

MS-Q QUADRUS™ HAND HELD IMAGER

The MS-Q Quadrus™ imagers are optimized to read bar codes and 2D symbols that use direct part mark (DPM) methods. It is the most aggressive hand held imager available for decoding symbols on low contrast substrates such as metal, plastic, rubber, and glass with marking methods such as dot peen and laser/chemical etch.

Containing custom optics and Microscan's Quadrus decode algorithms, the MS-Q combines the decoding power of Microscan's popular smart camera Quadrus EZ™ into a portable hand held device.

QUADRUS™ IMAGER FOR DIRECT MARK READING

Optical Options:

The MS-Q Quadrus™ hand held imager is available in two optical options:

- The high resolution version is custom designed to optimize resolution for reading small 2D symbols in direct part mark applications.
- The standard resolution version is suitable for reading all printed bar code methods plus many applications with directly marked symbols.



LightRay Optics Accessory:

Microscan's patented **LightRay Optics** solution further enhances the MS-Q's ability to read directly marked parts. By directing the illumination toward the symbol at off-axis angles, the **LightRay Optics** increase symbol contrast and filters out texture noise. The LightRay Optics are designed so that the MS-Q is positioned at the correct focal distance and angle. No training is needed to find the best angles for reading low contrast symbols. Either optical accessory easily attaches onto the end of the MS-Q. Two options are available: the LightRay 100 Series and the LightRay 200 Series.



*LightRay 100 Series
generates off-axis
diffuse illumination*



*LightRay 200 Series
generates dark field
illumination*

Ease of Use:

All MS-Q imagers feature point-and-click targeting with a red laser spot to quickly center the symbol in the field of view. Beeper, vibrator, and multi-purpose LEDs provide real-time feedback to signal successful decoding.

Applications:

The MS-Q Quadrus provides outstanding performance on challenging directly marked 2D codes.

Automotive and Aerospace: reads codes directly marked on steel, iron, aluminum, rubber, and glass parts by laser etch, dot peen, metal stamp, and other methods.

Electronics: reads codes laser etched on printed circuit boards and components.

Department of Defense: reads UID codes on a variety of substrates. Software enables MS-Q to verify UID code format for suppliers and constructs the UID string for DoD operators.

System Integration:

All MS-Q imagers are available in 3 configuration options:

- **Batch:** A wireless way to collect thousands of decoded symbols for later download, capable of performing more than 4000 reads from a single battery charge and buffer a minimum of 1 MB of data in non-volatile memory.*
- **Cabled:** Cabled units include USB, RS-232, and PS2.
- **Bluetooth:** Wireless data transmission using Bluetooth™ class 1 radio with a 328' (100 m) operating range.

*For batch and Bluetooth options a 1300 mA Lithium-Ion battery is included.

Symbologies:

The MS-Q Quadrus™ imager reads all standard linear bar codes plus:

2D Symbologies:

- Data Matrix (ECC 0-200)
- QR Code
- MaxiCode
- Aztec Code

Stacked Symbologies:

- UCC Composite
- PDF417 (Macro support)
- Micro PDF417

MICROSCAN®

MS-Q QUADRUS™ IMAGER FOR DIRECT PART MARK READING

SPECIFICATIONS AND OPTIONS

IMAGER MECHANICAL

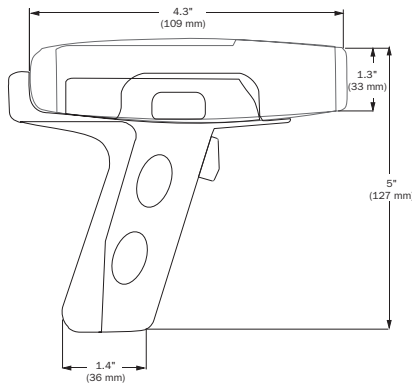
Height: 1.3" (33 mm)
Width: 1.8" (46 mm)
Depth: 4.3" (109 mm)
Weight: 2.5 oz. (71.5 g),
 not including cable

HANDLE MECHANICAL

Height: 3.8" (96.5 mm)
Width: 1.2" (30 mm)
Depth: 1.4" (36 mm)
Weight: 1.2 oz. (59.8 g)

ADDITIONAL PHYSICAL CHARACTERISTICS

Battery Weight: 2.1 oz. (59.5 g)
Battery Blank: .5 oz. (13.6 g)
Cable Length: 6' (1.8 m)



ENVIRONMENTAL

Operating Temperature: 0° to 40°C (32° to 104°F)
Storage Temperature: -20° to 60° C (-4 to 140°F)
Humidity: 5 to 90% (non-condensing)

CE STANDARDS

Immunity: EN 55024
ESD: EN 61000-4-2 **Radiated RF:** EN61000-4-3
Keyed Carrier: ENV50204 **EFT:** EN61000-4-4
Conducted RF: EN61000-4-6,
Emissions: EN55022, Class B Radiated,
 Class B Conducted

LIGHT COLLECTION OPTIONS

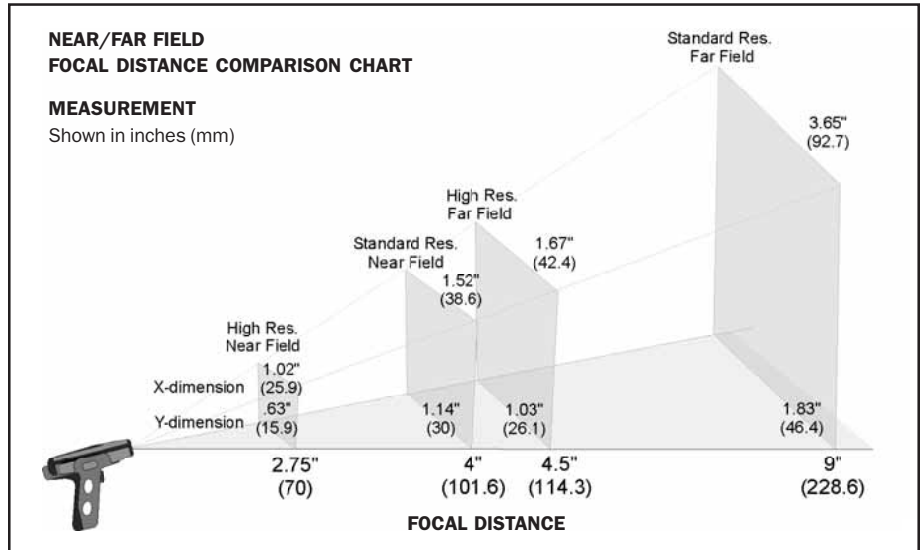
Sensor: CMOS, progressive scan, 1.33 MP (1024 by 1280), 256 gray scale
Standard Resolution Field of View:
 Near: 21.5° horizontal by 16.2° vertical
 Far: 22.9° horizontal by 11.6° vertical
High Resolution Field of View:
 Near & Far: 21° horizontal by 13° vertical
Standard Resolution Focal Point:
 Near: 4" (101.6 mm)
 Far: 9" (228.6 mm)
High Resolution Focal Point:
 Near: 2.75" (70 mm)
 Far: 4.5" (115 mm)
Sensor Array:
 Near Field: 1024 by 640 (default)
 Far Field: 1024 by 640 (default)

SYMBOLGY TYPES

Linear Bar Codes: Code 39, Code 128, I2 of 5, RSS, UPC/EAN, Codabar, Codablock F, Go Code, Code 93, PLANET, PostNet, KIX Code, Postal Codes
Stacked Symbolgies: PDF417, UCC Composite, Micro PDF417
2D Symbolgies: Data Matrix, MaxiCode, Aztec Code, QR Code
 Note: Quadrus mode decodes Data Matrix ECC 0-200 and QR code only.
 Basic mode decodes Data Matrix ECC 200 plus all other listed symbolgies.

READ PARAMETERS

Pitch: ±60° (front to back) **Skew:** ±60° **Tilt:** 360°
Focal Range: 1 to 20" (25 to 508 mm)
Rotational Tolerance: ±180°
Print Contrast Resolution: 25 percent (bar codes); 35 percent (PDF417); absolute dark/light reflectance differential, measure at 650 nm.



READ RANGES, STANDARD RESOLUTION

Narrow Bar-Width	Read Range Distance
.0075" (.191 mm)	3.2 to 3.9" (81 to 99 mm)
.015" (.381 mm)	3.0 to 9.0" (76 to 229 mm)
.020" (.508 mm)	3.0 to 11.5" (76 to 292 mm)

READ RANGES, HIGH RESOLUTION

Narrow Bar-Width	Read Range Distance
.005" (.127 mm)	1.75 to 2.5" (44.4 to 63.5 mm)
.0075" (.191 mm)	1.75 to 4" (44.4 to 101.6 mm)
.010" (.254 mm)	1.75 to 4.75" (44.4 to 102.6 mm)
.015" (.381 mm)	1.75 to 6" (44.4 to 152.3 mm)
.020" (.508 mm)	1.75 to 6.5" (44.4 to 165.1 mm)

READ RANGES WITH LIGHTRAY OPTICS

LightRay Options	Read Range Distance
LightRay 100 Series	Contact to .25" (6.35 mm)
LightRay 200 Series	Contact to .25" (6.35 mm)

Ranges based on Grade A, Data Matrix symbols.

Target Beam: Visible Laser Diode at 630 nm. Class 2
Ambient Light Immunity: Sunlight: Up to 9,000 ft-candles 96,890 lux
Shock: Withstands multiple drops of 6.5' (2 meters) to concrete

INDICATORS

LED Indicators: Memory status, Battery power, Successful decode, and Connection status
Programmable Indicators: Beeper or Vibrate option; communicates scanner operation and communication functions to user

IMAGE OUTPUT OPTIONS

Format: Jpeg, Raw (uncompressed)
Time Stamp: Interval logging

COMMUNICATION PROTOCOLS

Standard Interface: USB
Optional Interface: RS-232, Bluetooth Class 1 Radio at 328' (100 m), PS2

ELECTRICAL

Power Requirements: 5 VDC (mA)
Typical: 310 **Peak:** 310 **Sleep:** 3

Bluetooth Radio at 295' (90 m) away (mA):
Typical: 280 **Peak:** 350 **Idle:** 96 **Sleep:** 3

Bluetooth Radio at 33' (10 m) away (mA):
Typical: 260 **Peak:** 350 **Idle:** 96 **Sleep:** 3

Battery Life: Battery with radio will support 4000 read/transmits per charge including 8 hours of standby interval.

SAFETY CERTIFICATIONS

FCC, CE

ISO CERTIFICATION

Issued by RWTÜV, USA Inc.
 ISO 9001:2000 – Cert No. 03-1212

FIELD OF VIEW, STANDARD RESOLUTION

Near Field of View	
Distance (inches/mm)	Field of View Size (1024 x 640 pixel, Default)
4" (101.6)	1.52 x 1.14" (38.6 x 30 mm)
Far Field of View	
9" (228.6)	3.65 x 1.83" (92.7 x 46.4 mm)

FIELD OF VIEW, HIGH RESOLUTION

Near Field of View	
Distance (inches/mm)	Field of View Size (1024 x 640 pixel, Default)
2" (50.8)	.74 x .46" (18.8 x 11.6 mm)
2.5" (63.5)	.93 x .57" (23.5 x 14.5 mm)
2.75" (69.9)	1.02 x .63" (25.9 x 15.9 mm)
3" (76.2)	1.11 x .68" (28.3 x 17.4 mm)
3.5" (88.9)	1.3 x .80" (32.9 x 20.3 mm)
4" (101.6)	1.48 x .91" (37.6 x 23.2 mm)
Far Field of View	
2" (50.8)	.74 x .46" (18.8 x 11.6 mm)
2.5" (63.5)	.93 x .57" (23.5 x 14.5 mm)
3" (76.2)	1.11 x .68" (28.2 x 17.4 mm)
3.5" (88.9)	1.3 x .80" (32.9 x 20.3 mm)
4" (101.6)	1.48 x .91" (37.6 x 23.2 mm)
4.5" (114.3)	1.67 x 1.03" (42.4 x 26.1 mm)
5" (127)	1.85 x 1.14" (47.1 x 28.9 mm)
5.5" (139.7)	2.04 x 1.25" (51.8 x 31.8 mm)
6" (152.7)	2.22 x 1.37" (56.5 x 34.7 mm)
6.5" (165.1)	2.41 x 1.48" (61.2 x 37.6 mm)

FIELD OF VIEW, LIGHTRAY OPTICS*

LightRay Options	Field of View Size
LightRay 100 Series	Small Circular: .75" (19.1 mm) Dia. Large Circular: TBD
LightRay 200 Series	Small Circular: .75" (19.1 mm) Dia. Large Circular: TBD

*Patents: U.S. 6, 352, 204, and other patents pending.

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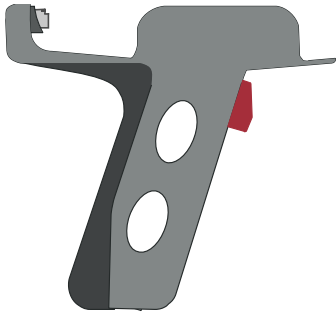
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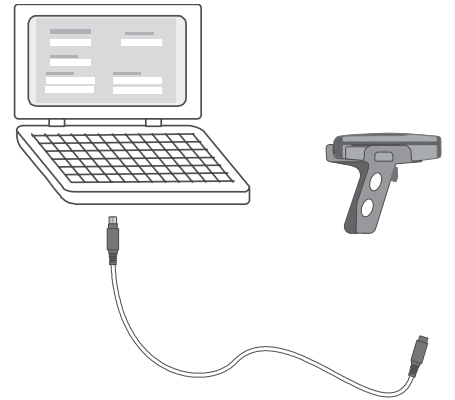
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Specifications subject to change, 11/04 - Base D

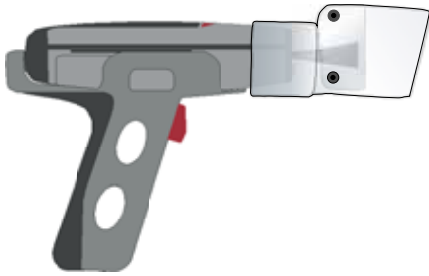
► Handle



► USB Interface Cable



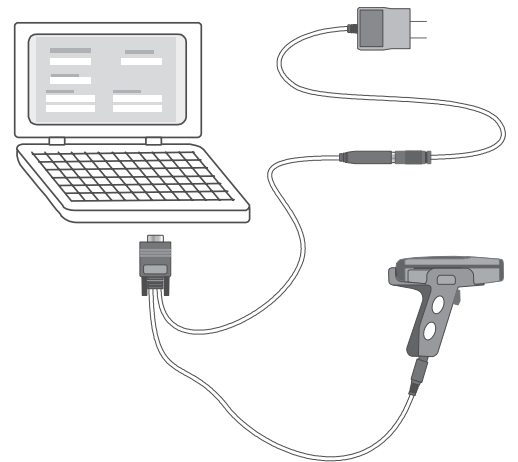
► LightRay 100 Series



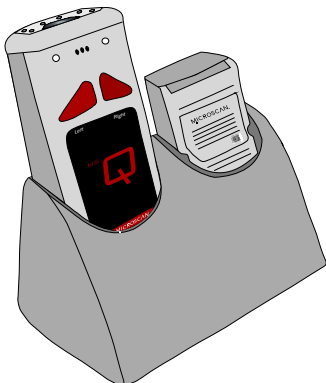
► LightRay 200 Series



► RS-232 Cable



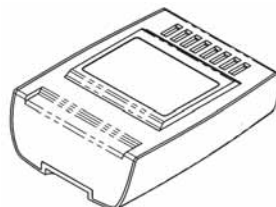
► 2-Bay Battery Charger



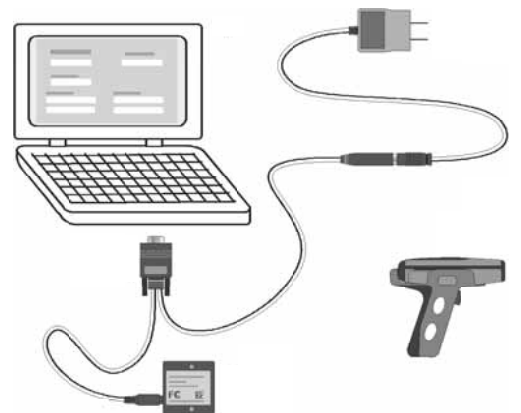
► Lithium Ion Battery



► Battery Blank



► Bluetooth™ (Wireless) Modem



MS-Q™ IMAGER ACCESSORIES

COMMUNICATION OPTIONS

Accessory	Microscan Part Number	Description
USB Cable	60-000009-01	USB communication cable, 6' (1.8 m).
Bluetooth Modem Kit (Serial Gateway)	98-000076-01 (U.S) 98-000076-02 (Euro) 98-000076-03 (U.K)	Bluetooth to serial gateway with power supply integrated into the unit. Allows for wireless communication.
RS232 Kit	98-000074-01 (U.S) 98-000074-02 (Euro) 98-000074-03 (U.K)	Kit, RS232 interface, 8' (2.4 m) coiled cable.

OPTICAL ACCESSORIES

LightRay 100 Series	Call Microscan	The LightRay 100 Series is a patented optical accessory designed for the MS-Q. The optical attachment directs and diffuses the illumination to optimize the MS-Q to read direct part mark (DPM) symbols on curved or highly reflective surfaces.
LightRay 200 Series	Call Microscan	The LightRay 200 Series is a patented optical accessory designed for the MS-Q. The optical attachment allows light to be directed at an increased shallow angle which increases symbol contrast on direct part mark symbols.

POWER, BATTERY & HOLSTER

Power Supply	20-000335-01 (U.S) 20-000336-01 (Euro) 20-000337-01 (U.K)	Offered in US, European, and UK formats. Provided in Bluetooth Modem, Battery Charger, and RS232 kits. Wall mounted, 90-264 VAC, +5 VDC 1.5A (2.4A, U.K. version). Cable length: 8.7' (2.7 m).
2-Bay Battery Charger	98-000075-01 (U.S) 98-000075-02 (Euro) 98-000075-03 (U.K)	Port for two batteries to be recharged simultaneously.
Lithium Ion Battery	20-000333-01	1300 mAH, rechargeable batteries for use with MS-Q. A fully charged battery is good for 4,000 triggers.
*Battery Blank	20-000338-01	Blank for battery chamber. For use with tethered configurations: RS232, USB, and PS2 configurations.
*MS-Q Handle	12-000215-01	Handle for MS-Q unit.

DOCUMENTATION

ESP™ Software, User Manuals	37-000001-01	User Manuals and ESP™ software (1 copy free per order).
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*Included in the MS-Q Imager purchase. Parts can be purchased as spares.

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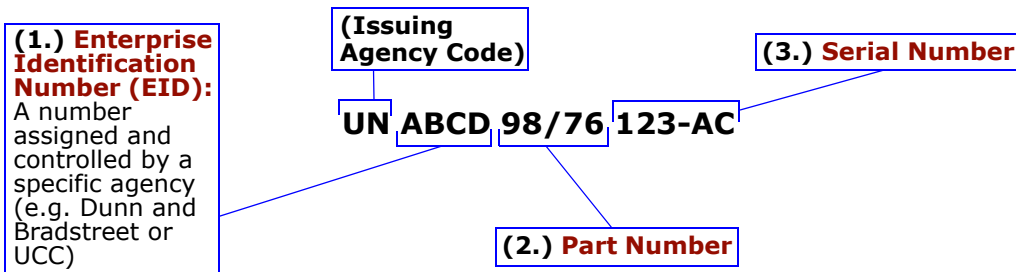
www.quadrus-ez.com

Reading UIDs with the MS-Q Imager

The Department of Defense (DoD) now requires Unique Identification (UID) numbers for all products sold to the DoD by private vendors. A UID number can be thought of as a Social Security number for each part. The UID number must be encoded in an ECC 200 Data Matrix symbol that conforms to the data structure defined in the DoD's "Guide for Uniquely Identifying Items."

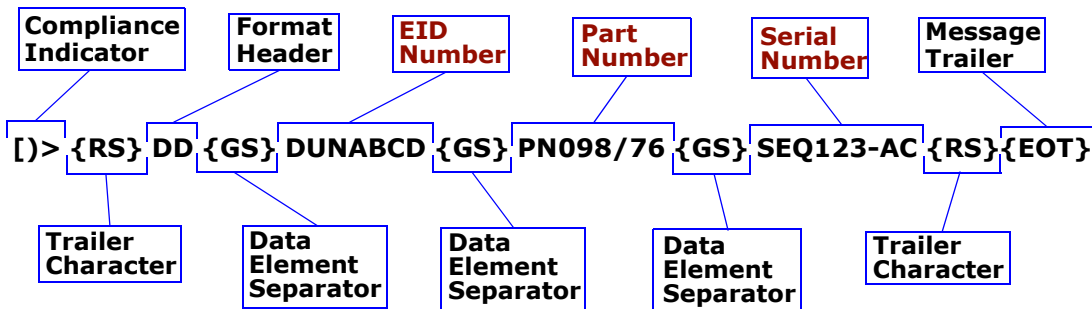
UID Elements

UID numbers come in two forms, called **Construct 1** and **Construct 2**. The following is an example of Construct 2. Construct 1 is identical, except that it doesn't include a part number. Construct 2 is composed of three basic elements:



Encoding a UID

The information in a UID also includes a compliance indicator, data qualifiers, and data element separators. None of these elements are part of the final UID number. When UID-Only Mode is enabled in the MS-Q, the characters that are not part of the UID number are removed from the decoded symbol data. Only characters that make up the UID number are passed on to the host computer. Otherwise, the symbol is rejected.



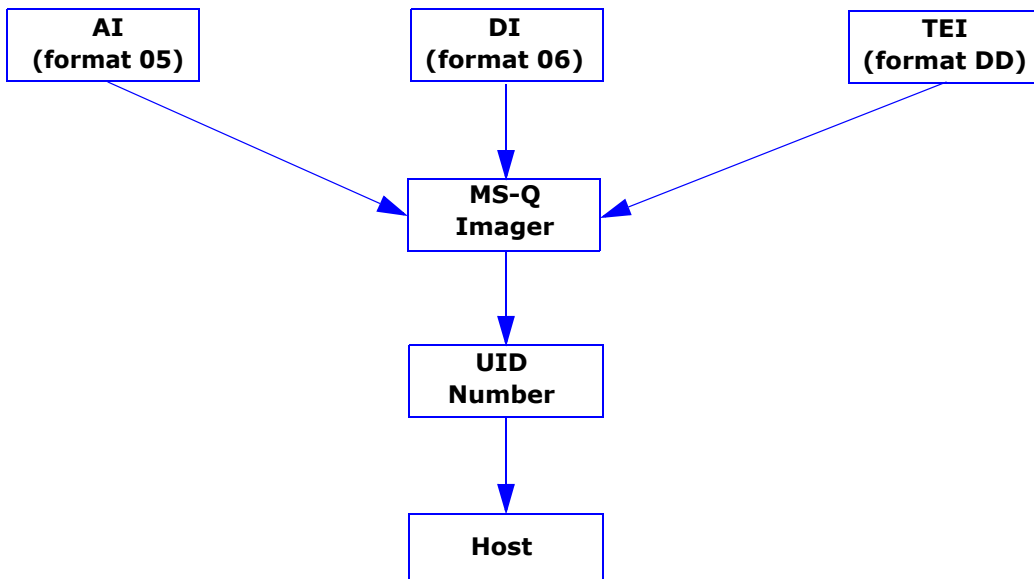
Non-UID Characters in a UID Message Stream

The following table identifies and describes all characters in a UID message stream that are not part of the final UID number sent to the host.

Table 1: Non-UID Characters in a UID Message Stream.

<i>Compliance Indicator</i>	Identifies to the Imager that the symbol contains a UID number.
<i>Format Header</i>	Describes the type of data qualifier used. These qualifiers include AI (format 05), DI (format 06), and TEI (format DD).
<i>Trailer Character</i>	An ASCII character that separates the compliance indicator from the format header information, and also appears at the end of the message stream.
<i>Data Element Separator</i>	An ASCII character used to separate data fields.
<i>Message Trailer</i>	Identifies the end of the message within the data stream.
<i>Data Qualifier</i>	Defines each data element placed in the UID message stream.

When a message stream in any of the three formats is read by the Imager, non-UID characters are omitted and the UID number is sent to the host.



UID Mode Features

Table 2: Features of UID Mode.

<i>UID-Only Enabled</i>	Allows the MS-Q to read <i>only</i> UID message streams encoded in ECC 200 Data Matrix symbols and to send the UID output to the host computer. The Imager will not read any other symbol data when UID-Only is enabled.
<i>UID-Only Enabled with Error Messaging</i>	Allows the MS-Q to read <i>only</i> UID message streams encoded in ECC 200 Data Matrix symbols and to send the UID output to the host computer. In addition, the Imager will send an error message to the host if the UID message stream is invalid.
<i>UID Enabled with Pass Through</i>	Allows both UID-encoded symbols and non-UID symbols to be decoded and sent to the host.
<i>UID Enabled with Error Messaging and Pass Through</i>	Allows the MS-Q to decode UID symbols and non-UID symbols, and to provide error messages if the UID message stream is invalid.

UID Mode Command Symbols

The following symbols control UID functions:



Q014_01

UID-Only Enabled



Q015_01

UID-Only Enabled with Error Messaging



Q016_01

UID Enabled with Pass Through



Q017_01

UID Enabled with Error Messaging and Pass Through



Q018_01

UID Disabled

Save Settings



M188_02

Default to USB



M049_01

Clear XML Rules









M052_01

Error Messaging

This feature is used to validate that UID data strings are in the correct format. When Error Messaging is enabled, the MS-Q sends a message to the host indicating an error every time a bad symbol is read. The following table shows examples of error messages.

Table 3: Examples of error messages.

<i>Invalid Format Header</i>	[>{RS} 15 {GS}800406141411A0B9C3D6{RS}{EOT} Error message: "Invalid UID Format Header"	
<i>Invalid AI</i>	(01 + 21) [>{RS}05{GS}0100061414199999{GS} 31 1A0B9C3D6{RS}{EOT} Error message: "Invalid AI"	
<i>Invalid DI</i>	(UN + 12V + 1P + S) [>{RS}06{GS} 12X 077991289{GS}1P4202435{GS}S10936{RS}{EOT} Error message: "Invalid DI"	
<i>Invalid TEI</i>	(D + CAG + SER) [>{RS}DD{GS} CAX 987654{GS}SERMKLJHUIYD{RS}{EOT} Error message: "Invalid TEI"	
<i>Space in Data Qualifier</i>	[>{RS}05{GS}8 [↓] 0040614 1411 A0 B9 C3D6{RS}{EOT} Error message: "Invalid AI (or DI or TEI depending on format in use)"	
<i>Lower Case Characters</i>	[>{RS}05{GS}800406141411 a 0B9C3 d 6{RS}{EOT} Error message: "Invalid Characters in Data"	

Save Settings



M188_02

Default to USB



M049_01

Clear XML Rules



M052_01

Table 3: Examples of error messages (cont.)

<p><i>Invalid Characters</i></p>	<p>[>{RS}05{GS}800406141411#0B9C3D6{RS}{EOT} Error message: "Invalid Characters in Data"</p>	
<p><i>UID Too Long</i></p>	<p>(Character limit: 78) [>{RS}05{GS}80021234567891123456789212345678931234567894123456789512345678961234567897123456789{RS}{EOT} Error message: "UID Too Long"</p>	
<p><i>Part Number Too Long</i></p>	<p>(Character limit: 32) [>{RS}DD{GS}DUNABCD{GS}PNO1234567891123456789212345678931234{GS}SEQ123-AC{RS}{EOT} Error message: "UID Part Number Too Long"</p>	
<p><i>Serial Number Too Long</i></p>	<p>(Character limit: 30) [>{RS}DD{GS}DUNABCD{GS}PNO098/76{GS}SEQ1234567891123456789212345678931{RS}{EOT} Error message: "UID Serial Number Too Long"</p>	
<p><i>EID Number Too Long</i></p>	<p>(Character limit: 13) [>{RS}DD{GS}DUN12345678911234211{GS}PNO98/76{GS}SEQ123-AC{RS}{EOT} Error message: "UID EID Too Long"</p>	
<p><i>Invalid Compliance Indicator</i></p>	<p>(I))>{RS}05{GS}800406141411A0B9C3D6{RS}{EOT} Error message: "Invalid UID Compliance Indicator" Note: The following symbol <i>will read</i> in UID-Only Mode, because the invalid compliance indicator suggests that the encoded characters form a non-UID message stream.</p>	

Save Settings



Default to USB



Clear XML Rules



Valid Formats

The following table shows examples of correctly encoded UID message stream and the decoded UID output.

Table 4: Examples of valid UID data strings and UID numbers.

<i>AI (Format 05)</i>	<p>Encoded message stream: []>{RS}05{GS}0100061414199999{GS}211A0B9C3D6{RS}{EOT}</p> <p>Decoded UID output: 000614141999991A0B9C3D6</p>	
<i>DI (Format 06)</i>	<p>Encoded message stream: []>{RS}06{GS}18SOCVA5674A36458{RS}{EOT}</p> <p>Decoded UID output: DOCVA5674A36458</p>	
<i>TEI (Format DD)</i>	<p>Encoded message stream: []>{RS}DD{GS}CAG987654{GS}SERMKLJHUIYD{RS}{EOT}</p> <p>Decoded UID output: D987654MKLJHUIYD</p>	

Save
Settings



M188_02

Default
to USB



M049_01

Clear
XML Rules



M052_01