



SC4000 ID-NET Controller Software Configuration Parameter Guide

- Code Definition
- Operating Modes
- System Layout
- Communication Settings
- Data Format
- Built-In Digital I/Os
- Display & Keypad
- Diagnostics
- Statistics
- User Information Section
- System Information Section

SW package 003 and later

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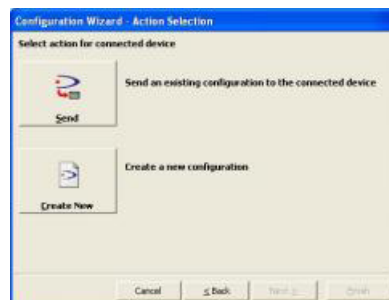
Guide to Rapid Configuration

Wizard for Quick Reader Setup

After installing the Genius™ software program the following window appears asking the user to choose the desired configuration level:



The Wizard option is advised to new users, since it shows a step-by-step scanner configuration. Select the *Create a new configuration* button.

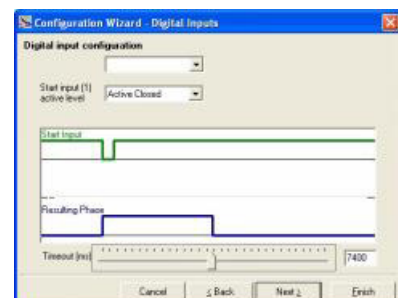
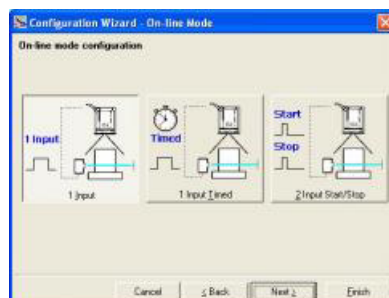
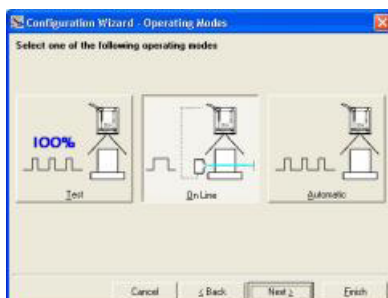


You will be guided through the configuration being asked to define the following parameters:

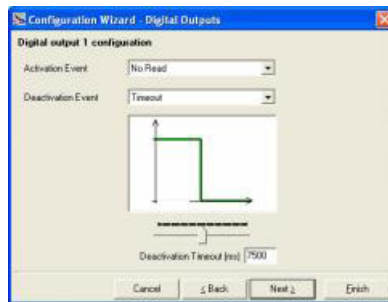
- Barcode selection and definition;



- Operating mode selection and definition;



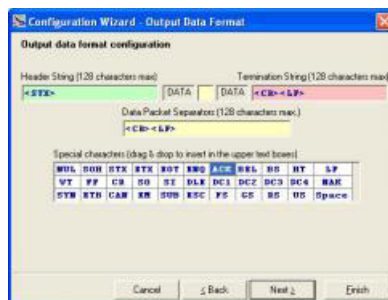
- Digital Outputs configuration;



- Hardware interface selection;

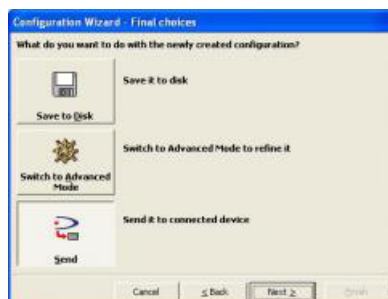


- Output data format configuration;

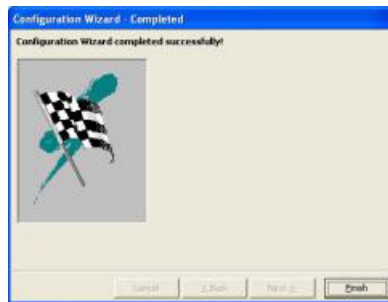


After defining the parameter values the following window appears allowing to complete the reader configuration as follows:

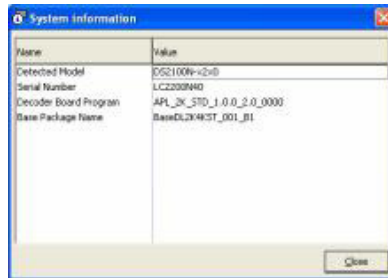
- Saving the configuration to disk;
- Switching to Advanced mode;
- Sending the configuration to the scanner.



After sending the configuration to the scanner you have completed the configuration process.



By clicking Finish, the System Information window will be displayed with specific information concerning the scanner.



Network Setup

The Network Setup allows configuring your ID-NET™ Network through the Master using Genius™.

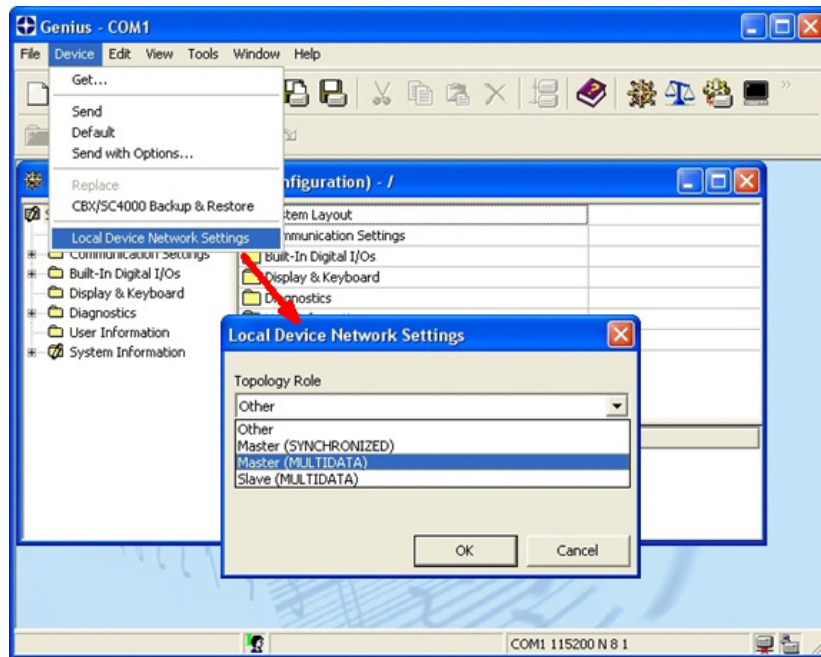
Three different procedures are available to define the number of network slave scanners, their label and address according to two main conditions:

Condition	Available Procedure	Feature
<u>Unknown Slave Addresses</u>	Net-Autoset	automatically assigns random addresses to slave scanners.
<u>Known Slave Addresses</u>	Network Wizard	customizes the network (slave label and address definition and physical identification of a specific slave within network), updates configuration to a file and makes it ready to be sent to the Master.
	Express Network Setup	automatically performs all the operations of the Network Wizard apart from the physical identification of a specific slave scanner.

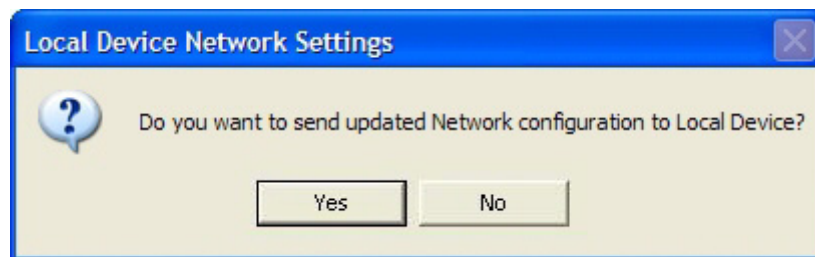
NOTE


The Network Setup procedure as described requires Genius™ software version 1.06 or later. In addition, the Net-Autoset procedure requires device software version 2.00 or later.

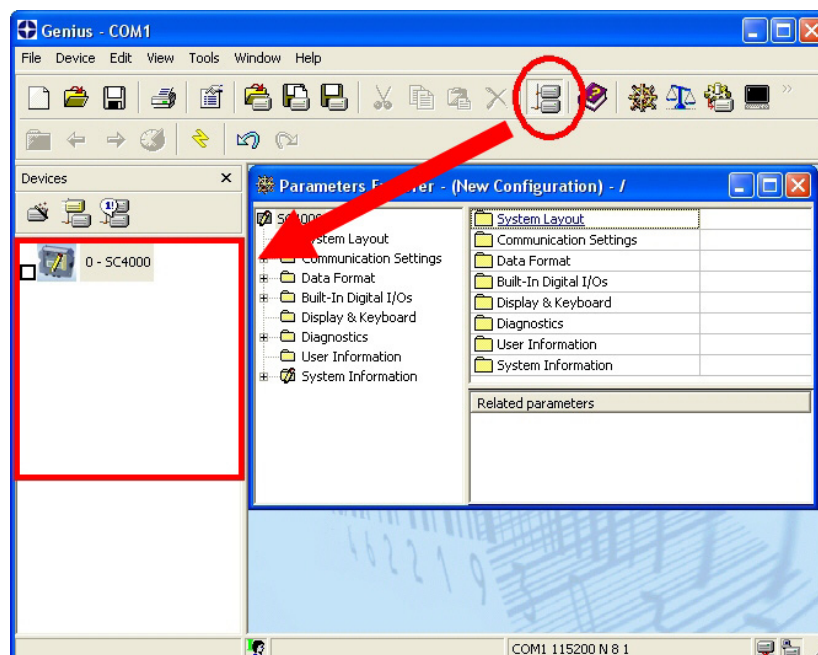
1. **The first operation** to perform is the configuration of your **SC4000 as "Master"** from the Local Device Network Settings item in the Device Menu, see figure below:



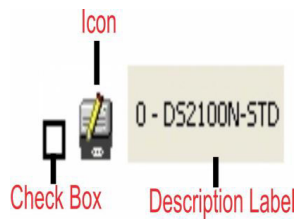
The following dialog box appears asking whether to send the configuration to the Local Device or not:



2. Click the "Yes" button; then, click on the  icon available on the Toolbar to make the "Devices" area appear next to the Parameter Explorer window. By repeatedly clicking the icon this area will be displayed or hidden.



Each scanner of the cluster is indicated by the following graphical objects:



- check box allowing to select/deselect a specific scanner to perform the desired operations (i.e. program downloading);
 - icon representing the scanner status;
- a label reporting information transmitted by the scanner when connected (the scanner address, generated errors, scanner description).

3. **Then, proceed with the network setup** by using one of the icons available on the Tool Bar according to the procedure to follow:



= Net-Autoset procedure



= Network Wizard procedure



= Express Network Setup procedure

Net-Autoset

This procedure is to be used when all scanner addresses and labels are unknown (typically when configuring the network for the first time or whenever a network reconfiguration is required).



By clicking the icon or selecting the "Net-Autoset" option from the Device menu, the Net-Autoset procedure is started allowing automatic assignment of random addresses to all slave scanners connected within the network.

Once the procedure has been completed, it is possible to:

- define customized addresses and labels through the Network Wizard;
- display the scanner default labels through the Express Network Setup.

Express Network Setup

Before performing this procedure, an ID-NET™ address must be assigned to each slave device. The most practical method is through the Net-Autoset procedure. Refer to the scanner Reference manual for details about alternative address assignment methods.

Once all addresses have been assigned, the Express Network Setup is to be used when all scanner addresses and labels do not need to be modified.



By clicking on the icon or by choosing the related option from the right-click menu, the procedure is started which automatically performs the following operations:


- opening the wizard;
- polling the network to discover connected scanners;
- transferring all device found to the "Requested Devices" area of the wizard where your network customization is defined;
- saving the new network configuration;

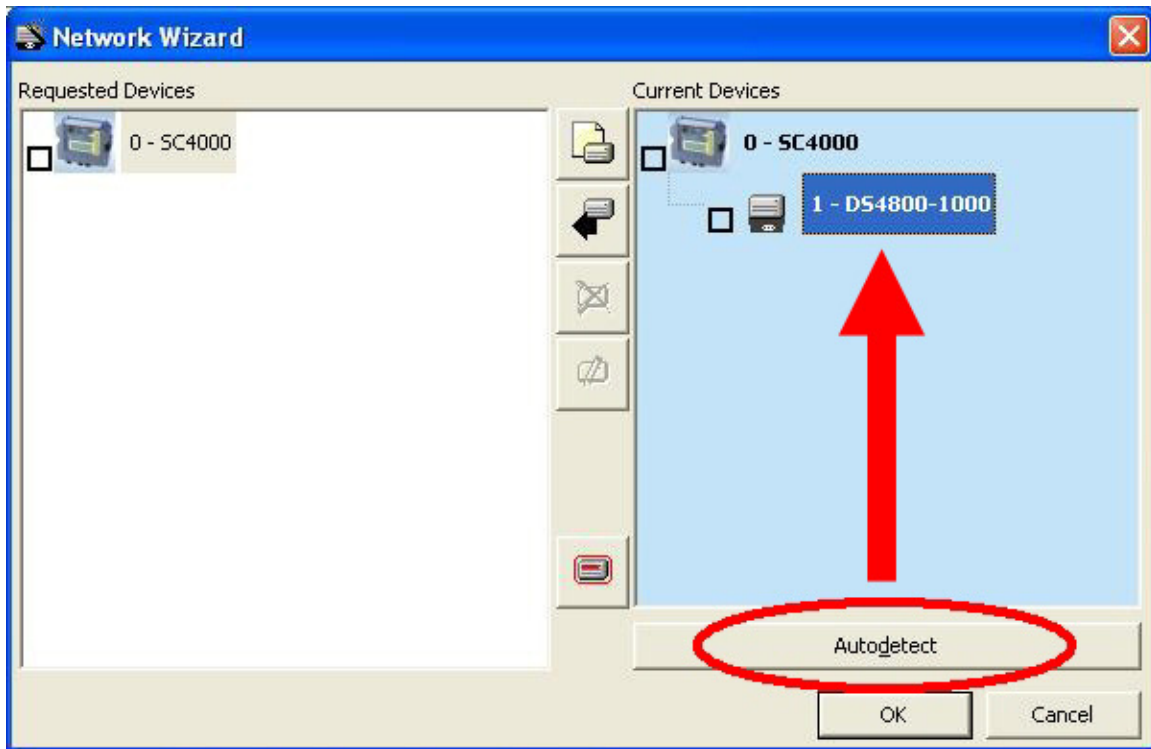
Once the procedure has been completed, a dialog box will appear asking whether to send the configuration to the Local Device. Choose the "Yes" option to start this procedure.

Network Wizard


Before performing this procedure, an ID-NET™ address must be assigned to each slave scanner. The most practical method is through the Net-AutoSet procedure. Refer to the scanner Reference manual for details about alternative address assignment methods.

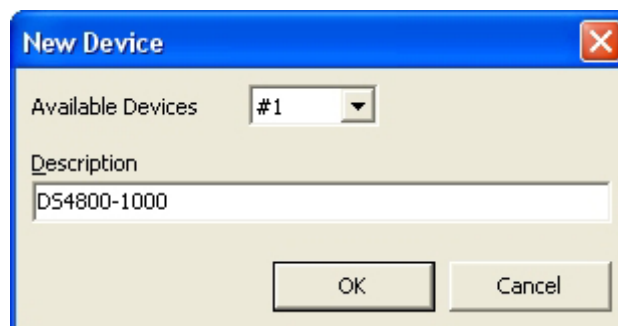
Once all addresses have been assigned, the Network Wizard is to be used when one or more scanner addresses and labels need to be modified.


1. Click on the  button to open the Network Wizard dialog box:




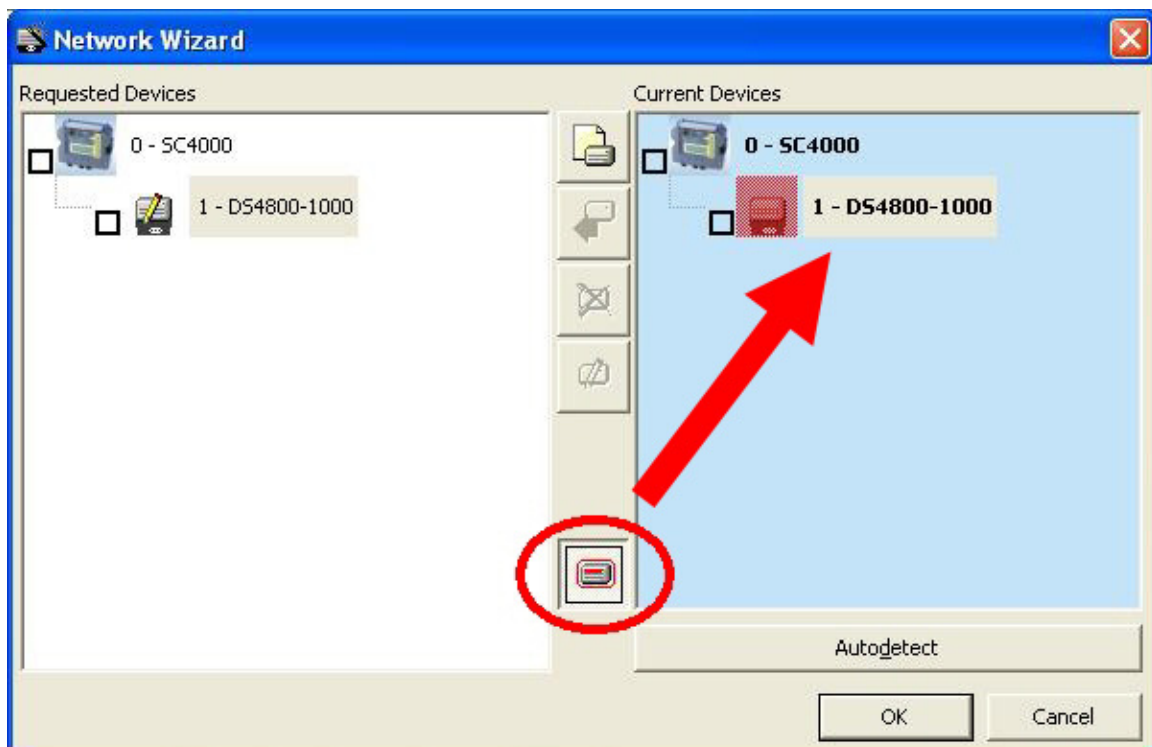
- a. if the slave scanners have already been configured and wired to the network, click on the Autodetect button to start a polling procedure of the current network. The master and all slave scanners found will be represented in the "Current Devices" area. Then, select the desired slave

device from the "Current Devices" area and click on the  icon (or drag and drop) to transfer it to the "Requested Devices" area where your network customization is defined. The following dialog box will appear allowing (if necessary) to change the slave address ("Available Device" field) and label ("Description" field):



- b. if the slave scanners have **not** been configured and wired to the network, click on the  icon to add a new device defining its address and model. The added slave scanner will then be displayed in the "Requested Devices" area.

2. If desired, select a scanner within the "Current Devices" area and click on the  icon (or select the "Show Device" option from the right-click menu) to make the dialog box appear as follows:



The "Show Device" option is particularly useful after the Net-Autoset procedure or whenever it is necessary to physically identify a specific scanner on the network. Indeed, it activates the following signals which physically indicate the scanner corresponding to the one selected, in particular:

- in Network Wizard the icon corresponding to the selected scanner starts blinking red;
- in the Physical Network all scanners turn off except the selected scanner which turns on.

NOTE

If using Show Device as a diagnostic tool on an already configured network, the following notes apply:

- If the Beam Shutter is Enabled the laser will not turn on.
- Upon exit from Show Device, the network returns to its previously configured state.

3. If desired, select the transferred/added slave scanner within the "Requested Devices" area and click on the



icon to customize the scanner label and slave address. You can also customize the master scanner label. The maximum description string length is 32 characters.

4. Once your network has been customized, close the network wizard. Before closure, the program will show a dialog box asking whether to send the new configuration to the Local Device. Choose the "Yes" option to start this procedure.

Code Definition

This group allows defining the following parameters, which are common to all the code symbologies.

Code Combination

The Code Combination parameter selects the decoding mode for the scanner:

Selections: **Single Label**

In Single Label mode only one barcode can be read in each reading phase, however it can be determined automatically from up to 10 enabled codes. The scanner stops decoding as soon as a code is read.

If the code is not read during the reading phase, the No Read message is produced.

Standard Multi Label

In Multi Label mode the barcodes selected (up to 10), will all be read in the same reading phase. All the selected codes in the reading phase must be read. If the reading phase terminates before all the codes are read, either a Global No Read message or a Local No Read message can be produced.

NOTE

In case of Multi Label, the codes will be distinguished EITHER by their symbology, OR by their contents. If two (or more) codes share the same symbology and content, the scanner will perceive them as a unique code.

Logical Combination

In Logical Combination mode the codes of the groups defined by the Logical Combination Rule are read in the same reading phase.

Code Collection

In Code Collection mode expected codes are collected within a single reading phase in the order in which they are read. The No Read message is produced only if none of the codes are read. Up to 50 codes can be collected.

Logical Combination Rule

It allows editing the rule which the combination of groups of labels is based upon.

Groups and their order define the output message format, while each group identifies an expected code.

When editing the logical combination rule, proceed as follows:

1. define the Code Label Settings #n indicating the type of expected code labels. It is possible to define up to 10 different code types;
2. define how many code types (groups) are expected by editing the combination rule through the following logical operators. Each group may include one or more selected code types.

& = AND operator which separates a group from the previous/following one;

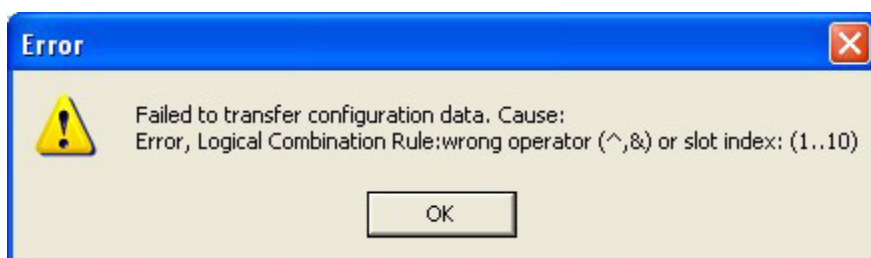
^ = XOR operator to be used to combine different code labels within the same group. It allows reading one of the defined code labels.

The maximum number of groups to be defined for each rule string is 15.

If setting the Local No Read Message, a further parameter group is displayed requiring the definition of a Local No Read String for each group.

NOTE

If the syntax of the combination rule is wrong or the expected Code label settings#n is not defined, the following message appears after sending a configuration to the reader:



Examples

For all the following examples the No Read Message parameter is set to Global No Read Message.

- 1 -

Code label setting#1 = Code 128

Logical Combination Rule = 1&1

Defines 2 groups, each of them expecting a Code 128 label.

Decoded Code Symbology		Output Message
First Label #1	Second Label #1	
---	---	<Header><Global No Read Message><Terminator>
X	---	<Header><Global No Read Message><Terminator>
---	X	<Header><Global No Read Message><Terminator>
X	X	<Header><Code 128 data><Data Packet Separator><Code 128 data><Terminator>

NOTE

In case the Multiple Read Message is enabled and a third label belonging to the Code 128 symbology is decoded, the Multiple Read string will also be transmitted. If the Multiple Read Message is disabled, the third code label is ignored and only the first two codes are transmitted.

- 2 -

Code label setting#1 = Code 39

Code label setting#2 = Code 128

Logical Combination Rule = 1^2

Defines a single group expecting a Code 128 label OR a Code 39 label.

Decoded Code Symbology		Output Message
Label #1	Label #2	
---	---	<Header><Global No Read Message><Terminator>
X	---	<Header><Code 39 data><Terminator>
---	X	<Header><Code 128 data><Terminator>
X	X	<Header><First decoded code/Multiple Read Message string ><Terminator>

NOTE

In case the Multiple Read Message is enabled and both codes are decoded, the Multiple Read string will also be transmitted. If the Multiple Read Message is disabled, only the first decoded code is transmitted.

- 3 -

Code label setting#1 = EAN 8

Code label setting#2 = UPC-A

Logical Combination Rule = 1&1&1^2

Defines three different groups. The first two groups expect an EAN 8 label while the third one expects an EAN 8 label OR a UPC-A label.

Decoded Code Symbology				Output Message
First Label #1	Second Label #1	Third Label #1	Label #2	
---	---	---	---	<Header><Global No Read Message><Terminator>
X	---	---	---	<Header><Global No Read Message><Terminator>
---	X	---	---	<Header><Global No Read Message><Terminator>
---	---	X	---	<Header><Global No Read Message><Terminator>
---	---	---	X	<Header><Global No Read Message><Terminator>
X	X	X	---	<Header><EAN 8 data><DPS><EAN 8 data><DPS><EAN 8 data><Terminator>
X	X	---	X	<Header><EAN 8 data><DPS><EAN 8 data><DPS><UPC-A data><Terminator>
X	X	X	X	<Header><EAN 8 data><DPS><EAN 8 data><DPS><First

				decoded code/Multiple Read Message string><Terminator>
--	--	--	--	--

NOTE

In case the Multiple Read Message is enabled and both codes of the third group are decoded, the Multiple Read string will also be transmitted. If the Multiple Read Message is disabled, only the first decoded code of the third group is transmitted.

- 4 -

Code label setting#1 = Code 93

Code label setting#2 = Interleaved 2/5

Code label setting#3= EAN-8

Code label setting#4= UPC-A

Logical Combination Rule = $1 \wedge 2 \& 3 \wedge 4$

Defines 2 groups, each of them expecting one of the defined code types. The first group may expect a Code 93 label or an Interleaved 2/5 label. The second group may expect an EAN-8 label or a UPC-A label.

Decoded Code Symbology				Output Message
Label #1	Label #2	Label #3	Label #4	
---	---	---	---	<Header><Global No Read Message><Terminator>
X	---	---	---	<Header><Global No Read Message><Terminator>
---	X	---	---	<Header><Global No Read Message><Terminator>
---	---	X	---	<Header><Global No Read Message><Terminator>
---	---	---	X	<Header><Global No Read Message><Terminator>
X	X	---	---	<Header><Global No Read Message><Terminator>
X	---	X	X	<Header><Code93><DPS>< First decoded code/Multiple Read Message string><Terminator>
X	X	X	---	<Header><First decoded code/Multiple Read Message string><DPS><EAN 8 data><Terminator>
---	X	X	X	<Header>< Interleaved 2/5 data><DPS>< First decoded code/Multiple Read Message string ><Terminator>
X	---	X	---	<Header><Code 93 data><DPS><EAN 8 data><Terminator>
X	---	---	X	<Header><Code 93 data><DPS><UPC-A data><Terminator>
---	X	X	---	<Header><Interleaved 2/5 data><DPS><EAN 8 data><Terminator>
---	X	---	X	<Header><Interleaved 2/5 data><DPS><UPC-A data><Terminator>
X	X	X	X	<Header><First decoded code/Multiple Read Message string><DPS>< First decoded code/Multiple Read Message string ><Terminator>

NOTE

In case the Multiple Read Message is enabled and both codes of either group are decoded, the Multiple Read string will also be transmitted. If the Multiple Read Message is disabled, only the first decoded code of the relative group is transmitted.

No Read Message

The No Read condition occurs whenever a code cannot be read or decoded.

Selections: **Disable** **No** **Read** the No Read Message is not transmitted

Message

Global **No** **Read**

Message

Local **No** **Read(s)**

Message

the No Read String will be sent if the scanner is unable to decode one or more barcodes in the reading phase.

this option is useful when one or more codes are not read in the reading phase or when more codes than the expected number set by the configuration parameters are read.

If working in Standard Multi Label mode, this option activates the Code Label Local No Read String and the Code Label Local Multiple Read String parameters which allow setting a Local No Read String and a Local Multiple string for each defined code symbology.

If working in Logical Combination Rule mode, this option activates the Local No Read Strings and the Local Multiple

Read Strings groups where setting respectively a Local No Read String and a Local Multiple Read String for each group label.

Do not use this option when working in single-label mode.

No Read String

It defines the string to be displayed in case of Global No Read Message. It is possible to select either an ASCII or HEX value.

Multiple Read Message

This parameter is only available when the Code Combination is set to *Standard Multi Label* or *Logical Combination*. When checked, this parameter allows the Multiple Read String to be sent if, during the reading phase, the scanner reads more than the number of the expected barcodes set by the configuration parameters.

Multiple Read String

This parameter is only available when Multiple Read Message is enabled and the No Read Message selection is different from Local No Read(s) String. It defines the string to be displayed in case of Multiple Read Message. It is possible to select either the ASCII or HEX value. If **disabled**, the scanner transmits the first code read.

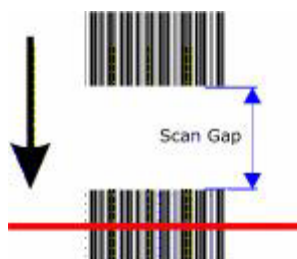
Associate Same Codes When Read By Different Scanners

This parameter is available only when the Code Combination parameter is set to *Code Collection* and the scanner Topology Role is *Master*. If enabled, it allows transmitting all codes belonging to the same programmed Slot (same symbology and content) but read by different scanners (including the Master) in a single instance.

Codes Different When Scan Gap Is Greater Than

This parameter is available only when the Code Combination parameter is set to *Code Collection*. If the number of scans performed between two consecutive codes read (by the Master or Stand Alone scanner) is greater than the defined number, the codes will be considered as different.

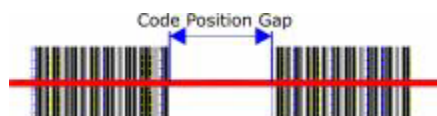
The parameter set to 0 means the filter is disabled: when there is no scan gap all the consecutive codes read will be considered as only one code.



Codes Different When Code Position Gap Is Greater Than

This parameter is available only when the Code Combination parameter is set to *Code Collection*. If the position gap between two consecutive codes read (by the Master or Stand Alone scanner) on the same scan line is greater than the defined gap number, the codes will be considered as different.

The parameter set to 0 means the filter is disabled: when there is no code position gap all the consecutive codes read will be considered as only one code.



LED Indication

Partial Read Is Treated As

This parameter is only available when the Code Combination is set to *Standard Multi Label* or *Logical Combination* and the Operating Mode is *On Line*. It defines the behavior of the LED Indicator on the scanner when a partial read condition occurs. If set to Good Read, the GOOD (Read) LED will light. If set to No Read, the STATUS (No Read) LED will light.

Multiple Read Is Treated As

This parameter is only available when the Code Combination is set to *Standard Multi Label* or *Logical Combination* and the Operating Mode is *On Line*. It defines the behavior of the LED Indicator on the scanner when a multiple read condition occurs. If set to Good Read, the GOOD (Read) LED will light. If set to No Read, the STATUS (No Read) LED will light.

Family Setting

The parameters available in this group define the properties of the code symbology selected.

Decoding Safety

This parameter is available only when the Reading Mode parameter is set to *Linear*. It verifies that an N number of decodes are performed with the same result before code reading is accepted as valid:

Selections: a number from **1** to **100** (**1** = control disabled)

Decoding Severity

During decoding, poorly printed or damaged codes could be discarded and not transmitted because their image does not match the expected code image.

Through the Decoding Severity parameter, a ratio between the actual and the expected code image can be considered. The lower this ratio is, the higher the difference between the images can be.

However, please note that setting a low value for this parameter increases the possibility of decoding errors.

Selections: from **1** to where 1 and 5 represent respectively the lowest and highest
5 severity level.

Inter Character Gap

Used for Code 39 and Codabar codes, it allows setting the number of modules of the Inter Character Gap.

Selections: from **1** to
12

Ink Spread Equalization

The Ink Spread Equalization parameter allows the decoding of codes which are not perfectly printed because the page texture tends to absorb the ink.

This parameter can be enabled for code types EAN/UPC, Code 93 and Code 128.

Concatenation

The Concatenation parameter defines whether concatenation is to be performed on ABC Codabar and/or ISBT 128 codes or not. These codes are typically paired together in a particular combination and order, each one containing different information concerning the same package. Concatenation requires both codes to be found in the same scan line.

<u>Selections:</u>	Do Not Chain	No code concatenation will be performed. The first code encountered will be decoded.
	Optional Chain	Code concatenated will be performed if possible. If one of the codes is unreadable, the other will be decoded. For ISBT 128 code concatenation, it must meet the criteria specified in the Chain options to be decoded, otherwise a No Read event occurs.
	Mandatory Chain	Code concatenation will always be performed. If one of the codes is unreadable or does not meet the criteria specified in the Chain options (for ISBT 128 codes), a No Read event occurs.

Chain

When Concatenation is selected for ISBT 128 codes, up to 8 pairs of code combinations can be defined for acceptable decoding. Concatenation requires both codes to be found in the same scan line.

<u>Selections:</u>	Chain <i>n</i> Left	The specified code information type must be paired (chained) to the left of its corresponding code.
	Chain <i>n</i> Right	The specified code information type must be paired (chained) to the right of its corresponding code.

Addon Overflow Start Ratio

For the 4K family, if working in Reconstruction reading mode, this parameter defines the minimum expected width of the beginning (Start) quiet zone of the Addon portion of an EAN/UPC barcode, expressed in number of modules. The Start and Stop Ratios can be different from each other. If the specific barcode quiet zone is less than the expected ratio, the Addon barcode will not be decoded.

Selections: from **1** to **50**

NOTE

The Addon Overflow Start Ratio value must be less than or equal to the Max. Distance between EAN/UPC and Addon value.

Addon Overflow Stop Ratio

For 2K family Linear/Reconstruction reading and 4K family Linear reading, this parameter defines the minimum expected width of both quiet zones of the Addon portion of an EAN/UPC barcode, expressed in number of modules. If the barcode quiet zones are less than the expected ratio, the Addon barcode will not be decoded.

For the 4K family, if working in Reconstruction reading mode, this parameter defines the minimum expected width of the ending (Stop) quiet zone of the Addon portion of an EAN/UPC barcode, expressed in number of modules. The Start and Stop Ratios can be different from each other. If the specific barcode quiet zone is less than the expected ratio, the Addon barcode will not be decoded.

Selections: from **1** to **50**

Max Distance between EAN/UPC and Addon

For the 4K family, if working in Reconstruction reading mode, this parameter determines the maximum distance (from 1 to 256 modules) that an EAN/UPC code and its Addon component can be located and still be considered valid. If the Addon component is farther away in number of modules, the Addon barcode will not be decoded.

Selections: from **1** to **256**

Code Label Settings

The parameters available in this group define the properties of the code symbology selected.

Enable

Checking this box allows setting all parameters defining the code to be read.

Code Symbology

You can select the code type to be read in a wide range of symbologies.

The following is the complete list of all the code types that are available:

CODE 128	UPC-A
ISBT 128	UPC-E
INTERLEAVED 2 OF 5	All EAN-UPC
CODE 39	CODABAR
CODE 39 FULL ASCII	ABC CODABAR
GS1-128 (ex EAN 128)	CODE 93
EAN-13	PHARMACODE
EAN-8	PLESSEY

EAN Add On

This parameter is available only for EAN/UPC code symbologies. It allows defining the Add On:

<u>Selections:</u>	No Add On	the selected EAN/UPC code has no additional digit;
	2 digits Add On	the selected EAN/UPC code has 2 additional digits;
	5 digits Add On	the selected EAN/UPC code has 5 additional digits;

Label Length

The label length (in number of characters/digits) can be specified in order to be accepted for decoding.

<u>Selections:</u>	Variable	all possible label lengths (in number of characters/digits) allowed for the code selected are accepted.
	Fixed from 1 to 60	only the selected length is accepted.

The selection of a fixed label length is advised whenever possible.

NOTE

This parameter is not available for the following code symbologies, since their label length is automatically defined:

- EAN-8	- UPC-E
- EAN-13	- All EAN-UPC
- UPC-A	

Check Digit

The check digit control can be enabled to improve decoding safety: it is generally the last digit aligned to the right of the code and verifies the validity of the preceding digits. The calculation technique and number of check digits depend on the code selected.

It is advised to enable the check digit whenever correct code identification is difficult.

The following barcode symbologies include check digits in their definitions:

- Code 128
- EAN/UPC
- Code 93

For these symbologies the check digit control is not allowed.

Check Digit Type

This parameter allows selecting from a list of standardized check digits relative to the Code Type selected.

Check Digit Tx

This option allows the Check Digit to be included in the code transmitted.

Bar Count

The Bar Count allows to further specify the number of elements in the read code for Code 128, GS1-128 Code 93 or Code 39 Full ASCII.

For these codes, the same number of barcode elements (bars + spaces) can be associated with a different number of characters.

Selections: **Variable**

to select the correct number of characters, set **Label Length** to the desired **fixed** value and Bar Count to Variable.



12

Code 128
Subset A



12

Code 128
Subset C

Digit Number 2, Bar Count variable

Code 128 or GS1-128 or Code 93 from **25 to 385** a variable number of characters in steps of 6 whose range depends on the code symbology selected.

Code 39 Full ASCII from **29 to 619** a variable number of characters in steps of 10 whose range depends on the code symbology selected.

To select a particular barcode length in elements, set Bar Count to the desired fixed value and **Label Length** to **Variable**.



12

Code 128
Subset A



1234

Code 128
Subset C

Digit Number variable, Bar Count 31

Min/Max Label Length

Codes, whose lengths are within the range of values specified by these parameters, will be accepted for decoding.

Selections: from **1 to 60** Label length in number of characters

NOTE

The value set as maximum acceptable label length must always be greater than the value set for the minimum label length. These parameters are configurable when the [Label Length](#) is set to **Variable**.

Code Label Local No Read String

This is used when the defined code is not read in the reading phase. The Local No Read String is enabled when setting the [No Read Message](#) parameter to Local No Read Message.

Code Label Local Multiple Read String

This is used when the defined code is read more than the expected number of times in the reading phase. The Local Multiple Read String is enabled when setting the Code Combination parameter to Standard Multi Label and the [No Read Message](#) parameter to Local No Read(s) Message.

Match String Rule

This parameter defines the matching rule, according to which a code can be transmitted.

Selections: **Match** all codes matching the Pattern Match String will be transmitted

Do Not Match all codes not matching the Pattern Match String will be transmitted

Pattern Match String (200 characters max.)

A code can also be identified by its content. A pattern matching string is programmable for each code and if the read codes do not match the defined string, a No Read Event will be returned.

It is possible to define the matching string by inserting:

- all printable characters
- non printable ASCII characters available in the list which appears by right-clicking on the parameter edit box
- * = defining any string consisting of an undefined number of characters (it may be empty)
- ? = identifying any character to be found in the position indicated within the string

If your application requires inserting ?, * and NUL as characters, it is necessary to use the following syntax:

- ? character = <NUL>?
- * character = <NUL>*
- NUL character = <NUL>00
- other extended ASCII characters = <NUL>xy, where xy identifies the character hex value

Examples

- 1 -

Match a code starting with 123 string and followed by any string of characters:

Match String = **123***

Example Code = **123aC53**

- 2 -

Match a code ending with 123 string preceded by any string of characters:

Match String = ***123**

Example Code = **41pO123**

- 3 -

Match a code having 123 string in any position:

Match String = ***123***

Example Code = **41pO123253**

- 4 -

Match a code starting with 123 string followed by three generic characters and an undefined string of characters, in this case no character:

Match String = **123???***

Example Code = **123ad2**

- 5 -

Match any code of four characters:

Match String = **????**

Example Code = **gT6k**

- 6 -

Match a code with 6 characters in any position having 12 as central characters:

Match String = ***??12??***

Example Code = **data12og35**

- 7 -

The following is an example of a very complex string where ? and * are used both as commands and as characters:

Match String = ***45<NUL>??*??AC<NUL>*251?***

Example Code = GEN45?3iusdsAC*2516300

NOTE

For Codabar codes the start/stop characters must be considered in the match conditions.

For all codes which use check digits, if the Check Digit is transmitted, it must be considered in the match conditions.

Match Direction Rule

This parameter defines the direction, according to which a code can be transmitted. The direction refers to the code direction with respect to the scan line, in particular:

Forward = the code start character precedes the stop character in the scan line (Start Ch + Code + Stop Ch)

Reverse = the code stop character precedes the start character in the scan line (Stop Ch + Code + Start Ch)

Selections:

Disable	all codes are transmitted no matter what the direction is
Forward	all codes having a forward direction are transmitted
Reverse	all codes having a reverse direction are transmitted

Min/Max Code Position Filter

These parameters specify where in the scan line a particular code can be found. The scan line is divided into 256 physical positions.

The code position is determined at the **center** of the label and is checked to be between the **Min** and **Max** parameters specified in the configuration. These values go from 0 to 255.

Selections: a value from **0** to **255**

Since the Min and Max values depend on many factors such as: the scanner model, number of mirrors, scan speed, aperture angle, etc., typical values are not applicable.

NOTE

You must set a range of positions in which the code will be found. A typical range is 5 positions (i.e. min = 25, max = 30).

If you want to disable this verification, set **Min** = **0** and **Max** = **255**, which means the code can occur anywhere in the scan line.

Start Char Tx

This parameter is available only for Codabar code symbologies. It allows transmitting the code start character:

Selections:

Disabled	the character is not selected;
Lower Case	the character is transmitted in lower case;
Upper Case	the character is transmitted in upper case.

Stop Char Tx

This parameter is available only for Codabar code symbologies. It allows transmitting the code stop character:

Selections:

Disabled	the character is not selected;
Lower Case	the character is transmitted in lower case;
Upper Case	the character is transmitted in upper case.

Local No Read Strings

This group allows defining a Local No Read string for each group used in the Logical Combination Rule.

Group Label Local No Read String #n

It defines the string to be transmitted when the expected label (group) is not read. It is possible to define up to 15 no read strings corresponding to the 15 groups to be defined.

Local Multiple Read Strings

This group allows defining a Local Multiple Read string for each group used in the Logical Combination Rule.

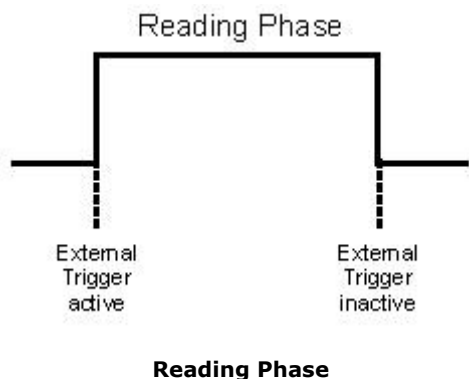
Group Label Local Multiple Read String #n

It defines the string to be transmitted when the expected label (group) is read more times than expected. It is possible to define up to 15 multiple read strings corresponding to the 15 groups to be defined.

Operating Mode

On Line

In this operating mode, the reading phase is defined as the time between the Phase ON and Phase OFF events. The Phase events can be signals coming from one or two external presence sensors connected to the scanner inputs or serial start/stop strings sent from the host over the serial interface.



ACK/NAK Protocol

When checked this parameter enables the ACK/NAK Protocol which is available only in On Line operating mode. When ACK/NAK Protocol is enabled, Serial Start/Stop Strings cannot contain ACK/NAK characters.

On Line Options

The On Line mode can be activated by choosing one of the following options:

- Selections:**
- On Line 1 Input:** the reading phase takes place during the active phase of the presence sensor, when the scanner tries to acquire and correctly decode the code. If the operation is successful, the barcode characters are transmitted on the serial interface in the format defined by the current configuration and the right output event is risen at the end of the PS active phase. If a code cannot be decoded, a no read message is sent and the no read event is risen at the end of the PS active phase.
 - On Line 2 Inputs:** the reading phase is defined by 2 inputs. It starts when the Start Input is activated and stops when the Stop Input is deactivated (unless the Extended Phase is enabled). If the operation is successful, the barcode characters are transmitted in the format defined during the configuration phase on the interface(s) enabled and the right output event is risen. If a code cannot be decoded, a no read event is risen.
 - Serial On Line:** In Serial-On-Line mode the reading phase starts when the Serial Start String is received on the serial interface and ends when the Serial Stop String is received or when a programmed Reading Phase Timeout expires.
If decoding is correct, the data is transmitted on the serial port as defined by the configuration. The output line selected for the right output event is risen and the relative message is transmitted on the serial interface.
In case of a wrong read, a no read message is transmitted on the serial interface. The output line selected for the no read event is risen and the relative message is transmitted on the serial interface.

Extended Phase

Available only for the "On Line 2 Inputs" option, if checked, it allows the Stop Input to end the reading phase only if the Start Input is also deactivated.

Start Input Number

It defines the number of the input starting the reading phase.

Selections: from 1 to 2

Start Input Active Level

Allows the selection of the active state of the input.

Selections: **Active Open** the input is active when there is no current flowing through IN pins.
 Active Closed the input is active when current flows through IN pins.

Stop Input Number

It defines the number of the input ending the reading phase.

Selections: from **1** to **2**

Stop Input Active Level

Allows the selection of the active state of the input.

Selections: **Active Open** the input is active when there is no current flowing through IN pins.
 Active Closed the input is active when current flows through IN pins.

Stop Phase Edge

This parameter is available only when On Line Options = On Line 2 Inputs.

It allows defining the signal edge of the stop input used by the scanner as reference for ending the reading phase:

Selections: **Trailing** the reading phase ends when the pack has completely passed by the stop input.
 Leading the reading phase ends as soon as the stop input detects the front edge of the pack.

Serial Start String

The Serial Start string signals the beginning of the reading phase.

Selections: a character from **NUL** (00H) to **~** (7EH)

The Serial Start string must be different from the Serial Stop string. When ACK/NAK Protocol is enabled, the Serial Start/Stop Strings cannot contain ACK/NAK characters.

Serial Stop String

The Serial Stop string signals the end of the reading phase.

Selections: a character from **NUL** (00H) to **~** (7EH)

The Serial Stop string must be different from the Serial Start string. When ACK/NAK Protocol is enabled, the Serial Start/Stop Strings cannot contain ACK/NAK characters.

Reading Phase Timeout

If checked, it allows defining a timeout for the Serial On Line mode and the On Line 1 Input mode.

Timeout

By setting this parameter the reading phase starts when the Start Input or Serial Start String is activated and stops when the selected Timeout expires. The Timeout represents the period of time for the reading phase.

Selections: from **40** to **15000 ms**

Timeout Counting From

This parameter determines whether the Timeout used to determine the reading phase will begin from the Start Input or Serial Start String (normal operation), or from the Stop Input or Serial Stop String (effectively extending the reading phase).

Selections: **Start** or **Stop**

Stop Priority

It defines the parameter defining the end of the reading phase:

<u>Selections:</u>	Input/Serial Stop	the Serial Stop String define the end of the reading phase. Timeout has a lower priority.
	Always Timeout	the reading phase always stops when the selected timeout expires.

Start Input From Fieldbus

This parameter is available only when using a Fieldbus interface.

If checked, it allows the Fieldbus Master to remotely start/stop the reading phase via bit 7 (MSb) in Byte 0 (LSB) of the Output Area.

Energy Saving

When SC4000 operates as a Master in a SYNCHRONIZED ID-NET™ network, this parameter allows all slave scanner motors to be stopped with a single command and started with a different single command, therefore saving energy.

Serial Motor On

A Serial Motor On string is an ASCII string of up to 32 characters which, when received on the SC4000 serial interface, starts all slave scanner motors according to the speed selection in the scan speed parameter. If the scanner motors are already running this command is ignored.

NOTE

The Serial Motor On string must be different from the Serial Motor Off string and the Serial Start/Stop Strings.
When ACK/NAK Protocol and Energy Saving are enabled, the Serial Motor ON/OFF strings cannot contain ACK/NAK characters.

Serial Motor Off

A Serial Motor Off string is an ASCII string of up to 32 characters which, when received on the SC4000 serial interface, stops all slave scanner motors.

NOTE

The Serial Motor On string must be different from the Serial Motor Off string and the Serial Start/Stop Strings.
When ACK/NAK Protocol and Energy Saving are enabled, the Serial Motor ON/OFF strings cannot contain ACK/NAK characters.

Verifier

This operating mode condition allows the scanner to verify that all codes read and decoded match the string saved in its memory.

If the code read matches the code verifier string then it is sent to the host through the configured port. If it does not match the verifier string, it can be sent or not depending on the Wrong Code Tx parameter. Independently from the Wrong Code transmission, a Wrong String message can be defined and sent indicating the error.

The Code Verifier String can be stored in the scanner memory by writing the string in the Verifier Code parameter.

It is possible to define the string by inserting:

- all printable characters
- non printable ASCII characters available in the list which appears by right-clicking when inside the parameter edit box
- * = defining any string consisting of an undefined number of characters (it may be empty)
- ? = identifying any character to be found in the position indicated within the string

If your application requires inserting ?, * and NUL as characters, it is necessary to use the following syntax:

- ? character = <NUL>?
- * character = <NUL>*
- NUL character = <NUL>00
- other extended ASCII characters = <NUL>xy, where xy identifies the character hex value

The Digital Outputs can be driven by the Right or Wrong events.

Enable

When checked it enables the Code Verifier operating mode.

Verifier Code

The string used as the match code to the decoded codes.

Selections: characters from **NUL** (00H) to ~ (7EH)

Wrong String Tx

When checked it enables transmission of the Wrong String message.

Wrong String

The string sent in case of a mismatch (wrong code read).

Selections: characters from **NUL** (00H) to ~ (7EH)

Wrong Code Tx

When checked it enables the transmission of the Wrong Code.

System Layout

ID-NET Network Baud Rate (bps)

This parameter defines the baud rate for the ID-NET™ network.

Selections: from **19200** to **1Mb**.

Slave Address

When setting the device topology role to Slave, it is necessary to define the ID-NET™ slave address within the network (1..31).

Host 1 Serial Port Type

It allows selecting the Host Interface network type (Fieldbus and non-Fieldbus) for communication to/from the Host network.

<u>Selections:</u>	Serial	The SC4000 Host 1 Serial Interface is available for communication with the Host. No Host Interface module is installed.
Profibus	(BM3x0)	Enables the Gateway branch to allow the Profibus interface parameters to be configured.
DeviceNet	(BM4x0)	Enables the Gateway branch to allow the DeviceNet interface parameters to be configured.
Ethernet/IP (Ethernet/IP - TCP/IP)	(BM5x0)	Enables the Gateway branch to allow either the Ethernet/IP interface (Fieldbus), the Ethernet TCP/IP Services which allow up to 2 User Sockets to be configured - (non Fieldbus), or both. IP Addressing in the Line Parameters branch determines the method of address selection, either user defined (Static Assignment), DHCP or Remote Assignment.
CC-Link	(BM11x0)	Enables the Gateway branch to allow the CC-Link interface parameters to be configured.
CANopen	(BM6x0)	Enables the Gateway branch to allow the CANopen interface parameters to be configured.
Profinet (Profinet IO - TCP/IP)	(BM7x0)	Enables the Gateway branch to allow either the Profinet IO interface (Fieldbus), the Profinet TCP/IP Services which allow up to 2 User Sockets to be configured - (non Fieldbus), or both. IP Addressing in the Line Parameters branch determines the method of address selection, either user defined (Static Assignment), DHCP or Remote Assignment.
Modbus TCP (Modbus TCP - TCP/IP)	(BM12x0)	Enables the Gateway branch to allow either the Modbus TCP interface (Fieldbus), the Modbus TCP/IP Services which allow up to 2 User Sockets to be configured - (non Fieldbus), or both. IP Addressing in the Line Parameters branch determines the method of address selection, either user defined (Static Assignment), DHCP or Remote Assignment.

<u>Selections</u>	Ethernet TCP/IP Ethernet/IP (explicit messaging) Modbus TCP	(BM2x0)	Enables the combination TCP/IP services (up to 2 User Sockets can be configured) and/or the following fieldbus: Ethernet/IP (Explicit Messaging), Modbus TCP (Server or Client). IP Addressing in the Line Parameters branch determines the method of address selection, either user defined (Static Assignment) or DHCP.
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CAUTION

When any Host Interface module is plugged in, and/or a network type is selected (other than Serial), the Host 1 Serial Interface is not available for communication and the Host 1 spring clamp terminals must not be electrically connected.

NOTE

The SC4000 integrated Backup and Restore Module Net Type and Address Selection hardware switch settings are read at power-up and override the software settings. For correct software configuration, make sure these switch settings are compatible with your application.

Communication Settings

The communication may occur through:

Gateway	for Host communication when a Host Interface Module is installed in the SC4000 and a Fieldbus or TCP/IP communication type is selected for the Host 1 Serial Port Type.
Host 1 Serial Port	for Host communication only when there is no Host Interface Module installed in the SC4000 and the Serial communication type is selected for the Host 1 Serial Port Type.
Host 2 Serial Port	an SC4000 secondary serial port used to communicate data towards an <u>alternative</u> or <u>additional</u> Serial Host other than the Host 1 Serial Port or Gateway. It can also be used to <u>pass data through</u> to the Host 1 Serial Port or Gateway.
Auxiliary Serial Port	an SC4000 secondary serial port typically used for SC4000 configuration through Genius™. It can be used to communicate data towards an <u>alternative</u> or <u>additional</u> Serial Host (RS232 only) other than the Host 1 Serial Port or Gateway. It can also be used to <u>pass data through</u> to the Host 1 Serial Port or Gateway.

Gateway

The following parameters are available when one of the Fieldbus Host Interface Modules is selected in the Host 1 Serial Port Type parameter (and is physically installed in the SC4000). They determine the communication between the SC4000 and the selected Fieldbus network.

All the parameters managing the Heartbeat are available in the Heartbeat parameters group.

Status

If checked, this parameter enables communication over the selected Fieldbus.

This parameter must be enabled for Serial-based Fieldbus modules: Profibus, DeviceNet, CANopen, and CC-Link.

For Ethernet-based Fieldbus modules (Ethernet/IP - TCP/IP, Profinet IO - TCP/IP, and Modbus TCP - TCP/IP) when using TCP/IP communication only, performance can be improved by disabling the Fieldbus communication. In this way more resources are freed up for TCP/IP communications.

For Ethernet TCP/IP (BM2x0), this parameter is not necessary and therefore not available. For this module, all selections including Modbus and Ethernet/IP are selected under the TCP/IP Services branch.

Data Tx

If enabled (checked), data will be transmitted from the SC4000 on the Fieldbus network.

Heartbeat

This parameter enables/disables transmission of the Heartbeat message used to signal device or system status at regular intervals. The Heartbeat message is independent from Data Tx and can be enabled even if data is not sent on the Fieldbus network (Data Tx - disabled).

<u>Selections:</u>	Disable	the Heartbeat message is not transmitted
	Enable Unconditioned	the Heartbeat message is always transmitted, even if communication is still active
	Enable Conditioned	the Heartbeat message is transmitted only when there is no communication

Heartbeat

The following parameters allow enabling the communication through the selected Fieldbus interface protocol:

The Heartbeat message is used to signal the device's or system's status at regular intervals to the Host. It has the following format:

Header	Counter	Field Sep	System Diagnostics	Field Sep	Network Diagnostics	Terminator
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Timeout

This parameter defines the amount of time between two message transmissions. If the selected time out expires and no transmission has occurred, the Heartbeat message will be transmitted.

Heartbeat Header String

This parameter signals the beginning of the Heartbeat message. It can be a string of up to 128 characters.

Selections: characters from **NUL** (00H) to **~** (7EH)

The Heartbeat Header String should be different from the Heartbeat Terminator String.

Heartbeat Field Separators String

This parameter determines the string used to separate the fields within the Heartbeat message. It can be a string of up to 128 characters.

Selections: characters from **NUL** (00H) to **~** (7EH)

Counter Module

This parameter enables a counter to track the number of Heartbeat messages.

Selections:

Disable	no counter field in the Heartbeat message
10	counts cyclically from 0 to 9
100	counts cyclically from 0 to 99
1000	counts cyclically from 0 to 999
10000	counts cyclically from 0 to 9999
Custom	allows defining a custom counter start/stop range from 0 to 10000.

Custom Counter Module

This parameter is available when the Counter Module parameter is Custom. It allows defining the maximum count number to reach before recycling.

Selections: a number from **2** to **10000**

Counter Starting Value

For the Custom Counter Module this parameter selects the starting counter value.

Selections: a number from **0** to **9999**

Counter Direction

Sets the counter direction, either **up** or **down**.

System Diagnostics

If checked it enables the System Diagnostics Field in the Heartbeat message. The System Diagnostics field is a fixed 2-byte field. The first byte has the following meaning:

- 1 = Reading Station OK
- 3 = Presence Sensor Failure
- 4 = Reading Station Failure

Network Diagnostics

If checked it enables the Network Diagnostics Field in the Heartbeat message. The Network Diagnostics field is a fixed 32-byte field (one for each scanner in the network from scanner 0 (Master), to scanner 31). Each byte has the following meaning:

- 0 = Scanner not expected
- 1 = Scanner OK
- 2 = Scanner expected but not present (not connected or possible network failure)
- 3 = Scanner Failure

Heartbeat Terminator String

This parameter signals the end of the Heartbeat message. It can be a string of up to 128 characters.

Selections: characters from **NUL** (00H) to **~** (7EH)

The Heartbeat Header String should be different from the Heartbeat Terminator String.

Bus Communication

The parameters available in this group define the fundamental information about the communication.

NOTE

For further information regarding Fieldbus interfacing including downloadable support files, go to the HMS website at <http://www.anybus.com>, choose the link to the support page, select the Anybus-CompactCom product type and then your network type.

Baud Rate

This is a read-only parameter. The modules are set to use the automatic baud rate mechanism where the Fieldbus Master defines the speed of the connection. After connection, for some Fieldbus types, the actual speed of the Fieldbus will be displayed in this parameter.

For CC-Link Fieldbus, the Fieldbus Master does not set the network baud rate and therefore this parameter must be set manually according to the application specific network baud rate.

Max. Exchange Area Size (Input+Output)

This is a read-only parameter. It defines the (fixed) maximum size of the exchange area (total of both Input and Output Areas) available for messages between the Fieldbus Master and the Fieldbus module.

Selections:

Profibus	152
DeviceNet	152
Ethernet IP	152
CC-Link	254
CANopen	152
Profinet IO	64
Modbus TCP	152

Master Input Area Size

It defines the size of the message command sent from the Fieldbus module to the Fieldbus Master.

Selections:

Profibus	a value in the range 8 - 144
DeviceNet	a value in the range 8 - 144
Ethernet IP	a value in the range 8 - 144
* CC-Link	a value in the range 2 - 126
CANopen	a value in the range 8 - 144
Profinet IO	a value in the range 8 - 56
Modbus TCP	a value in the range 8 - 144

* For CC-Link Version 1, the Master Input Area Size must be less than or equal to 30.

Master Output Area Size

It defines the size of the message command sent to the Fieldbus module from the Fieldbus Master.

Selections:

Profibus	a value in the range 8 - 144
DeviceNet	a value in the range 8 - 144
Ethernet IP	a value in the range 8 - 144
* CC-Link	a value in the range 2 - 128
CANopen	a value in the range 8 - 144
Profinet IO	a value in the range 8 - 56
Modbus TCP	a value in the range 8 - 144

* For CC-Link Version 1, the Master Output Area Size must be less than or equal to 32.

Node Address (MAC ID)

NOTE

The SC4000 integrated Backup and Restore Module Net Type and Address Selection hardware switch settings are read at power-up and override the software settings. For correct software configuration, make sure these switch settings are compatible with your application.

The Media Access Control Identifier (MAC ID) is an integer identification value assigned to each node of the Fieldbus network. The defined value distinguishes a node from all other nodes on the same link.

Selections:

⁽¹⁾ Profibus	a value in the range 0 - 126
⁽²⁾ DeviceNet	a value in the range 0 - 64
⁽³⁾ CC-Link	a value in the range 1 - 64
⁽⁴⁾ CANopen	a value in the range 1 - 128

⁽¹⁾ For Profibus, the Node Address 126 forces the SSA (Set Station Address) service which allows the Fieldbus Master to assign the slave node address. It is no longer possible to visualize the new address from the slave node after the Master sets it.

⁽²⁾ For DeviceNet, the Node Address 64 allows the Fieldbus Master to assign the slave node address. It is possible to visualize the new address from the slave node after the Master sets it.

⁽³⁾ The range of valid addresses for CC-Link depends on the assigned Input/Output Area Size as follows:
 If the Input Area is greater than 6 or the Output Area is greater than 8, the max Node Address is 63.
 If the Input Area is greater than 14 or the Output Area is greater than 16, the max Node Address is 62.
 If the Input Area is greater than 22 or the Output Area is greater than 24, the max Node Address is 61.

⁽⁴⁾ For CANopen, the Node Address 128 forces the LSS (Layer Setting Service) which allows the Fieldbus Master to assign the baud rate and address, but it is no longer possible to visualize the new address value from the slave node.

Data Flow Control

It implements a reliable transmission protocol between Fieldbus Master (PLC) and Slave (Fieldbus module) allowing specific functionalities such as Synchronization, Fragmentation/Reassembling and Data Consistency. For more details refer to the "DAD / DPD Driver" document on the CD-ROM.

Selections:

Disable
DAD Driver
DPD Driver

Data Consistency

If checked (enabled), it allows improving the overall communication robustness of the Fieldbus network. For more details refer to the "DAD / DPD Driver" document on the CD-ROM.

Version

This parameter appears only if the Fieldbus type is CC-Link. It indicates the software version of the CC-Link controller. The possible values are Version **1** or **2**.

Stations

This is a read-only parameter that appears only if the Fieldbus type is CC-Link. It indicates how many logical stations are assigned to the physical slave.

Cycles

This is a read-only parameter that appears only if the Fieldbus type is CC-Link. It indicates the number of cycles the CC-Link Fieldbus Master must perform on the logical stations in order to manage the Exchange Areas.

Process Active Timeout (ms)

This value specifies how long the module shall stay in the 'PROCESS_ACTIVE'-state after receiving a Modbus TCP request. The valid values are in the range from **0** to **65535** ms. The default value is 0 = timeout disabled.

Connection Timeout (s)

This setting specifies how long a Modbus TCP connection may be idle before it is closed by the module. The valid values are in the range from **0** to **65535** seconds, default = 60 seconds. 0 = timeout disabled.

Line Parameters

The parameters available in this group define and report the fundamental information about the system.

For details refer to "Internetworking with TCP/IP, vol. I", by Douglas E. Comer.

MAC

This is a read-only parameter, which displays the address of the network interface card (NIC).

Baud Rate

This is a read-only parameter. All modules are set to use the automatic baud rate mechanism where the Fieldbus-TCP/IP Master defines the speed of the connection. After connection the actual speed will be displayed in this parameter.

IP Addressing

<u>Selections:</u>	Static Assignment	the IP Address can be set manually through the IP_address, IP_netmask and IP_gateway parameters.
	DHCP	the IP address is assigned by a DHCP server when getting the scanner configuration. In this case the IP address parameters are read-only and display the DHCP assigned address.
	Remote Assignment	the IP address is assigned by a remote network device (PC) using the IPConfig address configuration application available on the CD-ROM. In this case the IP address parameters are read-only and display the remotely assigned address.

IP_address

If the IP Addressing parameter is set to Static Assignment, the Internet Protocol (IP) network address can be defined manually. Consult your network administrator to obtain a new address. For other IP Addressing selections, this parameter is read-only.

IP_netmask

If the IP Addressing parameter is set to Static Assignment, the subnet mask address can be defined manually. Consult your network administrator to obtain a new address. For other IP Addressing selections, this parameter is read-only.

IP_gateway

If the IP Addressing parameter is set to Static Assignment, the gateway address can be defined manually. Consult your network administrator to obtain a new address. For other IP Addressing selections, this parameter is read-only.

Station Name

This parameter is meaningful and mandatory only for the Profinet interface. It is a string (max 240 characters) which identifies the node on the network as an alternative to the IP address. If this value is changed by the host application during runtime, a reset is required in order for changes to have effect.

The Name can be made up only of letters or numbers. The . (dot) and - (dash) characters can be used but not as the first or last character in the Name.

Digital Inputs Conditioning

NOTE

If any of the following parameters are enabled, the DAD or DPD Driver starts at Byte 1 (second byte) of the Input/Output Areas, and Byte 0 of the Input/Output Areas is reserved for Digital I/O Conditioning parameters.

If none of the following parameters are enabled, the DAD or DPD Driver starts at Byte 0 (first byte) of the Input/Output Areas.

For details about the DAD or DPD Driver, refer to the "DAD / DPD Driver" document on the CD-ROM.

The DAD or DPD Drivers are NOT available for the Fieldbus networks managed under the Ethernet TCP/IP Services branch (BM2x0 Ethernet/IP or Modbus TCP) since these protocols do not use Exchange Areas.

Input 1 Echo

If checked, the SC4000 Input 1 status is echoed to the Fieldbus Master via bit 0 in Byte 0 (LSB) of the Input Area.

For BM2x0 Ethernet/IP, the Input 1 status is echoed to the Fieldbus Master using Assembly Object Instances as described in section C of the Ethernet/IP document for DS6x00 scanners.

Input 2 Echo

If checked, the SC4000 Input 2 status is echoed to the Fieldbus Master via bit 1 in Byte 0 (LSB) of the Input Area.

For BM2x0 Ethernet/IP, the Input 2 status is echoed to the Fieldbus Master using Assembly Object Instances as described in section C of the Ethernet/IP document for DS6x00 scanners.

Input 3 Echo

If checked, the SC4000 Input 3 status is echoed to the Fieldbus Master via bit 2 in Byte 0 (LSB) of the Input Area.

For BM2x0 Ethernet/IP, the Input 3 status is echoed to the Fieldbus Master using Assembly Object Instances as described in section C of the Ethernet/IP document for DS6x00 scanners.

Phase Echo

If checked, the SC4000 Reading Phase status is echoed to the Fieldbus Master via bit 7 in Byte 0 (LSB) of the Input Area. This parameter is only available if Start Input from Fieldbus is enabled.

For BM2x0 Ethernet/IP, the SC4000 Reading Phase status is echoed to the Fieldbus Master using Assembly Object Instances as described in section C of the Ethernet/IP document for DS6x00 scanners.

Digital Outputs Conditioning

NOTE

If any of the following parameters are enabled, the DAD or DPD Driver starts at Byte 1 (second byte) of the Input/Output Areas, and Byte 0 of the Input/Output Areas is reserved for Digital I/O Conditioning parameters.

If none of the following parameters are enabled, the DAD or DPD Driver starts at Byte 0 (first byte) of the Input/Output Areas.

For details about the DAD or DPD Driver, refer to the "DAD / DPD Driver" document on the CD-ROM.

The DAD or DPD Drivers are NOT available for the Fieldbus networks managed under the Ethernet TCP/IP Services branch (BM2x0 Ethernet/IP or Modbus TCP) since these protocols do not use Exchange Areas.

Output 1

This parameter is read-only if the SC4000 Output 1 is set to Use Local. If the SC4000 Output 1 is set to Use External Fieldbus, then this parameter can be checked to allow the Fieldbus Master to drive the SC4000 Output 1 via bit 0 in Byte 0 (LSB) of the Output Area.

For BM2x0 Ethernet/IP, the Fieldbus Master can drive Output 1 using Assembly Object Instances as described in section C of the Ethernet/IP document for DS6x00 scanners.

Output 2

This parameter is read-only if the SC4000 Output 2 is set to Use Local. If the SC4000 Output 2 is set to Use External Fieldbus, then this parameter can be checked to allow the Fieldbus Master to drive the SC4000 Output 2 via bit 1 in Byte 0 (LSB) of the Output Area.

For BM2x0 Ethernet/IP, the Fieldbus Master can drive Output 2 using Assembly Object Instances as described in section C of the Ethernet/IP document for DS6x00 scanners.

Output 3

This parameter is read-only if the SC4000 Output 3 is set to Use Local. If the SC4000 Output 3 is set to Use External Fieldbus, then this parameter can be checked to allow the Fieldbus Master to drive the SC4000 Output 3 via bit 2 in Byte 0 (LSB) of the Output Area.

For BM2x0 Ethernet/IP, the Fieldbus Master can drive Output 3 using Assembly Object Instances as described in section C of the Ethernet/IP document for DS6x00 scanners.

TCP/IP Services

UserSocket #n

The TCP/IP protocol provides two (user-defined) application sockets for communication. For further details refer to the following bibliography:

- Internetworking with TCP/IP, vol. I (chap. 20), by Douglas E. Comer
- UNIX, network programming, by W. Richards Stevens

All the parameters managing the Heartbeat are available in the Heartbeat parameters group.

Status

Enables the TCP/IP User Socket #n.

Data Tx

If enabled (checked), data will be transmitted from the SC4000 on the TCP/IP User Socket.

Heartbeat

This parameter enables/disables transmission of the Heartbeat message used to signal device or system status at regular intervals. The Heartbeat message is independent from Data Tx and can be enabled even if data is not sent on the TCP/IP User Socket (Data Tx - disabled).

<u>Selections:</u>	Disable	the Heartbeat message is not transmitted
	Enable Unconditioned	the Heartbeat message is always transmitted, even if communication is still active
	Enable Conditioned	the Heartbeat message is transmitted only when there is no communication

Type

It defines the type of the socket:

<u>Selection:</u>	Server	the station waits for connections and can communicate with a maximum of 3 clients simultaneously
	Client	the station tries a connection towards the server

Only one connection can be associated with an application socket of type server TCP. If a second connection is opened by the same peer machine with an application socket of type server TCP, this new connection will replace the first.

Server Address

This parameter is available only when the socket is configured as a Client. It defines the IP address of the server to which the client tries to connect.

Protocol

It defines the protocol to be used for the TCP/IP communication.

Selection: **TCP**
 UDP

For details refer to "Internetworking with TCP/IP, vol. I", by Douglas E. Comer.

Port

It defines the port number of the socket.

For details refer to "Internetworking with TCP/IP, vol. I", by Douglas E. Comer.

Use As WebSentinel Client

The Datalogic WebSentinel™ supervisor software monitors the behaviour of multiple scanner arrays in a plant. WebSentinel collects data from the arrays through an Ethernet TCP/IP bus and computes the received information flow as visual onscreen information.

This parameter allows using application Socket #1 as a WebSentinel Client.

Partial Read Is Treated As

This parameter is only available when the Code Combination is set to *Standard Multi Label* or *Logical Combination* and the Operating Mode is *On Line*. It defines how partial read conditions on the scanner will be interpreted by WebSentinel: Good Read, No Read or Partial Read.

Master Diagnostic Check Period (secs)

This parameter allows defining the period, in seconds, that Datalogic WebSentinel™ will use to check for diagnostic errors on the Master scanner. If an error is found, it will be sent to WebSentinel.

Heartbeat

The following parameters allow enabling the communication through the TCP/IP interface protocol:

The Heartbeat message is used to signal the device's or system's status at regular intervals to the Host. It has the following format:

Header	Counter	Field Sep	System Diagnostics	Field Sep	Network Diagnostics	Terminator
--------	---------	-----------	--------------------	-----------	---------------------	------------

Timeout

This parameter defines the amount of time between two message transmissions. If the selected time out expires and no transmission has occurred, the Heartbeat message will be transmitted.

Heartbeat Header String

This parameter signals the beginning of the Heartbeat message. It can be a string of up to 128 characters.

Selections: characters from **NUL** (00H) to **~** (7EH)

The Heartbeat Header String should be different from the Heartbeat Terminator String.

Heartbeat Field Separators String

This parameter determines the string used to separate the fields within the Heartbeat message. It can be a string of up to 128 characters.

Selections: characters from **NUL** (00H) to **~** (7EH)

Counter Module

This parameter enables a counter to track the number of Heartbeat messages.

Selections:

Disable	no counter field in the Heartbeat message
10	counts cyclically from 0 to 9
100	counts cyclically from 0 to 99
1000	counts cyclically from 0 to 999
10000	counts cyclically from 0 to 9999
Custom	allows defining a custom counter start/stop range from 0 to 10000.

Custom Counter Module

This parameter is available when the Counter Module parameter is Custom. It allows defining the maximum count number to reach before recycling.

Selections: a number from **2** to **10000**

Counter Starting Value

For the Custom Counter Module this parameter selects the starting counter value.

Selections: a number from **0** to **9999**

Counter Direction

Sets the counter direction, either **up** or **down**.

System Diagnostics

If checked it enables the System Diagnostics Field in the Heartbeat message. The System Diagnostics field is a fixed 2-byte field. The first byte has the following meaning:

1 = Reading Station OK
 3 = Presence Sensor Failure
 4 = Reading Station Failure

Network Diagnostics

If checked it enables the Network Diagnostics Field in the Heartbeat message. The Network Diagnostics field is a fixed 32-byte field (one for each scanner in the network from scanner 0 (Master), to scanner 31). Each byte has the following meaning:

0 = Scanner not expected
 1 = Scanner OK
 2 = Scanner expected but not present (not connected or possible network failure)
 3 = Scanner Failure

Heartbeat Terminator String

This parameter signals the end of the Heartbeat message. It can be a string of up to 128 characters.

Selections: characters from **NUL** (00H) to **~** (7EH)

The Heartbeat Header String should be different from the Heartbeat Terminator String.

Modbus TCP

This option determines the communication between the scanner, or, in a multi-sided layout, between several scanners and the Fieldbus network.

The Modbus Application Protocol-TCP/IP allows data transmission between the server and client. Both the scanner and a Quantum family PLC (programmer logical controller) can be either server or client.

This protocol implements Function Code 16(10Hex), which allows copying the application format message into the registers of the Modicon PLC controller. The application format rules for the Modicon message are the same of the Standard protocol on the Serial Line (for example, header and terminators), but it is recommended not to use Headers and Terminators since the mechanism to bind information is already native on the Modicon protocol. Both the parameters managing respectively the PLC memory register address value and the number of registers can be modified (see Start Register Number and Number of Registers for details). This protocol also implements function code F03 (read holding register), and F06 (preset single register).

The following parameters allow enabling the communication through the CBX Gateway to the Fieldbus network.

Status

This parameter enables the Modbus TCP socket and allows setting the Modbus TCP parameters.

Data Tx

If enabled (checked), data from the scanner will be transmitted on the Fieldbus network.

Type

It defines the type of the Modbus TCP socket:

Selection: **Server** The station waits for connection and can communicate with one single client at a time. If a second connection is opened by the same peer machine with an application socket of type server TCP, this new connection will be ignored.

Client The station tries a connection towards the server.

Server Address

This parameter is available only when the Modbus TCP socket is configured as a Client. It defines the IP address of the server to which the client tries to connect.

Start Register Number

It defines the "Starting Address" field of the Modbus TCP message. For details refer to "Modicon Modbus Protocol Reference Guide" by AEG Schneider Automation.

Number of Registers

It defines the maximum number of registers according to the maximum length of the message to be transmitted. The size of the message transmitted is constant, thus, it must be big enough to contain the largest barcode information. If the message is longer than the one expected, it will be truncated during transmission; if shorter, all unused characters will be filled with 0 binary. For details refer to "Modicon Modbus Protocol Reference Guide" by AEG Schneider Automation.

Ethernet/IP (explicit messaging)

Ethernet/IP is a high-level industrial application layer protocol for industrial automation applications. Based on the standard TCP/IP protocol suite, it uses the traditional Ethernet hardware and software to define an application layer protocol for configuring, accessing and controlling industrial automation devices.

NOTE

This feature is only available when BM2x0 is running SW Release 2.02.01 or later.

Status

This parameter enables the Ethernet/IP (explicit messaging) socket. When enabled, the Digital Inputs Conditioning and Digital Outputs Conditioning parameters can be defined.

Host 1 Serial Port

The following parameters determine the communication between the SC4000 and a Serial Host.

All parameters managing the serial communication are available in the Line Parameters group while all the parameters managing the Heartbeat are available in the Heartbeat parameters group.

Data Tx

If enabled (checked), data will be transmitted from the SC4000 on the Host 1 Serial Port.

Heartbeat

This parameter enables/disables transmission of the Heartbeat message used to signal device or system status at regular intervals. The Heartbeat message is independent from Data Tx and can be enabled even if data is not sent on the Host 1 Serial Port (Data Tx - disabled).

<u>Selections:</u>	Disable	the Heartbeat message is not transmitted
	Enable Unconditioned	the Heartbeat message is always transmitted, even if data communication is still active
	Enable Conditioned	the Heartbeat message is transmitted only when there is no data communication

Heartbeat

The following parameters allow configuring the Heartbeat message for communication through the Host 1 Serial Port.

The Heartbeat message is used to signal the device's or system's status at regular intervals to the Host. It has the following format:

Header	Counter	Field Sep	System Diagnostics	Field Sep	Network Diagnostics	Terminator
--------	---------	-----------	--------------------	-----------	---------------------	------------

Timeout

This parameter defines the amount of time between two message transmissions. If the selected time out expires and no transmission has occurred, the Heartbeat message will be transmitted.

Heartbeat Header String

This parameter signals the beginning of the Heartbeat message. It can be a string of up to 128 characters.

Selections: characters from **NUL** (00H) to **~** (7EH)

The Heartbeat Header String should be different from the Heartbeat Terminator String.

Heartbeat Field Separators String

This parameter determines the string used to separate the fields within the Heartbeat message. It can be a string of up to 128 characters.

Selections: characters from **NUL** (00H) to **~** (7EH)

Counter Module

This parameter enables a counter to track the number of Heartbeat messages.

Selections:

Disable	no counter field in the Heartbeat message
10	counts cyclically from 0 to 9
100	counts cyclically from 0 to 99
1000	counts cyclically from 0 to 999
10000	counts cyclically from 0 to 9999
Custom	allows defining a custom counter start/stop range from 0 to 10000.

Custom Counter Module

This parameter is available when the Counter Module parameter is Custom. It allows defining the maximum count number to reach before recycling.

Selections: a number from **2** to **10000**

Counter Starting Value

For the Custom Counter Module this parameter selects the starting counter value.

Selections: a number from **0** to **9999**

Counter Direction

Sets the counter direction, either **up** or **down**.

System Diagnostics

If checked it enables the System Diagnostics Field in the Heartbeat message. The System Diagnostics field is a fixed 2-byte field. The first byte has the following meaning:

1 = Reading Station OK
 3 = Presence Sensor Failure
 4 = Reading Station Failure

Network Diagnostics

If checked it enables the Network Diagnostics Field in the Heartbeat message. The Network Diagnostics field is a fixed 32-byte field (one for each scanner in the network from scanner 0 (Master), to scanner 31). Each byte has the following meaning:

0 = Scanner not expected
 1 = Scanner OK
 2 = Scanner expected but not present (not connected or possible network failure)
 3 = Scanner Failure

Heartbeat Terminator String

This parameter signals the end of the Heartbeat message. It can be a string of up to 128 characters.

Selections: characters from **NUL** (00H) to **~** (7EH)

The Heartbeat Header String should be different from the Heartbeat Terminator String.

Line Parameters

Communication Protocol

The following communication modes can be selected when using the Host 1 Serial Port.

Selections: **Standard**
 MUX 32 slave
 Siemens 3694
 Siemens RK512

Standard

Standard is the normal mode for the Host 1 Serial Interface. In this communication mode the following physical connections are allowed:

- RS232
- RS485 full-duplex

Selecting Standard, the scanner will send out the data using the specified Handshake, but without any special protocol.

MUX32 Slave

MUX32 slave is the communication mode used for connections to a Multiplexer. For such a configuration the scanner must be set with the same communication parameters (Baud rate, Parity, etc.) as the multiplexer.

In this communication mode, only the RS485 half-duplex physical connection is possible.

The following values are automatically set:

- No parity
- 8 data bits
- 1 stop bit

3964

This communication mode is typically used for connections to a PLC. The following physical connections are allowed:

- RS232
- RS485 full-duplex

RK512

For RK512 protocol the following parameters must be set:

Checksum	Filler Character	Header Bytes
Priority	Filler Position	

Electrical Interface

The Host 1 Serial Interface is compatible with the following electrical standards:

Selections: **RS232**
 RS485 full duplex

Handshake

Handshake is a communication control used to protect against data loss, it can be achieved via hardware (RTS\CTS protocol) or software (Xon\Xoff protocol).

Selections: **None**
 Hardware (RTS/CTS)
 Software (Xon/Xoff)

Baud Rate

Baud rate is the transmission speed in a communication line.

Selections: from **1200** to **115200**

Parity

Parity is a parameter indicating the presence of a control bit in the communication protocol frame.

Selections: **None**
 Odd
 Even

Data Bits

Data Bits is a parameter indicating the number of bits composing the data packet of the communication protocol frame.

Stop Bits

Stop Bits is a parameter indicating the number of stop bits in the data packet of the communication protocol frame.

Mux32 Protocol Address

When MUX32 Communication Mode is selected, it is possible to define an address for the connection of the scanner with a Multiplexer.

Selections: a value from **0** to **31**

Checksum

If **checked**, it enables the Checksum parameter. It is a control byte of the communication protocol. It is the one that distinguishes the normal protocol from the R version of the Siemens protocol itself (3964 from 3964R).

Priority

Priority is a parameter indicating the priority of the local node with the 3964 link.

Selections: **Low**
 High

Header Bytes

RK512 frame header is composed of 10 bytes. The values of bytes 5, 6, 9 and 10 must be defined.

Filler Character

The Fill character parameter indicates the value of the filler byte added by RK512 protocol if an odd number of bytes has to be transmitted.

Filler Position

The Fill position parameter indicates the position (at the beginning or at the end of the data packet) of the filler byte added by RK512 protocol if an odd number of bytes has to be transmitted.

Selections: **After data**
 Before data

Host 2 Serial Port

The Host 2 Serial Port is used by the SC4000 for one of the following purposes:

- to communicate data towards an alternative or additional Serial Host other than the Host 1 Serial Port or Gateway
- to pass data from a reader through to the Host 1 Serial Port or to the Host network through the Gateway. The reader can be connected to the 25-pin connector or to the internal spring clamp terminals.

The following parameters determine the SC4000 communication.

All parameters managing the serial communication are available in the Line Parameters group while all the parameters managing the Heartbeat are available in the Heartbeat parameters group.

Data TX

If enabled (checked), data will be transmitted from the SC4000 on the Host 2 Serial Port.

Heartbeat

This parameter enables/disables transmission of the Heartbeat message used to signal device or system status at regular intervals. The Heartbeat message is independent from Data Tx and can be enabled even if data is not sent on the Host 2 Serial Port (Data Tx - disabled).

<u>Selections:</u>	Disable	the Heartbeat message is not transmitted
	Enable Unconditioned	the Heartbeat message is always transmitted, even if communication is still active
	Enable Conditioned	the Heartbeat message is transmitted only when there is no communication

Data Pass Through

If enabled (checked), a reader connected to the Host 2 Serial Port (25-pin connector or to the internal spring clamp terminals) can pass its data through to the Host 1 Serial Port or to the Host network through the Gateway. See Data Pass Through Options.

NOTE

In rare cases where SC4000 is used as a Slave Multidata device, the connected reader data can be passed through to the ID-NET network.

Heartbeat

The following parameters allow configuring the Heartbeat message for communication through the Host 2 Serial Port.

The Heartbeat message is used to signal the device's or system's status at regular intervals to the Host. It has the following format:

Header	Counter	Field Sep	System Diagnostics	Field Sep	Network Diagnostics	Terminator
--------	---------	-----------	--------------------	-----------	---------------------	------------

Timeout

This parameter defines the amount of time between two message transmissions. If the selected time out expires and no transmission has occurred, the Heartbeat message will be transmitted.

Heartbeat Header String

This parameter signals the beginning of the Heartbeat message. It can be a string of up to 128 characters.

Selections: characters from **NUL** (00H) to **~** (7EH)

The Heartbeat Header String should be different from the Heartbeat Terminator String.

Heartbeat Field Separators String

This parameter determines the string used to separate the fields within the Heartbeat message. It can be a string of up to 128 characters.

Selections: characters from **NUL** (00H) to **~** (7EH)

Counter Module

This parameter enables a counter to track the number of Heartbeat messages.

Selections:

Disable	no counter field in the Heartbeat message
10	counts cyclically from 0 to 9
100	counts cyclically from 0 to 99
1000	counts cyclically from 0 to 999
10000	counts cyclically from 0 to 9999
Custom	allows defining a custom counter start/stop range from 0 to 10000.

Custom Counter Module

This parameter is available when the Counter Module parameter is Custom. It allows defining the maximum count number to reach before recycling.

Selections: a number from **2** to **10000**

Counter Starting Value

For the Custom Counter Module this parameter selects the starting counter value.

Selections: a number from **0** to **9999**

Counter Direction

Sets the counter direction, either **up** or **down**.

System Diagnostics

If checked it enables the System Diagnostics Field in the Heartbeat message. The System Diagnostics field is a fixed 2-byte field. The first byte has the following meaning:

1 = Reading Station OK
 3 = Presence Sensor Failure
 4 = Reading Station Failure

Network Diagnostics

If checked it enables the Network Diagnostics Field in the Heartbeat message. The Network Diagnostics field is a fixed 32-byte field (one for each scanner in the network from scanner 0 (Master), to scanner 31). Each byte has the following meaning:

0 = Scanner not expected
 1 = Scanner OK
 2 = Scanner expected but not present (not connected or possible network failure)
 3 = Scanner Failure

Heartbeat Terminator String

This parameter signals the end of the Heartbeat message. It can be a string of up to 128 characters.

Selections: characters from **NUL** (00H) to **~** (7EH)

The Heartbeat Header String should be different from the Heartbeat Terminator String.

Line Parameters

Communication Protocol

The following communication modes can be selected when using the Host 2 Serial Port.

Selections: **Standard**
 MUX 32 slave
 Siemens 3694
 Siemens RK512

Standard

Standard is the normal mode for the Host 2 Serial Interface. In this communication mode the following physical connections are allowed:

- RS232
- RS485 full-duplex

Selecting Standard, the scanner will send out the data using the specified Handshake, but without any special protocol.

MUX32 Slave

MUX32 slave is the communication mode used for connections to a Multiplexer. For such a configuration the scanner must be set with the same communication parameters (Baud rate, Parity, etc.) as the multiplexer.

In this communication mode, only the RS485 half-duplex physical connection is possible.

The following values are automatically set:

- No parity
- 8 data bits
- 1 stop bit

3694

This communication mode is typically used for connections to a PLC. The following physical connections are allowed:

- RS232
- RS485 full-duplex

RK512

For RK512 protocol the following parameters must be set:

Checksum	Filler Character	Header Bytes
Priority	Filler Position	

Electrical Interface

The Host 2 Serial Interface is compatible with the following electrical standards:

Selections: **RS232**
 RS485 full duplex

Handshake

Handshake is a communication control used to protect against data loss, it can be achieved via hardware (RTS\CTS protocol) or software (Xon\Xoff protocol).

Selections: **None**
 Hardware (RTS/CTS)
 Software (Xon/Xoff)

Baud Rate

Baud rate is the transmission speed in a communication line.

Selections: from **1200** to **115200**

Parity

Parity is a parameter indicating the presence of a control bit in the communication protocol frame.

Selections: **None**
 Odd
 Even

Data Bits

Data Bits is a parameter indicating the number of bits composing the data packet of the communication protocol frame.

Stop Bits

Stop Bits is a parameter indicating the number of stop bits in the data packet of the communication protocol frame.

Mux32 Protocol Address

When MUX32 Communication Mode is selected, it is possible to define an address for the connection of the scanner with a Multiplexer.

Selections: a value from **0** to **31**

Checksum

If **checked**, it enables the Checksum parameter. It is a control byte of the communication protocol. It is the one that distinguishes the normal protocol from the R version of the Siemens protocol itself (3964 from 3964R).

Priority

Priority is a parameter indicating the priority of the local node with the 3964 link.

Selections: **Low**
 High

Header Bytes

RK512 frame header is composed of 10 bytes. The values of bytes 5, 6, 9 and 10 must be defined.

Filler Character

The Fill character parameter indicates the value of the filler byte added by RK512 protocol if an odd number of bytes has to be transmitted.

Filler Position

The Fill position parameter indicates the position (at the beginning or at the end of the data packet) of the filler byte added by RK512 protocol if an odd number of bytes has to be transmitted.

Selections: **After data**
 Before data

Data Pass Through Options

Pass Through mode allows a separate reader (Hand-Held, scanner, 2D imager, etc.) to be connected directly to the SC4000 and pass its data through to the host independently from the data arriving from the reader network. The SC4000 transmits messages received by the reader connected to its Host 2 interface onto its Host 1 interface. The maximum length of the string to be received in pass through (buffer) is fixed in software at 16 Kbytes. In case the string is longer than this, it will be discarded.

For the description of these layouts refer to the scanner Reference Manual under "Typical Layouts".

When using Pass Through mode, follow these programming notes:

1. Program the Host 2 serial port according to the reading device requirements (communication protocol, electrical interface, baud rate, data bits, stop bits and parity).
2. The Termination string must be configured in the same way as the message terminator on the reader network. The terminator will be sent with the message.

Termination String

It defines the characters terminating the expected string.

Data Destination: Host 1 Serial Port

The reading device connected to Host 2 will pass its data through to the Host 1 interface.

Data Destination: Gateway

The reading device connected to Host 2 will pass its data through to the Gateway interface.

Data Destination: ID-NET

If the SC4000 Topology Role is set as Multidata Slave (Gateway), the reading device connected to Host 2 will pass its data through to the ID-NET™ interface.

This data can also be passed through to the Host 1 Serial interface.

Auxiliary Serial Port

The Auxiliary Serial Port is used by the SC4000 for one of the following purposes:

- to communicate data towards an alternative or additional Serial Host (RS232 only) other than the Host 1 Serial Port or Gateway
- to pass data from a reader through to the Host 1 Serial Port or to the Host network through the Gateway. The reader can be connected to the internal spring clamp terminals.

The following parameters determine the SC4000 communication.

All parameters managing the serial communication are available in the Line Parameters group while all the parameters managing the Heartbeat are available in the Heartbeat parameters group.

Data TX

If enabled (checked), data will be transmitted from the SC4000 on the Auxiliary Serial Port.

Heartbeat

This parameter enables/disables transmission of the Heartbeat message used to signal device or system status at regular intervals. The Heartbeat message is independent from Data Tx and can be enabled even if data is not sent on the Auxiliary Serial Port (Data Tx - disabled).

<u>Selections:</u>	Disable	the Heartbeat message is not transmitted
	Enable Unconditioned	the Heartbeat message is always transmitted, even if communication is still active
	Enable Conditioned	the Heartbeat message is transmitted only when there is no communication

Data Pass Through

If enabled (checked), a reader connected to the Auxiliary Serial Port spring clamp connectors can pass its data through to the Host 1 Serial Port or to the Host network through the Gateway. See Data Pass Through Options.

NOTE

In rare cases where SC4000 is used as a Slave Multidata device, the connected reader data can be passed through to the ID-NET network.

Heartbeat

The following parameters allow configuring the Heartbeat message for communication through the Auxiliary Port.

The Heartbeat message is used to signal the device's or system's status at regular intervals to the Host. It has the following format:

Header	Counter	Field Sep	System Diagnostics	Field Sep	Network Diagnostics	Terminator
--------	---------	-----------	--------------------	-----------	---------------------	------------

Timeout

This parameter defines the amount of time between two message transmissions. If the selected time out expires and no transmission has occurred, the Heartbeat message will be transmitted.

Heartbeat Header String

This parameter signals the beginning of the Heartbeat message. It can be a string of up to 128 characters.

Selections: characters from **NUL** (00H) to **~** (7EH)

The Heartbeat Header String should be different from the Heartbeat Terminator String.

Heartbeat Field Separators String

This parameter determines the string used to separate the fields within the Heartbeat message. It can be a string of up to 128 characters.

Selections: characters from **NUL** (00H) to **~** (7EH)

Counter Module

This parameter enables a counter to track the number of Heartbeat messages.

Selections:

Disable	no counter field in the Heartbeat message
10	counts cyclically from 0 to 9
100	counts cyclically from 0 to 99
1000	counts cyclically from 0 to 999
10000	counts cyclically from 0 to 9999
Custom	allows defining a custom counter start/stop range from 0 to 10000.

Custom Counter Module

This parameter is available when the Counter Module parameter is Custom. It allows defining the maximum count number to reach before recycling.

Selections: a number from **2** to **10000**

Counter Starting Value

For the Custom Counter Module this parameter selects the starting counter value.

Selections: a number from **0** to **9999**

Counter Direction

Sets the counter direction, either **up** or **down**.

System Diagnostics

If checked it enables the System Diagnostics Field in the Heartbeat message. The System Diagnostics field is a fixed 2-byte field. The first byte has the following meaning:

1 = Reading Station OK
 3 = Presence Sensor Failure
 4 = Reading Station Failure

Network Diagnostics

If checked it enables the Network Diagnostics Field in the Heartbeat message. The Network Diagnostics field is a fixed 32-byte field (one for each scanner in the network from scanner 0 (Master), to scanner 31). Each byte has the following meaning:

0 = Scanner not expected
 1 = Scanner OK
 2 = Scanner expected but not present (not connected or possible network failure)
 3 = Scanner Failure

Heartbeat Terminator String

This parameter signals the end of the Heartbeat message. It can be a string of up to 128 characters.

Selections: characters from **NUL** (00H) to **~** (7EH)

The Heartbeat Header String should be different from the Heartbeat Terminator String.

Line Parameters

Baud Rate

Baud rate is the transmission speed in a communication line.

Selections: from **1200** to **115200**

Parity

Parity is a parameter indicating the presence of a control bit in the communication protocol frame.

Selections: **None**
Odd
Even

Data Bits

Data Bits is a parameter indicating the number of bits composing the data packet of the communication protocol frame.

Stop Bits

Stop Bits is a parameter indicating the number of stop bits in the data packet of the communication protocol frame.

Data Pass Through Options

Pass Through mode allows a separate reader (Hand-Held, scanner, 2D imager, etc.) to be connected directly to the SC4000 and pass its data through to the host independently from the data arriving from the reader network. The SC4000 transmits messages received by the reader connected to its Auxiliary interface onto its Host 1 interface. The maximum length of the string to be received in pass through (buffer) is fixed in software at 16 Kbytes. In case the string is longer than this, it will be discarded.

For the description of these layouts refer to the scanner Reference Manual under "Typical Layouts".

When using Pass Through mode, follow these programming notes:

1. Program the Auxiliary serial port (RS232 only) according to the reading device requirements (baud rate, data bits, stop bits and parity).
2. The Termination string must be configured in the same way as the message terminator on the reader network. The terminator will be sent with the message.

Termination String

It defines the characters terminating the expected string.

Data Destination: Host 1 Serial Port

The reading device connected to the Auxiliary interface will pass its data through to the Host 1 interface.

Data Destination: Gateway

The reading device connected to the Auxiliary interface will pass its data through to the Gateway interface.

Data Destination: ID-NET™

If the SC4000 Topology Role is set as Multidata Slave (Gateway), the reading device connected to the Auxiliary interface will pass its data through to the ID-NET™ interface. This data can also be passed through to the Host 1 Serial interface.

Data Format

Data Format allows to configure the parameters relative to the message format and the transmission mode.

Host Application Protocol Type

It defines the protocol type to be used when transmitting the data format.

Selections: **Standard**

Crisplant: the Crisplant protocol type can be selected only when the following parameters are set as follows:

- Operating Mode = On-Line
- On-Line Options = On-Line 1 Input or On-Line 2 Inputs
- Host 1 Serial Port Type = Serial
- Host 1 Communication Protocol = Standard
- Message TX Event = After Reading Phase Off
- Code Combination = Standard Multi Label
- Pass Through = Disabled

While using the Crisplant protocol the value set for these parameters cannot be changed.

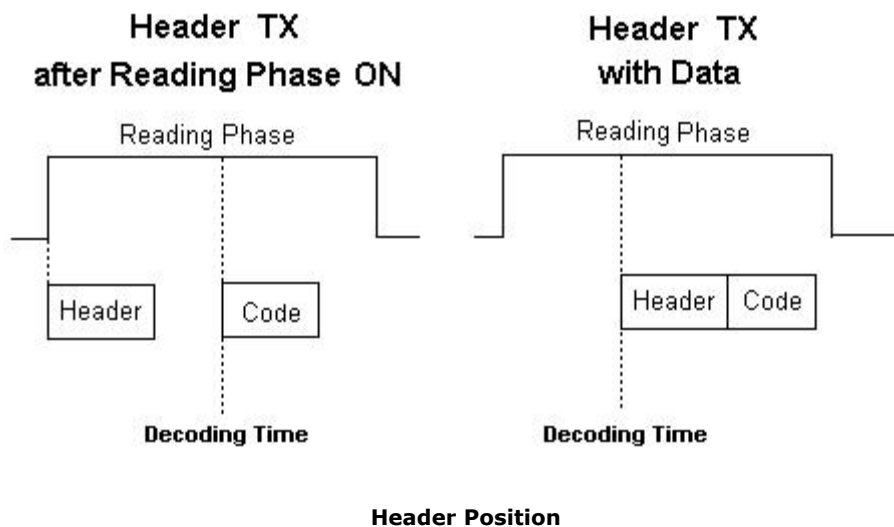
Header Tx Event

It selects the transmission of the header **after the reading phase** activation or **with data**.

Selections: **After Reading Phase On** header will be transmitted after the reading phase activation

With Data header will be transmitted with data

Example



Termination After No Read Message

This parameter is available only when the No Read Message parameter is set to "Global No Read Message" or "Local No Read Message".

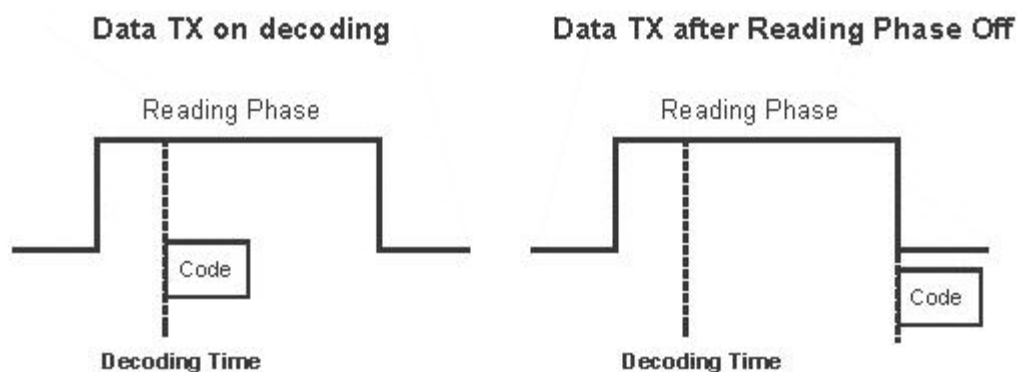
If checked (enabled), the Termination String is added to the No Read message string.

Message Tx Event

Message Tx Selection selects the transmission of the output message either on decoding or after the reading phase.

Selections: **On decoding**

After Reading Phase Off



Format Type

This parameter allows defining the output format type:

Selections: **Standard** allows setting the format type through the Standard Parameters
Advanced allows setting the format type through a dedicated add-on.

Master Max Tx Delay After Phase Off

For master devices, this parameter defines a timeout, which is the maximum delay allowable after the reading phase is closed before transmitting to the Host. All messages from slaves must be received by the master before this timeout expires, otherwise they will be discarded.

Selections: **value from 50 to 500 ms**

Code Identifier

A Code Identifier string can be included in the output message.

Possible selections are:

Selections: **Disable** no code identifier is included in the output message
Standard AIM ID the AIM standard identifier is included in the output message
Custom activates the Custom Code ID strings group allowing to define an identifier string for each code symbology. The string will be included in the output message.

Standard Parameters

Header String

Headers (up to 128 bytes) can be defined and transmitted as a block preceding the barcode(s).

Selections: characters from **NUL** (00H) to **~** (7EH).

Code Position Tx

If enabled, the code position information is included in the output message. The scan line is divided into 256 physical positions and therefore the code position value is transmitted in a fixed 3-digit decimal format separated by a Code Field Separator before the Code Identifier field.

The code position is determined at the **center** of the label and is checked to be between the Min and Max parameters specified in the configuration.

Code Direction Identifier Enable

If enabled (checked), the relative Code Direction Identifier string is included in the output message.

The forward, reverse and unknown direction strings, which indicate the scanning direction with respect to the code direction, can be defined.

Forward Direction String

A Forward Direction string indicates that the current code has been scanned in the forward direction (scanning from left to right). This string ("+" is the default value) can be customized by the user including up to 32 characters.

Selections: characters from **NUL** (00H) to ~ (7EH).

Reverse Direction String

A Reverse Direction string indicates that the current code has been scanned in the reverse direction (scanning from right to left). The string ("-") is the default value) can be customized by the user including up to 32 characters.

Selections: characters from **NUL** (00H) to ~ (7EH).

Unknown Direction String

An Unknown Direction string indicates that it is not possible to determine the scanning direction of a code. This occurs for the Pharmacode code which has no start/stop characters and for some code reconstruction reading conditions. The string ("?" is the default value) can be customized by the user including up to 32 characters.

Selections: characters from **NUL** (00H) to ~ (7EH).

Motor OFF Message

If checked, it allows sending the Motor OFF string whenever the motor is set OFF.

Motor OFF String

It defines the message string (up to 128 bytes) that will be sent whenever a Motor OFF condition exists. When the Motor OFF condition occurs this string is sent instead of the Global No Read Message.

Selections: characters from **NUL** (00H) to ~ (7EH).

Termination String

Terminators (up to 128 bytes) can be defined and transmitted as a block following the barcode(s).

Selections: characters from **NUL** (00H) to ~ (7EH).

Data Packet Separators

The Data Packet Separators (up to 128 bytes) are used to separate multiple Data Packets (barcodes with their relative reading information) in a single reading phase. For this reason, they are useful only when the Code Combination parameter is not Single Label.

Selections: characters from **NUL** (00H) to ~ (7EH).

Info Field Separators

The Info Field Separators (up to 128 bytes) are used to separate the Info Field from the Code Field within the Data Packet of an output message. The Info Field contains the Quality Counters.

Selections: characters from **NUL** (00H) to ~ (7EH).

Code Field Separators

The Code Field Separators (up to 128 bytes) are used to separate each of the code reading information fields before the Code Field within the Data Packet.

Selections: characters from **NUL** (00H) to ~ (7EH).

Code Field Length Setting

The code field length (in number of characters/digits) can be specified in order to be transmitted:

Selections: **Variable** all possible code field lengths (in number of characters/digits) allowed for the code selected are accepted.
Fixed only the length defined by the Code Field Length parameter is accepted.

Code Field Length

This parameter is only available when the Code Field Length Setting is set to *Fixed*. It defines (in number of characters/digits) the length of the code field to be transmitted:

Selections: a value in the range from **0** to **48** (in number of characters/ digits)

Data Justification

This parameter is only available when the Code Field Length Setting is set to *Fixed*. It defines the position of the Fill Character within the code:

Selections: **Left** the Fill Character is left aligned and precedes the code field
Right the Fill Character is right aligned and follows the code field

Fill Character

This parameter is only available when the Code Field Length Setting is set to *Fixed*. The Fill Character is inserted into each character position of a code field that has more characters (as defined in the Code Field Length) than exist in the barcode read. If the field is left blank, the space character is sent.

Selections: a character from **NUL** (00H) to **~** (7EH)

Example

For barcode "12345" with Fill Character "-" (2DH) and Code Field Length of **10** characters, the result of the different alignment will be:

Left aligned = ...<Code Identifier><12345----->...
Right aligned = ...<Code Identifier><-----12345>...

Multidata

When a Master MULTIDATA configuration is selected, this group allows the Slave address to be included before the Slave message together with its own Header and separator strings.

The syntax of this message is:

<Slave Address Header>xx<Address Separator><Slave Header><Code1 [Code2....Coden]><Slave Terminator>
 ...

Address Tx

It enables the Slave Address to be included before the Slave message.

Header

An address Header string (up to 32 bytes) can be defined and transmitted as a block preceding the Slave Address.

Selections: characters from **NUL** (00H) to **~** (7EH).

Separator

It defines the separator string (up to 32 bytes) that will be inserted between the Slave address and the Slave message.

Example:

An example of a message coming from Slave 3 through the Master MULTIDATA scanner is represented below:

<Slave Address Header>03<Address Separator><Slave Header><Code1 [Code2....Codn]><Slave Terminator>
 ...

Crisplant Parameters

This group allows defining all the parameters managing this communication protocol.

Crisplant Manufacturer ID

It defines the Crisplant proprietary format.

Heartbeat Message

It enables/disables the transmission of the Heartbeat telegram.

Heartbeat Message Timing

It defines the amount of time between two code transmissions. If the selected timeout expires and no transmission has occurred, the Heartbeat telegram will be transmitted.

Type of Crisplant Protocol

It defines the type of Crisplant protocol to be used:

<u>Selections:</u>	CSC	the <CR><LF> characters do not appear at the end of transmitted/received telegrams
	CMC	the <CR><LF> characters appear at the end of transmitted/received telegrams

Reading Mask Tx

It allows the transmission of the Reading Mask within the output message.

Code Type Tx

It allows the transmission of the code type within the output message.

Built-In Digital I/Os

Inputs

Input 1 Active Level (Overridden By Operating Mode)

It allows selecting the active state of Input 1 (External Trigger).

NOTE

This parameter setting is not valid, if the input has already been defined in On Line Operating Mode.

Selections: **Active Closed** Input 1 is active when current flows through I1A and I1B pins.
 Active Open Input 1 is active when there is no current flowing through I1A and I1B pins.

Input 2 Active Level (Overridden By Operating Mode)

It allows selecting the active state of Input 2.

NOTE

This parameter setting is not valid, if the input has already been defined in On Line Operating Mode.

Selections: **Active Closed** Input 2 is active when current flows through I2A and I2B pins.
 Active Open Input 2 is active when there is no current flowing through I2A and I2B pins.

Input 3 Active Level (Overridden By Operating Mode)

It allows selecting the active state of Input 3.

NOTE

This parameter setting is not valid, if the input has already been defined in On Line Operating Mode.

Selections: **Active Closed** Input 3 is active when current flows through I3A and I34B pins.
 Active Open Input 3 is active when there is no current flowing through I3A and I34B pins.

Debounce Filter (ms)

Sets the maximum duration of the pulses which are rejected by the anti-disturbance filter. Pulses exceeding this limit are recognized as valid commands.

Selections: **5 to 1000 (ms)**

Output 1/2/3

Use

Selection: **Local** The SC4000 drives the output line depending on the activation/deactivation events.

External Fieldbus The external Fieldbus Master drives the output line.

Line State

Allows the selection of the active state of the output.

Each output can be represented as an NPN transistor; this transistor acts like a switch: so, when the transistor is OFF, it acts like an OPEN switch. On the contrary, when the transistor is ON, it acts like a CLOSED switch.

Selection: **Normally Open** the idle state of the output line is open, that is, the NPN transistor is OFF (like an open switch). When the output is activated, the transistor goes ON (like a closed switch).

Normally Closed the idle state of the output line is closed, that is, the NPN transistor is ON (like a closed switch). When the output is activated, the transistor goes OFF (like an open switch).

Activation Event

Defines the event activating the output.

Selection: **None** the output is always in the selected line state.

Complete Read the event occurs if all selected codes are read.

Partial Read the event occurs if less than the selected codes are read.

No Read the event occurs if no code is read.

Phase On the event occurs when a start event takes place starting the reading phase.

Phase Off the event occurs when a stop event takes place ending the reading phase.

Multiple Read Right the event occurs if a code is read more than once consecutively.

Wrong the event occurs if a code is successfully decoded and matches the Verifier Code.

Ready the event occurs if a code is successfully decoded but does not match the Verifier Code.

Quality Counter < Threshold the event occurs after the power up phase when the SC4000 is ready.

the event occurs if the number of good decodes counted by the Quality Counter, defined in the Quality Counter Threshold parameter, is not reached.

Alternative Activation Event

Defines an alternative event activating the output in addition to the one selected for the Activation Event parameter.

Selection: **None** the output is always in line state.

Complete Read the event occurs if all selected codes are read.

Partial Read the event occurs if less than the selected codes are read.

No Read the event occurs if no code is read.

Phase On the event occurs when a start event takes place starting the reading phase.

Phase Off the event occurs when a stop event takes place ending the reading phase.

Multiple Read Right the event occurs if a code is read more than once consecutively.

Wrong the event occurs if a code is successfully decoded and matches the Verifier Code.

Ready the event occurs if a code is successfully decoded but does not match the Verifier Code.

Quality Counter < the event occurs after the power up phase when the SC4000 is ready.

the event occurs if the number of good decodes counted by the

Threshold	Quality Counter, defined in the Quality Counter Threshold parameter, is not reached.
------------------	--

Deactivation Event

Defines the event deactivating the output.

<u>Selection:</u>	Timeout	indicates the maximum duration of the output pulse.
	Phase On	the event occurs, when a start event takes place starting the reading phase.
	Phase Off	the event occurs, when a stop event takes place terminating the reading phase.
	None	
	Quality Counter >= Threshold	the event occurs after the number of good decodes counted by the Quality Counter, defined in the Quality Counter Threshold parameter, has been equalled or exceeded.

Alternative Deactivation Event

Defines the event deactivating the output, in addition to the one selected for the Deactivation Event.

<u>Selection:</u>	None	
	Phase On	the event occurs, when a start event takes place starting the reading phase.
	Phase Off	the event occurs, when a stop event takes place terminating the reading phase.
	Quality Counter >= Threshold	the event occurs after the number of good decodes counted by the Quality Counter, defined in the Quality Counter Threshold parameter, has been equalled or exceeded.

Activate on any Diagnostics Error

If this parameter is checked, the output will activate when a diagnostic error message is sent, independent from the event counter parameter. This parameter has priority over all other activation, deactivation, and timeout events.

Deactivate when all Diagnostics Errors Recovered

If this parameters is checked, the output will deactivate when there are no more diagnostic error message to send.

Deactivation Timeout

Indicates the maximum duration of the output pulse measured in milliseconds.

Selection: value from **40** to **15000**

NOTE

All values defined for this parameter will be rounded up to the nearest multiple of 20 ms.

Event Counter

The Event Counter parameter defines the number of occurrences of the activation event and/or alternative activation event that must transpire before the output can be activated. These occurrences can be either consecutive or not consecutive as described in the Event Counter Mode parameter. Once this value is reached the counter is reset and starts recounting.

Selection: value from **1** to **70000**

NOTE

This parameter is recommended only for On-Line or Serial On Line operating modes.

Event Counter Mode

<u>Selection:</u>	Consecutive	This counter only counts events that occur in consecutive reading phases. The output is activated after the Event Counter value is reached. If the event is not consecutive the counter is reset.
	Not Consecutive	This counter totals all events, even when occurring at non-consecutive reading phases. The output is activated according to the Message Tx Event parameter after the Event Counter value is reached.

NOTE

Not all Activation Event and Alternative Activation Event combinations are meaningful.
The Phase ON and Phase OFF events are only managed as totals, independent from the Event Counter Mode selection.

The Ready event has no count associated with it and therefore the Event Counter and Event Counter Mode parameters are ignored.

Quality Counter Threshold

This parameter sets the number of Quality Counter good decodes that serve as the threshold for one of the Activation/Deactivation events.

Selection: value from **1** to **100**

Display & Keypad

Display Language

This parameter sets the language used for all messages on the SC4000 display.

Selection: **English** **(United**
 States)

 French (France)
 German (Germany)
 Italian (Italy)
 Japanese (Japan)

Keypad

This parameter controls access to the SC4000 Keypad functions.

Selection: **Unlocked** the SC4000 Keypad is enabled.

 Locked the SC4000 Keypad is disabled.

Reset Last Reading Result After

This parameter clears the reading result shown on the SC4000 display after the selected number of seconds has elapsed without any new reading result. When no new reading result data is available the display shows the welcome message. If set to Disable, the last reading result is only cleared by new reading result data or other higher priority messages.

Other higher priority messages such as alarms are not affected (not cleared) by this parameter.

Diagnostics

When enabled, this group allows selection of the desired diagnostic messages and definition of the relative diagnostic management parameters.

The relative transmission parameters are described in Actions.

The relative data format parameters are described in Format.

For information on Diagnostic Error Messages see Diagnostic Error Conditions.

Enable

If checked, it allows configuring the Diagnostics parameters. Diagnostic error messages (or alarms) can be used to activate digital outputs when the Activate on any Diagnostic Error parameter is selected and/or they can be sent as strings when the Diagnostic Message Format parameter is set as a User Defined String.

ID-NET Slave Diagnostics

This parameter has meaning only for a SC4000 Master since it enables all diagnostic error messages coming from the ID-NET™ network slaves (through the Master) to the host. If unchecked, slave scanner alarms will be ignored and will not be sent to the host.

ID-NET Controller Failure

If checked, it allows sending an alarm signalling a malfunctioning of the SC4000 ID-NET™ network controller.

No Phase Timeout

It defines the time interval after which an error code is generated if no reading phase has occurred.

Selections:

- Disable**
- 1 sec**
- 5 sec**
- 10 sec**
- 20 sec**
- 1 min**
- 5 min**
- 10 min**
- 20 min**

Start/Stop Input Failure

This parameter is available only when working in On Line operating mode and when the On Line Options parameter is set to On Line Input 2. If checked, it generates an error if one of the two inputs (Start Input/Stop Input) does not work.

Fieldbus Failure

If checked, it allows sending an alarm whenever there is a communication error between the SC4000 and the Fieldbus module inside the SC4000.

Fieldbus Configuration Error

If checked, it allows sending an alarm whenever a configuration error has occurred between the SC4000 and the Fieldbus module inside the SC4000.

Fieldbus DHCP Problem

If checked, it allows sending an alarm whenever there is a communication problem between the DHCP server and the Fieldbus module inside the SC4000.

Fieldbus Mismatch

If checked, it allows sending an alarm whenever the Fieldbus module inside the SC4000 doesn't match the SC4000 configuration memory.

BM100: Wrong Rotary Switch Selection

If checked, it allows sending an alarm whenever one or more of the selected BM100 Rotary Switch settings inside the SC4000 doesn't match the SC4000 configuration memory.

BM100 Communication Failure

If checked, it allows sending an alarm whenever there is a communication error between the SC4000 and the BM100 module inside the SC4000.

Actions

When diagnostics are enabled, this group allows selection of all the parameters managing diagnostic message transmission by the SC4000.

Tx Mode

The diagnostic message can be transmitted to the system by the SC4000 either asynchronously (at programmed intervals), or synchronously with the code.

Tx Refresh

It defines the time interval in which the diagnostic messages will be transmitted if Tx Mode is asynchronous (On Timeout).

Message Position

If Tx Mode is synchronous (With Code), the diagnostic messages will be transmitted on the same interface used for code transmission. This selection determines if the messages will replace the code or be appended to it.

Example:

```
<STX><10DL><CR><LF> code
<STX><00#81><ETX> diagnostic message
```

Interface Transmission (Aux, Host 1, Host 2, Fieldbus, User Socket #1, User Socket #2)

The interface(s) on which the diagnostic messages will be transmitted can be selected (checked) if Tx Mode is asynchronous (On Timeout). The selected interface can be different from the code transmission interface.

Format

This group allows definition of the diagnostic message formatting sent by the SC4000 to the system.

The format of diagnostic messages in general is <Header><Message><Terminator> where the Internal Numeric Message has the following syntax:

xx#yyy space...

xx is either the address of the device: 00 = Master, all others = Slaves; or the Node Identification description string.
yyy is the diagnostic error number as described in the diagnostic tables.

Internal Numeric Message Example

```
<STX>00#132 01#1<ETX>      Master (00) No Phase Timeout + Slave 01 not responding
```

Header String

Headers (up to 128 bytes) can be defined and transmitted as a block preceding the diagnostic message.

Selections: characters from **NUL** (00H) to ~ (7EH).

Termination String

Terminators (up to 128 bytes) can be defined and transmitted as a block following the diagnostic message.

Selections: characters from **NUL** (00H) to ~ (7EH).

Diagnostic Message Format

It defines whether the message will be sent as an Internal Numeric Message or as a User Defined String.

Node Identification

This parameter is meaningful only for devices set as Master SYNCHRONIZED or Master MULTIDATA. It determines whether the diagnostic alarm messages sent for the various scanners in the network will be based on (and therefore include) their address or their description. The scanner description is the one described in the Network Wizard window and can be edited for both Master and Slaves.

User Defined Messages

The following messages substitute the Internal Numeric Messages when Diagnostic Message Format is set to User Defined Messages.

The format of diagnostic messages in general is <Header><Message><Terminator> where the User Defined Message has the following syntax:

xx#yyy space...

xx is either the address of the device: 00 = Master, all others = Slaves; or the Node Identification description string.
yyy is the User Defined Message string

User Defined Message Examples

<STX>00#* 01#^<ETX>
not responding

Master (00) No Phase Timeout + Slave 01

<STX>00#"No Phase Timeout" 01#"Slave Not Responding"<ETX>
Responding" (user defined strings)

"No Phase Timeout" + "Slave Not

ID-NET Controller Failure

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever the local ID-NET™ network controller failure is present.

Start/Stop Input Failure

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever a start/stop input failure is present.

No Phase Timeout

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever the No Phase Timeout expires (no phase activity - on or off).

ID-NET Slave No Reply

This message is sent only by the Master. It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever there is no response from slave number **xx**, where xx is the slave address.

ID-NET Slave Address Duplication

This message is sent only by the Master. It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever there are two or more slaves that have the same address xx.

ID-NET Slave Net Configuration

This message is sent only by the Master. It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever slave xx has been (re)configured.

Fieldbus Failure

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever there is a communication error between the SC4000 and the Fieldbus module inside the SC4000.

Fieldbus DHCP Problem

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever there is a communication problem between the DHCP server and the Fieldbus module inside the SC4000.

Fieldbus Configuration Error

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever a configuration error has occurred between the SC4000 and the Fieldbus module inside the SC4000.

Fieldbus Mismatch

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever the Fieldbus module inside the SC4000 doesn't match the SC4000 configuration memory.

BM100: Wrong Rotary Switch Selection

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever one or more of the selected BM100 Rotary Switch settings inside the SC4000 doesn't match the SC4000 configuration memory.

BM100 Communication Failure

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever there is a communication error between the SC4000 and the BM100 module inside the SC4000.

Statistics

When enabled, this group allows selection of the desired statistical counters and relative counter separator string to be sent to the system by the SC4000 Master (Synchronized).

Enable

If checked, it allows setting all parameters defining the global statistics for the reading phase.

Separator

It defines the separator string (up to 32 bytes) that will be inserted between the last code and the first statistical counter.

Time

If enabled (checked), this counter is included in the statistical message and reports the time elapsed in hh, mm from the last hardware reset.

Phase Counter

If enabled (checked), this counter is included in the statistical message and reports the total number of reading phases from the last hardware reset.

Good Read Counter

If enabled (checked), this counter is included in the statistical message and reports the total number of good reads from the last hardware reset.

Partial Read Counter

If enabled (checked), this counter is included in the statistical message and reports the total number of partial reads from the last hardware reset.

No Read Counter

If enabled (checked), this counter is included in the statistical message and reports the total number of no reads from the last hardware reset.

Multiple Read Counter

If enabled (checked), this counter is included in the statistical message and reports the total number of multiple reads from the last hardware reset.

Example:

The statistical message format is fixed and will include only the statistical counters selected. The entire statistical message is inserted between the Data Field and the Terminator Field. An example of a complete message is represented below:

```
<Header><Data Packet1 [<DPS><Data Packet2....Data Packetn>]><Statistics Separator><Time hh><Space><Time mm><Space><Reading Phase><Space><Good Reads><Space><Partial Reads><Space><No Reads><Space><Multiple Reads><Terminator>
```


User Information Section

This section allows storing specific SC4000 and system identity information together with the SC4000 configuration. It can be visualized in Genius, printed together with the configuration report and also through Host Mode Programming.

User Name

Add the User or Company name to the SC4000 information.

Device Name

Add the Device Name to the SC4000 information.

Line Name

Add the workstation Line Name or SC4000 position to the SC4000 information.

System Information Section

Device Information

This displays read only device identity information. It can be visualized in Genius, printed together with the configuration report and also through Host Mode Programming.

Detected Model

Displays the SC4000 model number.

Serial Number

Displays the SC4000 serial number.

References

Diagnostic Error Conditions

The following tables summarize all Internal Numeric Error Messages generated when working in the network.

Diagnostic Error Messages

Master/ Slave/ Other

Diagnostic Error Number	Meaning
[131] / [133]	Start/Stop Input Failure: the start or stop input is not working.
[132]	No Phase Timeout: no reading phase for more than the programmed No Phase timeout.
[151]	ID-NET Controller Failure: the SC4000 ID-NET controller has failed.
[185]	BM100 Communication Failure: there is a communication error between the SC4000 and the BM100 module inside the SC4000.
[187]	BM100: Wrong Rotary Switch Selection: one or more of the selected BM100 Rotary Switch settings inside the SC4000 doesn't match the SC4000 configuration memory.
[189]	Fieldbus Failure: there is a communication error between the SC4000 and the Fieldbus module inside the SC4000.
[191]	Fieldbus Mismatch: the Fieldbus module inside the SC4000 doesn't match the SC4000 configuration memory.
[193]	Fieldbus Configuration Error: a configuration error has occurred between the SC4000 and the Fieldbus module inside the SC4000.
[195]	Fieldbus DHCP Problem: a communication problem has occurred between the DHCP server and the Fieldbus module inside the SC4000.

Master only

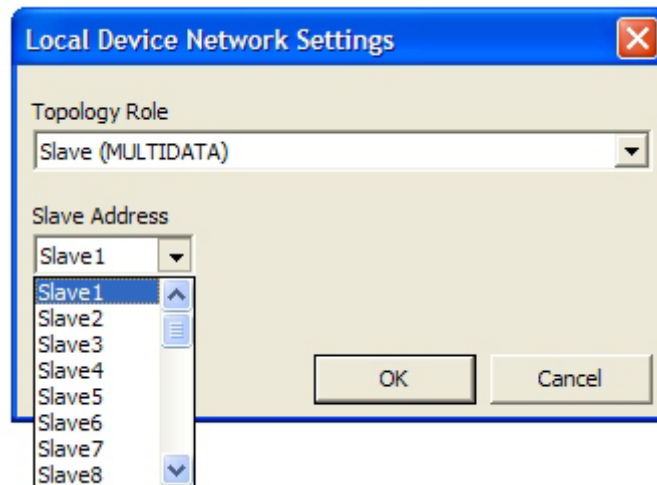
Diagnostic Error Number	Meaning
[1]	ID-NET Slave xx No Reply: no response from slave number xx , where xx is the slave address.
[64]	ID-NET Slave Address xx Duplication: two or more slaves have the same address xx.
[80]	ID-NET Slave xx Net Configuration: slave xx has been (re)configured.

NOTE

- Errors [1] and [80] may be detected whenever any scanner configuration changes.
- Error [64] may be detected a few minutes after the problem is generated and it is maintained until the master configuration changes or until the next power cycle of the master itself.
- Error [1] may be detected before Error [64] is detected due to the latency required for Error [64] detection.

Local Device Network Settings

By selecting the "Local Device Network Settings" from the Device menu, the following dialog box appears allowing to define the topology role of the SC4000::



SYNCHRONIZED: The Master SYNCHRONIZED configuration is the traditional ID-NET™ network configuration in which the On-Line Operating Mode is used.

MULTIDATA: The Master MULTIDATA / Slave MULTIDATA configuration is an ID-NET™ network configuration which allows the Slave devices to be configured differently and independently from the Master. In this way the Slave devices act as Stand Alone Devices which can send their data not only to their configured communication channels but also to the Master. The Master can be configured to send this data as a complete message to its configured communication channels with header, address and separators (see Multidata).

Topology Role

Defines the SC4000 topology role:

Master SYNCHRONIZED: The SC4000 is connected as an ID-NET™ Master in a master/slave synchronized configuration.

Master MULTIDATA: The SC4000 is connected as an ID-NET™ Master in a master/slave multidata configuration.

Slave MULTIDATA: The SC4000 is connected as an ID-NET™ Slave in a master/slave multidata configuration (ID-NET™ Gateway).

Other: The SC4000 can be used as a non ID-NET™ network Gateway (i.e. Fieldbus Gateway).

Slave Address

When setting the SC4000 topology role to Slave, it is necessary to define the ID-NET™ slave address within the network (1..31).

Standard Message Format

Information relative to code reading is transmitted in standard formats on the selected serial interface(s).

The general format is:

<HEADER><DATA><TERMINATOR>

The decoding result can be one of the following:

- DECODED CODE
- NO READ
- WRONG READ (Code Verifier)
- DIAGNOSTIC MESSAGES

A combination of the first two results can be obtained when using multilabel codes.

The following applies to message structures and transmission features:

- 1) Header Field can be transmitted at the start of the reading phase or together with the Data.
- 2) The Data and Terminator Fields can be transmitted as soon as decoding is over or at the end of the reading phase.

Decoded Code

Format

For Single Label:

<DATA> = <DATA PACKET>

For Multi Label:

<DATA> = <DATA PACKET #1><DPS><DATA PACKET #2><DPS>...<DATA PACKET #n>

where:

<DATA PACKET> = [<CDI><CFS><CP><CFS><CI><CFS><CODE FIELD><INFO FIELD>]

<CDI> = Code Direction Identifier

<CFS> = Code Field Separator

<CP> = **Code Position TX**

<CI> = Code Identifier

<CODE FIELD> = **Barcode** (see note)

<INFO FIELD> = [**<IFS>** **<QUALITY COUNTERS>**]

<IFS> = Info Field Separators

<DPS> = Data Packet Separators (only for Multi Label)

n= up to 10

Example

Single Label

Header = H

CDI = enabled (+ and -)

CFS = <space>

CP = enabled

CI = Standard AIM ID

Code Field Length Setting = Variable Length

Code 39 = DATALOGIC

IFS = \$

Quality Counters = enabled

Terminator = T

Output Message: **H+ 155 JA0 DATALOGIC\$099T**

Note

When the Code Field Length Setting parameter is *Fixed*, the <CODE FIELD> is subject to the editing rules specified by the parameters:

Code Field Length

Data Justification

Fill Character

No Read

The No Read condition occurs whenever a code cannot be read or decoded during the reading phase.

Format

For Disable No Read Message:

<HEADER><TERMINATOR>

For Single Label or Standard Multi Label when the Global No Read Message is enabled:

<HEADER><NO READ STRING><TERMINATOR>

For Standard Multi Label when the Local No Read Message is enabled:

<HEADER><DATA><TERMINATOR>

where:

<DATA> = <DATA PACKET #1><DPS><DATA PACKET #2><DPS>...<DATA PACKET #n>

<DATA PACKET> = [<CODE LABEL LOCAL NO READ STRING><INFO FIELD>] if not read

or

<DATA PACKET> = [<CDI><CFS><CP><CFS><CI><CFS><CODE FIELD><INFO FIELD>] if read

For field descriptions see Decoded Code.

Each field can appear or not depending on the configuration and the result of the reading.

Note

When the Code Field Length Setting parameter is *Fixed*, the <NO READ STRING> and <CODE FIELD> are subject to the editing rules specified by the parameters:

Code Field Length

Data Justification

Fill Character

Wrong Read

Only for Code Verifier (Single Label):

Format

When Wrong String Tx and Wrong Code Tx are enabled:

<HEADER><WRONG READ><TERMINATOR>

where:

<WRONG READ> = [<WRONG READ STRING><WRONG READ CODE><INFO FIELD>] if read but NOT Verifier Code

Each field can appear or not depending on the configuration and the result of the reading.

Diagnostic Messages

When enabled, Diagnostic Messages can be sent as an output message for certain error conditions.

Format

When Internal Numeric Messages are enabled:

**<HEADER><DIAGNOSTIC HEADER><INTERNAL NUMERIC MESSAGE><DIAGNOSTIC TERMINATOR>
<TERMINATOR>**

where:

<INTERNAL NUMERIC MESSAGE> = xx<#>yyy<space>

xx= is the address of the device: 00 = Master; all others = Slaves

yyy= is the diagnostic error number as described in the diagnostic tables.

When User Defined Strings are enabled:

**<HEADER><DIAGNOSTIC HEADER><#><DIAGNOSTIC ERROR MESSAGE><DIAGNOSTIC TERMINATOR>
<TERMINATOR>**

Each field can appear or not depending on the configuration and the result of the reading.

Host Mode Programming

An alternative method of programming the SC4000 is by sending programming strings over one of the serial interfaces.



These strings are transmitted from the Host system to the device on either the Auxiliary RS232 or Host 1 RS232/RS485 serial interface.

This is called Host Mode programming.

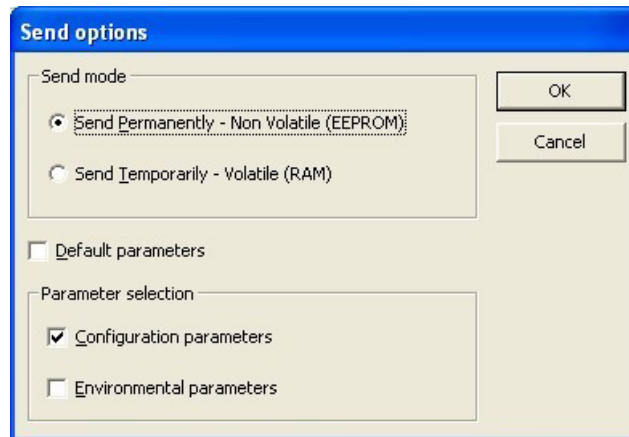
Once the programming session has started on one of the interfaces, the other is disabled until programming is over.

For a detailed description of the programming commands refer to the [Host Mode Programming](#) document on the CD-ROM.

Send Configuration Options

The SC4000 parameters are divided into two main classes, Configuration and Environmental which are effected differently by the Send Default  and Send Configuration  commands.

Configuration Parameters regard parameters that are specific to the SC4000. These parameters are influenced by the Send Default and Send Configuration commands, that is they are overwritten by these commands. The same parameters are modified by the following "Send with Options..." dialog from the Device Menu:



Environmental Parameters regard the SC4000 Identity and Position in a Network (Master or Slave ID-NET™, MUX 32 Slave) and are not influenced by the Send Default and Send Configuration commands. This allows individual devices to be configured differently without affecting their recognized position in the network.

The following is a list of the Environmental Parameters:

READING SYSTEM LAYOUT

- Network Baud Rate

LOCAL DEVICE NETWORK SETTING

- Topology Role
- ID-NET Slave Address
- Device Enable
- Device Description

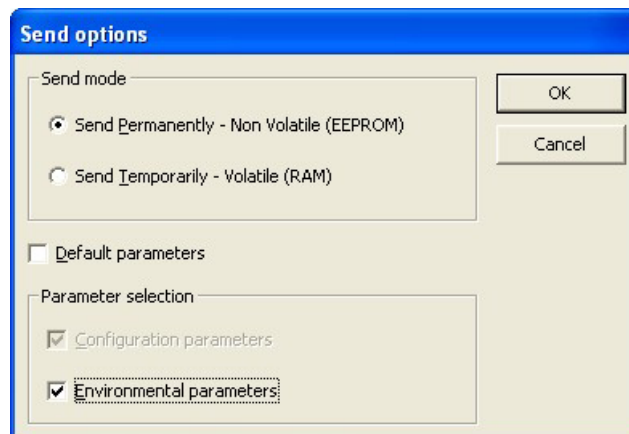
DATA FORMAT

- Crisplant Manufacturer ID
- MUX 32 Protocol Address

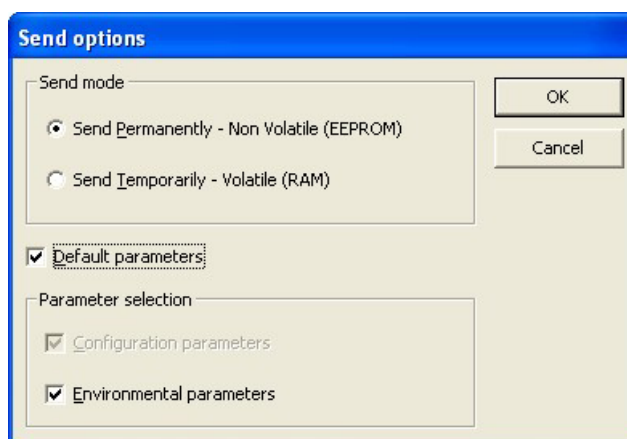
USER INFORMATION SECTION

- User Name
- Device Name
- Line Name

By the Sending Configuration parameters and Environmental parameters, the individual devices can be completely re-configured including their assigned position in the network. This was useful for device replacement in the past. However now, for device replacement use the procedures described in CBX/SC4000 Backup & Restore.



In order to return a device to its absolute default parameters including Environmental parameters, the following Send with Option..." dialog must be used:

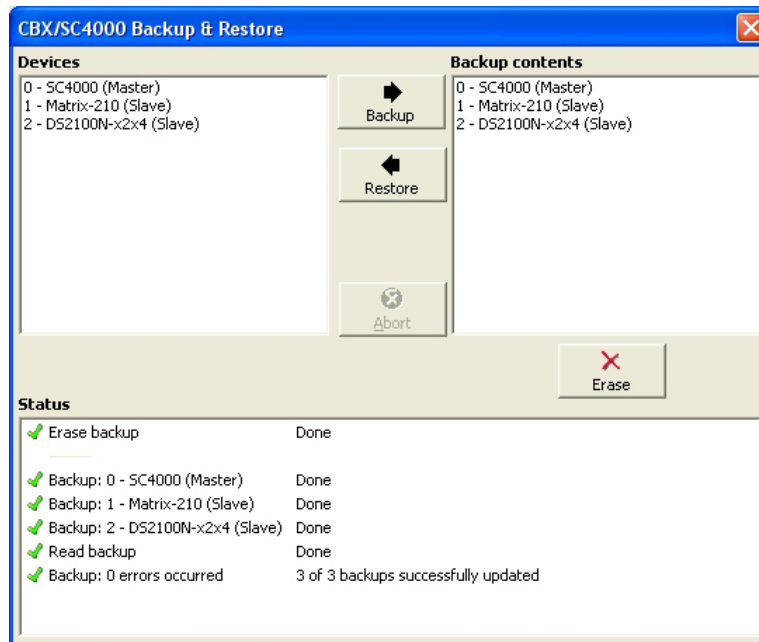
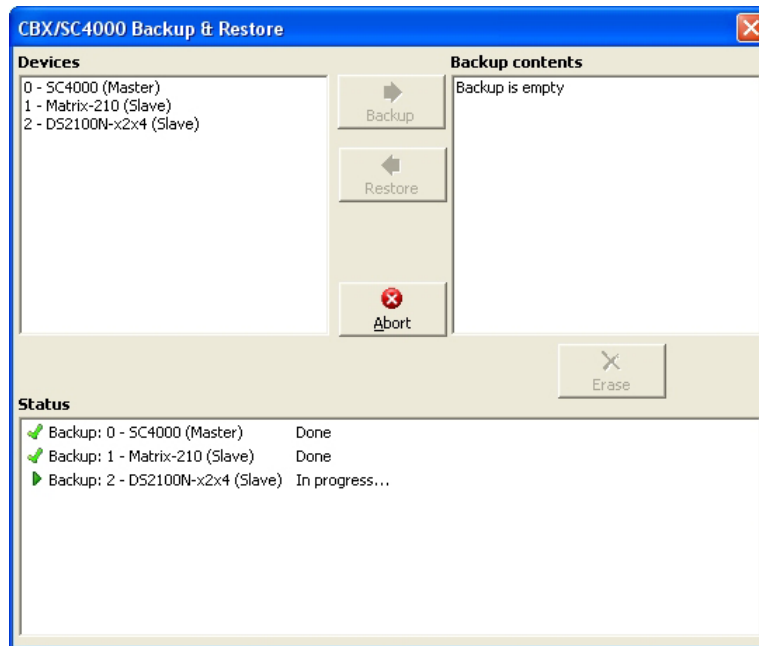


CBX SC4000 Backup & Restore

By selecting "CBX/SC4000 Backup & Restore" from the Device menu, the following dialog box appears allowing to perform Complete Configuration and Environmental parameter storage for network and reading devices.

- Backup & Restore can be applied to 2KN/4K Family scanners regardless of the devices' network configuration when connected to:
 - CBX + BM100 and/or BM2x0
 - QL500 (Ethernet TCP/IP)
 - QLM-Series Gateways
 - SC4000 ID-NET Controller
- Backup & Restore can be applied to Matrix Family readers regardless of the devices' network configuration through VisiSet™, or through Genius™ when connected as Multidata Slaves to an SC4000 ID-NET Controller.
- Backup & Restore can also be applied to CBX800 Gateways when set as ID-NET™ Multidata Slaves only.

Backup & Restore automatically checks whether a previous backup or configuration is already available for each device speeding the procedure up and making it more secure.



NOTE

- Before executing a Backup on a BM100 backup module make sure the Write Protection switch is set to Unlocked.
- If BM100 and BM2x0 are both installed B&R is automatically performed only on the BM100 module.
- BM2x0 can execute B&R only with Network up and running (network cable connected).
- QL500 can backup up to 10 nodes (Master + 9 slaves).

In the pictures above the Backup/Restore Dialog is shown:

the **Devices** window lists all of the available devices in the current configuration,
the **Backup Contents** window lists any previous device backups.

To perform a **Backup**:

1. Press the Backup button (you will be warned that all previous backups will be overwritten)
2. The Status window shows information as the backup procedure goes on

To perform a **Restore**:

1. Press the Restore button (you will be warned that all device configurations will be overwritten)
2. The Status window shows information as the restore procedure goes on

The **Restore** function also provides easy and secure Single Device Replacement:

1. Remove the device to be replaced
2. Connect the new device (make sure the new device has been previously set to default)
3. Run the Restore procedure by pressing the Restore Button (see: Restore procedure)

NOTE

If the ID-NET™ network baud rate is different from 500kb (default), the replacement device must have its node value and ID-NET™ baud rate set before connecting it to the network.

To **Erase** any previous Backup:

1. Press the Erase button
2. All backups are deleted

The **Status** window shows the status of the backup procedure as it is being executed.

The following is a list of possible error messages:

Module not present: backup module not mounted (BM100) or not ready (QL500 , BM2x0, SC4000, QLMxxx)

Unable to Read Backup State: Genius is unable to get connected to the device

Backup function not allowed: when device is in X-Press Menu mode (BM100) or is out of memory (QL500)

Failed! (Device not found): Master is unable to reach the addressed device

Failed! (Module is write protected): BM100 Write Protection switch is set to Locked