel 'Chart Wizard' icon.
 Select 'Line' graph option.
 Select the smooth line graph.
 Click 'Next'.
 Click 'Next' again.
 Type in chart title 'Boiler 6'
 Select 'Axes' tab and select 'Category (x) axis / Automatic'
 Click 'Next'.
 Choose the page on which the graph should appear (*Sheet 1*). (It is best not to use a 'Chart Sheet' here as these will tend to blink when updated.)
 Click 'Finish'.
 Adjust the graph to any size you wish to see.

Now go to the 'Control' page and re-establish the 'Link' to Access by clicking the 'Link' button. (Wait till the 'Link Active' status is reported before clicking anywhere else!)
 Click on 'Sheet 1' and watch the data moving in the line graph.

Note: Any number and types of graphs may be created and shown on one or more new or old pages. These graphs can also be modified in size, colour or type. All the option in Excel are available. The user should consult the Excel manual for maximum benefit.

Save the worksheet and close the workbook.

Now re-open the workbook and you will see that Excel will return to the graph page 'Sheet 1' automatically and show the real time display. Naturally, the Access database 'Boiler SCADA' will have to be running to provide the live data to Excel at all times.

Before we leave this section let's create another graph, a column graph, on the same page.

Go to the 'UniData' page and select the last row of data (one row only, the two device readings).

Click on the 'Chart Wizard' icon.

Select 'Column'

Select one of the graph types.

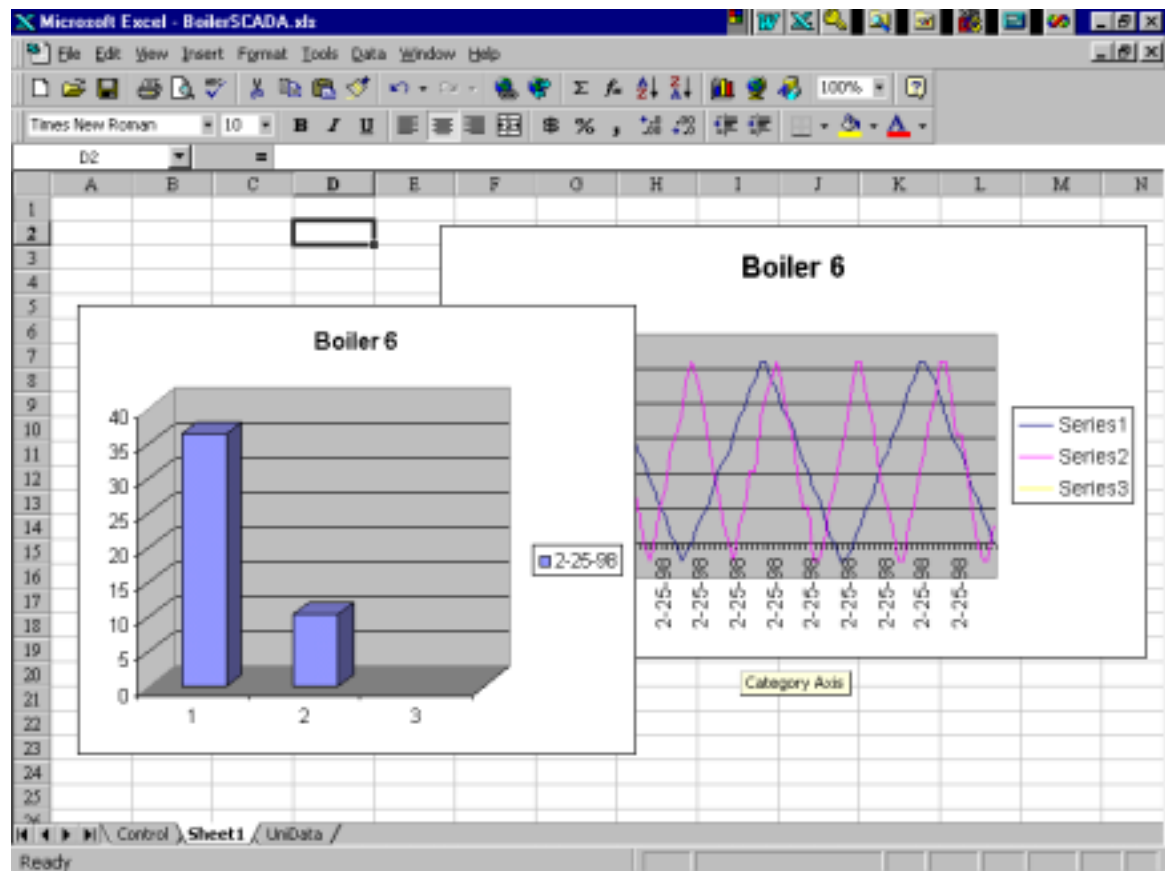
Click 'Next'.

Click 'Next'.

Select 'Sheet 1'.

Click 'Finish'.

The bar graph will now appear on top of the other existing line graph. Simply move the new graph to one side.



Note: If at any time there appears 'display flicker' following the adjustment or modification of a graph, simply click on an empty cell to stop the flicker. (Come on Microsoft).

Real Time Execution

Exit both Access and Excel and all other programs that may be open.

Run 'Uni-Link' from Windows 95 bottom command line and enable the communications port to which the AS400 adapter and the two Unimeters are connected. This is done by 'Start/Programs/Uni-Link/Uni-Link/Setup/Comms' enable Comm ?, and click 'OK'. Exit Uni-Link.

Now restart Access and Excel. The information flowing into the SCADA will now be real information coming from the two Unimeters. Also, you can now go to sub form 1 and test the toggle button to turn Setpoint 1, on Unimeter Pump 1, on and off.

General

All data logged to the Access database can be evaluated and analyzed in Excel the normal way. This means, a data file can be taken from Access and simply put into an Excel worksheet any time after the data has been recorded and not real time. To facilitate this feature with 'Window SCADA' we have arranged the Access database to close every midnight and record the data in the Excel format as 'Tablename_year-month-day.xls. In the Boiler SCADA example this would be 'UniData_1988-02-24.xls' being the recording of the 24th of February 1998 and can be found in folder C:\Unilink\Data).

APPENDIX 'A'

Adding the 'Add-Ins' Dialog Box.

If the Add-Ins Box was not available during installation, you may use this procedure to install this feature.

Run Microsoft Office SETUP from '*My Computer/Control Panel/Add Remove Programs*'.
Select Microsoft Office in the lower window and click the '*Add/Remove*' button 97

Or

Use Explorer to run MS Office Setup from your MS Office 97 disks or CD. Setup is on disk 1 of the floppies or the root directory of the CD.

Click on the 'Add/Remove' button.

Select 'Microsoft Access'.

Click 'Change Option'.

Tick 'Wizards'.

Tick 'Advanced Wizards'.

Click 'OK'.

Tick 'Data Access'.

Click 'Change Option'.

Click 'Select All'.

Click 'OK'.

Click 'Continue'.

Now continue with the wizard installation.

APPENDIX 'B'

Uninstalling the RS485 communications driver.

To restore the communications port to the normal state (for modem or similar device, not RS485), follow the next steps.

Double click on *'My Computer'*.

Double click on *'Control Panel'*.

Double click on *'System'*.

Select *'Device manager'* tab.

Double click on *'Ports (Com&LPT)'*.

Double click on the Comms port that you installed the AS4000 adaptor on.

Select the *'Driver'* tab.

Click on *'Update Driver'*.

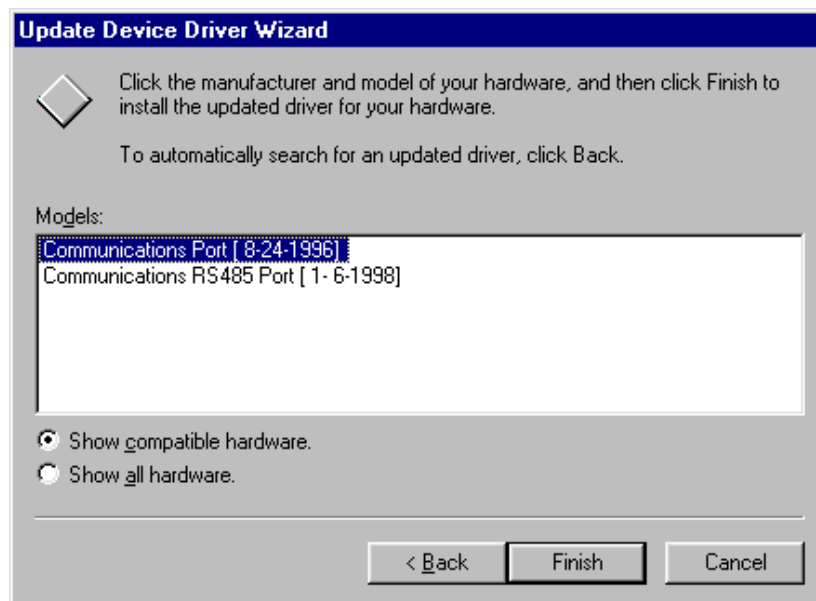
Select *'No'* from the *'Select Driver from List'*.

Click on *'Next'*.

Select *'Communications Port'* (not the Communications RS485 Port).

Click *'finish'*.

If the computer requests the CD Rom simply ignore and click *'OK'* Two more windows will appear, select *'Skip File'* in both.



Close all windows and restart the computer. Naturally, you may reinstall the RS485 driver, as outlined in the installation procedure, at any time.

Uninstalling Access and Excel wizard files

Double click on *'My computer'*.

Double click on *'Control Panel'*.

Double click on *'Add/Remove Programs'*.

Select *'UniLink'*.

Click 'Yes'.
Click 'Yes to All'.
Click 'Yes'.
Click 'OK'.

Close the windows.

Using Microsoft Explorer, delete the 'UniLink' folder. In the 'User Folder' (probably 'My Documents') remove 'BoilerSCADA.mdb' and the 'UniLink.ini' file. In the Excel folder remove the BoilerSCADA.xls workbook.

Also delete the following files:

C:\Program Files\Microsoft Office\Office\UniLinkWizard_97.mda
C:\Program Files\Microsoft Office\Templates\UniTrends.xlt
C:\Windows\Inf\Other\AutoplexMSSPORTS.INF

Your computer will now be back to normal.

Uninstalling a Device in Access

To uninstall a device in the Access forms, simply go into the design mode and click on the device and all the devices graphics including alarm lights, reading and bar graph and delete. Then save the modifications.

Open the 'UniDetails' table in the main database menu 'Tables' option and remove the device and all its properties from this table.

Open the file 'UniLink.ini' in the 'C:\UniLink' folder and remove the deleted device's reference from this file.

APPENDIX 'C'

Advanced Use, Visual Basic and Macros

The Uni-Link Access and Excel wizards were created using Microsoft Visual Basic within these packages. The user with visual basic skills can add or even modify this code as may be required. Basically any functions can be provided for customizing special applications.

The existing visual basic code can be seen by opening the BoilerSCADA Access database and selecting 'Forms/BoilerSCADA Master' and clicking 'Code' on the Access title bar at the top. The visual basic code will appear. At the end of the code, you will see the code shown below.

There are two macros coded here and will be executed with the normal code. However, the result will have no effect because there are some lines disabled. If enabled, each macro will act on the programmed setpoints of Pump 1 and will call the sound generator files called 'Chord.Wav' and 'Ding.Wav'. These are two simple sound files installed during the installation procedure.

```
Public Sub AP1_Control_Macro(Rst As Recordset)
Dim tm As Date
'Place Code referencing the CONTROL NAME AND SUBFORM NAME here eg:
If Rst!ControlName = "Pump1" And Rst!Subform = "BoilerSCADA Sub 1" Then
    If (Rst!AP1Misc = 0) Then 'it hasn't been activated
        On Error Resume Next
        'Code Blocked out below in case No Soundcard is installed (Remove leading ' to try it)
        'Shell "SndRec32.Exe /Play /Close \UniLink\Chord.Wav", 0 'Or other Call as required
        'tm = DateAdd("s", 1, Now)
        'While Now < tm 'Delay to allow sound to play
        'Wend
    End If
Exit Sub
End If
'Add Code referencing other CONTROL NAME's AND SUBFORM NAME's here:
```

End Sub

```
Public Sub AP2_Control_Macro(Rst As Recordset)
Dim tm As Date
'Place Code referencing the CONTROL NAME AND SUBFORM NAME here eg:
If Rst!ControlName = "Pump1" And Rst!Subform = "BoilerSCADA Sub 1" Then
    If (Rst!AP2Misc = 0) Then 'it hasn't been activated (This is set to 1 after this sub returns)
        On Error Resume Next
        'Code Blocked out below in case No Soundcard is installed (Remove leading ' to try it)
        'Shell "SndRec32.Exe /Play /Close \UniLink\Ding.Wav", 0 'Or other Call as required
        'tm = DateAdd("s", 1, Now)
        'While Now < tm 'Delay to allow sound to play
        'Wend
    End If
Exit Sub
End If
'Add Code referencing other CONTROL NAME's AND SUBFORM NAME's here:
```

End Sub

Any additional macros can be written along the same lines and simply added here.

APPENDIX 'D'

Connecting to the Unimeter devices via Modem.

The user may connect remote devices to the SCADA system at any time. There are only some minor adjustments required to achieve this.

Let us assume that we have a system with two devices connected, one on communications port 2 with RS485 format, called Pump 1 with ID '1' and one is connected via modem in Adelaide, Australia, on port 4. This device is called Pump 2 and also has the ID of '1'. (Port 4 must not have the RS485 driver installed.)

Note: One or many remote devices can be connected anywhere in the world, via the tele-communications network, to a Uni-Modem at the remote site. The Uni-Modem is a Unimeter look-alike device and does not require additional intelligence like a P.C. at the remote end. All Unimeter devices simply connect via the normal RS485 line to the Uni-Modem and to the telephone line.

```
UniLink_MODEM.ini - Notepad
File Edit Search Help

[MRU]
Count=4

[DefaultSettings]
CommPort=2
DemoMode=0
Customer=0
TurboMode=0
PauseDelay=10
PortPollFailLimit=5
PortFailRetryDelay=30
PortFailTimeout=30
UniPollLimit=0

[InstalledDevices]
U001=Pump 1, ID:001, CH:000, POLL:Y, POLLDelay:1.00, PORT:2
U002=Pump 2, ID:001, CH:000, POLL:Y, POLLDelay:1.00, PORT:4, MODEMID:64, PLACE:Adelaide, PHONE_NO:08 82608124, PW:password

[COMM1]
Speed=38400
Active=0
Modem=0

[COMM2]
Speed=38400
Active=1
Modem=0

[COMM3]
Speed=38400
Active=0
Modem=0

[COMM4]
Speed=38400
Active=1
Modem=1
```

Connection via modem to the remote site requires you to add the following string to the device name line in the UniLink.ini file.

,MODEMID064,PLACE:Adelaide,Australia,PHONE_NO:0882608984,PW:password

This file is found in the 'C:\UniLink' folder. There is a character number limit on the PLACE string of 55 and also a limit on the remote PHONE number of 30. The PW string must be an 8 character password string and this must match the Uni-Modem programmed password. (If the Uni-Modem password has not been programmed, this may be omitted). In the comms port 4 specification, the Modem status must also be changed from 0 to 1.

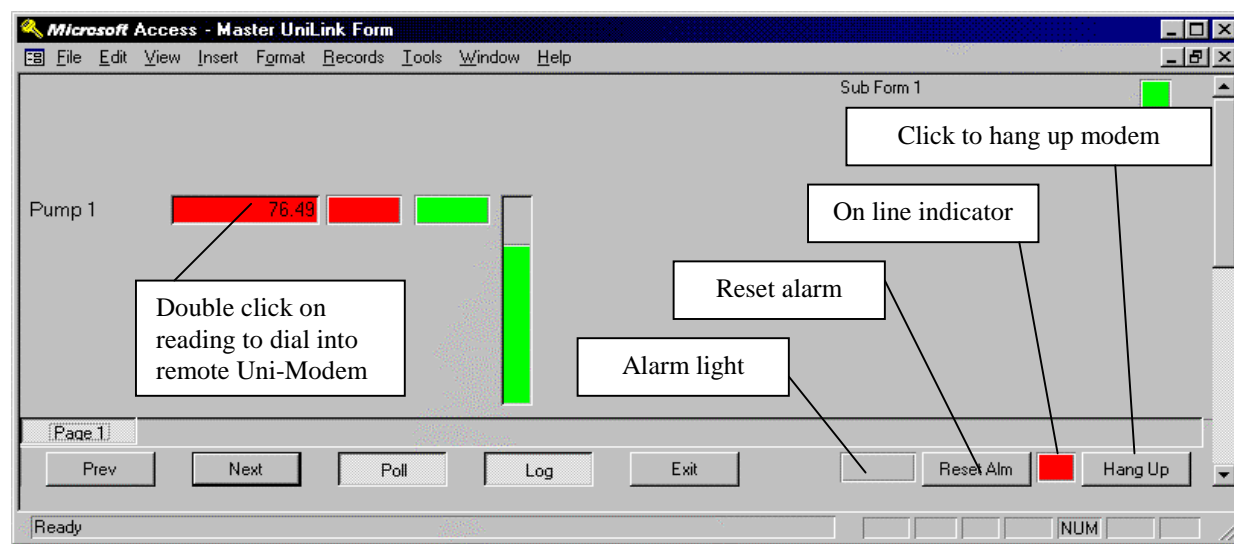
The above procedure must be applied for all devices connected by modem.

Note: You can use Unitools to set up a ring back number in the Uni-Modem. This will initialise the remote Uni-Modem to call the programmed number on an alarm condition.

Modem Connection in Access

If the device installed via the Uni-Link wizard 'Unimeter Device' page was at a remote place, you can connect to the remote device simply by clicking on the device reading in the Access sub form. There is a hidden button on top of the reading that can only be seen in the Access design mode. This hidden button must always be in the foreground to become click sensitive. This button may be modified and shifted if required, however, the best place will be on top of the reading to avoid confusion.

To connect to the remote site in the Access sub form, simply double click on the device reading. The readings of all the devices connected to this Uni-Modem will start to update and be data logged. To disconnect the remote devices, click on the 'Hang Up' button. The Uni-Modem will also be disconnected when Uni-Link stops, when you click the 'Exit' button or choose to close the Access database.



Alarms from Uni-Modem

If the alarm facility of the Uni-Modem is used, a red light with the label 'Alarm' will be displayed on the bottom of the master form whenever the connected Uni-Modem has an active alarm. This light will remain until the Uni-Modem is no longer connected or you choose to acknowledge the alarm by clicking the 'Reset Alarm' button.

APPENDIX 'E'

Unitools Manual

The second Icon created during the installation procedure will invoke the Unitools program. This software has been created to serve as a toolbox for all the Unimeter devices. It enables the user to program, reprogram and adjust settings in the hardware devices. Unitools can be used on both the RS485 and the modem connected devices.

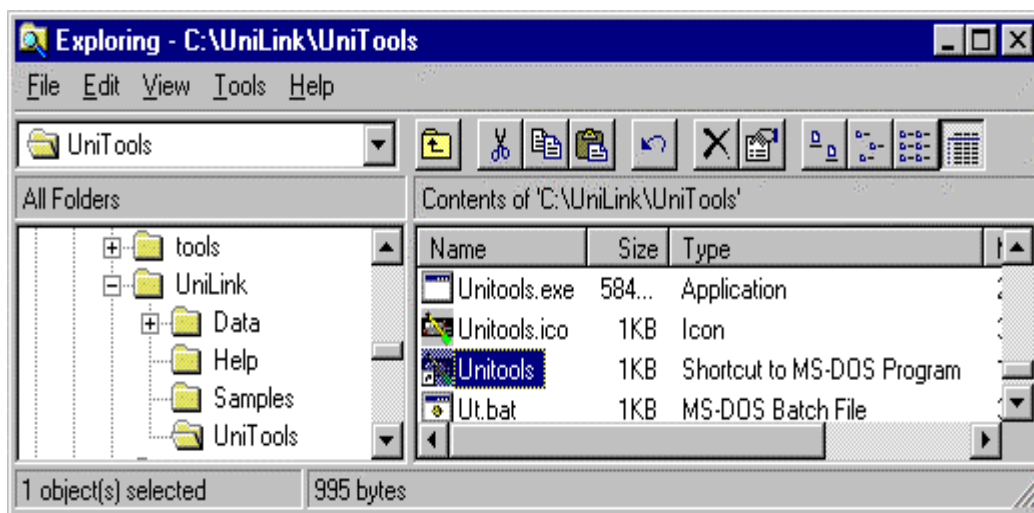
Warning: At present, Unitools is a DOS based program and must not be run at the same time as UniLink. This would result in conflicts on the communications ports.

Unitools is a DOS based program and requires 600Kb of DOS memory to run.

By default, the program expects the AS4000 adaptor to be on COM 2, if you intend to run Unitools on a laptop computer without a COM 2 port, the program will cause the computer to 'hang'.

Configuring Unitools Shortcut for Windows 95.

Using 'Explorer', locate the Unitools shortcut in the 'C:\UniLink\UniTools' folder
Right click on 'Unitools' (Shortcut to MS DOS Program)

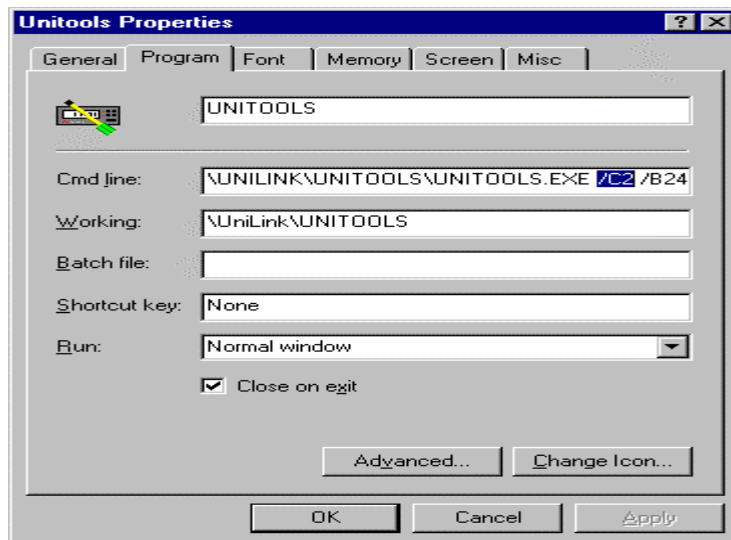


Click on 'Properties'

Select the 'Program' tab

In the command line box, add '/C1' for the COM1 Port, or '/C2' for the COM2 port etc.

If your system is running at a speed other than 2400 baud, also, in the Command line box, add to the end of the line: '/B38400' for 38400 baud or '/B2400' for 2400 baud.



Insufficient memory

If Unitools does not find sufficient memory, there are two options to remedy the problem

1. Use the Shortcut to provide a clean DOS environment.

On the Unitools shortcut, select the 'Program' tab.

Click on 'Advanced'.

Click 'MS-DOS Mode'.

Click 'Specify a new MS-DOS configuration'.

Remove all entries from the 'Config.sys' and the 'Autoexec.bat' boxes.

Type in the Following:

CONFIG.SYS Box:

DOS=HIGH,UMB

Device=C:\WINDOWS\Himem.Sys

AUTOEXEC.BAT Box:

SET winbootdir=C:\WINDOWS

SET TEMP=C:\TEMP

2. Remove unused devices from your 'Config.sys' file. Many of these devices do not need to be in the 'Config.sys' file as Windows 95 arranges it's own drivers.

Copy the 'Config.sys' file as a backup.

Edit the file with notepad.

Typing 'rem' at the start of each unwanted line.

Save the file & exit notepad.

Restart Your PC.

Unitools Features and Options

When Unitools is invoked, it will automatically attempt to communicate with a device connected to the RS495 port with ID = 1. If successful, the value will be automatically displayed in the bottom right hand corner of the monitor.

The captions at the top title bar give the following options:

File
Edit
Tools
Logger
Uni_HF
Setup
Options

File options:

‘Open Annunciator File’ this will open an annunciator file for modification and downloading to the Unimeter. See page 16 of the Unimeter manual for details.

‘Convert Unisoft File to Text’ this will convert a normal Unisoft binary file to a text file format and time stamp the records for programs such as Excel.

Edit options:

None of these options are presently available.

Tools options:

‘Read Unimeter’s Value’ this will display the value of the presently connected Unimeter in a box.

‘Show Unimeter Readings’ this will display the value of the presently connected Unimeter in a box with a label. By connecting numerous devices in succession via the ‘Setup’ option, the user can put many device readings on the computer monitor.

‘Clear Unimeter Readings’ this will erase the displayed readings.

‘Change Unimeter Reading Title’ this will allow the user to change the label of the displayed reading.

‘Linear Values’ click this option and the system will present a table with 100 small windows to enter any number from 4 to 100 linearising values for the Unimeter. The program will adjust and calculate the curve and this can then be down loaded to the Unimeter.

‘Profile Controller Values’ this is similar to the linear values. The Unimeter can except up to 100 setpoints for a PID profile control. See pages 245, 247 and 356 for additional details.

‘Get Unimeter’s Setpoint Values’ click here and the programmed Unimeter setpoints will be displayed.

‘Send Value to Unimeter’ when the Unimeter is in function 171, it can be used to display values sent to it by this option or from other computer programs.

'Program Unimeter Device' this is the main programming facility for the Unimeter. Here the existing functions in the connected Unimeter are displayed for modification and down load to the Unimeter. This information can also be stored in a file on the computer.

'Program Uni-Mux' as for the Unimeter, this option is used for programming the Uni-Mux with all the functions including baudrates and ID numbers, as required.

'Program HF' this feature will facilitate the programming of the Unimeter HF device. The Unimeter HF is a high speed data logger and display, converting 25 000 readings per second.

Logger option:

'Reset Logger' when the Unimeter is fitted with a JIC data logger or the connected device is a Unimeter XQL, this feature can be used to reset the memories of the loggers to zero.

'Unload Logger' this option will unload any Unimeter logger connected and create files to suit programs such as Excel, Lotus 123 or Unisoft.

'Make Default Annunciator File, Edit Annunciator File, Send Annunciator to Unimeter' all these options facilitate the creation and download of annunciator messages. See page 16 of the Unimeter manual.

Uni HF option:

'Unload HF' this feature is used to unload the stored data from the Unimeter HF device.

Setup option:

'Enable Automatic Polling' when selected this will enable the auto poll of the connected device and display the value at the bottom of the monitor.

'Disable Automatic Polling' as per above but disable.

'Comms Port & ID' this option will program the ID, baudrate and sampling rate for the connected device. This must coincide with the settings of the connected device.

'Tets Serial Adaptor' the AS4000 can here be tested to see if connected to the comms port and working.

'Send Time to Unimeter' here, the time clock of the Unimeter can be set or reset.

'Dial a Modem, Answer Incoming Call, Hang Up Modem, Get Version Number, Reset Modem, Set Modem Ring back Number, Set Modem Passeord, Check Modem Password, Enable Alarm Ringbacks, Disable Alarm Ringbacks, Query Modem Alarm and Clear Alarm Acknowledgement' these are all features and option to manage the Uni-Modem.

Options option:

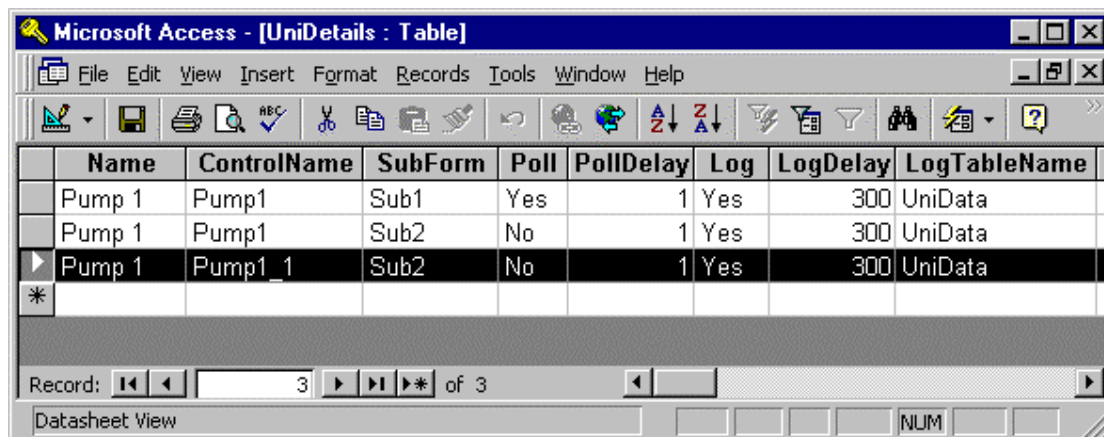
None of these options are presently available.

The user will find a detailed description of all the Unitools functions and features in the Unitools help file and this can be accessed by F1 in the Unitools program.

Appendix 'F'

Deleting a Reading from an MS Access Sub Form

- Using Explorer, copy the database and save the copy.
 - Right Click on the database name – Copy
 - Right Click in a vacant area beside the database name – Paste
- Enter 'form / design' mode
- Click on the Reading to be Deleted
- View it's properties (Click on 'View | Properties' if the properties box is not displayed)
- Click on the 'Other' tab in the Properties box
- Write down the NAME of the control – This is the CONTROL NAME (eg: "Pump1", or "Pump1_1" etc). The additional "_1" or "_2" was automatically added if the Same device was used more than once on the same sub form. The Control Name may have some letters after the name ("Pump1_1_cbtn") depending on exactly where You clicked
 - Delete the Hidden '_cbtn' Button covering the reading (eg "Pump1_cbtn")
 - Delete the reading,
 - Delete its label (if any),
 - Delete the Bargraph (if any) (eg "Pump1_graph") and it's Background box.
 - Delete the Alarm Points (if any) (eg "Pump1_AP1")
- Save the Form and close it.
- Click on 'Tables',
- Open the 'UniDetails' Table
- Locate the reading You deleted by it's 'CONTROL NAME' AND 'SUB FORM' (Note that the same Control Name can exist on different SubForms).
- Highlight the entire Record
- Write down the 'LogTableName' (Usually "UniData").
- Push delete and click 'Yes'
- Close the Table.



	Name	ControlName	SubForm	Poll	PollDelay	Log	LogDelay	LogTableName
	Pump 1	Pump1	Sub1	Yes	1	Yes	300	UniData
	Pump 1	Pump1	Sub2	No	1	Yes	300	UniData
▶	Pump 1	Pump1_1	Sub2	No	1	Yes	300	UniData
*								

Record: 3 of 3

Datasheet View

- Highlight the table that was shown in the 'LogTableName' field.
- Click 'Design'
- Find the Control name field and Highlight it (if it exists)
- Push 'Delete' and Click on 'Yes' if asked for confirmation.
- Save the Table
- Close the Table

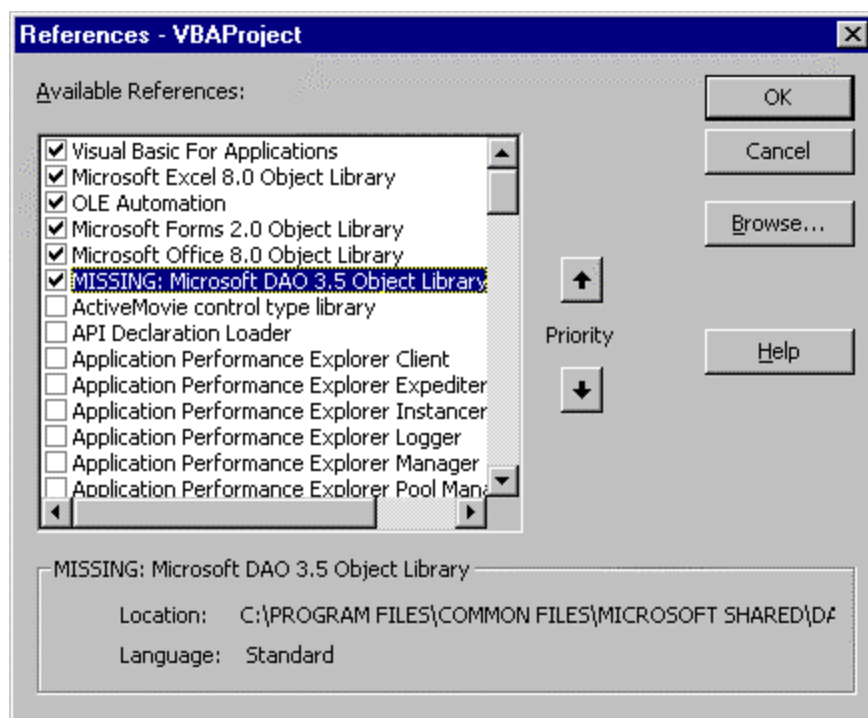
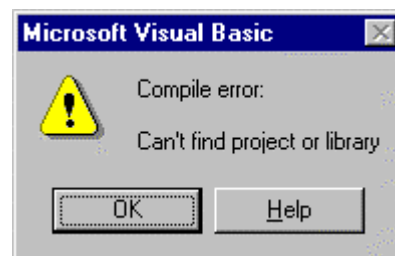
Deleting an MS Access Sub Form

1. Using Explorer, copy the database and save the copy.
 - Right Click on the database name – Copy
 - Right Click in a vacant area beside the database name - Paste
2. Open the Database & Click on the 'Forms' tab
3. Highlight the Sub Form and Note it's name.
4. Press 'Delete' (Click 'Yes' to Confirm).
5. Click on the 'Master' Form
6. Click 'Design'
7. Move down to the 'Form Footer' where the page tabs appear
8. Delete the **most Right hand side** SubForm tab, and re-arrange the names as necessary.
9. If the Sub Form that You Deleted was the First Sub Form:
 - Move up to the white 'Detail' section of the form.
 - Edit the Subform name in the top left hand corner of the white panel, to reflect the new No 1 Sub Form name.
10. Save the Master Form.
11. Close the Master Form.
12. Click on the 'Tables' Tab
13. Open the 'SubForms' Table
14. Highlight the Entire record (row) for the 'SubformName' that You deleted
15. Delete the Row. (Click 'Yes' to confirm).
16. Re-arrange the 'FormOrder' Field so that the numbers are sequential from 1 onwards. (You cannot use the same number more than once in this field, so You may have to Use a higher temporary number range to enable the changes to be made – eg: re-number them all from 101 upwards first, then renumber all records from 1 onwards).
17. Open the 'UniDetails' Table
18. Find EVERY occurrence where the 'SubForm' field has the 'SubFormName':
 - Write down the 'Name'
 - Write down the 'ControlName'
 - Write down if the 'Poll' Field = 'Yes' and the 'PollDelay' time
 - Write down if the 'Log' Field = 'Yes' and if so the 'LogDelay' time
 - Write down the 'LogTableName'
 - Delete the record (Click 'Yes' to confirm).
 - Look for any other Occurrences of the 'Name', make sure the first one has the Poll field set to 'Yes'
 - Look for any other occurrence of the 'ControlName'. If there are, You may wish to transfer the 'Log' table settings to this field. If there are no other occurrences, You will have to remove this name from the 'LogTableName' table (Come back and do this later):
 - Highlight the table that was shown in the 'LogTableName' field.
 - Click 'Design'
 - Find the Control name field and Highlight it (if it exists)
 - Push 'Delete' and Click on 'Yes' if asked for confirmation.
 - Save the Table
 - Close the Table
19. Save the Table
20. Close the table

Appendix 'G'

Installing Microsoft DAO 3.5 Object Library

Do this step if a compile error occurs when you open the Excel UniTrends Template or your UniTrends Workbook.



- Run **Microsoft Office SETUP** From 'My Computer / Control Panel / Add Remove Programs'
 - Select Microsoft Office in the lower Window and click the Add/Remove button
 - **OR** use Explorer to run MS Office 97 **Setup** from your MS Office 97 disks or CD. Setup is on disk 1 or the root directory of the CD.
 - Click on the 'Add/Remove' button
 - Select 'Data Access'.
 - Click 'Change Option'
 - Click 'Select All'
 - Click 'OK'
 - Click on the 'Continue' Button
- Close the Workbook and re-open it.