



Operating Instruction Manual

ASCII DTM

Configuration of ASCII settings and parameters

Hilscher Gesellschaft für Systemautomation mbH

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1 Introduction

1.1 About this Manual

The ASC DTM is used to configure ASCII settings and parameters for gateway devices within a FDT frame application.

1.1.1 Online Help

The ASCII DTM contains an integrated online help facility.

- To open the online help, click on **Help** or press **F1**.

1.1.2 List of Revisions

Index	Date	Chapter	Revision
1	19-08-29	All	created

Table 1: List of Revisions

1.1.3 Conventions in this Manual

Notes, operation instructions and results of operation steps are marked as follows:

Notes



Important: <important note you must follow to avoid malfunction>



Note: <general note>



<note, where to find further information>

Operation Instructions

1. <instruction>

2. <instruction>

or

➤ <instruction>

Results

⇒ <result>

1.2 Requirements

System Requirements

- PC with 1 GHz processor or higher
- Windows® XP SP3,
Windows® Vista (32-Bit) SP2,
Windows® 7 (32-Bit and 64-Bit) SP1,
Windows® 8 (32-Bit and 64-Bit),
Windows® 8.1 (32-Bit and 64-Bit),
Windows® 10 (32-Bit and 64-Bit)
- Administrator privilege required for installation
- Internet Explorer 5.5 or higher
- RAM: min. 512 MByte, recommended 1024 MByte
- Graphic resolution: min. 1024 x 768 pixel
- Keyboard and Mouse
- Restriction: Touch screen is not supported.



Note: If the project file is used on a further PC,

- this PC must also comply with the above system requirements,
- the device description files of the devices used in the project must be imported into the configuration software SYCON.net on the new PC,
- and the DTMs of the devices used in the project must also be installed on that further PC.

Requirements ASCII DTM

To configure the Gateway device with the ASCII DTM the following requirements have to be accomplished:

- Completed hardware installation of a netX based DTM-compatible Gateway device, inclusive loaded firmware and loaded configuration file
- Installed FDT/DTM V 1.2 compliant frame application
- Loaded DTM in the Device Catalog of the FTD Framework



Note: If the ASCII DTM and the Gateway device are installed on the same PC, the **cifX Device Driver** must be installed on that PC, as you can connect the DTM to the device.



For more information to the hardware installation, please refer to the corresponding **User Manual** of your device.

1.3 Dialog Structure

The graphical user interface of the ASCII DTM is composed of different areas and elements listed hereafter:

1. A header area containing the **General Device Information**,
2. The **Navigation Area** (area on the left side),
3. The **Dialog Pane** (main area on the right side),
4. **OK, Cancel, Apply, Help**,
5. The **Status Line** containing information e. g. the online-state of the DTM.

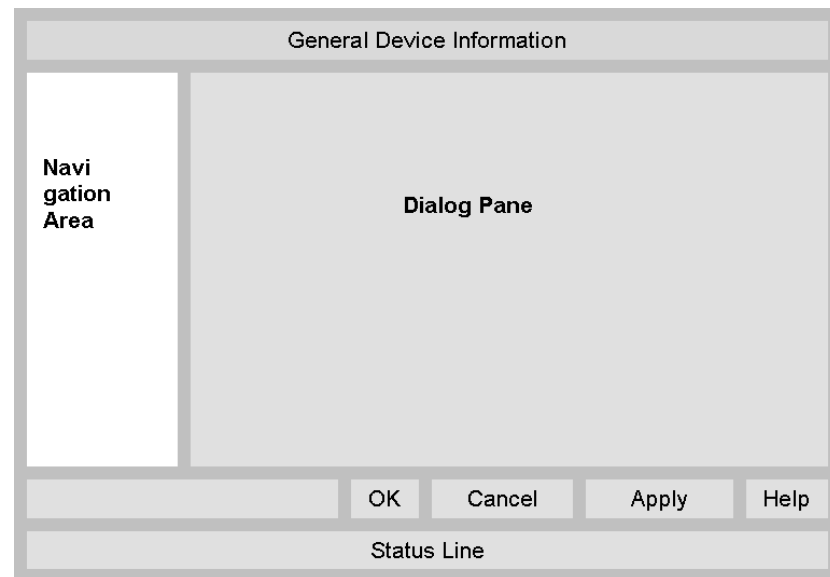


Figure 1: Dialog Structure of the ASCII DTM

1.3.1 General Device Information

Parameter	Meaning
IO Device	Name of the device
Vendor	Vendor name of the device
Device ID	Identification number of the device
Vendor ID	Identification number of the vendor

Table 2: General Device Information

1.3.2 Navigation Area

The **Navigation Area** contains folders and subfolders to open the dialog panes of the DTM.

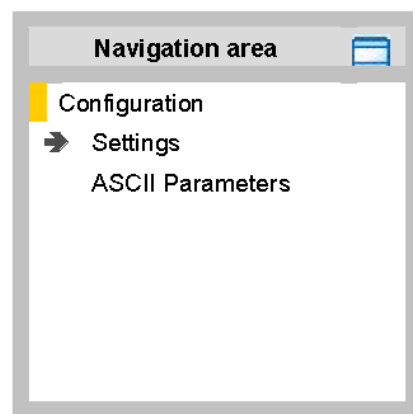


Figure 2: Navigation Area

- Select the required folder and subfolder.
- The corresponding Dialog pane is displayed.

Hide / display Navigation

	Hiding the navigation area (above right side).
Show navigation area	Opening the navigation area (below left side).

1.3.3 Dialog Panes

At the dialog pane the **Configuration** panes are opened via the corresponding folder in the navigation area.

1.3.4 OK, Cancel, Apply and Help

OK, Cancel, Apply and Help you can use as described hereafter.

	Meaning
OK	To confirm your latest settings, click OK . All changed values will be applied on the frame application database. <i>The dialog then closes.</i>
Cancel	To cancel your latest changes, click Cancel . Answer to the safety query Configuration data has been changed. Do you want to save the data? by Yes , No or Cancel . Yes: The changes are saved or the changed values are applied on the frame application database. <i>The dialog then closes.</i> No: The changes are <u>not</u> saved or the changed values are not applied on the frame application database. <i>The dialog then closes.</i> Cancel: <i>Back to the DTM.</i>
Apply	To confirm your latest settings, click Apply . All changed values will be applied on the frame application database. <i>The dialog remains opened.</i>
Help	To open the DTM online help, click Help .

Table 3: OK, Cancel, Apply and Help

1.3.5 Status Bar

The **Status Bar** displays information about the current state of the DTM. The current activity, e.g. download, is signaled graphically via icons in the status bar.

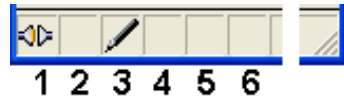


Figure 3: Status Bar – Status Fields 1 to 6









Status Field	Icon / Meaning	
1	DTM Connection States	
		Connected: Icon closed = Device is online
		Disconnected: Icon opened = Device is offline
2	Data Source States	
		Data set: The displayed data are read out from the instance data set (database).
		Device: The displayed data are read out from the device.
3	States of the instance Date Set	
		Valid Modified: Parameter is changed (not equal to data source).
4	Changes directly made on the Device	
		Load/configure diagnosis parameters: Diagnosis is activated.
6	Device Diagnosis Status	
		Save operation succeeded: The save operation has been successful. Further messages due to successful handling of device data.
		Save operation failed: The save operation has failed. Further fail operation messages due to incorrect communication due to malfunction in the field device or its peripherals.

Table 4: Status Bar Icons [1]

2 Safety

2.1 General Note

The documentation in the form of a user manual, an operating instruction manual or other manual types, as well as the accompanying texts have been created for the use of the products by educated personnel. When using the products, all Safety Messages, Integrated Safety Messages, Property Damage Messages and all valid legal regulations must be obeyed. Technical knowledge is presumed. The user has to assure that all legal regulations are obeyed.

2.2 Intended Use

The ASCII DTM is used to configure ASCII settings and ASCII parameters for gateway devices.

2.3 Personnel Qualification

Personnel responsible for the application of the network system shall be aware of the system behavior and shall be trained in using the system.

3 Configuration

You can use the ASCII DTM to configure ASCII settings and parameters for gateway devices. The settings and parameters can be edited as follows.

1. Open the configuration dialog
 - Select from the context menu of the gateway symbol the entry **Configuration > ASCII**
 - The ASCII settings dialog opens.
 - In the navigation area the entry **Settings** under the folder **Configuration** is selected and the settings dialog is displayed.
2. ASCII settings
 - Select in the dialog window the interface type, RTS control, baudrate, number of data bits, number of stop bits and parity. The settings are described in the following section *ASCII Settings* on page 12.
3. Open ASCII parameter dialog
 - Select in the navigation area under **Configuration** the entry **ASCII Parameter**.
 - The dialog **ASCII Parameter** is displayed.
4. Set parameter
 - Select the operating mode, set the telegram structure, set the timing and the size of the send and receive buffer. The parameter are described in section *ASCII Parameters* on page 13.
5. Close configuration dialog
 - Click on **OK** to save the parameter or click on **Cancel**, if the parameter should not be saved.
 - The configuration dialog closes

3.1 ASCII Settings

Parameter	Meaning	Value Range/Value
Interface type	Type of the serial interface, which should be used	RS232 (Default), RS485, RS422
RTS Control	Specifies, if RTS control is activated or deactivated. When using the interface type RS-485, then "RTS Control on" has to be used.	RTS Control Off (Default), RTS Control On
Baud rate	Specifies the baud rate.	300 Bit/s 600 Bit/s 1200 Bit/s 2400 Bit/s 4800 Bit/s 9600 Bit/s (Default) 19200 Bit/s 38400 Bit/s 57600 Bit/s 115200 Bit/s
Data bits	Specifies the number of data bits, 7 or 8	7, 8 (Default)
Stop bits	Specifies the number of stop bits, 1 or 2	1 (Default) 2
Parity	Specifies the parity bit of the serial data communication. None means that no parity bit is used.	None (Default), Even, Odd

Table 5: ASCII Parameter

3.2 ASCII Parameters

The operating modes are:

- 'Receive Only' Mode
- 'Send Only' Mode
- Client Mode (first send, then receive)
- Server Mode (first receive, then send)

The further configuration parameters specify the

- the telegram structure of the send telegram,
- the telegram structure of the receive telegram,
- the timing,
- the size of the send and receive buffer

3.2.1 Telegram Structure in Data Stream

A send or receive telegram in the simplest case only consists only by user data. Many implementations however add to the user data further characters which have a certain meaning, such as a start character, an end character, a checksum or a device address.

A typical telegram structure is e. g.

Start Data Checksum End

with for example (in hexadecimal notation):

[0x02] [0x38][0x33][0x33][0x37][0x38][0x30][0x33][0x37][0x36][0x33] [0x69][0xA5] [0x03]

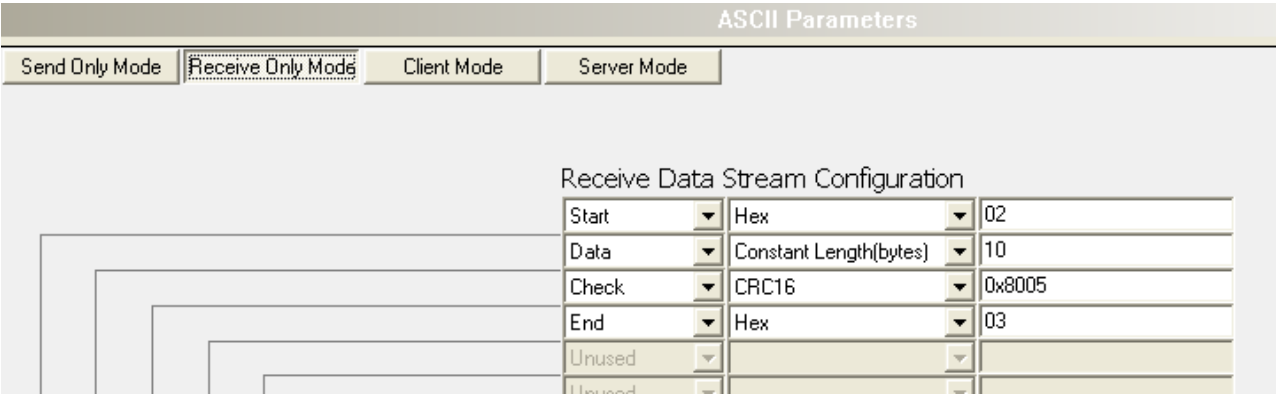


Table 6: ASCII Telegram Structure Example

The serial data stream of the send and receive telegram each can be defined with up to 10 structural elements.

Parameter	Description	Range of Value / Parameter Type
Unused	Structural element is not used	-
Start	Start character of the telegram consisting of one or more characters The information is given as an ASCII character (Char) or as hexadecimal (Hex). For the ASCII character 'STX' enter the hexadecimal value'02'. When sending, the start character is inserted in the telegram. When receiving, the start character is checked for equality.	ASCII, Hex, Decimal
Device	Device Address When sending, the device address is inserted in the telegram. Thereby the receiving device is specified. When receiving, the device address is checked for equality.	ASCII, Hex, Decimal
Object	Object Index or Start Address of the data in the device When sending, the object index / start address is inserted in the telegram. When receiving, the object index / start address is checked for equality.	ASCII, Hex, Decimal
Command	Command Identifier When sending, the Command Identifier is inserted in the telegram. When receiving, the Command Identifier is checked for equality.	ASCII, Hex, Decimal
Data	Length specification for Data Field or Telegram end (Character or Time) <u>Length Specification:</u> Constant Length (bytes): The data field has a fixed length. The information is given as number of bytes. Byte Number Data: The length specification is given in one byte. When sending, this byte is inserted in the telegram directly before the data field. When receiving, the value of this byte from the telegram is used as the length of the directly following data field. Word Number Data: The length specification is given in one word. When sending, this word is inserted in the telegram directly before the data area. When receiving, the value of this word from the telegram is used as the length of the directly following data field. <u>Termination Character:</u> Character Terminated: The data field is terminated by a fixed end identifier consisting of one byte. When sending, this termination character is inserted in the telegram after the data field. When receiving, this termination character is used to detect the end of the data field. The termination character is not part of the data field. <u>Telegram end by time:</u> Unspecific: The end of the data field is done with the character delay time.	Constant Length (Bytes) Byte Number Data Word Number Data Character Terminated Unspecific
End	End of the telegram character consisting of one or more characters The information is given as an ASCII character (Char) or as hexadecimal (Hex). For the ASCII character 'ETX' enter the hexadecimal value'03'. When sending, the end character is inserted in the telegram. When receiving, the end character is checked for equality.	ASCII, Hex, Decimal

Parameter	Description	Range of Value / Parameter Type
Check	<p>Checksum</p> <p>CRC8: Any data of the telegram before the checksum are inserted in the initial value zero with the polynomial 1D (default) and the 1-byte result is used as checksum.</p> <p>CRC16: Any data of the telegram before the checksum are inserted in the initial value zero with the polynomial 8005 (default) and the 2-byte result is used as checksum.</p> <p>CRC32: Any data of the telegram before the checksum are inserted in the initial value zero with the polynomial 04C11DB7 (default) and the 4-byte result is used as checksum.</p> <p>Exor: Any data of the telegram before the checksum are set off against the initial value zero with exclusive-or and the 1-byte result is used as checksum.</p> <p>When sending, the computed checksum is inserted in the telegram.</p> <p>When receiving, the checksum is calculated based on of the received characters and is checked for equality with the received checksum.</p>	CRC8, CRC16, CRC32, Exor
Don't care	<p>Characters with no meaning</p> <p>Constant Length (bytes): Specifies the number of bytes, which have no meaning and which should be ignored.</p> <p>When sending, the number of characters with a value of zero is inserted in the telegram.</p> <p>When receiving, the number of characters is ignored and thus filtered out from the telegram.</p>	Constant Length (Bytes)

Table 7: Telegram Structure

Type	Description
Hex	<p>Hexadecimals</p> <p>The entry is made as a hexadecimal value. A hexadecimal value consists of 2 characters in the range 00 to FF and result in one byte. Each character has the range of value 0, 1, 2, ..., 9, A, B, ..., F.</p>
ASCII	<p>ASCII Character</p> <p>The entry is made as a character. A character is one of the following characters: A-Z, a-z, 0-9, !, ", \$, %, &, /, (,), =, ?, , ; -, _ , +, *</p>
Decimal	<p>Decimal value</p> <p>The entry is made as a decimal value.</p>

Table 8: Parameter Types

Example: The specification of the character A is as hexadecimal value '41', as character 'A' or as a decimal value 65.

ASCII Character Table

ASCII Hex	ASCII Dez	Character	ASCII Hex	ASCII Dez	Character	ASCII Hex	ASCII Dez	Character	ASCII Hex	ASCII Dez	Character
00	0	NUL	20	32	SP	40	64	@	60	96	`
01	1	SOH ^A	21	33	!	41	65	A	61	97	a
02	2	STX ^B	22	34	"	42	66	B	62	98	b
03	3	ETX ^C	23	35	#	43	67	C	63	99	c
04	4	EOT ^D	24	36	\$	44	68	D	64	100	d
05	5	ENQ ^E	25	37	%	45	69	E	65	101	e
06	6	ACK ^F	26	38	&	46	70	F	66	102	f
07	7	BEL ^G	27	39	'	47	71	G	67	103	g
08	8	BS ^H	28	40	(	48	72	H	68	104	h
09	9	TAB ^I	29	41	)	49	73	I	69	105	i
0A	10	LF ^J	2A	42	*	4A	74	J	6A	106	j
0B	11	VT ^K	2B	43	+	4B	75	K	6B	107	k
0C	12	FF ^L	2C	44	,	4C	76	L	6C	108	l
0D	13	CR ^M	2D	45	-	4D	77	M	6D	109	m
0E	14	SO ^N	2E	46	.	4E	78	N	6E	110	n
0F	15	SI ^O	2F	47	/	4F	79	O	6F	111	o
10	16	DLE ^P	30	48	0	50	80	P	70	112	p
11	17	DC1 ^Q	31	49	1	51	81	Q	71	113	q
12	18	DC2 ^R	32	50	2	52	82	R	72	114	r
13	19	DC3 ^S	33	51	3	53	83	S	73	115	s
14	20	DC4 ^T	34	52	4	54	84	T	74	116	t
15	21	NAK ^U	35	53	5	55	85	U	75	117	u
16	22	SYN ^V	36	54	6	56	86	V	76	118	v
17	23	ETB ^W	37	55	7	57	87	W	77	119	w
18	24	CAN ^X	38	56	8	58	88	X	78	120	x
19	25	EM ^Y	39	57	9	59	89	Y	79	121	y
1A	26	SUB ^Z	3A	58	:	5A	90	Z	7A	122	z
1B	27	Esc	3B	59	;	5B	91	[	7B	123	{
1C	28	FS	3C	60	<	5C	92	\	7C	124	|
1D	29	GS	3D	61	=	5D	93	]	7D	125	}
1E	30	RS	3E	62	>	5E	94	^	7E	126	~
1F	31	US	3F	63	?	5F	95	_	7F	127	DEL

Table 9: ASCII Character Table

3.2.2 Size of the Send and Receive Buffer

The size of the send or receive buffer is configured.

Note: The send telegram must fit into the send buffer. The receive telegram must fit into the receive buffer.

Parameter	Description	Range of Value
Sendbuffer Size	Size of the send buffer in bytes	0 ... 1024 Default: 512 Bytes
Receivebuffer Size	Size of the receive buffer in bytes	0 ... 1024 Default: 512 Bytes

Table 10: Size of the Send and Receive Buffer

3.2.3 Operating Modes and Timing

The modes are:

- 'Receive Only' Mode
- 'Send Only' Mode
- Client Mode (first send, then receive)
- Server Mode (first receive, then send)

3.2.4 'Send Only' Mode

Basic Principle

In the 'Send Only' mode the device only sends. The remote device only receives. The superordinated control unit has to use a handshake to transfer the data to the device.

Communication

The send operation can be triggered from the superordinated control unit or performed by the device cyclically.

- triggered



With each handshake of the superordinated control unit a telegram is send. For this, set the timing parameter **Send Cycle Time** to zero.

- Cyclic

The device sends in a constant cycle.

With each handshake of the superordinated control unit the send data initially are updated in the internal buffer of the device and sent during the next send cycle. For this, set the timing parameter **Send Cycle Time** to the cycle time (unequal to zero).

Timing Parameter

Parameter	Description	Range of Value
Send Cycle Time	Specifies whether the telegram will be sent cyclically or triggered. The value (unequal to zero) specifies the cycle time of the send telegram. The value 0 specifies that the send telegram is triggered.	0 ... $2^{31}-1$ Default: 0

Table 11: Timing Parameters for the Operating 'Send Only' Mode

Configuration Example

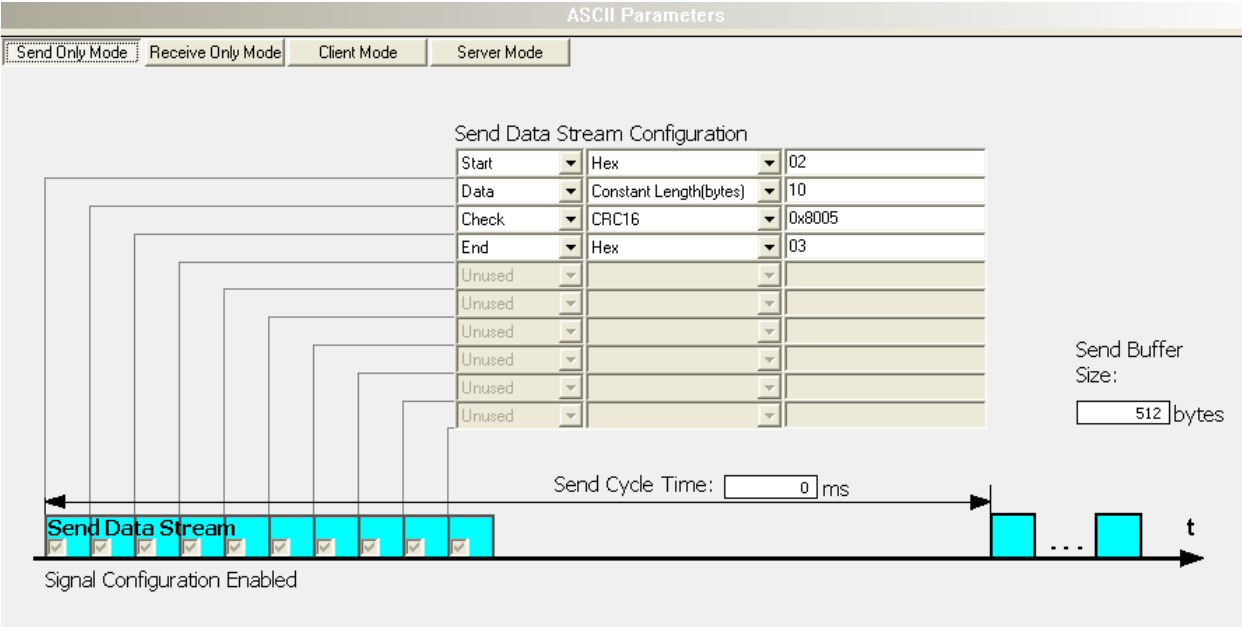


Table 12: Telegram Structure for the Operating 'Send Only' Mode

3.2.5 'Receive Only' Mode

Basic Principle

In the **'Receive Only' mode** the device only receives. The remote device only sends.



The superordinated control unit must acknowledge the reception.

Communication

When configuring the telegram structure the method is defined how the end of the telegram is detected:

- Character
- Length
- Time

Each telegram received is indicated to the superordinated control unit by handshake. The superordinated control unit must acknowledge the reception. Only after the acknowledgement the reception of a further telegram can be indicated to the superordinated control unit.

Timing Parameter

Parameter	Description	Range of Value
Receive Watchdog Time	Specifies whether the reception of subsequent telegrams is monitored by time. Thereby the remote device can be monitored. The time is taken from telegram end to telegram end. The value (unequal to zero) specifies in what time the remote device must have sent the next telegram. If the time is exceeded, then an error is reported to the host. The value 0 specifies that the reception of subsequent telegrams is not monitored.	0 ... 231-1 Default: 0
Character Delay Time	Specifies whether the time between two characters during reception is monitored by time. The value (unequal to zero) specifies in what time the remote device must have sent the next character. If the time is exceeded, then an error is reported to the host. The value 0 specifies that no monitoring is performed.	0 ... 231-1 Default: 0

Table 13: Timing Parameters for the Operating 'Receive Only' Mode

Configuration Example

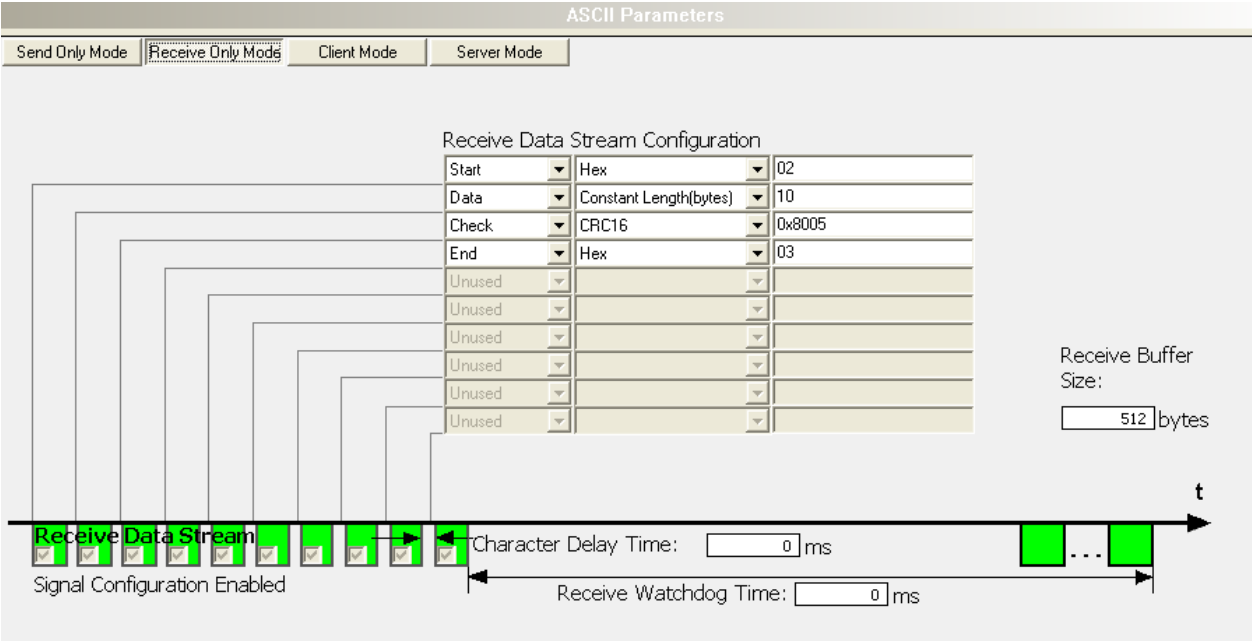


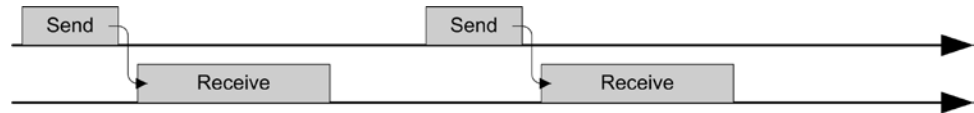
Table 14: Telegram Structure for the Operating 'Receive Only' Mode

3.2.6 Client Mode (First Send, Then Receive)

Basic Principle

In the 'Client Mode' the device sends a telegram to the remote device. The remote device then sends a telegram which is received by the device.

By this a polling (querying) of the remote devices can be performed. The device can send a polling telegram with or without user data.



The superordinated control unit must activate the send operation by handshake. The superordinated control unit must acknowledge each reception by handshake.

Communication

The send operation can be triggered or performed cyclically.

- triggered

With each handshake of the superordinated control unit a telegram is send. For this, set the timing parameter **Send Cycle Time** to zero.

The remote device then sends a telegram which is received by the device. The device can monitor the beginning of the receive telegram by time monitoring via the **Response Timeout** parameter.

The superordinated control unit must activate the send operation by handshake. The superordinated control unit must acknowledge each reception by handshake.

- Cyclic

The device sends in a constant cycle.

With each handshake of the host the send data initially are updated in the internal buffer and sent during the next sending cycle. For this, set the timing parameter **Send Cycle Time** to the cycle time (unequal to zero).

The remote device then sends a telegram which is received by the device. The device can monitor the beginning of the receive telegram by time monitoring via the **Response Timeout** parameter.

The superordinated control unit must activate the send data by handshake. The superordinated control unit must acknowledge each reception by handshake.

Timing Parameter

Parameter	Description	Range of Value
Send Cycle Time	Specifies whether the telegram will be sent cyclically or triggered. The value (unequal to zero) specifies the cycle time of the send telegram. The value 0 specifies that the send telegram is triggered.	0 ... $2^{31}-1$ Default: 0
Response Timeout	Specifies whether the reception of the response telegram is monitored by time. Thereby the remote device can be monitored. The time is taken from telegram end to telegram end. The value (unequal to zero) specifies in what time the remote device must have sent the response telegram. If the time is exceeded, then an error is reported to the host. The value 0 specifies that the reception of response telegrams is not monitored.	0 ... $2^{31}-1$ Default: 1000
Character Delay Time	Specifies whether the time between two characters during reception is monitored by time. The value (unequal to zero) specifies in what time the remote device must have sent the next character. If the time is exceeded, then an error is reported to the host. The value 0 specifies that no monitoring is performed.	0 ... $2^{31}-1$ Default: 0

Table 15: Timing Parameters for the Operating Mode 'Client Mode'

Configuration Example

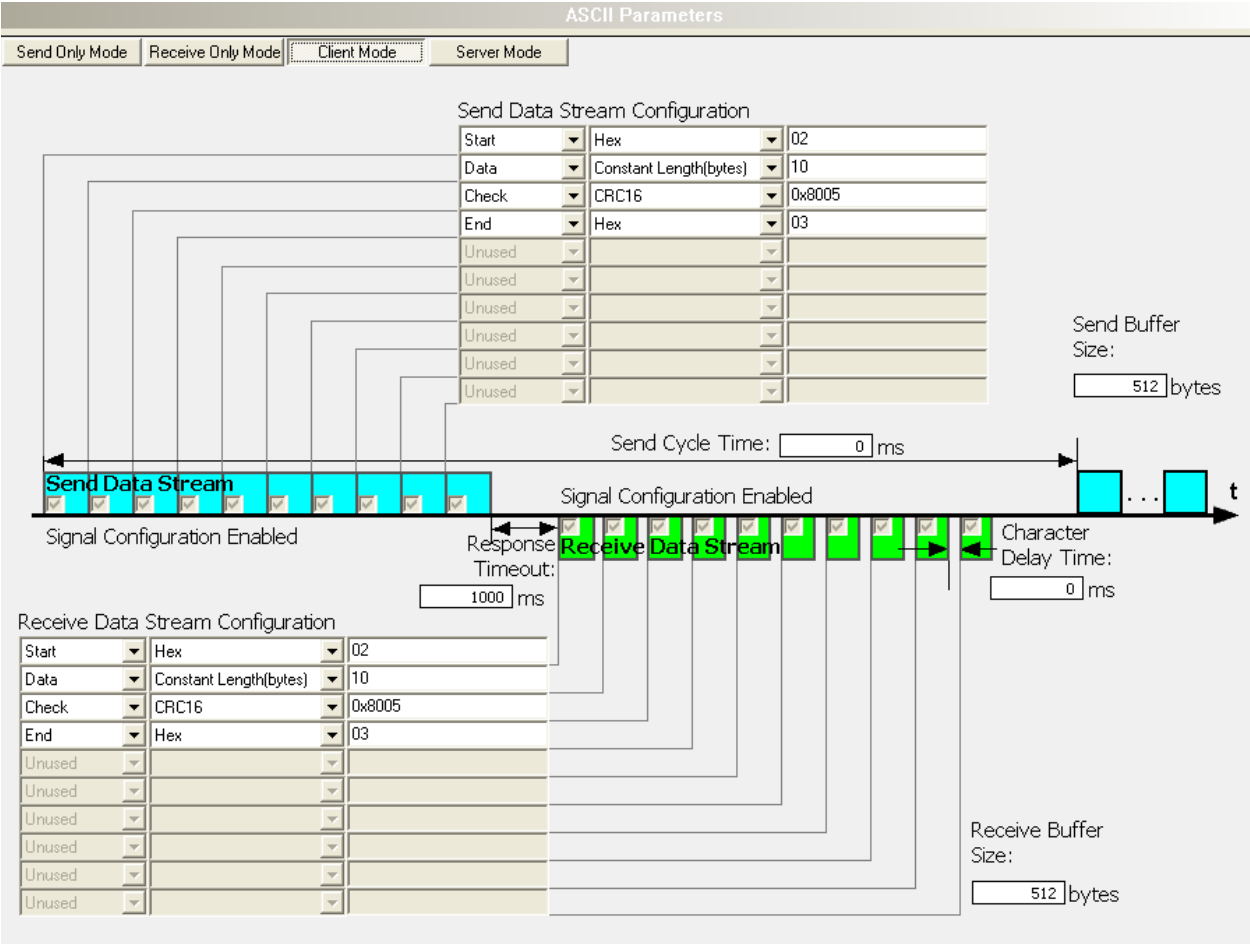
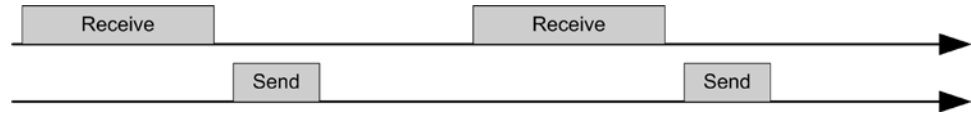


Table 16: Telegram Structure for the Operating Mode 'Client Mode'

3.2.7 Server Mode (First Receive, Then Send)

Basic Principle

In the 'Server Mode' the device receives a telegram from the remote device. The superordinated control unit must acknowledge each reception by handshake. The superordinated control unit must activate by handshake the send operation. The device then sends a telegram to the remote device.



Communication

When configuring the telegram structure the method is defined how the end of the telegram is detected:

- Character
- Length
- Time

Timing Parameter

Parameter	Description	Range of Value
Receive Watchdog Time	Specifies whether the reception of subsequent telegrams is monitored by time. Thereby the remote device can be monitored. The time is taken from telegram end to telegram end. The value (unequal to zero) specifies in what time the remote device must have sent the next telegram. If the time is exceeded, then an error is reported to the host. The value 0 specifies that the reception of subsequent telegrams is not monitored.	0 ... $2^{31}-1$ Default: 0
Response Timeout	Specifies whether the reception of telegrams is monitored by time. Thereby the remote device can be monitored. The time is taken from the end of the send telegram to the start of the receive telegram. The value (unequal to zero) specifies in what time the remote device must have sent the next telegram. If the time is exceeded, then an error is reported to the host. The value 0 specifies that the reception of telegrams is not monitored.	0 ... $2^{31}-1$ Default: 1000
Character Delay Time	Specifies whether the time between two characters during reception is monitored by time. The value (unequal to zero) specifies in what time the remote device must have sent the next character. If the time is exceeded, then an error is reported to the host. The value 0 specifies that no monitoring is performed.	0 ... $2^{31}-1$ Default: 0

Table 17: Timing Parameters for the Operating Mode 'Server Mode'

Configuration Example

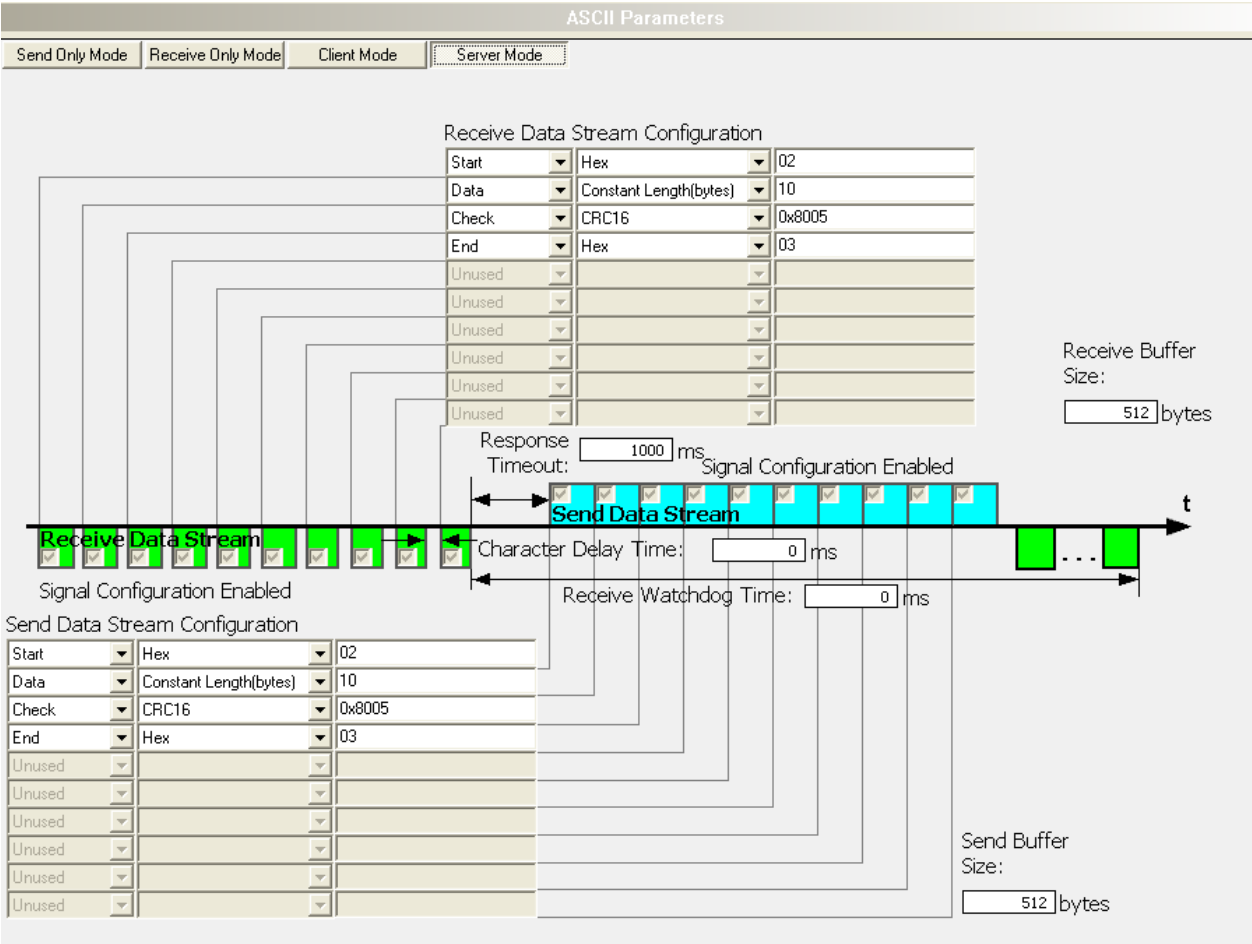


Table 18: Telegram Structure Parameters for the Operating Mode 'Server Mode'

4 Appendix

4.1 Legal Notes

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4.5 Glossary

ASCII

Protocol for serial data transmission (American Standard Code for Information Interchange, see www.asciitable.com)

Baud rate

Data transmission rate for a communication channel or interface.

DTM

Device Type Manager.

The Device Type Manager (DTM) is a software module with graphical user interface for the configuration or for diagnosis of device.

FDT

Field Device Tool

FDT specifies an interface, in order to be able to use DTM (Device Type Manager) in different applications of different manufacturers.

Gateway

A device which is used as a protocol converter between two communication standards

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