EXOR

Tech-note

Connecting UniOP to Unidrive SP with Modbus CMP Protocol

This Technical Note contains the information needed to connect UniOP to CT Unidrive SP drives using the Modbus CMP communication protocol. CMP is an extension to Modbus developed by Control Techniques for their Unidrive SP drives.
The CT Modbus CMP communication driver is delivered with the Designer file D32uplc211.dll.

Contents

www.exor-rd.com

1 Introduction

The Modbus CMP communication protocol is known also as "Modbus over CTNet"

CMP stands for **C**TNet **M**essage **P**rotocol; it is a messaging system designed to implement distributed control applications. The protocol permits exchange of parameters between Control Techniques drives and HMI devices, SCADA systems or other computer applications.

CMP is normally encapsulated in an existing network protocol. CMP has been successfully encapsulated also into the Modbus serial network. The UniOP communication protocol support implements the Modbus encapsulation of CMP.

Unidrive SP drives support the CTNet network using optional communication units called "SM Applications" modules.

To create a Designer project for Modbus CMP communication to the CT Unidrive SP inverters, select the driver "CT Unidrive CMP" from the list of drivers in the Configure Controller… dialog box.

1.1 Concept of operation

The network topology supported by the UniOP communication protocol is shown in Figure 1.
The HMI panel will communicate with a network of drives addressed using their Modbus node number.
Each drive can host up to three SM application boards; they may be used for CTNet communication.
The addressing model is based on a three level space; from the UniOP point of view each drive is identified with a unique ID composed of a maximum of three numbers; the ID can be calculated looking to the network topology.
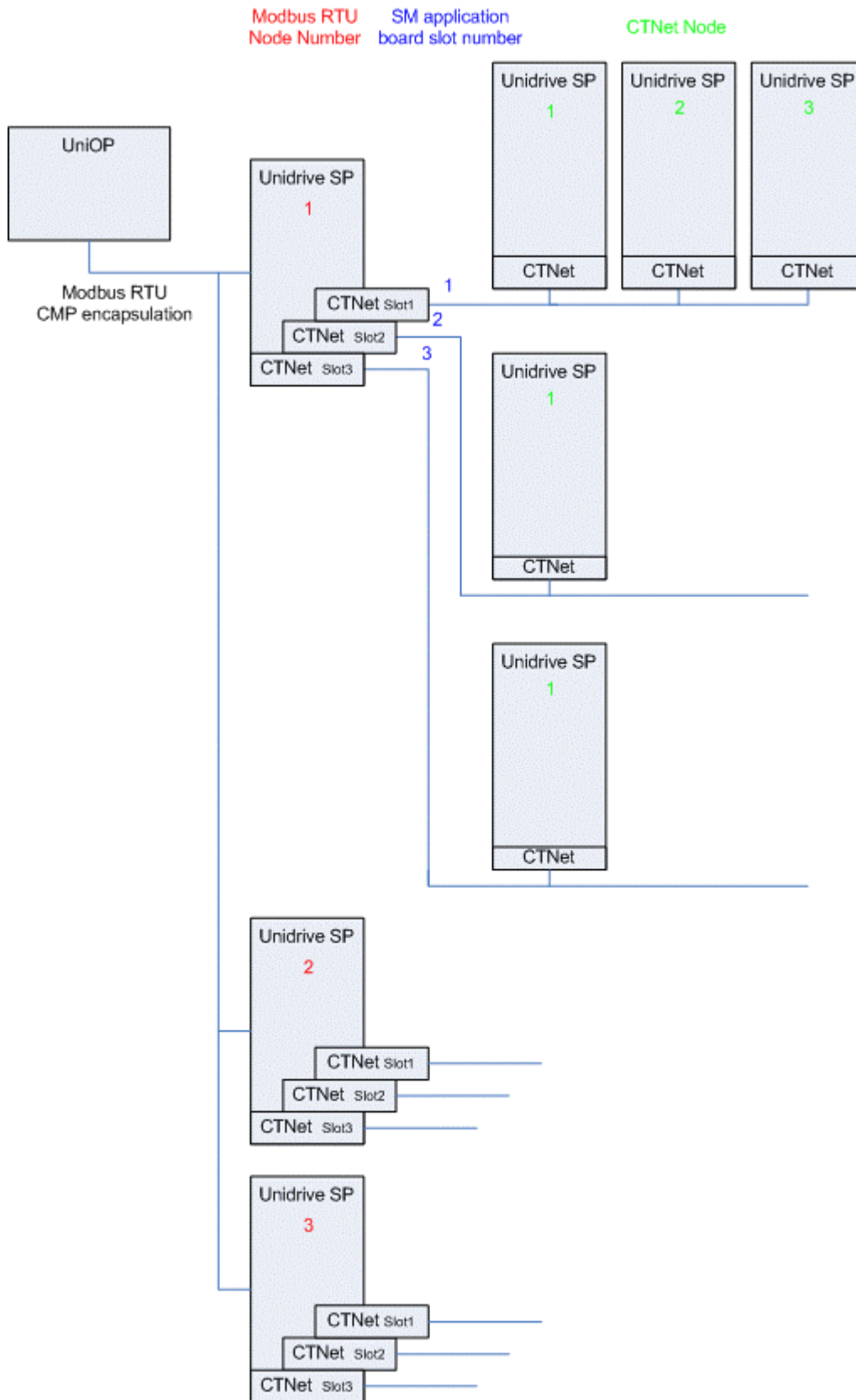
Figure 1

2 Configuring the drives

5

The Unidrive SP devices needs to be configured to enable Modbus communication through their built-in serial port.
The built-in serial port can be configured using the CTSoft Configuration Software or the integrated keypad.
Serial port settings are in Menu 0 (Basic Setup).
"Serial mode" must be set to "RTU".
"Baud rate" and "Serial address" must match those configured in the Controller Setup of the Designer project.

3   Configuration with Designer

The UniOP project file must be properly configured for communication with the CT Unidrive CMP communication protocol.

3.1   Controller Setup

Figure 2 shows the Designer Controller Setup dialog box for the CT Modbus CMP driver.
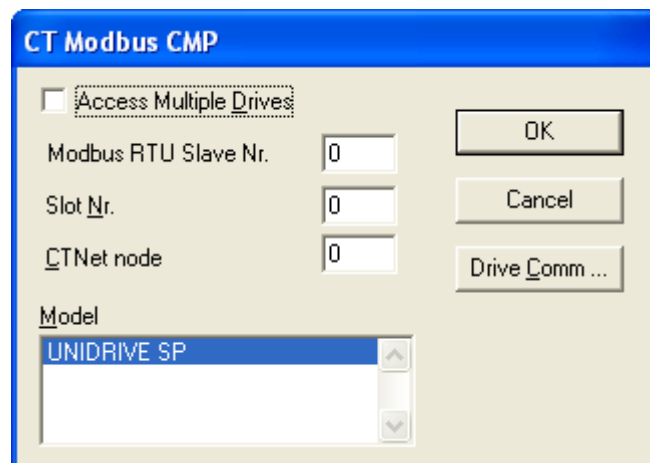

Figure 2

The protocol implementation supports the connection of multiple drives to one operator panel, as shown in Figure 1. To set-up multiple connections, check the "Access Multiple Drives" checkbox in the Controller Setup dialog box, see Figure 3.

3.2   Addressing the Drives

The HMI will address the drives in different ways, depending on their position in the network.

In case the drive to be addressed is connected to the Modbus network and is the master of a CTNet network, it is sufficient to specify its Modbus address (in red in Figure 1). In this case an ID made of only one number is sufficient to properly identify it.

In case the drive is a CTNet slave, it will require an address depending on its logical position in the network. The 3-digit identifier is composed of the following elements:
- the first number is the Modbus Node ID of the drive master of the CTNet network
- the second number is the slot where the SM application card is plugged-in
- the third number is the CTNet node number of the drive.

When the drive master of the CTNet network has only one SM application unit, the slot information specified into the Designer project is not relevant. In fact, the communication protocol supports an automatic recognition of the slot number; this makes possible to move the SM application board to another slot, maintaining the same configuration at Designer project level.
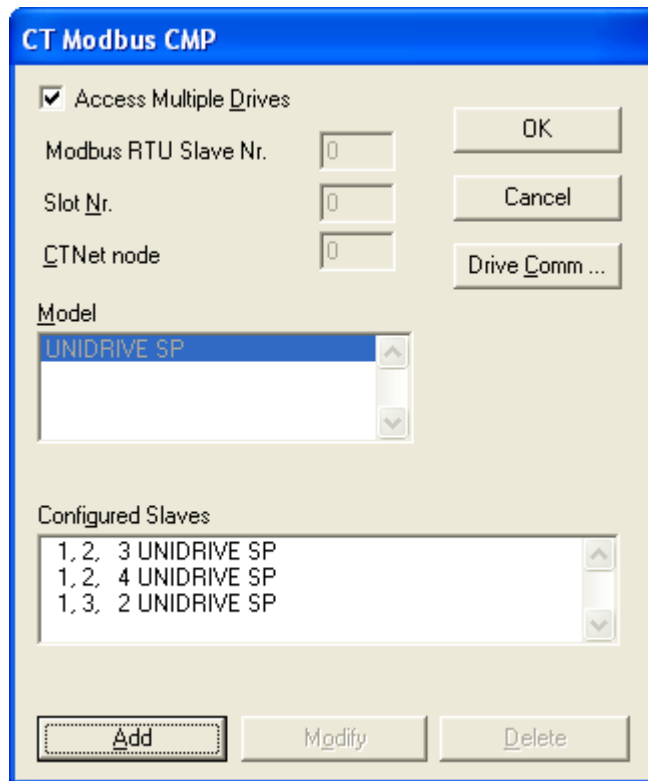
Figure 3

3.3 RDA Setup

The Reserved Data Area (RDA) is supported only with 32bit registers. The registers located at MENU20.21 can be used for this purpose.
The Real Time Clock information in the RDA is coded in binary and is arranged as shown in Table 1 for the 32 bits registers.

	Byte 3	Byte 2	Byte 1	Byte 0
MENU20.21	Day	Month	Reserved	Day of the week
MENU20.22	Minute	Second	Year	Hour

Table 1. RTC information in the RDA

The page number displayed and the page number requested in the RDA are coded in binary.

For the parts of the RDA organized in bits (Keyboard Status, LED Control, Alarms, UniOP Status Word and PLC Command Word), the first bit in the RDA corresponds to the first bit in the PLC (i.e. the lsb bit in the register). For example, if the Keyboard Status area is positioned at address MENU20.21, then the key F1 will be mapped to bit 0, the key F8 will be mapped to bit 7 and so on as shown in Table 2 below.

MENU	31							23	16	15						7						0
20.21	F32						F25	F24				F17	F16				F9	F8				F1

Table 2. RDA bit information

3.4 Alarms

The Alarms can be configured using the 32bit registers memory.

4 Mailbox

Mailbox is supported in 32bit doubleword memory.
The starting address for Mailbox must be specified using word data format.

	Word 1	Word 0
MENU20.21	Command/Response Word	Status Word
MENU20.22	Parameter 1	Parameter 0

Table 3

Appendix A. Communication Error Codes

Current communication status is displayed on the system page of the UniOP. Beside the string, describing current state of the communication (OFF, ON, ERR), there is an additional error code representing the last (which may be not the current one) error encountered. The codes are:

Code	Description	Notes
00	No error	There are no communication errors and there have been no errors since start-up.
04	checksum response error	
05	Time-out (receiving)	The panel has not received a response from the PLC within the timeout interval
06	Response error (buffer overrun)	
07	General error (internal software error)	Internal protocol error, please contact the technical support
10	NAK from PLC	The request sent to the plc was not valid and the plc responded with a NAK
11	Communication error - wrong baud rate, parity, stop bits	The communication parameters set into the project are different from the communication parameters of the plc
12	Invalid response frame or invalid object in response frame	The controller returned the "status error" to inform that a wrong command has been used in the panel request