



## ***TCNM-AD/EX/SP Family Software Configuration Parameter Guide***

- Code Definition
- Operating Modes
- Reading System Layout
- Reading Parameters
- Data Communication Settings
- Digital I/O Setting
- LEDs & Keypad
- Display
- Diagnostics
- Statistics
- User Information Section

SW package 001 and later

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# Guide to Rapid Configuration

## Wizard for Quick Reader Setup

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

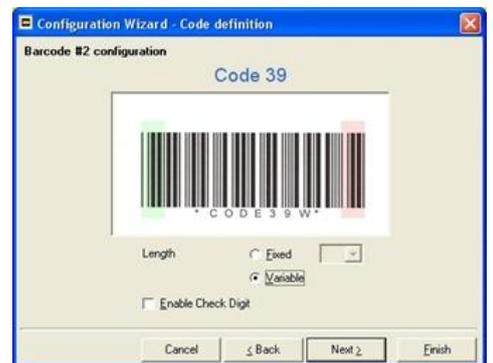
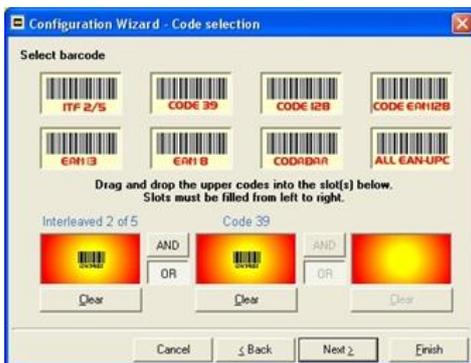


The Wizard option is advised to new users, since it shows a step-by-step scanner configuration. Select the *Create a new configuration* button.

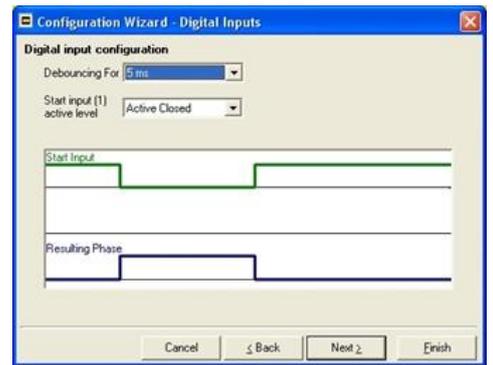
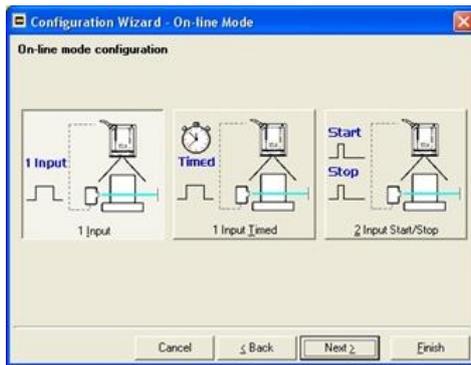
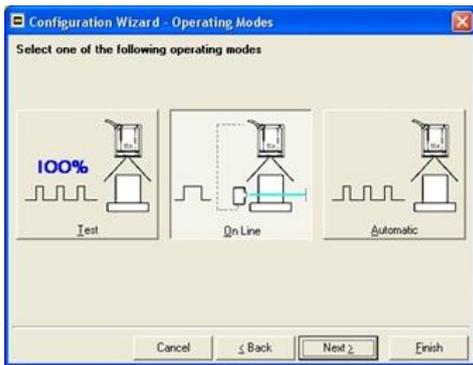


You will be guided through the configuration being asked to define the following parameters:

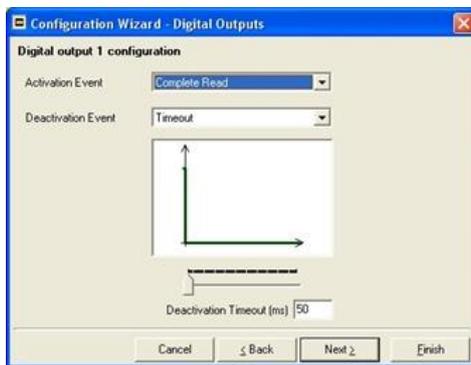
- Barcode selection and definition;



- Operating mode selection and definition;



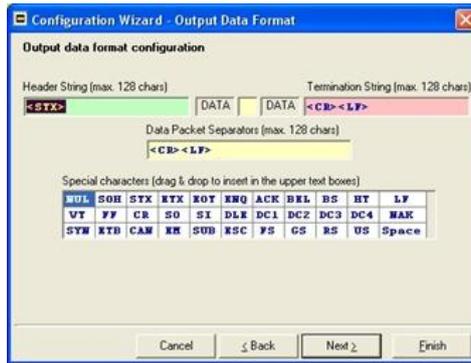
- Digital Outputs configuration;



- Hardware interface selection;



- Output data format configuration;



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

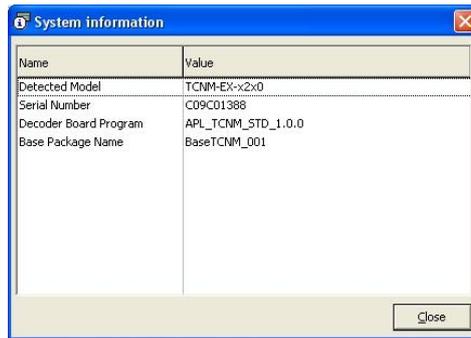
- Saving the configuration to disk;
- Switching to Advanced mode;
- Sending the configuration to the scanner.



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.



## Operating Modes

The wizard offers the following Operating modes:

### On Line Operating Mode

This operating mode causes the reader to be connected to an external Presence Sensor using EXT TRIG+ and EXT TRIG- inputs.

During the active phase of the presence sensor, the scanners try to acquire and correctly decode the code.

In case the decoding phase is successful, the barcode characters are transmitted on the serial interface. Otherwise, a no read message is sent.

### Automatic Operating Mode

This operating mode does not require the connection to an external Presence Sensor.

When working in this mode the reader is continuously scanning, while the reading phase is activated each time a barcode enters the reader reading zone. The reader stops reading after an N number of scans without a code.

Barcode characters are transmitted on the serial interface. In case of a failed reading phase no message is sent to the host computer.

### Test Operating Mode

This operating mode causes the reader to be continuously activated allowing to verify its reading features and its reading position with respect to the barcode. For this reason, it is particularly advised during the installation phase of the reader.

After 100 scans, the values relative to an internal counter and the decoded code are displayed and transmitted on the serial interface. The counter reports the percentage of good reads of the label.

**NOTE**

This operating mode is not used for SYNCHRONIZED network configurations.

The following Operating Mode is not included in the Wizard but can be selected from the Operating Mode parameters:

### Continuous Operating Mode

The reading phase is always active and, differently from the Automatic operating mode, it also allows reading two or more codes when placed along the same scan line.

Code transmission is identical to the other operating modes except that there is no transmission on the serial port in case of a No Read condition.

# Network Setup

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

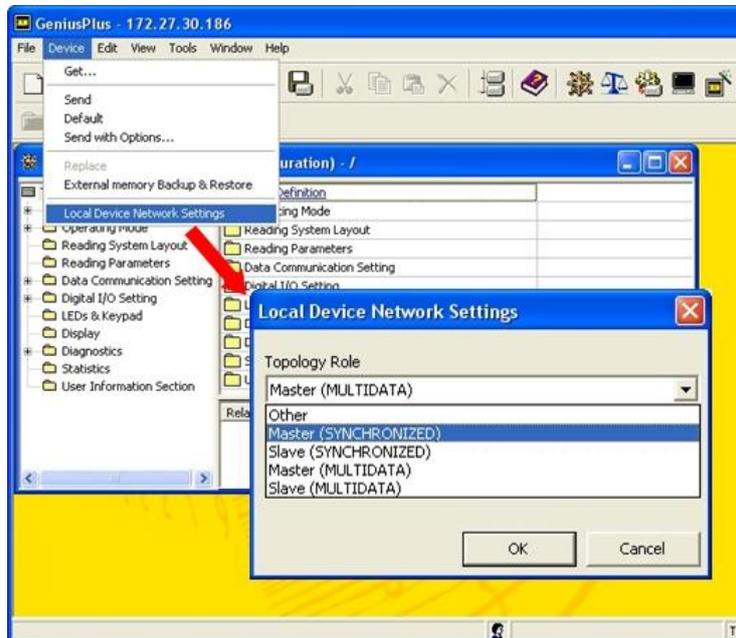
Three different procedures are available to define the number of network slave scanners, their label and address according to two main conditions:

Condition	Available Procedure	Feature
<u>Unknown Slave Addresses</u>	Net-Autoset	automatically assigns random addresses to slave or Stand Alone 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**

Any updates or changes to the ID-NET™ Master configuration cause the entire network to be reset. Therefore it is advised to use an ID-NET™ Controller for applications which require frequent reading device configuration (i.e. In-Line Code Verifier applications).

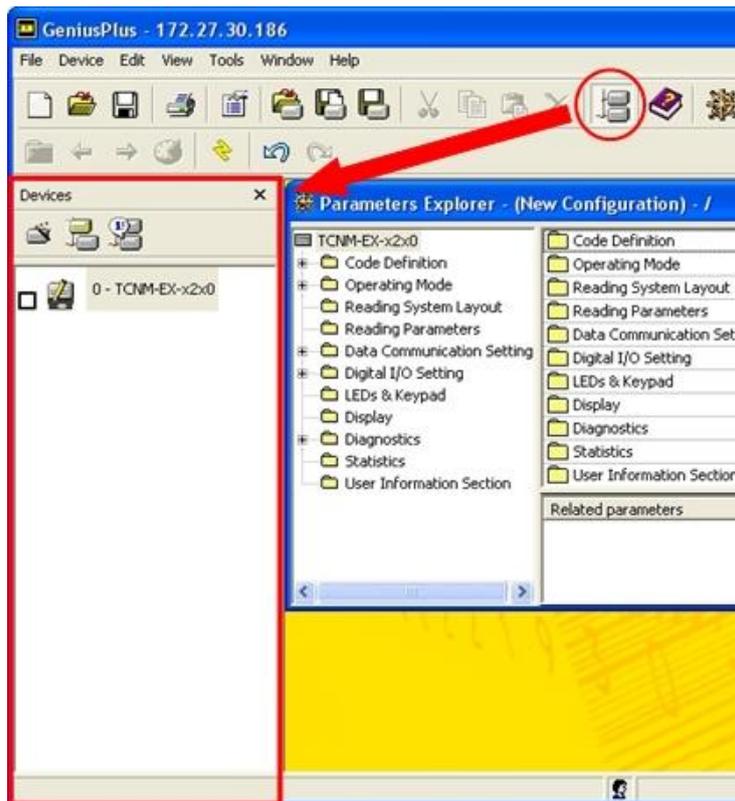
1. **The first operation** to perform is the configuration of your **scanner as "Master"** from the Local Device Network Settings item in the Device Menu, see figure below:



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 or Stand Alone 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 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 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 scanners found to the "Requested Devices" area of the wizard where your network customization is defined;
- saving the new network configuration;

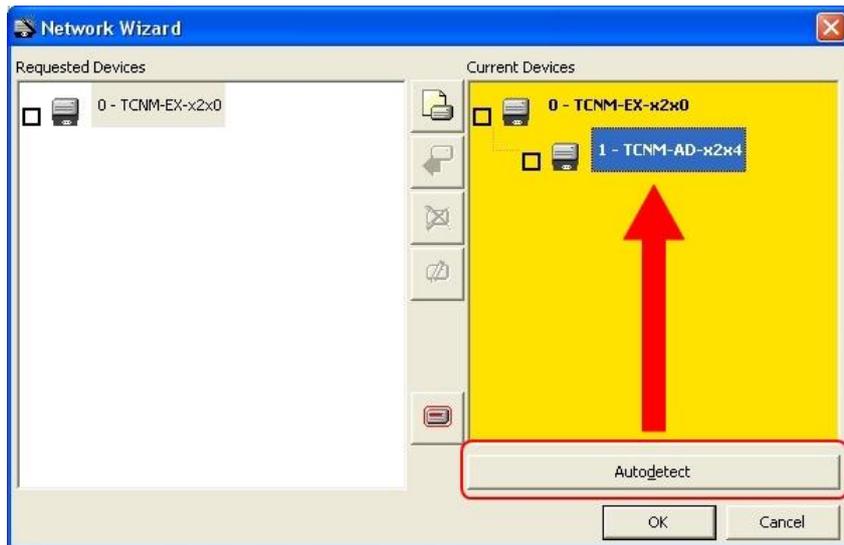
Once the procedure has been completed, a dialog box will appear asking whether to send the configuration to the Master. Choose the "Yes" option to start this procedure.

## 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:



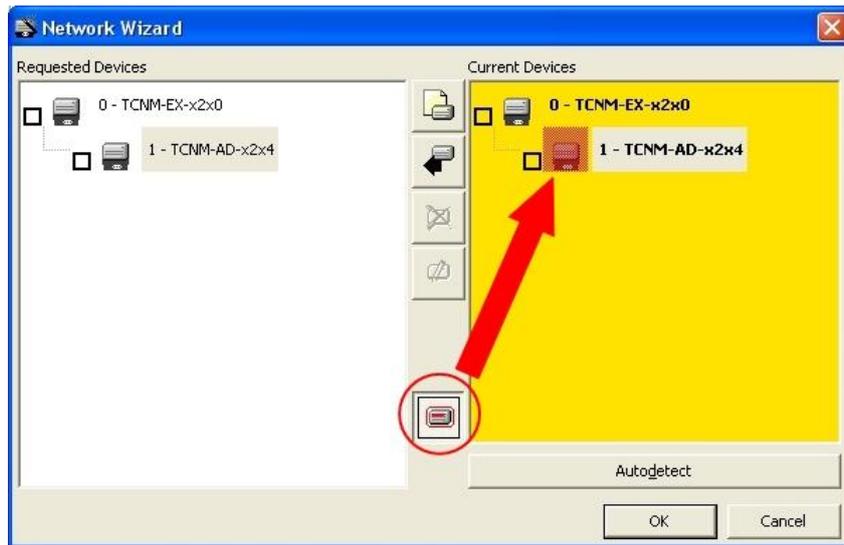
- a. if the slave scanners have already been configured and wired to the network, click on the Autodetect button to start a polling procedure of the current network. The master and all slave scanners found will be represented in the "Current Devices" area. Then, select the desired slave

scanner 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 scanner lasers turn off except the one of 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 Master. 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 = 1^2&3^4

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 Message** the No Read Message is not transmitted.

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

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

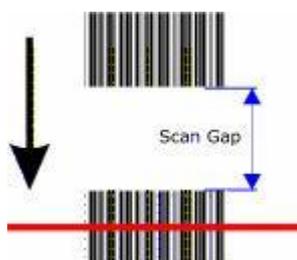
This parameter is only available when Multiple Read Message is enabled and the No Read Message selection is different from Local No Read(s) String. It defines the string to be displayed in case of Multiple Read Message. It is possible to select either the ASCII or HEX value. If **disabled**, the scanner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

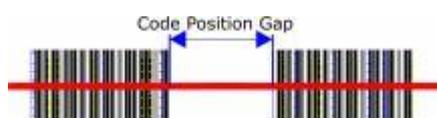
### Codes Different When Scan Gap Is Greater Than

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 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.

Selections:     **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.

Selections:     **Chain *n* Left**     The specified code information type must be paired (chained) to the left of its corresponding code.

**Chain *n* Right**     The specified code information type must be paired (chained) to the right of its corresponding code.

## Addon Overflow Start Ratio

For the TCNM-SP 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 TCNM-AD/EX family Linear/Reconstruction reading and TCNM-SP 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 TCNM-SP 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 TCNM-SP 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**

## Stacked Codes

When working in Reconstruction reading mode, enabling this parameter allows GS1 Databar stacked type codes to be decoded with the best performance (one code per scan line).

When working in Reconstruction reading mode and this parameter is not enabled (unchecked), GS1 Databar non-stacked type codes (excluding GS1 Databar Limited), can be reconstructed with an angle less than other code symbologies but up to 4 codes per scan line.

When working in Linear reading mode, only one GS1 Databar non-stacked type code can be read per scan line. GS1 Databar stacked type codes cannot be read in Linear reading mode.

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

### EAN Add On

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

Selections:    **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.

Selections:    **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.  
                   **Fixed from 2 to 74**        for **GS1 DataBar Expanded** 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.



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**.



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

from **2 to 74** for **GS1 DataBar Expanded** 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 = data**12og**35

- 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 = GEN**45?3iusdsAC\*2516**300

#### 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:

<b>Disable</b>	all codes are transmitted no matter what the direction is
<b>Forward</b>	all codes having a forward direction are transmitted
<b>Reverse</b>	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:

<b>Disabled</b>	the character is not selected;
<b>Lower Case</b>	the character is transmitted in lower case;
<b>Upper Case</b>	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:

<b>Disabled</b>	the character is not selected;
<b>Lower Case</b>	the character is transmitted in lower case;
<b>Upper Case</b>	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.

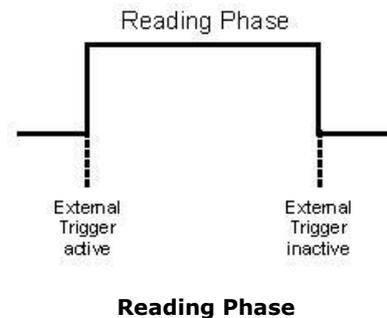
### **Group Label Local Multiple Read String #n**

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 Modes

## 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.



See the Operating Mode Reference Table for details about conditions when using this operating mode.

### 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 and Motor ON/OFF 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 and Motor ON/OFF strings. When ACK/NAK Protocol or Energy Saving are 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 and Motor ON/OFF strings. When ACK/NAK Protocol or Energy Saving are 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>	<b>Input/Serial Stop</b>	the Stop Input or Serial Stop String define the end of the reading phase. Timeout has a lower priority.
	<b>Always Timeout</b>	the reading phase always stops when the selected timeout expires.

## Start Input From Fieldbus

This parameter is available only when using a Fieldbus interface through the TCNM-ACBB5 connection box. 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.

## Quality Counters

When checked, the Quality Counters parameter activates a counter handled event, which counts the good decodes during the reading phase. If no stop reading phase event occurs, the reading phase is stopped at 100 good decodes. This parameter is independent from the Decoding Safety parameter.

The value reached by the counter is transmitted in a fixed 3-digit format in the Info Field.

For Multilabel Code Combinations the counter increments for each good decode on each label in the reading phase.

Quality counters are not valid for code Reconstruction Reading Mode or for readers in a Synchronized network (Master or Slaves).

# Automatic

The device does not require connections with external presence sensors in this operating mode.

In this mode the scanner is continuously scanning. The reading phase is enabled when a barcode enters the reading zone of the scanner and is terminated after an N number of scans without a code, where N is set using the Automatic Threshold selection. The next reading phase will begin when a code enters the reading zone of the scanner again.

The N number of scans without a code must be selected to assure code identification in the reading zone.

Code transmission is identical to the other operating modes except that there is no transmission on the serial port in the case of a No Read condition.

For details about the conditions to use this operating mode see the Operating Mode Reference Table.

## Automatic Threshold

The Automatic Threshold sets an N number of scans without a code in order to assure code identification in the reading zone.

Selection: a value from **10** to **32765**

## Code Filter Depth

In Automatic mode, Code Filter Depth is used to avoid multiple reads of the same code. The selected value (other than zero) defines the number of codes to memorize in a FIFO list.

When a code is read, it is compared to the list. The application program inherently compares codes based on content and code length. If the list contains a code identical to the current code being read, the current code is discarded. If not, the current code is accepted and added to the list in the first position; the remaining codes in the list are shifted. If the list is full the oldest code in the list will be flushed.

When = 0, there is no FIFO list and there is no filtering.

Selection: a value from **0** to **127**

**Example**

Code Filter Depth = 3

List	Code Read	Accepted
xxx (no codes in list)	A	Yes
Axx	B	Yes
BAx	B	No
BAx	C	Yes
CBA	D	Yes
DCB	A	Yes
ADC	A	No

**Quality Counters**

When checked, the Quality Counters parameter activates a counter handled event, which counts the good decodes during the reading phase. If no stop reading phase event occurs, the reading phase is stopped at 100 good decodes. This parameter is independent from the Decoding Safety parameter.

The value reached by the counter is transmitted in a fixed 3-digit format in the Info Field.

For Multilabel Code Combinations the counter increments for each good decode on each label in the reading phase.

Quality counters are not valid for code Reconstruction Reading Mode or for readers in a Synchronized network (Master or Slaves).

**Continuous**

The reading phase is always active and, differently from the Automatic operating mode, it also allows reading two or more codes when placed along the same scan line.

Code transmission is identical to the other operating modes except that there is no transmission on the serial port in case of a No Read condition.

For details about the conditions to use this operating mode see the Operating Mode Reference Table.

**Continuous Threshold**

The Continuous Threshold sets an N number of scans without a code in order to accept same code consecutive reading. This threshold does not apply to different code consecutive reading.

Selection: a value from **10** to **32765**

**Code Filter Depth**

For a description of Code Filter Depth in Automatic mode click [here](#).

In Continuous mode, Code Filter Depth is used to avoid multiple reads of the same code. The selected value (other than zero) defines the number of codes to memorize in a FIFO list.

When a code is read, it is compared to the list. The application program inherently compares codes based on content and code length. If the list contains a code identical to the current code being read, the current code is discarded. If not, the current code is accepted and added to the list in the first position; the remaining codes in the list are shifted. If the list is full the oldest code in the list will be flushed.

When = 0, there is no FIFO list and there is no filtering.

Selection: a value from **0** to **127**

**Example**

Code Filter Depth = 3

List	Code Read	Accepted
xxx (no codes in list)	A	Yes
Axx	B	Yes
BAx	B	No
BAx	C	Yes
CBA	D	Yes
DCB	A	Yes
ADC	A	No

## Test

The Test Mode reports information about the reading performance of the laser beam and the code is continuously read.

After 100 scans, the following information is transmitted on the serial interface.

The information can be displayed on the Host PC by running a terminal emulator program (ex. Hyper Terminal):

```

100% P:150 "10234563" L:8<CR><LF>

```

Command:

Terminator  None  CR  CRLF  Interactive terminal mode

The information reports:

- percentage of good reads
- code position in the scan line
- the code content
- code length

The format of the string displayed on the terminal emulator is fixed and cannot be modified through the No Read String parameter nor the Data Format parameter group. Each field is separated by a space character and the string is terminated by <CR> <LF>. In case of No Read the test string message is fixed: "No Read" <CR><LF>.

## Test Mode Data Tx

When working in Test mode, this parameter allows activating a further filter for the selection of the transmission channel in addition to the one provided by the Data Tx parameter available for each communication channel.

<b>Selections:</b>	<b>Disable</b>	Do not send test data over any interface
	<b>Main</b>	Send test data only over the Main interface
	<b>Aux</b>	Send test data only over the Auxiliary interface
	<b>Main &amp; Aux</b>	Send test data over the Main and Auxiliary interfaces
	<b>All Selected Channels + ID-NET™</b>	Send test data over all <b>selected</b> interface channels (Data Tx checked): Fieldbus or Main, Aux, and on the ID-NET™ interface for MULTIDATA Slaves.

## Verifier

### NOTE

If using an ID-NET™ network for In-Line Code Verifier applications, it is advised to use an ID-NET™ Controller as Master instead of a scanner Master. This avoids Master reconfiguration (which necessarily causes an entire network reset); since all reading devices will be Slaves, configuration updates with a new Verifier Code only cause individual Slave scanner resets.

This operating mode condition allows the scanner to verify that all codes read and decoded match the string saved in its memory. It is valid when using On Line, Automatic and Continuous Operating Modes.

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 using two different methods.

1. 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

2. By reading the string from a barcode while the Input defined in the Store Input parameter is active.

The input must be activated before the reading phase starts, the verifier code must be read and then after the end of the reading phase the input must be deactivated.

After reading the code, check that the string in the Verifier Code parameter is correct, in GeniusPlus or through the GeniusPlus-based Host Mode Programming.

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)

**Store Input**

It defines the number of the input used to automatically store the verifier code. This input must be activated before the reading phase starts, the verifier code must be read and then after the end of the reading phase the input must be deactivated.

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

**Active Level**

Allows the selection of the active state of the input.

Selections: **Active Closed** the input is active when current flows through IN pins.

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

**Right Code Tx**

When checked it enables the transmission of the Right Code.

**Wrong Code Tx**

When checked it enables the transmission of the Wrong Code.

**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)

## Reading System Layout

This group is available only when working in On-Line, and Continuous operating modes.

The Local Device Alternative Network Settings selections and related parameters depend on the Topology Role defined for the current scanner. In particular:

Topology Role	Local Device Alternative Network Setting	Selectable Parameters
Master (SYNCHRONIZED)	Alone or ID-NET	
Slave (SYNCHRONIZED)	Alone or ID-NET	
Master (MULTIDATA)	Alone or ID-NET	
Slave (MULTIDATA)	Alone or ID-NET	
Other	Alone or ID-NET Master RS232 (Type A) Slave RS232 (Type A)	Number of Slaves (Type A)

### Local Device Alternative Network Settings

This parameter allows configuring the device according to the desired layout.

- Selections:
- Alone or ID-NET** the scanner is in a stand-alone configuration connected to a Host or utilizes an ID-NET network configuration.
  - Master RS232 (Type A)** this selection is maintained for backward compatibility. The master configuration varies according to the types of scanners that will be connected together in the network as Slaves: TCNM-AD/EX/SP families.  
To select this option it is necessary to disable the transmission on the Auxiliary Serial Port and enable it on the Main Serial Port through the corresponding Data Tx parameter.
  - Slave RS232 (TypeA)** this selection is maintained for backward compatibility. The slave configuration varies according to the types of scanners that will be connected together in the network as Master: TCNM-AD/EX/SP families.

### Network Baud Rate (bps)

This parameter is enabled when the Local Device Alternative Network Settings parameter is set to Alone or ID-NET. It defines the baud rate for the ID-NET network.

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

#### NOTE

In order for the Backup & Restore function to work correctly, when changing the ID-NET network baud rate, all slaves must be set manually to the new baud rate either through GeniusPlus or through the slave TCNM-ACBB Backup module rotary switches.

### Number of Slaves (Type A)

This parameter is enabled when the Local Device Alternative Network Settings parameter is set to Master RS232 (Type A). It defines the number of slaves to be connected to the master scanner.

Selections: a number in the range **1** to **9**.

# Reading Parameters

## Scan Speed (Scans per Second)

This parameter controls the activation/deactivation of the scanner's motor and the selection of the scanner's speed. The available selections depend on the scanner model. Use the value best suited for your application. When changing the value of this parameter to improve the reading performance on some barcode conditions (i.e. low scan speed for high resolution codes), the new value may have an adverse effect on the reading performance of others (i.e. low resolution codes).

For automatic setup of this parameter, use the SMART-TEACH AutoSetup function described in the product manual.

<u>Selections:</u>	<b>(Off)</b>	the scanner's motor is stopped.
	<b>500</b>	
	<b>600</b>	<u>Low scan speed</u>
	<b>700</b>	Increased reading capability for high resolution barcodes and long distance reading.
	<b>800</b>	<u>Standard scan speed</u>
		Increased reading capability for low/medium resolution barcodes and short distance reading.
	<b>900</b>	<u>High scan speed</u>
	<b>1000</b>	Increased reading capability for low resolution barcodes and short distance reading.

## Energy Saving

If checked, it enables the Serial Motor On/Off parameters to control the energy saving feature. In particular, it allows turning on/off the motor and laser, and if it is MASTER to turn on/off all scanners on the network.

The time required to restart the system is only a few seconds, independently from the number of scanners connected.

It is suggested to use this parameter for example when the it is not necessary to read codes for a lengthy period.

## Serial Motor On

A Serial Motor On string is an ASCII string of up to 32 characters which, when received on the serial interface, starts the scanner motor according to the speed selection in the scan speed parameter. If the scanner motor is 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 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 serial interface, stops the scanner motor.

### 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 Motor ON/OFF strings cannot contain ACK/NAK characters.

## Code Resolution

This parameter (available only for TCNM-AD and TCNM-EX), allows to optimize the scanner's performance according to the specific barcode density.

Selection: **Standard** Optimized reading of low/medium density barcodes.

**High** Optimized reading of high density barcodes.

**Toggle** In successive scan lines, the software resolution is toggled between the values Standard and High. The scanner takes advantage of the two settings at each reading phase when both high and low/ medium resolution barcodes are used together.

## Reading Conditions

This parameter allows selecting various predefined "recipes" (combinations of internal component settings) to optimize the scanner to read under specific application requirements.

For automatic setup of this parameter, use the SMART-TEACH AutoSetup function described in the product manual.

Selection:

**TCNM-AD/EX** **Standard** Default value. The scanner is optimized to read good print quality barcodes within the reading range (refer to the reading diagrams in the Installation Manual).

**Difficult** The scanner is optimized to improve:

- Low/Very Low PCS barcodes
- Long distance reading
- High skew angle conditions (>30°)

**Toggle** In successive scan lines, the Code Reading Condition parameter is toggled between the Standard and Difficult values. In this way, the scanner takes advantage of the two settings at each reading phase. This is advisable when different reading conditions can occur.

**TCNM-EX** **Dark Background** The scanner is optimized to read low contrast barcodes due to dark backgrounds.

**Toggle** In successive scan lines, the Code Reading Condition parameter is toggled between the Standard, and/or Difficult, and/or Dark Background values. In this way, the scanner takes advantage of all the selected settings at each reading phase. This is advisable when different reading conditions can occur.

**TCNM-SP** **Standard** Default value. The scanner is optimized to read good/medium print quality barcodes within the reading range (refer to the reading diagrams in the Installation Manual).

**Cartons** The scanner is optimized to read low contrast barcodes also having printing imperfections, typical of barcodes printed directly on cardboard packaging cartons.

**Low Contrast** The scanner is optimized to read low contrast barcodes.

**High Skew Angles** The scanner is optimized to read good/medium quality barcodes at high skew angle conditions (>30°).

## Beam Shutter

The Beam Shutter turns the laser off.  
The Beam Shutter option can be used:

- to increase the overall laser diode life when used in high ambient temperature applications (over 35° C);
- to reduce power consumption;
- to turn off the laser for safety purposes.

<u>Selections:</u>	<b>Disabled</b>	the laser is always on.
	<b>Enabled</b>	the laser is always off and all operations are suspended.
	<b>Triggered</b>	the laser is turned off as soon as the code(s) are read or when the reading phase ends. The laser is turned on again when the next reading phase starts.

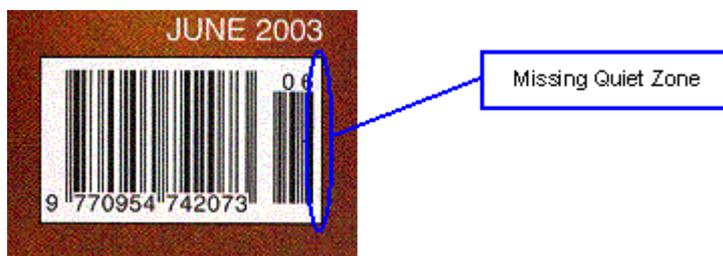
**NOTE**

The **Triggered** selection is ignored for Automatic and Test Operating Modes.

**Required Quiet Zones**

For Linear reading, with fixed length codes or fixed bar counts, the Quiet Zone requirements can be defined.

<u>Selections:</u>	<b>Both</b>	Both Quiet Zones must be present adjacent to the code (Normal condition for all code reading).
	<b>One</b>	Only one quiet zone must be present adjacent to the code.

**Overflow Ratio**

This parameter defines the minimum expected width of the barcode quiet zone, expressed in number of modules. If the barcode quiet zone is less than the expected ratio, the barcode will not be decoded.

Selections: a value between **3** and **32** for Linear reading.

**Overflow Start/Stop Ratio**

For the TCNM-SP family, if working in Reconstruction reading mode, this parameter defines the minimum expected width of both the beginning (Start) and ending (Stop) barcode quiet zone, 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 barcode will not be decoded.

Selections: a value between **1** and **50** for TCNM-SP Reconstruction reading.

**Reading Mode**

It defines the scanner reading mode:

<u>Selections:</u>	<b>Linear</b>	standard reading mode - the scan line must intersect the entire code.
	<b>Reconstruction</b>	allows code reconstruction when reading the code TCNM-AD/EX - the scanner works in ACR-Lite (Advanced Code Reconstruction) mode in which several partial scans of a barcode are added together to reconstruct the code information. This allows code reading at more acute tilt angles (however less than ACR4™) and improves reading percentage of some damaged codes.  TCNM-SP - the scanner works in ACR4™ (Advanced Code Reconstruction) mode in which several partial scans of a barcode are added together to reconstruct the code information. This allows code reading at more acute tilt angles and improves reading percentage of some damaged codes.

## Focus

### Locked Position (cm/in)

This parameter allows the scanner focus position to be saved in memory. If the physical focus position changes with respect to the saved value, an alarm can be generated (message on the scanner display, TCNM-ACBB5 display, diagnostic message on the selected interface).

Selections: **Unlocked** the focus position is not stored in memory. Changes in the focus distance do not generate any alarms.

a value between **25 cm/9.84 in** and **70 cm/27.56 in**.

#### NOTE

Changing this parameter causes the scanner to reset, and therefore, if the scanner motor has been set to **off** by the Energy Saving/Serial Motor OFF parameters, the motor will automatically be restarted upon reset.

## TCNM-ACM-OM110 Oscillating Mirror

#### NOTE

This parameter group is available only for **TCNM-AD/EX family** scanners with Oscillating Mirror.

### Oscillating Mode

This parameter defines the oscillating mode of the scanner mirror:

Selections: **Fixed** the oscillating mirror deflects the scan line at a fixed angle of deflection (-15°).  
**Continuous** the scan line is deflected according to the Amplitude and Frequency settings.

### Amplitude (degrees)

This parameter is available only when working in Continuous oscillating mode. It defines the deflection range in degrees as a symmetrical oscillation with respect to the fixed angle (-15°).

Selections: a value from **10°** to **40°**:

### Frequency (Hz)

This parameter is available only when working in Continuous oscillating mode. It defines the oscillating frequency in Hertz:

Selections: a value from **0.5** to **4.0** Hertz

#### NOTE

The maximum allowable frequency for an amplitude of 35° or more is 3 Hz.

## Triggered

If checked, it allows assigning a trigger through which the oscillating mirror can be activated to work in a second reading zone according to the defined parameters.

## Second Zone Trigger

This parameters defines the number of the input or the phase working as trigger.

Selections: **Phase** (available only when working in On Line operating mode)

**Input 1**

**Input 2**

## Second Zone Trigger Level

This parameter allows setting the active state of the trigger. When the selected state is active, the oscillating mirror starts working in the second reading zone according to the parameters set:

Selections: **Active Open**

**Active Closed**

## Second Zone Oscillating Mode

This parameter defines the oscillating mode of the scanner mirror to be used in the second reading zone:

Selections: **Fixed** the oscillating mirror deflects the scan line at a fixed angle of deflection (-15°).

**Continuous** the scan line is deflected according to the Second Zone Amplitude and Second Zone Frequency settings.

## Second Zone Amplitude (degrees)

This parameter is available only when working in Continuous Second Zone Oscillating Mode.

It defines the deflection range in degrees as a symmetrical oscillation with respect to the fixed angle (-15°).

Selections: a value from **10°** to **40°**:

## Second Zone Frequency (Hz)

This parameter is available only when working in Continuous Second Zone Oscillating Mode.

It defines the oscillating frequency in Hertz:

Selections: a value from **0.5** to **4.0**  
Hertz:

### NOTE

The maximum allowable frequency for an amplitude of 35° or more is 3 Hz.

## TCNM-SPLD-OM Oscillating Mirror

### NOTE

This parameter group is available only for **TCNM-SP** scanners (Oscillating Mirror models).

## Oscillating Mode

This parameter defines the oscillating mode of the scanner mirror:

Selections:    **Fixed**            the oscillating mirror deflects the scan line at a fixed angle (default 0°).  
                          **Continuous**    the scan line is deflected according to the Min-Max Angle and Frequency settings.

**Angle (degrees)**

This parameter is available only when working in **Fixed** oscillating mode. It defines the angle in degrees with respect to the angle perpendicular to the scanner (0°).

Selections:    a value from **-5°** to **35°**:

**Min Angle (degrees)**

This parameter is available only when working in **Continuous** oscillating mode. It defines the minimum angle for the deflection range with respect to the angle perpendicular to the scanner (0°).

Selections:    a value from **-5°** to **35°**:

**Max Angle (degrees)**

This parameter is available only when working in **Continuous** oscillating mode. It defines the maximum angle for the deflection range with respect to the angle perpendicular to the scanner (0°).

Selections:    a value from **-5°** to **35°**:

**Frequency (Hz)**

This parameter is available only when working in **Continuous** oscillating mode. It defines the oscillating frequency in Hertz:

Selections:            a value from **0.2** to **20.0** Hertz

<b>NOTE</b>	
The maximum allowable frequency for the given oscillating amplitudes is:	
30.5° to 40°	5 Hz
20.5° to 30°	7 Hz
10.5° to 20°	10 Hz
0.5 to 10°	20 Hz

**Triggered**

If checked, it allows assigning a trigger through which the oscillating mirror can be activated to work in a second reading zone according to the defined parameters.

**Second Zone Trigger**

This parameters defines the number of the input or the phase working as trigger.

Selections: **Phase** (available only when working in On Line operating mode)

**Input 1**

**Input 2**

## Second Zone Trigger Level

This parameter allows setting the active state of the trigger. When the selected state is active, the oscillating mirror starts working in the second reading zone according to the parameters set:

Selections: **Active Open**  
**Active Closed**

## Second Zone Oscillating Mode

This parameter defines the oscillating mode of the scanner mirror to be used in the second reading zone:

Selections:     **Fixed**             the oscillating mirror deflects the scan line at a fixed Second Zone Angle (default 10°).  
                  **Continuous**     the scan line is deflected according to the Second Zone Min-Max Angle and Second Zone Frequency settings.

## Second Zone Angle (degrees)

This parameter is available only when the second reading zone is working in **Fixed Second Zone Oscillating Mode**. It defines the angle in degrees with respect to the angle perpendicular to the scanner (0°). The default value is 10°.

Selections: a value from -5° to  
35°:

## Second Zone Min Angle (degrees)

This parameter is available only when the second reading zone is working in **Continuous Second Zone Oscillating Mode**.

It defines the minimum angle for the second zone deflection range with respect to the angle perpendicular to the scanner (0°).

Selections: a value from -5° to  
35°:

## Second Zone Max Angle (degrees)

This parameter is available only when the second reading zone is working in **Continuous Second Zone Oscillating Mode**.

It defines the maximum angle for the second zone deflection range with respect to the angle perpendicular to the scanner (0°).

Selections: a value from -5° to  
35°:

## Second Zone Frequency (Hz)

This parameter is available only when working in **Continuous Second Zone Oscillating Mode**. It defines the oscillating frequency in Hertz for the second oscillating zone:

Selections: a value from **0.2** to **20.0**  
Hertz:

### NOTE

The maximum allowable frequency for the given oscillating amplitudes is:

30.5° to 40°	5 Hz
20.5° to 30°	7 Hz
10.5° to 20°	10 Hz
0.5 to 10°	20 Hz



## Data Format

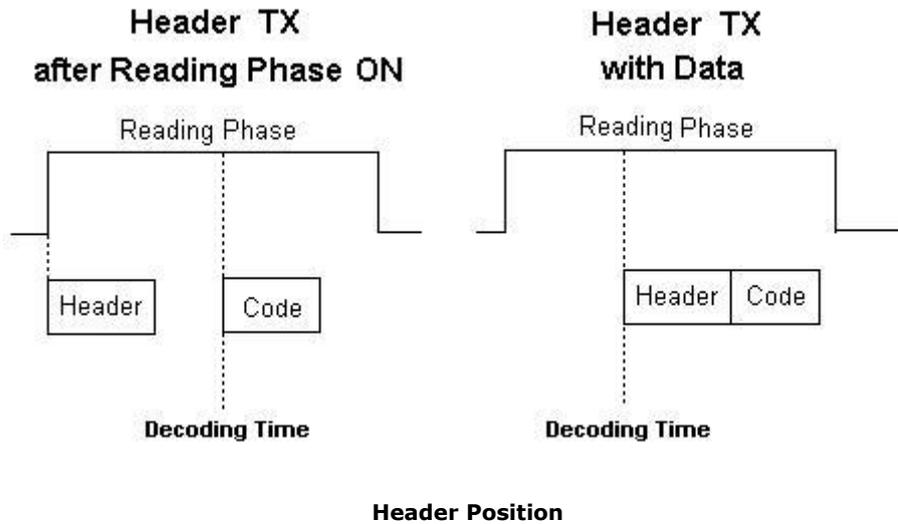
Data Format allows to configure the parameters relative to the message format and the transmission mode:

### Header Tx Start

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

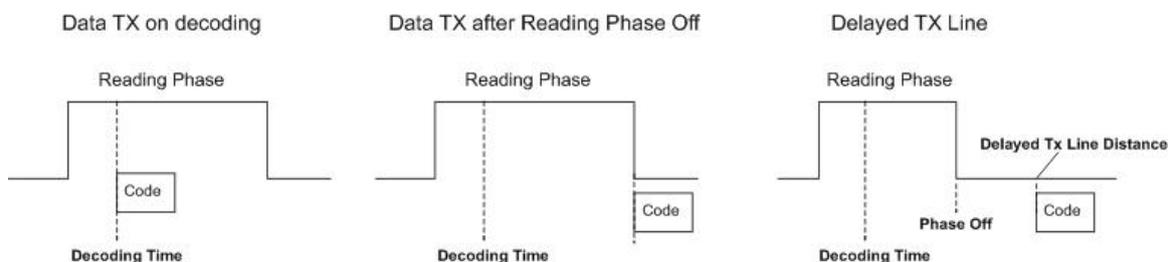
This parameter is available only when the No Read Message parameter is set to "Global No Read Message" or "Local No Read Message".

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

### Message Tx Selection

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**  
**Delayed Tx Line** (only for On-Line operating mode)



### Physical Encoder

This parameter is available only when Message Tx Selection is set to Delayed Tx Line. If checked, it enables the encoder which is physically connected to the Input selected in Encoder Reference Signal. For correct functioning, define the Encoder Step parameter (hundredths of a millimeter) and ensure that the Debouncing value for the Input is 5 ms. The maximum allowable Encoder Frequency is 150 Hz.

If unchecked, the conveyor speed is supposed to be constant. Thus, it is only required to define the Conveyor Speed parameter.

### Encoder Reference Signal

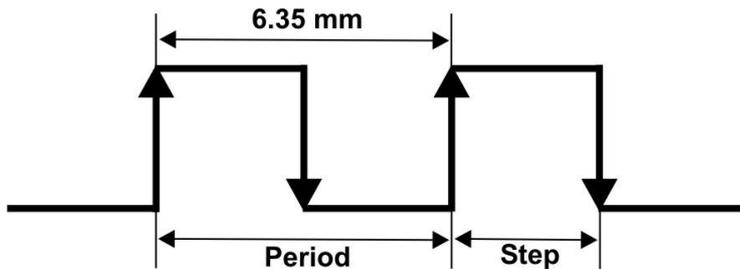
This parameter is available only when Message Tx Selection is set to Delayed Tx Line. Allows selecting which digital input will be used for the Physical Encoder.

### Encoder Step

This parameter is available only when Message Tx Selection is set to Delayed Tx Line. It defines the value of a single step of the encoder in hundredths of a millimeter. Each front of the Encoder Step signal is used and therefore the Single step value must be divided by two (see example).

**Example:**

Encoder circumference = 305 mm  
 Periods per Revolution (PPR) = 48  
 Single period is  $305/48 = 6.35$  mm



Encoder Step is  $6.35 / 2 = 3.175$  mm (**318**)

### Conveyor Speed

This parameter is available only when Message Tx Selection is set to Delayed Tx Line and the Physical Encoder is disabled. It defines the constant speed of the conveyor in mm/sec.

### Delayed Tx Line Distance (mm)

This parameter is available only when Message Tx Selection is set to Delayed Tx Line. It defines the distance in mm (delay) from the Phase Off event to the TX line (see Message Tx Selection).

**NOTE**

The trigger LED on the scanner is activated at Phase Off independent from the Tx Line delay distance.

For local network configurations, this delay starts after the **Master Max. Tx Delay After Phase Off** parameter expires.

### 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.

**NOTE**

Advanced Formatting is not supported for slave scanners using the ID-NET™ network.

### 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:

<u>Selections:</u> <b>Disable</b>	no code identifier is included in the output message
<b>Standard AIM ID</b>	the AIM standard identifier is included in the output message
<b>Custom</b>	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

If checked, it allows sending the Motor OFF string whenever the motor is set OFF. The motor OFF condition can occur either through the Scan Speed or Energy Saving parameters.

### 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 MULTIDATA network configuration is selected, this group allows the scanner address, together with its own header and separator strings, to be included before the scanner message.

The syntax of this message is:

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

where xx is 00 = Master, all others = Slaves

### Address Tx

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

### Header

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

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

### Separator

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

### Example:

An example of a message coming from Slave 3 through the Master MULTIDATA scanner or ID-NET controller is represented below:

**<Address Header>03<Address Separator><Slave 3 Header><Code1 [Code2....Coden]><Slave 3 Terminator>**  
...

## Main Serial Port

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

### Data Tx

If enabled (checked), data from the scanner will be transmitted on the Main 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 Main Serial Port (Data Tx - disabled).

Selections:

<b>Disable</b>	the Heartbeat message is not transmitted
<b>Enable Unconditioned</b>	the Heartbeat message is always transmitted, even if data communication is still active
<b>Enable Conditioned</b>	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 Main 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:

<b>Disable</b>	no counter field in the Heartbeat message
<b>10</b>	counts cyclically from 0 to 9
<b>100</b>	counts cyclically from 0 to 99
<b>1000</b>	counts cyclically from 0 to 999
<b>10000</b>	counts cyclically from 0 to 9999
<b>Custom</b>	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 (for the TCNM-AD/EX Family the second byte is always 0). 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.

# Main Serial Port Parameters

## Main Port Communication Mode

The following communication modes can be selected when using the main serial port.

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

### Standard

Standard is the normal mode for the Main 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	

## Main Port Electrical Interface

The Main 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**

## Auxiliary Serial Port

This group determines the communication through the Auxiliary Serial Port (RS232 only). This port is also available to MULTIDATA Slave scanners.

### Search for TCNM-ACBB Backup Module at Device Startup

If enabled (checked), at startup, the scanner sends a message to recognize the presence of, and communicate with, the Backup Module. If using the Backup Module, this parameter must be enabled (checked).

#### NOTE

Disable this parameter if the Backup Module is not used and the Host must not receive data at startup.

### Data TX

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

Selections:

- 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

### Pass Through

It enables/disables the Pass Through options.

## 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:

<b>Disable</b>	no counter field in the Heartbeat message
<b>10</b>	counts cyclically from 0 to 9
<b>100</b>	counts cyclically from 0 to 99
<b>1000</b>	counts cyclically from 0 to 999
<b>10000</b>	counts cyclically from 0 to 9999
<b>Custom</b>	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 (for the TCNM-AD/EX Family the second byte is always 0). 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.

## Pass Through Options

Pass Through mode allows two or more devices to be connected to a single external serial interface. The scanner transmits messages received by its auxiliary interface (RS232 only) onto its main interface.

In this configuration a series of scanners can be connected together using RS232 on the main interface and all messages will be passed through this chain to the host. The reading phase of each scanner is independent from the others in a Pass Through chain.

Applications can also be implemented to connect a device such as a hand-held reader to the Auxiliary port for additional manual code reading capability.

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 serial ports in the same way regarding baud rate, data bits, stop bits and parity on all the devices in the Pass Through chain.
2. The Termination string must be configured in the same way as the message terminator on the device connected to the Auxiliary port. The terminator will be forwarded with the message.
3. The Serial On-Line, Master/Slave and Crisplant protocol parameters are not configurable for the Auxiliary interface.

### String Max Length

It defines the maximum length of the expected string to be received. In case the string is longer than the one expected, it will be discarded.

### Termination String

It defines the characters terminating the expected string.

### Pass Through on ID-NET™

If the scanner is set as a Slave (MULTIDATA), the Pass Through network can be made using ID-NET™ which is faster and it also frees up the Aux serial channel so that each Slave scanner can accept input data, for example from a hand-held reader.

The Main Serial Interface always echos the Aux interface data and can be used to monitor this data.

## Auxiliary Serial Port 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.

# TCNM-ACBB5 Gateway

## Type

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

### CAUTION

When any Host interface network type is selected, the Main Serial Interface is not available for communication and must not be electrically connected in the TCNM-ACBB5 connection box.

### NOTE

When using the Backup and Restore Module with a TCNM-ACBB connection box, the 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.

<u>Selections:</u> <b>None</b>	No Host interface network type is selected. The Main Serial Interface is available for communication with the Host.
<b>Profibus</b>	Enables the Fieldbus branch to allow the Profibus interface parameters to be configured.
<b>DeviceNet</b>	Enables the Fieldbus branch to allow the DeviceNet interface parameters to be configured.
<b>Ethernet/IP (Ethernet/IP - TCP/IP)</b>	Enables the combination Fieldbus and TCP/IP branches for parameter configuration of 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.
<b>CC-Link</b>	Enables the Fieldbus branch to allow the CC-Link interface parameters to be configured.
<b>CANopen</b>	Enables the Fieldbus branch to allow the CANopen interface parameters to be configured.
<b>Profinet (Profinet IO - TCP/IP)</b>	Enables the combination Fieldbus and TCP/IP branches for parameter configuration of 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.
<b>Modbus TCP (Modbus TCP - TCP/IP)</b>	Enables the combination Fieldbus and TCP/IP branches for parameter configuration of 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.

**Ethernet  
TCP/IP  
Ethernet/IP  
(explicit  
messaging)  
Modbus TCP**

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.

**NOTE**

GeniusPlus can be connected for scanner configuration directly through the Ethernet TCP/IP connection. See Configuration Through Ethernet.

## 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

Selections:    **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.

## Fieldbus

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

The following parameters allow enabling the communication through the TCNM-ABB5 Gateway to the Fieldbus network.

### Status

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.

### Data Tx

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

Selections:

- 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
--------	---------	-----------	--------------------	-----------	---------------------	------------

### 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:

<b>Disable</b>	no counter field in the Heartbeat message
<b>10</b>	counts cyclically from 0 to 9
<b>100</b>	counts cyclically from 0 to 99
<b>1000</b>	counts cyclically from 0 to 999
<b>10000</b>	counts cyclically from 0 to 9999
<b>Custom</b>	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 (for the TCNM-AD/EX Family the second byte is always 0). 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**

### **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	<b>152</b>
DeviceNet	<b>152</b>
Ethernet IP	<b>152</b>
CC-Link	<b>254</b>
CANopen	<b>152</b>
Profinet IO	<b>64</b>
Modbus TCP	<b>152</b>

### **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 <b>8 - 144</b>
DeviceNet	a value in the range <b>8 - 144</b>
Ethernet IP	a value in the range <b>8 - 144</b>
* CC-Link	a value in the range <b>2 - 126</b>
CANopen	a value in the range <b>8 - 144</b>
Profinet IO	a value in the range <b>8 - 56</b>
Modbus TCP	a value in the range <b>8 - 144</b>

\* 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 <b>8 - 144</b>
DeviceNet	a value in the range <b>8 - 144</b>
Ethernet IP	a value in the range <b>8 - 144</b>
* CC-Link	a value in the range <b>2 - 128</b>
CANopen	a value in the range <b>8 - 144</b>
Profinet IO	a value in the range <b>8 - 56</b>
Modbus TCP	a value in the range <b>8 - 144</b>

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

## Node Address (MAC ID)

### NOTE

When using the Backup and Restore Module with a TCNM-ACBB5 connection box, the 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:

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

<sup>(1)</sup> 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.

<sup>(2)</sup> 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.

<sup>(3)</sup> 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.

<sup>(4)</sup> 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.

## **Digital I/O 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 (Ethernet/IP or Modbus TCP) since these protocols do not use Exchange Areas.

## **Digital Input Lines**

### **Input 1 Echo**

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

For Ethernet/IP under the TCP/IP Services branch, the Input 1 status is echoed to the Fieldbus Master using Assembly Object Instances.

### **Input 2 Echo**

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

For Ethernet/IP under the TCP/IP Services branch, the Input 2 status is echoed to the Fieldbus Master using Assembly Object Instances.

### **Phase Echo**

If checked, the scanner 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 Ethernet/IP under the TCP/IP Services branch, the scanner Reading Phase status is echoed to the Fieldbus Master using Assembly Object Instances.

## **Digital Output Lines**

### **Output 1**

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

For Ethernet/IP under the TCP/IP Services branch, the Fieldbus Master can drive Output 1 using Assembly Object Instances.

## Output 2

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

For Ethernet/IP under the TCP/IP Services branch, the Fieldbus Master can drive Output 2 using Assembly Object Instances.

# 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 from the scanner will be transmitted 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>	<b>Disable</b>	the Heartbeat message is not transmitted
	<b>Enable Unconditioned</b>	the Heartbeat message is always transmitted, even if communication is still active
	<b>Enable Conditioned</b>	the Heartbeat message is transmitted only when there is no communication

### Type

It defines the type of the socket:

Selection: **Server** For all TCP/IP Host Interface Modules, 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 replace the first.

**Client** The station tries a connection towards the server.

### 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 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 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.

<u>Selections:</u>	<b>Disable</b>	no counter field in the Heartbeat message
	<b>10</b>	counts cyclically from 0 to 9
	<b>100</b>	counts cyclically from 0 to 99
	<b>1000</b>	counts cyclically from 0 to 999
	<b>10000</b>	counts cyclically from 0 to 9999
	<b>Custom</b>	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 (for the TCNM-AD/EX Family the second byte is always 0). 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 TCNM-ACBB5 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.

### **Status**

This parameter enables the Ethernet/IP (explicit messaging) socket. When enabled, the Digital Input/Output Conditioning can be defined.

# Digital I/O Setting

## Digital Input Lines

### 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 or Code Verifier.

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 or Code Verifier.

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.

### 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)**

## Digital Output Lines

### Use

Selection: **Local** The scanner 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.

<u>Selection:</u> <b>None</b>	the output is always in the selected line state.
<b>Complete Read</b>	the event occurs if all selected codes are read.
<b>Partial Read</b>	the event occurs if less than the selected codes are read.
<b>No Read</b>	the event occurs if no code is read.
<b>Phase On</b>	the event occurs when a start event takes place starting the reading phase.
<b>Phase Off</b>	the event occurs when a stop event takes place ending the reading phase.
<b>Multiple Read</b>	the event occurs if a code is read more than once consecutively.
<b>Right</b>	the event occurs if a code is successfully decoded and matches the Verifier Code.
<b>Wrong</b>	the event occurs if a code is successfully decoded but does not match the Verifier Code.
<b>Ready</b>	the event occurs after the power up phase when the scanner is ready to decode codes.
<b>Quality Counter &lt; Threshold</b>	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.

<u>Selection:</u> <b>None</b>	the output is always in line state.
<b>Complete Read</b>	the event occurs if all selected codes are read.
<b>Partial Read</b>	the event occurs if less than the selected codes are read.
<b>No Read</b>	the event occurs if no code is read.
<b>Phase On</b>	the event occurs when a start event takes place starting the reading phase.
<b>Phase Off</b>	the event occurs when a stop event takes place ending the reading phase.
<b>Multiple Read</b>	the event occurs if a code is read more than once consecutively.
<b>Right</b>	the event occurs if a code is successfully decoded and matches the Verifier Code.
<b>Wrong</b>	the event occurs if a code is successfully decoded but does not match the Verifier Code.
<b>Ready</b>	the event occurs after the power up phase when the scanner is ready to decode codes.
<b>Quality Counter &lt; Threshold</b>	the event occurs if the number of good decodes counted by the Quality Counter, defined in the Quality Counter Threshold parameter, is not reached.

## Deactivation Event

Defines the event deactivating the output.

<u>Selection:</u> <b>Timeout</b>	indicates the maximum duration of the output pulse.
<b>Phase On</b>	the event occurs, when a start event takes place starting the reading phase.
<b>Phase Off</b>	the event occurs, when a stop event takes place terminating the reading phase.
<b>None</b>	
<b>Quality Counter &gt;= Threshold</b>	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> <b>None</b>	
<b>Phase On</b>	the event occurs, when a start event takes place starting the reading phase.
<b>Phase Off</b>	the event occurs, when a stop event takes place terminating the reading phase.
<b>Quality Counter &gt;= Threshold</b>	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> <b>Consecutive</b>	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.
<b>Not Consecutive</b>	This counter totals all events, even when occurring at non-consecutive reading phases. The output is activated according to the Message Tx Selection 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**

## ***System Information Section***

### **Device Information**

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

#### **Detected Model**

Displays the reading device model number.

#### **Serial Number**

Displays the reading device serial number.

# LEDs & Keypad

## Key Functionality

This parameter controls access to the external Multifunction Key functions.

<u>Selection:</u> <b>Enabled</b>	The external Multifunction Key is enabled.
<b>Partially Locked</b>	The external Multifunction Key is disabled except it will enter Autolearn (F2) - but only reads the <u>Lock/Unlock SMART-TEACH Key</u> barcode. Whenever the external Multifunction Key is disabled (locked) this also disables the Backup and Restore feature using either the Backup module button or the TCNM-ACBB5 accessory display menu. Backup and Restore can always be performed through GeniusPlus.
<b>Locked</b>	The external Multifunction Key is completely disabled. This also disables the Backup and Restore feature using either the Backup module button or the TCNM-ACBB5 accessory display menu. Backup and Restore can always be performed through GeniusPlus.

## Test Mode Data Tx

This group allows to disable the Test Mode Data Tx or to select the output Tx Interface.

<u>Selection:</u> <b>Disable</b>	Test Mode Data Tx is disabled.
<b>Main</b>	Test Mode Data Tx is enabled on the Main serial interface.
<b>Aux</b>	Test Mode Data Tx is enabled on the Auxiliary serial interface.
<b>Main&amp;Aux</b>	Test Mode Data Tx is enabled on the Main and Auxiliary serial interfaces.

### NOTE

You must not be in Test Mode activated by the Multifunction Key when configuring the scanner parameters.

## Test Mode Exit Menu Timeout

This group allows to define exit from Test Mode.

<u>Selection:</u> <b>Disable</b>	Exit Test Mode only by the SMART-TEACH key.
<b>5 sec to 10 min</b>	Time that transpires before automatically exiting Test mode.

## Auto Learn Exit Menu Timeout

This group allows to define exit from Auto Learn Mode.

<u>Selection:</u> <b>Disable</b>	Exit Auto Learn Mode only by the SMART-TEACH key.
<b>5 sec to 10 min</b>	Time that transpires before automatically exiting Auto Learn mode.

## Reset LED Reading Result Timeout

This group allows to define reading result LED resetting.

<u>Selection:</u> <b>Disable</b>	Reading Result LEDs not reset.
<b>5 sec to 10 min</b>	Time that transpires before the reading result LEDs (GOOD READ and STATUS) are automatically reset.

# Display

## Display Language

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

Selection: **English (United States)**  
**French (France)**  
**German (Germany)**  
**Italian (Italy)**  
**Japanese (Japan)**

## Network Status Monitor

For Master devices (SYNCHRONIZED or MULTIDATA), when checked, this parameter enables Network Status messages on the Master display (for scanners with display), and on the TCNM-ACBB5 accessory display if present.

## Toggle Network Status Monitor with Last Data Read

Allows the Network Status Message to be toggled with the Last Data Read message on the Master display (for scanners with display), and on the TCNM-ACBB5 accessory display if present.

## Contrast (Local Device)

This parameter sets the contrast of the reader display. It has no effect on the TCNM-ACBB5 display (if present).

Selection: value from **5** to **45**

# 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.

## Conveyor Info

It allows indicating if information about the conveyor status is available or not.

Selections:     **Available**  
                  **Not Available**

## Conveyor Info Provider

If the Conveyor Info is Available, this parameter allows setting the source providing info about the conveyor status:

Selections:     **Input\_1**  
                  **Input\_2**

## Refresh Time

It defines the frequency at which the diagnostic messages are updated. This parameter excludes the network diagnostics which are updated at a fixed internal frequency.

## LED Indication on Network Slave Failure

This parameter has meaning only for a Master scanner since it allows the LEDs to signal a Network Slave Failure. When enabled, if a Slave Network Failure is detected, the Master scanner Status and Ready LEDs blink simultaneously and the GOOD LED remains on constantly.

## Slave Diagnostics

This parameter has meaning only for a Master scanner 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.

## Local Network Failure

If checked, it allows sending an alarm signalling a malfunctioning of the local ID-NET™ network controller, independent from the scanner role (Master, Slave, Other).

## 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**

### **Motor Failure**

For TCNM-AD/EX scanners, if checked, it allows sending an alarm whenever the motor speed is above or below the internal threshold with respect to the programmed Scan Speed.

### **Laser Failure**

For TCNM-AD/EX scanners, if checked, it allows sending an alarm whenever a laser failure has occurred.

### **Oscillating Mirror Failure**

For TCNM-AD/EX scanners, if checked, it allows sending an alarm whenever the oscillating mirror has not been recognized.

### **Oscillating Mirror Data Consistency Error**

For TCNM-AD/EX scanners, if checked, it allows sending an alarm whenever a checksum error has occurred on the oscillating mirror onboard settings.

### **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.

### **Presence Sensor Stuck Timeout**

This parameter is available only when working in On Line operating mode and when the Conveyor Info is available. It defines the time interval after which an error is generated if the status of the presence sensor does not change (presence sensor remains open).

Selections:     **Disable**  
                  **1 sec**  
                  **2 sec**  
                  **5 sec**  
                  **10 sec**  
                  **30 sec**  
                  **1 min**

### **Focus Displacement**

If checked, it allows sending an alarm whenever the actual focus position doesn't match the Locked Position saved in the scanner configuration memory. This alarm is generated when the focus position has exceeded the allowable tolerance.

### **DIGITIZER: Motor Failure**

If checked, it allows sending an alarm whenever the motor speed is above or below the internal threshold with respect to the programmed Scan Speed.

### **DIGITIZER: Motor Life End**

If checked, it allows sending an alarm when the motor has surpassed its factory declared functional life.

### **DIGITIZER: Laser Failure**

If checked, it allows sending an alarm whenever a laser failure has occurred.

### **DIGITIZER: Laser Life End**

If checked, it allows sending an alarm when the laser has surpassed its factory declared functional life.

**DIGITIZER: Data Consistency Error**

If checked, it allows sending an alarm whenever a checksum error has occurred on the analog board EEPROM memory.

**DIGITIZER: Data Write Error**

If checked, it allows sending an alarm whenever a data write error has occurred to the analog board EEPROM memory.

**DIGITIZER: Communication Error**

If checked, it allows sending an alarm whenever there is a communication error between the decoder board and the analog board.

**DIGITIZER: Reset**

If checked, it allows sending an alarm whenever an unexpected analog board reset has occurred.

**OSCILLATING MIRROR: Motor Failure**

If checked, it allows sending an alarm whenever an oscillating mirror motor failure is signaled.

**OSCILLATING MIRROR: Motor Life End**

If checked, it allows sending an alarm when the oscillating mirror motor has surpassed its factory declared functional life.

**OSCILLATING MIRROR: Data Consistency Error**

If checked, it allows sending an alarm whenever a checksum error has occurred on the oscillating mirror board EEPROM memory.

**OSCILLATING MIRROR: Data Write Error**

If checked, it allows sending an alarm whenever a data write error has occurred to the oscillating mirror board EEPROM memory.

**OSCILLATING MIRROR: Communication Error**

If checked, it allows sending an alarm whenever there is a communication error between the decoder board and the oscillating mirror board.

**OSCILLATING MIRROR: Reset**

If checked, it allows sending an alarm whenever an unexpected oscillating mirror board reset has occurred.

**Reading Conditions Controller: Communication Error**

If checked, it allows sending an alarm whenever there is a communication error between the decoder board and the Reading Conditions Controller.

**Focus Controller: Communication Error**

If checked, it allows sending an alarm whenever there is a communication error between the decoder board and the Focus Controller.

**Temperature Sensor: Communication Error**

If checked, it allows sending an alarm whenever there is a communication error between the decoder board and the Temperature Sensor.

### **Laser Temperature Sensor: Communication Error**

If checked, it allows sending an alarm whenever there is a communication error between the decoder board and the Laser Temperature Sensor.

### **Temperature Sensors Mismatch Error**

If checked, it allows sending an alarm whenever the internal Temperature Sensors values don't match.

### **Low Temperature Alarm**

If checked, it allows sending an alarm whenever the internal temperature falls below the threshold of 0 °C indicating the scanner is operating outside of its specifications. To avoid component damage, the scanner will enter a sort of standby condition where the laser, motor, display and oscillating mirror (for OM models) are turned off until the internal temperature returns to within the normal operating range. The Ready LED also blinks in this condition.

### **High Temperature Warning**

If checked, it allows sending an alarm whenever the internal temperature has reached the maximum level. The scanner life and/or performance may be reduced. Continued operation at this level could cause the scanner to fail.

### **Low Power Supply Alarm**

If checked, it allows sending an alarm whenever the input power to the scanner falls below an internal threshold which depends on the model:

$$\text{TCNM-SP} < 8 \text{ Vdc}$$

Operation at this level is not guaranteed and may reduce performance.

### **Fieldbus Failure**

If checked, it allows sending an alarm whenever there is a communication error between the scanner and the Fieldbus module inside the TCNM-ACBB5 connection box.

### **Fieldbus Configuration Error**

If checked, it allows sending an alarm whenever a configuration error has occurred between the scanner and the Fieldbus module inside the TCNM-ACBB5 connection box.

### **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 TCNM-ACBB5 connection box.

### **Fieldbus Mismatch**

If checked, it allows sending an alarm whenever the Fieldbus module inside the TCNM-ACBB5 doesn't match the one saved in the scanner configuration memory.

### **Wrong TCNM-ACBB Backup Module Rotary Switch Selection**

If checked, it allows sending an alarm whenever one or more of the selected Backup module Rotary Switch settings inside the TCNM-ACBB doesn't match the scanner configuration memory.

### **TCNM-ACBB Backup Module Communication Failure**

If checked, it allows sending an alarm whenever there is a communication error between the scanner and the Backup module inside the TCNM-ACBB connection box.

## Actions

When diagnostics are enabled, this group allows selection of all the parameters managing diagnostic message transmission by the Stand Alone or Master scanner:

### **Tx Mode**

The diagnostic message can be transmitted to the system by the Stand Alone or Master scanner 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).

### **Interface Transmission (Aux, Main, Fieldbus, User Socket(s))**

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.

#### **NOTE**

The Main Interface is not compatible with Fieldbus and/or User Socket selections. If a Fieldbus module is installed in the TCNM-ACBB5 connection box, the Main Interface selection will be ignored.

### **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 diagnostic messages will replace the code, be appended after the code, or be inserted before the code.

#### **Example:**

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

## Format

This group allows definition of the diagnostic message formatting sent by the Stand Alone or Master scanner 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 scanner: 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 Examples**

Stand Alone	<STX>#81<ETX>	Motor Failure
Master	<STX>00#81 01#1<ETX>	Master (00) digitizer motor failure + 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).

**No Failure String**

The No Failure String can be defined and transmitted as a block when there is no diagnostic message to be sent. This is useful for example when the output message must have fixed fields, including diagnostic messages.

When this parameter is blank the diagnostic message field will only be included in the output message when an actual diagnostic message is present.

**Diagnostic Message Format**

It defines whether the message(s) will be sent as Internal Numeric Message(s) or as User Defined String(s).

If the Compact value is selected, then only a single message will be sent in the User Defined Strings format. In the case of multiple messages this will be the first one revealed. If the first message is cleared then the next message (if any) will take its place.

**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 scanner: 00 = Master, all others = Slaves; or the Node Identification description string.  
 yyy is the User Defined Message string

### User Defined Message Examples

Stand Alone	<STX>#<BEL><ETX> <STX>#Motor Failure<ETX>	Motor Failure (default string) "Motor Failure" (user defined string)
Master	<STX>00#<BEL> 01#^<ETX> <STX>00#Motor Failure 01#Slave Not Responding<ETX>	Master (00) digitizer motor failure (default string) + Slave 01 not responding (default string) "Motor Failure" + "Slave Not Responding" (user defined strings)

### Local Network 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.

### Motor Failure

For TCNM-AD/EX scanners, it defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever the motor speed is above or below the internal threshold with respect to the programmed Scan Speed.

### Laser Failure

For TCNM-AD/EX scanners, it defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever a laser failure has occurred.

### Oscillating Mirror Failure

For TCNM-AD/EX scanners, it defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever the oscillating mirror has not been recognized.

### Oscillating Mirror Data Consistency Error

For TCNM-AD/EX scanners, it defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever a checksum error has occurred on the oscillating mirror onboard settings.

### 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.

### Presence Sensor Stuck Timeout

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever a presence sensor stuck timeout is present.

### No Phase Warning

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).

### Focus Displacement

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever the actual focus position doesn't match the Locked Position saved in the scanner configuration memory. This alarm is generated when the focus position has exceeded the allowable tolerance.

### DIGITIZER: Motor Failure

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever the motor speed is above or below the internal threshold with respect to the programmed Scan Speed.

**DIGITIZER: Motor Life End**

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message when the motor has surpassed its factory declared functional life.

**DIGITIZER: Laser Failure**

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever a laser failure has occurred.

**DIGITIZER: Laser Life End**

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message when the laser has surpassed its factory declared functional life.

**DIGITIZER: Data Consistency Error**

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever a checksum error has occurred on the analog board EEPROM memory.

**DIGITIZER: Data Write Error**

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever a data write error has occurred to the analog board EEPROM memory.

**DIGITIZER: Communication Error**

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 decoder board and the analog board.

**DIGITIZER: Reset**

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever an unexpected analog board reset has occurred.

**OSCILLATING MIRROR: Motor Failure**

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever an oscillating mirror motor failure is signaled.

**OSCILLATING MIRROR: Motor Life End**

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message when the oscillating mirror motor has surpassed its factory declared functional life.

**OSCILLATING MIRROR: Data Consistency Error**

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever a checksum error has occurred on the oscillating mirror onboard settings.

**OSCILLATING MIRROR: Data Write Error**

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever a data write error has occurred to the oscillating mirror board EEPROM memory.

**OSCILLATING MIRROR: Communication Error**

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 decoder board and the oscillating mirror board.

**OSCILLATING MIRROR: Reset**

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever an unexpected oscillating mirror board reset has occurred.

**Reading Conditions Controller: Communication Error**

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 decoder board and the Reading Conditions Controller.

**Focus Controller: Communication Error**

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 decoder board and the Focus Controller.

**Temperature Sensor: Communication Error**

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 decoder board and the Temperature Sensor.

**Laser Temperature Sensor: Communication Error**

If checked, it allows sending an alarm whenever there is a communication error between the decoder board and the Laser Temperature Sensor.

**Temperature Sensors Mismatch Error**

If checked, it allows sending an alarm whenever the internal Temperature Sensors values don't match.

**Low Temperature Alarm**

If checked, it allows sending an alarm whenever the internal temperature falls below the threshold of 0 °C indicating the scanner is operating outside of its specifications. To avoid component damage, the scanner will enter a sort of standby condition where the laser, motor, display and oscillating mirror (for OM models) are turned off until the internal temperature returns to within the normal operating range. The Ready LED also blinks in this condition.

**High Temperature Warning**

It defines the message string (up to 128 bytes) that will be sent as a diagnostic message whenever the internal temperature has reached the maximum level. The scanner life and/or performance may be reduced. Continued operation at this level could cause the scanner to fail.

**Low Power Supply Alarm**

If checked, it allows sending an alarm whenever the input power to the scanner falls below an internal threshold which depends on the model:

$$\text{TCNM-SP} < 8 \text{ Vdc}$$

Operation at this level is not guaranteed and may reduce performance.

**Slave No Reply**

This message is sent only by the Master scanner. 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.

**Slave Address Duplication**

This message is sent only by the Master scanner. 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.

**Slave Net Configuration**

This message is sent only by the Master scanner. 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 scanner and the Fieldbus module inside the TCNM-ACBB5 connection box.

### **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 TCNM-ACBB5 connection box.

### **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 scanner and the Fieldbus module inside the TCNM-ACBB5 connection box.

### **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 TCNM-ACBB5 doesn't match the one saved in the scanner configuration memory.

### **Wrong TCNM-ACBB Backup Module 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 Backup module Rotary Switch settings inside the TCNM-ACBB doesn't match the scanner configuration memory.

### **TCNM-ACBB Backup Module 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 scanner and the Backup module inside the TCNM-ACBB connection box.

# 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 Stand Alone or Master scanner.

## 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.

## Motor OFF Counter

If enabled (checked), this counter is included in the statistical message and reports the total number of motor OFF conditions 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><Motor OFF><Space><Multiple Reads><Terminator>
```

## ***User Information Section***

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

### **User Name**

Add the User or Company name to the scanner information.

### **Device Name**

Add the Device Name to the scanner information.

### **Line Name**

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

# References

## Diagnostic Error Conditions

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

### Diagnostic Error Messages

#### Stand Alone / Master/ MULTIDATA Slave

Family	Diagnostic Error Number	Meaning
AD/EX	[81]	<b>Motor Failure:</b> the motor speed is above or below the internal threshold with respect to the programmed Scan Speed.
SP	[81]	<b>DIGITIZER: Motor Failure</b> the motor speed is above or below the internal threshold with respect to the programmed Scan Speed.
SP	[82]	<b>DIGITIZER: Motor Life End</b> the motor has surpassed its factory declared functional life.
AD/EX	[83]	<b>Laser Failure:</b> a laser failure has occurred.
SP	[83]	<b>DIGITIZER: Laser Failure</b> a laser failure has occurred.
SP	[84]	<b>DIGITIZER: Laser Life End</b> the laser has surpassed its factory declared functional life.
SP	[85]	<b>DIGITIZER: Data Consistency Error</b> a checksum error has occurred on the analog board EEPROM memory.
SP	[87]	<b>DIGITIZER: Communication Error</b> there is a communication error between the decoder board and the analog board.
SP	[89]	<b>DIGITIZER: Reset</b> an unexpected analog board reset has occurred.
SP	[91]	<b>DIGITIZER: Data Write Error</b> a data write error has occurred to the analog board EEPROM memory.
SP	[93]	<b>Focus Displacement</b> the actual focus position doesn't match the Locked Position saved in the scanner configuration memory. This alarm is generated when the focus position has exceeded the allowable tolerance.
AD/EX	[97]	<b>Oscillating Mirror Failure</b> the oscillating mirror has not been recognized.
SP	[97]	<b>OSCILLATING MIRROR: Motor Failure</b> the oscillating mirror motor speed is above or below the internal threshold with respect to the programmed Frequency.
SP	[98]	<b>OSCILLATING MIRROR: Motor Life End</b> the oscillating mirror motor has surpassed its factory declared functional life.
AD/EX	[99]	<b>Oscillating Mirror Data Consistency Error</b> a checksum error has occurred on the oscillating mirror onboard settings.
SP	[99]	<b>OSCILLATING MIRROR: Data Consistency Error</b> a checksum error has occurred on the oscillating mirror onboard settings.
SP	[101]	<b>OSCILLATING MIRROR: Communication Error</b> there is a communication error between the decoder board and the oscillating mirror board.
SP	[103]	<b>OSCILLATING MIRROR: Reset</b> an unexpected oscillating mirror board reset has occurred.
SP	[105]	<b>OSCILLATING MIRROR: Data Write Error</b> a data write error has occurred to the oscillating mirror board EEPROM memory.
SP	[119]	<b>Reading Conditions Controller: Communication Error</b> there is a communication error between the decoder board and the Reading Conditions Controller.
SP	[121]	<b>Focus Controller: Communication Error</b> there is a communication error between the decoder board and the Focus Controller.
SP	[123]	<b>Temperature Sensor: Communication Error</b> there is a communication error between the decoder board and the Temperature Sensor.
SP	[124]	<b>High Temperature Warning:</b> the internal temperature has reached the maximum level. The scanner life and/or performance may be reduced. Continued operation at this level could cause the scanner to fail.
SP	[125]	<b>Laser Temperature Sensor: Communication Error</b> there is a communication error between the decoder board and the Laser Temperature Sensor.
SP	[127]	<b>Temperature sensors Mismatch Error:</b> the internal Temperature Sensors values don't match.
All	[131] [133]	<b>Start/Stop Input Failure:</b> the start or stop input is not working.
All	[132]	<b>No Phase Timeout:</b> no reading phase for more than the programmed No Phase timeout.

All	[149]	<b>Presence Sensor Failure:</b> presence sensor(s) remain open for more than the programmed Presence Sensor Stuck timeout.
All	[151]	<b>Local Network Failure:</b> a local ID-NET™ network controller error has occurred.
All	[185]	<b>TCNM-ACBB Backup Module Communication Failure:</b> there is a communication error between the scanner and the Backup module inside the TCNM-ACBB connection box.
All	[187]	<b>Wrong TCNM-ACBB Backup Module Rotary Switch Selection:</b> one or more of the selected Backup module Rotary Switch settings inside the TCNM-ACBB doesn't match the scanner configuration memory.
All	[189]	<b>Fieldbus Failure:</b> there is a communication error between the scanner and the Fieldbus module inside the TCNM-ACBB5 connection box.
All	[191]	<b>Fieldbus Mismatch:</b> the Fieldbus module inside the TCNM-ACBB5 doesn't match the one saved in the scanner configuration memory.
All	[193]	<b>Fieldbus Configuration Error:</b> a configuration error has occurred between the scanner and the Fieldbus module inside the TCNM-ACBB5 connection box.
All	[195]	<b>Fieldbus DHCP Problem:</b> a communication problem has occurred between the DHCP server and the Fieldbus module inside the TCNM-ACBB5 connection box.
SP	[197]	<b>Low Temperature:</b> indicates the scanner is operating below its minimum internal temperature specification limit of 0°C; scanner in standby.
SP	[199]	<b>Low Power:</b> the scanner is operating below the minimum input power threshold value depending on the model.

Some of these error messages may have different meaning according to different conditions. See also Note 2.

### Master only

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

#### NOTE 1

- 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 scanner configuration changes or until the next power cycle of the master scanner itself.
- Error [1] may be detected before Error [64] is detected due to the latency required for Error [64] detection.

### SYNCHRONIZED Slave only

Family	Diagnostic Error Number	Meaning
AD/EX	[81]	<b>Motor Failure:</b> the motor speed is above or below the internal threshold with respect to the programmed Scan Speed.
SP	[81]	<b>DIGITIZER: Motor Failure</b> the motor speed is above or below the internal threshold with respect to the programmed Scan Speed.
AD/EX	[83]	<b>Laser Failure:</b> a laser failure has occurred.
SP	[83]	<b>DIGITIZER: Laser Failure</b> a laser failure has occurred.
SP	[85]	<b>DIGITIZER: Data Consistency Error</b> a checksum error has occurred on the analog board EEPROM memory.
SP	[87]	<b>DIGITIZER: Communication Error</b> there is a communication error between the decoder board and the analog board.
SP	[89]	<b>DIGITIZER: Reset</b> an unexpected analog board reset has occurred.
SP	[91]	<b>DIGITIZER: Data Write Error</b> a data write error has occurred to the analog board EEPROM memory.
SP	[93]	<b>Focus Displacement</b> the actual focus position doesn't match the Locked Position saved in the scanner configuration memory. This alarm is generated when the focus position has exceeded the allowable tolerance.

AD/EX	[97]	<b>Oscillating Mirror Failure</b> the oscillating mirror has not been recognized.
SP	[97]	<b>OSCILLATING MIRROR: Motor Failure</b> the oscillating mirror motor speed is above or below the internal threshold with respect to the programmed Frequency.
AD/EX	[99]	<b>Oscillating Mirror Data Consistency Error</b> a checksum error has occurred on the oscillating mirror onboard settings.
SP	[99]	<b>OSCILLATING MIRROR: Data Consistency Error</b> a checksum error has occurred on the oscillating mirror onboard settings.
SP	[101]	<b>OSCILLATING MIRROR: Communication Error</b> there is a communication error between the decoder board and the oscillating mirror board.
SP	[103]	<b>OSCILLATING MIRROR: Reset</b> an unexpected oscillating mirror board reset has occurred.
SP	[105]	<b>OSCILLATING MIRROR: Data Write Error</b> a data write error has occurred to the oscillating mirror board EEPROM memory.
SP	[119]	<b>Reading Conditions Controller: Communication Error</b> there is a communication error between the decoder board and the Reading Conditions Controller.
SP	[121]	<b>Focus Controller: Communication Error</b> there is a communication error between the decoder board and the Focus Controller.
SP	[123]	<b>Temperature Sensor: Communication Error</b> there is a communication error between the decoder board and the Temperature Sensor.
All	[151]	<b>Local Network Failure:</b> a local ID-NET™ network controller error has occurred.
All	[185]	<b>TCNM-ACBB Backup Module Communication Failure:</b> there is a communication error between the scanner and the Backup module inside the TCNM-ACBB connection box.
All	[187]	<b>Wrong TCNM-ACBB Backup Module Rotary Switch Selection:</b> one or more of the selected Backup module Rotary Switch settings inside the TCNM-ACBB doesn't match the scanner configuration memory.

Some of these error messages may have different meaning according to different conditions.

#### NOTE 2

All **DIGITIZER, OSCILLATING MIRROR, and FLASH** errors, except for: DIGITIZER Motor Warning, Focus Displacement, and High Temperature Warning, require that the relative scanner be reset before the error can be cancelled.

## Error Message Conditions

A single error number can indicate different types of failure according to the following conditions:

- working in On Line mode with 1 input and Conveyor Info available
- working in On Line mode with 1 input and without Conveyor Info available
- working in On Line mode with 2 inputs and with Conveyor Info available
- working in On Line mode with 2 inputs and without Conveyor Info available
- working in Serial On Line mode

In the following description the following expressions are used:

"presence sensor open" = the presence sensor light beam is broken

"presence sensor closed" = the presence sensor light beam is continuous

## On Line Operating Mode

When working in On Line operating mode the meaning of an error message can change according to the selection of the On Line Options parameter and to the selection of the Conveyor Info parameter.

**On Line 1 Input with Conveyor Info Available**

<b>Diagnostics Error Number</b>	<b>Meaning</b>
[132]	<b>Presence Sensor Warning:</b> the conveyor moves but the presence sensor remains closed for more than the programmed No Phase timeout. This message may indicate that no pack is present on the conveyor.
[149]	<b>Presence Sensor Failure:</b> the conveyor moves but the presence sensor remains open for more than the programmed Presence Sensor Stuck timeout. This message may indicate a presence sensor failure or physical misalignment. Take into consideration the calculation of the maximum period of time required by the package to pass through the reading area.

**On Line 1 Input without Conveyor Info Available**

<b>Diagnostics Error Number</b>	<b>Meaning</b>
[132]	<b>Presence Sensor Warning:</b> the presence sensor remains closed for more than the programmed No Phase timeout. This message may indicate that no pack is present on the conveyor.
[149]	<b>Not available</b>

**On Line 2 Inputs with Conveyor Info Available**

<b>Diagnostics Error Number</b>	<b>Meaning</b>
[131]	<b>PS Input Failure:</b> the conveyor moves and the PS Output is active while the PS Input is inactive. Or the conveyor is not moving and the PS Output is inactive while the PS Input is active. The correct synchronization of the two presence sensors is periodically checked by counting the number of their status changes within a sampling period of 4 minutes.
[132]	<b>Presence Sensor Warning:</b> the conveyor moves but both the presence sensors remain closed for more than the programmed No Phase timeout. This message may indicate that no pack is present on the conveyor. Furthermore, it is assumed that both presence sensors are correctly synchronized otherwise a [131] or [133] error would be generated.
[133]	<b>PS Output Failure:</b> the conveyor moves and the PS Input is active while the PS Output is inactive. Or the conveyor is not moving and the PS Input is inactive while the PS Output is active. The correct synchronization of the two presence sensors is periodically checked by counting the number of their status changes within a sampling period of 4 minutes.
[149]	<b>Presence Sensor Failure:</b> the conveyor moves but both the presence sensors remain open for more than the programmed Presence Sensor Stuck timeout. This message may indicate both presence sensors have failed or are physically misaligned. It is assumed that both presence sensors are correctly synchronized otherwise a [131] or [133] error would be generated. Take into consideration the calculation of the maximum period of time required by the package to pass through the reading area.

**On Line 2 Inputs without Conveyor Info Available**

<b>Diagnostics Error Number</b>	<b>Meaning</b>
[131]	<b>PS Input Failure:</b> the PS Output is active while the PS Input is inactive. When no information about movement is provided, it is assumed that the broken presence sensor is the one which does not signal the packs entering the tracking area. The correct synchronization of the two presence sensors is periodically checked by counting the number of their status changes within a sampling period of 4 minutes.

[132]	<b>Presence Sensor Warning:</b> both the presence sensors remain closed for more than the programmed No Phase timeout. This message may indicate that no pack is present on the conveyor. Furthermore, it is assumed that both presence sensors are correctly synchronized otherwise a [131] or [133] error would be generated.
[133]	<b>PS Output Failure:</b> the PS Input is active while the PS Output is inactive. When no information about movement is provided, it is assumed that the broken presence sensor is the one which does not signal the packs entering the tracking area. The correct synchronization of the two presence sensors is periodically checked by counting the number of their status changes within a sampling period of 4 minutes.
[149]	<b>Not available</b>

## Serial On Line Mode

Diagnostics Error Number	Meaning
[132]	<b>Presence Sensor Warning:</b> there is no Reading Phase for more than the programmed No Phase timeout. This message may indicate that no pack is present on the conveyor.

## 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 local scanner:



**SYNCHRONIZED:** The Master SYNCHRONIZED / Slave 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 scanners to be configured differently and independently from the Master. In this way the Slave scanners 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 scanner topology role:

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

**Slave SYNCHRONIZED:** The scanner is connected as an ID-NET™ Slave in a master/slave synchronized configuration.

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

**Slave MULTIDATA:** The scanner is connected as an ID-NET™ Slave in a master/slave multidata configuration.

**Other:** This selection allows Local Device Alternative Network Settings to support (Master/Slave RS232 networks or Stand Alone applications).

**Slave Address**

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

## Operating Mode Reference Table

The following table summarizes all the conditions determining the use of each operating mode:

Operating Mode	Code Combination				Topology Role				P.S.
	Single Label	Standard Multilabel	Logical Combination	Code Collection	Other Stand Alone	Master Synchronized	Slave Synchronized	Master/Slave Multidata	HW/SW
On Line	X	X	X	X	X	X	X	X	X
Automatic	X	X	X	X	X	---	---	X	---
Continuous	X	---	---	---	X	---	---	X	---
Test <sup>1</sup>	---	---	---	---	---	---	---	---	---

<sup>1</sup> This operating mode does not require particular conditions.

## 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 = BANNER

IFS = \$

Quality Counters = enabled

Terminator = T

Output Message: **H+ 155 ]A0 BANNER\$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 scanner: 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 scanners 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 main RS232/RS485 serial interface.

This is called Host Mode programming.

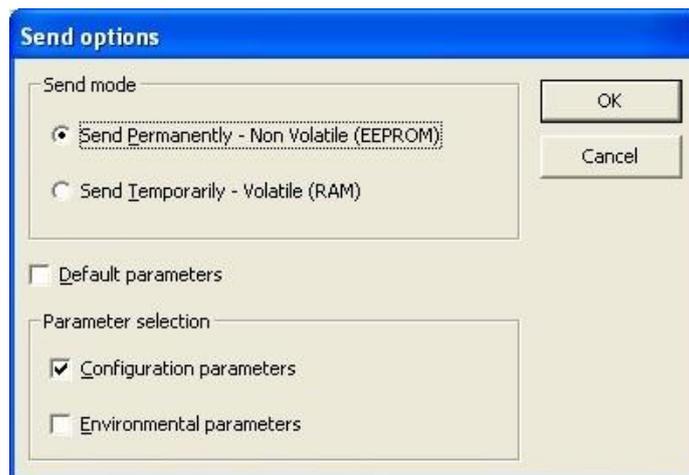
Once the programming session has started on one of the interfaces, the other is disabled until programming is over.

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

## Send Configuration Options

The scanner 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 scanner. 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 scanner Identity and Position in a Network (ID-NET™, Master/Slave RS232, MUX 32) and are not influenced by the Send Default and Send Configuration commands. This allows individual scanners to be configured differently without affecting their recognized position in the network.

The following is a list of the Environmental Parameters:

### READING SYSTEM LAYOUT

- Local Device Alternative Network Settings
- Number of Slaves (Type A)

### LOCAL DEVICE NETWORK SETTING

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

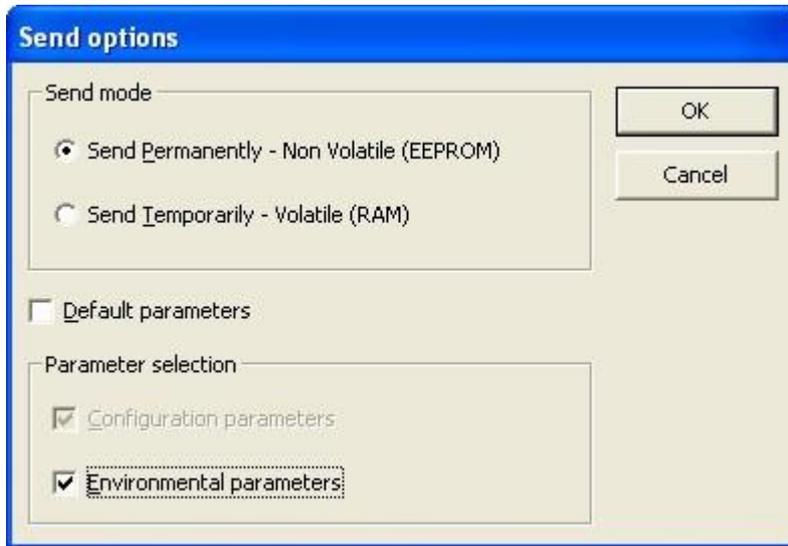
### DATA COMMUNICATION SETTINGS

- Crisplant Manufacturer ID
- MUX 32 Protocol Address

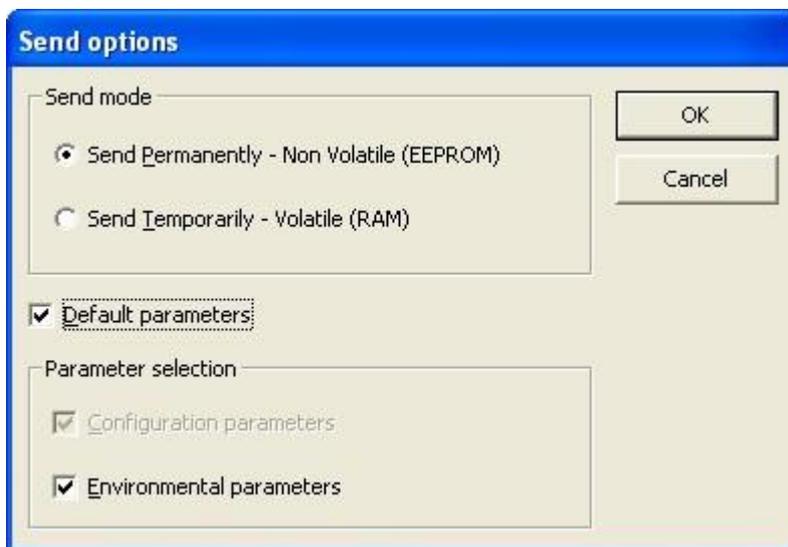
USER INFORMATION SECTION

- User Name
- Device Name
- Line Name

For scanner replacement it is necessary to send the previously saved configuration (both Configuration and Environmental parameters) to the new scanner. To do this select "Send with Options..." from the Device Menu and check the Environmental Parameters checkbox:



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



# Configuration Through Ethernet

## ***IP Address Alignment Procedures***

In order to connect a scanner to GeniusPlus using Ethernet, the Ethernet IP Addressing parameters must be aligned between the configuration PC and the scanner. The following procedures can be used:

### ***Using Setup Programming Barcodes***

#### **DHCP Enabled**

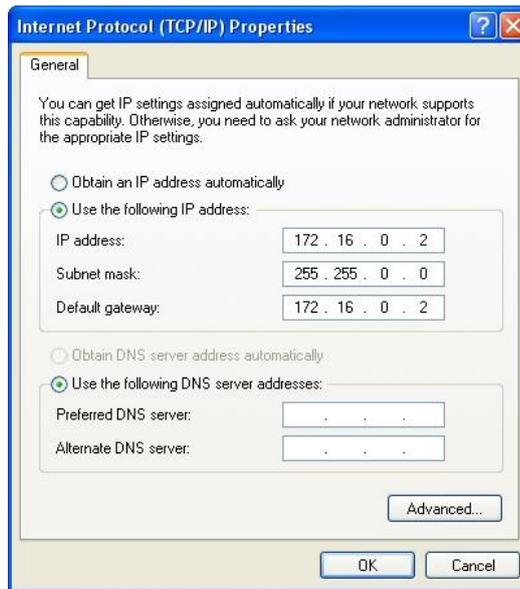
1. Printout the "Setup Procedure Using Programming Barcodes" document from the CD-ROM and read the **Ethernet TCP/IP enabled DHCP enabled** barcode using the SMART-TEACH Autolearn function (as described in the Quick Reference Guide).
2. Launch the Finder program on the GeniusPlus CD-ROM in `..Doc\Software Utilities\IP Finder.zip` to determine the IP address assigned to the scanner.
3. Set the GeniusPlus Tools>Options>Communications window to TCP/IP and in the Device address or name field, input the IP address returned by the finder program. The port number is 51235. Then click *OK*.
4. Perform a Device>Get (configuration) from GeniusPlus.

#### **NOTE**

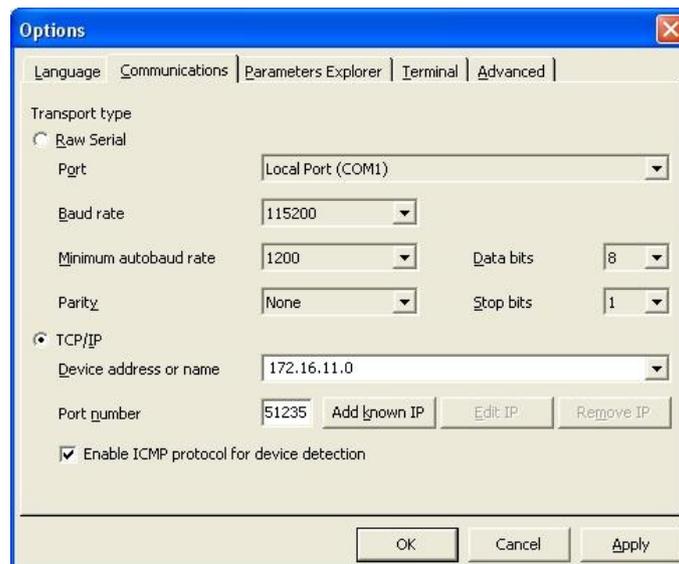
Devices working in DHCP may be assigned different IP addresses at each powerup, therefore steps 2 - 4 of the above procedure may need to be repeated at successive connections between GeniusPlus and the scanner.

#### **Static IP Addressing (DHCP Disabled)**

1. Printout the "Setup Procedure Using Programming Barcodes" document from the CD-ROM and read the **Ethernet TCP/IP enabled DHCP disabled** barcode using the SMART-TEACH Autolearn function (as described in the Quick Reference Guide).
2. Before changing the Ethernet network settings on the PC running GeniusPlus, close any open applications which use network resources (i.e. Outlook, or Web browser).
3. On the Configuration PC, from the Control Panel>Network Connections, right-click on the LAN connection icon and open the properties window.
4. Select the Internet Protocol (TCP/IP) item and open the properties window.
5. Set the IP Address fields as follows and click *OK* to save.



- Set the GeniusPlus Tools>Options>Communications window to TCP/IP and in the Device address or name field, input the scanner Factory Default address. The port number is 51235. Then click OK.



- Perform a Device>Get (configuration) from GeniusPlus.

## Using the Serial Interface

- Connect to GeniusPlus through the RS232 Serial Port (enabled by default) and the scanner Aux RS232 port.
- Perform a Device>Get (configuration) from GeniusPlus.
- Set the Data Communication Setting>TCNM-ACBB5 Gateway>Type to **Ethernet TCP/IP** and the desired Line Parameters>IP Addressing parameters.
- Send the configuration to the scanner.
- Set the GeniusPlus Tools>Options>Communications window to TCP/IP and in the Device address or name field, input the IP address. The port number is 51235. Then click OK.
- Exit from GeniusPlus. The next connection will take place using the configured IP addressing.

## External Memory Backup & Restore

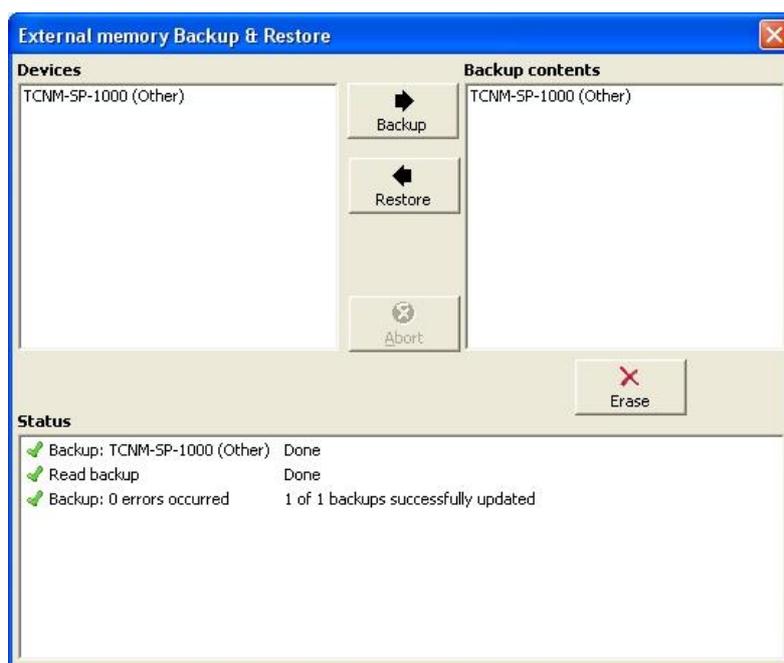
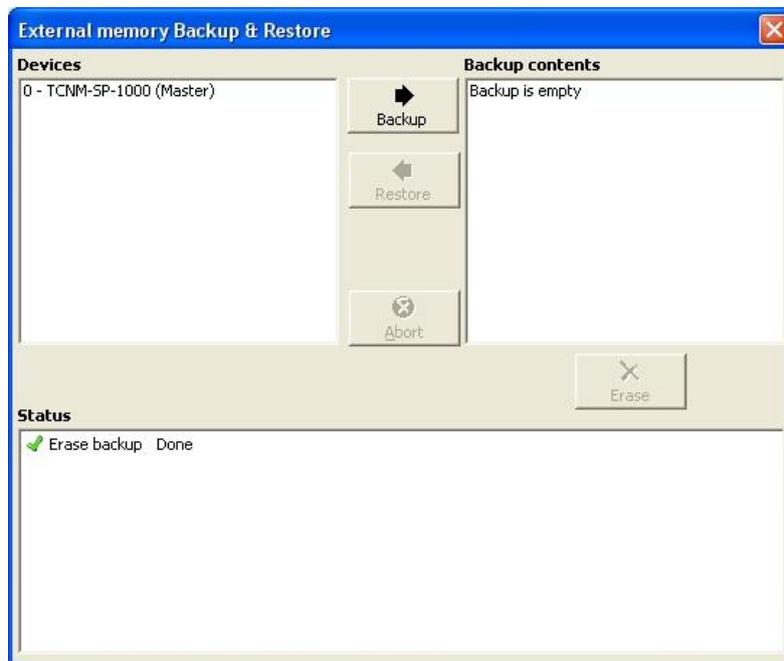
By selecting "External Memory Backup & Restore" from the Device menu, the following dialog box appears allowing Complete Configuration and Environmental parameter storage for network and reading devices.

Backup & Restore can be applied to any connected device through which backup memory is available, regardless of the devices' network configuration.

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

The Backup & Restore function is supported by TCNM-AD/EX/SP scanners when connected to or through:

- TCNM-ACBB with External Memory Module
- ID-NET Controller



**NOTE**

- Before executing a Backup on a backup module make sure the Write Protection switch is set to Unlocked.
- If the backup module and the TCP/IP interface module are both installed, B&R is automatically performed only on the backup module.
- The TCP/IP interface module can execute B&R only with Network up and running (network cable connected).

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 is being executed

To perform a **Restore**:

1. Press the Restore button (you will be warned that all scanner configurations will be overwritten)
2. The Status window shows information as the restore procedure is being executed

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

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

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 or not ready, or Search for TCNM-ACBB Backup Memory at Device Startup parameter disabled

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

**Backup function not allowed:** when device is in SMART-TEACH Menu mode

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

**Failed! (Module is write protected):** backup module Write Protection switch is set to Locked