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> DL.CODE™

SER'S MANUAL

Device Selection			Help	
Online Devices	Selected Device Details		▲ Show	
	Name	Matrix	Device Selection	
SN: C14P00284	Model	M450N 800-030 5MP GIGE	OF BIRDLE - FORM	
	Layout Type	Synchronized		
M210N 172 27.30.157; Matrix SN: C14P00452	Internal Network Role	Master		
	Status	Hybrid Running		
M410N 172 27.102.17: Matrix	Startup Info	OK	The second secon	
M410N 172.27.102.17; Matrix SN: C14P00588	IP Address	172.27.102.246	Construction of the second sec	
	Application SW Version	1.5.0.538-RC02	Branne Branne	
M300N 172.27.101.253; Matrix	Loader Version	4.0.2.20		
M450N 172.27.102.169; MasterHybr	Task Selection		The Device Selection screen allows you to choose an Ori Device (Ethernet), Scriff Device, or an Offine Device (Simulator) to work with.	
M300N 172.27.101.153; Matrix SN: C15P00088	Open Devi	ce Configuration		
M300N 172.27.101.190; Matrix 🛛 🖉 E SN: C16D04762	Presentation Mode		Task Selection	
4 000 M450N 172.27.102.246; Matrix SN: C16I07048	Setup Internal Network Configuration		Presentation Mode Setup Internal Network Configuration	
M450N 172.27.102.247; Matrix SN: C16/07054 Network Address:1	Packtrack Calibration		PackTrack Calibration Monitor Device Web Monitor	
M450N 172.27.102.248; Matrix SN: C1607D49 Network Address:2	Monitor Device		ID WED FORIED	
M450N 172.27.102.249; Matrix SN: C16I07053 Network Address:3	Web Monit	or		
M300N 172.27.102.19; Matrix SN: C16P00331				

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Datalogic S.r.l. Via S. Vitalino 13 40012 Calderara di Reno Italy

DL.CODE[™] User's Manual

Ed.: 10/2017

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CONTENTS

	DATALOGIC END USER LICENSE AGREEMENT	iii
	REFERENCES	ix
	Conventions	
	Reference Documentation	
	Support Through the Website	
1	INTRODUCTION	1
1.1	Main Features	
1.2	Configuration and Monitoring Sessions	
1.3	Simulators	
1.4	Device Configuration	
•		
2	INSTALLATION	
2.1	DL.CODE Distribution Contents	
2.2	Hardware Requirements	
2.3	Software Requirements	
2.4	Installing DL.CODE	
2.4.1	Standard Installation	
2.4.2	Silent Installation	
2.5	Uninstalling DL.CODE	6
3	QUICK START	
3.1	Ethernet Device Discovery	
3.2	Serial Device Discovery	10
3.3	Decoding Configuration Parameters	
3.3.1	Automatic Setup	12
3.3.2	Advanced Setup	15
3.4	Operating Mode Configuration Parameters	22
3.4.1	Reading Phase	22
3.4.2	Good Read Setup	23
3.5	Output Configuration Parameters	24
3.5.1	Data Formatting	
3.5.2	Output Setup	
4	DL.CODE USER INTERFACE	26
4.1	DL.CODE Device Discovery Window	
4.1.1	Device List Area	
4.1.2	Control/Help Panel	
4.2	DL.CODE Main Menu and Toolbar	
4.2.1	User Levels	
4.3	Multi Image Acquisition Settings	
4.3.1	Automatic Image Settings Selection	
4.3.2	External Image Settings Selection	
4.4	Image Cropping	
4.5	Code Autolearn Feature	
4.6	Image Filtering	
4.6.1	DPM Algorithms	
4.6.2	Image Filters	
4.6.2	Image Filter Setting Examples	
4.6.3 4.7	Matrix Control by Fieldbus Channel	
4.1		94

4.7.1 4.7.2	Fieldbus Input/Output Representation in DL.CODE Digital IO Conditioning	55
4.7.3	Fieldbus Reading Phase Control	
4.7.4	Fieldbus Digital Output Control	
4.7.5	Digital Input Echo to Fieldbus	
4.8	Backup and Restore Through DL.CODE	
4.8.1 4.8.2	Backup	
4.8.3	Restore Replacement	
4.8.3	Replacement	
4.9.1	Restore Default Startup Configuration	
4.9.2	Restore Default Environment	
4.9.3	Restore Factory Defaults	
4.10	Software Reset	
4.11	Web Monitor	
5	DATA COLLECTION METHODS	
5.1	Code Collection	
5.2	Code Combination	
5.3	Code Presentation	
5.4	Match Code	
5.4.1	User Defined	
5.4.2	Input Based.	
5.5	Presentation Mode	75
6	PROTOCOL INDEX	77
6 .1	Overview	
6.2	Including Protocol Index in the Output Message	
6.3	Parsing a Complex Protocol Index Message	79
6.3	Parsing a Complex Protocol Index Message	79
6.3 7	MESSAGE FORMATTING	81
7 7.1	MESSAGE FORMATTING Field Length Management	81 82
7 7.1 7.2	MESSAGE FORMATTING Field Length Management Input Strings	81 82 82
7 7.1 7.2 7.3	MESSAGE FORMATTING Field Length Management Input Strings Field Separator	81 82 82 83
7 7.1 7.2 7.3 7.4	MESSAGE FORMATTING Field Length Management Input Strings Field Separator Independent Diagnostic Messages	81 82 82 83 83
7 7.1 7.2 7.3 7.4 7.5	MESSAGE FORMATTING Field Length Management Input Strings Field Separator Independent Diagnostic Messages. Code Combination Message Formatting Example	81 82 82 83 83 84 86
7 7.1 7.2 7.3 7.4 7.5 7.6	MESSAGE FORMATTING. Field Length Management. Input Strings. Field Separator Independent Diagnostic Messages. Code Combination Message Formatting Example Script Formatter	81 82 82 83 83 84 86 88
7 7.1 7.2 7.3 7.4 7.5 7.6 7.6.1	MESSAGE FORMATTING Field Length Management Input Strings Field Separator Independent Diagnostic Messages	81 82 82 83 83 84 86 88 89
7 7.1 7.2 7.3 7.4 7.5 7.6 7.6.1 7.6.2	MESSAGE FORMATTING Field Length Management Input Strings Field Separator Independent Diagnostic Messages	81 82 82 83 83 84 86 88 89 89
7 7.1 7.2 7.3 7.4 7.5 7.6 7.6.1 7.6.2 7.6.3	MESSAGE FORMATTING Field Length Management	81 82 82 83 84 86 86 89 89 89 90
7 7.1 7.2 7.3 7.4 7.5 7.6 7.6.1 7.6.2	MESSAGE FORMATTING Field Length Management Input Strings Field Separator Independent Diagnostic Messages	81 82 82 83 84 86 86 89 89 89 90
7 7.1 7.2 7.3 7.4 7.5 7.6 7.6.1 7.6.2 7.6.3 7.6.4	MESSAGE FORMATTING	81 82 82 83 84 86 86 88 89 90 94
7 7.1 7.2 7.3 7.4 7.5 7.6 7.6.1 7.6.2 7.6.3	MESSAGE FORMATTING Field Length Management Input Strings Field Separator Independent Diagnostic Messages. Code Combination Message Formatting Example Script Formatter Global Objects Callbacks Objects Reference Script Event Digital Output Control	81 82 82 83 84 86 88 89 89 90 94 94
7 7.1 7.2 7.3 7.4 7.5 7.6 7.6.1 7.6.2 7.6.3 7.6.4 8	MESSAGE FORMATTING	81 82 82 83 84 86 89 90 94 94 95
7 7.1 7.2 7.3 7.4 7.5 7.6 7.6.1 7.6.2 7.6.3 7.6.4 8 8.1	MESSAGE FORMATTING	81 82 82 83 84 86 86 88 89 90 90 94 95 96
7 7.1 7.2 7.3 7.4 7.5 7.6 7.6.1 7.6.2 7.6.3 7.6.3 7.6.4 8 8.1 8.2	MESSAGE FORMATTING. Field Length Management Input Strings. Field Separator Independent Diagnostic Messages. Code Combination Message Formatting Example Script Formatter Global Objects Callbacks Objects Reference Script Event Digital Output Control MONITOR Acessing the Monitor	81 82 82 83 84 86 88 89 90 90 94 95 96 98
7 7.1 7.2 7.3 7.4 7.5 7.6 7.6.1 7.6.2 7.6.3 7.6.4 8 8.1 8.2 8.2.1	MESSAGE FORMATTING. Field Length Management Input Strings. Field Separator Independent Diagnostic Messages Code Combination Message Formatting Example Script Formatter Global Objects Callbacks Objects Reference Script Event Digital Output Control MONITOR Acessing the Monitor Monitoring Statistics Statistics Settings Monitoring Diagnostic Alarms	81 82 82 82 82 83 84 86 88 89 90 94 94 95 95 98 98 98 98
7 7.1 7.2 7.3 7.4 7.5 7.6 7.6.1 7.6.2 7.6.3 7.6.4 8 8.1 8.2 8.2.1 8.3 8.4 8.4.1	MESSAGE FORMATTING	81 82 82 83 84 86 89 90 94 95 95 95 96 98 98 9101 101
7 7.1 7.2 7.3 7.4 7.5 7.6 7.6.1 7.6.2 7.6.3 7.6.4 8 8.1 8.2 8.2.1 8.3 8.4	MESSAGE FORMATTING	81 82 82 83 84 86 89 90 94 95 95 95 96 98 98 9100 101 101
7 7.1 7.2 7.3 7.4 7.5 7.6 7.6.1 7.6.2 7.6.3 7.6.4 8 8.1 8.2 8.2.1 8.3 8.4 8.4.1 8.4.2	MESSAGE FORMATTING	81 82 82 83 84 86 88 89 90 90 94 95 95 96 98 98 100 101 101
7 7.1 7.2 7.3 7.4 7.5 7.6 7.6.1 7.6.2 7.6.3 7.6.4 8 8.1 8.2 8.2.1 8.3 8.4 8.4.1 8.4.2 9	MESSAGE FORMATTING Field Length Management Input Strings Field Separator Independent Diagnostic Messages Code Combination Message Formatting Example Script Formatter Global Objects Callbacks Objects Reference Script Event Digital Output Control MONITOR Acessing the Monitor Monitoring Statistics Statistics Settings Monitor Images Options View Window	81 82 82 82 82 84 86 88 89 90 94 95 95 96 98 98 90 98 101 101 101
7 7.1 7.2 7.3 7.4 7.5 7.6.1 7.6.2 7.6.3 7.6.4 8 8.1 8.2 8.2.1 8.3 8.4 8.4.1 8.4.2 9 9.1	MESSAGE FORMATTING. Field Length Management Input Strings. Field Separator Independent Diagnostic Messages. Code Combination Message Formatting Example Script Formatter Global Objects Callbacks Objects Reference Script Event Digital Output Control MONITOR Acessing the Monitor Monitoring Statistics. Statistics Settings Monitor Images Options. View Window IMAGE SAVING Device Image Buffer	81 82 82 82 82 83 84 86 88 89 90 94 94 95 95 96 98 98 90 98 100 101 101 102 102
7 7.1 7.2 7.3 7.4 7.5 7.6 7.6.1 7.6.2 7.6.3 7.6.4 8 8.1 8.2 8.2.1 8.3 8.4 8.4.1 8.4.2 9	MESSAGE FORMATTING Field Length Management Input Strings Field Separator Independent Diagnostic Messages Code Combination Message Formatting Example Script Formatter Global Objects Callbacks Objects Reference Script Event Digital Output Control MONITOR Acessing the Monitor Monitoring Statistics Statistics Settings Monitor Images Options View Window	81 82 82 83 84 86 89 90 90 90 94 95 95 96 98 100 101 101 101 101 102 102 103

9.1.3 9.1.4 9.1.5 9.2	Image Saving On Demand to WebSentinel FTP Server Image Saving On Demand Using Send Images HMP Command Image Saving Using Internal Buffer UI Image Buffer.	106 107
10.2.2 10.2.3	MULTI DEVICE CONFIGURATION OPTIONS Pass-through Configurations Internal Network Configurations Multidata ID-NET Network Configurations Synchronized ID-NET Network Configurations Verify Master/Slave Synchronized Configuration Alternative Device Role Selection	110 112 116 122 127
11.2.2 11.2.3 11.2.4	PACKTRACK CALIBRATION	132 133 133 134 134 135 135 136
12 12.1 12.2	DPM DPM Autolearn Pre Configuration	146
13.6 13.6.1 13.7 13.7.1 13.8	ISO/IEC TR 29158 (AIM DPM 2006) Quality Guideline Code Quality Scan Grade Parameters ISO/IEC 15415 Standard Code Quality Scan Grade Parameters ISO/IEC 15416 1D Standard Code Quality Scan Grade Parameters Code Grading Example Using ISO/IEC 16022 and ISO/IEC 18004 Standards	147 148 149 151 152 152 155 155 157 157
14 14.1 14.2 14.3 14.4 14.5	DEVICE CONFIGURATION SETTINGS Accessing Device Configuration Settings Statistics WebSentinel Configuration SC5000 Configuration Crisplant Protocol Configuration	161 162 162 163
15 15.1 15.2 15.3 15.4	DEVICE ENVIRONMENT SETTINGS Accessing Device Environment Settings Ethernet Settings Internal Network Settings X-PRESS Configuration	166 167 167

15.6	PackTrack Calibration LED Configuration Maintenance Settings	
16	MAINTENANCE	171
17	TROUBLESHOOTING	172

REFERENCES

CONVENTIONS

This manual uses the following conventions:

"DL.CODE" refers to the Datalogic User Interface client application running on a PC.

"User" or "Installer" refer to anyone using DL.CODE.

"Device" refers to physical devices used in the reading stations: i.e. Matrix readers.

"You" refers to the System Administrator or Technical Support person using this manual to install, configure, operate, maintain or troubleshoot a plant equipped with DL.CODE.

REFERENCE DOCUMENTATION

The documentation related to DL.CODE is listed below:

- Device specific Help On Line
- This User's Manual

SUPPORT THROUGH THE WEBSITE

Datalogic provides several services as well as technical support through its website. Log on to **www.datalogic.com** and click on the <u>SUPPORT</u> > <u>Unattended Scanning Systems</u> category link. From this page you can select your product from the dropdown list which gives you access to:

- Downloads including Data Sheets, Manuals, Software & Utilities, and Drawings;
- <u>Repair Program</u> for On-Line Return Material Authorizations (RMAs) plus Repair Center contact information;
- Service Program containing details about Maintenance Agreements;
- <u>Technical Support</u> through email or phone.

1 INTRODUCTION

DL.CODE software is a User Interface client application that provides reading device configuration for Stand Alone, and Master/Slave configurations. It is installed in and runs on Windows-based PCs (usually laptops), and connection takes place through an Ethernet TCP/IP interface.

It also provides visual monitoring of images that can be stored in an Image Database either locally on the device or to the local or a remote PC.

DL.CODE provides PackTrack Calibration for omnidirectional reading and tracking stations used in Logistics applications.

DL.CODE offers statistic and diagnostic information at reading station level whether the station is made up of a single reader or several readers connected in a Master Slave configuration.



Figure 1 – Main Window Areas

1.1 MAIN FEATURES

A summary of the DL.CODE main features is listed below:

- Simultaneous Device Monitoring from different remote PCs
- 3 different User access levels
- User and Session Language configuration in real time
- System configuration
- Dynamic content and automatic page update

1.2 CONFIGURATION AND MONITORING SESSIONS

Device configuration can be performed using DL.CODE running on a remote PC through a single session. Multiple instances of DL.CODE cannot be run on a PC and once a device is connected for configuration it cannot be accessed by another PC running DL.CODE.

However the Monitoring feature can be accessed simultaneously by several PCs running DL.CODE.

1.3 SIMULATORS

DL.CODE has different device prototypes which can be loaded as Offline devices. This allows offline configurations to be prepared and loaded to a device at a later time.

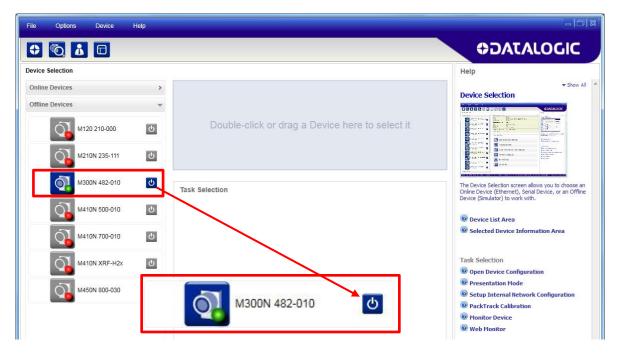


NOTE: Creating and saving offline configuration (.dlcfg) files and then loading them onto physical devices can be done but the following precautions should be followed:

- Due to differences in image sensors, internal memory, etc., it is **strongly** suggested to use the same family product as the device to be configured.
- The following parameter groups may need to be adjusted: Advanced Setup Image Settings, Reading Phase, Output Setup.
- Advanced Setup Code Settings, Good Read, and Data Formatting will be maintained.

To load a Simulator, Click on the *Offline Devices* tab at the bottom of the Device List Area to open the list of available simulators.

All of the simulators are offline by default. To select a reader click its Simulator Power button icon.



Now you can double-click or drag the simulator into the Selected Device Information Area and begin a new configuration. See Chapter 3.

1.4 DEVICE CONFIGURATION

DL.CODE is designed to simplify standard configuration by grouping the basic functions into three major parameter groups: <u>Decoding</u>, <u>Operating Mode</u>, and <u>Output</u>.

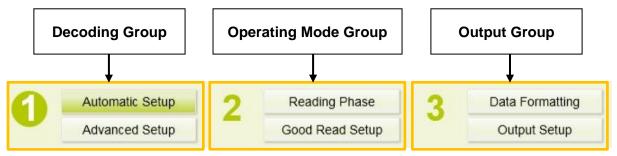


Figure 2 – DL.CODE Configuration Groups

Each major group is sub-divided into two parts as follows:

1. Decoding:

- Automatic Setup: this is a new feature that provides a one-step process for automatically setting the photometry for image acquisition (Image Setting) and the code symbology selection (for a single code type). Click on **Start Automatic Setup** to start the procedure. It is particularly useful for DPM applications and requires no calibration. See chapter 12.
- Advanced Setup: this group completely manages:

Image Setting parameters, including **Image Auto Setup** for photometry, multiple Image Settings, **Focus Autolearn** for liquid lens models, a **Focus Calibration** tool with oscilloscope for manual focusing and a **PPI** acquisition tool for calibration.

General Settings including Processing Time and Code Grading parameter management.

Code Symbology selection and configuration including Code Filtering parameters and a Code Localization tool. It also contains the **Code Autolearn** routine to find one or more unknown code symbologies on an acquired image.

The image Cropping Region Area tool is available to this group to help speed up decoding.

2. Operating Mode:

- Reading Phase: this group manages the operating mode for image acquisition.
- Good Read Setup: this group manages data collection: <u>Code Collection</u>, <u>Code</u> <u>Combination</u>, <u>Code Presentation</u>, or <u>Match Code</u>.

3. Output:

- Data Formatting: this group manages the output message to the Host.
- Output Setup: this group manages the digital outputs as well as the Green/Red Spots.

2 INSTALLATION

2.1 DL.CODE DISTRIBUTION CONTENTS

The DL.CODE program distribution contains the following:

- Complete Installation of DL.CODE
- .NET Framework (if not already present)
- This manual

2.2 HARDWARE REQUIREMENTS

Typical hardware requirements for a DL.CODE Client PC are:

- 2.00 GHz or faster microprocessor
- 1 GB RAM
- 2 GB hard disk for 64-bit machines; 1 GB hard disk for 32-bit machines
- 100 Base-T Ethernet
- One 19" or larger monitor (optimized for 1280x1024 resolution)

2.3 SOFTWARE REQUIREMENTS

- One of the following Windows Operating Systems (32 or 64-bit):
 - Windows XP
 - Windows 7
 - Windows 8
 - Windows 10
- Web Browser: Google Chrome, Mozilla Firefox, Microsoft Internet Explorer, Opera, etc.



NOTE: The Google Chrome Web Browser is recommended for its superior performance characteristics.



CAUTION: DL.CODE does not currently support Windows Embedded (often used in industrial PCs and/or PLCs).

2.4 INSTALLING DL.CODE



NOTE: Starting from version 1.5.0, multiple versions of DL.CODE can be installed on the same PC. Each version will be installed in its own folder **however only one version can be run at a time**.

2.4.1 Standard Installation

1. On the PC that will be used for configuration, (running Windows XP SP3, 7, 8; or 10), download the DL.CODE mini-DVD .zip file. Extract the files maintaining the folder structure and run the **start.hta** file to access the installation pop-up. Click on the **Install DL.CODE** link to run the installation program and follow the installation procedure.



NOTE: If you need to configure Serial models, check the RS232 Serial Port Driver installation box in the Welcome window of the DL.CODE Installer.



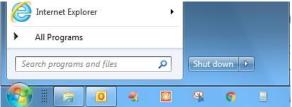
NOTE: If you need to configure USB models, check the Matrix USB Driver installation box in the Welcome window of the DL.CODE Installer and follow the procedure given in the specific reader Reference Manual.

2. When the installation is complete the DL.CODE entry is created in the Start>Programs bar under "Datalogic" as well as a desktop icon. Double-click the desktop icon to run it.

2.4.2 Silent Installation

A silent installation which requires no input from the user can be run from a command line prompt. You must have Administrator rights on the PC for this installation. There are two options:

- Quiet: this does not display any user interface.
- Passive: this displays the user interface but proceeds without requiring any user input.
- 1. Open a command line prompt from the Windows Start Menu by typing "cmd" in the search box:



- 2. Set the directory to where the extracted DL.CODE setup package is located.
- 3. Invoke the package with double quotes "" and either /passive or /quiet switches.



2.5 UNINSTALLING DL.CODE

To completely uninstall DL.CODE including software drivers from your PC you must use the following sequence:

- 1. Uninstall all versions of DL.CODE from your PC from the Control Panel.
- 2. Uninstall the com0com driver from the com0com folder in Windows Start Menu All Programs.
- 3. Uninstall the USBCOMInstaller from the Control Panel.
- 4. Uninstall the cdcecmInstaller from the Control Panel.



2

NOTE: Trying to uninstall software drivers before all versions of DL.CODE are uninstalled will cause an error.

3 QUICK START

To help you get started, here is an example configuration demonstrating the basic steps of DL.CODE configuration.

To configure your device for your application using DL.CODE, the following preliminary steps are assumed:

- The reading device(s) are installed and running.
- DL.CODE is installed and running (chapter 2).

3.1 ETHERNET DEVICE DISCOVERY



NOTE: To discover Serial models see par. 3.2. To discover USB models, see the specific reader Reference Manual for details.

The User Interface opens and displays a list of all the devices belonging to the Local Area Network. DL.CODE has a discovery feature to accomplish this task.

vice Selection	Help
Nine Devices SN: C13L02652 M300N 172 27.102.18; Matrix SN: C14005274 M300N 172 27.102.16; Matrix SN: C14002559	ect it
M300N 172.27.101.190; Matrix Image: Shi Citebools I	The Device Selection screen allows you to choose a Online Device (Ethernet), Serial Device, or an Offin Device (Simulator) to work with.
M210N 172.27.30.157; Matrix SN: C14PD0452 M300N 192.168.3.100; Matrix SN: C14PD0530 M450: 172.27.103.130; Galadriel	Task Selection Open Device Configuration Presentation Mode Setup Internal Network Configuration AckTrack Calibration
M300N 172.27.101.153; Matrix SN: C15P00088	Pack rack caluration Monitor Device Web Monitor

Figure 3 – Device Discovery

The discovery feature will also show devices not belonging to the LAN and display them in grey (see Figure 3).

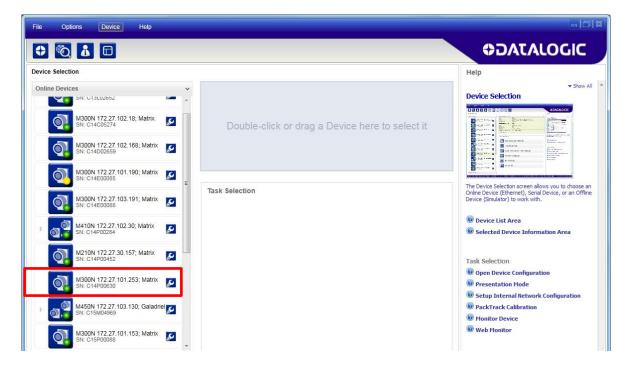
The following procedure will demonstrate an example configuration.

- 1. First, the device must be added to the LAN by aligning its IP Address to the network. The network administrator should provide valid LAN address(es).
- 2. Click on the device wrench icon *solution* to open the Device Environment Configuration window.
- 3. Change the Ethernet Settings (IP Address, Subnet Mask, Gateway Address etc.) according to the network requirements. See also Figure 4 below.

Device Environment	Configuration	Device Environment	Configuration
Ethernet Settings	~	Ethernet Settings	*
MAC Address	00:07:BE:01:25:FE	MAC Address	00:07:BE:01:25:FE
Use DHCP		Use DHCP	
IP Address	192 🗣 168 🗣 3 🗣 100 🗣	IP Address	172 🔹 27 👟 101 👟 253 🗣
Subnet Mask	255 👟 255 👟 255 👟 0 🖨	Subnet Mask	255 😧 255 文 0 文 0 🗣
Gateway Address		Gateway Address	0 🔹 0 🛋 0 🛋 0
DNS1 Address		DNS1 Address	
Local Area Connectio	on A	Local Area Connectio	on
IP Address	172.27.30.183	IP Address	172.27.30.183
Subnet Mask	255.255.0.0	Subnet Mask	255.255.0.0
Loopback Pseudo-Int	terface 1	Loopback Pseudo-Int	terface 1 ^
IP Address	127.0.0.1	IP Address	127.0.0.1
Subnet Mask	255.0.0.0	Subnet Mask	255.0.0.0
OK	Cancel	ОК	Cancel
			Cancer

Figure 4 - Device Environment Configuration Window

4. Click OK; the device will reappear in the list of Online Devices (in color) meaning it is now part of the LAN and can be configured. The new IP address will also be displayed.



5. Double-click on or drag the device icon into the Selected Device Information Area. Details about the device will be displayed in this area.

evice Selection		
A service of the serv		Help
nline Devices Selected Device Deta	iils	▲ Show A
SN: 013L02652 Mame	Matrix	Device Selection
Model	M300N 434-010 LNS-12 RED NARR STD	
M300N 172.27.102.18; Matrix Z	Alone	And a second sec
SN: C14C05274 March Internal Network Role	Slave	
Status	Default Running	
M300N 172.27.102.168; Matrix Startup Info	ОК	A CONTRACTOR OF A CONTRACTOR O
IP Address	172.27.101.253	
Application SW Version	n 1.5.0.517-BETA05	
M300N 172.27.101.190; Matrix Se Loader Version	1.38	
M410N 172.27.102.30; Matrix SN: C14P00284	evice Configuration	Device List Area O Selected Device Information Area
M210N 172.27.30.157; Matex 🗾 🔤	ation Mode	
Setup In	ternal Network Configuration	Task Selection Open Device Configuration
M300N 172.27.101 33; Matrix Packtrac	ck Calibration	 Presentation Mode Setup Internal Network Configuration
M450N 172.27.103.130; Galadriel SN: C15M04969 Monitor	Device	PackTrack CalibrationMonitor Device
M300N 172.27.101.153; Matrix SN: C15P00088	nitor	Web Monitor



NOTE: After device discovery, configure your device through DL.CODE as described in paragraphs 3.3, 3.4 and 3.5.

3.2 SERIAL DEVICE DISCOVERY

Starting from DL.CODE 1.4.0, serial port communication is supported for device discovery and configuration. This allows dedicated serial communication models to be configured through DL.CODE.



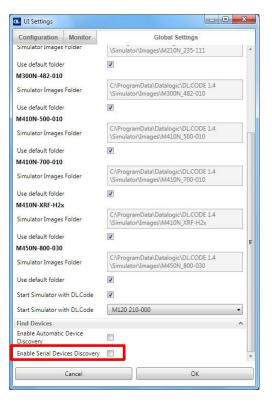
3

NOTE: Although this feature allows all devices to be configured through their Serial Interface, be aware that transmission speeds and some DL.CODE features are limited when using this interface. It is always advised to use the Ethernet interface whenever possible.

This feature is not enabled by default, so the first thing to do is to enable it through the UI Settings window.

- 1. From the main menu open the Options>UI Settings window.
- 2. Click on the Global Settings menu and scroll down to the Find Devices tab.
- 3. Check the Enable Serial Device Discovery box. Scroll down to see the following selections.
- 4. Select the Serial communication parameters according to your application.

Configuration Monitor		Global Settings	
Log Options			~
Simulator Settings			~
Find Devices	_		^
Enable Automatic Device Discove	ry		
Enable Serial Devices Discovery			
Serial Parity	None		*
Serial Data Bits	8		•
Serial Stop Bits	1		•
Baud Rate 921600	1		
Baud Rate 460800			
Baud Rate 230400			
Baud Rate 115200			
Baud Rate 57600			
Baud Rate 38400			
Baud Rate 19200			
Baud Rate 9600			
Baud Rate 4800			
Baud Rate 2400			
Baud Rate 1200			
Cancel		OK	





NOTE: If you're not sure of the Serial baud rate you can also check the Enable Automatic Device Discovery box which for serial devices will try communication at all baud rates, but only at **N**o parity, **8** data bits;**1** stop bit. Enabling this parameter can notably lengthen Discovery time, therefore in general it is better to disable it to increase Discovery efficiency.

5. Click OK to return to DL.CODE and click on the Getting Started icon.

6. Open the Serial devices tab and double-click on or drag the device icon into the Selected Device Information Area.

ile Options Device Help		- 6
0 1		OIDOJATAGO
Device Selection		Help
Online Devices		▼ Show All
Serial Devices		Device Selection
M300N COM12; Matrix SN: C15P00088	Double-click or drag a Device here to select it	
	Task Selection	The Device Selection screen allows you to choose an Online Device or a Simulator to work with.
		Ø Device List Area
		Selected Device Information Area
		Task Selection
		Open Device Configuration
		Setup Internal Network Configuration PackTrack Calibration
		Monitor Device
Offline Devices 3		
vice Model : Configuration Schema Release : User : I	nstaller-Expert	DL.CODE 1.4.0.2

The device is now connected to the DL.CODE Configuration environment. Configure your device through DL.CODE as described in paragraphs 3.3, 3.4 and 3.5.

ice Selection			Help
line Devices	> Selected Device Details		▲ Show i
rial Devices	Name	Matrix	Device Selection
	Model	M300N 435-010 LNS-16 RED NARR STD	
M300N COM12; Matrix	Layout Type	Alone	
SN: C15P00088	Internal Network Role	Slave	
	Status	Phase Mode Running	Contraction of the second seco
	Startup Info	OK	Constant of the second se
	Serial Port	COM12	Balance and an Albert State State State
	Application SW Version	1.4.0.1101	
	Loader Version	1.38	CONTRACTOR DE LA CONTRA
		Device Configuration	Task Selection Open Device Configuration Setup Internal Network Configuration
	Setup	Internal Network Configuration	
	Packtr	ack Calibration	PackTrack Calibration Monitor Device
	Monito	or Device	

3.3 DECODING CONFIGURATION PARAMETERS

The Decoding Configuration parameters are divided into two groups: Automatic Setup and Advanced Setup.

 Automatic Setup provides an automatic procedure for setting optical/illumination and code definition parameters to obtain the most stable decoding conditions for a single code symbology based on the images presented to the reader. It can be set to include Image Filters if necessary. See the table below for codes and filters managed by Automatic Setup. Automatic Setup is especially useful for DPM applications.

Enabled 1D Codes	Enabled 2D Codes	Enabled Filters
CODE 128	DATAMATRIX ECC 200	ERODE 3x3, 5x5 and 7x7
EAN 128	QR	DILATE 3x3, 5x5 and 7x7
CODE 39	MICRO QR	SMOOTHING
CODE 93	AZTEC	
CODABAR	MAXICODE	
PDF417	DOTCODE	
MICRO PDF417		
GS1 DATABAR		
GS1 DATABAR STACKED		
GS1 DATABAR LIMITED		
GS1 DATABAR EXPANDED		
GS1 DATABAR EXPANDED STACKED		
UPCEAN FAMILY EAN13		
UPCEAN FAMILY EAN8		
UPCEAN FAMILY UPCA		
UPCEAN FAMILY UPCE		

 Advanced Setup provides access to the complete array of optical/illumination and code definition parameters that can be fine-tuned semi-automatically and manually to obtain the best results for applications of any complexity.





NOTE: If your application requires multiple code symbologies, multiple image settings, Code Grading or other parameter settings for decoding, then use the Advanced Setup, see. par. 3.3.2.

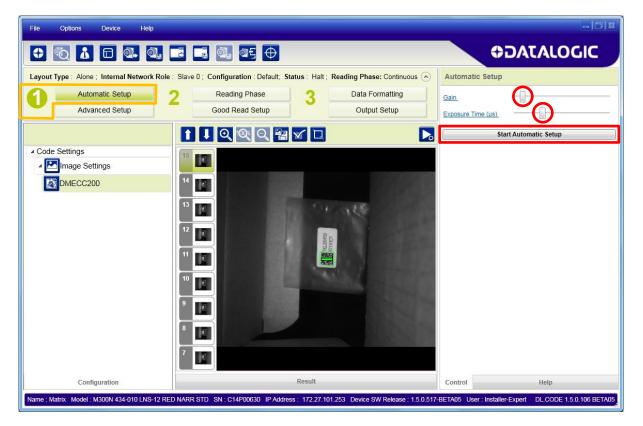
3.3.1 Automatic Setup

To begin configuration, the reader must be correctly mounted so that its Field of View covers the application reading area.

- 1. From the Task Area select Open Device Configuration.
- 2. The Open Device Configuration window opens showing the list of currently saved configurations (jobs) saved on the device. For new devices, the only saved job is the Default configuration. Click OK. The device enters run mode and begins acquiring images.

Task Selection	C Open Device Configuration	X
Open Device Configuration	Default	
Presentation Mode		
Setup Internal Network Configuration		
Packtrack Calibration		
Monitor Device		
Web Monitor	Set as Startup Configuration	Cancel

- 3. Place the application code in front of the reader at the correct application reading distance.
- 4. Click on the Pause button **u** to stop image acquisition.





NOTE: If the image display area is too dark to see the images being captured, you can drag the Gain and Exposure Time sliders (circled in red in the figure above) to the right to increase visibility. This will not affect Automatic Setup.

5. Click on the Start Automatic Setup button. The following window is displayed.



- 6. Select the correct reading conditions: Static or Dynamic Tuning, 1D or 2D code, Include Image Filtering (to find the best decoding condition).
- 7. Click Start to begin the procedure. The reader begins acquiring images. At the end of the procedure the **Status: Completed** message appears. You can Close the window.



Your reader is now optimized for decoding. Continue with the Operating Mode configuration described in par. 3.4.

3.3.2 Advanced Setup

If your application requires multiple code symbologies, multiple image settings or other parameter settings for decoding, then use the Advanced Setup.

- 1. Click on the Advanced Setup button and press the Play icon **D**.
- 2. Place the **Grade A Barcode Test Chart** in the reading area. Once positioned, stop image acquisition by clicking on the Pause button **II**.

Image: Status - Advanced Setup - DMECC200	9
Lavout Type : Alone : Internal Network Role : Slave 0 : Configuration : Tempi: Status : Run : Reading Phase: Continuous (A) Advanced Setup : DMECC200	
Automatic Setup 2 Reading Phase 3 Data Formatting Code Symbology Setup	^
Advanced Setup Good Read Setup Output Setup DMECC200	*
Code Settings Grey Level Calibration	
	-
Code Contrast Standard - Code Grad	ng 👻
	-
9 • Code Size Free	-
Source Size Free Advanced Box Improvement	
7 T T T T T T T T T T T T T T T T T T T	*
Linage Processing Order Code Localization Box	~
0.38 mm	
Configuration Focus Calibration Result Console Control Help	
Configuration Pocus Calibration Result Consule Consule Control Help	TADE

3. Click the Image Settings branch and then click the Image Auto-Setup button to automatically acquire the best exposure time and gain values.

File Options Device Help					- C ×
0 1 0 0	2 II 🕼 📭 🕂			ACO	TALOGIC
Layout Type : Alone ; Internal Network Role	: Slave 0; Configuration : [Temp]; Stat	us : Halt ; Reading Phase: Continuous	\odot	Advanced Setup	: Image Settings
Automatic Setup	2 Reading Phase	3 Data Formatting		Image Quality	^
Advanced Setup	Good Read Setup	Output Setup		Image Polarity Inver	
				Exposure Time (µs)	150 🛋
Code Settings				Gain	8 🗸
Image Settings	° 1		-	Gain Multiplier	X1 💌
General Settings - Code Grading	7		2	Internal Lighting	Very High-Power Strobed
DMECC200				Ima	ge Auto-Setup
				Image Density(PPI)	^
	5 E 800	0.30 mm		PPI	230 🔦
				Cropping Region A	Acquire PPI
				cropping region A	
	3	0.33 mm			
	2				
		6.38 mm			
	20				
Configuration	Focus Calibration Result	Console		Control	Help
Name : Matrix Model : M300N 434-010 LNS-12 RE	D NARR STD SN : C14P00630 IP Address	: 172.27.101.253 Device SW Release : 1.5.0	.517-BET/	A05 User : Installer-Ex	pert CODE 1.5.0.106 BETA05

4. Select the Static or Dynamic Self-Tuning option; Start the Image Auto Setup and Apply to the Image Settings.

	uto-Setup on current Image Setting reading options: in case of Dynamic option esolution according to your application.
© Static	
Oynamic	
Line Speed (mm/sec)	1000 🖨
Code Resolution (mm)	0.30
<u> </u>	
	22 22 22

File Options Device Help		= C X
		⇔ DATALOGIC
Layout Type : Alone ; Internal Network Role :	Slave 0; Configuration : [Temp]; Status : Halt ; Reading Phase: Continu	nuous 🕥 Advanced Setup : Image Settings
Automatic Setup	2 Reading Phase 3 Data Format	atting Image Quality ^
Advanced Setup	Good Read Setup Output Set	
	1 🕽 🔍 🔍 🔍 🔚 🖌 🗔 🏭	Exposure Time (µs) 250 🐑
✓ Code Settings		Gain 4
Image Settings	10	Gain Multiplier X1
		Internal Lighting Very High-Power Strobed -
		Image Auto-Setup
		Image Density(PPI)
	0.00 0.30 mm	PPI 230 💉
		Acquire PPI Cropping Region Area
		Copping region Area
	8.33 mm	
	8/10 0.38 mm	
	Facus Calibration Deput	
Configuration	Focus Calibration Result Console	Control Help
Name : Matrix Model : M300N 434-010 LNS-12 RED	ONARR STD SN : C14P00630 IP Address : 172.27.101.253 Device SW Release	ise : 1.5.0.517-BETA05 User : Installer-ExpertCODE 1.5.0.106 BETA05

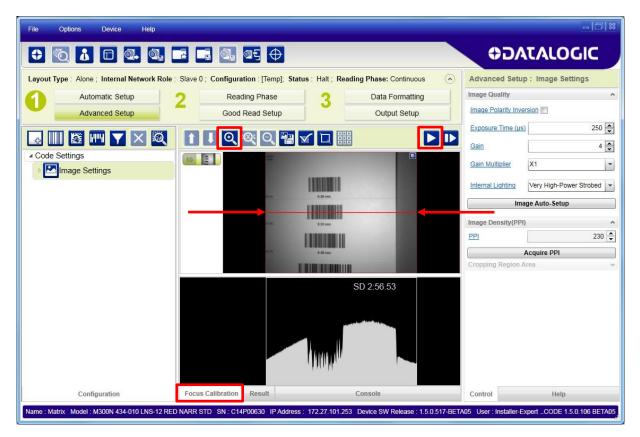


NOTE: For applications having multiple lighting or code reading conditions, up to 10 different Image Settings can be configured by adding them with the icon.

For the next step you need to enable the Focus Calibration Tool from the Options>UI Settings Configuration tab if not already enabled.

Configuration Mo	nitor		Global Set	ttings	
Console Settings					*
UI Image Buffer					`
Local Images Folder S					
Max. Downloaded Imag size (MB)	ges folder				256 💂
DPM Images Databas	e				`
View Window					
UI Image Buffer					
Console		1			
Simulator Window					
Result		1			
Focus Calibration					
DPM Images Database		J			
Display Phase on Imag	e				
Display Image Reso <mark>lu</mark> ti	on				
Automatically start Rur Configuration	Mode in				
Display Image Name					
Packtrack Calibration					,
Device Recalibration					,
Canc	1944 A			OK	

5. Now click on the Focus Calibration tab at the bottom of the window. The oscilloscope view is shown in the bottom panel and can be used for manual focus adjustment.



The red line in the image panel above the oscilloscope must pass through the code. You can click and drag the red line vertically to reposition it over the code.



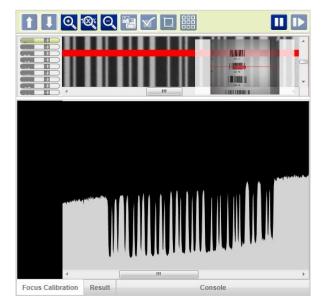
NOTE: To enlarge the visual image of the code and the oscilloscope views, you can drag the Focus Calibration window up and click on the zoom image

icon 🔍 repositioning it on the code.

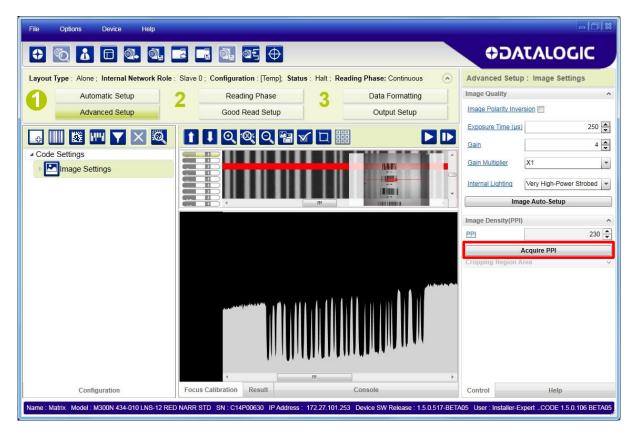
While in run mode, manually adjust the focus until the bars relative to the code in the oscilloscope demonstrate their maximum length (focus).

You can also see the visual focus on the code view.

When focused, click Pause to stop image acquisition.



6. Click the **Acquire PPI** button to automatically set Image Density so that reader will function correctly and to the fullest extent of its capabilities. This procedure is necessary for first time installations, or if the focal distance is changed.



- | **-** | × Device Hein File Options DATALOGIC **. .** बर्⊒ ⊕ 0 0 c) ٥Ô Layout Type : Alone ; Internal Network Role : Slave 0 ; Configuration : [Temp]; Status : Halt ; Reading Phase: Continuous Advanced Setup : Image Settings (~ Image Quality Automatic Setup Reading Phase Data Formatting 3 1 Image Polarity Inversion Advanced Setup Good Read Setup Output Setup Exposure Time (µs) 250 0.000 2 📲 🖌 🗆 🎬 4 Gain ▲ Code Settings X1 Gain Multiplier -Image Settings ALC U 112 Very High-Power Strobed 💌 Internal Lighting Image Auto-Setup PPI acquired 202 🗘 PPI OK Acquire PPI Cropping Region Area Configuration Focus Calibration Result Control Help Name : Matrix Model : M300N 434-010 LNS-12 RED NARR STD SN : C14P00630 IP Address : 172 27.101 253 Device SW Release : 1.5.0.517-BETA05 User : Installer-Expert _CODE 1.5.0.106 BETA05



3

NOTE: At this point it is probably a good idea to save the configuration from temporary memory to permanent memory giving it a specific name.

File Options Device Help	
	ODATALOGIC
Layout Type: Alone : Internal Network Role : Slave 0; Configuration : Default; Status : Halt; Reading Phase: Continuous Automatic Setup Advanced Setup Advanced Setup Save New Configuration (Enter Configuration Name) Station 1 Our overwrite an existing configuration Code Settings General Settings - Code Grading DMECC200 Set as Startup Configuration V Set as Startup Configuration	Advanced Setup : Image Settings Image Quality Image Polarity Inversion Exposure Time (us) 150 Gain Gain Multiplier X1 Internal Lighting Very High-Power Strobed Image Auto-Setup Image Density(PPI) PPI 202 Cropping Region Area V

7. Now place an application specific code in front of the reader and only click the Image Auto-Setup button to register any changes in lighting or code surface contrast.

Do not repeat Focus Calibration or PPI.

8. Click on the Data Matrix ECC 200 symbology under the Image Settings branch (enabled by default). If this symbology is among those in your application it will be shown in the image display with its code symbology name and a green box around it indicating it is decoded.





NOTE: The large green box for each symbol indicates the code localization area which by default is equal to the maximum FoV. It can be resized and moved by dragging its borders with the mouse. The code must be found within this area in order to be decoded.

Add your application specific codes to the Code Settings by selecting them from the icons over the Configuration Parameters tree area. If the Data Matrix symbology is not used, then delete it from the Code Settings with the x icon.

If you don't know the code type you can use the Code Autolearn feature by clicking on the icon. See par. 4.5 for details.

10. For each code symbology set the relative parameters according to your application.

3.4 OPERATING MODE CONFIGURATION PARAMETERS

The Operating Mode Configuration parameters are divided into two groups: **Reading Phase** parameters and **Good Read Setup** parameters.



3.4.1 Reading Phase

3

1. Select your application specific Operating Mode from the icons over the Configuration Parameters tree area: Continuous, One Shot, Phase Mode or PackTrack.

Image: Solution Trype Image: Solution Tryp	File Options Device Help			-15	×
1 Automatic Setup 2 Reading Phase 3 Data Formatting Advanced Setup Good Read Setup Sutput Setup Periodic (ms) Dearmal Image: Phase Image: Phase Image: Phase Image: Phase Periodic (ms) Dearmal Image: Phase Image: Phase <td< th=""><th></th><th></th><th></th><th>♥DATALOGIC</th><th></th></td<>				♥DATALOGIC	
	Automatic Setup Advanced Setup Advanced Setup Reading Phase General Settings Acquisition Trigger Phase On Phase Off Channels Fieldbuses Inputs Input 1 Input 2 Sensors Data Collection Type	Reading Phase Good Read Setup	3 Data Formatiling Staliput Setup	Trigger Type Continuous Periodic (ms) External Trigger Delay Delay (ms) External Trigger Delay Delay Type on External Trigger External Trigger Source Matrix TCP Server Matin Aux. ID-Net Input 1. Leading	< + <
Name : Matrix Model : M300N 434-010 LNS-12 RED NARR STD SN : C14P00630 IP Address : 172.27.101.253 Device SW Release : 1.5.0.517-BETA05 User : Installer-Expert CODE 1.5.0.106 BETA05				- The state of the	

2. Configure the relative Operating Mode parameters from the Reading Phase parameters panel. Different groups will appear in the panel depending on the selected icons over the Configuration Parameters tree area.

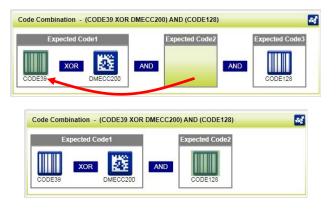
3.4.2 Good Read Setup

 Select your specific data collection type from the icons over the Configuration Parameters tree area: Code Collection, Code Combination, Code Presentation or Match Code. Not all data collection types are available for all Operating Modes; for example PackTrack Operating Mode only supports Code Combination. Incompatible data collection types will be shown in grey and cannot be selected.

The following example shows Code Combination. By default, the Expected Codes (when more than one code type is selected), are in logical AND, which means that all codes are required to be decoded to produce a Good Read condition.

File Options Device Help				
			¢⊃/	ATALOGIC
Layout Type : Alone ; Internal Network Role	Clave 0, Configuration [Temp], Status . Hait, Reading	Phase Phase Mode	Good Read Setu	p: Code Combination
Automatic Setup	2 Reading Phase 3	Data Formatting	No Read	Enabled
Advanced Setu	Good Read Setup	Output Setup	Partial Read	Treat as No Read
💹 🎿 🎯 🕅			Multiple Read	Disabled
Code Settings	Code Combination - (DMECC200) AND (CODE39) AND (CO		Analysis	Within Phase
Image Settings		Expected Code3	Minimum Phase Dura	ation (ms) 0
₿ 2 DMECC200		Specied Codes	Send Data On	Analysis Complete
CODE39				
CODE128	DMECC200 CODE39	CODE128		
 Services Data Collection Type 	Output Data Channels			
Ref Code Combination	Kessage1 Nessage1	Aatrix TCP Server		
	Message2	Main 🚆		
	No Read	Aux 🕎		
		ID-Net		
Configuration	Events Result Console		Control	Help
Name : Matrix Model : M300N 434-010 LNS-12 REI	0 NARR STD SN : C14P00630 IP Address : 172.27.101.253 De	vice SW Release : 1.5.0.517-BE	TA05 User : Installer-	ExpertCODE 1.5.0.106 BETA05

2. If a Good Read condition should be produced when any single code is decoded, independent from the others, then they need to be combined in logical XOR. To do this, drag the code icon(s) from their relative Expected Code box into the Expected Code box of the XOR combination you wish to create. Then delete the empty box by selecting it with the mouse (highlighted) and pressing the delete key on your keyboard.



To create a logical AND condition from a logical XOR, create a new Expected Code box using the icon. Then drag the desired code icon from one box to the other.



3.5 OUTPUT CONFIGURATION PARAMETERS

The Output Configuration parameters are divided into two groups: **Data Formatting** parameters and **Output Setup** parameters.



3.5.1 Data Formatting

1. Configure your application specific Data Formatting Message(s) from the Configuration Parameters tree area: Message 1, Message 2, etc.

File Options Device Help			
			с
Layout Type : Alone ; Internal Network Role	Claus 0 + Configuration + [Temp]; Etatus + Halt + Reading Phaser Phase Mode	Data Formatting : Message 1	
Automatic Setup	Reading Phase Data Formatting	Header <stx></stx>	6
Advanced Setup	Good Read Setup Output Setup	Terminator <cr><lf></lf></cr>	6
	💥 O 🖪 🖊 🗸 🦉 🕨 🕨	Output Channels	^
Output Data Format		Matrix TCP Server	
General Settings	Message 1 Field	Aux	
Output Messages	Expected Code 1 Expected Code 2 Expected Code 3	Event Type	~
Message 1		Code Related Field	^
Message 2		Field Type Code Content	-
Diagnostic Messages	Output Data Channels	Local No Read <can></can>	₿
▷ Channels Fieldbuses		Local Multiple Read ?	₿,
Images Saving Conditions	Good Read	Filling Mode Variable Length	-
Passthrough Configuration	Kessage2	Referenced Label Expected Code 1	-
	No Read	Cutting Pattern Type Simple	-
	Aux	Remove leading	0 🛋
	ID-Net 🕎	Remove Trailing	0 🚔
		Code Related Field	~
		Code Related Field	~
Configuration	Events Result Console	Control Help	
Name : Matrix Model : M300N 434-010 LNS-12 RED	NARR STD SN : C14P00630 IP Address : 172.27.101.253 Device SW Release : 1.5.0.517-1	BETA05 User : Installer-ExpertCODE 1.5.0.106	6 BETA05

You can add fields to the output message by clicking on the icons above the Message Field area. They will be appended to the message. You can drag them to position them between other fields in the message so that the output message is ordered according to your application requirements.

Each field has its own relative configuration parameters in the parameters panel.

3.5.2 Output Setup

1. Configure your application specific Digital Output(s) and Green/Red Spots (if used) from the Configuration Parameters tree area: Output 1, Output 2, etc.





NOTE: Save the configuration from temporary memory to permanent memory, overwriting the previously saved configuration.

4 DL.CODE USER INTERFACE

4.1 DL.CODE DEVICE DISCOVERY WINDOW

After loading your specific device from the discovery window (drag & drop from the Device Selection Area), the DL.CODE Device Discovery window presents the following principal areas:

- Main Menu and Toolbar Area allows access to the major program functions and commands. See par. 4.2.
- **Device List Area** shows all the discovered devices both on and off the LAN. The colored icons next to the device labels indicate network status, see par. 4.1.1. Double-clicking or dragging an available device icon onto the Device Information Area connects it to DL.CODE for configuration.
- **Device Information Area** this area shows all device specific information: Name, Model, Role, running software and version details.
- **Task Area** Presents a graphical list of the main features to be performed upon device connection: create a new configuration (Stand Alone or Master/Slave), Open an existing configuration, perform PackTrack calibration, or switch to Monitor mode. These selections are also available in the File and Device Menus.
- **Control/Help Panel** In the DL.CODE opening window this panel provides a Help description for Device Selection. Once a new or existing configuration is loaded, this is the key area which allows all the individual device configuration parameters to be set. Context sensitive Help is also available from this panel. See par. 4.1.2.
- Status Bar a reserved area that keeps specific information about the connected device: Name, Model, SN, IP Address, Device SW version, user level, and DL.CODE program version always visible.



Figure 5 – Device Discovery Window Areas

4.1.1 Device List Area

The Device List area shows all the discovered devices both on and off the LAN. The icons indicate the Device status as shown in the table below:

Q	Stand Alone device connected to the network with a valid LAN IP address. Available for configuration through DL.CODE. Stand Alone device connected to DL.CODE via Serial COM Port.
I	Stand Alone device connected to the network with a valid LAN IP address but currently connected to DL.CODE by another User. Not available for configuration through DL.CODE (double-clicking or dragging the icon has no effect).
Q.	Device connected to the network but without a valid LAN IP address (i.e. default IP address). The IP addressing parameters must be modified to connect to the LAN. See par. 3.1. Device connected to a Serial COM port but not to DL.CODE.
Q	Offline device deactivated. Only one offline device at a time can be activated.
D 0	Master device connected to the network with a valid LAN IP address. Available for configuration through DL.CODE.
2	Slave device # connected to the Master via ID-NET and to the network with a valid LAN IP address. Available for configuration directly through DL.CODE.
10	Slave device # connected to the Master via ID-NET network but not to the LAN. Available for configuration through the Master connected to DL.CODE.
Q.	Slave device # not connected to the Master via ID-NET. Not available for configuration.

4.1.2 Control/Help Panel

4

Upon opening DL.CODE, the Device Selection Help Page is displayed with dropdown descriptions briefly explaining how to connect to your device and the various configuration selections. Click on the @ icon to open the dropdown description.

You can also click on the Show All link at the top of the Help page to open all collapsed text descriptions.

Device Selection		▼ Show A
	eontatocic	
Total Total <td< th=""><th>And Annual Annua</th><th></th></td<>	And Annual Annua	
Online Device (Ethernet), Seria		
Online Device (Ethernet), Seria Device (Simulator) to work with Device List Area	Device, or an	
Online Device (Ethernet), Seria Device (Simulator) to work with Device List Area Selected Device Inform	Device, or an	
Online Device (Ethernet), Seria Device (Simulator) to work with Device List Area Selected Device Inform	l Device, or an	
Online Device (Ethernet), Seria Device (Simulator) to work with Device List Area Selected Device Inform Task Selection Open Device Configurat	l Device, or an	
Online Device (Ethernet), Seria Device (Simulator) to work with Device List Area Selected Device Inform Task Selection Open Device Configural Presentation Mode	I Device, or an	1 Offline
Online Device (Ethernet), Seria Device (Simulator) to work with Device List Area Selected Device Inform Task Selection Open Device Configural Presentation Mode Setup Internal Network	I Device, or an	1 Offline
Online Device (Ethernet), Seria Device (Simulator) to work with Device List Area Selected Device Inform Task Selection Open Device Configural Presentation Mode Setup Internal Networl PackTrack Calibration Monitor Device	I Device, or an	1 Offline

When a new configuration is created or an existing one is opened, the Control page showing all of the configuration parameters for the selected configuration step or item is displayed in the Help/Control area.

File Options Device Help			- C ×
	2 2 0. 05 🕀		♥DATALOGIC
Layout Type : Alone ; Internal Network Role :	Slave 0; Configuration : Station 1; Sta	tus : Halt ; Reading Phase: Phase Mode	Reading Phase : Acquisition Trigger
1 Automatic Setup	Reading Phase	2 Data Formatting	Trigger Type
Advanced Setup	Good Read Setup	Output Setup	© <u>Continuous</u> © <u>Periodic (ms)</u>
			© Delay (ms)
🔎 사 🖅 🔛 🕊 🗐 🖕			External
Reading Phase			Trigger Delay
Seneral Settings	Matrix TCP Server	Acquisition Trigger	Delay Type on External Trigger Disabled
Acquisition Trigger			External Trigger Source
Phase On	Mein	Phase On 🛃	Matrix TCP Server
Phase Off		Phase Off	
Channels	UD-Net		D-Net
Fieldbuses			✓ Input 1 Leading ▼
Inputs	Input 1		
📌 Input 1	Input 2		
Input 2	Mation Event		
▶ Sensors	Motion Event		
Data Collection Type	Good Read		
Protocol Index Collection			
Configuration	Result	Console	Control Help
Name : Matrix Model : M300N 434-010 LNS-12 RED	NARR STD SN : C14P00630 IP Address :	172.27.101.253 Device SW Release : 1.5.0.517-BE	TA05 User : Installer-ExpertCODE 1.5.0.106 BETA05

By clicking on any parameter name with a hyperlink, the relative contextual help page will open and present the specific parameter description.

Advanced Setup : Image Settings	Help
Image Quality	▼ Exposure Time
Image Polarity Inversion Exposure Time (µs) Gain 4	It defines the time during which all pixels of the CMOS image sensor synchronously capture the frame. This parameter must be set according to the environmental conditions (external lighting, code contrast etc.). In general, a longer time corresponds to a lighter image but is susceptible to blurring due to the code movement. A shorter exposure time corresponds to a darker image.
Gain Multiplier X1 Internal Lighting Very High-Power Strobed	NOTE: The range of values and step of this parameter change according to the Internal Lighting Mode parameter setting, therefore, after changes to Internal Lighting Mode, recheck Exposure Time.
	@ Gain
Image Auto-Setup	@ Gain Multiplier
Image Density(PPI)	Internal Lighting
	@ LED Group
201 •	@ Sectors
Acquire PPI	
Cropping Region Area 🗸 🗸	Image Auto-Setup
	This feature automatically sets the image photometry parameters quickly and accurately and is the recommended method.
	Reading Distance
Return to the configuration page	Focusing depends on the type of reader. For manually focused models, the Focus Calibration tool with oscilloscope is provided, while tiquid Lens models should use the Focus Auto-Learn feature.
	Reading Distance
Control Help	Control Help

Figure 6 – Control Panel and Relative Contextual Help Page

To return to the parameter page, click on the **Control** bar.

4

4.2 DL.CODE MAIN MENU AND TOOLBAR

The Main Menu and Toolbar icons are located at the top of the DL.CODE window as shown below.



The Main Menu presents the following items:

File:

- **Getting Started**: returns to the initial Device Discovery window to load a different device. You will be prompted to Save or Discard the current configuration.
- **Open**: load a previously saved configuration from the device memory or from a .dlcfg file selected from a disk/directory of your choice.
- **Save**: save the current configuration to the device memory or to a .dlcfg file selected from a disk/directory of your choice.
- Setup Internal Network: sets the current device's internal network Role to Master and performs the Net Auto-set feature to automatically recognize its connected ID-NET Slaves. The Internal Network Configuration window allows ID-NET configuration management. See chapter 10 for details.
- **Monitor**: sets the device to run mode for testing configuration results. An image window is displayed along with Statistics, Diagnostics and a Console for output message verification. See chapter 8 for details on using and configuring the Monitor.
- **Exit**: exits the DL.CODE User Interface.

Options:

- **Change Language**: allows you to change the display language used for DL.CODE in real time. The selected language will also be used for successive sessions.
- **UI Settings**: opens a window where various settings can be made regarding DL.CODE presentation on the PC. The following DL.CODE features can be configured: console presentation, Image Buffer positioning and behavior, Simulator Settings, and selecting which features to enable for viewing. The Monitor can also be configured from this window by selecting the Monitor tab.
- **Change Log Level**: allows the configuration log level to be changed between Verbose, Information and Error.
- **Change User**: allows the configuration access level to be changed between Basic-User (no parameters modification allowed), Basic-Installer (medium level of parameter modification allowed) and Expert-Installer (maximum level of parameter modification allowed).
- Restore UI to Default: restores all UI panels to their default positions.

Device:

- **Connect to Device**: if not already connected to a device, this allows you to connect to a device on the LAN by inputting its IP Address into the dialog box and clicking Connect.
- **Find Devices**: searches for new devices connected to the LAN without disconnecting from the current device.
- **Settings**: opens device configuration windows for configuring Environment parameters (see chp. 14), Advanced Configuration Settings, resetting Statistics and/or Diagnostic counters and viewing HMP shortcuts.
- **Update Package**: allows updating the device firmware (application program, schema, etc.) either upgrading or downgrading to a different version, see also Caution below.
- **Multi-Device Package Update**: allows updating multiple devices simultaneously. This command is only available when no device is currently connected to DL.CODE. Update firmware (application program, schema, etc.) either upgrading or downgrading to a different version, see also Caution below.

After selecting the software package to update, select the devices from the list in the Mult-Device Package Update window. When updating is completed the window reappears indicating success or failure for each device.

- Change Current Configuration:
- **Restart Device**: performs a software reset on the loaded device.
- **Backup/Restore**: manages all the backup and restore options to and from the device as well as restoring the default settings.
- **RAM Image Buffer Settings**: opens the RAM Image Buffer Management window to either save or discard images in the device's RAM Image Buffer.
- **PackTrack Calibration**: launches the Packtrack Calibration procedure. See chapter 11 for details.



CAUTION: <u>Before performing any downgrade of device firmware</u>, always restore the reading device default environment parameters using the X-PRESS button procedure on the reading device, (see the device Reference Manual). Alternatively, execute this command from the DL.CODE Device menu: Backup/Restore>Restore Defaults>Restore Default Environment.

Help:

- About: opens the information window containing the DL.CODE program release version number.
- DL.CODE User's Manual: opens this manual.

Toolbar buttons:

€	Getting Started: Disconnects the current device and returns to the Device Discovery window. If the current configuration hasn't been saved you will be prompted to do so before disconnecting.
Ô	Find Devices: Executes a device discovery to find new or modified devices on the LAN without disconnecting from the current device.
å	Change User: Select a different User configuration access level.
	Restore UI to Default Layout: resets all the various DL.CODE resizable graphical areas (window panels) to their default layout positions.
.	Open Device Configuration: Open a previously saved configuration from the device memory. You can create a new configuration by opening a configuration in the list and then saving it with a new name.
a ,	Save on Device: Save the current configuration to the device.
	Load from PC: Open a previously saved .dlcfg configuration file from the local PC or from a remote network location.
	Save on PC: Save the current configuration to a .dlcfg file on the local PC or to a remote network location.
.	Save Configuration in Temporary Memory:
ع ٤	Configuration/Monitor Switch: toggles between the Configuration environment and the Monitor environment. See chp. 8 for details.
\oplus	PackTrack Calibration: starts the PackTrack Calibration feature. See chapter 11.

4.2.1 User Levels

DL.CODE has a 3-level user interface (<u>Basic User</u> level, <u>Basic Installer</u> level, <u>Expert</u> <u>Installer</u> level).

Each level can be accessed by selecting it from the Options Menu.

The User levels have the following access rights.

Basic User: only access to the Monitor feature is given. No device configuration.

Basic Installer: a subset of program features and configuration parameters is allowed. No Master/Slave configuration, no multiple Image Settings configurations, no Postal Codes configuration, no Fieldbus configuration.

Expert Installer: access is given to all program features and configuration parameters.

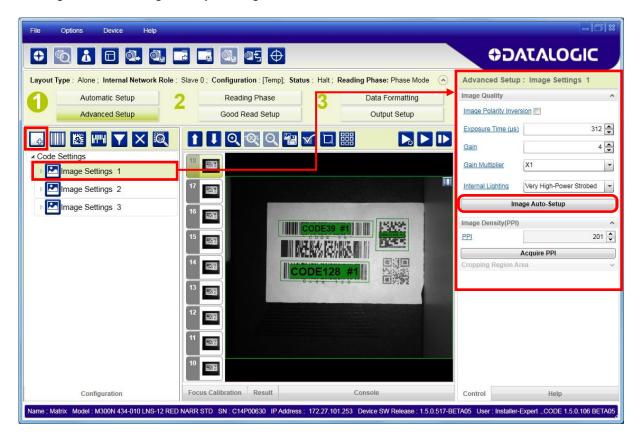
4.3 MULTI IMAGE ACQUISITION SETTINGS

When <u>controlled</u> variable conditions occur in the application, Multiple *Image Acquisition* **Settings** can be defined to create a database of parameter groups that handle each specific application condition. This database of pre-defined settings improves system flexibility and readiness by being applied either automatically or selectively by an activation event.

For example, an application may have several <u>stable but different lighting conditions</u> which require different lighting options. One Image Acquisition Setting could enable and use an internal illuminator and another setting could enable and use an external lighting system.

This feature is available for all Operating Modes.

Image Settings are found in the DL.CODE **Advanced Setup** step. Up to 10 different Image Settings can be configured by adding them with the a icon.



For each Image Setting condition start **Image Auto Setup**, select the Static or Dynamic Self-Tuning option; and Apply it.



NOTE: The Automatic Setup procedure can be used for each Image Setting that is added through the Advanced Setup group, however only one code will be associated with each Image Setting.

Δ

4.3.1 Automatic Image Settings Selection

If we don't know from one item to the next which reading condition will be presented, we will cycle through the pre-defined database of Image Settings (<u>one per acquisition</u>) in order to automatically capture the correctly lighted image over the course of several acquisitions. When the correct condition is matched, the result should be able to produce a Good Read.

When the **Image Settings Selection** is **Automatic** (default), then these Image Settings groups will be used cyclically.

File Options Device Help				- C ×
	📑 💁 🚭 🕀		\$	DATALOGIC
Layout Type : Alone ; Internal Network Role : Si	lave 0; Configuration : [Temp]; Stat	s : Halt ; Reading Phase: Phase Mode	Reading Phase : G	eneral Settings
Automatic Setup	Reading Phase	2 Data Formatting	General Settings	^
Advanced Setup	Good Read Setup	Output Setup	Image Buffer Size	2 🔷
			Layout Type	Alone
🖓 사 🕾 🖳 関 📮 🗌	୍ର ପ୍ ଷ୍ଟ୍ ପ୍		Energy Saving Status	Disabled
A Reading Phase			Acquisition Settings	
Seneral Settings	m		Image Settings Selection	
Acquisition Trigger	Matrix TCP Server	Acquisition Trigger	inage Settings Selection	
	Main	Phase On 🛃	Start Acquisition From	Last Successful 👻
🔁 🛱 Phase On				First Enabled Last Successful
₽ Anase Off	Aux	Phase Off		
▶ Channels	E ID-Net			
Fieldbuses				
▶ Inputs	Input 1			
▶ Sensors	Input 2			
Data Collection Type	Input 2			
Protocol Index Collection	Motion Event			
	Good Read			



NOTE: Applications typically require more than one acquisition to obtain sufficient Good Read percentages. This means that for *N* acquisitions we will surely have captured the correct lighting condition but we will also have captured some acquisitions with the wrong lighting condition. A consequence then is that we cannot run these types of applications at the maximum speed because not all the acquisitions are useful to us. We must wait for a sufficient number of acquisitions that will guarantee a Good Read result.

If items to be read having the same lighting conditions are grouped together, then we can improve the read rate through the **Start Acquisition From** parameter. By choosing the **Last Successful** value, we will start with the Image Setting that last produced a Good Read. For this group of items the last Image Setting used will be correct for the next item and so we start each cycle with the acquisition that will potentially produce a Good Read.

4.3.2 External Image Settings Selection

There are some applications where the lighting conditions are known before each item is read and therefore we can pre-select the correct Image Setting from an external source.

When the **Image Settings Selection** is **External**, Acquisition Sequences are created and by default each Image Setting has its own Acquisition Sequence.



Each **Acquisition Sequence** can be activated exclusively by a single event, either through a string from an available communication channel or by a digital input.

File Options Device Help					-121×
	2 🖪 💁 🚭 🕀		0	DATALO	GIC
Layout Type : Alone ; Internal Network Role :	Slave 0; Configuration : [Temp]; Status : I	Halt ; Reading Phase: Phase Mode	Reading Phase : Se	equence 1	
1 Automatic Setup Advanced Setup	Reading Phase Good Read Setup	Data Formatting Output Setup	Start Acquisition From	First Enabled	•
			 Matrix TCP Server Main 		
Reading Phase General Settings	Matrix TCP Server	Acquisition Trigger	 <u>Aux</u> <u>ID-Net</u> <u>Input 1</u> 	Low	-
Acquisition Trigger	Main	Phase On B	© Input 2		
Phase Off	문 Aux 문 TD-Net	Phase Off			
Sequence 1 Sequence 2 Sequence 3	Input 1	Sequence 1 Image Settings 1			
Channels	Input 2				
▶ Inputs	Motion Event	Sequence 2			
Sensors Data Collection Type Protocol Index Collection	Good Read	Image Settings 2 E			

Alternatively a hybrid configuration can be made where more than one **Image Setting** can be grouped into an Acquisition Sequence by dragging it into the desired Sequence box. Select the empty Sequence box and delete it with the delete key.

File Options Device Help		- C X
		ODATALOGIC
Layout Type : Alone ; Internal Network Role : S	lave 0;Configuration:[Temp]; Status:Halt; Reading Pha	hase: Phase Mode) Reading Phase : General Settings
Automatic Setup	Reading Phase 3 Data Fo	Formatting General Settings
Advanced Setup		put Setup 2
Auvanceu Setup	Good Read Setup	Layout Type Alone
		Alone Alone
		Energy Saving Status Disabled
Reading Phase		Acquisition Settings
General Settings	m	
	Matrix TCP Server Acqui	equisition Trigger
Acquisition Trigger	Main Pł	
₽ Phase On		Phase On 🛃 🗸
Phase Off	Pi Aux Pi	Phase Off
Acquisition Sequence	TD-Net	
Sequence 1		Sequence 1
Sequence 2	Input 1	nage Settings 1
▷ Channels		
Fieldbuses	Input 2 Image	nage Settings 2
▷ Inputs	Motion Event	
▶ Sensors		
Data Collection Type	Good Read	Sequence 2
Protocol Index Collection		nage Settings 3

Each **Acquisition Sequence** can be activated exclusively by a single event, either through a string from an available communication channel or by a digital input.

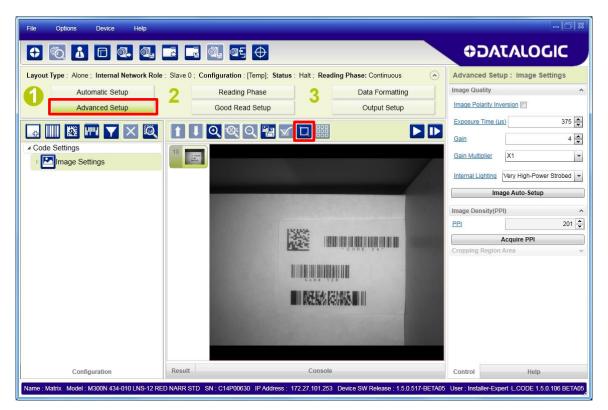
In this case the **Start Acquisition From** parameter can improve the read rate for that Sequence. It has no meaning for a Sequence containing only one Image Setting.

File Options Device Help				-	-1018
			¢	DATALOG	
Layout Type : Alone ; Internal Network Role : S	lave 0;Configuration:[Temp]; Status:Halt;F	Reading Phase: Phase Mode	Reading Phase : S	equence 1	
1 Automatic Setup	Reading Phase	Data Formatting	Start Acquisition From	Last Successful	-
Advanced Setup	Good Read Setup	Output Setup	Activation Events	-	^
			Matrix TCP Server		
Q 사 🛃 🔛 🗨 🛄 🖕 🗌	୍ର ପ୍ ଷ୍ ପ୍		Main		
▲ Reading Phase			O <u>Aux</u>		
Seneral Settings			ID-Net Input 1	Low	
	Matrix TCP Server	Acquisition Trigger	Input 2	Low	
Acquisition Trigger			- mpure		
₽ Ž Phase On		Phase On			
Phase Off	Aux	Phase Off			
Acquisition Sequence	ID-Net				
Sequence 1		Sequence 1			
Sequence 2	Input 1	Image Settings 1			
Channels	Input 2				
Fieldbuses	mput 2	Image Settings 2			
▶ Inputs ▶ Sensors	Motion Event				
Data Collection Type		Sequence 2			
Protocol Index Collection	Good Read				
		Image Settings 3			

4.4 IMAGE CROPPING

In some applications, the Image Cropping feature in DL.CODE can help to increase decoding and result performance. Image cropping is performed from the Advanced Setup tab by clicking on the Add Cropping Region icon as shown below.

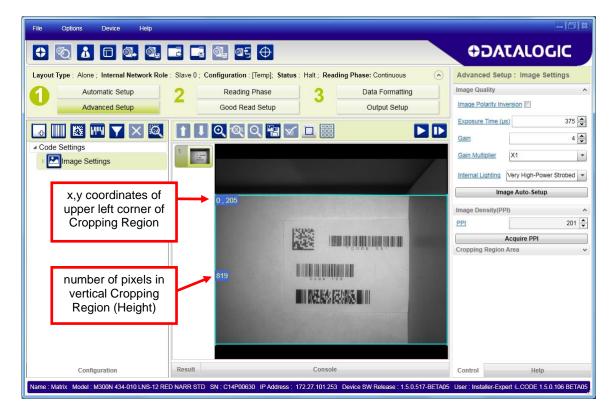
Image cropping allows reducing the Image processing area from the full FoV to a smaller area where codes are present. By excluding portions of the FoV, processing time is reduced.



After clicking the Add Cropping Region icon, a blue border appears which by default is equal to the FoV.

Image Destings Image Settings	File Options Device Help				= C 8
Automatic Setup 2 Reading Phase 3 Data Formatting Advanced Setup Good Read Setup Output Setup Image Polarity Inversion I Image Settings Image Settings Image Settings Image Auto-Setup Image Settings Image Settings Image Auto-Setup Image Auto-Setup Image Settings Image Settings Image Auto-Setup Image Auto-Setup Image Density(PP) Image Density(PP) Image Density(PP) P2 201 Image Density(PP) P2 201 Image Density(PP) P2 201 Image Density(PP)					⇔ DATALOGIC
Advanced Setup Good Read Setup Output Setup Advanced Setup Image Polarity Inversion I Code Settings Image Settings Image Settings Image Auto-Setup Image Auto-Setup Image Density(PP) Image Density(PP) Image Density(PP) Pell 201	Layout Type : Alone ; Internal Network Role	: Slave 0; Configuration : [Temp]; S	tatus : Halt ; Reading Phase: Continuous	\odot	Advanced Setup : Image Settings
Aurance Setup Good Read Setup Codpt Setup Codpt Setup Code Settings Image Settings Image Auto-Setup Image Auto-Setup Image Density(PP) Image Density(PP) Image Density(PP) P2 201 Image Density(PP)	Automatic Setup	7 Reading Phase	2 Data Formatting		Image Quality
Code Settings Multiplier Code Settings Multiplier Multiplie	Advanced Setup	Good Read Setup	Output Setup		Image Polarity Inversion
Code Settings Mage Settings Multiplier X1 Multiplier Multip					Exposure Time (µs) 375
Gain Multiplier X1					Gain 4
Internal Lighting Very High-Power Strobed + Image Auto-Setup Image Density(PPI) PPI 201 Acquire PPI		1 classe and anne			Gain Multiplier X1
Image Density(PPI) PPI 201 Acquire PPI Acquire PPI					Internal Lighting Very High-Power Strobed
PPI 201 🗘					Image Auto-Setup
Acquire PPI					Image Density(PPI)
			INIDA		<u>PPI</u> 201
			CODE 38-		Cropping Region Area
			Statistics and		
			State of the second second		
Configuration Result Console Control Help	Configuration	Result	Console		Control Help

By dragging the edges with the mouse (resizing) you can crop the image to a specific location where codes are present. The numbers in the blue boxes refer to pixel references.



File Options Device Helr **ODATALOGIC** 🗘 🔞 🔥 🗖 💁 🖏 🔁 🖬 🖏 🖉 🕀 Layout Type : Alone ; Internal Network Role : Slave 0 ; Configuration : [Temp]; Status : Halt ; Reading Phase: Continuous Advanced Setup : Image Settings ~ Image Quality Reading Phase Automatic Setup 2 Data Formatting 3 Image Polarity Inversion Good Read Setup Advanced Setup Output Setup 375 🚔 Exposure Time (us) 🗔 📖 🗱 💷 🝸 🖂 🍳 1 1 Q @ Q 署 🗸 🗖 🎬 4 Gain ▲ Code Settings EN MARYNE X1 • Gain Multiplier Image Settings Internal Lighting Very High-Power Strobed 👻 11/10/11 #1852/061 Image Auto-Setup Image Density(PPI) 201 🔹 PPI Acquire PPI **Cropping Region Area** Configuration Result Console Control Help Name : Matrix Model : M300N 434-010 LNS-12 RED NARR STD SN : C14P00630 IP Address : 172.27.101.253 Device SW Release : 1.5.0.517-BETA05 User : Installer-Expert L.CODE 1.5.0.106 BETA05

The cropped area can be moved by dragging its center.

You can also set the cropped image size and position through the Cropping Region Area group of parameters; size = **Width** and **Height**, position = **Left**, **Top** (x,y) coordinates.

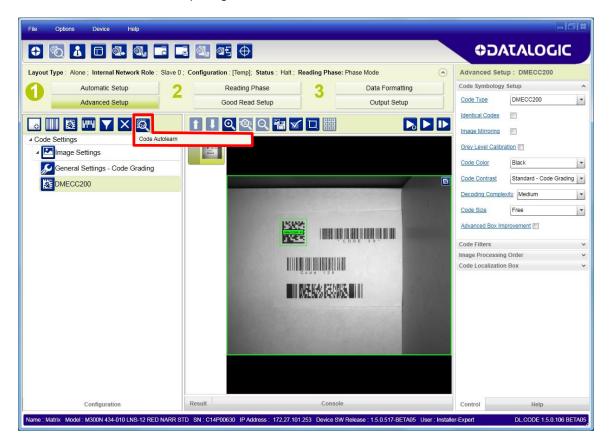
File Options Device Help		
01000	■ 01 01 0	⇔ DATALOGIC
Layout Type : Alone ; Internal Network Role : Slav	ve 0 ; Configuration : [Temp]; Status : Halt ; Reading Phase: Continuous	Advanced Setup : Image Settings
Automatic Setup	Reading Phase 2 Data Formatting	Image Quality
Advanced Setup	Good Read Setup Output Setup	Image Polarity Inversion
		Exposure Time (µs) 375 💽
		Gain 4
Code Settings	SE encours Install	Gain Multiplier X1 -
1		Internal Lighting Very High-Power Strobed
		Image Auto-Setup
		Image Density(PPI)
	LINUAR.	<u>PPI</u> 201 💽
		Acquire PPI
	CODE 30*	Cropping Region Area
	Code 128	Box Top 338
		Box Width 704 💌
		Box Height 508 🗢
	Console	Control Help
Name : Matrix Model : M300N 434-010 LNS-12 RED NAR	RR STD SN : C14P00630 IP Address : 172.27.101.253 Device SW Release : 1.5.0.517-BETA0	5 User : Installer-Expert L.CODE 1.5.0.106 BETA05

4.5 CODE AUTOLEARN FEATURE

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From the Advanced setup page you can run the Code Autolearn feature which will recognize all the codes present in the captured image.

1. From the Advanced Setup Page click on the Autolearn icon and select Code Autolearn.



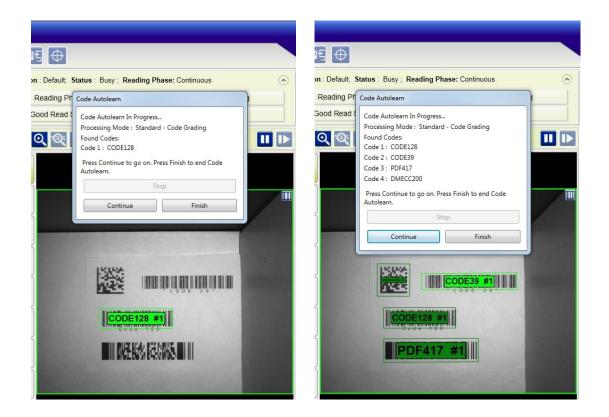
The Autolearn region (equal to the FoV) is shown in grey. You can reduce and/or move the search area by dragging the borders or the center of the area with the mouse.

- Reducing the area can reduce the time necessary to find the code(s).
- Moving the search area allows finding specific code(s) in the image.

File Options Device Help			- C ×
	0. 01 0 1		♥DATALOGIC
Layout Type : Alone ; Internal Network Role : Slave 0 ;	Configuration : [Temp]; Status : Halt ; Reading Phase	se: Phase Mode 📀	Advanced Setup : DMECC200
Automatic Setup	Reading Phase 2	Data Formatting	Code Symbology Setup
Advanced Setup	Good Read Setup	Output Setup	Code Type DMECC200 -
			Identical Codes
Code Settings			Image Mirroring
Image Settings	E Brand		Grey Level Calibration
General Settings - Code Grading			Code Color Black
DMECC200		<u>a</u> X	Code Contrast Standard - Code Grading +
			Decoding Complexity Medium
			Code Size Free
	1983		Advanced Box Improvement
	1 and 1	. CODE 39.	Code Filters 🗸
		111	Image Processing Order Code Localization Box
	G o d e 12 6	^{IIII} [
	11月18月18日		
		IN STELLE	
Configuration	Result Cons	ole	Control Help
Name : Matrix Model : M300N 434-010 LNS-12 RED NARR ST	D SN : C14P00630 IP Address : 172.27.101.253 Device	SW Release : 1.5.0.517-BETA05 User : Installe	er-Expert DL.CODE 1.5.0.106 BETA05

2. Whether the area is reduced or not, you can start the Autolearn feature by clicking on the Autolearn icon in the display area.

Each autolearn iteration locates a single code symbology and you will be prompted to Continue (if you need to find other codes) or to Finish.



3. When you have located all the code symbologies, click on Finish. You will be prompted to choose a saving selection.

Code Autolearn	
Code Search Completed!	
Add to Current Configuration	
Replace Current Configuration	
O Discard Autolearn Result	
Ok	

4.6 IMAGE FILTERING

Image Filtering is typically done in DPM applications where the marking technique produces module shapes or textures that can make decoding difficult. Special DPM algorithms are provided to improve decoding as well as pre-processing Image Filters which modify the image to compensate for defects.

The following paragraphs detail the DPM parameters used to enhance decoding capabilities.

4.6.1 **DPM Algorithms**

For **Data Matrix** family codes the **Decoding Complexity** parameter is available when Processing Mode is set to Standard and selects the decoding algorithm according to the printing/marking technique used to create the symbol and on the overall printing/marking quality.

The possible selections progress from Low to Very High where Low can improve decoding time for good print/mark quality and/or relatively normal size codes. This is the default setting. Very High can improve the decode rate for low print/mark quality and/or small size codes. This algorithm is much more aggressive but in general it may have longer decoding times than the lower complexity algorithms. To minimize decoding time it is better to select the lowest value that still guarantees good decoding.

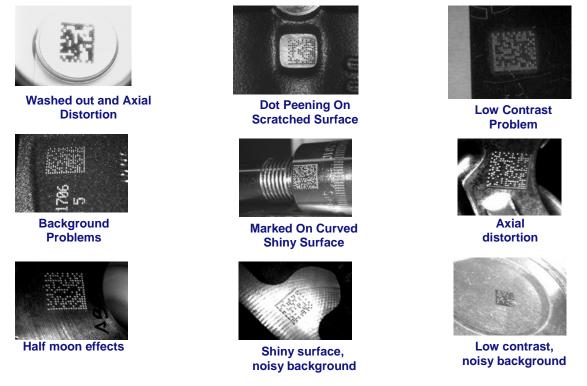


Figure 7 – Problematic Direct Part Marking Examples

For **QR** code the **Decoding Method** parameter allows the Dot Peen Decoding algorithm to be selected which improves the decode rate for low quality Direct Part Mark codes and in general for Direct Part Mark codes with dot peening type module shapes.

4.6.2 Image Filters

In DL.CODE, when Image Filters are used, they are always applied relative to a specific code symbology or group of symbologies depending on the nesting logic applied to the tree structure. See par. 4.6.3 for examples.

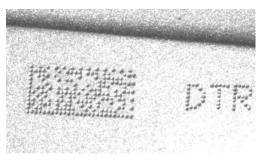
The following Image Filters can be applied to DPM codes to improve decoding.

Image Filter

Sets the filter to be applied to the image before being processed. This parameter can be used to successfully decode particular ink-spread printed codes (ex. direct part mark codes).

Different filters can be applied to a single code or group of codes in one or more *Image Settings*. See par. 4.6.3.

The *Erode* Filter enlarges the image dark zones to increase readability.



Before - No Read

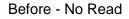


After - Readable

Erode

The *Dilate* Filter enlarges the image white zones to increase readability.







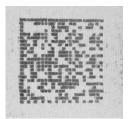
After - Readable

Dilate

The *Close* filter eliminates dark areas (defects) in the white zones of the image.



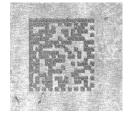
Before - No Read



After - Readable

Close

The **Open** filter eliminates white areas (defects) in the dark zones of the image.



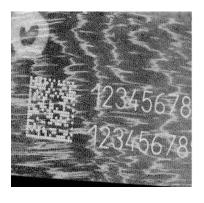
Before - No Read



After - Readable

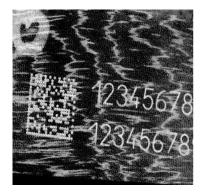
Open

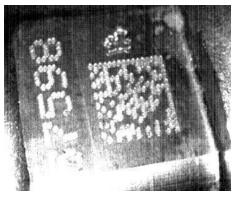
The Contrast Stretching filter maximizes image contrast.





Before - No Read





After - Readable

Contrast Stretching

The *Histogram Equalization* filter makes the gray level distribution uniform.



Before - No Read



After - Readable

Histogram Equalization

Smoothing

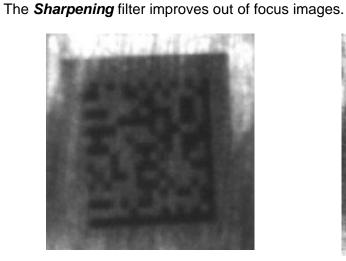
The **Smoothing** filter deletes small (insignificant) details in the center of the image.

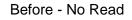


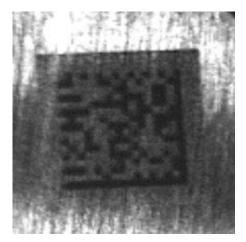
Before - No Read



After - Readable



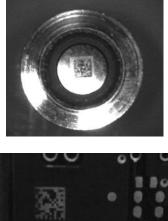




After - Readable

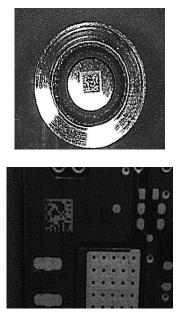
Sharpening

The *Deblurring* filter improves blurred images.





Before - No Read



After - Readable

Deblurring

The **Black Enhancement** filter produces a nonlinear increase in the black level for light images.



Before - No Read



After - Readable

Black Enhancement

The *White Enhancement* filter produces a nonlinear increase in the white level for dark images.



Before - No Read



After - Readable

White Enhancement

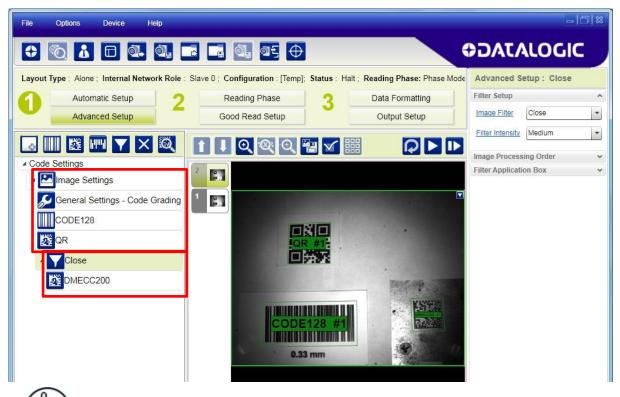
4.6.3 Image Filter Setting Examples

Example 1

To demonstrate how to apply an Image Filter through DL.CODE, the following example shows a hypothetical application in which a Data Matrix ECC 200 DPM code and printed label codes (QR Code and Code 128) must be decoded in the same image. In this example the codes can be found in any area within the image.

To correctly decode the Data Matrix ECC 200 DPM code, an Image Filter needs to be applied.

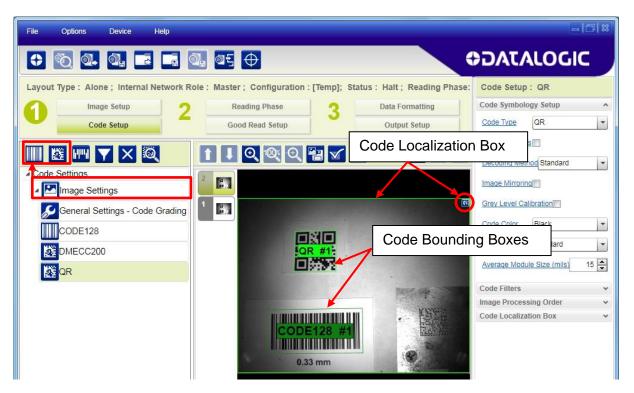
Since all codes can be found in any area of the image, both Code Localization and Filter Application boxes will be left at their default values, all covering the entire image area. The resulting image is shown below.



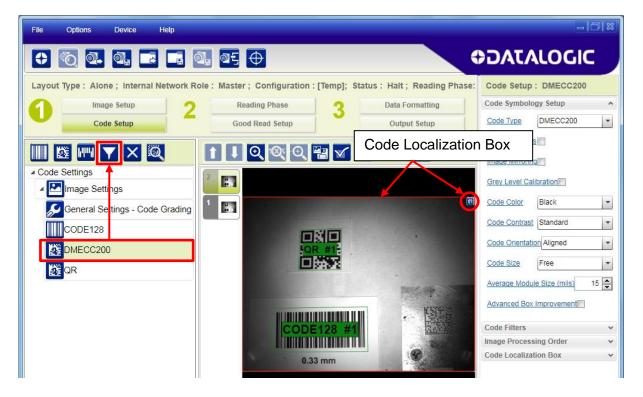
NOTE: By leaving the Filter Application box at its default value, covering the entire image area, you will see the visual filter effects on the entire image, seemingly affecting the other codes, however this pre-processing filter is **only** applied to the Data Matrix ECC 200 code as shown in the configuration parameter tree. **The filter is not applied to Code 128 and QR Codes**.

The following steps are taken to apply the Close filter to Example 1:

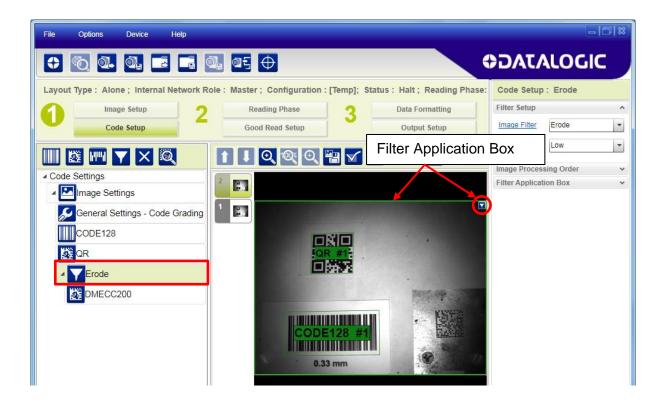
 From the Image Settings group, add the Code Symbologies that must be decoded: Code 128, DMECC200 and QR Code. The Code 128 and QR Codes are successfully decoded; Code Localization boxes as well as code bounding boxes are colored green.



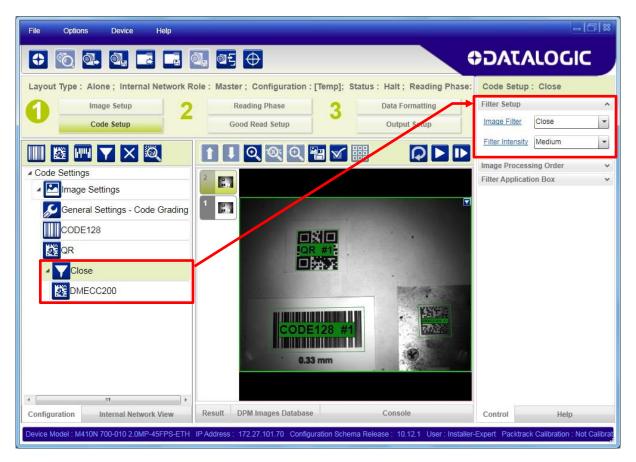
2. Select the Data Matrix ECC 200 code and add the Image Filter. Notice that the Data Matrix DPM code is not successfully decoded, Code Localization box is colored red.



Δ



3. Select the desired Image Filter Type and Intensity for correct decoding.



The Data Matrix DPM code is now successfully decoded; Code Localization box as well as code bounding box are colored green.

Example 2

This example is based on the previous one except that each of the three code symbologies will always be located in a specific physical area of the image and must not be decoded out of its expected position.

In this case, not only do we need to apply an Image Filter to the Data Matrix ECC 200 DPM code, but we need to set the Code Localization and Filter Application box sizes and positions to their respective image area to prevent decoding a code if it is in the wrong position.



The following steps are taken to apply the Close filter to Example 2:

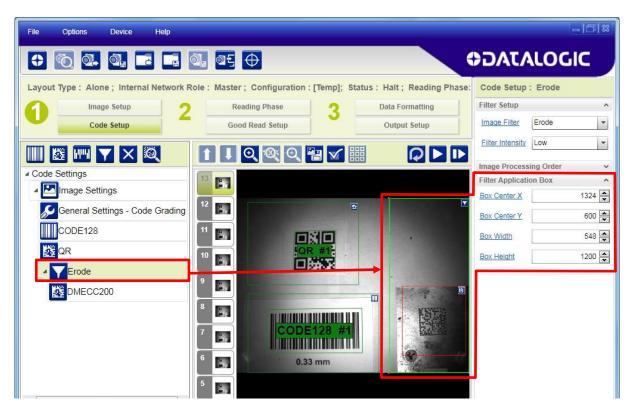
- 1. From the Image Settings group, add the Code Symbologies that must be decoded: Code 128, DMECC200 and QR Code.
- 2. For each one of them, resize and position its code localization box (dragging its borders with the mouse or editing the Code Localization Box parameters) to the image area where the code will be found.

File Options Device Help	- C ×
	DATALOGIC
Layout Type : Alone ; Internal Network Role : Master ; Configuration : [Temp]; Status : Halt ; Reading Phase:	Code Setup : QR
Image Setup 2 Reading Phase 2 Data Formatting	Code Symbology Setup
Code Setup Good Read Setup Output Setup	Code Type QR 🔹
	Identical Codes
	Decoding Method Standard
Code Settings I Image Settings	Image Mirroring
General Settings - Code Grading	Grey Level Calibration
	Code Color Black -
	Code Contrast Standard -
	Average Module Size (mils) 15
	Code Filters 🗸
8 William Willia William William W	Image Processing Order v Code Localization Box
7 CODE128 #1	Code Localization Box A Box Center X 458
	Box Center Y 312
6 🔛 0.33 mm	Box Width 764
5	
· · · · · · · · · · · · · · · · · · ·	Box Height 568

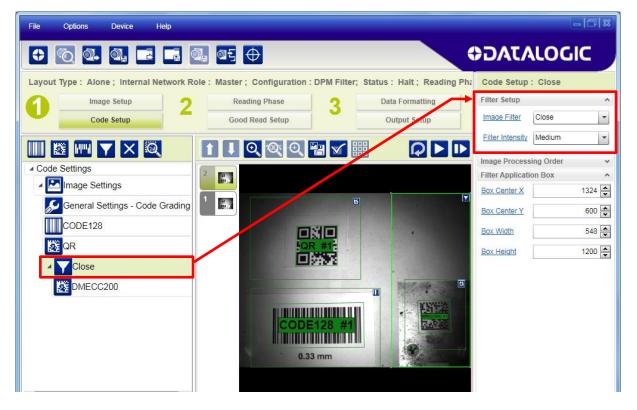
3. Select the Data Matrix ECC 200 code and add the Image Filter.

File Options Device Help			- [C X
	1. OI 🕂		DATALOGIC
Layout Type : Alone ; Internal Network R Image Setup Code Setup	Configuration : [Temp] Reading Phase Good Read Setup	Status : Halt ; Reading Phase: Data Formatting Output Setup	Code Setup : DMECC200 Code Symbology Setup Code Type DMECC200
Code Settings	1 I Q & Q # V 13 II		Identical Codes
General Settings - Code Grading	12 F. 11 F. 10 GR #1:		Code Color Black ▼ Code Contrast Standard ▼ Code Orientation Aligned ▼
QR			Code Size Free Average Module Size (mils) 15 💌 Advanced Box Improvement
	7 CODE128 #		Code Filters Image Processing Order Code Localization Box

4. Resize and position the filter application box (dragging its borders with the mouse or editing the Filter Application Box parameters) to the image area where the filter will be applied. The relative Code Localization box must fit inside its Filter Application box.



5. Select the desired Image Filter Type and Intensity for correct decoding.



The Data Matrix DPM code is now successfully decoded only within the expected position; Code Localization box as well as code bounding box are colored green.

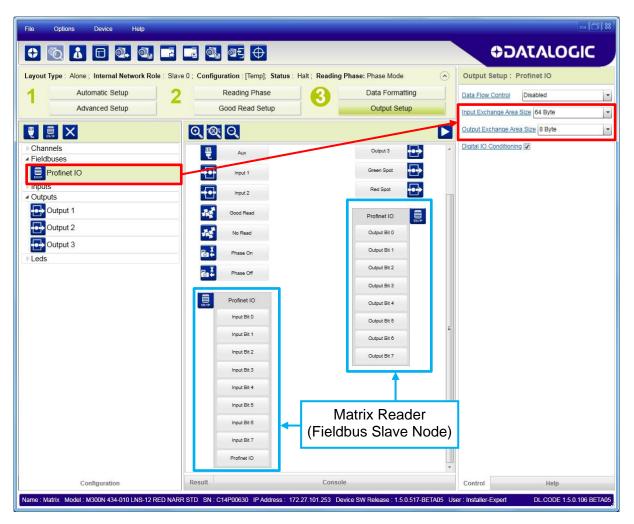
4.7 MATRIX CONTROL BY FIELDBUS CHANNEL

The Matrix reader can be controlled by signals coming from the Fieldbus Master as well as echoing its input signals to the Fieldbus Master.

4.7.1 Fieldbus Input/Output Representation in DL.CODE

For HMS Fieldbus and the embedded Profinet-IO channels, communication with the Matrix reader takes place through Input/Output Exchange Areas. The size of these areas must be correctly defined in the relative parameters (see below). See also par. 4.7.2 to account for Digital IO Conditioning.

The <u>Input</u> and <u>Output Exchange Area Size</u> parameters refer to the <u>Fieldbus Master</u>.; Input **to** the Master, Output **from** the Master.



(b)

NOTE: All other representations in DL.CODE show the fieldbus input and output channels from the Matrix reader perspective (Fieldbus Slave Node). Therefore fieldbus slave node Input Bits are **from** the Fieldbus Master and fieldbus slave node Output Bits are **to** the Fieldbus Master.

4.7.2 Digital IO Conditioning

When checked (enabled by default), this parameter reserves the <u>first byte</u> of the Input/Output Areas for the Host to receive device Input echoes, drive the device Reading Phase and/or drive the device Outputs.

In this case application data or Data Flow Control begin at the <u>second byte</u> of the Input/Output Areas. For more details on Data Flow Control refer to the "DAD Driver" document included in the DL.CODE installation package.

File Options Device Help			
	Q, Q5 🕂		₽ DATALOGIC
Layout Type : Alone ; Internal Network Role : Slave 0 ;	Configuration : [Temp]; Status : H	alt ; Reading Phase: Phase Mode	Output Setup : Profinet IO
1 Automatic Setup 2	Reading Phase	Data Formatting	Data Flow Control Disabled
Advanced Setup	Good Read Setup	Output Setup	Input Exchange Area Size 64 Byte
₹ 🔜 🗙			Output Exchange Area Size 8 Byte
Channels Fieldbuses	Aux	Output 3	Digital IO Conditioning
Profinet IO	Input 1	Green Spot	
Inputs Outputs	Input 2	Red Spot	7
Output 1	Good Read	Profinet IO	
Output 2	No Read	Output Bit 0	
Output 3	Phase On	Output Bit 1	
	Phase Off	Output Bit 2	
		Output Bit 3	
	Profinet IO	Output Bit 4	
	Input Bit 0	Output Bit 5	
	Input Bit 1	Output Bit 6	
	Input Bit 2	Output Bit 7	
	Input Bit 3		
	Input Bit 4		
	Input Bit 5		
	Input Bit 6		
	Input Bit 7		
	Profinet IO	•	
Configuration	esult	Console	Control Help
Name : Matrix Model : M300N 434-010 LNS-12 RED NARR STE	SN: C14P00630 IP Address: 172.2	27.101.253 Device SW Release : 1.5.0.517-BETA05 U	Jser : Installer-Expert DL.CODE 1.5.0.106 BETA05



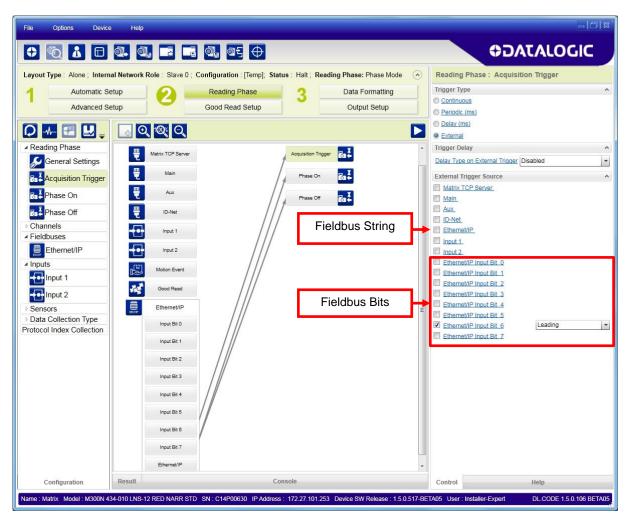
NOTE: By disabling Digital IO Conditioning, application data or Data Flow Control begin at the <u>first byte</u> of the Input/Output Areas. Any Digital IO Conditioning configurations (Input echo, Reading Phase or Output control from the Fieldbus Host) will be ignored.

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4.7.3 Fieldbus Reading Phase Control

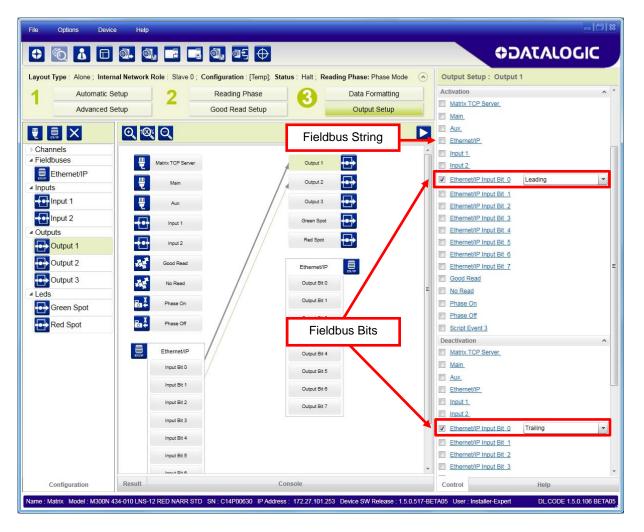
4

The Fieldbus Master can control the reading phase by assigning either communication strings or individual communication bits to reading phase parameters. These bits are received on the Matrix fieldbus channel as Input Bits.



4.7.4 Fieldbus Digital Output Control

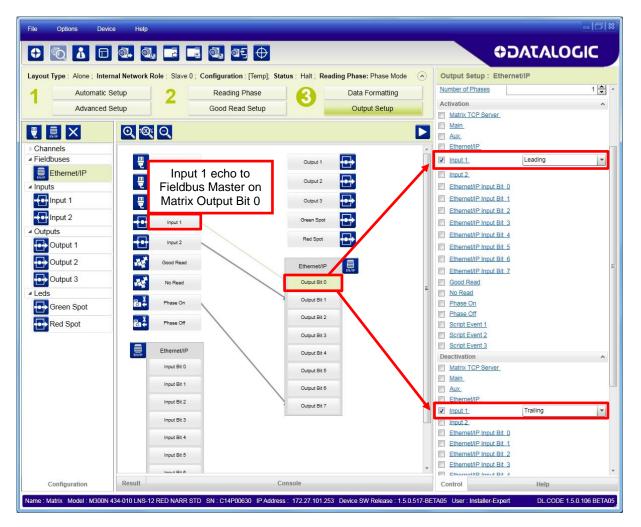
The Fieldbus Master can also drive the Matrix reader's Digital Outputs by assigning either communication strings or individual communication bits to the Digital Output Activation and Deactivation parameters. These bits are received on the Matrix fieldbus channel as Input Bits.



4.7.5 Digital Input Echo to Fieldbus

4

The Fieldbus Master can receive the Matrix Reading Phase and Input signal echoes by assigning them as sources to the fieldbus individual communication Output Bit Activation and Deactivation parameters. These bits are sent on the Matrix fieldbus channel as Output Bits.



4.8 BACKUP AND RESTORE THROUGH DL.CODE

DL.CODE allows Backup and Restore to be performed to the configuration PC via file or to an external storage device such as BM100.

It can be performed for Single Reader and Internal Network (Master/Slave) configurations.

Backup and Restore functions allow performing Complete Configuration and Environment parameter storage for Single Reader and ID-NET (Master/Slave) network devices as well as device firmware. Backup and Restore can be applied to any reader connected through a device having external backup memory, regardless of the reader's network configuration.

Backup to and Restore from external device is supported by DL.CODE for all reading devices when connected to:

- CBX + BM100
- QLM-Series Gateways



NOTE: Before executing a Backup to a BM100 backup module make sure the Write Protection switch is set to Unlocked.

File Options Device Help		
Connect to Device		
Layout Type : Alone Dupdate Package	onfiguration : [Temp]; Status : Halt ; Reading Phase: Phase N	Code Setup : DMECC200
Change Current Configuration	ading Phase 3 Data Formatting	Code Symbology Setup Code Type DMECC200
Backup / Restore	Single Reader Backup Single Reader Restore	Identical Codes
Code Settings	Backup current Internal Network configurations	Image Mirroring
Image Settings	Backup to external storage device Restore from external storage device	Grey Level Calibration
General Settings - Code Grading	Restore Defaults	Code Contrast Standard
3		Decoding Complexity Low
2 5%		Code Size Free Advanced Box Improvement
1 85		Code Filters 🗸
		Image Processing Order Code Localization Box
		Code Localization Box V
Configuration Result DPM	Images Database Console	Control Help
Device Model : M300N 435-010 LNS-16 RED NARR STD I P Address :	172.27.101.69 Configuration Schema Release : 9.6.7 User : Installer-Expert	Packtrack Calibration : Not Calibrated: 1.3.0.120 RC2

4.8.1 Backup

To perform a **Backup**:

1. From the DL.CODE Device menu, select either **Single Reader Backup** (to file on PC); or **Backup to external storage device**.



NOTE: For ID-NET network Backup, select the **Backup current Internal Network configurations** selection.

You will be reminded that configuration in temporary memory will not be saved so you should save the configuration to the reader before performing Backup.

emporary configuration will h	be not included in the backup. Do you want to
proceed?	be not included in the backup, bo you want to
	Ves No

If you are performing a backup to a file you will be asked whether to include the firmware or not.

	Do you want to include firmware?
	Yes No
	Device backup. Please wait
claun	to external storage device. Please w

At the end of the backup, DL.CODE shows a message indicating successful completion.

ttention	
Operation compl	eted successfully!
	ОК

4.8.2 Restore

To perform a **Restore**:

1. From the DL.CODE Device menu, select either **Single Reader Restore** (from file on PC); or **Restore from external storage device**.



NOTE: For ID-NET network Restore, select the **Internal Network** replacement selection.

Restore from external storage device. Please wait

If restoring an ID-NET network though the Master, this may take a few minutes.

At the end of the restore, DL.CODE shows a message indicating successful completion.

Attention	
Restore procedure completed successfully. The device wi changes!	ll restart in order to apply
	ОК

4.8.3 Replacement



CAUTION: The replacement device **must be the exact same model** as the device it is replacing.

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

- 1. Remove the device to be replaced.
- 2. Connect the new device (make sure the new device has been previously set to factory default).
- 3. Run the Restore procedure by selecting either **Single Reader Restore** (from file on PC) or **Restore from external storage device** item (see: Restore procedure).



NOTE: In case of Backup or Restore operation failures, error messages will be displayed in the Monitor Diagnostic page.

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4.9 **RESTORE DEFAULTS**

The device parameters are divided into two main classes, <u>Configuration</u> and <u>Environment</u> which are affected differently by the Restore Defaults commands.

- The Configuration parameters are the ones set in the various steps of the configuration process and are specific to each application. When multiple configurations (jobs) are saved on a single device, these parameters can be different from one configuration to the next.
- Environment parameters regard the device Identity and Position in a Network (Ethernet, ID-NET, etc.) and are not influenced by the Default (or any other) Configuration present in memory.

4.9.1 Restore Default Startup Configuration

The Default configuration is always present on the reader and in fact it is not modifiable and cannot be deleted. It can always be restored by simply selecting it from the Open from Device configuration list.

Open Configuration from Device	
Phase Mode	×
Set as Startup Configuration	
	incel

The same action can be performed from the Device menu >Backup/Restore > Restore Defaults > **Restore Default Startup Configuration**. The Default Configuration will be set to run at startup and the reader will be reset.

File Options Device Help		- D ×
Connect to Device		♥DATALOGIC
Layout Type : Alone Update Package Imag & Change Current Configura Restart Device	nfiguration : [Temp]; Status : Halt ; Reading Phase Data Formatting	e: Phi Code Setup : DMECC200 Code Symbology Setup
Code Packar Porto	Single Reader Backup Single Reader Restore Backup current Internal Network configurations	Code Type DMECC200 Identical Codes Image Mirroring
Code Settings Mage Settings	Internal Network replacement Backup to external storage device Restore from external storage device	Grey Level Calibration
General Settings - Code Grading	ET Restore Defaults	Restore Default Environment Restore Default Startup Configuration Restore Factory Defaults

Any previously saved configurations on the device will remain in memory, but the Default configuration is set as the startup configuration.

4.9.2 Restore Default Environment

Restore Default Environment returns all Environment parameters to their factory default settings. The default IP address will be restored as well as all the parameters managed in the Device Environment Configuration window.

Device Environment Configurat	ion		
Device Name	Matrix	^	
Startup Configuration	Default	•	
About Device		^	
Device Model	M300N 435-010 LNS-16 RED NARR STD		
Application SW Version	1.3.0.749.ALPHA04		
Boot SW Version	1.18		
Loader SW Version	1.38	=	
Recovery SW Version	1.04		
VL Version	VL5.07.20R.16777214.14		
MVL Version	2.1.8		The Factory Default static IP address for all
Ethernet Settings		^	Matrix N Family readers is:
Use DHCP			
IP Address	192 🔷 168 🖨 3 🗘	100 🜩	IP Address = 192.168.3.100
Subnet Mask	255 👟 255 👟 255 🖨	0 🗬	IF Address = 192.100.3.100
Gateway Address		0 🌩	
DNS 1 Address	0 🔷 . 0 🖨 . 0 🌩	0 🜩	
Keep Alive Timeout (ms)		5000 🚔	
Internal Network Settings		^	
Reading Point Address		0 💌	
Internal Network Role	Slave	-	
Device Description			
Internal Network Baud Rate	500Kb	•	
X-PRESS Configuration		^	
Configuration Status		-	
Cancel	ОК		
		J	

Any previously saved configurations on the device will remain in memory, but the Default configuration is set as the startup configuration.

4.9.3 Restore Factory Defaults

In order to return a device to its absolute Factory default parameters (for example device replacement) it is necessary to use the **Restore Factory Defaults** command. You will be prompted to confirm.

All Environment parameters will be restored to Factory default values **and any existing configurations stored on the device will be erased**. The device will be reset and therefore start in run mode with the factory default configuration.

4.10 SOFTWARE RESET

At any time the device can be reset by the Restart Device command (O) in the DL.CODE Device Menu.



CAUTION: Remember to save the current configuration before restarting.

4.11 WEB MONITOR

Web Monitor is a remote monitoring tool provided to visualize the Matrix reader in its run-time environment. You can access it from the DL.CODE Task area or directly from your browser by inputting the IP address of the reader. The reader must available on the LAN.

This works on major browsers (also on smartphones and tablets), which support HTML5 (see the table below).

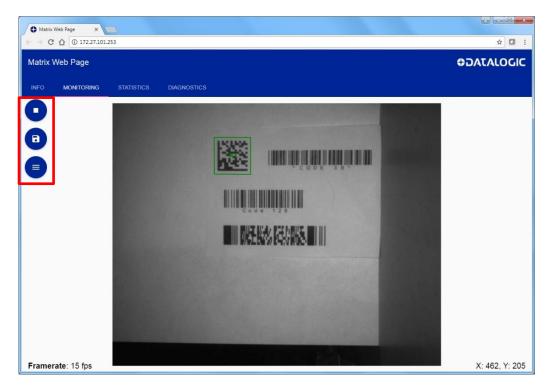
Chrome	Firefox	Edge	IE	Safari	iOS	Android	IE Mobile
latest	latest	14	11	10	10	Nougat (7.0)	11
						Marshmallow (6.0)	
		13	10	9	9	Lollipop (5.0, 5.1)	
			9	8	8	KitKat (4.4)	
				7	7	Jelly Bean (4.1, 4.2. 4.3)	

The Matrix Web Page provides the following features:

Info page:

atrix Web Page				OJATAGO
Device Info		Network Info		
Device Name	Matrix	DHCP	Disabled	
Model	M300N 434-010	IP Address	172.27.101.253	
Order Number	937600088	Subnet Mask	255.255.0.0	
Serial number	C14P00630	Gateway	0.0.0.0	
Software Version	1.5.0.528-RC01	MAC Address	00:07:BE:01:25:FE	
Environment Schema Version	7.9.7			
Job Schema Version	12.4.2			
Plugin Version	UnknownVersion			
Current Device	Configuration			
Running	Default			
Startup	Default			

Monitoring Page:



0	The Stop/Play button allows you to stop image monitoring to save a particular image. The reader continues to run, only the monitored image is stopped.
	The Save image button automatically downloads the current image as a jpg file to the browser's default Download folder. The default naming syntax is image_weekday month day year.jpg (i.e. image_Fri Sep 29 2017.jpg)
	 The options button opens an options panel on the Monitoring window which allows setting: the quality of the image to monitor, (higher quality images reduce framerate) show only positive results (good read) add Framerate reporting to the Monitoring window add x,y Coordinates to the Monitoring window. The coordinates report the mouse position over the monitored image (in pixels). To close the options panel, click on the image area.

Statistics Page:

4

atrix Web Page				OJAJAG\$
FO MONITORING STATISTICS DIAGNOST	TICS			
Analysis Statistics		c	Global Statistics	c
ame	Value	96	Name	Value
ood Reads	15192	99.97	Read Codes	15192
o Reads	5	0.03	Acquired Images	15204
ultiple Reads	0	0.00	Frame Rate	15
artial Reads	0	0.00		
Analysis Chart				

Diagnostics Page:

Matrix Web Page ×		
→ C û 172.27.101.253		¢ 🖸
Matrix Web Page		⇔ DATALOGIC
INFO MONITORING	STATISTICS DIAGNOSTICS	
Diagnostics		
Alarm Code	Description	Status
1	Slave No Reply	•
64	Slave Address Duplication	•
171	Protocol Index Failure	•
185	Backup Memory Communication Failure	•
187	Wrong Rotary Switch Selection	•
189	Fieldbus Communication Failure	•
191	Fieldbus Type Mismatch	•
193	Fieldbus Configuration Error	•

5 DATA COLLECTION METHODS

5.1 CODE COLLECTION

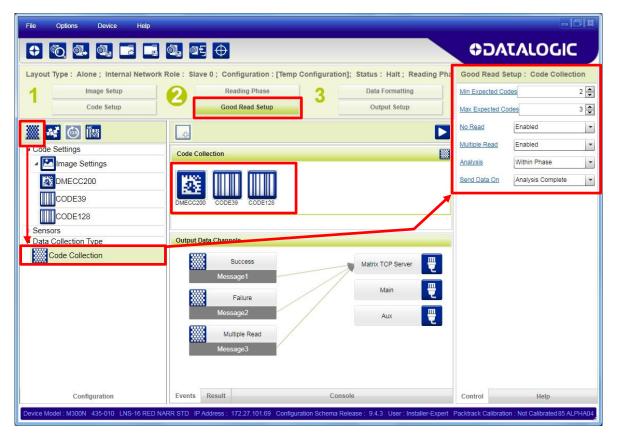
Valid Operating Modes: Continuous, One Shot, Phase Mode, PackTrack

In Code Collection mode the reader can collect several codes before providing a single output result.

The number of codes to be collected is set by the *Min Expected Codes* and *Max Expected Codes*.

The type of output message sent to the host depends on the *No Read* and *Multiple Read* parameter settings and can be modified and formatted in the Data Formatting Output Group.

Example:



As shown in the figure above, the following parameters are set:

The DMECC200, CODE39 and CODE128 code types are enabled and present in the Code Collection.

Min Expected Codes = 2; Max Expected Codes = 3; No Read is Enabled; Multiple Read is Enabled

Case 1: two or three codes (of the enabled code types) are read

Output: the content of **Message 1 Success** is sent to the Host. This corresponds to a Good Read message and by default contains the code content.

Case 2: one code is read

- Output: the content of **Message 2 Failure** is sent to the Host. This corresponds to the No Read message because it doesn't satisfy the minimum expected codes criteria.
- Case 3: four codes (of the enabled code types) are read
- Output: the content of **Message 3 Multiple Read** is sent to the Host. This corresponds to the Multiple Read message because it exceeds the maximum expected codes criteria.

If the Multiple Read parameter is Disabled, then Case 3 is considered a Good Read and the content of **Message 1 Success** is sent to the Host containing the first three decoded codes.

In Phase Mode, by setting *Analysis* to *Within Phase* only the reading phase is considered and a single result is provided to the user for each phase. On the other hand, by selecting *Within An Image* the reader searches for the defined number of codes within each acquired image and a result is provided to the user after each image decoding.

5.2 CODE COMBINATION

Valid Operating Modes: Continuous, One Shot, Phase Mode, PackTrack

In Code Combination mode the output results sent to the Host depend not only on the codes read but on meeting their configured logical combination criteria.

Example:

File Options Device Help		- 5 ×
	Ω, @Ξ ⊕	ODATALOGIC
Layout Type : Alone ; Internal Network F	ole: Slave 0; Configuration: [Temp Configuration]; Status: Halt; Reading Pha	Good Read Setup : Code Combination
Image Setup	2 Reading Phase 3 Data Formatting	No Read Enabled
Code Setup	Good Read Setup Output Setup	Partial Read Treat as No Read 💌
💹 🧟 🚳 🕅		Multiple Read Enabled
Code Settings	Code Combination - (QR XOR DMECC200) AND (CODE128)	Analysis Within Phase 💌
▲ P Image Settings	Expected Code1 Expected Code2	Send Data On Analysis Complete
DMECC200		
2 QR	QR DMECC200 CODE128	
Sensors A Data Collection Type	Output Data Channels	
Code Combination	Good Read Matrix TCP Server	
	🔏 Multiple Read Main 🚆	
	Message2 Aux 🕎	
	No Read	
	Message3	
Configuration	Events Result Console	Control Help
Device Model : M300N 435-010 LNS-16 RED NA	R STD_IP Address : 172.27.101.69 Configuration Schema Release : 9.4.3 User : Installer-Expert	Packtrack Calibration : Not Calibrated 85 ALPHA04

As shown in the figure above, the following parameters are set:

The DMECC200, QR Code and CODE128 types are enabled and present in the Code Combination with the following logical combination:

DMECC200 OR QRCode AND Code128.

No Read is Enabled; Multiple Read is Enabled; Partial Read is treated as No Read

- Case 1: codes (DMECC200 AND Code128) or (QR Code AND Code128) are read
- Output: the content of **Message 1 Good Read** is sent to the Host. This message by default contains the code content.
- Case 2: only one of the three codes (DMECC200, QR Code or Code128) is read
- Output: this is a Partial Read which, in this example, is treated as a No Read. The content of **Message 2 No Read** is sent to the Host.
- Case 3: all three codes (DMECC200, QR Code and Code128) or (only DMECC200 and QR Code) are read
- Output: the content of **Message 3 Multiple Read** is sent to the Host.

If the Multiple Read parameter is Disabled, then for Case 3:

- all three codes read (DMECC200, QR Code and Code128), is considered a Good Read and the content of Message 1 Good Read is sent to the Host containing one of the 2D codes (whichever was decoded first) AND Code128.
- reading (only DMECC200 and QR Code), is considered a Partial Read which, in this example, is treated as a No Read and the content of Message 2 No Read is sent to the Host.

In Phase Mode, by setting *Analysis* to *Within Phase* only the reading phase is considered and a single result is provided to the user for each phase. On the other hand, by selecting *Within An Image* the reader searches for the defined combination of codes within each acquired image and a result is provided to the user after each image decoding.



NOTE: In Code Combination mode, the configured expression can contain up to a maximum of 50 codes.

5.3 CODE PRESENTATION

Valid Operating Modes: Continuous, One Shot, Phase Mode (Motion Sensor)

In Code Presentation mode typically a code is placed in front of the reader manually and the successful output results are sent to the Host. Usually No Reads are disabled and the configuration should correctly manage Multiple Reads.

Example:

File Options Device Help			-101×
	₫, ₫Ę ⊕	ODAT	
Layout Type : Alone ; Internal Network	Role: Slave 0; Configuration:[Temp Configuration]; Status: Halt; Reading Pha	Good Read Set	tup : Code Presentation
Image Setup	Reading Phase 3 Data Formatting	No Read	Disabled 💌
Code Setup	Good Read Setup Output Setup	Code Filter Depth	1 🛋
🔤 🛃 🙆 🕅		Threshold Type	Counter Threshold 👻
Code Settings		Success Threshold	0 🔺
⊿ 🛃 Image Settings	Code Presentation	Failure Threshold	1 🛋
	DMECC200 CODE128 CODE39		
▷ Sensors			
Data Collection Type Code Presentation	Output Data Channels		
Code Presentation	Success Matrix TCP Server		
	Message1		
	Aux 🚆		
		-	
Configuration	Events Result Console	Control	Help
Device Model : M300N 435-010 LNS-16 RED NA	RR STD IP Address : 172.27.101.69 Configuration Schema Release : 9.4.3 User : Installer-Expert	Packtrack Calibration	: Not Calibrated 85 ALPHA04

As shown in the figure above, the following parameters are set:

The DMECC200, CODE128 and CODE39 types are enabled and present in the Code Presentation:

No Read is Disabled; Code Filter Depth is 1, and multiple reads are handled by the Acquisition Counter Threshold: Success Threshold=0, Failure Threshold=1.

Case 1: any code or combination of codes (of the enabled code types) is read in a single acquisition.

Output: the content of **Message 1 Success** is sent to the Host containing one occurrence of all of the decoded codes. This message by default contains the code content.

Case 2: any code or combination of codes is presented to the reader repeatedly

Output: this is a multiple read condition which is managed as follows:

- Success Threshold=0, the same code (by content and type) cannot be read in successive acquisitions.
- Failure Threshold=1, the same code (by content and type) can only be read after at least 1 acquisition without a code.

5.4 MATCH CODE

In Match Code mode the output results sent to the Host depend on whether the codes read meet the match code criteria or not.

5.4.1 User Defined

Valid Operating Modes: Continuous, One Shot, Phase Mode

Example:

File Options Device Hel	þ.	-101×
		ODATALOGIC
Layout Type : Alone ; Internal Networ 1 Image Setup Code Setup Code Setup Code Settings CODE39 Sensors Data Collection Type	k Role : Slave 0 ; Configuration : [Temp]; Status : Halt ; Reading Phase: Continuous Reading Phase 3 Data Formatting Good Read Setup 3 Output Setup Match Code - (CODE39) Image: Code1	Good Read Setup : Match Code Match Code Events No Read Enabled Match Code Data Match Code Input User Defined Expected Content O* Capture from decoded image
Match Code	CODE39 Output Data Channels	WildCard * Placeholder ?
	Message1 Matrix TCP Server Match Code Main No Match Code Aux Message3 ID-Net	
Configuration	Events Result Console	Control Help

As shown in the figure above, the following parameters are set:

CODE39 type is enabled and present in the Match Code:

No Read is Enabled; Match Code Input is User Defined where the Expected Content = "0*" (all codes must begin with zero but can be followed by any string – wildcard).

- Case 1: a CODE39 type is read and its content begins with 0 (zero).
- Output: the content of **Message 1 Match Code** is sent to the Host. This message by default contains the code content.
- Case 2: a CODE39 type is read but its content does not begin with 0 (zero).
- Output: the content of **Message 2 No Match Code** is sent to the Host.
- Case 3: no CODE39 type is read.

Output: the content of **Message 3 No Read** is sent to the Host.

5.4.2 Input Based

Valid Operating Modes: One Shot, Phase Mode

The reading phase is typically controlled by Input 1 (Trigger) while Input 2 is used for Match Code saving. An alternative is to control the reading Phase by sending strings from one of the available communication Channels.

Example:

5

File Options Device H	elp		- 6 8
		ODAT	
Layout Type : Alone ; Internal Netw	ork Role : Slave 0 ; Configuration : [Temp]; Status : Halt ; Reading Phase: Phase Mod	Good Read Set	up: Match Code
Image Setup	Reading Phase Q Data Formatting	Match Code Event	is ^
Code Setup	Good Read Setup Output Setup	No Read	Enabled
		<u>Analysis</u>	Within Phase
		Send Data On	Analysis Complete
Code Settings	Match Code - (DMECC200)	Match Code Data	^
✓ Image Settings	Expected Code1	Match Code Input	Input Based 💌
		Input Slots	1 🔦
Sensors A Data Collection Type		O_Input 1_	
Match Code	DMECC200	Input 2	High
	Output Data Channels	Saving Options	Permanent
		Configuration Name	Match Code from Input
	Matrix TCP Server	Expected Content	🕒 🕂
	Message2 Main		
	Aux 🕎 Message3		rom decoded image
	No Read ID-Net	WildCard Placeholder	*
		- Stocholder	
Configuration	Events Result Console	Control	Help
Device Model : M300N 435-010 LNS-16 R	ED NARR STD IP Address: 172.27.31.30 Configuration Schema Release: 10.17.2 User: Inst	aller-Expert Packtrac	k Calibration : Not Calibrated7

As shown in the figure above, the following parameters are set:

Data Matrix ECC 200 type is enabled and present in the Match Code:

No Read is Enabled; Match Code Input is Input Based (captured by the Input 2 High state), Saved to Permanent memory with configuration job name = "Match Code from Input".



NOTE: Capturing the Match Code on Input must be done either in Monitor or in RUN mode (disconnected from DL.CODE). You cannot capture the match code on input from the DL.CODE configuration environment.

Switch to Monitor and trigger a reading phase <u>while Input 2 is in the High state</u> (for this example).

The code will be read, saved in the Expected Content list and the entire job will be saved to the configuration name "Match Code from Input".



Return to the Configuration Environment.

Open Device Configuration	×	Configuration : Match Code from	m Input; Status : Halt ; Reading P	Good Read S	etup : Match Code	
Default		Reading Phase	Data Formatting	Match Code Ev	ents	
1.2.0 Prod master slave 18 June 2015	×	ood Read Setup	Output Setup	No Read	Enabled	
Icd vericode Match Code from Input	×			Analysis	Within Phase	
min-reflectance	×			Send Data On	Analysis Complete	
new test	×	MECC200)	(iter			
Phase Mode	×			Match Code Inp	ut Input Based	
💼 rectangular DPM advanced mode	×			Input Slots		1
test 1websenntinel	×			O Input 1	1.0-6	_
UPS Ground	× .	nnels		Input 2 Saving Options	High	-
et as Startup Configuration OK Cance		Message1	Matrix TCP Server		ame Match Code from Ir	
		cii code	Main	Expected Conte	nt	

If you choose the Temporary Saving Option, you will need to save the job manually from the configuration environment as with all other configurations.

- Case 1: a DMECC200 type is read and its content matches a code in the Expected Content list.
- Output: the content of **Message 1 Match Code** is sent to the Host. This message by default contains the code content.
- Case 2: a DMECC200 type is read but its content does not match a code in the Expected Content list.
- Output: the content of **Message 2 No Match Code** is sent to the Host.
- Case 3: no DMECC200 type is read.

5

Output: the content of **Message 3 No Read** is sent to the Host.

5.5 PRESENTATION MODE

Presentation Mode is a pre-configured case of the Phase Mode Operating Mode. It uses a software Motion Sensor to constantly search for changes in the images during the Idle state. When images change (indicating motion), the reading phase is activated to automatically detect any codes that will be presented to the device.

ce Selection			Help
ine Devices v	Selected Device Details	i	★ Show
	Name	Matrix	Device Selection
M410N 172.27.102.30; Matrix SN: C14P00284	Model	M300N 434-010 LNS-12 RED NARR STD	
SN: C14P00284	Layout Type	Alone	
	Internal Network Role	Slave	CALLED AN ALL TAXABLE CALLED AND ALLED AND ALLED AND ALLED AND ALLED AND ALLED AND ALLED AN
M210N 172.27.30.157; Matrix SN: C14P00452	Status	[Temp] Running	
	Startup Info	ОК	
M410N 172.27.102.17; Matrix	IP Address	172.27.101.253	
SN: C14P00588	Application SW Version	1.5.0.517-BETA05	Contraction of the second seco
_	Loader Version	1.38	
M450N 172.27.102.169; MasterHybrid SN: C15M04969 SN: C15M04969 M300N 172.27.101.153; Matrix SN- C15P00088		ice Configuration	Device List Area Selected Device Information Area
SN: C15P00088	Presentat	ion Mode	Task Selection
M210N 172.27.102.24; Matrix SN: C15P00110	Setup Inte	ernal Network Configuration	Open Device Configuration Presentation Mode
M300N 172.27.101.191; Matrix SN: C16D04762	Packtrack	Calibration	Presentation Proce Ø Setup Internal Network Configuration Ø PackTrack Calibration
M450N 172.27.102.246; Matrix SN: C16I07048	Monitor D	evice	Monitor Device Web Monitor
M120 172.27.102.160; Thormund	Web Moni	itor	

Selecting this task opens DL.CODE with the following default parameter settings:

- Phase Mode Operating Mode
- Phase On and Phase Off connected to Motion Event
- Data Collection Method is Code Presentation
- Code Filter Depth is 1
- Threshold Timeout 2 sec
- Data Matrix symbology enabled.
- Output Message to the Host is sent to the TCP Channel
- Green Spot is illuminated on successful read

File Options Device Help		-151×
		ATALOGIC
	Reading Phase 3 Data Formatting Good Read Setup Output Setup Color	uisition Trigger
Configuration	Result Console Control	Неір

This default is useful for kiosk or cash register applications where a single code is presented to the reader one-at-a-time by hand. The movement is typically < 0.5 m/s and the Focusing Pointer system is enabled during the Idle state to show where the code must be presented. The illuminator is off in the Idle state to avoid constant flashing. Either the code is returned or no message is returned.

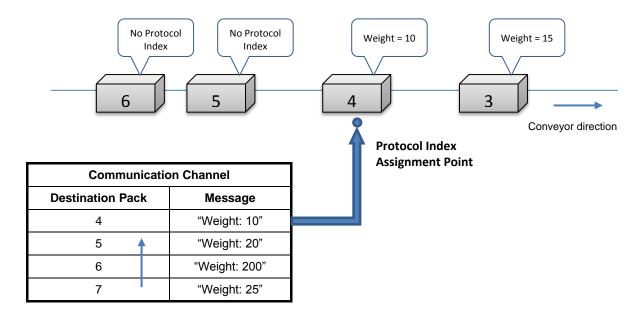
Another type of application is an In-line application where packages are introduced on a relatively slow moving conveyor (< 1 m/s). Typically the Code Combination Data Collection method is used. Either the codes are returned or a No Read message is returned.

The Presentation Mode can also be used with the Code Collection Data Collection method.

6 PROTOCOL INDEX

6.1 OVERVIEW

Protocol Index is a feature allowing a custom message (string) sent from a remote Host to be assigned to a specific reading phase or pack. A typical application is assigning a message containing the weight, dimensions, etc., to each package passing through the system.



Protocol Index can be used either in Phase Mode (during the active reading phase) or in PackTrack operating mode (between the PS Offset and the Tx Line Distance).

Up to 10 different Protocol Indexes can be configured but each one must be transmitted over a dedicated communication channel (source). They can all transmit at the same or different assignment points.

File Options Device Help				- [C] X
	Q. qt ⊕		00	ATALOGIC
Layout Type : Alone ; Internal Network	Role : Slave 0 ; Configuration : Phase Mode; St	tatus : Halt ; Reading Phase: Pa	Reading Phase : F	Protocol Index 1
Image Setup	Reading Phase	Data Formatting	Header <stx></stx>	
Code Setup	Good Read Setup	Output Setup	Terminator <cr><lf></lf></cr>	
₽ 📲 🔜 🗉 📰			Distance of Protocol Ind	dex to trigger (mm) 2000 💌
A Reading Phase			Message Length Type	Fixed Length
General Settings			Message Length	10 🔺
Acquisition Trigger	Matrix TCP Server	Protocol Index 1	Source Channel	Matrix TCP Server
Channels	Main	Protocol Index 2		,
Fieldbuses	Aux Aux			
Sensors	Input 1	ecolution under Ote		
Data Collection Type		Presence Sensor (1)		
Protocol Index Collection Protocol Index 1 Protocol Index 2		Encoder Sensor		

Header and *Terminator* strings must be configured whenever a new Protocol Index object is added to a configuration. Either *Header* or *Terminator* can be blank but not both at the same time.

Typically if the Protocol Index Message Length Type is Variable Length, then both Header and Terminator will be needed.

If the Message Length Type is Fixed Length, then at least the Header or the Terminator is necessary.

6.2 INCLUDING PROTOCOL INDEX IN THE OUTPUT MESSAGE

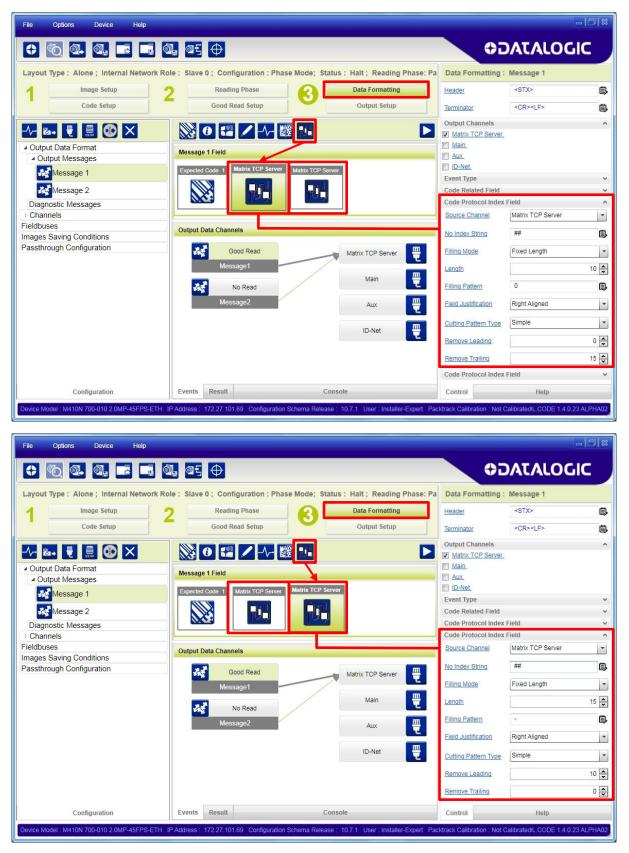
This message (in whole or in part), is also usually included in the output message. Each PI message can be added to the output message by including a Protocol Index Field.

File Options Device Help				
	L 05 0	02	DATALOGIC	
Layout Type : Alone ; Internal Network Ro	le : Slave 0 ; Cominguration : Phase Mode; Status : Hait ; Reading Phase: Pa	Data Formatting :	Message 1	
Image Setup	Reading Phase Data Formatting	Header	<stx></stx>	۵,
Code Setup	Good Read Setup Output Setup	Terminator	<cr><lf></lf></cr>	₿
Coutput Data Format Output Data Format Output Messages Message 1 Message 2 Diagnostic Messages Channels Fieldbuses Images Saving Conditions Passthrough Configuration	Image: Constraint of the state of	Output Channels Matrix TCP Server Main. Aux. ID-Net Event Type Code Related Field Code Protocol Index Source Channel No Index String Filling Mode Length Filling Pattern Field Justification Cutting Pattern Type Remove Leading Remove Trailing	Matrix TCP Server <space> Fixed Length</space>	
Configuration Device Model : M410N 700-010 2.0MP-45FPS-ETH	Events Result Console PAddress: 172.27.101.69 Configuration Schema Release: 10.7.1 User: Installer-Expert Pa	Control cktrack Calibration : Not 0	Help CalibratedL.CODE 1.4.0.23 AL	PHA02

It is usually good practice to add the same PI message to both the Good Read and No Read output messages.

6.3 PARSING A COMPLEX PROTOCOL INDEX MESSAGE

A single complex Protocol Index message coming from a single channel can be received from a Host and can be divided into separate Protocol Index messages in the Data Formatting output message.



For further details on the Protocol Index Message, see the parameter descriptions in the DL.CODE Help On Line Protocol Index page.

7 MESSAGE FORMATTING

Message Formatting is extremely flexible to allow a high level of customization depending on the application requirements. This however makes formatting more complex.



NOTE: A new Script Formatting tool based on javascript is provided to personalize the output message to a higher level than what is available using the standard Output Message tools. This tool is recommended only for people experienced with scripting. For details see par. 7.6.

Here we will break down the main characteristics of the Output Message and describe the standard Output Message tools.

Information relative to code reading is transmitted in standard formats on the device's selected interface. We refer to this as the OUTPUT MESSAGE. The general format of the OUTPUT MESSAGE is:

<HEADER><RESULTS><TERMINATOR>

The RESULTS component is composed of several optional fields which are used in different combinations to create different output messages (like Successful Read, No Read, Statistical Data, Diagnostic Data, etc.). These fields can be inserted into the output message in any order. A list of the formatting fields is given in the table below.

Fields	lcon	Meaning
Code Related		Report various code related information types in the output message: Code Content, Number of Characters, Code Symbology, Pixels Per Element, Average Module Size (mils), Symbol Size, Decoding Time, X-Coordinate, Y- Coordinate, Angle, Slave Number, Bounding Box.
		Each Code Related field can only contain one information type, but you can include multiple Code Related fields in the output message.
Global Statistics	0	Include Global Statistical Counters in the output message.
Global Reading		This field offers different types of information depending on the data collection Analysis Mode and on the Operating Mode. When analyizing within an image, the Image Processing Time can be included in the output message to monitor performance. Typically used for Troubleshooting or fine tuning during installation. For Phase mode, several phase related counters are available. For PackTrack mode you can add the Pack ID to the output message.
Custom	/	Define custom strings to be included in the output message. Typically used to customize Failure messages like No Read or Multiple Read.
Diagnostics	-1/	Monitor individual Diagnostic Failure events by including them in the output message. Typically used for Troubleshooting.
		These can also be included independently from the Code Reading events by defining them in the Diagnostic Message. In this case they will be sent at regular intervals depending on the defined timeout.
Code Quality Grading		Include code quality trending to monitor print quality of code labels.

7.1 FIELD LENGTH MANAGEMENT

7

All field types by default are Variable Length fields but they also support Fixed Lengths with cutting and filling mode options.

Filling Mode	Fixed Length	•
Length		20
Filling Pattern	-	
Field Justification	Left Aligned	-
Referenced Label	Expected Code 1	-
Cutting Pattern Type	Pattern	•
Pattern Cutting Mode	Keep Before	•
Pattern String	<can></can>	Ë,

7.2 INPUT STRINGS

All Input String fields have a table icon to the right of the field which allows you to input all ASCII characters including non-printable characters.

Custom Field										
Custom Lieiu		^	<nul> 00 <spa< th=""><th></th><th>40</th><th>60 <80></th><th>80 <a0></a0></th><th>A0 <c0></c0></th><th></th><th>E0> E0</th></spa<></nul>		40	60 <80>	80 <a0></a0>	A0 <c0></c0>		E0> E0
			<soh> 01 !</soh>	21 A	41 a	61 <81>	81 <a1></a1>	A1 <c1></c1>		E1> E1
Custom String		Ē,	<stx> 02 " <etx> 03 #</etx></stx>	22 B 23 C	42 b 43 c	62 <82> 63 <83>	82 <a2> 83 <a3></a3></a2>	A2 <c2> A3 <c3></c3></c2>		E2> E2 E3> E3
Custom String			<eot> 04 \$</eot>	23 C	43 c 44 d	63 <83> 64 <84>	84 <a4></a4>	A3 <c3></c3>		E3> E3 E4> E4
			<enq> 05 %</enq>	24 D	44 0 45 e	65 <85>	85 <a5></a5>	A5 <c5></c5>		E5> E5
			<ack> 06 &</ack>	26 F	45 f	66 <86>	86 <a6></a6>	A6 <c6></c6>		E6> E6
Filling Mode	Variable Longth	-	<bel> 07 '</bel>	27 G	47 g	67 <87>	87 <a7></a7>	A7 <c7></c7>		E7> E7
Filling Mode	Variable Length		<bs> 08 (</bs>	28 H	48 h	68 <88>	88 <a8></a8>	A8 <c8></c8>		E8> E8
			<tab> 09)</tab>	29 1	49 i	69 <89>	89 <a9></a9>	A9 <c9></c9>		E9> E9
			<lf> 0A *</lf>	2A J	4A i	6A <8A>	8A <aa></aa>	AA <ca></ca>		EA> EA
			<vt> 0B +</vt>	2B K	4B k	6B <8B>	88 <ab></ab>	AB <cb></cb>		EB> EB
			<ff> OC ,</ff>	2C L	4C 1	6C <8C>	8C <ac></ac>	AC <cc></cc>	CC <1	EC> EC
			<cr> 0D -</cr>	2D M	4D m	6D <8D>	8D <ad></ad>	AD <cd></cd>	CD <	ED> ED
			<so> 0E .</so>	2E N	4E n	6E <8E>	8E <ae></ae>	AE <ce></ce>	CE <	EE> EE
		· · · · · ·	<si> OF /</si>	2F O	4F o	6F <8F>	8F <af></af>	AF <cf></cf>	CF <i< td=""><td>EF> EF</td></i<>	EF> EF
			<dle> 10 0</dle>	30 P	50 p	70 <90>	90 <bo></bo>	B0 <d0></d0>		F0> F0
		· · · · · · · · · · · · · · · · · · ·	<dc1> 11 1</dc1>	31 Q	51 q	71 <91>	91 <b1></b1>	B1 <d1></d1>		F1> F1
			<dc2> 12 2</dc2>	32 R	52 r	72 <92>	92 <b2></b2>	B2 <d2></d2>		F2> F2
		· · · · · · · · · · · · · · · · · · ·	<dc3> 13 3</dc3>	33 S	53 s	73 <93>	93 <b3></b3>	B3 <d3></d3>		F3> F3
			<dc4> 14 4</dc4>	34 T	54 t	74 <94>	94 <b4></b4>	B4 <d4></d4>		F4> F4
Custom Field		~	<nak> 15 5</nak>	35 U	55 u	75 <95>	95 <b5></b5>	B5 <d5></d5>		F5> F5
Custom rielu		~	<syn> 16 6</syn>	36 V	56 v	76 <96>	96 <b6></b6>	B6 <d6></d6>		F6> F6
	the second products	2010/01/01	<etb> 17 7</etb>	37 W	57 w	77 <97>	97 <b7></b7>	B7 <d7></d7>		F7> F7
Queters Ofrica	<esc>BB7</esc>	(***)	<can> 18 8</can>	38 X	58 x	78 <98>	98 <b8></b8>	B8 <d8></d8>		F8> F8
Custom String	SEGURDD/	Ē,	 19 9	39 Y	59 y	79 <99>	99 <b9></b9>	B9 <d9></d9>		F9> F9
		1.00	-	3A Z	5A z	7A <9A>	9A <ba></ba>	BA <da></da>	DA <	
			<esc> 1B;</esc>	3B [5B {	7B <9B>	9B <bb></bb>	BB <db></db>	DB <	
Contraction of the state	A REPORT OF A REPORT	1.5354	<fs> 1C <</fs>	3C \	5C	7C <9C>	9C <bc></bc>	BC <dc></dc>	DC <	
Filling Mode	Variable Length	-	<gs> 1D = <rs> 1E ></rs></gs>	3D] 3E ^	5D } 5E ~	7D <9D> 7E <9E>	9D <bd></bd>	BD <dd></dd>		FD> FD FE> FE
	Contraction and the second second second		<rs> 1E > <us> 1F ?</us></rs>	3E O		> 7E <9E>	9E <be></be>	BE <de> BE <de></de></de>		

Just single-click on the desired character to insert it into the string.

While it is quicker to type normal characters directly from your keyboard, non-printable characters must be entered using the table.

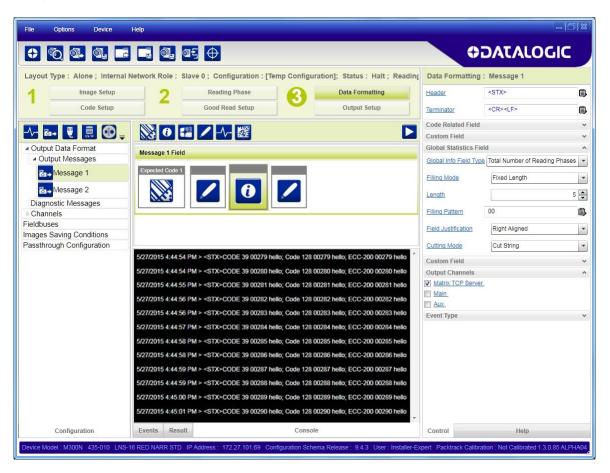
7.3 FIELD SEPARATOR

When Operating Mode is set to Code Collection or Code Presentation, the Field Separator character or string is used to separate each formatted code message within the complete output message #n. For example:

[Header] [formatted Code1] [Field Separator] [formatted Code2] ... [Terminator]

Each defined message #n can have a different Field Separator.

Example:





7.4 INDEPENDENT DIAGNOSTIC MESSAGES

As a troubleshooting tool or for error monitoring a Diagnostic Message can be sent independently from the code reading message.

For demonstration purposes, the figure below shows the Diagnostic Message for a **Backup Memory Communication Failure** being monitored and sent every 3 seconds on the output independently from the code reading output message.

File Options Device Help				
	. Q. QI 🕂	¢ i	DATALOGI	с
Layout Type : Alone ; Internal Netw	ork Role : Slave 0 ; Configuration : [Temp Configuration]; Status : Hal	t; Data Formattir	ng: Message	
Image Setup	2 Reading Phase Data Formatting	Header	<stx></stx>	₿
Code Setup	Good Read Setup Output Setup	Terminator	<cr><lf></lf></cr>	6
		Timeout (ms)		2000 🚔
and the second sec		Diagnostics Field		^
Output Data Format Output Messages	Message Field	Event Type Backu	up Memory Communication Fa	ailure 💌
B. Message 1		Failure Mask Form	ASCII	•
B. Message 2		Failure Message	Backup <space>Failure!</space>	Ē,
Diagnostic Messages		No Failure Messad	ge Ok	6
-/Message		Filling Mode	Variable Length	
▶ Channels				
Fieldbuses Images Saving Conditions	5/27/2015 4:22:57 PM > <\$TX>OK	. Output Channels		^
Passthrough Configuration		Matrix TCP Ser	ver	
	5/27/2015 4:22:57 PM > <stx>Code 128 00147 helio</stx>	Main_		
	5/27/2015 4:22:57 PM > <stx>Code 128 00148 hello</stx>	Aux		
	5/27/2015 4:23:00 PM > <stx>OK</stx>			
	5/27/2015 4:23:03 PM > <stx>OK</stx>			
	5/27/2015 4:23:03 PM > <stx>Code 128 00149 helio</stx>			
	5/27/2015 4:23:06 PM > <stx>OK</stx>			
	5/27/2015 4:23:06 PM > <stx>Code 128 00150 helio</stx>			
	5/27/2015 4:23:09 PM > <stx>OK</stx>			
	5/27/2015 4:23:09 PM > <stx>Code 128 00151 helio</stx>			
	5/27/2015 4:23:10 PM > <stx>Code 128 00152 helio</stx>			
	5/27/2015 4:23:11 PM > <stx>Code 128 00153 hello</stx>			•
Configuration	Events Result Console	Control	Help	
Device Model : M300N 435-010 LNS-16 RE	D NARR STD IP Address: 172.27.101.69 Configuration Schema Release: 9.4.3 Use	r : Installer-Expert Paci	ktrack Calibration : Not Calibra	atedHA04

Typically only the Failure string is defined to avoid unnecessary message traffic.

Only upon failures, the Failure Mask sends a fixed 32-character mask. Each character represents the Standalone/Master device + 31 Slaves. The ASCII mask sends 0 = OK and 1 = Failure. The Binary mask sends non-printable characters.

The mask is appended to the Failure Content message (if defined).

This monitoring could be sent to another channel so as not to interfere with data communication, for example to another Matrix TCP Server connection, as shown below.

File Options Device Help		- 15 1
0 0 0 0 0 0 0 0 0 0 0 0	C¢	ATALOGIC
Layout Type : Alone ; Internal Network Role : Slave 0 ; Configuration : [Temp Configuration]; Sta	tus : Halt ; Data Formatting :	Message
1 Image Setup 2 Reading Phase 2 Data Formatt	ting Header	<stx></stx>
Code Setup Good Read Setup Output Setu	Terminator	<cr><lf></lf></cr>
∿ № ₹ 🕲 🗙 🖊 🗸-	Timeout (ms)	2000
	Diagnostics Field	
Output Data Format A Output Messages	Event Type Backup M	emory Communication Failure
Brew Message 1	Failure Mask Format	ASCII
Message 2	Failure Message	Backup <space>Failure!</space>
Diagnostic Messages	No Failure Message	Ok (
-1/-Message	Filling Mode	Variable Length
Channels		
Matrix TCP Server 1	Output Channels	
Hatrix TCP Server 2	Matrix TCP Server	
Main Good Read	ver 1	<u></u>
Messager	Aux.	
eldbuses No Read Matrix TCP Ser	ver 2 🚆	
nages Saving Conditions Message2 Main		
assthrough Configuration		
Aux Aux		
· • [
Configuration Events Result Console	Control	Help
	Control	

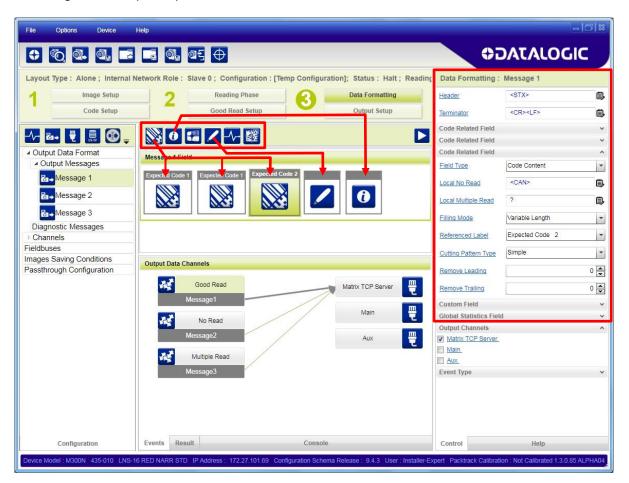
Several Diagnostic fields can be added to the Diagnostic Message for complete monitoring.



7.5 CODE COMBINATION MESSAGE FORMATTING EXAMPLE

In Code Combination the expected result is always known in terms of code reading. To simplify these examples we will not consider Code Cutting or Justification, all fields are considered with the default value as Variable Length fields.

Recalling the example in par. 5.2:



The DMECC200, QR Code and Code128 types are enabled and present in the Code Combination with the following logical combination:

DMECC200 OR QRCode AND Code128.

No Read is Enabled; Multiple Read is Enabled; Partial Read is treated as No Read

Click on the various field icons to add them to the Message Field Area to compose the message.

You can drag them into different positions to change the ordering of the message fields.

You can also delete them by selecting the field with the mouse (highlighted in green), and then delete it using your keyboard.

Then modify the Data Formatting parameters of each field in the parameters panel.

The Data Formatting Parameters are:

Message 1 = Good Read Header String = <STX> Terminator String = <CR><LF>

Referenced Label = Expected Code 1 Code Related Field = Code Symbology Code Related Field = Code Content

Referenced Label = Expected Code 2 Code Related Field = Code Content

Custom Field Custom String = <Space>->Space>

Global Statistics Field Global Info Field Type = Total Number of No Reads

Message 2 = No Read Custom Field Custom String = <CAN>

Message 3 = Multiple Read Custom Field Custom String = <?>

The Output Messages are:

Case 1: codes (DMECC200 AND Code128) or (QR Code AND Code128) are read Output: the content of **Message 1 Good Read** is sent to the Host.

1/3/2013 3.37.101 Mix -31X-j@1@1-C00eC00e 120-0		
1/9/2015 3:37:17 PM > <stx>]Q1QR-CodeCode 128 - 0</stx>		
1/9/2015 3:37:26 PM > <stx><can></can></stx>	No Read	
1/9/2015 3:37:35 PM > <stx>]d1ECC-200Code 128 - 1</stx>		
1/9/2015 3:37:36 PM > <stx>]d1ECC-200Code 128 - 1</stx>		
1/9/2015 3:37:39 PM > <stx>]d1ECC-200Code 128 - 1</stx>		7
1/9/2015 3:37:40 PM > <stx>]d1ECC-200Code 128 - 1</stx>		
1/9/2015 3:37:41 PM > <stx>]d1ECC-200Code 128 - 1</stx>		Ξ
1/9/2015 3:51:20 PM > <stx>?</stx>	Multiple Read	
1/9/2015 3:52:39 PM > <stx>]d1ECC-200Code 128 - 1</stx>		

7.6 SCRIPT FORMATTER

7

Script formatting is designed to allow the highest level of output message configuration in place of the standard Output Message tools. It is recommended only for people experienced with scripting and can be enabled from the Data Formatting – General Settings branch.

File Options Device H	elp	
0 🖸 🕹 🖸 🔍	0. E I 0. 05 🕂	⇔ DATALOGIC
Layout Type : Alone ; Internal Netwo	ork Role : Standalone ; Configuration : [Temp]; Status : Halt ; Reading	Data Formatting : General Settings
Automatic Setup Advanced Setup	2 Reading Phase 3 Data Formatting Good Read Setup Output Setup	Custom Aim 1D PDF417
Output Data Format General Settings	General Settings Field	Custom Aim 2D DMECC200
Output Messages Message 1 Message 2		Custom Aim Posta Australia Post
Diagnostic Messages Channels	put Data Channels	
Fieldbuses Images Saving Conditions Passthrough Configuration	Message1 Matrix TCP Server	Enable Script Formatter
	Message2 Main No Read Aux	
	ID-Net	

The Script Formatter will now replace the Output Messages branch. It is complete with several editing tool icons to facilitate scripting within the DL.CODE GUI.

File Options Device Help		-68
Automatic Setup Advanced Setup	Role : Standalone : Configuration : [Temp]: Status : Halt ; Reading Phase 2 Reading Phase Good Read Setup Output	rmatting Output Channels
Output Data Format General Settings Diagnostic Messages Script Formatter Channels Fieldbuses		
Images Saving Conditions Passthrough Configuration	Output Data Channels Script Matrix TCP Server Main serialchannel1 Aux serialchannel2 ID-Net idnetchannel0	

Script Formatter is based on an embedded JavaScript engine. For DL.CODE version 1.5.0 and later, the embedded JavaScript engine conforms to ECMAScript 5.0/5.1 Language Specification.

7.6.1 Global Objects

Inside the script engine, the script code makes it possible to access some global objects:

Statistics - an object to access device global reading statistics

Diagnostics – an object to access device diagnostic information

7.6.2 Callbacks

Function: onResult

This callback function is called every time the code analysis completes and allows for program controlled customized formatting of one or more messages based on decoding data results.

Argument	Туре	Description
result	Result	Allows access to all the decoding data
output	<u>Output</u>	Allows access to all the output messages

Example:

This simple example accesses information wrapped inside the *Result* object to extract the content of all the decoded codes content and concatenate it into a space separated string. The generated string is then used as the output message by accessing the *Output* object.

```
function onResult(result, output) {
    var message = '';
    result.codes.forEach(function(code) {
        message += code.content + ' ';
    });
    output.setMessage(message ? message : 'no_read');
}
```

7.6.3 Objects Reference

Result Object

7

Provides functions to access decoding data.

Property	Туре	Description		
codes	Array	The array of all the decoded Code objects.		
slots	Array	The array of all the configured <u>Slot objects</u> . The array contains a Slot object for each <i>Expected Code</i> in <i>Code Combination</i> . If the current Data Collection is not of type <i>Code Combination</i> , the property is set to undefined .		
images	Array	The array of all the decoded images <u>Image objects</u> .		
success	Boolean	This is set to true if the current result is a <i>Good Read</i> , <i>Success</i> or <i>Match</i> , otherwise it is set to false .		
addresses	Array	The array of device addresses that decoded at leas one code. Address 0 corresponds to the Maste address.		
readingCount	Number	The total number of decoded codes in the reading phase.		
rejectedCodes	Number	The number of decoded codes removed from th output based on the analysis. An example counting multiple read codes when the <i>Multiple Rea</i> event is disabled.		
imageProcessingTime	Number	Average time used to decode an image.		
imageld	Number	The current image identifier. This is meaningful only if <i>Analysis</i> is <i>Within An Image</i> .		
phaseld	Number	The current phase identifier. This is meaningful onl if <i>Reading Phase</i> is set to <i>Phase Mode</i> and <i>Analysi</i> is <i>Within Phase</i> .		
phaseDuration	Number	The duration of the last phase.		
phaseOffDuration	Number	The duration of the last phase off period.		
packld	Number	The current pack identifier. This is meaningful only if <i>Reading Phase</i> is set to <i>PackTrack Mode</i> .		

Code Object

Property	Туре	Description	
content	String	The content of a code as a String.	
center	Point	The center position of the code inside the image.	
corners	Array	The four corners of the bounding box of the code as an array of <u>Point objects</u> .	
addresses	Array	The array of device addresses that decoded this code. Address 0 corresponds to the Master address.	
binaryContent	Uint8Array	The content of the code as an Uint8Array.	
symbology	String	The code symbology name.	
aimId	String	The AIM identifier of the code symbology.	
angle	Number	The code angle.	
рре	Number	The code pixels per element.	
moduleSize	Number	The code module size.	
decodingTime	Number	The decoding time in microseconds.	
symbolSize	String	The code symbol size (if applicable).	
quality	QualityMetrics	The <u>Quality Metrics object</u> that contains all the quality metrics info for the code.	
imageIndex	Number The index number of the image containing code. This value is undefined if the code been decoded on a slave device.		

Provides access to the data of a single decoded code.

Quality Metrics Object

Provides access to the quality metrics of a single decoded code. Each metric returns an object with two properties:

grade – a string representing the quality grade (A, B, C, etc.)

value – a numeric representation of the quality.

Property	Туре	Description		
overall	Object	Overall quality grade.		
decode	Object	Decode grade and value.		
contrast	Object	Contrast grade and value.		
modulation	Object	Modulation grade and value.		
decodability	Object	Decodability grade and value.		
meanEdgeContrast	Object	Mean Edge Contrast grade and value.		
axialNonUniformity	Object	Axial Non Uniformity grade and value.		
uec	Object	Unused Error Correction grade and value.		
printGrowth	Object	Print Growth grade and value.		
minReflectance	Object	Minimum Reflectance grade and value.		
defects	Object	Defects grade and value.		
fixedPatternDamage	Object	Fixed Pattern Damage grade and value.		
gridNonUniformity	Object	Grid Non Uniformity grade and value.		





Point Object

This is an object with the x and y pixel coordinates of a point on an image. Values are relative to the upper left corner of the image (0,0).

Property	Туре	Description		
x	Number	The x coordinate (increases from left to right).		
У	Number	The y coordinate (increases from top to bottom).		

Slot Object

A slot corresponds to a single *Expected Code* in *Code Combination*. This object provides functions to access the <u>Code objects</u> associated with the Expected Code.

Property	Туре	Description
codes	Array	The array of all the <u>Code objects</u> assigned to this slot.

Image Object

Provides access to the data of a single decoded image.

Property	Туре	Description
processingTime	Number	The decoding time in microseconds.
imageld	Number	The current image identifier.

Output Object

Provides a function to set the output message to be sent on the output channel(s).

Function	Arguments	Description
setMessage	string, channel_id (optional)	Sets the output message. If no <i>channel_id</i> is specified, the message is sent to all connected channels, otherwise it is sent only to the specified channel (which has to be connected to the script message in any case). At the end of the formatting script execution, for each channel, the system sends its specific message, if it exists, otherwise it sends out the generic message.
setEvent1	none	Set Script Event 1. If called, the event will be generated at the end of the script execution. From the Output Setup group, the event can be linked to any available output.
setEvent2	none	Set Script Event 2. If called, the event will be generated at the end of the script execution. From the Output Setup group, the event can be linked to any available output.
setEvent3	none	Set Script Event 3. If called, the event will be generated at the end of the script execution. From the Output Setup group, the event can be linked to any available output.

Statistics Object

Property	Туре	Description		
phases	Number	Number of Reading Phases.		
goodReads	Number	Number of Good Reads.		
noReads	Number	Number of No Reads.		
multipleReads	Number	Number of Multiple Reads.		
partialReads	Number	Number of Partial Reads.		
phaseOverrun	Number	Number of Phase Overruns.		
triggerOverrun	Number	Number of Trigger Overruns.		
unexpectedPhaseOn	Number	Number of Unexpected Phase Ons.		
images	Number	Number of Image Acquisitions.		
fps	Number	Current frames per second.		

Provides access to global device statistics.

Diagnostics Object

Provides access to global device diagnostics. Each diagnostic returns an object with the following properties:

alarm – a flag set to true if the alarm is currently active, otherwise it is set to false.

addresses – an array of numbers where every number is the address of the device that has activated the alarm. If the alarm equals **false**, the array is empty. Address 0 corresponds to the Master address.

Property	Туре	Description	
slaveNoReplay	Object	Slave No Reply diagnostic alarm.	
slaveAddressDuplication	Object	Slave Address Duplication diagnostic alarm.	
fieldbusCommunicationFailure	Object	Fieldbus Communication Failure diagnostic	
	_	alarm.	
fieldbusDHCPFailure	Object	Fieldbus DHCP Failure diagnostic alarm.	
fieldbusConfigurationFailure	Object	Fieldbus Configuration Failure diagnostic	
		alarm.	
fieldbusTypeMismatch	Object	Fieldbus Type Mismatch diagnostic alarm.	
wrongRotarySwitch	Object	Wrong Rotary Switch diagnostic alarm.	
backupMemoryCommunication	Object	Backup Memory Communication Failure	
Failure		diagnostic alarm.	
xrfSlaveNotDetected	Object	XRF Slave Not Detected diagnostic alarm.	
protocolIndexFailure	Object	Protocol Index Failure diagnostic alarm.	
sc5000CommunicationFailure	Object	SC5000 Communication Failure diagnostic	
		alarm.	
sc5000PresentationMessageRe	Object	SC5000 Presentation Message Response	
sponseFailure		Failure diagnostic alarm.	
noCameraHeadFailure	Object	No Camera Head Failure diagnostic alarm.	

7.6.4 Script Event Digital Output Control

7

As well as the output message configuration, the script can also contain Output object functions that can drive the reader's outputs.



8 MONITOR

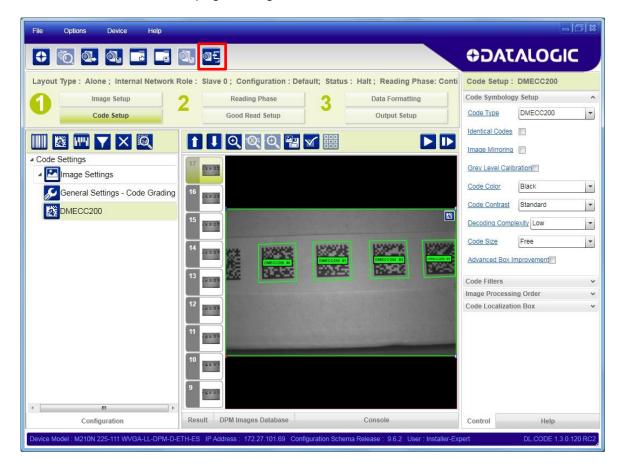
The Monitor feature is designed to check device operation from a remote PC even simultaneously with other monitoring PCs.

It can be used during installation or troubleshooting to check the device operation. The device operates with a minimum of DL.CODE overhead and therefore reading results are much closer to real-time performance.

Monitor also provides diagnostic alarm feedback.

8.1 ACESSING THE MONITOR

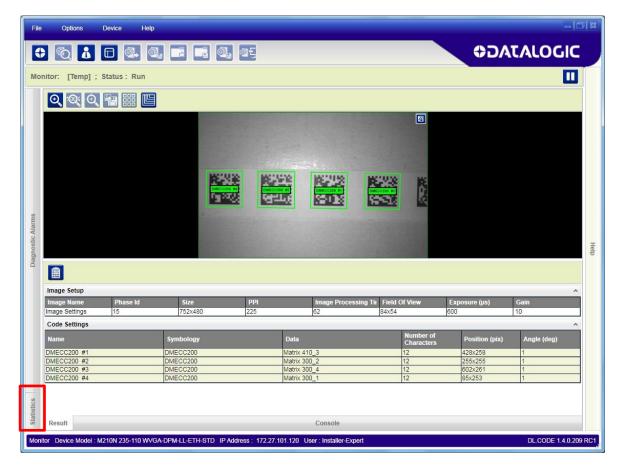
You can access the Monitor page through the File menu or the Monitor icon.



8

8.2 MONITORING STATISTICS

The Monitor loads with the reader in run mode. If the device is reading (in Continuous operating mode or One Shot/Phase Mode with trigger active), the reader will show image acquisition. The Results area underneath the image gives feedback on decoding results.



The Statistics page is collapsed to the left side of the DL.CODE window and can be opened by clicking on the its tab.

-

File Options Device Help		
	, a f	
Monitor: [Temp Configuration] ; Status :	Run	
Description Absolute Number of Decoded Codes 106990 Good Read Count 11887 (99.9%) Partial Read Count 0 (0.0%)		8
No Read Count 6 (0.1%) Multiple Read Count 0 (0.0%) 111		
•		Hep
	3/6/2015 10.48.53 AW > <\$1.5 Matrix 410_3Matrix 300_4Matrix 300_2 3/6/2015 10.48.54 AM > <\$1.5 Matrix 410_3Matrix 300_4Matrix 300_2	
	3/6/2015 10:48:54 AM > <stx>Matrix 410_3Matrix 300_4Matrix 300_2 3/6/2015 10:48:54 AM > <stx>Matrix 410_3Matrix 300_4Matrix 300_2</stx></stx>	
	3/6/2015 10:48:54 AM > <stx>Matrix 410_3Matrix 300_4Matrix 300_2</stx>	
	3/6/2015 10:48:54 AM > <stx>Matrix 410_3Matrix 300_4Matrix 300_2 3/6/2015 10:48:55 AM > <stx>Matrix 410_3Matrix 300_4Matrix 300_2</stx></stx>	
	3/6/2015 10:48:55 AM > <stx>Matrix 410_3Matrix 300_4Matrix 300_2</stx>	
	3/6/2015 10:48:55 AM > <stx>Matrix 410_3Matrix 300_4Matrix 300_2</stx>	
	3/6/2015 10:48:56 AM > <stx>Matrix 410_3Matrix 300_4Matrix 300_2 3/6/2015 10:48:56 AM > <stx>Matrix 410_3Matrix 300_4Matrix 300_2</stx></stx>	
Statistics Diagnostic Alarms	Result Con	isole
Monitor Device Model : M210N 225-111 WVGA-LL-E	OPM-D-ETH-ES IP Address : 172.27.101.69 User : Installer-Expert	t DL.CODE 1.3.0.85 ALPHA04

You can resize the various windows by dragging the edges with the mouse.

You can toggle between table view and chart view statistics by clicking on the icon.

File Options Device	e Help						- 151 ×
		वम्			O E	οΑτΑιος	JIC
Monitor: [Temp Configur	ration]; Status: R	un					
		000					
Description	Absolute			-		1	
Number of Decoded Codes	105109						
Good Read Count	99.9%						
Partial Read Count	0.0%		Marries and	-		L. Stars	
No Read Count	0.1%		Reven	Real Second	16. W.S.	MACK INC.	
Multiple Read Count	0.0%		Ser C	503	1957	8	
				and the second			

You can also switch between Session and Absolute statistics.

₩ 📺 🕨 🕄	
Desci Session Numb V Absolute	
Good Read Count	
Partial Read Count	
No Read Count	
Multiple Read Count	

- Session Statistics: show only the fields selected that are represented as a percentage, rate, or average (i.e. Good Read, Partial Read, No Read, Average Pack Size, etc.) and refer to the last session or the last time the Statistics were reset up to the maximum Session number of reading phases. See below. A session ends if the device is connected to the DL.CODE configuration environment.
- Absolute Statistics: show all the fields selected in the Device menu > Settings > Configuration Settings > Statistics > Enabled Counters list from the last device power on or the last time the Statistics were reset.

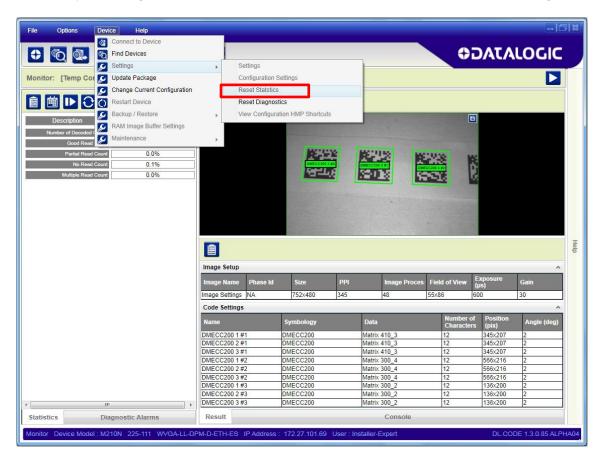
8.2.1 Statistics Settings

From the Device menu > Settings > Configuration Settings you can set the number of reading phases to monitor for a Session (from 10 to 1000).

You can also choose which fields to visualize in the Monitor Statistics page.

Configuration		
Configuration Name	Default Configuration	
Configuration Version	12.4.2	
Statistics		,
Session (Num. Reading Phases)		1000 🛓
Enabled Counters	 Elapsed Time (sec) Phase On Count Pack Count Valid Code Count Reading Phase Count Trigger Overrun Count Number of Decoded Codes Encoder Errors Count Number of Spurious Phases Good Read Count Partial Read Count No Read Count Multiple Read Count Successful Collection Count Failed Collection Count 	E
WebSentinel Configuration		`
SC5000 Configuration		`
Crisplant Configuration		
Status	Disabled	
Cancel	ОК	

You can reset all the statistics (both Session and Absolute) clicking on the Reset Statistics icon **O** or by selecting the Reset Statistics command from the Device menu > Settings.



8.3 MONITORING DIAGNOSTIC ALARMS

8

Any Diagnostic Alarms will show up as a warning light on the alarm panel. Most Alarms are relative only to Standalone or Master readers.

File	Options Device Help			- 0 8
•	0],		¢DATALOGIC
Monito	or: [Temp] ; Status : Run			
				Q & Q 🔛 🎬 🛄
Alarm Code	Description	Master	Slave 1	
1	Slave No Reply	۲	۲	
64	Slave Address Duplication	•	•	
71	Protocol Index Failure	۲	•	
85	Backup Memory Communication Failure	•	•	14:14-04
87	Wrong Rotary Switch Selection	•	•	
89 91	Fieldbus Communication Failure	•		
	Fieldbus Type Mismatch Fieldbus Configuration Error			CODE 39
93 95	Fieldbus DHCP Problem			
95 101	No XRF Slave(s) Detected			
< [+	
Statistic	cs Diagnostic	Alarms		Result Console
Monitor	Device Model : M410N 700-010 2.0MP-45F	PS-ETH IP Address :	172.27.101.70	70 User : Installer-Expert : Packtrack Calibration : Not Calibrated DL.CODE 1.4.0.113 BETAG

Alarm	Description	Meaning
	Description	meaning
Code		
1	Slave No Reply	No response to master from slave (shown in slave column)
64	Slave Address Duplication	Two or more slaves have the same address
171	Protocol Index Failure	The expected Protocol Index is not received
185	Backup Memory	There is a communication error between the reader and the
	Communication Failure	external memory (BM100 module inside the CBX connection box
		or QLM Gateway).
187	Wrong Rotary Switch Selection	One or more of the selected BM100 Rotary Switch settings inside
		the CBX doesn't match the reader configuration memory.
189	Fieldbus Communication	There is a communication error between the reader and the
	Failure	Fieldbus module inside the CBX connection box or QLM Gateway.
191	Fieldbus Type Mismatch	The Fieldbus module inside the CBX doesn't match the one saved
		in the reader configuration memory.
193	Fieldbus Configuration Error	A configuration error has occurred between the reader and the
		Fieldbus module inside the CBX connection box.
195	Fieldbus DHCP Problem	A communication problem has occurred between the DHCP
		server and the Fieldbus module inside the CBX connection box or
		QLM Gateway.
201	No XRF Slave(s) Detected	The XRF Master must have at least one XRF Slave.
301	SC5000 Communication	There is a communication error between the reader and the
	Failure	SC5000 Controller
302	SC5000 Presentation	There is a configuration error between the reader and the SC5000
	Message Response Failure	Controller, typically TX Line position or start position (address).
999998	Camera Head Failure	There is a communication error between the reader and its
		internal camera module.

8.4 MONITOR SETTINGS

8.4.1 Monitor Images Options

Several options can be set for the Monitor window. They are set in the Options>UI Settings menu on the Monitor tab.

Enable Image and Results Transfer: enables the image feedback in the Monitor window.

Display ROI on Image: shows the bounding box around each code on the image.

Enable Code Localization Map shows...

Display Phase on Image: shows the Phase identification number in white letters over the upper left-hand side of the image.

Display Image Resolution: shows the Image resolution in white letters over the upper lefthand side of the image.

Image Scaling Factor: allows downsizing the image subsampling to increase the visualization performance.

8.4.2 View Window

You can select several options to view in the Monitor window.

Console: shows the Console panel to view output messages.

Configuration: shows the Configuration panel to allow viewing the configuration parameters (read-only). Configuration cannot be performed from the Monitor window.

Statistics/Diagnostics: shows the Statistics and Diagnostic Alarms panels.

Automatically start Run Mode in Monitor: when launching Monitor the window opens with the device in Run Mode. This is the default setting.

Configuration	Monitor		Globa	l Settings	
Monitor Images	Options				~
View Window					^
Console		V			
Configuration					
Enable Statistics/[Diagnostics	V			
Automatically star in Monitor	t Run Mode	V			
Ci	ancel		[OK	

Configuration	Monitor	Global Setting	s
Monitor Images	Options		^
Enable Image And Transfer	l Results		
Display ROI on Im	age		
Enable Code Loca	lization Map		
Display Phase on I	Image		
Display Image Res	olution		
Image Scaling Fac	tor (%)	100%	•
View Window			~
	Cancel		K

9 IMAGE SAVING

9.1 DEVICE IMAGE BUFFER

The Device Image Buffer allows saving captured images to the internal device memory (RAM) for data collection analysis. These images can either be sent to a remote or local PC or an FTP server at run time; or they can be downloaded from the buffer when the device is offline (not in run mode).



CAUTION: The internal device memory has a circular buffer to avoid overrunning the available memory. To save images correctly to the internal buffer, you need to calculate the number of images the buffer can hold based on the image resolution for your device model.

More images can be stored in memory by scaling down the image size.

File Options Device Help		
	0, 05	⇔ DATALOGIC
Layout Type : Alone ; Internal Network I 1 Image Setup Code Setu	Role : Slave 0 ; Configuration : [Temp Configuration]; Status : Halt ; Reading 2 Reading Phase Good Read Setup Output Setup Images Saving Conditions Field Output Data Channels Good Fead Message1 No Read Message2 Aux	Data Formatting : Images Saving Conditions Maximum Depth 50 ♀ Scaling Factor 100 ♦



NOTE: Transferring images remotely may slightly reduce the decoding rate. It is recommended to use this feature only when enough time is available to guarantee the decoding of all images.

Image Saving Conditions

Maximum Depth sets the total number of images that can be sent from or saved to the Device Image Buffer. Set this figure to a practical value taking into consideration the above mentioned CAUTION.

Scaling Factor allows reducing the size of images to be saved so that a greater number of images can be saved in the Device Image Buffer.

9.1.1 Image Saving Using Matrix TCP Server/Client

To add an image saving condition to the configuration, click on the Add Image Saving Condition icon.

ile	Options	Device	Help								-	6I
0	0	o.	2	Q.	⊴ € ⊕					ODA	TALOGIC	
ayout	Type : Alone	; Intern	al Netwo	rk Role : S	Slave 0; Confi	guration : Defa	ult Configur	ation; Status : Halt ; F	teading	Data Formattin	g : Images Saving	
1	Imag	le Setup		2	Reading	j Phase	8	Data Formatting		Image Destination	Remote	
-	Cod	e Setup			Good Re	ad Setup		Output Setup		Send Image On	Analysis Complete	
	→ ₹		×			- ∖- [₩2				Saving Condition	 On Good Read On No Read 	
	u Data Forma tout Message			Images Sa	aving Field					Header	<stx></stx>	(
100										Terminator	<cr><lf></lf></cr>	
100										Image Format	Bmp	
Chan		es		Output Da	ita Channels					Send Image From	Matrix TCP Server	
and the second second	es Saving Cor			180		d	1	Matrix TCP Server	2			
	mages Saving ough Configui			સર્વ	Message1 No Read		/	Main	2			
					Message2			Aux	2			
				6	Images Sav	ing		ID-Net	2			
	Configurat	-		Events	Result		Conse			Control	Help	

When selecting a Remote **Image Destination**, the default value is **Send Image From** Matrix TCP Server (on-board Ethernet) channel to an external TCP Client. If desired, a different dedicated Matrix channel can be added for image transfer.

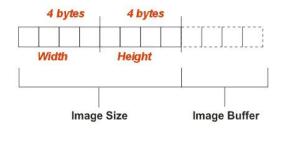
According to the selected **Saving Condition** parameter, after data collection analysis is complete, images can be sent at run time directly from the Device Image Buffer to a remote or local PC.

The Image Saving format is:

[Header] [Image Buffer] [Terminator]

The Image Buffer contains the image data in the selected format (.bmp, .jpg, .png, .tif).

If the RAW data format is selected, the Image Buffer data is preceded by 8 bytes which indicate the image size: the first 4 bytes indicate the image columns (width) while the last 4 bytes indicate the image lines (height) in little-endian ordering.



9.1.2 Image Saving Using Matrix FTP Client

Images can be sent at run time directly from the device image buffer to an external FTP Server through a Matrix FTP Client channel. The Matrix FTP Client must be added as a new communication channel since it is disabled by default. Do this by selecting the channel icon.

File Options Device Help		
	0, 05 0	
Layout Type : Alone ; Internal Netwo	rk Role: Slave 0; Configuration: Default Configuration; Status: Halt; Reading	Data Formatting : Matrix FTP Client
Image Setup	2 Reading Phase Data Formatting	User Name guest
Code Setup	Good Read Setup Output Setup	Password datalogic
		Passive Mode
Output D Matrix TCP Client		Server Address 127.0.0.1
Output D Matrix TCP Server Matrix UDP Client	Client Field	Server Port 21
Matrix FTP Client		L
Message 2		
Diagnostic Messages	Output Data Channels	-
Matrix TCP Se ver		-
Hain	Good Bead Matrix TCP Server	
Aux	Main	
Matrix FTP Client		
Fieldbuses	Message2 Aux	
Images Saving Conditions	Images Saving	

- The Server Address must match the external FTP Server PC.
- The Username and Password must match the ones required by the external FTP Server PC.

Now select Images Saving and set the Send Image From parameter to Matrix FTP Client.

Input the name of the Remote Folder on the FTP Server to which the image files must be saved.

File Options Device Help		- C ×
		ODATALOGIC
Layout Type : Alone ; Internal Netw	ork Role : Slave 0 ; Configuration : Default Configuration; Status : Halt ; Reading	Data Formatting : Images Saving
Image Setup	2 Reading Phase Data Formatting	Image Destination Remote
Code Setup	Good Read Setup Output Setup	Send Image On Analysis Complete
B 👻 🛄 🐼 🗙		Saving Condition On Good Read
Output Data Format Output Messages	Images Saving Field	Image Format Bmp 🔻
Message 1		Remote Folder No Read Images
Message 2		Send Image From Matrix FTP Client
Diagnostic Messages	Output Data Channels	
🚆 Matrix TCP Server	Good Rease Matrix TCP Server	
Aux	No Read Main	
Matrix FTP Client	Message2 Aux 🗮	
Fieldbuses Images Saving Conditions Images Saving Passthrough Configuration	Matrix FTP Client	

9.1.3 Image Saving On Demand to WebSentinel FTP Server

Images can be sent to the WebSentinel FTP Server through a Matrix FTP Client channel upon receiving a Download command from Datalogic WebSentinel[™] through the Download buttons in the Event Search tab. See the description in the Datalogic WebSentinal User's Manual.

This selection applies only to One Shot and Phase Mode Operating Modes.



NOTE: In order for Datalogic WebSentinel to communicate with the Matrix array you must enable WebSentinel Monitor Status in the DL.CODE Device>Settings>Configuration Settings menu.

Configuration		~
Statistics		~
WebSentinel Configuration		^
WebSentinel Monitor Status	Enabled	•
Master Diagnostics Check Period (sec.)		3 💌
Cancel		OK

The Matrix FTP Client must be added as a new communication channel since it is disabled by default. Do this by selecting the channel icon.

File	Options	Device	Help						-[6]×
Ð	© 0 .	0,		.	45 ⊕			¢D∧	TALOGIC
Layou	it Type : Aloi	ne ; Interna	al Network	Role :	Slave 0 ; Configuration : Defa	ult Configur	ation; Status : Halt ; Readir	g Data Formatti	ng : Matrix FTP Client
1	Im	age Setup		2	Reading Phase	6	Data Formatting	User Name	anonymous
	C	ode Setup		-	Good Read Setup		Output Setup	Password	anonymous
-/	81+ 🖷 .		X		0 @ / 小膠			Passive Mode	
⊿ Out		CP Client						Server Address	127.0.0.1
	utpu Matrix 1	CP Server			Client Field			Server Port	21
di na seconda	Matrix F	TP Client							
2	Message .								
Diag ⊿ Cha	nostic Messa nne <mark>l</mark> s	ages		Output [Data Channels				
#	Matrix TCP	Server		160	Good Read		Matrix TCP Server		
#	Main				inessage1				
	Aux	+		12	No Read		Main \! 🗒		
픹	Matrix FTP	Client		-	Message2		Aux		
Fieldb		onditions							
	ges Saving C Images Savi			o	Images Saving		Matrix FTP Client		
	nrough Config	-							

- The Server Address must match the external WebSentinel FTP Server PC.
- The Username and Password must match the ones required by the external WebSentinel FTP Server PC. For WebSentinel the defaults are **anonymous**, **anonymous**.

Now select Images Saving and set **Send Image On** to Demand and set the **Send Image From** parameter to Matrix FTP Client.

Input the name of the Remote Folder on the FTP Server to which the image files must be saved.

File Options Device Help		
	a a a a	⇔ DATALOGIC
Layout Type : Alone ; Internal Netw	ork Role: Slave 0; Configuration: Default Configuration; Status: Halt; Rea	ading Data Formatting : Images Saving
Image Setup	2 Reading Phase 3 Data Formatting	Image Destination Remote
Code Setup	Good Read Setup Output Setup	Send Image On Demand
- <u></u> ₽, ₹ 🗐 🕲 🗙	0 🖬 🖊 🕂 🧱	Saving Condition On Good Read
Output Data Format Output Messages	Images Saving Field	Image Format Bmp
Message 1		Remote Folder No Read Images
Message 2		Send Image From Matrix FTP Client
Diagnostic Messages	Output Data Channels	
Matrix TCP Server	Good Read Matrix TCP Server	
🚆 Aux	No Read	
Fieldbuses	Message2 Aux	
Images Saving Conditions	Matrix FTP Client	
Passthrough Configuration		
Configuration	Events Result Console	Control Help
Device Model : M300N 472-010 LQL-9 LT-DPM	I STD IP Address : 172.27.101.69 Configuration Schema Release : 9.6.2 User : Installer-Exp	ert Packtrack Calibration : Not Calibratedl .3.0.78 ALPHA02

9.1.4 Image Saving On Demand Using Send Images HMP Command

Images can also be sent to a remote destination through a Matrix communication channel (typically to an FTP Server through a Matrix FTP Client channel), upon receiving a **Send Images** command from the Host. See the Matrix N Family Host Mode Programming manual for details on this command.

This selection applies only to One Shot and Phase Mode Operating Modes.

9.1.5 Image Saving Using Internal Buffer

Images can be saved to the Device Image Buffer and be downloaded to a PC when the device is offline.

File Options Device Help		
	01. OS	⇔ DATALOGIC
Layout Type : Alone ; Internal Network R 1 Image Setup Code Setup • Output Data Format • Output Messages • Output Messages • Message 1 • Message 2 Diagnostic Messages • Channels Fieldbuses • Images Saving Passthrough Configuration	Cole : Slave 0 ; Configuration : [Temp Configuration]; Status : Halt ; Reading 2 Reading Phase Good Read Setup Output Setup Output Setup Images Saving Field Output Data Channels Good Read Matrix TCP Server Main Images Saving Main Images Saving Main Images Saving Main Images Saving	Data Formatting : Images Saving Image Destination Image Condition On No Read Image Format
Configuration Device Model : M210N 225-111 WVGA-LL-DPM-D	Events Result Console -ETH-ES IP Address : 172.27.101.69 Configuration Schema Release : 9.4.3 User : Installer-F	Control Help Xxpert DL.CODE 1.3.0.85 ALPHA04

To download the saved images, the device must be in offline mode. Through the Device menu>RAM Image Buffer you can access the **Image Buffer Management** window.





Upon opening this window, the images in the Device Image Buffer (RAM) are transferred to the DL.CODE Device Image Buffer Management window and the images are deleted from the device RAM.

You can save all the images in a zip file to the PC or you can delete the images from the DL.CODE Image Buffer Management memory.

9.2 UI IMAGE BUFFER

The UI Image Buffer manages the images captured through the DL.CODE Play and Capture features.

	File Options Device Help			- 61
		. 05	ODAT.	ALOGIC
		le: Slave 0; Configuration: [Temp Configuration]; Status: Halt; Reading	Image Setup :	Image Settings
	Restore UI to Default	Reading Phase 🧿 Data Formatting	Image Quality	
	Code Setup	Good Read Setup Output Setup	Image Polarity In	ersion
			Exposure Time (u	e) 600
			Gain	30
	Code Settings	1	Gain Multiplier	x2
	Image Settings			C~ 1
UI Settings		20 20	Internal Lighting	ery High-Power Strobed
Configuration Monitor Global Settings		1º Tal Marine	Sectors	 ✓ Top ✓ Bottom
Console Settings *				☑ Left
JI Image Buffer		The second second		Right
Buffer Size 20 🛋		T The Alter		ge Auto-Setup
PPM Images Database			Reading Distance	
uffer Size 10 💌		The second secon	Reading Distance	
ew Window 🗸				cus Autolearn
cktrack Calibration 🗸			Cropping Region	Area
evice Recalibration 🗸 🗸		14 100		
nd Devices		13		
nable Automatic Device Discovery			*	
Cancel OK	Configuration	Result TH-ES IP Address 172 27.101.69 Configuration Schema Release 9.4.3 User Instater-E	Control	Help LCODE 1.3.0.85 ALPHA04

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10 MULTI DEVICE CONFIGURATION OPTIONS



NOTE: DL.CODE now supports several different multi device configuration types using the PASS-THROUGH configuration. In particular this feature allows MULTIDATA ID-NET network configurations to be made. Master/Slave SYNCHRONIZED ID-NET network configurations are also configurable as before.

10.1 PASS-THROUGH CONFIGURATIONS

Starting from software version 1.3.0, DL.CODE and Matrix N family readers support passthrough multi device configurations.

The pass-through configuration allows individually working devices (Alone), to collect data from other devices (also working Alone), and pass this data to a third device through a different communication channel. See the figure below as an example.

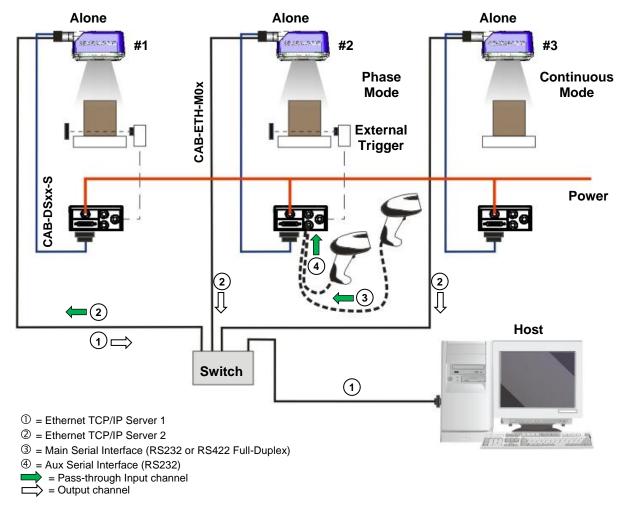


Figure 8 – Example Pass-through Layout

The following screenshots show the configuration settings for the three devices in the example above.

Layout Type : Alone ; Internal Network Rol	e: Slave 0; Configuration: Station 1; Statu	s: Halt; Reading Phase: Phase	Data Formatt	ing : Passthrough	
Deciden #4	Reading Phase	Data Formatting	Header	<stx></stx>	۵,
Reader #1	Good Read Setup	Output Setup	Terminator	<cr><lf></lf></cr>	₿,
			Passthrough Inj	put Data	^
사 🖬 📱 🔝 🗙			Header	<stx></stx>	۵,
Output Data Format Output Messages	Passthrough Field		Terminator	<cr><lf></lf></cr>	₿
Message 1			Input Channel	Matrix TCP Server 2	•
Message 2	10011 00111 11010		Passthrough Co	ontent Field	~
Diagnostic Messages			Output Channel		^
▲ Channels			Matrix TCP Se		
Hatrix TCP Server 1	Output Data Channels		Matrix TCP Se	arver_2	
Hatrix TCP Server 2	Good Read	Matrix TCP Server 1	Aux		
삍 Main	Message1				
	No Read	Matrix TCP Server 2			
Fieldbuses	Message2	m			
Images Saving Conditions	Messagez	Main \! 🗒			
Passthrough Configuration	Matrix TCP Server 2				
Passthrough	Passthrough	Aux			

Layout Type : Alone Internal Network	Role : Slave 0 ; Configuration : Station 2; Status : Halt ; Reading Phase: Phase	Data Format	ting : Passthroug	jh 2
	Reading Phase Data Formatting	Header	<stx></stx>	₿
Reader #2	Good Read Setup Output Setup	Terminator	<cr><lf></lf></cr>	۵,
		Passthrough II	nput Data	^
A- B+ 📱 🗐 🚯 🗙		Header	<stx></stx>	۵,
Output Data Format Output Messages	Passthrough 2 Field	Terminator	<cr><lf></lf></cr>	6
Message 1		Input Channel	Aux	•
Message 2	10013	Passthrough C	Content Field	~
Diagnostic Messages	(11010)	Output Channe		^
 Channels 		Matrix TCP S		
Hatrix TCP Server 1	Output Data Channels	Matrix TCP S	server 2	
TCP Server 2	Good Read Matrix TCP Server 1	Aux		
🕎 Main	Message1			
Terration and the second secon	No Read			
Fieldbuses				
Images Saving Conditions	Message2 Main			
 Passthrough Configuration 	Main m			
Passthrough 1	Passthrough1 Aux			
Passthrough 2				
	Aux Passthrough2			

Layout Type : Alone ; Internal Network F	Role : Slave 0 ; Configuration : Station 3; Statu	s: Halt; Reading Phase: Conti	Data Format	tting:Message 1	
	Reading Phase	Data Formatting	Header	<stx></stx>	5
Reader #3	Good Read Setup	Output Setup	Terminator	<cr><lf></lf></cr>	₿
-\- B+ 🖳 🔝 🗙	🛞 O 🕼 🖊 사 🗱		Code Related	Field	~
			Output Channe	els	^
Output Data Format	Message 1 Field		Matrix TCP s		
 Output Messages 	instalige friend		Matrix TCP S	Server 2	
Message 1	Expected Code 1		Main_		
	NNN		Aux_		
Message 2	NX2		Event Type		~
Diagnostic Messages					
▷ Channels					
Fieldbuses	Output Data Channels				
Images Saving Conditions					
Passthrough Configuration	Good Read Message1	Matrix TCP Server 1			
	No Read	Matrix TCP Server 2			
	Message2	Main			
		Aux			

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10.2 INTERNAL NETWORK CONFIGURATIONS

Internal Network configurations (also called Master/Slave configurations), are designed to collect data from several devices connected together in an ID-NET[™] network and send data output to the Host system.

DL.CODE has a Net Autoset feature for the Internal ID-NET Network which automatically recognizes and assigns addresses to all connected Slave readers.

In order to automatically recognize the ID-NET Slaves, all devices must be physically installed and electrically connected (including ID-NET network wiring).

The general procedure is to:

- 1. Mount all the readers (mechanical and electrical installation) with factory default settings (Layout Type = Alone, Internal Network Role = Slave).
- Connect to the designated Master device in DL.CODE and open the Setup Internal Network Configuration. You will be prompted to change the device to Master. Click OK. The Slave units will automatically be recognized.
- 3. Depending on the application, select Multidata, Synchronized Phase Mode or Synchronized PackTrack Configuration.

Master Configuration

First start with the desired device to assign as ID-NET Master (current default setting is Slave). Click on Setup Internal Network Configuration from the Task area.

ce Selection			Help
ine Devices	, Selected Device Details		▲ Show
	Name	Matrix	Device Selection
M410N 172.27.102.30; Matrix	Model	M300N 434-010 LNS-12 RED NARR STD	
SN: C14P00284	Layout Type	Alone	The second secon
	Internal Network Role	Slave	
M210N 172.27.30.157; Matrix SN: C14P00452	Status	Default Running	
	Startup Info	ок	
M410N 172.27.102.17; Matrix	IP Address	172.27.101.253	Construction Const
M410N 172.27.102.17; Matrix SN: C14P00588	Application SW Version	1.5.0.538-RC02	State
	Loader Version	1.38	
M300N 172.27.101.191; Matrix SN: C14P00616	1		The Device Selection screen allows you to choose an Online Device (Ethernet), Serial Device, or an Offlin Device (Simulator) to work with.
M300N 172.27.101.253; Matrix SN: C14P00630	Task Selection	ice Configuration	Device List Area Selected Device Information Area
M450N 172.27.102.169; MasterHy S SN: C15M04969	Presentat	ion Mode	Task Selection
M300N 172.27.101.153; Matrix SN: C15P00088	Setup Inte	ernal Network Configuration	Open Device Configuration OPresentation Mode
M300N 172.27.102.194; Matrix SN: C15P00094	Packtrack	Calibration	Setup Internal Network Configuration PackTrack Calibration Monitor Device
M450N 172.27.102.246; Matrix SN: C16I07048	Monitor D	evice	Web Monitor
M410N 172.27.101.190; Matrix SN: C16L02245			
M300N 172.27.102.19; Matrix SN: C16P00331	Web Moni	tor	

You will be advised that the device role will be changed to Master.



Click OK. The Net Autoset feature automatically starts to find Slave devices connected to the ID-NET network of the Master.

Vet Autoset	Progress : 51 %	
Connection T	ype: ID-NET	
	20	

When finished, all the Slaves should have been correctly recognized. If not, verify all device connections and power and then repeat the operation by clicking on the Start Net Autoset button.



Internal Network Icons

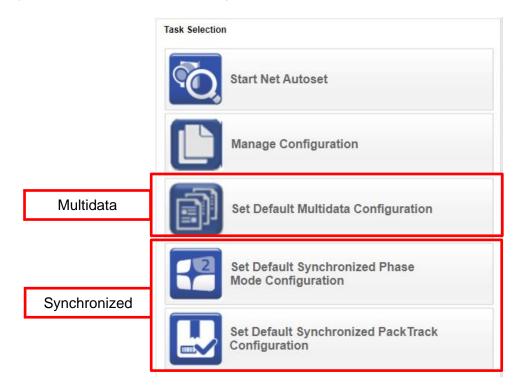
,	Open Device Configuration	Go directly to the Master device configuration without setting one of the default network configurations.
/	Edit Device Description	Set a descriptive name for the device in the internal network, for example a position name: Top, Left, Right, etc. It will be shown in the Internal Network panel. This is not the same as the Device Name in the Settings menu.
Se .	Edit Environment	Go directly to the Slave device environment parameters window.
$\langle \rangle$	Reset Device	Reset the Slave device.
×	Delete Slave	Delete the Slave device from the list.



NOTE: The internal network can be pre-configured by right-clicking (and waiting), on the "add a Device" button under the last slave. Placeholder slave device(s) will be added to the list and a new slave network address for each will be assigned to them. When a device is physically revealed, through the Start Net Autoset button, it will be associated with the first placeholder in the list.

While the entire internal network can be pre-configured, each device must be physically added to the network one-at-a-time in order to be correctly recognized by the network.

Depending on the application, select one of the Default Internal Network Configurations: **Multidata**, **Synchronized Phase Mode** or **Synchronized PackTrack**.



This selection will open a pre-configured job for the Master reader according to the selection. Follow the specific application instructions in the following paragraphs.

10.2.1 Multidata ID-NET Network Configurations

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The Multidata ID-NET network communications between Master and Slave are managed by the application job (configuration) using the pass-through feature. A pre-configured job is loaded with the correct pass-through settings for both the Master and Slaves when the Default Multidata Configuration is selected from the Internal Network Setting feature.

 Complete the configuration of <u>all the application parameters</u> (including Image Settings) and save them to the Master with an application specific name. Optionally, checking the **Save on Slave Device** box can be helpful to save all the current individual Slave configurations with the new configuration *name*. This does not clone any parameters. If not checked, Slave configurations will remain as *Temp* configurations and you will be warned that changes to the Master have not been saved to the Cluster. For Multidata configurations, the option to **Clone Master configuration on Slaves must not be checked**.

File Options Device Help		- D X
	Q, Q5 ⊕	ODATALOGIC
Layout Type : Alone ; Internal Network Role : Master ;	Configuration : [Temp]; Status : Halt ; R ading Phase: Phase Mode	Advanced Setup : CODE128
Automatic Setup 2	Reading Phase 3 Data Formatting	Code Symbology Setup
Advanced Setup	Good Read Setup Output Setup	CODE128
	A Carl Save Configuration on Device	Identical Codes
▲ Code Settings	Save New Configuration (Enter Configuration Name)	Grey Level Calibration
Image Settings	19 Multidata Station 1	Code Color Black
General Settings - Code Grading	Overwrite an existing configuration	Code Orientation Both
		Advanced Box Improvement
CODE39	12 Bearst	Subpixel Decoding Improvement
		Code Aspect Ratio Standard
		Narrow Quiet Zone
		Start/Stop Characters TX
		Characters TX
		Code Filters 🗸
		Image Processing Order Code Localization Box
	8 First Proto Configuration	
	Image: Set as Startup Configuration Image: Save on Slave Device	
	Clone Master Configuration on Slaves	
	6 OK Cancel	
	e a san Para Tara	
Configuration Internal Network View	Result Console	Control Help

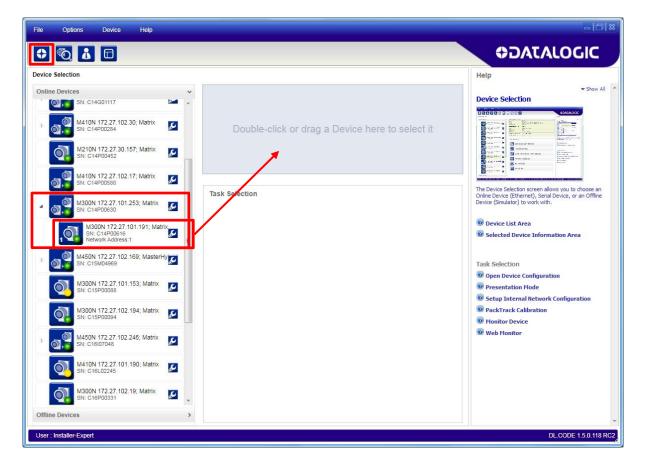
Figure 9 – Saving Multidata Configuration to Master

The jobs must not be cloned because the Master and Slaves have different input/output communication channels. The readers are also working independently from each other, often on separate stations with different code reading requirements, different operating modes, etc.

2. Connect to each Slave reader via Ethernet (see note below), and set all the configuration parameters of each Slave device.



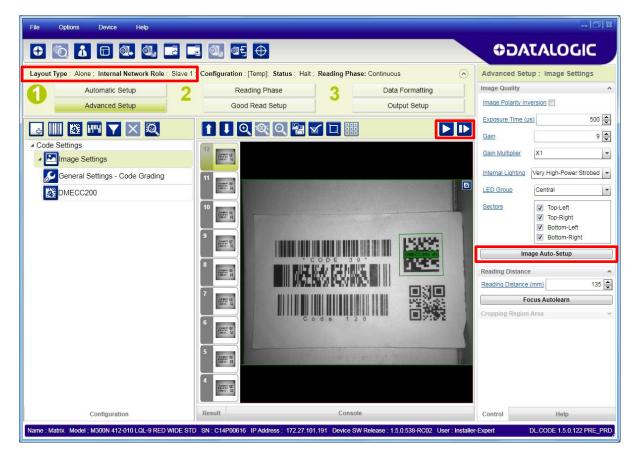
NOTE: If necessary, Slave device photometric (Image Settings) parameters must be configured separately through DL.CODE. This is preferably done through each device's Ethernet TCP/IP channel. If Slave devices are not connected to Ethernet you must temporarily (manually) connect them one by one to perform Image Settings.



Open the Slave specific application job, (it will either have the new name saved from the Master or Temp depending on the **Save on Slave Device** selection).

File Options Device Help					-121 ×
		Φ		OJATACO	GIC
Device Selection				Help	
Online Devices 🗸	Selected Device Details		^		▼ Show All
	Name	Matrix		Device Selection	
M300N 172.27.31.203; Matrix SN: B13P00013	Model	M300N 412-010 LQL-9 RED WIDE STD			ac d
	Layout Type	Alone			- 1
M300N 172.27.101.254; Matrix	Internal Network Role	Slave			
M300N 172.27.101.254; Matrix SN: C13L02659	Status	[Temp] Running		Carlanda	
	Startup Info	OK		Carlos and	
M300N 172.27.30.43; Cuoghi	IP Address	172.27.101.191			
SN: C14GD1117 22	Application SW Version	1.5.0.538-RC02			
	Loader Version	1.38			<u></u>
M410N 172.27.102.30; Matrix SN: C14P00284				The Device Selection screen allows you to Online Device (Ethernet), Serial Device, o	choose an r an Offline
SN: C14P00204	Task Selection		Open Device Con		23
M210N 172.27.30.157; Matrix			open berice con	inguisticit.	
M210N 172.27.30.157; Matrix SN: C14P00452	Onon Dovi	ice Configuration			
	Open Devi	ice configuration	ET. [lemp]		
M410N 172.27.102.17; Matrix			Default		
M410N 172.27.102.17; Matrix SN: C14P00588	Presentati	on Mode			
	Fleseman	on mode			
M300N 172.27.101.253; Matrix					
511.0147.00050	Setup Inte	rnal Network Configuration			
M300N 172 27 101 101: Matrix	tootap mito	ina notion configuration			
M300N 172.27.101.191; Matrix SN: C14P00616					
Network Address:1	Packtrack	Calibration			
M450N 172.27.102.169; MasterH	Packtrack	Guibladon			
SN: C15M04969					
	Monitor De	evice			
M300N 172.27.101.190; Matrix					
SN: C16D04762					
	Web Monit	tor			
M450N 172.27.102.246; Matrix SN: C16I07048			OK	Cancel	
SN: C16ID7048					
4 III +					
Offline Devices >					
					*
Name : Matrix Model : M300N 412-010 LQL-9 RED WI	DESTD SN C1/P00616	Address - 172 27 101 101 Device SW/ Delease - 1	5.0.538-RC02 lear-last	aller-Expert DL.CODE 1.5.0.	122 PRE PRD
Name - Maarx Model - Mo	DE 010 011-014-00010 1	Address . ITZZI . IOT. IST Device Swittelease . I.	3.0.330 1002 User . Insi	DECODE 1.5.0.	IZET NE_FKD

When the configuration opens, pause run mode and set all the application specific configuration parameters (including Image Settings).



Verify the focus and decoding with the capture image **D**.

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3. Now save them, to a <u>new Slave specific application job name</u>¹.

> 💿 🚹 🗖 💁 🖪 🖬	. Q. Q		¢DA	TALOGIC
yout Type : Alone ; Internal Network Role : Slave 1	Configuration	I: [Temp]; Status : Halt ; R ading Phase: Continuous	Advanced Setu	ıp : Image Settings
Automatic Setup 2	R	eading Phase 2 Data Formatting	Image Quality	
Advanced Setup	Go	od Read Setup Output Setup	Image Polarity Inv	ersion
		Save Configuration on Device	Exposure Time (us	<u>s)</u> 500 [
Code Settings		Save New Configuration (Enter Configuration Name)	Gain	9
Image Settings	12	Multidata Station 2	Gain Multiplier	X1
General Settings - Code Grading	11	Overwrite an existing configuration	Internal Lighting	Very High-Power Strobed
DMECC200	angenet (B) angenet (B) angenet (B)		LED Group	Central
	10 		Sectors	 Top-Left Top-Right Bottom-Left Bottom-Right
	THE S		Ima	age Auto-Setup
	8 102742 2014	1	Reading Distance	
			Reading Distance	(<u>mm)</u> 135
	ADUCAL SS			cus Autolearn
	6	Set as Startup Configuration	Cropping Region	Area
	5	OK Cancel		
	Franker St.			

Figure 10 – Saving Multidata Configuration to Slave 1

Repeat this procedure for each Slave device until the entire network is configured.

¹ If **Save on Slave Device** was selected when saving the Master configuration, an application job with the same name (but with all Slave specific configuration parameters), has been saved to the Slaves. No parameters have been cloned from the Master. There are no common parameters managed by the Master for Multidata configurations.

Example Multidata ID-NET Configuration

The Multidata ID-NET network takes advantage of the pass-through configuration to allow all the connected readers to work independently from each other (Layout Type = Alone).

In this way data is collected over the ID-NET network and passed-through the Master to the Host system on a different communication channel. See the figure below as an example.

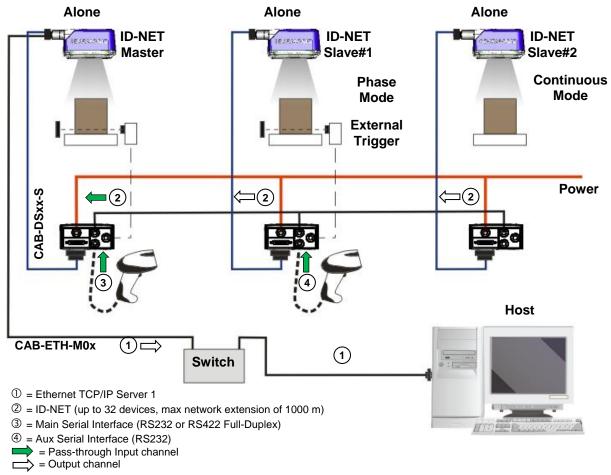
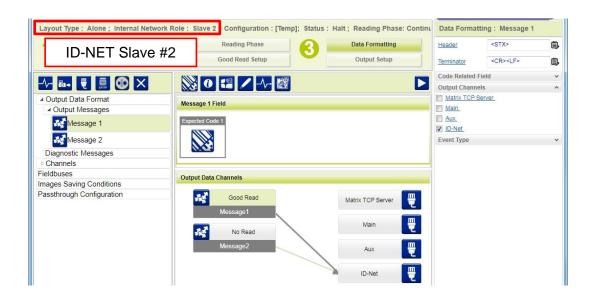


Figure 11 – ID-NET Multidata Layout (Pass-through)

The following screenshots show the pass-through configuration settings for the three devices in the example above.

Layout Type : Alone ; Internal Network Ro	ole: Master Configuration: [Temp]; Status: Halt; Reading Phase: Phase N	Data Format	ting : Passthroug	h 2
	Reading Phase Data Formatting	Header	<stx></stx>	5
ID-NET Master	Good Read Setup Output Setup	Terminator	<cr><lf></lf></cr>	₿,
		Passthrough In	nput Data	^
💤 🛃 📱 🎑 🗙		Header	<stx></stx>	6
Output Data Format Output Messages	Passthrough 2 Field	Terminator	<cr><lf></lf></cr>	₿.
Message 1		Input Channel	ID-Net	•
Message 2	1001.1 001.1 1.010	Passthrough C	ontent Field	¥
Diagnostic Messages	11010	Output Channe		^
▲ Channels		Matrix TCP S	erver	
Hatrix TCP Server	Output Data Channels	Aux		
🚆 Main	Good Read Matrix TCP Server			
🚆 Aux	Message1			
TD-Net	No Read Main			
Fieldbuses	Message2 Aux			
Images Saving Conditions Passthrough Configuration				
Passthrough 1	Main Passthrough1			
Passthrough 2	ID-Net			
	Passthrough2			

Layout Type : Alone ; Internal Network Role :	Slave 1 Configuration : [Temp]; Status :	Halt ; Reading Phase: Phase I	Data Formati	ting : Passthroug	jh
ID NET Clave #1	Reading Phase	Data Formatting	Header	<stx></stx>	6
ID-NET Slave #1	Good Read Setup	Output Setup	Terminator	<cr><lf></lf></cr>	₿.
	7 📖 🖂		Passthrough In	put Data	^
A- B- 🖲 🗐 🗙 🚺	1 📰 🖾		Header	<stx></stx>	6
Output Data Format Output Messages	sthrough Field		Terminator	<cr><lf></lf></cr>	
Message 1			Input Channel	Aux	•
Message 2	10011 00111 11010		Passthrough C	ontent Field	*
Diagnostic Messages			Output Channe		^
Channels			Matrix TCP S	erver	
Matrix TCP Server	put Data Channels		Main Aux		
The main the	Good Read	Matrix TCP Server	D-Net		
🚆 Aux	Message1				
🕎 ID-Net	No Read	Main 🗒			
Fieldbuses	Message2	A			
Images Saving Conditions		Aux 🗒			
Passthrough Configuration	Aux				
Passthrough	Passthrough	iD-Net			



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10.2.2 Synchronized ID-NET Network Configurations

The Synchronized ID-NET network communications between Master and Slave are internally managed by the application software. A pre-configured job is loaded with the Synchronized Layout Type and the correct Operating Mode for both the Master and Slaves when either the Phase Mode or PackTrack Configuration is selected from the Internal Network Setting feature.

1. Complete the configuration of <u>all the application parameters</u> (including Image Settings) and save them to the Master with an application relative name and **with** the option to **Clone Master configuration on Slaves**.



Figure 12 – Saving Synchronized Phase Mode Configuration to Master

2. Connect to each Slave reader via Ethernet (see note below), and set the Slave specific parameters.



NOTE: If necessary, Slave device photometric (Image Settings) parameters must be configured separately through DL.CODE. This is preferably done through each device's Ethernet TCP/IP channel. If Slave devices are not connected to Ethernet you must temporarily (manually) connect them one by one to configure Image Settings.

		DATALOGIC
ice Selection		Help Show
Iline Devices 🗸 🗸		Device Selection
M410N 172.27.102.30; Matrix SN: C14P00284	Double-click or drag a Device here to select it	
M210N 172.27.30.157; Matrix		
M210N 172.27.30.157; Matrix SN: C14P00452	1	C (1) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2
M410N 172.27.102.17; Matrix		
M410N 172.27.102.17; Matrix SN: C14P00588	Task Selection	The Device Selection screen allows you to choose an
M300N 172.27.101.253; Matrix	lask Spection	Online Device (Ethernet), Serial Device, or an Offline Device (Simulator) to work with.
317, 014-00030		Device List Area
M300N 172.27.101.191; Matrix N: C14P00616		Device List Area Selected Device Information Area
Network Address. 1		
M450N 172.27.102.169; MasterHy SN: C15M04969		Task Selection
		Open Device Configuration
M300N 172.27.101.153; Matrix SN: C15P00088		Presentation Mode
M300N 172.27.102.194; Matrix		 Setup Internal Network Configuration PackTrack Calibration
M300N 172.27.102.194; Matrix SN: C15P00094		Monitor Device
M450N 172.27.102.246; Matrix		Web Monitor
SN: C16I07048		
M410N 172.27.101.190; Matrix		
SN: C16L02245		
M300N 172.27.102.19; Matrix SN: C16P00331		
fline Devices >		

Open the cloned application job.

File Options Device Help					
	Q. QI 🕂			DACO	ALOGIC
Device Selection				Help	
Online Devices 🗸	Selected Device Details		^	51 5 (are no	▼ Show All ▲
	Name	Matrix		Device Selection	
M300N 172.27.31.203; Matrix SN: B13P00013	Model Layout Type	M300N 412-010 LQL-9 RED WIDE STD Synchronized			DOM: MOCK
	Internal Network Role	Slave			
M300N 172.27.101.254; Matrix SN: C13L02659	Status	Station 1 Running			A second
SN: C13E02659	Startup Info	ok			
M300N 172.27.30.43; Cuoghi	IP Address	172.27.101.191			Reading Reading and Sectors Provide all Provides and Provide and P
M300N 172.27.30.43; Cuoghi SN: C14G01117	Application SW Version	1.5.0.538-RC02			
	Loader Version	1.38	-	The Device Selection screen	allows you to choose an
M410N 172.27.102.30; Matrix SN: C14P00284			Open Device Co		x)
	Task Selection				
M210N 172.27.30.157; Matrix SN: C14P00452			Default		
SN: C14P00452	Open Dev	vice Configuration	Station 1	[×
M410N 172.27.102.17; Matrix		and the second			
M410N 172.27.102.17; Matrix	Presentat	ion Mode			
	Presenta	tion Mode			
M300N 172.27.101.253; Matrix SN: C14P00630					
	Setup Int	ernal Network Configuration			
M300N 172.27.101.191; Matrix SN: C14P00616	2 +				
Network Address:1					
M450N 172.27.102.169; MasterHybrid	Packtraci	Calibration			
SN: C15MD4969					
M300N 172.27.101.153; Matrix.	Monitor E	Jevice			
			Set as Startup C	Configuration	
M450N 172.27.102.246; Matrix	Web Mon	itor	ОК		Cancel
SN: CTBIU/048					
M300N 172.27.102.19; Matrix					
M300N 172.27.102.19; Matrix SN: C16P00331					
Offline Devices >					-
Name : Matrix Model : M300N 412-010 LQL-9 RED WIDE STD	SN: C14P00616 IP Address:	172.27.101.191 Device SW Release : 1.5.0.538-	RCU2 User : Installer-E	expert	DL.CODE 1.5.0.118 RC2

When the job opens, pause run mode and configure the Slave specific parameters. These depend on the application and include the following:

- photometric parameters (Image Auto-Setup feature in the Advanced Setup Image Settings step)
- Acquisition Trigger Delays necessary to avoid lighting interference between adjacent or oppositely positioned readers (Reading Phase step)
- Images Saving if used (Data Formatting step)
- Encoder Sensor: if used, (for all Slaves, the Encoder Type must be set to Internal)

File Options Device Help				- C ×
	a 🕼 a 🕁 🕁		00A	TALOGIC
Layout Type : Synchronized ; Internal Network Role :	Slave 1 Configuration : [Temp]; Status : Halt ; Reading Pha	ase: Phase Mode	Advanced Setu	p : Image Settings
Automatic Setup	Reading Phase	Data Formatting	Image Quality	^
Advanced Setup	Good Read Setup	Output Setup	Image Polarity Inve	ersion 🕅
			Exposure Time (µs	500 🔿
Code Settings			Gain	7 🖍
Code Settings	4 25 minute 194.04		Gain Multiplier	X1 💌
General Settings - Code Grading			Internal Lighting	Very High-Power Strobed
	S B Brown		LED Group	Central
	2		Sectors	Top-Left
	2 month Sector			 Top-Right Bottom-Left
				Bottom-Right
			Im	age Auto-Setup
			Reading Distance	^
	2 million Vicel Marcina		Reading Distance (mm) 135 🖍
	13 2 mmm CODE128 #1			ocus Autolearn
	Code 128		Cropping Region /	Area 🗸 🗸
	12			
	10			
	Di enterne teant Bablanti			
Configuration	Result Console		Control	Help
Name : Matrix Model : M300N 412-010 LQL-9 RED WIDE ST	SN : C14P00616 IP Address : 172.27.101.191 Device SW Relea	ase : 1.5.0.538-RC02 User : Installer-Exp	ert	DL.CODE 1.5.0.118 RC2

Verify the focus and decoding with the capture image **D**.

							TALOGIC
ayout Type : Synchronized ; Internal Network Role :		ration : [Temp]; Status : Ha			\odot	Advanced Setu Image Quality	p : Image Settings
Automatic Setup	1	eading Phase	3	Data Formatting Output Setup		Image Polarity Inve	rsion
		•	<u> </u>			Exposure Time (µs	500
						Gain	7
Code Settings	4	Save New Configuration	on (Enter Configuration N	ame)		Gain Multiplier	X1
General Settings - Code Grading	3	Overwrite an existing	configuration			Internal Lighting	Very High-Power Strobed
CODE128		Station 1				LED Group	Central
CODE39	2 B amount (Backing 1 B amount (Section (Section) (Secti					Sectors	Top-Left Top-Right Bottom-Left Bottom-Right Bottom-Right Bottom-Setup
	14					Reading Distance	ige Auto-Setup
	20 minute Value 1 Marc Chi					Reading Distance (<u>mm)</u> 135
	13					Fo	cus Autolearn
	SE Mittaine Nation 1 MENE 1944					Cropping Region A	Irea
	12	Set as Startup Configu		ncel			
	11						
	10 36 mmms 1 ₄₀ R (825,001)						
Configuration	Result		Console			Control	Help

3. Now save them, <u>overwriting the cloned application job^2 </u>.

Figure 13 – Saving Synchronized Phase Mode Configuration to Slave

Repeat this procedure for each Slave device until the entire network is configured.

² An application job with the same name as the Master's has been cloned to the Slaves. Each Slave can have its own Image Settings parameters saved in its own copy of the application job. Common parameters managed by the Master such as Operating Mode cannot be modified in the Slave jobs and are shown in dark grey.

Example Synchronized ID-NET Configuration

10

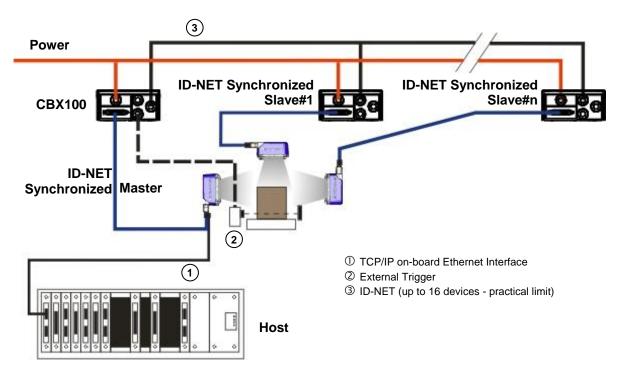
When the device is working in a **Synchronized** Layout Type, the ID-NET connection is used to collect data from several readers to build a multi-point or a multi-sided reading system; there can be one Master and up to 31 Slaves connected together.

The Slave readers are connected together using the ID-NET interface. Every slave reader must have an ID-NET address in the range 1-31.

The Master reader is also connected to the Host on one of its communication channels. In the following example the TCP/IP on-board Ethernet interface is used.

For a Master/Slave Synchronized layout the External Trigger signal is unique to the system; there is a single reading phase and a single message from the Master reader to the Host computer. It is not necessary to bring the External Trigger signal to all the readers.

In the Master/Slave Synchronized layout the Master operating mode can only be set to <u>PackTrack</u> or <u>Phase Mode</u>.



The TCP/IP and ID-NET interfaces are connected as shown in the following figures.

Figure 14 – Example ID-NET Synchronized Layout with Master on-board TCP/IP Ethernet Interface to Host

The Master reader can be connected to the CBX series connection box with the advantage of the Backup and Restore configuration function (CBX + BM100 module).

All devices always support multiple output channels (i.e. for data monitoring).

10.2.3 Verify Master/Slave Synchronized Configuration

From the Master configuration, run the application and monitor the output data from the DL.CODE Console or a configured channel terminal.

If necessary, as a troubleshooting tip, you can temporarily apply the **Reading Mask** field in place of each Code Content field to verify if all devices are reading. To do this:

1. Connect to the Master device via Ethernet and from the Data Formatting step, change each Expected Code Field Type from Code Content to Reading Mask.

File Options Device Help		- C ×
		ODATALOGIC
Layout Type : Synchronized ; Internal Network Role :	Master Configuration : [Temp]; Status : Halt ; Reading Phase: Phase Mode	Data Formatting : Message 1
1 Automatic Setup 2	Reading Phase Data Formatting	Header <stx></stx>
Advanced Setup	Good Read Setup Output Setup	Terminator <cr><lf></lf></cr>
Coutput Data Format Coutput Data Format Coutput Messages Coutput Messages Message 1 Message 2 Diagnostic Messages Channels Fieldbuses Images Saving Conditions Passthrough Configuration	Image: Constant of the second sec	Output Channels ~ Watrix TCP Server Main Main Aux Event Type ~ Code Related Field ~ Code Related Field ~ Code Related Field ~ Code Related Field ~ Reading Mask Format ASCII Reading Mask Format ASCII Variable Longth ~ Local No Read <can> Eilling Mode Variable Length Variable Length ~ Referenced Label Expected Code 2 Cutting Pattern Type Simple Remove Leading 0 🗢</can>
Configuration Internal Network View	Events Result Console	Control Help
Name : Matrix Model : M300N 434-010 LNS-12 RED NARR S	TD SN: C14P00630 IP Address: 172.27.101.253 Device SW Release: 1.5.0.538-RC02 User: It	nstaller-Expert DL.CODE 1.5.0.122 PRE_PRD



2. Run the application and monitor the output data from the DL.CODE Console or a configured channel terminal.

		OJATALOC	
ayout Type : Synchronized ; Internal Network Rol	: Master Configuration : [Temp]; Status : Halt ; Reading Phase: Phase Mode	a Formatting : Message 1	
Automatic Setup	Reading Phase Data Formatting Head	er <stx></stx>	ĺ
Advanced Setup	Good Read Setup Output Setup Termi	<cr><lf></lf></cr>	(
		ut Channels	
V- 🖦 🖳 🗐 🗙 🗙		atrix TCP Server	
Output Data Format	Message 1 Field		
General Settings			
Output Messages		t Type	
		Related Field	
Message 1		om Field	
Message 2	Code	Related Field	
Diagnostic Messages	Field	Type Reading Mask	
Channels	10/12/2017 12:53:13:918 PM > <stx>Code 128 CODE 39</stx>	ling Mask Format ASCII	
eldbuses	10/12/2017 12:53:16:039 PM > <stx>Code 128 CODE 39</stx>		
nages Saving Conditions		ling Mask Order Master on Right	ht
assthrough Configuration		No Read <can></can>	1
		Multiple Read ?	
	10/12/2017 12:53:39:700 PM > <\$TX>000000000000000000000000000011 0000000000	Variable Length	
	10/12/2017 12:53:40:980 PM > <\$TX>0000000000000000000000000000001 00000000	renced Label Expected Code	2
	Cuttin	ng Pattern Type Simple	
	10/12/2017 12:53:42:212 PM > <stx>000000000000000000000000000000000000</stx>		
	10/12/2017 12:53:45:504 PM > <stx>000000000000000000000000000000000000</stx>	Mask ——	0
	000000000000000000000000000000000000000	ind on	0

The Reading Mask shows which device reads which Expected Code. The mask is composed of a fixed 32-character string (0=No Read or 1=Read) representing the 32 possible readers in an ID-NET network. By default the Master is the last character in the string (**Master on Right**) but this can be changed. The Slaves are shown adjacent to the Master in order (1 to 31), by default from right to left.

The figure above shows that both the Master and Slave 1 are reading Code 128 while only the Master is reading Code 39.

- 3. After verifying correct functioning of the reading devices, return the Expected Code fields from Reading Mask to Code Content.
- 4. If you haven't made any other changes you can exit without saving. Otherwise, save the Master device configuration overwriting its previous one, making sure to save without Clone Master Configuration on Slaves, otherwise the Slave configurations will be overwritten.

To view the connected Slave configurations:

- 1. Click on the Internal Network View tab at the bottom of the screen
- 2. Open the Master branch by clicking on the arrow to the left of the Master icon.
- 3. Select any slave. Wait for the configuration to load.
- 4. Click The Configuration tab at the bottom of the screen.

By selecting the various configuration steps above you can visualize the slave configuration.

File Options Device Help			= □ ×
	a 🔍 at 🕂		ODATALOGIC
Layout Type : Synchronized ; Internal Network Role :	Slave 1 Configuration : Station 1; Status : Halt ; F	Reading Phase: Phase Mode	Advanced Setup : CODE39
Automatic Setup	Reading Phase	Data Formatting	Code Symbology Setup
Advanced Setup	Good Read Setup	Output Setup	CODE39
Internal Network View			Identical Codes
	Image		Grev Level Calibration
M300N 434-010 172 27.101.253 Matrix Master Device Description	mage		Code Color Black
Network Address: 1 SN: C14P00616			Code Orientation Both
Device Description :			Advanced Box Improvement
ll T			Subpixel Decoding Improvement
			Code Aspect Ratio Standard
1			Narrow Quiet Zone
	Image Setup	~	Character Set Standard
	Ima	contain Field Of Exposure	Code 32 Decoding
	Image Name Phase Id Size PPI g Ti (ms	me View (µs) Gain	Check Digit Status
	Image Settin 95 1280/1024 201 27 Code Settings	161×129 500 7	Code Filters 🗸
	Code settings	Number	Image Processing Order Code Localization Box
	Name Symbology Data	of Position Angle Charact (pix) (deg) ers	
	CODE39 #1 CODE39 CODE 39	7 811x302 1	
Configuration Internal Network View	Result		Control Help
Name Matrix Model : M300N 434-010 LNS-12 RFD NARR S	ID SN : C14P00630 IP Address : 172.27.101.253 Devi	ce SW Release : 1.5.0.538-RC02 User : Instal	er-Expert DL.CODE 1.5.0.122 PRE_PRD



NOTE: You can modify some Slave Synchronized parameters from this view but you cannot save them here.

To save changed slave parameters here, you must click on the Master and Save the configuration overwriting it, making sure to select **Save on Slave Device** but **without Clone Master Configuration on Slaves**, otherwise <u>all</u> the Slave configuration parameters will be overwritten by the Master configuration.

10.2.4 Alternative Device Role Selection

To set up a Master/Slave Internal Network Role you can also enter the Device Environment settings from the Device menu>Settings>Settings and open the Internal Network Settings group.

Change the Internal Network Role to Master or Slave accordingly.

Station 1	
	-
	~
	~
Master	-
Master Slave	
	,
	`
	ок
	Master

Wait for the device to reset. It may be necessary to wait several seconds and then perform a Discovery to refresh the device list area. You should now see the Master device with its relative icon.



Likewise you can set the device **Internal Network Role** to Slave and the **Reading Point Address** (ID-NET address) according to the network configuration.

Device Environment Configu	ration	
Device Name	Matrix	
Startup Configuration	Station 1	-
About Device		*
Ethernet Settings		~
Internal Network Settings		~
Reading Point Address		1 🛋
Internal Network Role	Slave	•
Internal Network Baud Rate	500Kb	•
Master Device Type	Matrix Device	•
X-PRESS Configuration		~
LED Configuration		*
Maintenance Settings		*
Cancel		ОК

Complete the Slave configuration and save it to the device.

Complete all the ID-NET Slaves in the same way.

The Master must be set to expect the same number of slaves as foreseen by the application. Now by simply making the electrical connections the network will be automatically recognized upon power up.

11 PACKTRACK CALIBRATION

PackTrack Calibration can be performed on all Standalone or Master Matrix N family readers that support this feature.

11.1 OVERVIEW

PackTrack Operating Mode is a method used to correctly assign codes read to their corresponding parcel or pack in systems where multiple packs are simultaneously present in the reading area.

The figure below illustrates the main concepts defining a PackTrack system. The main hardware parts are: conveyor, Matrix N reader(s), encoder (tach), and presence sensor (photocell).

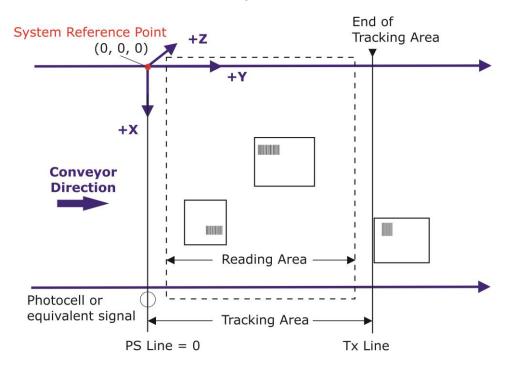
The Reading Area corresponds to the Field Of View of the Matrix N reader.

An area called the Tracking Area is defined between the System Reference Point and the Transmission Line (Tx Line) and obviously includes the Reading Area. All packs passing through the system will have their position tracked.

The System Reference Point is defined as the point where the coordinates (X, Y, Z = 0). The Presence Sensor is normally aligned at the Y = 0 coordinate. If necessary, (after first-time calibration), it can be offset using the PS Line parameter.

The Encoder signal (Encoder Step), together with the Presence sensor is used to track the length of the pack as it passes through the system. The physical encoder can be replaced by an internal signal representing a constant speed conveyor, depending on the application.

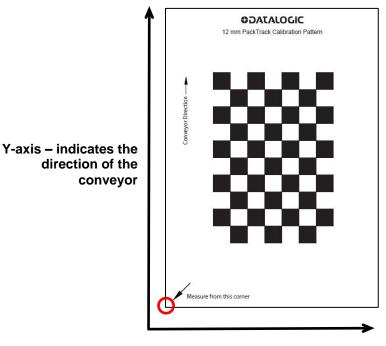
When the pack transits the Tx Line its message is sent to the Host.



11.2 CALIBRATION PATTERN

11.2.1 Top/Bottom Orientation

The Calibration Pattern has a precise orientation as shown in the image. The top has 4 black squares and the bottom has 3 black squares.

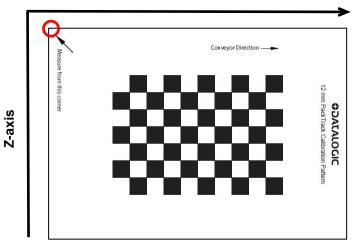


X-axis

During the calibration process the user has to input the coordinates measured from the System Reference Point to the **lower left corner of the Calibration Pattern** indicated by the red circle.

11.2.2 Left/Right Orientation

When calibrating left/right side readers, the Calibration Pattern is aligned to match the Y-axis (rotated 90° or 270°). This means the short side of the pattern is now aligned with the Z-axis.

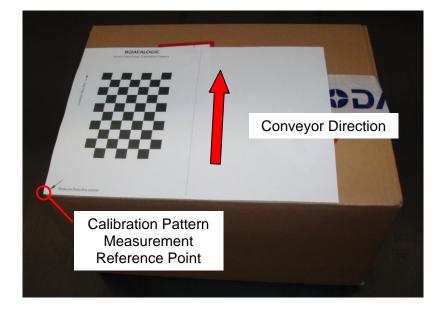


Y-axis - indicates the direction of the conveyor

11.2.3 Top/Bottom Calibration Chart Positioning

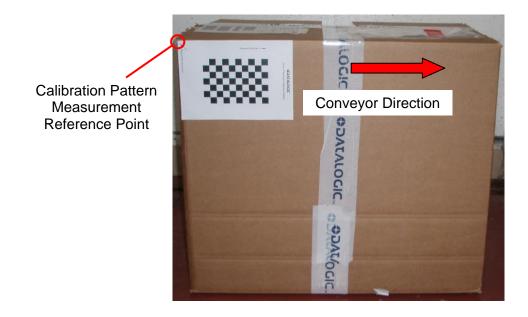
11

For Top/Bottom readers, the pattern should be aligned with the lower left corner of the pack as shown below so that measurements can easily be taken from the pack itself. **The Conveyor Direction Arrow must always be aligned with the conveyor direction.**



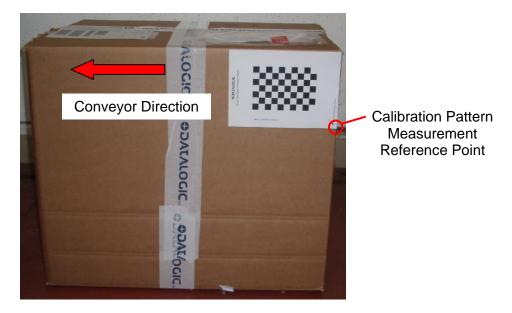
11.2.4 Right Side Calibration Chart Positioning

For Right side readers, the pattern should be placed as shown below so that measurements can easily be taken from the pack itself. **The Conveyor Direction Arrow must always be aligned with the conveyor direction.**



11.2.5 Left Side Calibration Chart Positioning

For Left side readers, the pattern should be placed as shown below so that measurements can easily be taken from the pack itself. **The Conveyor Direction Arrow must always be aligned with the conveyor direction.**



11.3 REFERENCE SYSTEM

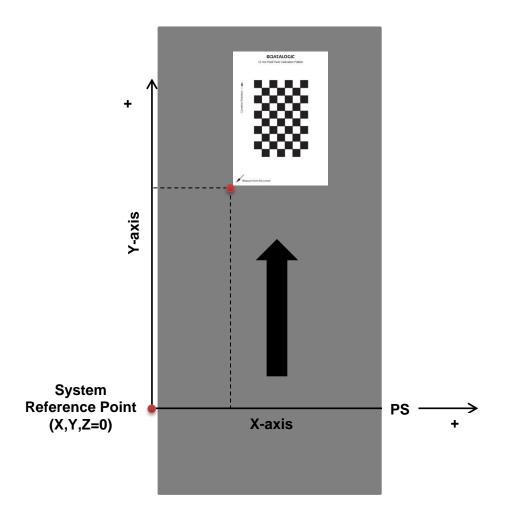
11

The image below shows the coordinate reference system on the conveyor: the origin of the coordinate reference system is the System Reference Point.

The Y-axis runs parallel to the conveyor movement direction. So the Y coordinate of a point is measured as the distance between that point the and the System Reference Point along the conveyor direction.

The X-axis runs perpendicular to the conveyor movement direction. The X coordinate is measured as the distance between the point and the System Reference Point across the conveyor.

The Z-axis runs vertically through the conveyor plane with the positive direction above the conveyor.



11.4 REQUIREMENTS

The following is a list of required hardware/software that supports PackTrack for Matrix and is necessary for performing the PackTrack Calibration.

- DL.CODE release: 1.00 or later
- Matrix N Standard Application Program Software: 1.00 or later
- Products: Matrix 300N[™] Matrix 410N[™], Matrix 450N[™], XRF410N^{™3}
- PackTrack Calibration Pattern



CAUTION: print either the **A4** or **Letter** size pdf file according to the paper size you are using. Printing on the wrong size paper or rescaling the Calibration Pattern will cause PackTrack calibration errors.

- Tape Measure
- These instructions

11.5 TOP CALIBRATION USING DL.CODE



CAUTION: The conveyor must be STOPPED while performing this procedure!



NOTE: Standard Setup including optical Calibration must be completed before performing PackTrack Calibration.

Calibration is performed using the Calibration Pattern positioned on the plane corresponding to the tallest pack, (Near Plane, i.e. closest to the Matrix reader) and on the plane corresponding to the shortest pack, (Far Plane, i.e. farthest from the Matrix reader).

The PackTrack Calibration is completed only after both planes have been calibrated and saved in Flash.



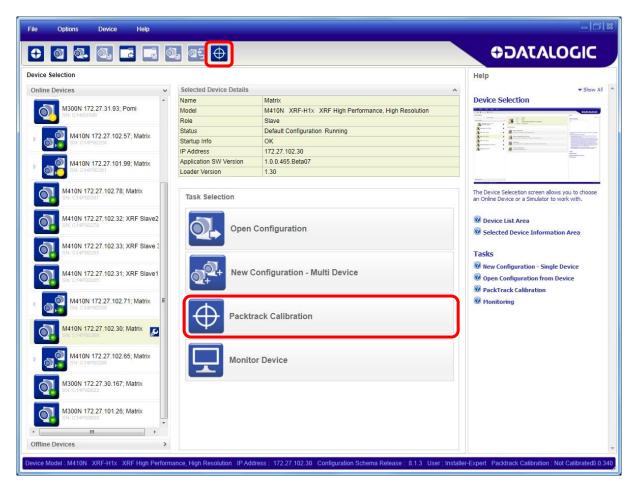
NOTE: Once a completed calibration is performed, it is not possible to perform calibration on a single plane, for example modifying one plane while maintaining the previous parameters of the other plane. The PackTrack Calibration always requires both steps to be completed.

³ For XRF410N products, PackTrack Calibration must be performed separately for all the readers, first the Master and then the Slave (or Slaves in the case of Extended models).

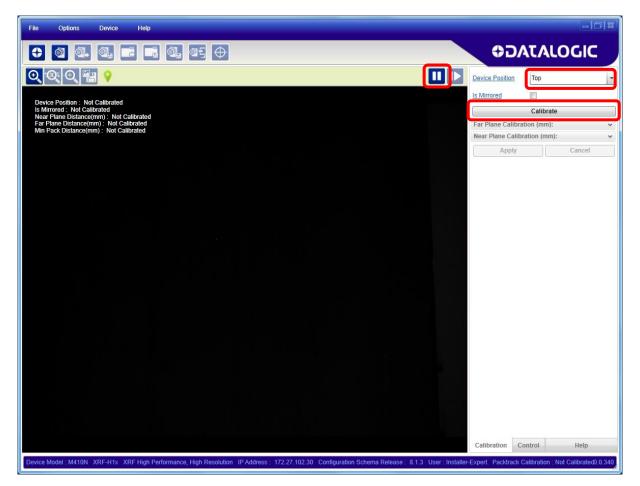
STEP 1 – Run PackTrack Calibration:

11

a) Select **PackTrack Calibration** from the toolbar icon or item in the DL.CODE Task Area.



- b) Set the Device Position to Top from the dropdown list.
- c) Click on the **Calibrate** button to open the Calibration Planes panel for co-ordinate input.



STEP 2 – Determine the PackTrack System Reference Point:

a) Determine the PackTrack System Reference Point, if possible **on the conveyor frame surface**, where the X, Y, Z co-ordinates = (0,0,0). Visibly mark this point on a piece of tape or other surface, so that it can be used to make the measurements necessary for calibration. The Y = 0 value **normally** corresponds to the PS Line position.

STEP 3 – Far Plane Calibration:



NOTE: Step 3 and Step 4 can be inverted.

a) The reader should already be running (illuminator flashing and acquiring images) so that positioning can be seen on the monitor. The pause button should be shown indicating the reader is running.

b) Place the Calibration Pattern so that it is completely visible in the monitor window and it corresponds to the plane representing the lowest pack allowed to pass through the system on the conveyor. This is the Far Plane which can also be on the conveyor surface.



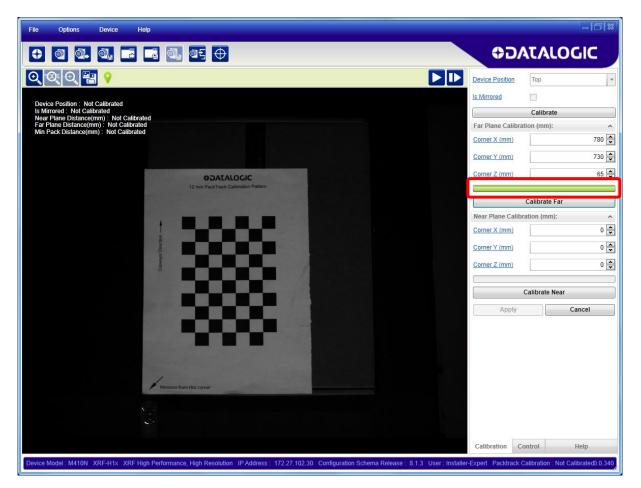
11

NOTE: the Calibration Pattern must be aligned so that the y-axis is <u>parallel</u> to the conveyor movement direction.

File Options Device Help		- 5 ×
	¢⊃/	TALOGIC
Q @ Q ₽ ♀	Device Position	Тор
Device Position : Not Calibrated	Is Mirrored	
Is Mirrored : Not Calibrated Near Plane Distance(mm) : Not Calibrated Far Plane Distance(mm) : Not Calibrated		Calibrate
Far Plane Distance(mm) : Not Calibrated Min Pack Distance(mm) : Not Calibrated	Far Plane Calibra	and the second sec
	Corner X (mm)	780 🗬
	Corner Y (mm)	730 👻
	Corner Z (mm)	65 🗢
		Calibrate Far
	Near Plane Calibr	ation (mm):
	Corner X (mm)	0
	Corner Y (mm)	0 🛋
	Corner Z (mm)	0 🗢
	[Calibrate Near
	Apply	Cancel
Measure from this corner		
	Calibration Co	ontrol Help
Device Model : M410N XRF-H1x XRF High Performance, High Resolution IP Address : 172.27,102.30 Configuration Schema Release : 8.1.3 User : Installer	-Expert Packtrack C	alibration : Not Calibrated0.0.340

- c) Press the Pause button.
- d) Using the tape measure, physically measure the X, Y and Z offsets from the System Reference Point to the lower left corner of the Calibration Pattern and input this data (mm) into the Far Plane Calibration boxes.
- e) Press the Calibrate Far button for start Far Calibration.

f) Wait until the operation finishes. An orange progression bar runs above the Calibrate Far button and should end in a solid green bar indicating successful calibration of the far plane.



Possible Error Causes:

- Calibration Pattern is not completely contained in the Field of View.
- Calibration Pattern is partially obscured by objects covering it

STEP 4 – Near Plane Calibration:



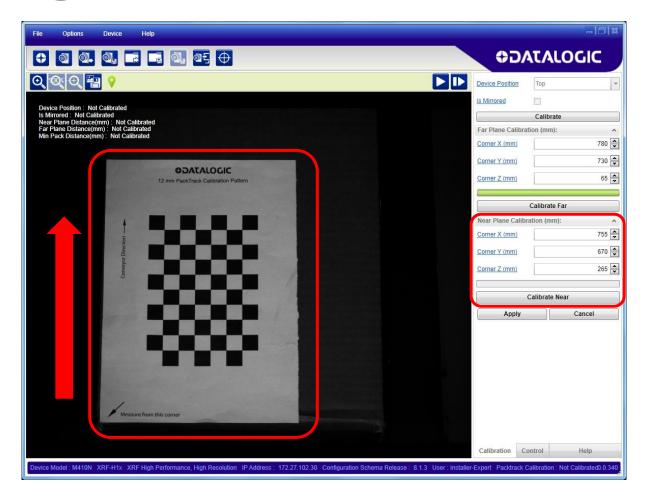
11

NOTE: Step 3 and Step 4 can be inverted.

- a) Press the **Play** button. The reader again begins to acquire images.
- b) Place the Calibration Pattern on a pack so that it is completely visible in the monitor window and it corresponds to the plane representing the tallest pack allowed to pass through the system on the conveyor. This is the Near Plane.

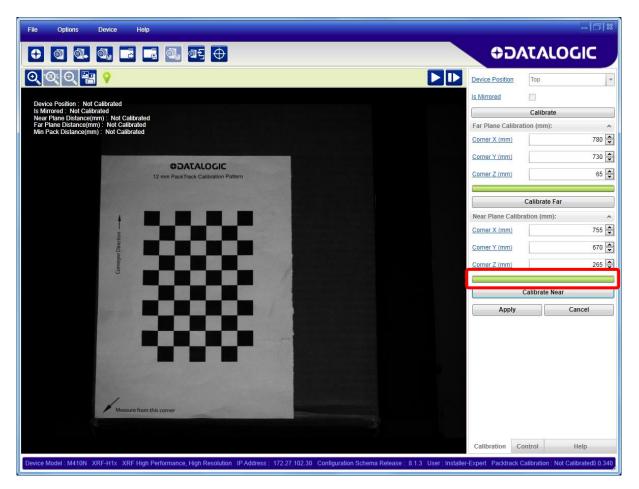


NOTE: the Calibration Pattern must be aligned so that the y-axis is <u>parallel</u> to the conveyor movement direction.



- c) Press the Pause button.
- d) Using the tape measure, physically measure the X, Y and Z offsets from the System Reference Point to the lower left corner of the pack (aligned with the Calibration Pattern) and input this data (mm) into the Near Plane Calibration boxes.
- e) Press the Start button for Near Calibration.

f) Wait until the operation finishes. An orange progression bar runs above the Calibrate Near button and should end in a solid green bar indicating successful calibration of the near plane.



Possible Error Causes:

- Calibration Pattern is not completely contained in the Field of View.
- Calibration Pattern is partially obscured by objects covering it

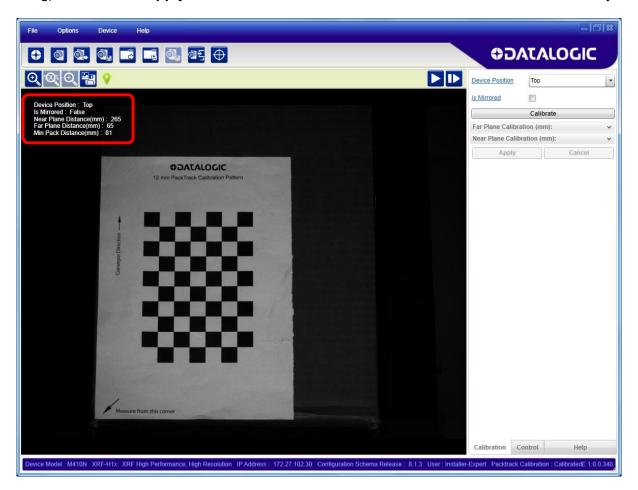
In this case (first time calibration), it is possible to repeat the Near Calibration without losing the previously completed Far Calibration.



NOTE: the items in the monitor window are still shown as "Not Calibrated" because the calibration has not been saved yet.

STEP 5 – Saving Calibration:

g) Click on the **Apply** button to save the calibration values in the reader's flash memory.

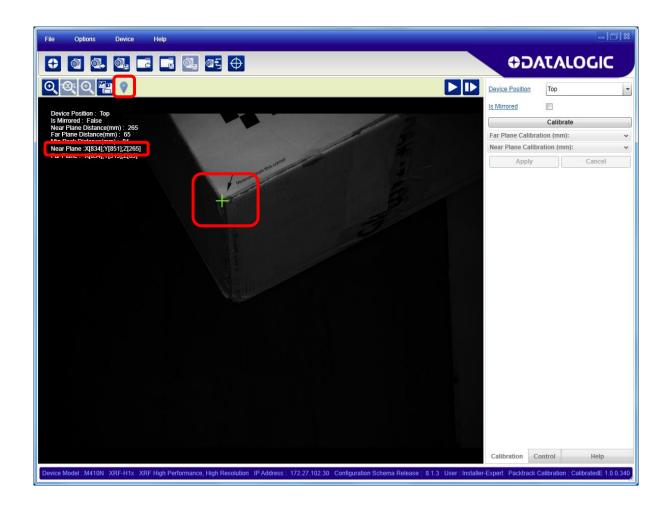


The calibration also advises the minimum distance between packs (Min Pack Distance), for which correct code to pack assignment can be guaranteed.

At this point PackTrack Calibration has been successfully completed.

STEP 6 – Verify Calibration Results:

- a) Place a pack, code or other object onto either the Near or Far plane at a different coordinate from the calibration, however it must be visible in the monitor window.
- b) Click on the Show Real World Coordinates icon. A green cross will appear in the monitor window. Drag this cross with the mouse to an easy-to-measure reference point (i.e. pack edge).
- c) Using the tape measure, physically measure the X and Y coordinates from the System Reference Point and compare them to the data shown in the monitor window for the reference plane you are measuring.



12 DPM

12

12.1 DPM AUTOLEARN

In DL.CODE 1.5.0 the DPM Autolearn feature has been replaced by the Automatic Setup, see par. 3.3.1.

If you load devices with software application programs having previous versions and you don't want to upgrade, then you will need to consult the specific software version documentation for the DPM Autolearn feature.

12.2 PRE CONFIGURATION

Before performing Automatic Setup the following factors require attention in order to produce the best decoding results for DPM code reading applications.

- 1. The best reading results occur in static applications (no code movement during image acquisition).
- 2. When using internal illumination, reduce skew angle to minimum to allow uniform lighting on the code surface.
- 3. The code should be placed as close as possible to the center of the FoV.
- 4. Reduce reading distance to reduce ambient lighting interference.
- 5. The best internal illumination chain combination in part depends on the reading distance. More light is applied to the surface at closer distances.

13 CODE GRADING

13.1 SYMBOL VERIFICATION VERSUS CODE GRADING

Symbol Verification involves completely testing the adherence of 2D and 1D codes to the parameters defined in specific International Standards in order to guarantee their reliability and therefore ability to be correctly decoded. In Symbol Verification the (Overall) Symbol Grade is only meaningful if it is expressed in conjunction with the measurement wavelength and aperture used. It should be shown in the format:

Grade / Aperture / Wavelength [/ Angle]

Where:

"Grade" is the overall symbol grade (i.e. the arithmetic mean of the individual Scan Grades for a number of tested images of the symbol).

"Aperture" is the aperture reference number or the diameter in thousandths of an inch (to the nearest thousandth) of the synthetized aperture.

"Wavelength" is the peak light wavelength in nanometers.

"Angle" is the angle of incidence of the illumination relative to the plane of the symbol of the illumination (if 45° it is omitted).

Code Grading for the Matrix N family reader is a feature used to evaluate the quality of a code within a specific application based only on the Scan Grade parameters defined in certain International Standards. It does not take into consideration the external environmental lighting parameters such as Aperture, Wavelength and Illumination Angle which can in any case affect the Scan Grade.

The Overall Code Grade is determined by the lowest resulting Scan Grade within the evaluated set of individual Scan Grade parameters.

Through DL.CODE you can also configure the Matrix N reader to perform Code Grading on a specific sub-set of parameters for evaluation. For example, it may be that you are only interested in grading the Print Growth and Symbol Contrast parameters as a function of symbol print quality and therefore only want to monitor these two parameters. Only these two parameters then will contribute to the Overall Code Grade. See also par. 13.8.



NOTE: Overall Code Grading cannot be equated with and should not be confused with Symbol Verification.

13

13.2 INTERNATIONAL STANDARDS APPLIED TO CODE GRADING

Matrix N family readers can be used to evaluate printed or marked symbols according to the ISO/IEC 16022, 18004, AIM DPM, and ISO/IEC 15416 standards.

ISO-IEC 16022

(Data Matrix - International Symbology Specification)

The ISO-IEC 16022 Standard specifies general requirements (data character encoding, error correction rul

es, decoding algorithm, etc.) for Data Matrix symbology.

ISO-IEC 18004

(QR Code - International Symbology Specification)

The ISO-IEC 18004 Standard specifies general requirements (data character encoding, error correction rules, decoding algorithm, etc.) for QR Code symbology.

ISO-IEC TR 29158 (AIM DPM 2006)

(Direct Part Mark Quality Guideline)

The AIM DPM Quality Guideline is applicable to the symbol quality assessment of direct parts marking performed in using two-dimensional bar code symbols. It defines modifications to the measurement and grading of several symbol quality parameters.

The marking processes covered by this guideline are as follows: Dot Peening, Ink Jet, Laser Etching and Electro-Chemical Etching.

ISO-IEC 15415

(Two-Dimensional Symbols - Print Quality Test Specification)

The ISO-IEC 15415 Standard specifies the methodologies for the measurement of specific attributes of two-dimensional bar code symbols, and methods for evaluating and grading these measurements and deriving an overall assessment of symbol quality.

ISO-IEC 15416

(Linear Symbols - Print Quality Test Specification)

The ISO-IEC 15416 Standard specifies the methodologies for the measurement of specific attributes of linear bar code symbols, and methods for evaluating and grading these measurements and deriving an overall assessment of symbol quality.

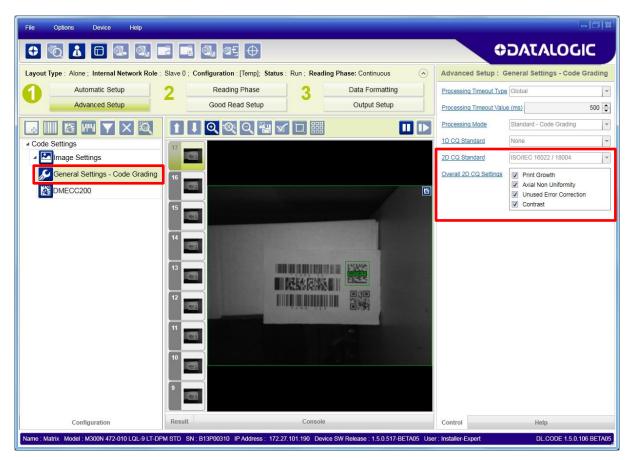
Standards	ISO/IEC 16022	ISO/IEC 18004	ISO/IEC TR 29158	ISO/IEC 15415	ISO/IEC 15416
Parameters	Data Matrix	QR	2D DPM	2D	1D
Print Growth	\checkmark	\checkmark	Non Graded	\checkmark	Non Graded
Axial Non Uniformity	\checkmark	\checkmark	\checkmark	\checkmark	
Unused Error Correction	\checkmark	\checkmark	\checkmark	\checkmark	
Symbol Contrast	\checkmark	\checkmark		\checkmark	\checkmark
Cell Contrast			\checkmark		
Cell Modulation			\checkmark		
Decode			\checkmark	\checkmark	\checkmark
Fixed Pattern Damage			\checkmark	\checkmark	
Grid Non Uniformity			\checkmark	\checkmark	
Minimum Reflectance			\checkmark		\checkmark
Minimum Edge Contrast					\checkmark
Decodability					\checkmark
Modulation				\checkmark	\checkmark
Defects					\checkmark

You can enable Code Grading by selecting the International Code Quality (CQ) Standard from the Advanced Setup General Settings menu.

- 1. Set the Processing Mode parameter to Standard Code Grading.
- 2. Select the 1D or 2D Code Quality Standard from the drop down lists:
 - 1D: None, ISO/IEC 15416

2D: None, ISO/IEC 16022 / 18004, ISO/IEC 29158 (AIM DPM), ISO/IEC 15415

Depending on the selection, the relative Overall Code Quality Settings box is displayed that allows you to select which parameters to use to determine the overall grading.



13.4 ISO/IEC 16022 AND ISO/IEC 18004 STANDARDS

The ISO-IEC 16022 and ISO-IEC 18004 Standards specify the methodologies for the measurement of specific attributes respectively for **Data Matrix** and **QR** code symbols, and methods for evaluating and grading these measurements and deriving an overall assessment of symbol quality.

Each quality parameter shall be measured and a grade on a descending scale of integers from 4 to 0 shall be allocated to it. The grade 4 represents the highest quality, while the grade 0 represents failure.

13.4.1 Code Quality Scan Grade Parameters

The following scan grade parameters can be evaluated for the ISO-IEC 16022 and ISO-IEC 18004 Standards:

Print Growth

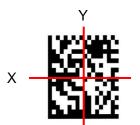
Measures the deviation of actual elements dimension from the expected element dimension due to printing problems (i.e. overprint or underprint).





Axial Non-Uniformity (ANU)

Measures and grades the squareness of all modules in the direction of each of the symbol's major axes (X-axis and Y-axis) by applying the decode algorithm to the binarized image.



Unused Error Correction (UEC)

This parameter tests and grade the extent to which regional or spot damage in the symbol has eroded the information redundancy margin that error correction provides. 100% Unused Error Correction Capacity is the ideal condition.



Symbol Contrast (SC)

13

Symbol Contrast tests that the two reflective states in the symbol, namely Light and Dark, are sufficiently distinct within the symbol.



The Overall Code Grade is determined by the lowest resulting Scan Grade within the evaluated set of individual Scan Grade parameters.

13.5 ISO/IEC TR 29158 (AIM DPM 2006) QUALITY GUIDELINE

The AIM DPM Quality Guideline is applicable to the symbol quality assessment of direct parts marking performed in using two-dimensional bar code symbols. It defines modifications to the measurement and grading of several symbol quality parameters.

The marking processes covered by this guideline are as follows: Dot Peening, Ink Jet, Laser Etching and Electro-Chemical Etching.

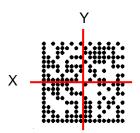
Each quality parameter shall be measured and a grade on a descending scale of integers from 4 to 0 shall be allocated to it. The grade 4 represents the highest quality, while the grade 0 represents failure.

13.5.1 Code Quality Scan Grade Parameters

The following scan grade parameters can be evaluated for the AIM DPM Standard:

Axial Non-Uniformity (ANU)

Measures and grades the squareness of all modules in the direction of each of the symbol's major axes (X-axis and Y-axis) by applying the decode algorithm to the binarized image.



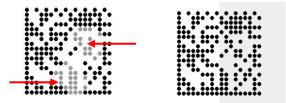
Cell Contrast (CC)

Measures and grades the difference between the means of brightest and darkest values of the symbol (instead of determining differences between the brightest and darkest values).



Cell Modulation (CM)

Cell modulation analyzes the grid center points within the data region to determine the reflectance uniformity of light and dark elements after considering the amount of error correction available in the code.



Decode

The Decode parameter tests, on a Pass/Fail basis, whether the symbol has all its features sufficiently correct to be readable. If the image cannot be decoded using the symbology reference decode algorithm, then it shall receive the failing grade 0. Otherwise, it shall receive the grade 4.

This parameter then will always produce Grade A for good reads. If the code cannot be decoded, then a No Read result will be produced by the reader so you will never have a Grade F result for this parameter.

Fixed Pattern Damage (FPD)

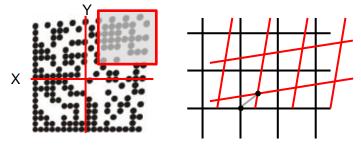
This metric is similar to Cell Modulation, but it analyzes the finder pattern and clock pattern as well as the quiet zone around the code instead of the data region.



Grid Non-Uniformity (GNU)

13

Measures and grades the largest vector deviation of the grid intersections, determined by the reference decode algorithm from the binarized image of a given symbol, from their "ideal" theoretical position. Assuming a grid on which the ideal angle of intersection is 90°, any angle deviation from 90° constitutes Grid Non-Uniformity.

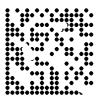


Minimum Reflectance (MR)

The image brightness is adjusted on a reference part, after which this calibrated value is compared with the reflectance of that part. Minimum Reflectance is the ratio of the parts reflectance to the calibrated reflectance.

Unused Error Correction (UEC)

This parameter tests and grade the extent to which regional or spot damage in the symbol has eroded the information redundancy margin that error correction provides. 100% Unused Error Correction Capacity is the ideal condition.



NON GRADED PARAMETERS

Print Growth

Measures the deviation of actual elements dimension from the expected element dimension due to printing problems (i.e. overprint or underprint).







Overprinting

13.6 ISO/IEC 15415 STANDARD

The ISO-IEC 15415 Standard specifies the methodologies for the measurement of specific attributes two-dimensional bar code symbols, and methods for evaluating and grading these measurements and deriving an overall assessment of symbol quality.

Each quality parameter shall be measured and a grade on a descending scale of integers from 4 to 0 shall be allocated to it. The grade 4 represents the highest quality, while the grade 0 represents failure.

13.6.1 Code Quality Scan Grade Parameters

The following scan grade parameters can be evaluated for the ISO-IEC 15415 Standard:

Print Growth

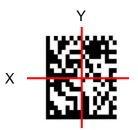
Measures the deviation of actual elements dimension from the expected element dimension due to printing problems (i.e. overprint or underprint).





Axial Non-Uniformity (ANU)

Measures and grades the squareness of all modules in the direction of each of the symbol's major axes (X-axis and Y-axis) by applying the decode algorithm to the binarized image.



Unused Error Correction (UEC)

This parameter tests and grade the extent to which regional or spot damage in the symbol has eroded the information redundancy margin that error correction provides. 100% Unused Error Correction Capacity is the ideal condition.



Symbol Contrast (SC)

Symbol Contrast tests that the two reflective states in the symbol, namely Light and Dark, are sufficiently distinct within the symbol.



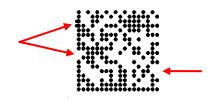
Decode

The Decode parameter tests, on a Pass/Fail basis, whether the symbol has all its features sufficiently correct to be readable. If the image cannot be decoded using the symbology reference decode algorithm, then it shall receive the failing grade 0. Otherwise, it shall receive the grade 4.

This parameter then will always produce Grade A for good reads. If the code cannot be decoded, then a No Read result will be produced by the reader so you will never have a Grade F result for this parameter.

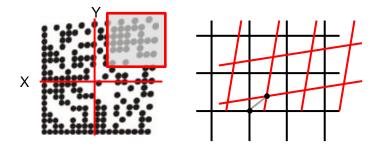
Fixed Pattern Damage (FPD)

This metric is similar to Cell Modulation, but it analyzes the finder pattern and clock pattern as well as the quiet zone around the code instead of the data region.



Grid Non-Uniformity (GNU)

Measures and grades the largest vector deviation of the grid intersections, determined by the reference decode algorithm from the binarized image of a given symbol, from their "ideal" theoretical position. Assuming a grid on which the ideal angle of intersection is 90°, any angle deviation from 90° constitutes Grid Non-Uniformity.



Modulation (MOD)

Modulation is the ratio of the minimum edge contrast to Symbol Contrast. It can be considered as the quality of the Analog signal related to the printing contrast.

The Overall Code Grade is determined by the lowest resulting Scan Grade within the evaluated set of individual Scan Grade parameters.

13.7 ISO/IEC 15416 1D STANDARD

The ISO-IEC 15416 Standard specifies the methodologies for the measurement of specific attributes of linear bar code symbols, and methods for evaluating and grading these measurements and deriving an overall assessment of symbol quality.

Bar code symbol quality assessment shall be based on an analysis of the Scan Reflectance profiles. The scan reflectance profile is a record of the Reflectance values measured on a single line across the entire width of the barcode.

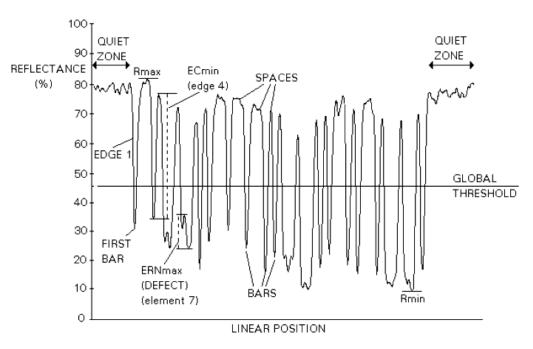


Figure 15 – Scan Reflectance Profile

Symbol Quality grading shall be used to derive a relative measure of symbol quality under the measurement conditions used. Each scan reflectance profile shall be analyzed and a grade on a descending scale of integers from 4 to 0 shall be allocated to each of the parameters evaluated.

13.7.1 Code Quality Scan Grade Parameters

The following scan grade parameters can be evaluated for the ISO-IEC 15416 Standard:

Decode

The symbology reference decode algorithm shall be used to decode the symbol using the element edges determined on the Scan Reflectance profile. This algorithm may be found in the symbology specification.

Decodability

The decodability of a bar code symbol is a measure of the accuracy of its production in relation to the appropriate reference decode algorithm.



Defects

Defects are irregularities found within elements and quiet zones, and are measured in terms of element reflectance non-uniformity.

Element reflectance non-uniformity within an individual element or quiet zone is the difference between the reflectance of the highest peak and the reflectance of the lowest valley.

Defect measurement is expressed as the ratio of the maximum element Reflectance Non-Uniformity (ERNmax) to Symbol Contrast.

Minimum Edge Contrast (EC)

Edge contrast is the difference between the Rs (Space Reflectance) and Rb (Bar Reflectance) of adjoining elements including quiet zones.

The lowest value of edge contrast found in the scan reflectance profile is the minimum edge contrast, ECmin.

Minimum Reflectance (Rmin)

Rmin is the lowest reflectance value in the scan reflectance profile. Rmin shall not be higher than $0.5 \times Rmax$. This parameter is intended to ensure that Rmin shall not be too high, especially when the value of Rmax is high.

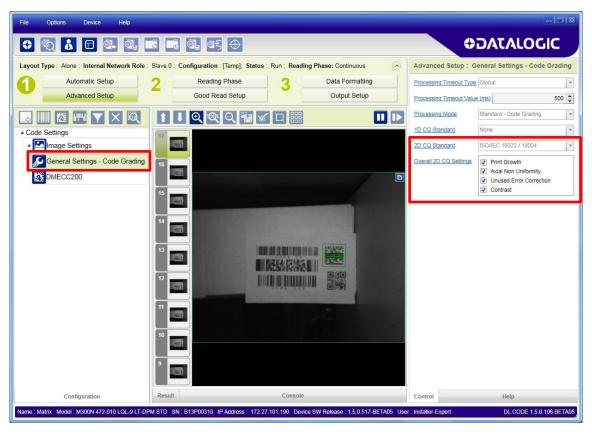
Modulation (MOD)

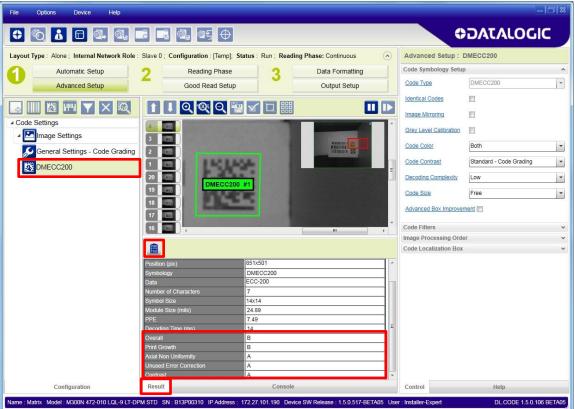
Modulation is the ratio of the minimum edge contrast to Symbol Contrast. It can be considered as the quality of the Analog signal related to the printing contrast.

Symbol Contrast (SC)

Symbol contrast is the difference between the highest and lowest reflectance values in a scan reflectance profile.

13.8 CODE GRADING EXAMPLE USING ISO/IEC 16022 AND ISO/IEC 18004 STANDARDS





The output message can also be defined to include the scan grade parameters.

) 🔯 🚹 🗖 💁 🚱	2 🗔 💁 🕰 🕂		4	DATALOGIC
ayout Type : Alone ; Internal Network Role :	Standalone; Configuration : [Temp]; Status : H	Halt ; Reading Phase: Continuous	Advanced Setup :	DMECC200
Automatic Setup	Reading Phase	2 Data Formatting	Code Symbology Setu	p
Advanced Setup	Good Read Setup	Output Setup	Code Type	DMECC200
			Identical Codes	
a IIII 🕺 IIII 🝸 🗙 🔍] 🎬 📮 🕨 🕩	Image Mirroring	
Code Settings	5		Grey Level Calibration	
Image Settings				_
General Settings - Code Grading	3 7		Code Color	Both
DMECC200	2 0% DMECC200 #1		Code Contrast	Standard - Code Grading
	20 000		Decoding Complexity	Low
	19 081		Code Size	Free
	18 27		Advanced Box Improve	ment 🗐
	17			
	09/19/2017 05:00:23:630 PM > <stx>ECC-200</stx>		Code Filters	
	Overall Grade = B Print Growth = B		Image Processing Ord	
	ANU = A UEC = A		Code Localization Box	
	SC = A			
	09/19/2017 05:00:24:116 PM > <stx>ECC-200 Overall Grade = B</stx>			
	Print Growth = B ANU = A			
	UEC = A SC = A			
	09/19/2017 05:00:24:589 PM > <stx>ECC-200</stx>			
	Overall Grade = B			
	Print Growth = B ANU = A			
	UEC = A SC = A			
	09/19/2017 05:00:25:054 PM > <stx>ECC-200</stx>			
	Overall Grade = B			
Configuration	Result	Console	Control	Help

14 DEVICE CONFIGURATION SETTINGS

The Statistics behavior for the DL.CODE Monitor is managed through the Configuration Settings window.

The other configuration groups manage some special application parameters for hybrid systems where Matrix readers are used in combination with other devices and monitoring software.

14.1 ACCESSING DEVICE CONFIGURATION SETTINGS

To access the device configuration settings obviously the device must be connected to DL.CODE. From the Device>Settings>Configuration Settings menu open the Configuration Settings window.

This window presents the following fields:

The configuration **Name** and **Version** of the Default Configuration are reported in the first group (read-only).

This is independent from the actual configuration currently running on the connected device.

Configuration Settings		
Configuration		^
Configuration Name	Default Configuration	
Configuration Version	12.4.2	
Statistics		~
WebSentinel Configuration		^
WebSentinel Monitor Status	Disabled	*
SC5000 Configuration		^
SC5000 Status	Disabled	-
Crisplant Configuration		^
Status	Disabled	*
Cancel		ОК

14.2 STATISTICS

14

This group manages the statistics reporting behavior in the Monitor Statistics page. See also par. 8.2.

Session lets you set the number of reading phases to monitor for a Session (from 10 to 1000).

Enabled Counters lets you choose which counter fields to visualize in the Monitor Statistics page.

Configuration		
Configuration Name	Default Configuration	
Configuration Version	12.4.2	
Statistics		
Session (Num. Reading Phases)		1000
Enabled Counters	 Elapsed Time (sec) Phase On Count Pack Count Valid Code Count Reading Phase Count Trigger Overrun Count Number of Decoded Codes Encoder Errors Count Number of Spurious Phases Good Read Count Partial Read Count No Read Count Multiple Read Count Successful Collection Count Failed Collection Count 	
WebSentinel Configuration	n	,
SC5000 Configuration		
Crisplant Configuration		
Status	Disabled	
Cancel	ок	

14.3 WEBSENTINEL CONFIGURATION

This group manages configuration to the WebSentinel PLUS Monitoring software program.

WebSentinel Monitor Status enables or disables connection to the WebSentinel PLUS Monitor program.

Master Diagnostics Check Period sets the polling frequency for Diagnostic messages to be reported to WebSentinel PLUS.

Configuration	^
Configuration Name	Default Configuration
Configuration Version	12.4.2
Statistics	~
WebSentinel Configuration	^
WebSentinel Monitor Status	Enabled
Master Diagnostics Check Period (sec.)	3 💌
SC5000 Configuration	Ŷ
Crisplant Configuration	Ŷ
Cancel	ОК

14.4 SC5000 CONFIGURATION



NOTE: This configuration can only be used in PackTrack operating mode and Code Combination data collection method.

This group manages the configuration of the Matrix device to the SC5000 Controller in a Hybrid configuration.

SC5000 Status enables or disables connection to the SC5000 Controller.

SC5000 IP Address must match the SC5000 Controller.

SC5000 Port must match the SC5000 Controller.

Start Position is the address number (1 to 31) of the Matrix Master or Stand Alone reader which acts as a Slave to the SC5000. The Matrix Master reader has its own slaves (ID-NET network) whose addresses will automatically be assigned by the SC5000 in consecutive order to the Matrix Start Position address.

Configuration Settings	
Configuration	^
Configuration Name	Default Configuration
Configuration Version	12.4.2
Statistics	v
WebSentinel Configuration	*
SC5000 Configuration	^
SC5000 Status	Enabled
SC5000 IP Address	172 • 27 • 101 • 220 •
SC5000 Port	5100 💌
SC5000 Start Position	1 💌
SC5000 Heartbeat Timeout	60 💌
SC5000 Diagnostic Timeout	2 💌
Crisplant Configuration	~
Cancel	ОК

SC5000 Heartbeat Timeout must match the SC5000 Controller. A value of 1 to 180 seconds can be configured for the Heartbeat.

SC5000 Diagnostic Timeout sets the polling frequency (in seconds) for Diagnostic messages to be reported to the SC5000 Controller.



NOTE: Since messages sent to the SC5000 on the selected communication channel will be formatted by the SC5000, DL.CODE message Data Formatting for this channel is ignored. This is not graphically indicated in DL.CODE, however do not disable Message Output Channels.

If necessary Image Saving can be applied, see chp. 9.

See the Matrix-SC5000 Hybrid System Application Note for complete setup and configuration.

14.5 CRISPLANT PROTOCOL CONFIGURATION



NOTE: This protocol can only be used in Phase Mode or PackTrack operating modes.

This group manages configuration for the Crisplant Protocol.

Status enables or disables Crisplant protocol configuration.

Version (Type) selects the Crisplant protocol type. Currently only **P10** is supported. The <CR><LF> characters appear at the end of transmitted/received telegrams.

Length (**Index**) selects between a 4-bit or a 6-bit index applied to the beginning of the telegram. This must match the incoming Crisplant index type.

Heartbeat Timeout must match the Crisplant protocol. A value of 1 to 180

Configuration Settings		
Configuration		^
Configuration Name	Default Configuration	
Configuration Version	12.4.2	
Statistics		~
WebSentinel Configurati	on	~
SC5000 Configuration		~
Crisplant Configuration		^
Status	Enabled	*
Version	P10	*
Length	4 digits	*
Heartbeat Timeout		60 🚔
Channels	Matrix TCP Server	-
Cancel		OK

seconds can be configured for the Heartbeat. A value of 0 means Heartbeat is disabled.

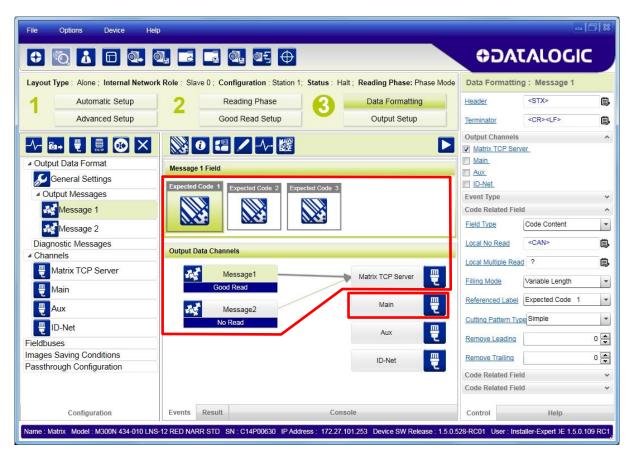
Channel selects which Matrix channel the Crisplant protocol is sent over. This should be a dedicated channel whose communication parameters match the Crisplant Host channel. Matrix Channel parameters are set in the Channels branch of the Configuration Parameters tree area.



NOTE: Since messages sent to the Crisplant Host on the selected communication channel will be formatted with the Crisplant Protocol, DL.CODE message Data Formatting for the this channel is ignored. This is not graphically indicated in DL.CODE, however do not disable Message Output Channels. See following example.

Example: Crisplant Protocol Communication on Matrix Main Serial port

For this port the messages will be sent according to the Crisplant protocol and ignore the Data Formatting applied to the TCP Server Port. Even if not used, do not disable the Matrix TCP Server Message Output Channel.



15

15 DEVICE ENVIRONMENT SETTINGS

15.1 ACCESSING DEVICE ENVIRONMENT SETTINGS

To access the device environment settings obviously the device must be connected to DL.CODE. From the Device>Settings>Settings menu open the Device Environment Configuration window.

The following fields are presented:

Device Name (default "Matrix") can be personalized by typing a new name in this field. This can be used to distinguish this device from others in the network (i.e. a name to indicate the device position in the network).

This name also shows up in the Device List Area.

See also note below for use with embedded Profinet-IO communication.

Startup Configuration which can be changed by selecting a different configuration from the dropdown list (if any).

Device Environment Configu	ration
Device Name	Matrix
Startup Configuration	Default
About Device	^
Device Model	M300N 435-010 LNS-16 RED NARR STD
Application SW Version	1.3.0.749
Boot SW Version	1.18
Loader SW Version	1.38
Recovery SW Version	1.04
VL Version	VL5.07.20R.16777214.14
MVL Version	2.1.8
Ethernet Settings	*
Internal Network Settings	~
X-PRESS Configuration	~
LED Configuration	*
Maintenance Settings	v
Cancel	ОК

About Device gives details about the various

software components currently loaded and running on this device. This data is important to know for troubleshooting purposes.



NOTE: When using embedded Profinet IO Fieldbus communication, **Device Name** coincides with the **Station Name** parameter and therefore must adhere to the following rules in order to be recognized by the Profinet Master (Host).

Station Name is a string (max 240 characters) which identifies the node on the Profinet IO network as an alternative to the IP address. The syntax is:

- one or more "labels" separated by the . (dot) character
- max label length is 63 characters
- valid characters are lower case letters (a..z), numbers (0-9) and (dash) characters
- the . (dot) and (dash) characters cannot be used as the first or last character in the name.

Example name showing four labels: device-1.machine-8.plant-234.vendor

If the Station Name is changed by the host application during runtime, a reset is required in order for changes to have effect.

15.2 ETHERNET SETTINGS

This group presents all the Ethernet Settings for correct device connection to the LAN.

It can also be accessed directly by clicking on the wrench icon in the device list area as shown in par. 3.1.

Change the Ethernet Settings (IP Address, Subnet Mask, Gateway Address etc.) according to the network requirements.

The **Keep Alive Timeout** parameter selects the period for which a signal is sent from the device to maintain the Ethernet connection with the DL.CODE UI configuration environment.

Device Name	Matrix			
Startup Configuration	Default			-
About Device				~
Ethernet Settings				
Use DHCP				
IP Address	172 👟	27 👟	101 🛋	120 🚔
Subnet Mask	255	255 🚖	0 🚔	0 🍨
Gateway Address	0 🗨	0 🌲	0 🖍	0
DNS 1 Address	0 💌	0	0 💌	0
Keep Alive Timeout (ms)				5000
Internal Network Settings				•
X-PRESS Configuration				`
LED Configuration				
Maintenance Settings				



NOTE: When using DHCP, if there is a communication loss (i.e. cable disconnect), the reader will take about 40 seconds to boot.



NOTE: If using DHCP with the embedded Profinet IO interface, the Profinet IO Host will not be able to change the IP address. For this interface it is suggested to use Static IP addressing.

15.3 INTERNAL NETWORK SETTINGS



NOTE: All devices are pre-assigned an Internal Network Role independent from their use. If the device is not used in an ID-NET network then this setting can be ignored.

This group allows managing the device role in an ID-NET network (Master or Slave).

The **Reading Point Address** indicates the address of the slave reader. This address is set automatically through the Setup Internal Network Configuration procedure but it can also be set here manually (1-31 for ID-NET Slaves).

The ID-NET Baud Rate is selected here and must be common to all devices in the network.

For a Matrix Slave Reader the **Master Device Type** parameter can be selected between Matrix Device or SC4000 ID-NET Controller.

See the device Reference Manual for details on ID-NET network configuration.

Device Name	Matrix	
Startup Configuration	Default	•
About Device		~
Ethernet Settings		~
Internal Network Settings		^
Reading Point Address		0 💌
Internal Network Role	Slave	-
Internal Network Baud Rate	500Kb	-
Master Device Type	Matrix Device	•
X-PRESS Configuration		~
LED Configuration		~
Maintenance Settings		v

15.4 X-PRESS CONFIGURATION

15

This group allows managing the HMI X-PRESS[™] behaviour. See the device Reference Manual for more details on the X-PRESS features.

Configuration Status enables/disables the X-PRESS features available through the multifunction key on the device.

X-PRESS Function (1-4) assigns an HMI function selected from the list to each one of the X-PRESS keys on the device.

Number of Samples selects the number of samples to analyze for the Test percentage.

Test Timeout sets when the expired timeout causes the Test feature to exit.

Aim Timeout sets when the expired timeout causes the Aim/Autofocus feature to exit.

Device Environment Configur	ation	
Device Name	Matrix	
Startup Configuration	Default	
About Device		
Ethernet Settings		
Internal Network Settings		
X-PRESS Configuration		
Configuration Status		
X-PRESS Function 1	Test Mode	
X-PRESS Function 2	AIM Mode	
X-PRESS Function 3	Auto Setup	
X-PRESS Function 4	Code Autolearn	
Number of Samples		20
Test Timeout (s)		180
Aim Timeout (s)		180 -
Saving Options	Permanent	
Configuration Name	HMIConfiguration	
Autolearn Timeout (s)		180 -
Packtrack Calibration		
LED Configuration		
Maintenance Settings		
Cancel		OK

Saving Options selects whether the X-PRESS Setup and Learn features will save their results to Permanent or Temporary memory. If set to Permanent memory, the configuration will be saved as the default configuration in the job list having the Configuration Name.

Configuration Name is the name given to the configuration saved to permanent memory by the X-PRESS Setup and Learn procedures.

Autolearn Timeout sets when the expired timeout causes the Learn feature to exit.

15.5 PACKTRACK CALIBRATION

This group shows the PackTrack Calibration parameter settings (read-only) for a device that has already been calibrated.

Device Name	Matrix	
Startup Configuration	PackTrack	-
About Device		~
Ethernet Settings		~
Internal Network Settings		~
X-PRESS Configuration		~
Packtrack Calibration		^
Device Position	Тор	
Near Plane Distance (mm)	0	
Far Plane Distance (mm)	600	
Min Pack Distance (mm)	372	
LED Configuration		~
Maintenance Settings		Ŷ
Cancel	OK	

15.6 LED CONFIGURATION

This group manages the device LEDs and Beeper behaviour.

COM LED Function selects whether the COM LED on the device (which signals activity on the Main Serial port) is ON when data is transmitted by the device (TX) or received from the Host (RX).

Beeper Status enables/disables the device beeper.

Beeper Activation Events selects which events will trigger the beeper.

Beeper Deactivation Timeout determines the length of the beeper signal.

LEDs Deactivation Timeout determines the length of time the LED signals are ON.

Device Name	Matrix	
Device Name	Matrix	
Startup Configuration	Default	-
About Device		*
Ethernet Settings		~
Internal Network Settings		~
X-PRESS Configuration		~
Packtrack Calibration		~
LED Configuration		^
COM LED Function	Main Serial Port TX	*
Beeper Status		
Beeper Activation Events	Good Read / Success / Code Match Multiple Read No Read / Failure / No Match	1
Beeper Deactivation Timeout (ms)		10 🌲
LEDs Deactivation Timeout (s)		30 💂
Focusing Pointer Status	Calibration Only	-
Multiple Read Treated As	Complete Read	-
Maintenance Settings		Ŷ
Cancel	ок	

Focusing Pointer Status (for devices with laser pointers) sets the aiming system management: **Disabled** - laser pointers always OFF; **Always On** - laser pointers always ON; **Calibration Only** - laser pointers only ON during calibration procedures.

Multiple Read Treated As determines which device LED will be activated on a Multiple Read event: **Complete Read** – the Good Read LED will be activated; **No Read** – the Status LED will be activated.

15.7 MAINTENANCE SETTINGS

Current Illuminator Model shows the internal illuminator model associated with this device.

If the device is not correctly associated with its internal illuminator incorrect functioning and/or damage can occur. For Matrix 410N devices see the following Illuminator Management procedure.

PPI is the same value saved in the **Acquire PPI** image density setting procedure located in the Advanced Setup – Image Settings branch. Here it can be set manually although it is advised to use the Acquire PPI procedure.

Enable BM100 Detection if enabled, at startup, the reader sends a message to recognize the presence of, and communicate with, the External Backup Memory (BM100

Device Environment Configuration	1	
Device Name	Matrix	
Startup Configuration	Default	-
About Device		~
Ethernet Settings		~
Internal Network Settings		~
X-PRESS Configuration		~
Packtrack Calibration		~
LED Configuration		~
Maintenance Settings		^
Current Illuminator Model	other	•
PPI		300 🜲
Enable BM100 Detection		
BM150 Display Layout	Reading Mask Only	*
Cancel	ОК	

Backup Module or integrated QLM-Series accessories). If using the Backup Memory, this parameter must be enabled.

BM150 Display Layout selects which information layout to display on the BM150 accessory display for CBX500 connection boxes. See the Matrix N Reference Manual for more details.

DL.CODE Illuminator Management Procedure for Matrix 410N

- In the DL.CODE Maintenance Settings

 Current Illuminator Model item, select the correct Illuminator being used from the dropdown list.
- 2. Click OK and at the device reset prompt click Yes and wait until the device resets. You can confirm by reopening this item from the same menu.

The above procedure must also be performed before any attempt to use the X-PRESS configuration on readers mounting the LT-005, LT-007, LT-010 or LT-011 illuminators.

Packtrack	•
	`
	,
	•
other	,
other 93A401026 - LT-010 93A400031 - LT-011 93A401032 - LT-005 93A401030 - LT-007	
other	
	other 93A401026 - LT-010 93A400031 - LT-011 93A401023 - LT-005 93A401030 - LT-007

16 MAINTENANCE

As with nearly all electronic components, performance may drift over time making it necessary to calibrate the device at periodic intervals for optimal reading performance. There is a Recalibration Tool provided in DL.CODE which performs the recalibration procedure. If it ever becomes necessary to perform this procedure, contact our Technical Support team for assistance.

This procedure is intended to be performed by trained technicians and not performed frequently (i.e. only after several years of operation and only if the focus level adversely affects decoding).



17 TROUBLESHOOTING

Problem	Solution
Online Device is not displayed in the Device Selection Area	In order to be found by DL.CODE, Online devices must be powered on and connected to the Local Area Network; if you don't see the desired device within this list, please verify its connections to the LAN and assure it is powered on; then click on the Discovery icon to run a new device search.
Serial Device is not displayed in the Device Selection Area	In order to be found by DL.CODE, Serial devices must be powered on, connected a Serial port of the configuration PC and have the serial port driver installed. if you don't see the desired device within the Serial Devices list, please verify its connections and assure it is powered on and the serial port driver is installed; then click on the Discovery icon to run a new device search.
Cannot open a device configuration DL.CODE Selected Device Information area shows a yellow background	Exit DL.CODE and cycle power to the device. Run DL.CODE and reselect the device. The background should now be green and device configurations can be opened.
Cannot Configure the Device (parameters and icons appear in grey)	The device is in run mode. Click on the Pause button to exit run mode.
Connection problem between DL.CODE and Online Device	If more than one LAN card is present on the local PC and a Simulator (offline device) is enabled in DL.CODE (disabled by default), the program can freeze up. Either disable the simulators in DL.CODE or disable the other LAN cards on the PC.
The User is not able to download images	the FTP Username and FTP Password must be the same as the ones defined in the FTP Client.
Some Images are missing	Image availability depends heavily on the number of images transferred and the rate of transfer, (system throughput and network bandwidth). Since Image downloading is usually based on specific criteria (i.e. No Read or Multiple Read conditions) the FTP Server is adequate to handle most applications. In extreme cases where a high throughput application requires all images to be downloaded it is possible that some images may not be available on the reader having been overwritten in the device's
	circular buffer.



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