## CYLON smart energy control

## How to change the UnitronUC32 system Data Storage platform to MSSQL Server



By default Datalog and Alarm data from a UnitronUC32 site is stored in Microsoft Access format. However, it can be desirable to change this to Microsoft SQL server under some circumstances.

This document describes how to decide whether or not to change the platform, and how to carry out the change.

## Choosing a Data Storage platform

There are two main platforms that can be user for Data Storage in the UnitronUC32 system:

- **MS Access Database** this method of storage does not require maintenance of a database server, but only works with relatively small amounts of data. This is the default for newly-installed UnitronUC32 systems.
- **Note**: The Datalog Database Archiving application (DDA) allows you to manage the size of large MSAccess datalog databases by archiving data to a separate MSAccess .mbd, or to CSV files. This can often be enough to overcome the data size restriction.
  - **MSSQL Server Database** very scalable and reliable, and can handle very large amounts of data. However, it is complex to set up and to administer.

In some legacy systems Datalog data may be stored directly in **CSV** (Comma Separated Values text file). This storage platform is simple to use, and can be accessed directly by many 3<sup>rd</sup> party applications. However

- 1. CSV is available for Datalogs only.
- 2. CSV is **not** reliable for large-scale use.
- 3. Triggered Time-Stamped datalogs cannot be accurately represented in the legacy Cylon CSV format. Instead, a regular time interval is assumed and the values supplied are extrapolated to fit into this time interval. This reduces the accuracy of such datalogs.





#### Data Storage Platforms in the UnitronUC32 system



#### How to choose a Data Storage Platform







#### **Database Information Flow**

Database Information Flow in the UnitronUC32 System







## How to Set up SQL Server (Express) in the UnitronUC32 system

In order to use SQL Server as the Data Storage platform for the UnitronUC32 system, you must first install SQL Server Express on your PC as follows:

#### 1. Run SQLEXPR\_ADV.EXE

This file is available on the Unitron Engineering Centre CD, or as a 250 Mb download from the Microsoft website: <a href="http://go.microsoft.com/fwlink/?LinkId=135973">http://go.microsoft.com/fwlink/?LinkId=135973</a>

2. Click run

- 3. Read the terms carefully, then tick the "I accept the licensing terms and conditions" unless you have a specific reason not to proceed with the installation.
- 4. Click Next
- 5. Click Install







6. Click next



7. Click Next

8. The System Configuration Check screen is displayed. View the action list, and correct any faults that are displayed .

Note: An error about IIS may be ignored.

9. Once all critical issues have been resolved, click Next



Filter 💌

Help

Report 🔹

Next >









14. When Database Services, Connectivity Components and Management Studio Express are all selected for install, click Next

15. Select "Mixed Mode" as the Authentication mode .

Enter "cylonctl" as the password.

16. Select security options and click Next

17. Click Next

🗒 Microsoft SQL Server 2005 Setup	X
Feature Selection Select the program features you want installed.	
Click an icon in the following list to change how a featur	e is installed.
Database Services     Outraction Components     Outractive Components     Software Development Kit     Software Development Kit     Software Development Kit	Feature description Installs interactive management tools for running SQL Server, including SQL Server Management Studio Express.
	This feature requires 512 bytes on your hard drive.
⊂ Installation path	Browse Disk Cost
Help < Back	Next > Cancel
🖉 Microsoft SQL Server 2005 Setup	X
Authentication Mode The authentication mode specifies the security use connecting to SQL Server.	ed when
Select the authentication mode to use for this inst	allation.
Windows Authentication Mode	
Mixed Mode (Windows Authentication and SQL	Server Authentication)
Specify the sa logon password below:	
Enter password:	
Confirm password:	
Help < Back	Next R Cancel
Microsoft SQL Server 2005 Setup	
Configuration Options	
Configure user and administrator accounts	
Imable User Instances This option enables users without administrator period	rmissions to run a separate
instance of the SQL Server Express Database Eng	ine.
Add user to the SOL Server Administrator role	
This option adds the user who is running the SQLS	erver Express installation program
to the SQL Server System Administrator role. By d Vista operating system are not members of the SQ	erauit, users on Microsoft Windows L Server System Administrator role.
rteip < Back	Cancel
Microsoft SOL Server 2005 Setun	
Error and Usage Report Settings Help Microsoft improve some of the SQL Server 20 and services	05 components
an of Bot Yildeb	
Automatically send Error reports for SQL Server 20 Constraint Server. Error reports include information 2005 when a morror occurred, your bardware confi may unintentionally include personal information, w	05 to Microsoft or your corporate error regarding the condition of SQL Server guration and other data. Error reports hich will not be used by Microsoft.
Automatically send Feature Usage data for SQL Se includes anonymous information about your hardw software and services.	rver 2005 to Microsoft. Usage data are configuration and how you use our
By installing Microsoft SQL Server 2005, SQL Server a automatically send fatal service error reports to Micros Server. Microsoft uses error reports to improve SQL S information as confidential.	nd its components will be configured to off or a Corporate Error Reporting erver functionality, and treats all
Help < Back	Next > Cancel





18	Click Install	🔊 Microsoft SQL Server 2005 Setup		×
10.	Cher mistan	Ready to Install Setup is ready to begin installation.		
		Setup has enough information to start co change any of your installation settings, (	pying the program files. To proceed, click Inst click Back. To exit setup, click Cancel.	tall. To
		The following components will	be installed:	-
		<ul> <li>SUL Server Database Se (Database Services)</li> </ul>	rvices	
		<ul> <li>Client Components (Connectivity Components, Manar</li> </ul>	aement Studio Express)	
		Help	< Back Instal Cancel	
		Microsoft SQL Server 2005 Setup		X
		Setup Progress		1
		The selected components are being config	ured	1
		Product	Status	
		MSXML6	Setun finished	
		SQL Native Client	Configuring components	
		SQL VSS Writer SQL Server Database Services		
		SOL Server Management Studio Express Workstation Components, Books Onlin		
		Status		
		Help	<< Back Next >> Cancel	1
				_
10	Click Novt	🞑 Microsoft SQL Server 2005 Setup		X
19.	CIICK NEXL	Setup Progress		
		Product MSXML6	Status Setup finished	·
		SOL Setup Support Files	Setup finished	
		Sol VSS Writer	Setup finished	
		SQL Server Database Services SQL Server Management Studio Express	Setup finished Setup finished with a reboot requirement.	
		Workstation Components, Books Onlin	Setup finished	
		1		
		Help	<< Back Next >>> Cancel	
			k	_
~~		🞑 Microsoft SQL Server 2005 Setup		
20.		Completing Microsoft SQL Server 200	5 Setup	9
		Setup has finished configuration of Micros	oft SQL Server 2005	
		Refer to the setup error logs for information setup. Click Finish to exit the installation wize	describing any failure(s) that occurred during ard.	p
		Summary Log		
		To minimize the server surface area of SQL S disabled by default for new installations. To	erver 2005, some features and services are configure the surface area of SQL Server, us	e the
		Surface Area Configuration tool.		
		Configuring and Managing SQL S	Server	^
		For improved manageability and s     Server 2005	ecurity, SQL	=
		Server 2005 provides more control Server surface area on your system	n. To minimize	
		the surface area, the following defa configurations have been applied t	aun 10 your	
		instance of SQL server:	to the second	
		<ul> <li>I Um/IP connections are discussed</li> </ul>	is abled	×



Help

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The SQL Server is now installed on your PC and running.

Next, set up the Cylon table Structure as follows:

21. Start the SQL Server Management Studio Express from the windows Start menu



22. Click on New Query

🇏 Microsoft SQL Server Management Studio Ex	press	
File Edit View Query Tools Window Commu	unity Help	
Si B New Query Fr	cute 🗸 = 17 🕰 🖏 17 🦷 🖻 10 🕅 00 1	19
Object Explorer	PC215.master - SQLQuery1.sql Summary	- ×
PC215 (3QU Server 9.0.3042 - CYLOM(eugene.pe     Databases     Server Objects     Server Objects     Destanting		
a ⊆ Cepredutin ⊕ ⊇ Management		-
		*
	<	>
<	PC215 (9.0 SP2) CYLON\Eugene.Peelo (52) master	00:00:00
Ready	Ln 1 Col 1 Ch 1	INS

23. Paste in the following:

/*=====================================	*
<pre>/ * Copyright(C *</pre>	C), 2002 Cylon Controls, All rights reserved *
FILE :	Datalogs.sql
DESCRIPTION :	This SQL script is to generate a database for datalogs on a MS-SQL Server 2000 and later versions. The script creates the database, all the tables and initialises the version in the configuration table
USE master	
CREATE DATABAS go	3E WN3000SL
USE WN3000SL	
www.cylon.com	Building Management System



CREATE TABLE [Datalog Descriptors] [Datalog ID] int IDENTITY(1,1) PRIMARY KEY CLUSTERED, [Site Name] nvarchar (50) NULL, [UCC4 Name] nvarchar (50) NULL, [UCxx Name] nvarchar (50) NULL, [Datalog Name] nvarchar (50) NULL, [Interval] int NULL, [Units] nvarchar (50) NULL ) qo GRANT ALL ON [Datalog Descriptors] TO PUBLIC go CREATE TABLE [Datalog Values] [Record ID] int IDENTITY(1,1) PRIMARY KEY CLUSTERED, [Datalog ID] int NOT NULL REFERENCES [Datalog Descriptors] ([Datalog ID]) ON DELETE CASCADE, [Time] datetime NOT NULL, [Value] real NOT NULL GRANT ALL ON [Datalog Values] TO PUBLIC CREATE TABLE [Configuration] [Upgrade ID] int IDENTITY(1,1) PRIMARY KEY CLUSTERED, [Upgrade Time] datetime DEFAULT GETDATE(), [High Version] int NULL, [Low Version] int NULL, [Comment] nvarchar (255) NULL qo GRANT ALL ON [Configuration] TO PUBLIC go --Adding initial records: BEGIN TRANSACTION INSERT [Configuration] ([High Version], [Low Version], [Comment]) VALUES('1', '1', 'Initial Version') COMMIT TRANSACTION qo CREATE TABLE [Alarm] AlarmID int IDENTITY(1,1) PRIMARY KEY CLUSTERED, ConnectedAlarmID int NULL, SiteName varchar (50) NULL SiteNumber smallint NULL, UCC4Name varchar (50) NULL, UCC4Number smallint NULL, UC16Name varchar (50) NULL, UC16Number smallint NULL, Priority smallint NULL, StartedAt datetime NULL, EndedAt datetime NULL, AlarmType smallint NULL, TriggerPointName varchar (50) NULL, TriggerPointNumber smallint NULL, TriggerPointType bit NULL, TriggerPointValue real NULL TriggerPointUnit varchar (25) NULL, AlarmNumber smallint NULL, ProgramModuleNumber smallint NULL,

> **UNITRONUL 46.** Building Management System



AlarmMessage varchar (300) NULL, UCC4SysStatus smallint NULL, UC16SysAlarms smallint NULL, Note varchar (2048) NULL, AcknowledgedBy varchar (50) NULL, AcknowledgedAt datetime NULL, Suppressed bit NULL, StringNumber smallint NULL, ExtraBits smallint NULL, ExtraInteger int NULL, ExtraString varchar (50) NULL qo GRANT ALL ON [Alarm] TO PUBLIC qo -- This function allows comparison by time ignoring date -- It returns 1, if the time-paremeter is less than the -- composed time-parameter, or 0 otherwise. CREATE FUNCTION TimeLessThan (@d AS DATETIME, @h AS INT, @m AS INT, @s AS INT) RETURNS BIT BEGIN IF DATEPART(hh, @d) < @h RETURN 1 IF DATEPART(hh, @d) > @h RETURN 0 IF DATEPART(mi, @d) < @m RETURN 1 IF DATEPART(mi, @d) > @m RETURN 0 IF DATEPART(ss, @d) <= @s RETURN 1 RETURN 0 END qo -- This function allows comparison by time ignoring date -- It returns 1, if the time-paremeter is greater than the -- composed time-parameter, or 0 otherwise. CREATE FUNCTION TimeGreaterThan (@d AS DATETIME, @h AS INT, @m AS INT, @s AS INT) RETURNS BIT BEGIN IF DATEPART(hh, @d) > @h RETURN 1 IF DATEPART(hh, @d) < @h RETURN 0 IF DATEPART(mi, @d) > @m RETURN 1 IF DATEPART(mi, @d) < @m RETURN 0 IF DATEPART(ss, @d) >= @s RETURN 1 RETURN 0 END go USE master GO







Alternatively you could save the text above to a text file (with the extension '.sql') then use File > Open in the SQL Server Management Studio Express to load it.

24. Click execute

The database should now be set up.



25. Click on 'databases' in the left-hand pane, and press the [F5] button to refresh it.

The WN3000SL database will then be visible:







## Redirecting UnitronUC32 data to the SQL Server

#### **Redirecting Datalog data**

To direct data from UnitronUC32 datalogs to the SQL Server platform, use the WN3000 Security Log in the Windows Control panel:

26. Double-click on the WN3000 Security Log icon.



- 27. Select Connection Type: Microsoft SQL Server 2000 or later.
- 28. De-select Local Server, and enter the full name of the SQL Server instance including the PC name – e.g. pc165/SQLEXPRESS
- 29. Click OK



**Note**: After changing the datalog Data Storage platform to SQL Server, if problems are detected with the storage you can simply change back to MSAccess using the same WN3000 Security Log.





#### Redirecting Alarm messages to the SQL Server platform

Configure the Alarm Handler to log alarms to SQL Server

30. Go to start>settings>control panel>administrative tools. Double-click to open **Data sources (ODBC)** dialog.

	Documents	💼 Administrative Tools 🔹 🎽 Component Services
	Settings Control Panel	BDE Administrator 📃 Computer Management
<b>B</b>	Search 🔹 🕨 Network and Dial-up Con	nections 🕨 😼 Date/Time 📑 Data Sources (ODBC)
2	Help 🥑 Printers	🖌 📝 Display 😽 Event Viewer 🗏
<u>z</u>	Run 🏼 🛃 Taskbar & Start Menu	🐐 Find Fast 📴 Local Security Policy
2	Log Off administrator	Folder Options 📓 Performance
<b>b</b>	Shut Down	🕢 Fonts 🕨 🎇 Services
	<ul> <li>31. Click the System DSN tab.</li> <li>32. Click on the Alarm DSN name.</li> </ul>	Image: System DSN System DSN File DSN System DATA Sources:         System Data Sources:         Name         Driver         Alarm SQL Server         Alarm Konfiguration         Archive         Microsoft Access Driver (*.mdb)         Archive         SQL Server         SQL Server         SQL Server         SQL Server         SQL Server
	<ol> <li>Click the <b>Remove</b> button to remove this Alarm DSN because it is pointing to Microsoft access and not SQL server.</li> </ol>	Remove S
	34. Click the <b>Add</b> button.	Add
	35. Scroll to the bottom of the list and select SQL server.	Select a driver for which you want to set up a data source.         Name       V         Microsoft FoxPro VFP Driver (*.dbf)       6.         Microsoft DDBC for Oracle       2.         Microsoft Paradox Driver (*.db )       4.         Microsoft Paradox Treiber (*.db )       4.         Microsoft Text Driver (*.tbt ; *.csv)       4.         Microsoft Text Driver (*.tbt ; *.csv)       4.         Microsoft Visual FoxPro Driver       6.         SQL Server       2.
	36. Click Finish.	Finish
	37. Enter Alarm in the Name f	ield. Leave the <b>Description</b> field blank.
W	/hat name do you want to use to refer to the data source	?

Name: Alarm







41. Tick the check box **Change the default database to**. Select from the database list - Alarms.



46. Click OK in the ODBC Data Source Administrator dialog.





#### Configure the Alarm Handler to log alarms in SQL format

- 47. Open the Alarm Handler module in the Unitron Engineering Centre.
- 48. Select **Options** from the **Configuration** menu.

<u>Configuration</u>	
Alarm Configuration Display Configuration Setup Wizard Audio On	1
Print <u>T</u> emplate <u>S</u> ave Template	Ctrl+S
Alarm Pop <u>U</u> p <u>G</u> oto Start\End	Backspace
<u>O</u> ptions	<u></u>

#### The Options dialog will open:

Options	Σ
Archiving Autoarchive after (100-5000) 100 Alarms When autoarchiving, archive 50 % of non-active alarms Archive Directory	Startup options Select default site on startup Reinit alarm strings checking date for next startup Master/Slave options
C:\Program Files\Common Files\SYSTEM\MSMAP         Scanning interval         Scan Interval (1-30)         5         Seconds         Database Scan Interval (5-99)         5         Seconds	Alarm master     Audio for slave alarms     Audio for slave alarms     Database options     Use SQL database (otherwise use MSAccess database
New alarms options Highlight active alarms Set Alarm Pop Up window in front Suppress Dialout Eailed Alarms Sort alarm popup by: Higher Priority  first.	Printer options Alarms per page for buffering: 10 OK Cancel

49. Select the Use SQL database option.

Use SQL database (otherwise use MSAccess database)

50. Then click the **OK** button to confirm the change.



# Querying the SQLServer platform - Cylon Table Structure

The Data Storage Platform contains the following tables:

Datalog Descriptors	Alarm	Configuration
Datalog ID	AlarmID	Upgrade ID
Site Name	ConnectedAlarmID	Upgrade Time
UCC4 Name	SiteName	High Version
UCxx Name	SiteNumber	Comment
Datalog Name	UCC4Name	
Interval	UC16Name	
Units	UC16Number	
	StartedAt	
	EndedAt	
	AlarmType	
Datalog Values	TriggerPointName	
Record ID	TriggerPointNumber	
Datalog ID	TriggerPoint Type	
Time	TriggerPointUnit	
Value	AlarmNumber	
	ProgramModuleNumber	
	AlarmMessage	
	UCC4SysStatus	
	UC16SysAlarms	
	AsknowledgedDv	
	AcknowledgedBy	
	Suppressed	
	StringNumber	
	ExtraBits	
	ExtraInteger	
	ExtraString	



#### **Alarms Structure**

AlarmID	Each alarm that is registered with the UCC software is stored in a row in this table, and is given a unique ID
ConnectedAlarmID	
SiteName SiteNumber UCC4Name UCC4Number UC16Name UC16Number	The address of the alarm is stored in these 6 fields.
StartedAt EndedAt	The start and stop times of the alarm
AlarmType	
TriggerPointName TriggerPointNumber TriggerPointType TriggerPointValue TriggerPointUnit	The point monitored by the Alarm block is described in these 5 fields
AlarmNumber ProgramModuleNumber AlarmMessage UCC4SysStatus UC16SysAlarms Note	
AcknowledgedBy AcknowledgedAt	
Suppressed StringNumber ExtraBits ExtraInteger ExtraString	

The Alarms part of the database consists of a single table.





#### **Datalog Structure**

The datalogs part of the database consists of two tables:

#### • Datalog Descriptors

Every time the software gets a datalog it adds a line to this table (even if it is the same datalog).

The fields are Datalog ID, Site name, UCC4 name (we now call it comms controller name), UCxx Name (we call it field controller name), Datalog name, Interval between samples (ignored) and Units

#### • Datalog Values

This table has a row for every data sample. This consists of a unique ID for the sample (Record ID) pointer to the datalog header (Datalog ID), the timestamp of the data (Time) and the data itself as a Float (value).

Because the reports program collects a snapshot of the datalog and stores it in the database, there will be duplicate data in the database. However there is no requirement to store redundant data when archiving.

## Migrating Data from MSAccess to MSSQL Server

It is not recommended that historical data is moved from the MSAccess platform to the SQL Server platform. Instead, it is recommended that the historical data is kept in MSAccess format as an archive, and future data is stored in SQL Server.

### Datalog Database Archiving application (DDA)

DDA allows users to:

- manage the size of large MSAccess datalog databases by archiving data to a separate MSAccess .mdb, or to CSV files
- export subsets of a collection or set of Datalogs to MSAccess (mdb) or CSV files. For example, if you had a number of different sites, you could export the datalogs from only one site, and send them to someone interested in only that site. (bureau communicating with customer?)
- Archives from SQL, and MDB and CSV to either MDB or user-defined CSV
- Converts Cylon CSV to user-defined CSV

**Note**: for User-Defined CSV formats, 3 templates are shipped as examples with the DDA application, and users can easily create their own.



