Connecting UniOP to SDS

This Technical Note contains all the information required to connect the UniOP panels as devices in a Smart Distributed System (SDS) and to take advantage from the advanced data access options supported by the UniOP SDS communication driver.

***Important**: this Technical Note applies to the SDS communication driver identified by the name 'SDS' and included in the Designer file UPLC112.DLL. This communication driver requires an operator panel of hardware type –0045 equipped with a communication module type TCM03.*

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1. Introduction

The UniOP SDS communication driver lets you add one or more UniOP operator panels as devices in an SDS (Smart Distributed System) network.
UniOP has been equipped with a special object model that lets you take advantage from the advanced user interface features of the UniOP products, while retaining the simple networking concepts supported by the SDS network.
The basic idea is to center the exchange of data between the controller and the device on a Local Database defined in the UniOP device. The controller will access the Local Database by means of two special SDS Attributes. UniOP can access the Database directly.
This Technical Note will describe in detail how to implement this connection.

2. UniOP Interface to the SDS Network

To connect UniOP to the SDS network an Input/Output Object Model has been implemented. Two attributes (one input attribute and one output attribute) have been defined to read and modify data in the UniOP local database. The data from UniOP local database can be displayed in the UniOP screen and modified using the UniOP keyboard.
Both attributes consist of two words (32 bits) as described below:

Attribute 18 – Receive Data

Var Index	Unsigned16, Offset of the data in the local database
Value	Unsigned16, Data to be transferred from the MMI to the controller

Attribute 19 – Send Data

Var Index	Unsigned16, Offset of the data in the local database
Value	Unsigned16, Data to be transferred from the controller to the MMI

The UniOP local database is an array of 2048 individually addressable word variables; variables can be accessed for reading and writing by the controller using the Send Data and Receive Data attributes.

The system architecture is shown in Figure.

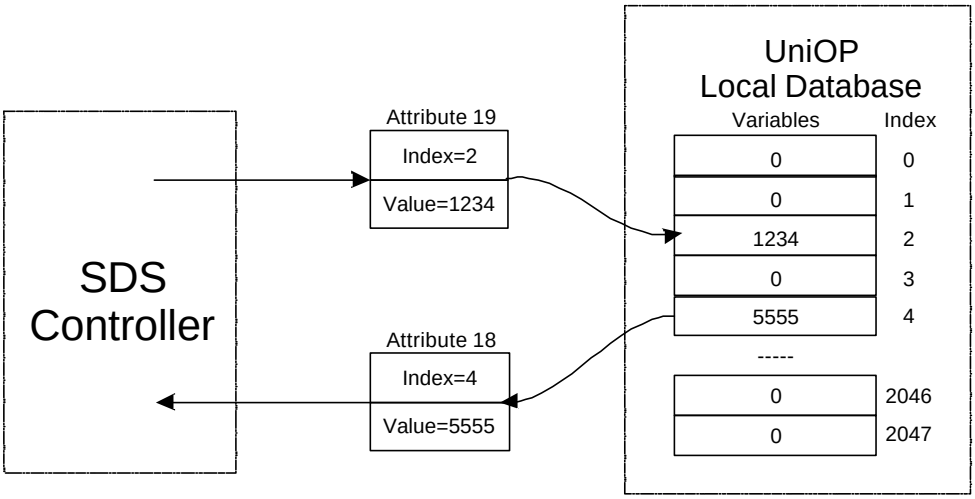

Figure 1 – Communication Model

2.1 The Local Database

The UniOP device contains an internal database composed of an array of 2048 word variables. Each variable in the Local Database can be individually addressed by the UniOP firmware. The UniOP application can reference variables in the Local Database to display them on the screen and/or to change their value with the data entry procedure.
Note also that all of the UniOP functions (Keyboard Macro Editor, alarms, RDA, mailbox, data transfer) will work on the Local Database.

The figure below shows how the address of a variable in the Local Database can be specified in the Designer software.

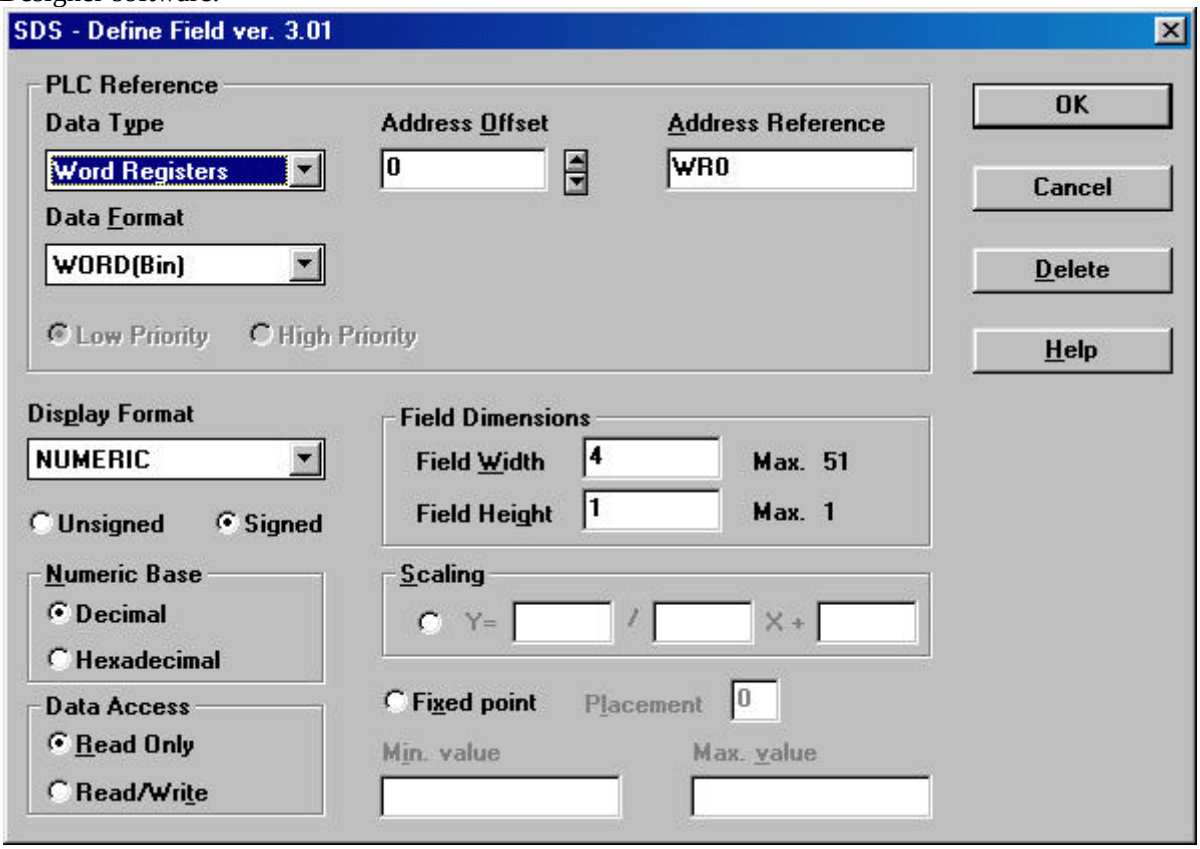

Figure 2 – Entering the address of a Variable

The content of the Local Database is initialized to all zeroes when UniOP starts. It is responsibility of the SDS controller to fill it with all the necessary values.

Whenever UniOP changes the value of a Variable in the Local Database, the SDS controller is notified of the change with a Change of Value Event 6 (unsolicited mode). The data portion of the event will contain the new value of the Receive Data Attribute 18. Attribute 18 contains the index and the current value of the changed variable.

The SDS Controller will send data to the UniOP using the Send Data Attribute 19. The SDS Controller will send an Attribute 19 to modify the content of a variable in the UniOP Local Database. The Attribute 19 contains the index of the variable to be changed and the new value.

3. Configuring UniOP for SDS with Designer

To configure a MMI panel for use with the SDS protocol with the Designer, follow the procedure described in this chapter.

1) Select the option 'Project/Change Communication Driver' and choose 'SDS'

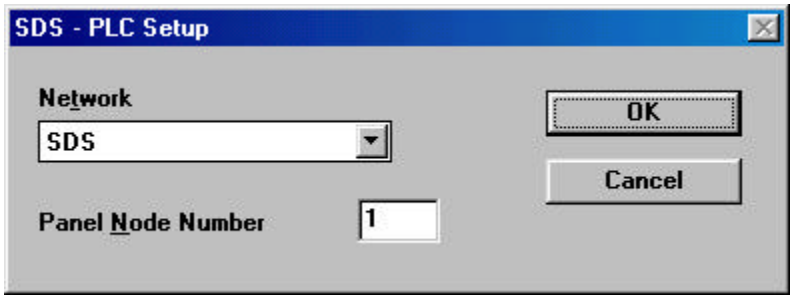

Figure 3 - Controller Setup

2) A UniOP panel in a SDS network is a device that exchanges data with a single controller. Every UniOP in the SDS network must be assigned its own unique Node address. You can do this by entering a number in the 'Panel Node Number' edit box in the Controller Setup dialog box.

3) Automatic recognition of the baud rate is supported. Communication speeds up to 1 Mb are supported. There is no need to enter the network speed in the Designer.

3) The Real Time Clock information in the Reserved Data Area (RDA) is coded in BCD

4) The Current Page and the Page Request registers in the RDA are coded in binary.

Note that you can attach more than one UniOP to a single SDS controller.

4. Connecting UniOP to Honeywell SDS-C1PC-ST and Think&Do

This chapter describes how to connect UniOP as a device on a SDS bus controlled by a Honeywell SDS-C1PC-ST controller board using the Think&Do control package.

Version 4.4 of the Think&Do software running on Windows NT version 4.0 has been used to perform this test.
The example uses only one panel connected to the bus. The I/O View Tool of the Think&Do software is used to configure the panel on the network.

When UniOP is connected to the SDS network, only the Designer project needs to be prepared according to Chapter 3 with a free node number assigned to the panel.

Once the network has been properly installed, the I/O View Tool of the Think&Do software allows to make a scan of the network detecting all the connected devices. From the Configuration menu of the I/O View tool, select “Connect”. The software will start a network scan and it will poll all the available node numbers in the SDS network. It will then create a list of only the live nodes. The result of the scan for a network with only one UniOP panel is shown in Figure 4.

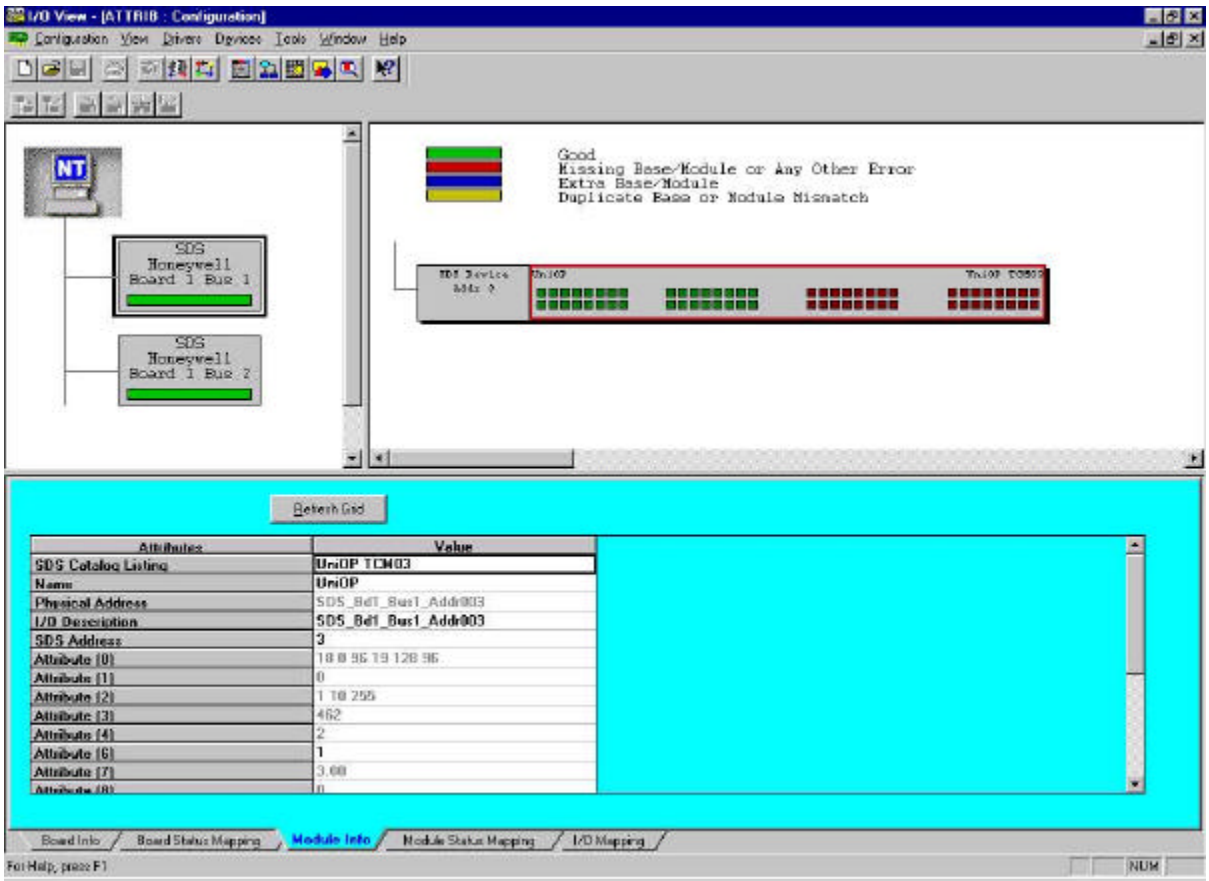

Figure 4 – I/O View Configuration

UniOP is properly recognized by the software and the “Module Info” tab shows all the accessible attributes implemented in the UniOP profile.

In particular, the Attribute 18 and 19 can be used, directly from the “Module Info” window to read and write values from and to UniOP; see Appendix 3 for further details.
Attribute 18 for read operations and Attribute 19 for write operation are directly available as shown in Figure 5.

Attributes	Value
Attribute [6]	1
Attribute [7]	3.00
Attribute [8]	0
Attribute [9]	0
Attribute [11]	1
Attribute [12]	0598
Attribute [13]	UniOP TCM03
Attribute [14]	Exor R&D
Attribute [15]	UniOP
Attribute [18]	0 0 0 0
Attribute [19]	0 0 0 0
Attribute [56]	Man Machine Interface (MMI)

Figure 5 – Attributes 18 and 19

Appendix 1 - Communication Error Codes

Current communication status is displayed in the System Menu of the UniOP.
The error status is described by a message and a numeric error code. The number shows the code of the current communication error and, if the communication is correct, the code of the last error encountered. When the error code 0 is shown, it means there have been no communication errors since this system start-up.

Code	Description	Notes
0	No error	There are no communication errors and there have been no errors since start-up.
04	Not acknowledged	The controller did not acknowledge the Event message
05	Timeout	UniOP is not being polled by the controller
06	No network supply	Failure in the network power supply (24 V)
07	General communication error	Frame length error

Table 1 – Communication Error Codes

Appendix 2 - Technical Data and Connection Information

The main technical information on the UniOP SDS interface using TCM03 is shown in the table below:

Baudrate	125 Kb, 250 Kb, 500 Kb and 1 Mb
Slave address	Software configurable
Optical insulation	Yes
Communication port	9 pin female sub-D type
SDS Partner ID	462

The Aux Port is used for the SDS communication. When the TCM03 communication module is plugged, the Aux Port becomes an SDS interface.

Use cable drawing CA165 as a reference for connecting of the UniOP panel to the SDS network.

***Note**: The current implementation does not support the run-time change of the network address.*

Software Requirements and Compatibility

This version of SDS communication driver is contained in the Designer DLL file UPLC112.DLL. The initial release level is 3.01 for the communication driver and 5.01 for the DLL (both version numbers are displayed in the Change Controller Driver dialog box of the Designer software).
A communication module of type TCM03 is required. The UniOP panel must have hardware type – 0045 and firmware version number 4.10 or higher to support the TCM03 modules.

Appendix 3 - The Object Model

UniOP has been modelled as an Input/Output Object Model.
The Input Attribute 18 is used for publishing data to the network; the Output attribute 19 is used for receiving data from the network. Both attributes consist of two words each (32 bit input and 32 bit output) containing application specific data.
The implementation of the Input Data is using the Change of Value feature, which is represented via the Un/Solicited Mode Attribute 6 and the Change of Value Event 6. The Cyclical Timer feature (Cyclical Timer Attribute 10 and End of Timer Event 6) has not been used in this application.
All other attributes in the lower attribute area are according the SDS Common Structure and Behavior. In addition the Object Tag Name Attribute 56, which contains another identification string has been included.

Att	Desc	Type	Size	Length	Min	Max	RdWrt	PWrd	PrimTag
0	Network Data Descriptor	0	1	32	0		R	N	0x003F
1	Baud Rate	0	1	1	0	4	R	N	0x0020
2	Object Type	0	1	8	0		R	N	0x0027
3	SDS Partner ID	0	2	1	0	65535	R	N	0x0040
4	Logical Address List	0	1	32	0	125	R	N	0x003F
6	Un/Solicited Mode	1	0	1	0	1	RW	N	0x8100
7	Software Version	7	0	12	0		R	N	0x070B
8	Diagnostic Error Counter	0	1	1	0	255	R	N	0x0020
9	Diagnostic Error Register	0	1	4	0		RW	N	0x8023
11	SDS Serial Number	0	3	1	0	4294967295	R	Y	0x0060
12	Date Code	7	0	4	0		R	Y	0x0703
13	Catalog Listing	7	0	32	0		R	Y	0x071F
14	SDS Partner Name	7	0	32	0		R	Y	0x071F
15	Component Tag Name	7	0	32	0		RW	N	0x871F
18	Receive Data	0	2	2	0		R	N	0x0041
19	Send Data	0	2	2	0		RW	N	0x8041
56	Object Tag Name	7	0	32	0		RW	N	0x871F

Table 2 - Attributes of SDS UniOP

Acti	Name	Prm	Name	Description	Requ	RW	Type	Size	Length	Min	Max
0	No Operation	0	None	No Parameter	Yes	W					
1	Change Address	1	Address	Request	Yes	W	0	1	1	0	125
1	Change Address	2	Device ID	Request	No	W	0	1	1	0	31
1	Change Address	3	Partner ID	Request	No	W	0	2	1	0	65535
1	Change Address	4	Serial Number	Request	No	W	0	3	1	0	4294967295
2	Self Test	0	None	No Parameter	Yes	W					
6	Clear Errors	0	None	No Parameter	Yes	W					
8	Enroll Logical	0	None	No Parameter	Yes	W					
8	Enroll Logical	1	Partner ID	Response	Yes	R	0	2	1	0	65535
8	Enroll Logical	2	Serial Number	Response	Yes	R	0	3	1	0	0
53	Read Primitive	1	Attribute ID	Request	Yes	W	0	1	1	0	255
53	Read Primitive	1	Attribute ID	Response	Yes	R	0	1	1	0	255
53	Read Primitive	2	Primitive Tag	Response	Yes	R	0	2	1	0	4294967295
57	Password	1	Password	Request	Yes	W	0	2	1	0	65535

Table 3 - Actions of SDS UniOP

Event	Description	Param	Parameter Name	type	size	length
0	Diagnostic Event counter	1	Counter Value	0	1	1
6	Change of Value	1	Attribute ID	0	1	0
6	Change of Value	2	Data	0	2	2

Table 4 - Events of SDS UniOP