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## **CBX800 Gateway**



## **Host Mode Programming**

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CBX800 Host Mode Programming

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# 1 HOST MODE PROGRAMMING

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An alternative method of programming the CBX800 is by sending programming strings.

These strings must be transmitted from the Host system to the device either on the auxiliary RS232 serial interface or on the main RS232/RS485 serial interface. This is called Host Mode Programming.

In order to send the programming strings, it is necessary to switch the reader into **Host Mode**.



**CAUTION**

*Genius™ must not be connected to the reader through the selected interface before entering in Host Control Mode.*

## Serial Interfaces

The programming commands and strings must be sent to the reader at the programmed baud rate of the selected interface (e.g. if the baud rate of the Auxiliary interface is programmed at 9600 bps the command must be sent at 9600 bps).

The selected communication channel must be programmed as follows:

- Data Bits: 8 Bits
- Parity: None
- Stop Bits: 1

Once the programming session has started on one of the interfaces, the other is disabled until programming is over.

## 2 PROGRAMMING COMMANDS

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### 2.1 CONNECTION TO DEVICE

	DESCRIPTION	HOST COMMAND	REPLY MESSAGE
1	<b>Enter Host Mode</b>	<b>&lt;ESC&gt; [ C</b>	<b>&lt;ESC&gt; H &lt;CR&gt;&lt;LF&gt;</b>
	<p>After entering this command, the device responds with the first reply message and then waits for the following command.</p> <p>From now on the device is in the <b>CONNECTED</b> state. Normal data flow is inhibited until it comes back to the <b>IDLE</b> state.</p>		
2	<b>Enter Terminal Mode</b>	<b>&lt;ESC&gt; ] B</b>	<b>&lt;ESC&gt; R &lt;CR&gt;&lt;LF&gt;</b>
	<p>After entering this command, the device responds with the second reply message and then waits for the following command in Terminal mode.</p>		
3	<b>Enter Programming Mode</b>	<b>&lt;ESC&gt; c M &lt;B0<sub>H</sub>&gt; ADDR</b>	<b>&lt;ESC&gt; c &lt;CR&gt;&lt;LF&gt;</b>
	<p><b>ADDR</b> is a character indicating the address of the device in an ID-NET™ Master/Slave reading system layout</p> <p><b>ADDR = &lt;30<sub>H</sub>&gt; + &lt;Device Address&gt;</b> where:</p> <ul style="list-style-type: none"> <li>• <b>Device Address = 0:</b> Stand Alone device or Master ID-NET™ device</li> <li>• <b>Device Address = 1 to 31:</b> Slave ID-NET™ device</li> </ul> <p>This means:</p> <ul style="list-style-type: none"> <li>• <b>ADDR = &lt;30<sub>H</sub>&gt;:</b> Stand Alone device or Master ID-NET™ device</li> <li>• <b>ADDR = &lt;31<sub>H</sub>&gt; to &lt;4F<sub>H</sub>&gt;:</b> Slave ID-NET™ device</li> </ul> <p>After entering this command, the device responds with the third reply message and then waits for one or more programming strings as shown in Chapter 3 and 4.</p>		

## 2.2 DISCONNECTION FROM DEVICE

	DESCRIPTION	HOST COMMAND	REPLY MESSAGE
1	<b>Exit Programming Mode</b>	<b>&lt;ESC&gt; d M &lt;B0<sub>H</sub>&gt; ADDR</b>	<b>&lt;ESC&gt; d &lt;CR&gt;&lt;LF&gt;</b>
	Where <b>ADDR</b> is the address of the device in an ID-NET™ Master/Slave layout. This message must always be transmitted to exit from programming mode.		
2	<b>Exit Terminal Mode</b>	<b>&lt;ESC&gt; I A &lt;space&gt;</b>	<b>&lt;ESC&gt; K &lt;CR&gt;&lt;LF&gt;</b>
	This message must always be transmitted to exit from Terminal mode.		
3	<b>Exit Host Mode</b>	<b>&lt;ESC&gt; [ A</b>	<b>&lt;ESC&gt; X &lt;CR&gt;&lt;LF&gt;</b>
	This message must always be transmitted to end the programming session. From now on device is in <b>IDLE</b> state. Communication channel may be used for normal data flow.		

## 2.3 SELF DISCONNECTION

Specific situations exist where the device is automatically disconnected from the Host and is restored to the **IDLE** state. Once connected, the following message could be sent:

	DESCRIPTION	HOST REPLY	DEVICE MESSAGE
	<b>Self Disconnection</b>	-	<ESC> [ A
	This message notifies a forced disconnection from the Host. This message must always be managed by the Host program to check when the device has gone back to the <b>IDLE</b> state.		

Normally programming sequences do not involve this message except for the occasions listed below:

### 1. Inactivity Timeout Expiration

After connection, no programming commands or programming strings are sent to the device (approximately 2 minutes as default).

### 2. Application Software Restart

Particular commands may force a restart of the device like Data Storage commands (refer to the par. 3.5). The Self Disconnection message is sent to notify these cases.

### 3. General Error Condition

After connection to the device, unexpected errors are notified by means of the Self Disconnection message.

### 4. Protocol Error

When Host sends wrong messages like unexpected escape sequences.

	DESCRIPTION	HOST REPLY	DEVICE MESSAGE
	<b>Self Disconnection</b>	<ESC> X <CR><LF>	-
	Host must confirm the disconnection event sending this reply message. If not sent, after a timeout (about 300 ms as default) device goes back to the <b>IDLE</b> state.		



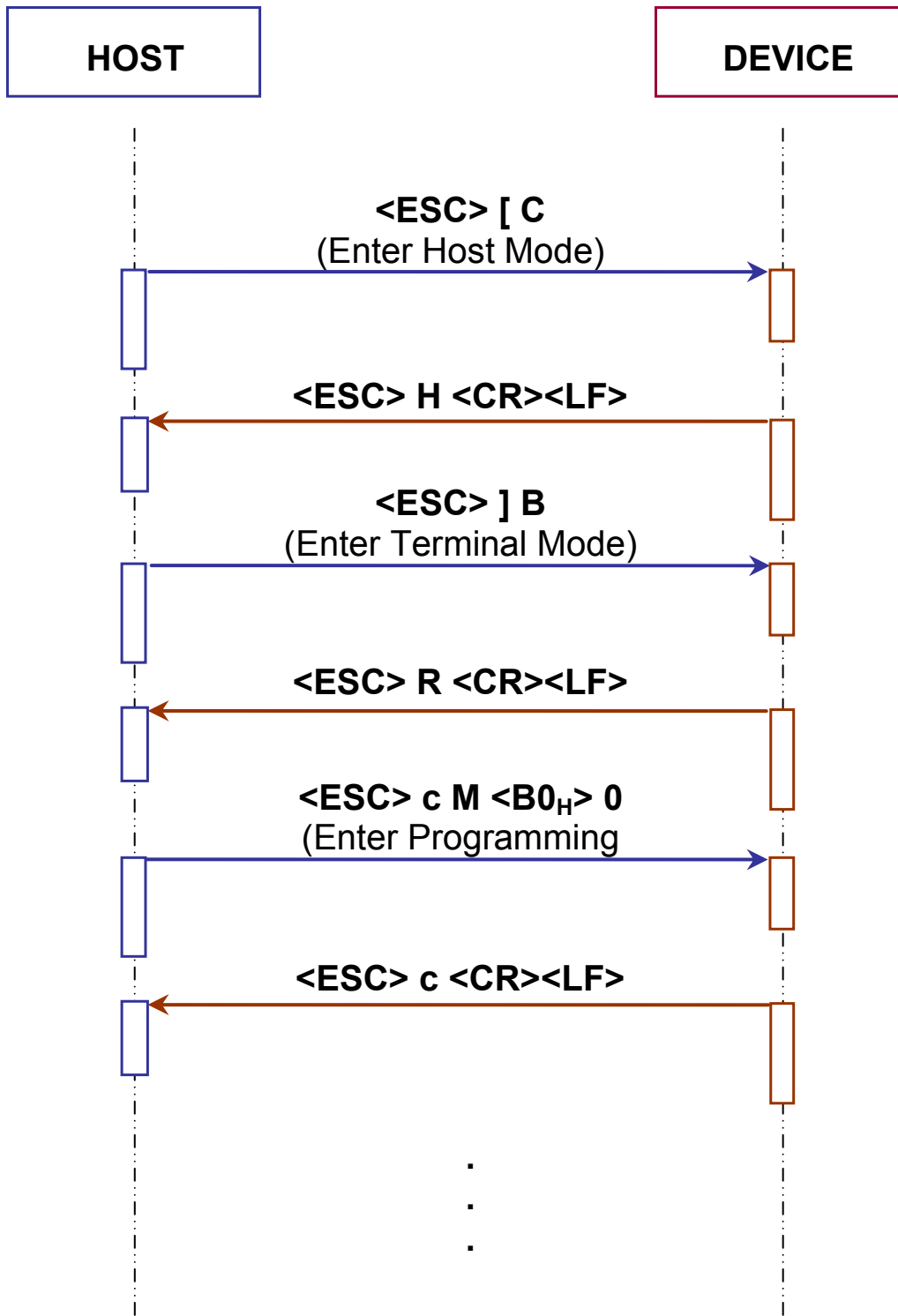


Figure 1 - Connection to Stand Alone Device

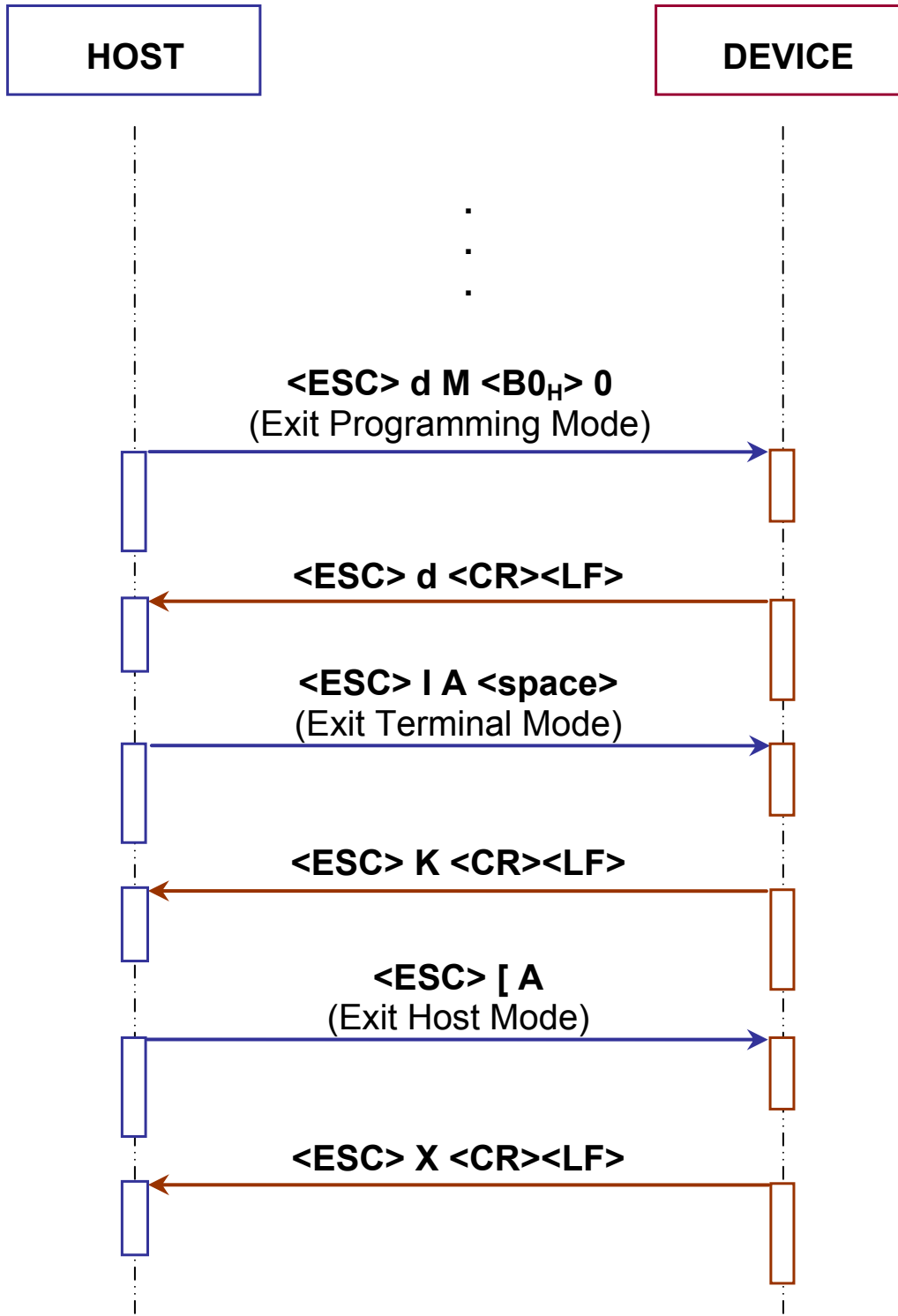


Figure 2 - Disconnection from Stand Alone Device

## 3 PROGRAMMING STRINGS

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### 3.1 DEFINITIONS

Common definitions for each parameter are:

#### Path

The complete parameter path must have the following format:

**/Folder1[#Depth1]/Folder2[#Depth2]/ ... /FolderN[#DepthN]/Param[#DepthM]**

Where:

- **FolderX:** Folder Name
- **[#DepthX]:** Folder or Parameter Depth (not necessary if equal to 1)
- **Param:** Parameter Name

#### Shortcut (SHC)

The short description replacing the complete parameter path (that allows implementing a shorter programming string) must have the following format:

**Shortcut [#Depth]**

Where:

- **Shortcut:** Short Parameter Description
- **[#Depth]:** Folder or Parameter Depth (not necessary if equal to 1)

#### Depth (Parameter Depth)

Depth of the parameter indicates if it is made up of a vector of values or a single value (e.g. *Cluster Device Description* parameter has depth > 1 since we have one Device Description value for each Enabled Device inside the Cluster).

Example:

Label:	Device Cluster
Path:	/Cluster/Device#N/Descr
Shortcut:	199#N

Allows selecting the Description requested for the Slave N (where N can assume the value between 1 and 31).

**Type (Parameter Type)**

Parameter type is essential in order to decide the parameter **VALUE** format used in the programming strings. Types are:

<a href="#">Type 0:</a>	Integer (Numeric)
<a href="#">Type 1:</a>	Enumeration
<a href="#">Type 2:</a>	String
<a href="#">Type 3:</a>	Binary String
<a href="#">Type 4:</a>	Floating Point

The other definitions change according to the parameter type.

**Integer (Type = 0)****Range**

Minimum and maximum values allowed for the parameter.

Example: *Master Input Area Size (Profibus)* parameter ([COMMUNICATION SETTINGS](#) folder).

Path:	/Comms/FieldbusOptions/BusData/ProfibusInputSize
Shortcut:	270
Type:	0
Label:	Master Input Area Size
Range:	8 to 144
Default:	8

The sign can be omitted if the parameter value is not negative.

**Enumeration (Type = 1)****Item List**

List of the values allowed for the parameter.

List of the values allowed for the parameter (i.e. 0 = first entry of the list, 1 = second entry of the list).

Example: *Diagnostic* parameter ([DIAGNOSTIC](#) folder).

Path:	/Diagno/Enable
Shortcut:	5100
Type:	1
Label:	Enable
Item List	0 = Disable 1 = Enable
Default:	1 (Entry 1 → Enable)

## String (Type = 2)

### Length

Minimum and maximum number of characters allowed for this parameter.

Example: *Device Name* parameter ([USER INFORMATION SECTION](#) folder).

Path: /UserInfo/Name  
Shortcut: 522  
Type: 2  
Label: Device Name  
Length: 0 to 128  
Default: Empty string

## Binary String (Type = 3)

The value of a Binary String parameter must have the following format:

**NumChar**<space>**[Char1][Char2] ... [CharK] ... [CharN]**

Where:

- **NumChar:** Number of Characters (DEC value)
- **[CharK]:** Character K (HEX value)

### Length

List of the allowed values of the parameter

Example: *Header String* parameter ([DIAGNOSTICS](#) folder).

Path: /Diagno/Format/Header  
Shortcut: 5101  
Type: 3  
Label: Header String  
Length: 0 to 128  
Default: <STX>

## Floating Point (Type = 4)

The Floating Point parameter value has the following format:

**XXX.YYY**

### Range

Minimum and maximum values allowed for the parameter.

The sign can be omitted if the parameter value is not negative.

## 3.2 HOW TO SEND A SINGLE PARAMETER TO THE READER



### NOTE

*To guarantee the complete compatibility with future software releases, It is strongly suggested to use the shortcuts programming strings.*

### Using Complete Parameter Path

The 'Set Parameter' programming string must have the following format:

**SP**<space>**PATH:VALUE**<CR><LF>

Where:

- **SP:** 'Set Parameter' command
- **PATH:** Complete Parameter Path
- **VALUE:** Parameter Value

After entering this command, the device responds with the proper reply message and then waits for one or more programming strings.

If the programming is correct, the device updates the configuration and confirms with the following message:

**Y**<space>**VALUE**<CR><LF>

Where:

- **VALUE:** Parameter Value

If programming contents are wrong (i.e. a typing error in the file) or due to a transmission error, the device replies with the following message and programming data will not be updated in this case:

**N**<space>**ERRCODE**<CR><LF>

Where:

- **ERRCODE:** Error Code (signed DEC value)

For information on Error Codes see the "Error Codes Table" in the Appendix.

## Using Short Parameter Description (Shortcut)

The '**Set Shortcut**' programming string (based on the short parameter description) must have the following format:

**SS**<space>**SHORTCUT:VALUE**<CR><LF>

Where:

- **SS**: 'Set Shortcut' command
- **SHORTCUT**: Short Parameter Description (SHC)
- **VALUE**: Parameter Value

After entering this command, the device responds with the proper reply message and then waits for one or more programming strings.

If the programming is correct, the device updates the configuration and confirms with the following message:

**Y**<space>**VALUE**<CR><LF>

Where:

- **VALUE**: Parameter Value

If programming contents are wrong (i.e. a typing error in the file) or due to a transmission error, the device replies with the following message and programming data will not be updated in this case:

**N**<space>**ERRCODE**<CR><LF>

Where:

- **ERRCODE**: Error Code (signed DEC value)

For information on Error Codes see the "Error Codes Table" in the Appendix.

### 3.3 HOW TO GET A SINGLE PARAMETER FROM THE READER

**NOTE**

*To guarantee the complete compatibility with future software releases, It is strongly suggested to use the shortcut programming strings.*

#### Using Complete Parameter Path

The 'Get Parameter' programming string must have the following format:

**GP**<space>**PATH**<CR><LF>

Where:

- **GP:** 'Get Parameter' command.
- **PATH:** Complete Parameter Path.

After entering this command, the device responds with the proper reply message and then waits for one or more programming strings.

If the programming is correct, the device updates the configuration and confirms with the following message:

**Y**<space>**VALUE**<CR><LF>

Where:

- **VALUE:** Parameter Value.

If programming contents are wrong (i.e. a typing error in the file) or due to a transmission error, the device replies with the following message:

**N**<space>**ERRCODE**<CR><LF>

Where:

- **ERRCODE:** Error Code (signed DEC value)

For information on Error Codes see the "Error Codes Table" in the Appendix.



## Using Short Parameter Description (Shortcut)

The '**Get Shortcut**' programming string (based on the short parameter description) must have the following format:

**GS**<space>**SHORTCUT**<CR><LF>

Where:

- **GS**: 'Get Shortcut' command.
- **SHORTCUT**: Short Parameter Description (SHC).

After entering this command, the device responds with the proper reply message and then waits for one or more programming strings.

If the programming is correct, the device updates the configuration and confirms with the following message:

**Y**<space>**VALUE**<CR><LF>

Where:

- **VALUE**: Parameter Value.

If programming contents are wrong (i.e. a typing error in the file) or due to a transmission error, the device replies with the following message:

**N**<space>**ERRCODE**<CR><LF>

Where:

- **ERRCODE**: Error Code (signed DEC value)

For information on Error Codes see the "Error Codes Table" in the Appendix.

### 3.4 HOW TO ACCESS INSTALLER PARAMETERS

#### Set Right Parameter Description

The '**Set Right**' programming string allows the user to access some particular parameters not available as standard user:

**SR**<space>**L**<space>**PASSWORD**<CR><LF>

Where:

- **SR**: 'Set Right' command
- **L**: Access Level Description
- **PASSWORD**: Password for the Level accessing

After entering this command, the device responds with the proper reply message and then waits for one or more programming strings.

If the programming is correct, the device updates the configuration and confirms with the following message:

**Y**<space>**L**<CR><LF>

If programming contents are wrong (i.e. a typing error in the file) or due to a transmission error, the device replies with the following message and programming data will not be updated in this case:

**N**<space>**ERRCODE**<CR><LF>

Where:

- **ERRCODE**: Error Code (signed DEC value)

For information on Error Codes see the "Error Codes Table" in the Appendix.



**NOTE**

To set the **INSTALLER** level (the only one available outside the Datalogic Company) use:

**SR**<space>**1**<space>**STHD**<CR><LF>

### 3.5 SAVE AND RESTORE COMMANDS

The 'Data Storage' programming command must have the following format:

**E**<space>**MODE**<CR><LF>

Where:

- **E**: Data Storage command.
- **MODE**: Data Storage mode. The possible values are:
  - V** = Storage in temporary (volatile) memory only.
  - P** = Storage in temporary and permanent memory.

If the programming is correct, the device updates the configuration and confirms with the following message:

**Y**<space>**MODE**<CR><LF>

Where:

- **MODE**: Data Storage mode.



**CAUTION**

*Restart of the device is now forced. If no disconnection commands are sent within a minimum timeout of 300 ms, the device will transmit the Self Disconnection message (refer to par. 2.3).*

If programming contents are wrong (i.e. a typing error in the file) or due to a transmission error, the device replies with the following message and programming data will not be updated in this case:

**N**<space>**ERRCODE**<CR><LF>

Where:

- **ERRCODE**: Error Code (signed DEC value).

For information on Error Codes see the "Error Codes Table" in the Appendix.

The '**Restore Default Configuration**' programming command must have the following format:

**SD**<space>**DEFNUM**<CR><LF>

Where:

- **SD:** Restore Default configuration command
- **DEFNUM:** Default configuration number. The only possible value is currently:  
**0** = Factory Default

After entering this command, the device responds with the proper reply message and then waits for one or more programming strings.

If the programming is correct, the device updates the configuration and confirms with the following message:

**Y**<space>**DEFNUM**<CR><LF>

Where:

- **DEFNUM:** Default

If programming contents are wrong (i.e. a typing error in the file) or due to a transmission error, the device replies with the following message:

**N**<space>**ERRCODE**<CR><LF>

Where:

- **ERRCODE:** Error Code (signed DEC value)

For information on Error Codes see the "Error Codes Table" in the Appendix.



**CAUTION**

*This programming command will be applied to all **Configuration** and **Environmental** parameters. Refer to the Genius™ Help On Line of the selected device for further details.*

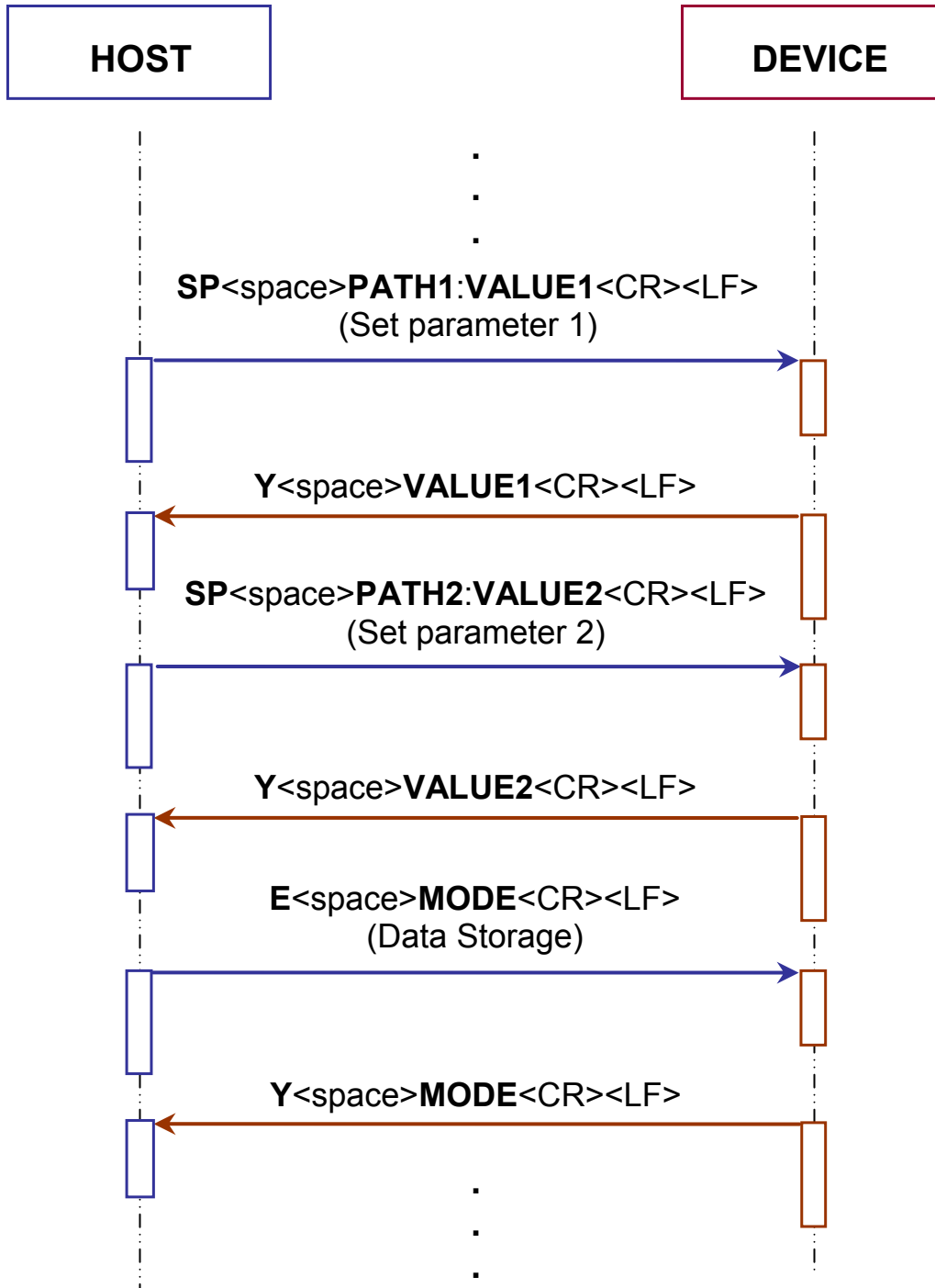


Figure 3 - Two-Parameter Programming Session With Data Storage

## 3.6 EXAMPLES

### - 1 -

Set *Master Input Area Size (Profibus)* parameter in the [COMMUNICATION SETTINGS](#) folder:

Path: /Comms/FieldbusOptions/BusData/ProfibusInputSize  
Shortcut: 270  
Type: 0 (Integer)  
Range: 8 to 144  
Value: 12

The 'Set Parameter' programming string is:

```
SP<space>/Comms/FieldbusOptions/BusData/ProfibusInputSize:12<CR><LF>
```

The 'Set Shortcut' programming string is:

```
SS<space>270:12<CR><LF>
```

After entering the programming string, the reader responds with the message:

```
Y<space>12<CR><LF>
```

### - 2 -

Set *Heartbeat* parameter in the [COMMUNICATION SETTINGS](#) folder:

Path: /Comms/SerMain/HeartbeatEnM  
Shortcut: 5069  
Type: 1 (Enumeration)  
Item List: 0 = Disable  
          1 = Enable

Value: 1 (Entry 1 → Enable)

The 'Set Parameter' programming string is:

```
SP<space>/Comms/SerMain/HeartbeatEnM:1<CR><LF>
```

The 'Set Shortcut' programming string is:

```
SS<space>5069:1<CR><LF>
```

After entering the programming string, the reader responds with the message:

```
Y<space>1<CR><LF>
```

**- 3 -**

Set *Device Name* parameter in [USER INFORMATION SECTION](#) folder:

Path: /UserInfo/Name  
Shortcut: 522  
Type: 2 (String)  
Length: 0 to 128  
Value: CBX800

The 'Set Parameter' programming string is:

```
SP<space>/UserInfo/Name:CBX800<CR><LF>
```

The 'Set Shortcut' programming string is:

```
SS<space>522:CBX800<CR><LF>
```

After entering the programming string the reader responds with the message:

```
Y<space>CBX800<CR><LF>
```

**- 4 -**

Set *Header String* parameter in [DIAGNOSTICS](#) folder:

Path: /Diagno/Format/Header  
Shortcut: 5101  
Type: 3 (Binary String)  
Length: 0 to 128  
Default: <STX> (HEX value: 02H)

The 'Set Parameter' programming string is:

```
SP<space>/Diagno/Format/Header:1<space>02<CR><LF>
```

The 'Set Shortcut' programming string is:

```
SS<space>5101:1<space>02<CR><LF>
```

After enter the programming string, the reader responds with the message:

```
Y<space>1<space>02<CR><LF>
```

**- 5 -**

Get value of *Enable Diagnostics* parameter in [DIAGNOSTICS](#) folder:

Path:                /Diagno/Enable  
Shortcut:           5100  
Type:                1 (Enumeration)  
Current value:      1 (Entry 1 → Enable)

The 'Get Parameter' programming string is:

```
GP<space>/Diagno/Enable<CR><LF>
```

The 'Get Shortcut' programming string is:

```
GS<space>5100<CR><LF>
```

After entering the programming string, the reader responds with the message:

```
Y<space>1<CR><LF>
```

**- 6 -**

Get value of *Header String* parameter in [DIAGNOSTICS](#) folder:

Path:                /Diagno/Format/Header  
Shortcut:           5101  
Type:                3 (Binary String)  
Current value:      <STX> (HEX value: 02H)

The 'Get Parameter' programming string is:

```
GP<space>/Diagno/Format/Header<CR><LF>
```

The 'Get Shortcut' programming string is:

```
GS<space>5101<CR><LF>
```

After entering the programming string, the reader responds with the message:

```
Y<space>02<CR><LF>
```



## 4 CBX800 PARAMETERS LIST

### 4.1 SYSTEM LAYOUT

PARAMETER	COMPLETE PATH	SHC	PT	VALUE
<b>SYSTEM LAYOUT</b>				
ID-NET Network Baud Rate (bps)	/Layout /NetBaudMS	5144	1	1 = 19200 2 = 38400 3 = 57600 4 = 125Kb 5 = 250Kb 6 = 500Kb 7 = 1Mb
Host Port Type	/Layout /CBXModuleType	5303	1	0 = Serial 1 = Profibus 2 = DeviceNet 3 = Ethernet/IP (Ethernet/IP - TCP/IP) 4 = CC-Link 5 = CANopen 6 = Profinet (Profinet IO - TCP/IP) 8 = Modbus TCP (Modbus TCP - TCP/IP) 9 = Ethernet/TCP
Host Port Serial Protocol	/Layout /Mode	33	1	0 = Standard 1 = MUX 32 slave

### 4.2 DEVICE NETWORK SETTING

PARAMETER	COMPLETE PATH	SHC	PT	VALUE
<b>SCANNER CLUSTER</b>				
Cluster Description	/Cluster /Descr	197	2	Length: 0 to 32
Slave Address	/Cluster /SIAddr	35	1	1 = Slave 1 2 = Slave 2 3 = Slave 3 4 = Slave 4 ... 28 = Slave 28 29 = Slave 29 30 = Slave 30 31 = Slave 31

PARAMETER	COMPLETE PATH	SHC	PT	VALUE
<b>DEVICE IDENTIFICATION #N (DEPTH: N = 1 to 31)</b>				
Device Enable	/Cluster /Device#N /Enable	198 #N	1	0 = Disable 1 = Enable
Device Cluster	/Cluster /Device#N /Descr	199 #N	2	Length: 0 to 32
Low Level Address	/Cluster /Device#N /LowLevelAddress	701 #N	2	Length: 0 to 64

### 4.3 COMMUNICATION SETTINGS

PARAMETER	COMPLETE PATH	SHC	PT	VALUE
<b>GATEWAY</b>				
Data Rx Destination	/Comms /FieldbusOptions /FieldbusDataRx	5561	1	0 = CBX800 1 = Data Source Serial Port
Data Source Port Device Type	/Comms /FieldbusOptions /DataSourceDeviceType	5568	1	0 = Standard 1 = Vision Sensor
Heartbeat	/Comms /FieldbusOptions /HeartbeatEnFieldbus	5288	1	0 = Disable 1 = Enable
<b>GATEWAY / HEARTBEAT</b>				
Timeout (s)	/Comms /FieldbusOptions /HeartbeatFieldbus /TimeOutFieldbus	5297	0	Range: 1 to 3600
Heartbeat Header String	/Comms /FieldbusOptions /HeartbeatFieldbus /HeaderFieldbus	5294	3	Length: 1 to 128
Heartbeat Fields Separator	/Comms /FieldbusOptions /HeartbeatFieldbus /SeparatorFieldbus	5295	3	Length: 1 to 128
Counter Module	/Comms /FieldbusOptions /HeartbeatFieldbus /CounterModFieldbus	5290	1	0 = Disable 1 = 10 2 = 100 3 = 1000 4 = 10000 5 = Custom
Custom Counter Module	/Comms /FieldbusOptions /HeartbeatFieldbus /CustomCounterModFieldbus	5292	0	Range: 2 to 10000

PARAMETER	COMPLETE PATH	SHC	PT	VALUE
Counter Starting Value	/Comms /FieldbusOptions /HeartbeatFieldbus /CounterStartFieldbus	5291	0	Range: 0 to 9999
Counter Direction	/Comms /FieldbusOptions /HeartbeatFieldbus /CounterDirectionFieldbus	5289	1	0 = Up 1 = Down
System Diagnostics	/Comms /FieldbusOptions /HeartbeatFieldbus /SysDiagFieldbus	5296	1	0 = Disable 1 = Enable
Network Diagnostics	/Comms /FieldbusOptions /HeartbeatFieldbus /DevDiagFieldbus	5293	1	0 = Disable 1 = Enable
Heartbeat Terminator String	/Comms /FieldbusOptions /HeartbeatFieldbus /TerminatorFieldbus	5304	3	Length: 1 to 128
<b>GATEWAY / BUS COMMUNICATION</b>				
Baud Rate (CC-LINK)	/Comms /FieldbusOptions /BusData /CCLinkBaudRate	5426	1	0 = 156 Kbps 1 = 625 Kbps 2 = 2.5 Mbps 3 = 5 Mbps 4 = 10 Mbps
Version	/Comms /FieldbusOptions /BusData /FieldbusVersion	5413	0	Range: 1 to 2
Master Input Area Size (Profibus)	/Comms /FieldbusOptions /BusData /ProfibusInputSize	270	0	Range: 8 to 144
Master Input Area Size (DeviceNet)	/Comms /FieldbusOptions /BusData /DeviceNetInputSize	5278	0	Range: 8 to 144
Master Input Area Size (Ethernet/IP)	/Comms /FieldbusOptions /BusData /EthernetIPInputSize	5282	0	Range: 8 to 144
Master Input Area Size (CC-LINK)	/Comms /FieldbusOptions /BusData /CCLinkInputSize	5355	0	Range: 2 to 126
Master Input Area Size (CANOpen)	/Comms /FieldbusOptions /BusData /CANOpenInputSize	5322	0	Range: 8 to 144

PARAMETER	COMPLETE PATH	SHC	PT	VALUE
Master Input Area Size (Profinet)	/Comms /FieldbusOptions /BusData /ProfinetInputSize	5325	0	Range: 8 to 56
Master Input Area Size (Modbus)	/Comms /FieldbusOptions /BusData /ModbusRtuInputSize	5372	0	Range: 8 to 144
Master Input Area Size (Modbus TCP)	/Comms /FieldbusOptions /BusData /ModbusTcpInputSize	5373	0	Range: 8 to 144
Master Output Area Size (Profibus)	/Comms /FieldbusOptions /BusData /ProfibusOutputSize	271	0	Range: 8 to 144
Master Output Area Size (DeviceNet)	/Comms /FieldbusOptions /BusData /DeviceNetOutputSize	5280	0	Range: 8 to 144
Master Output Area Size (Ethernet/IP)	/Comms /FieldbusOptions /BusData /EthernetIPOutputSize	5283	0	Range: 8 to 144
Master Output Area Size (CC-LINK)	/Comms /FieldbusOptions /BusData /CCLinkOutputSize	5356	0	Range: 2 to 128
Master Output Area Size (CANOpen)	/Comms /FieldbusOptions /BusData /CANOpenOutputSize	5321	0	Range: 8 to 144
Master Output Area Size (Profinet)	/Comms /FieldbusOptions /BusData /ProfinetOutputSize	5326	0	Range: 8 to 56
Master Output Area Size (Modbus)	/Comms /FieldbusOptions /BusData /ModbusRtuOutput Size	5374	0	Range: 8 to 144
Master Output Area Size (Modbus TCP)	/Comms /FieldbusOptions /BusData /ModbusTcpOutput Size	5375	0	Range: 8 to 144
Node Address (Profibus)	/Comms /FieldbusOptions /BusData /ProfibusNodeAddr	268	0	Range: 0 to 126

PARAMETER	COMPLETE PATH	SHC	PT	VALUE
Node address (MAC ID) (DeviceNet)	/Comms /FieldbusOptions /BusData /DeviceNetNodeAddr	5279	0	Range: 0 to 63
Node address (CC-LINK)	/Comms /FieldbusOptions /BusData /CCLinkNodeAddr	5319	0	Range: 1 to 64
Node address (CANOpen)	/Comms /FieldbusOptions /BusData /CANOpenNodeAddr	5323	0	Range: 1 to 127
Node address (Modbus)	/Comms /FieldbusOptions /BusData /ModbusRtuNodeAddr	5427	0	Range: 1 to 127
Data Flow Control	/Comms /FieldbusOptions /BusData /FlowControl	269	1	0 = Disable 2 = DAD Driver
Data Consistency	/Comms /FieldbusOptions /BusData /ConsistencyAbil	290	1	0 = Disable 1 = Enable
Process Active Timeout ms	/Comms /FieldbusOptions /BusData /ProcessActiveTimeout	5421	0	Range: 0 to 65535
Mode	/Comms /FieldbusOptions /BusData /Mode	5422	1	0 = RTU 1 = ASCII
Connection Timeout ms	/Comms /FieldbusOptions /BusData /ConnectionTimeout	5423	0	Range: 0 to 65535
<b>GATEWAY / LINE PARAMETERS</b>				
IP Addressing	/Comms /FieldbusOptions /Ethernet /IPAddressing	95	1	0 = Static Assignment 1 = DHCP 2 = Remote Assignment
IP Addressing (BM200)	/Comms /FieldbusOptions /Ethernet /IPAddressingBm200	5550	1	0 = Static Assignment 1 = DHCP
IP_address	/Comms /FieldbusOptions /Ethernet /IP_address	96	2	Max Length: 16

PARAMETER	COMPLETE PATH	SHC	PT	VALUE
IP_netmask	/Comms /FieldbusOptions /Ethernet /IP_netmask	97	2	Max Length: 16
IP_gateway	/Comms /FieldbusOptions /Ethernet /IP_gateway	98	2	Max Length: 16
IP_address (BM200)	/Comms /FieldbusOptions /Ethernet /IP_addressBm200	5551	2	Max Length: 16
IP_netmask (BM200)	/Comms /FieldbusOptions /Ethernet /IP_netmaskBm200	5552	2	Max Length: 16
IP_gateway (BM200)	/Comms /FieldbusOptions /Ethernet /IP_gatewayBm200	5553	2	Max Length: 16
Station Name	/Comms /FieldbusOptions /Ethernet /StationName	5425	2	Max Length: 32
<b>GATEWAY / TCP/IP SERVICES / USER SOCKET#1</b>				
Status	/Comms /FieldbusOptions /Services /UserSocket1 /Status1	134	1	0 = Disable 1 = Enable
Data Rx Destination	/Comms /FieldbusOptions /Services /UserSocket1 /Sock1DataRx	5562	1	0 = CBX800 1 = Data Source Serial Port
Heartbeat	/Comms /FieldbusOptions /Services /UserSocket1 /HeartbeatEnSocket1	5260	1	0 = Disable 1 = Enable
Type	/Comms /FieldbusOptions /Services /UserSocket1 /Type	135	1	0 = Server 1 = Client
Server Address	/Comms /FieldbusOptions /Services /UserSocket1 /Server_address	136	2	Max Length: 256

PARAMETER	COMPLETE PATH	SHC	PT	VALUE
Protocol	/Comms /FieldbusOptions /Services /UserSocket1 /Protocol	137	1	0 = TCP 1 = UDP
Port	/Comms /FieldbusOptions /Services /UserSocket1/Port	138	0	Range: 0 to 64538
<b>GATEWAY / TCP/IP SERVICES / USERSOCKET#1 / HEARTBEAT</b>				
Timeout (s)	/Comms /FieldbusOptions /Services /UserSocket1 /HeartbeatSocket /TimeOutSocket1	5261	0	Range: 0 to 3600
Heartbeat Header String	/Comms /FieldbusOptions /Services /UserSocket1 /HeartbeatSocket /HeaderSocket1	5262	3	Length: 1 to 128
Heartbeat Fields Separator	/Comms /FieldbusOptions /Services /UserSocket1 /HeartbeatSocket /SeparatorSocket1	5263	3	Length: 1 to 128
Counter Module	/Comms /FieldbusOptions /Services /UserSocket1 /HeartbeatSocket /CounterModSocket1	5264	1	0 = Disable 1 = 10 2 = 100 3 = 1000 4 = 10000 5 = Custom
Custom Counter Module	/Comms /FieldbusOptions /Services /UserSocket1 /HeartbeatSocket /CustomCounterMod Socket1	5265	0	Range: 2 to 10000
Counter Starting Value	/Comms /FieldbusOptions /Services /UserSocket1 /HeartbeatSocket /CounterStartSocket1	5266	0	Range: 0 to 9999

PARAMETER	COMPLETE PATH	SHC	PT	VALUE
Counter Direction	/Comms /FieldbusOptions /Services /UserSocket1 /HeartbeatSocket /CounterDirection Socket1	5267	1	0 = Up 1 = Down
System Diagnostics	/Comms /FieldbusOptions /Services /UserSocket1 /HeartbeatSocket /SysDiagSocket1	5268	1	0 = Disable 1 = Enable
Network Diagnostics	/Comms /FieldbusOptions /Services /UserSocket1 /HeartbeatSocket /DevDiagSocket1	5269	1	0 = Disable 1 = Enable
Heartbeat Terminator String	/Comms /FieldbusOptions /Services /UserSocket1 /HeartbeatSocket /TerminatorSocket1	5270	3	Length: 1 to 128
<b>GATEWAY / TCP/IP SERVICES / USER SOCKET#2</b>				
Status	/Comms /FieldbusOptions /Services /UserSocket2 /Status2	5329	1	0 = Disable 1 = Enable
Data Rx Destination	/Comms /FieldbusOptions /Services /UserSocket1 /Sock2DataRx	5563	1	0 = CBX800 1 = Data Source Serial Port
Heartbeat	/Comms /FieldbusOptions /Services /UserSocket2 /HeartbeatEnSocket2	5331	1	0 = Disable 1 = Enable
Type	/Comms /FieldbusOptions /Services /UserSocket2 /Type2	5342	1	0 = Server 1 = Client
Server Address	/Comms /FieldbusOptions /Services /UserSocket2 /Server_address2	5343	2	Max Length: 256



PARAMETER	COMPLETE PATH	SHC	PT	VALUE
Protocol	/Comms /FieldbusOptions /Services /UserSocket2 /Protocol2	5344	1	0 = TCP 1 = UDP
Port	/Comms /FieldbusOptions /Services /UserSocket2 /Port2	5345	0	Range: 0 to 64538
<b>GATEWAY / TCP/IP SERVICES / USERSOCKET#2 / HEARTBEAT</b>				
Timeout (s)	/Comms /FieldbusOptions /Services /UserSocket2 /HeartbeatSocket /TimeOutSocket2	5332	0	Range: 0 to 3600
Heartbeat Header String	/Comms /FieldbusOptions /Services /UserSocket2 /HeartbeatSocket /HeaderSocket2	5333	3	Length: 1 to 128
Heartbeat Fields Separator	/Comms /FieldbusOptions /Services /UserSocket2 /HeartbeatSocket /SeparatorSocket2	5334	3	Length: 1 to 128
Counter Module	/Comms /FieldbusOptions /Services /UserSocket2 /HeartbeatSocket /CounterModSocket2	5335	1	0 = Disable 1 = 10 2 = 100 3 = 1000 4 = 10000 5 = Custom
Custom Counter Module	/Comms /FieldbusOptions /Services /UserSocket2 /HeartbeatSocket /CustomCounterMod Socket2	5336	0	Range: 2 to 10000
Counter Starting Value	/Comms /FieldbusOptions /Services /UserSocket2 /HeartbeatSocket /CounterStartSocket2	5337	0	Range: 0 to 9999

PARAMETER	COMPLETE PATH	SHC	PT	VALUE
Counter Direction	/Comms /FieldbusOptions /Services /UserSocket2 /HeartbeatSocket /CounterDirection Socket2	5338	1	0 = Up 1 = Down
System Diagnostics	/Comms /FieldbusOptions /Services /UserSocket2 /HeartbeatSocket /SysDiagSocket2	5339	1	0 = Disable 1 = Enable
Network Diagnostics	/Comms /FieldbusOptions /Services /UserSocket2 /HeartbeatSocket /DevDiagSocket2	5340	1	0 = Disable 1 = Enable
Heartbeat Terminator String	/Comms /FieldbusOptions /Services /UserSocket2 /HeartbeatSocket /TerminatorSocket2	5341	3	Length: 1 to 128
<b>GATEWAY / TCP/IP SERVICES / MODBUS TCP</b>				
Status	/Comms /FieldbusOptions /Services /Modbus /Status	5628	1	0 = Disable 1 = Enable
Type	/Comms /FieldbusOptions /Services /Modbus /Type3	5624	1	0=Server 1=Client
Server Address	/Comms /FieldbusOptions /Services /Modbus /Server_address	126	2	Max Length: 256
Start Register Number	/Comms /FieldbusOptions /Services /Modbus /Start_reg	5629	0	Range: 0 to 256
Number Of Registers (valid when Type = Client)	/Comms /FieldbusOptions /Services /Modbus /Num_reg	5630	0	Range: 1 to 256

PARAMETER	COMPLETE PATH	SHC	PT	VALUE
Number Of Registers (valid when Type = Server)	/Comms /FieldbusOptions /Services /Modbus /MaxNumReg	5620	0	Range: 1 to 256
<b>GATEWAY / TCP/IP SERVICES / ETHERNET/IP</b>				
Status	/Comms /FieldbusOptions /Services /EthernetIP /Status	5609	1	0 = Disable 1 = Enable
<b>HOST SERIAL PORT</b>				
Data Rx Destination	/Comms /SerMain /SerMainDataRx	5566	1	0=CBX800 1=Data Source Serial Port
Heartbeat	/Comms /SerMain /HeartbeatEnM	5069	1	0 = Disable 1 = Enable
<b>HOST SERIAL PORT / HEARTBEAT</b>				
Timeout (s)	/Comms /SerMain/HeartbeatM /TimeOutM	5079	0	Range: 1 to 3600
Heartbeat Header String	/Comms /SerMain/HeartbeatM /HeaderM	5075	3	Length: 0 to 128
Heartbeat Fields Separator String	/Comms /SerMain/HeartbeatM /SeparatorM	5076	3	Length: 0 to 128
Counter Module	/Comms /SerMain/HeartbeatM /CounterModM	5071	1	0 = Disable 1 = 10 2 = 100 3 = 1000 4 = 10000 5 = Custom
Custom Counter Module	/Comms /SerMain/HeartbeatM /CustomCounterModM	5073	0	Length: 2 to 10000
Counter Starting Value	/Comms /SerMain/HeartbeatM /CounterStartM	5072	0	Length: 0 to 9999
Counter Direction	/Comms /SerMain/HeartbeatM /CounterDirectionM	5070	1	0 = Up 1 = Down
System Diagnostics	/Comms /SerMain/HeartbeatM /SysDiagM	5077	1	0 = Disable 1 = Enable
Network Diagnostics	/Comms /SerMain/HeartbeatM /DevDiagM	5074	1	0 = Disable 1 = Enable

PARAMETER	COMPLETE PATH	SHC	PT	VALUE
Heartbeat Terminator String	/Comms /SerMain/HeartbeatM /TerminatorM	5078	3	Length: 0 to 128
<b>HOST SERIAL PORT / LINE PARAMETERS</b>				
Electrical Interface	/Comms /SerMain/Line /MainHW	10	1	0 = RS232 1 = RS485 Full Duplex
Mux 32 Protocol Address	/Comms /SerMain/Line /Addr	58	0	Range: 0 to 31
Handshake (RS232)	/Comms /SerMain/Line /FlowCtrl	57	1	0 = None 1 = Hardware (RTS/CTS) 2 = Software (Xon/Xoff)
Handshake (RS485)	/Comms /SerMain/Line /Flow485	60	1	0 = None 1 = Software (Xon/Xoff)
Baud Rate (Standard)	/Comms /SerMain/Line /StdBaud	49	1	8 = 1200 1 = 2400 2 = 4800 3 = 9600 4 = 19200 5 = 38400 6 = 57600 7 = 115200
Baud Rate (Mux)	/Comms /SerMain/Line /MuxBaud	59	1	1 = 2400 2 = 4800 3 = 9600 4 = 19200 5 = 38400 6 = 57600
Parity	/Comms /SerMain/Line /Parity	50	1	0 = None 1 = Odd 2 = Even
Data Bits	/Comms /SerMain/Line/Data	51	1	0 = 7 1 = 8
Stop Bits	/Comms /SerMain/Line/Stop	52	1	0 = 1 1 = 2
<b>AUXILIARY SERIAL PORT</b>				
Heartbeat	/Comms /SerAux /HeartbeatEnA	5068	1	0 = Disable 1 = Enable
<b>AUXILIARY SERIAL PORT / HEARTBEAT</b>				
Timeout (s)	/Comms /SerAux/HeartbeatA /TimeOutA	5067	0	Range: 1 to 3600
Heartbeat Header String	/Comms /SerAux/HeartbeatA /HeaderA	5063	3	Length: 0 to 128

PARAMETER	COMPLETE PATH	SHC	PT	VALUE
Heartbeat Fields Separator	/Comms /SerAux/HeartbeatA /SeparatorA	5064	3	Length: 0 to 128
Counter Module	/Comms /SerAux/HeartbeatA /CounterModA	5059	1	0 = Disable 1 = 10 2 = 100 3 = 1000 4 = 10000 5 = Custom
Custom Counter Module	/Comms /SerAux/HeartbeatA /CustomCounterModA	5061	0	Length: 2 to 10000
Counter Starting Value	/Comms /SerAux/HeartbeatA /CounterStartA	5060	0	Length: 0 to 9999
Counter Direction	/Comms /SerAux/HeartbeatA /CounterDirectionA	5058	1	0 = Up 1 = Down
System Diagnostics	/Comms /SerAux/HeartbeatA /SysDiagA	5065	1	0 = Disable 1 = Enable
Network Diagnostics	/Comms /SerAux/HeartbeatA /DevDiagA	5062	1	0 = Disable 1 = Enable
Heartbeat Terminator String	/Comms /SerAux/HeartbeatA /TerminatorA	5066	3	Length: 0 to 128
<b>AUXILIARY SERIAL PORT / LINE PARAMETERS</b>				
Baud Rate	/Comms /SerAux/Line /StdBaud	53	1	8 = 1200 1 = 2400 2 = 4800 3 = 9600 4 = 19200 5 = 38400 6 = 57600 7 = 115200
Parity	/Comms /SerAux/Line /Parity	54	1	0 = None 1 = Odd 2 = Even
Data Bits	/Comms /SerAux/Line /Data	55	1	0 = 7 1 = 8
Stop Bits	/Comms /SerAux/Line /Stop	56	1	0 = 1 1 = 2
<b>DATA SOURCE SERIAL PORT</b>				
Data Destination: Host Serial Port	/Comms /DataSource /PTDestMain2	5884	1	0 = Disable 1 = Enable

PARAMETER	COMPLETE PATH	SHC	PT	VALUE
Data Destination: Auxiliary Serial Port	/Comms /DataSource /PTDestAux2	5632	1	0 = Disable 1 = Enable
Data Destination: Gateway	/Comms /DataSource /PTDestFieldbus2	5508	1	0 = Disable 1 = Enable
Data Destination: ID-NET	/Comms /DataSource /PTDestNet	5483	1	0 = Disable 1 = Enable
Send Data On	/Comms /DataSource /SendDataOn	5567	1	0 = Termination String 1 = Timeout
Expected Termination String	/Comms /DataSource /SendDataOn	5482	3	Length: 0 to 32
<b>DATA SOURCE LINE PARAMETERS</b>				
Electrical Interface	/Comms /DataSource/Line /MainHW2	5463	1	0 = RS232 1 = RS485 Full Duplex
Baud Rate	/Comms /DataSource/Line /StdBaud2	5467	1	8 = 1200 1 = 2400 2 = 4800 3 = 9600 4 = 19200 5 = 38400 6 = 57600 7 = 115200
Parity	/Comms /DataSource/Line /Parity2	5469	1	0 = None 1 = Odd 2 = Even
Data Bits	/Comms /DataSource/Line/Data2	5470	1	0 = 7 1 = 8
Stop Bits	/Comms /DataSource/Line/Stop2	5471	1	0 = 1 1 = 2

#### 4.4 DIAGNOSTICS

PARAMETER	COMPLETE PATH	SHC	PT	VALUE
<b>DIAGNOSTICS</b>				
Enable	/Diagno /Enable	5100	1	0 = Disable 1 = Enable
Refresh Time	/Diagno /RefreshT	5110	1	1 = 1 s 2 = 2 s 5 = 5 s 10 = 10 s 30 = 30 s 60 = 1 min
ID-NET Controller Failure	/Diagno /LocalNetBoard	5105	1	0 = Disable 1 = Enable

PARAMETER	COMPLETE PATH	SHC	PT	VALUE
Wrong Rotary Switch Selection	/Diagno /WrongRSPosition	5307	1	0 = Disable 1 = Enable
Fieldbus Failure	/Diagno /FBusFailure	5305	1	0 = Disable 1 = Enable
Fieldbus Mismatch	/Diagno /FBusMisMatch	5306	1	0 = Disable 1 = Enable
Fieldbus Configuration Error	/Diagno /FBusConfErr	5400	1	0 = Disable 1 = Enable
Fieldbus DHCP Problem	/Diagno /FBusDhcpProblem	5401	1	0 = Disable 1 = Enable
<b>ACTIONS</b>				
TX Mode	/Diagno /Actions /TxMode	5096	1	0 = On Timeout 1 = With Code"
TX Refresh	/Diagno /Actions /AsyncTO	5092	1	1 = 1 sec 2 = 2 sec 5 = 5 sec 10 = 10 sec 20 = 20 sec 30 = 30 sec 60 = 1 min 300 = 5 min
Message Position	/Diagno /Actions/SyncOpt	5095	1	0 = Append to Code 1 = Replace Code
Main	/Diagno /Actions /SerMainTx	5094	1	0 = Disable 1 = Enable
Aux	/Diagno /Actions /SerAuxTx	5093	1	0 = Disable 1 = Enable
Fieldbus	/Diagno /Actions /DiagnoFieldbus	5358	1	0 = Disable 1 = Enable
UserSocket#1	/Diagno /Actions /DiagnoUserSocket1	5354	1	0 = Disable 1 = Enable
UserSocket#2	/Diagno /Actions /DiagnoUserSocket2	5357	1	0 = Disable 1 = Enable
<b>FORMAT</b>				
Header String	/Diagno /Format /Header	5101	3	Length: 1 to 128
Terminator String	/Diagno /Format /Terminator	5102	3	Length: 1 to 128
Node Identification	/Diagno /Format /NodeIdentification	5253	3	Length: 1 to 128

PARAMETER	COMPLETE PATH	SHC	PT	VALUE
Diagnostic Message Format	/Diagno /Format /UseCabledMsg	5080	1	0 = Internal Numeric Messages 1 = User Defined Messages
<b>FORMAT / USER DEFINED MESSAGES</b>				
Local Net Failure	/Diagno /Format/UserDefMsg /LocalNetErrorMsg	5082	3	Length: 1 to 128
Wrong Rotary Switch Selection	/Diagno /Format/UserDefMsg /WrongRSPositionMsg	5310	3	Length: 1 to 128
Fieldbus Failure	/Diagno /Format/UserDefMsg /FieldBusFailureMsg	5312	3	Length: 1 to 128
Fieldbus Mismatch	/Diagno /Format/UserDefMsg /FieldBusMismatchMsg	5311	3	Length: 1 to 128
Fieldbus Configuration Error	/Diagno /Format/UserDefMsg /FieldBusConfErrMsg	5410	3	Length: 1 to 128
Fieldbus DHCP Problem	/Diagno /Format/UserDefMsg /FieldBusDhcpProblemMsg	5411	3	Length: 1 to 128

#### 4.5 USER INFORMATION SECTION

PARAMETER	COMPLETE PATH	SHC	PT	VALUE
<b>USER INFORMATION SECTION</b>				
User Name	/UserInfo /EndUser	521	2	Length: 0 to 32
Device Name	/UserInfo /Name	522	2	Length: 0 to 128
Line Name	/UserInfo /Line	523	2	Length: 0 to 128



## A SPECIAL COMMANDS AND TABLES

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### ID-NET™ SPECIAL COMMANDS

The following special command allows to send strings to a Slave #N through the Master device in an ID-NET™ reading system layout. In order to send this special command, it is not necessary to switch the reader into **Host Mode**.

This special command can be used to send "Serial Start String" and "Serial Stop String" (for "Serial On Line" operating mode option) to a Slave device in an ID-NET™ reading system layout.

The CBX800 '**Send String To Slave Device #N**' special command must have the following format:

**<ESC> ( <B0<sub>H</sub>> ADDR STRING ) <ESC>**

Where:

- **ADDR:** Device Address
- **STRING:** String To Send (Length: 1 to 32)

**ADDR** is a character indicating the address of the device in an ID-NET™ Master/Slave reading system layout:

**ADDR = <30<sub>H</sub>> + <Device Address>** where:

- Device Address = 0:** Stand Alone device or Master ID-NET™ device
- Device Address = 1 to 31:** Slave ID-NET™ device
- Device Address = 32:** ID-NET™ broadcast address

This means:

- ADDR = <30<sub>H</sub>>:** Stand Alone device or Master ID-NET™ device
- ADDR = <31<sub>H</sub>> to <4F<sub>H</sub>>:** Slave ID-NET™ device
- ADDR = <50<sub>H</sub>>** ID-NET™ broadcast address

## ERROR CODES TABLE

This paragraph provides a list of the most important error codes.

CODE	INTERPRETATION
<b>COMMAND PARSING</b>	
-3	Parameter does not exist.
-4	Invalid range.
-8	Wrong syntax error.
-9	Wrong shortcut error.
-12	Path not found.
-13	Unknown command.
-14	Too many parameters in the programming string.
-15	No command is present in the programming string.
-16	Wrong number of parameters in the programming string.
-17	Unexpected error.
-19	One or more parameters are not applicable.
<b>PARAMETERS PROGRAMMING</b>	
3	The current Path is not valid.
7	The current Path is a Folder
8	Parameter Type is not correct.
9	Parameter Value is not correct.
12	One or more Control Rules are not satisfied.
13	Access denied.

## ASCII TABLE

CHARACTER TO HEX CONVERSION TABLE					
CHAR	HEX	CHAR	HEX	CHAR	HEX
NUL	00	*	2A	U	55
SOH	01	+	2B	V	56
STX	02	,	2C	W	57
ETX	03	-	2D	X	58
EOT	04	.	2E	Y	59
ENQ	05	/	2F	Z	5A
ACK	06	0	30	[	5B
BEL	07	1	31	\	5C
BS	08	2	32	]	5D
HT	09	3	33	^	5E
LF	0A	4	34	~	5F
VT	0B	5	35	a	60
FF	0C	6	36	b	61
CR	0D	7	37	c	62
SO	0E	8	38	d	63
SI	0F	9	39	e	64
DLE	10	:	3A	f	65
DC1	11	;	3B	g	66
DC2	12	<	3C	h	67
DC3	13	=	3D	i	68
DC4	14	>	3E	j	69
NAK	15	?	3F	k	6A
SYN	16	@	40	l	6B
ETB	17	A	41	m	6C
CAN	18	B	42	n	6D
EM	19	C	43	o	6E
SUB	1A	D	44	p	6F
ESC	1B	E	45	q	70
FS	1C	F	46	r	71
GS	1D	G	47	s	72
RS	1E	H	48	t	73
US	1F	I	49	u	74
SPACE	20	J	4A	v	75
!	21	K	4B	w	76
"	22	L	4C	x	77
#	23	M	4D	y	78
\$	24	N	4E	z	79
%	25	O	4F	{	7A
&	26	P	50		7B
'	27	Q	51	}	7C
(	28	R	52	~	7D
)	29	S	53	DEL	7E
		T	54		7F

