

Contrex Serial Device Driver Help

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Table of Contents

Table of Contents	2
Contrex Serial Device Driver Help	3
Overview	3
Device Setup	4
Modem Setup	5
Data Types Description	6
Address Descriptions	7
Error Descriptions	9
Address Validation	9
Missing address.....	9
Device address '<address>' contains a syntax error.....	9
Address '<address>' is out of range for the specified device or register.....	9
Device address '<address>' is not supported by model '<model name>'.....	10
Data Type '<type>' is not valid for device address '<address>'.....	10
Device address '<address>' is Read Only.....	10
Serial Communications	10
COMn does not exist.....	10
Error opening COMn.....	11
COMn is in use by another application.....	11
Unable to set comm parameters on COMn.....	11
Communications error on '<channel name>' [<error mask>].....	11
Device Status Messages	11
Device '<device name>' is not responding.....	12
Device Specific Messages	12
Unable to write to '<address>' on device '<device name>.' Contrex Serial Error (<error code>) <error description>.....	12
Deactivating Tag '<address>' on device '<device name>.' Contrex Serial Error (<error code>) <error description>.....	12
Index	13

Contrex Serial Device Driver Help

Help version 1.013

CONTENTS

[Overview](#)

What is the Contrex Serial Driver?

[Device Setup](#)

How do I configure a device for use with this driver?

[Data Types Description](#)

What data types does this driver support?

[Address Descriptions](#)

How do I address a data location on a Contrex Serial device?

[Error Descriptions](#)

What error messages does the Contrex Serial driver produce?

Overview

The Contrex Serial Driver provides an easy and reliable way to connect Contrex Serial devices to OPC Client applications, including HMI, SCADA, Historian, MES, ERP and countless custom applications. It is intended for use with Contrex CX-1000 devices.

Device Setup

Supported Devices

Contrex CX-1000 Motion Controller

Communication Protocol

CX-Series Serial Communications Binary Data-Link Protocol.

Supported Communication Parameters

Baud Rate: 300, 600, 1200, 2400, 9600,* or 19200

Parity: None

Data Bits: 8

Stop Bits: 1

*This is the default setting.

Note: Not all devices support the listed configurations.

Ethernet Encapsulation

This driver supports Ethernet Encapsulation, which allows the driver to communicate with serial devices attached to an Ethernet network using a terminal server. It may be invoked through the COM ID dialog in Channel Properties.

Device IDs

Valid Device IDs range from 0 to 99.

Note: Device ID 0 is used to identify broadcast messages. A device topic can be configured within the server that uses a Device ID of station 0. All tags and data associated with this broadcast topic will be treated as Write Only. By defining a broadcast topic in the OPC Server project, users will be able to issue CX-1000 commands to multiple controllers simultaneously.

CRC Enabled

When CRC is enabled, the Contrex Serial driver will append a 16-bit CRC value at the end of each data transmission. The driver will also calculate and compare the 16-bit CRC value received from the controller for any errors. Users should determine if CRC is enabled on the controller and then set this parameter accordingly.

Precision

This parameter is used to specify the default precision to use when writing Float data to the device. For example, when writing 50.02 from the client, the Float value received by the server could be 50.019999. The driver needs to know the precision that should be used for this value. Solutions are as follows:

- Users could append a bit number to the address that represents the precision. A bit number of 3 would send the previous example as 50.019 with a precision of 3.
- Users could set a master precision value between 0 and 9 through the Device Properties. This would force the precision on all Float writes to be the value of the master precision. Setting this to 3 would not require users to append a bit number (as was done in the first solution).

Note: The master precision cannot be overridden by appending a bit number to any address. For more information, refer to [Address Descriptions](#).

Cable Connections

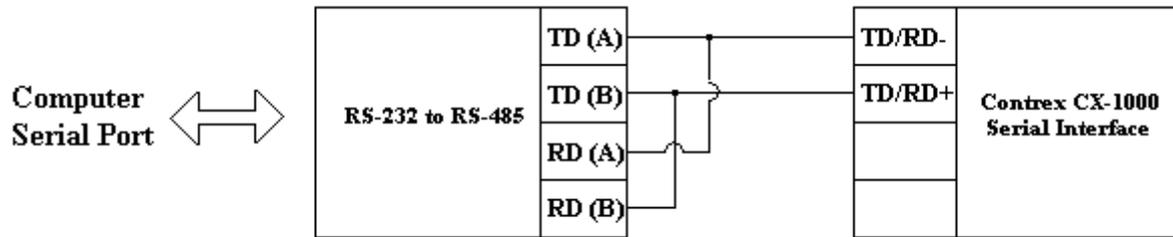
A high quality manufactured RS232/485 converter is recommended when communicating with the Contrex CX-1000. This converter will automatically handle the operation of the 485 line drivers.

Flow Control

When using an RS232/RS485 converter, the type of flow control that is required will depend on the needs of the converter. Some converters do not require any flow control whereas others require RTS flow. Consult the converter's documentation in order to determine its flow requirements.

Cable Diagram

The following diagram illustrates an RS-232 to RS-485 cable diagram using this converter.



Modem Setup

This driver supports modem functionality. For more information, please refer to the topic "Modem Support" in the OPC Server Help documentation.

Data Types Description

Data Type	Description
Boolean	Single bit
DWord	Unsigned 32 bit value bit 0 is the low bit bit 31 is the high bit
Long	Signed 32 bit value bit 0 is the low bit bit 30 is the high bit bit 31 is the sign bit
Float	32 bit Floating point value. The driver interprets two consecutive registers as a Floating point value by making the second register the high word and the first register the low word.
String	Null terminated character array

Address Descriptions

The Contrex Serial protocol supports the following addresses. The default data types for dynamically defined tags are shown in **bold**.

Memory	Syntax	Data Type	Access*
Monitor Parameters	MP01.bb-MP99.bb** MPxx.00-MPxx.31	Boolean, Long , DWord, Float Boolean	Read Only
Control Parameters	CP101.bb-CP999.bb** CPxx.00-CPxx.31	Boolean, Long , DWord, Float*** Boolean	Read/Write
Custom Engineering Units	EU	String	Read/Write
Control Commands	CL.<command mnemonic>(*2)	Boolean	Write Only
Constant Data Table	CT001.<element>- CT999.<element>(*1)	Long, Float String(*1)	Read Only

*For more information, refer to [Broadcast Messages](#).

**On DWord or Long types, an optional .bb (dot bit) can be appended to the address in order to reference a bit in a particular value. The valid ranges for the optional bit is 0-31. Float types do not support bit operations (except in the special cases of CPxxx.xx and CTxxx.<element>). Boolean types require a bit number.

***A Float address with an appended bit (0-9 allowed) will represent the Floating precision on any writes to the device. For more information on floating point precision, refer to [Device Setup](#).

(*1) For more information, refer to [Valid Constant Data Table Elements](#).

(*2) For more information, refer to the table on valid Command Mnemonics below. A 1 should be written to the address when executing these commands.

Mnemonic	Description
FS	F-Stop
RS	R-Stop
HS	H-Stop
RUN	Run
JF	Jog Forward
JR	Jog Reverse
JS	Jog Stop
RI	Reset Integral
PF	Preset Feedback Position
PL	Preset Lead Position
RPE	Reset Position Error
PFL	Preset Feedback & Lead Position
PFLR	Preset Feedback & Lead Position & Reset Position Error
NSR	Negate Scaled Reference
BR	Bypass Ramp
SR	Stop Ramp
OL	Open Loop
SI	Stop Integral

Valid Constant Data Table Elements

Element	Description	Required Data Type
PT	Parameter Title	String
MIN	Minimum Value	Float
MAX	Maximum Value	Float
DEF	Default Value	Float
FL	Field Length	Long

Broadcast Messages

When a topic is defined for Device ID 0, the CX-1000 driver allows users to send data and command parameters to all CX-1000 controllers on the network simultaneously. When using a broadcast topic, all memory types that normally supported Read/Write operation become Write Only. If intending to write a value of 100 to CP101 on every controller simultaneously, users can define a device topic as Device ID 0. The value of CP101 will not be able to be read back using the broadcast topic.

Examples

1. To send the Jog Forward command to the controller, use the syntax: CL.JF and write a 1 to the address.
2. To monitor the alarm conditions for the STD Alarms (MP54), reference the data as Boolean data. For more information, refer to the CX-1000 documentation.

MP54.0-Max FB Alarm
MP54.1-Max ACC/DEC
MP54.2-No Resp Time
MP54.3-Max F12 Pos
MP54.4-Lo Pwr Alm
MP54.5-Max FI1Hz
MP54.6-Max FI2 Hz
MP54.7-At Max CO_Sig

3. To view the constant data table element Minimum Value for CP250, use the syntax CT250.MIN.

Note: The actual number of addresses for each type depends on the Contrex Serial device in use. For address ranges, refer to the specific device's documentation.

Error Descriptions

The following error/warning messages may be generated. Click on the link for a description of the message.

Address Validation

[Missing address](#)

[Device address '<address>' contains a syntax error](#)

[Address '<address>' is out of range for the specified device or register](#)

[Device address '<address>' is not supported by model '<model name>'](#)

[Data Type '<type>' is not valid for device address '<address>'](#)

[Device address '<address>' is Read Only](#)

Serial Communications

[COMn does not exist](#)

[Error opening COMn](#)

[COMn is in use by another application](#)

[Unable to set comm parameters on COMn](#)

[Communications error on '<channel name>' \[<error mask>\]](#)

Device Status Messages

[Device '<device name>' is not responding](#)

Device Specific Messages

[Unable to write to '<address>' on device '<device name>'](#)

[Deactivating Tag '<address>' on device '<device name>'. Contrex Serial Error \(<error code>\)
<error description>](#)

Address Validation

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[Data Type '<type>' is not valid for device address '<address>'](#)

[Device address '<address>' is Read Only](#)

Missing address

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically has no length.

Solution:

Re-enter the address in the client application.

Device address '<address>' contains a syntax error

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically contains one or more invalid characters.

Solution:

Re-enter the address in the client application.

Address '<address>' is out of range for the specified device or register

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically references a location that is beyond the range of supported locations for the device.

Solution:

Verify that the address is correct; if it is not, re-enter it in the client application.

Device address '<address>' is not supported by model '<model name>'

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically references a location that is valid for the communications protocol but not supported by the target device.

Solution:

Verify that the address is correct; if it is not, re-enter it in the client application. Also verify that the selected model name for the device is correct.

Data Type '<type>' is not valid for device address '<address>'

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically has been assigned an invalid data type.

Solution:

Modify the requested data type in the client application.

Device address '<address>' is Read Only

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically has a requested access mode that is not compatible with what the device supports for that address.

Solution:

Change the access mode in the client application.

Serial Communications

The following error/warning messages may be generated. Click on the link for a description of the message.

Serial Communications

[COMn does not exist](#)

[Error opening COMn](#)

[COMn is in use by another application](#)

[Unable to set comm parameters on COMn](#)

[Communications error on '<channel name>' \[<error mask>\]](#)

COMn does not exist

Error Type:

Fatal

Possible Cause:

The specified COM port is not present on the target computer.

Solution:

Verify that the proper COM port has been selected.

Error opening COMn

Error Type:

Fatal

Possible Cause:

The specified COM port could not be opened due to an internal hardware or software problem on the target computer.

Solution:

Verify that the COM port is functional and may be accessed by other Windows applications.

COMn is in use by another application

Error Type:

Fatal

Possible Cause:

The serial port assigned to a device is being used by another application.

Solution:

1. Verify that the correct port has been assigned to the channel.
2. Verify that only one copy of the current project is running.

Unable to set comm parameters on COMn

Error Type:

Fatal

Possible Cause:

The serial parameters for the specified COM port are not valid.

Solution:

Verify the serial parameters and make any necessary changes.

Communications error on '<channel name>' [<error mask>]

Error Type:

Serious

Error Mask Definitions:

B= Hardware break detected.

F= Framing error.

E= I/O error.

O= Character buffer overrun.

R= RX buffer overrun.

P= Received byte parity error.

T= TX buffer full.

Possible Cause:

1. The serial connection between the device and the Host PC is bad.
2. The communications parameters for the serial connection are incorrect.

Solution:

1. Verify the cabling between the PC and the device.
2. Verify that the specified communications parameters match those of the device.

Device Status Messages

The following error/warning messages may be generated. Click on the link for a description of the message.

Device Status Messages

[Device '<device name>' is not responding](#)

Device '<device name>' is not responding

Error Type:

Serious

Possible Cause:

1. The serial connection between the device and the Host PC is broken.
2. The communications parameters for the serial connection are incorrect.
3. The named device may have been assigned an incorrect Network ID.
4. The response from the device took longer to receive than the amount of time specified in the "Request Timeout" device setting.

Solution:

1. Verify the cabling between the PC and the device.
2. Verify that the specified communications parameters match those of the device.
3. Verify that the Network ID given to the named device matches that of the actual device.
4. Increase the Request Timeout setting so that the entire response can be handled.

Device Specific Messages

The following error/warning messages may be generated. Click on the link for a description of the message.

Device Specific Messages

[Unable to write to '<address>' on device '<device name>'](#)
[Deactivating Tag '<address>' on device '<device name>.' Contrex Serial Error \(<error code>\)](#)
[<error description>](#)

Unable to write to '<address>' on device '<device name>.' Contrex Serial Error (<error code>) <error description>

Error Type:

Serious

Possible Cause:

1. The serial connection between the device and the Host PC is broken.
2. The communications parameters for the serial connection are incorrect.
3. The named device may have been assigned an incorrect Network ID.
4. The address that is being written to is invalid or the data is out of range.

Solution:

1. Verify the cabling between the PC and the device.
2. Verify that the specified communications parameters match those of the device.
3. Verify that the Network ID given to the named device matches that of the actual device.
4. Verify that the address is valid in the controller.
5. Refer to the Contrex Serial Error description in order to determine the cause of the error. For example, with the error "Out of Range," users should check to see if the data sent to the device is between the allowable minimum and maximum limits.

Deactivating Tag '<address>' on device '<device name>.' Contrex Serial Error (<error code>) <error description>

Error Type:

Serious

Possible Cause:

An attempt has been made to reference a nonexistent location in the specified device. The driver will deactivate the tag.

Solution:

1. Verify the tags assigned to addresses in the specified range on the device. Eliminate those that reference invalid locations.
2. Refer to the Contrex Serial Error description in order to determine the cause of the error.

Index

A

Address '<address>' is out of range for the specified device or register.....	9
Address Descriptions.....	7
Address Validation.....	9

B

Boolean.....	6
--------------	---

C

Communications error on '<channel name>' [<error mask>].....	11
COMn does not exist.....	10
COMn is in use by another application.....	11
CRC.....	4

D

Data Type '<type>' is not valid for device address '<address>'.....	10
Data Types Description.....	6
Deactivating Tag '<address>' on device '<device name>.' Contrex Serial Error (<error code>) <error description>.....	12
Device '<device name>' is not responding.....	12
Device address '<address>' contains a syntax error.....	9
Device address '<address>' is not supported by model '<model name>'.....	10
Device address '<address>' is read only.....	10
Device ID.....	4
Device Setup.....	4
Device Specific Messages.....	12
Device Status Messages.....	11
DWord.....	6

E

Error Descriptions..... 9
Error opening COMn..... 11

F

Float..... 6
Framing..... 11

H

Help Contents..... 3

L

Long..... 6

M

Mask..... 11
Missing address..... 9
Modem Setup..... 5

N

Network..... 4

O

Overrun..... 11
Overview..... 3

P

Parity..... 11

S

Serial Communications..... 10

String..... 6

U

Unable to set comm parameters on COMn..... 11

Unable to write to '<address>' on device '<device name>'..... 12