

ANSI MH10.8.17-2017



Item Unique Identification (IUID) Data Matrix Encoding Guideline



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American National Standard

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American National Standard

**Item Unique Identification (IUID)
Data Matrix Encoding Guideline**

Standards Developer:

Material Handling Committees

MH10 Committee, Unit-Loads and Transport-Packages

Subcommittee 8, Coding & Labelling of Unit-Loads

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FOREWORD. This standard represents suggested performance requirements and test procedures for pressure-sensitive labels incorporating linear bar code and two-dimensional (2D) symbols. It was developed by the MH10 Committee for Unit Loads and Transport Packages, Subcommittee 8, Coding and Labelling of Unit Loads. MH10 is promulgated under the Material Handling Committees (MHC) for which MHI is the Secretariat. This standard is intended to provide useful information and guidance for owners, users, designers, purchasers or specifiers of shipping label equipment. It is advisory only and should only be regarded as a simple tool that its intended audience may or may not choose to follow, adopt, modify, or reject. A standard may be part of, but does not constitute a comprehensive effectiveness program that cannot guard against pitfalls in operating, selecting and purchasing such a system, and should not be relied upon as such. Such a program should be developed by a qualified professional.

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Item Unique Identification (IUID) Data Matrix Encoding Guideline

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Item Unique Identification (IUID) Data Matrix Encoding Guideline

1. Objective

This standard has been developed as a guideline to address two related objectives:

- a) to provide a conceptual understanding of the various standards and how they interrelate to form requirements of Item Unique Identification (IUID). The specific facet of IUID this guideline focuses on is how to encode data into the proper machine readable symbol (like a barcode) the proper way; and
- b) to provide a troubleshooting guide for checking markers and readers of IUID Data Matrix symbols¹.

2. Requirements and Assumptions

2.1. Requirements

Current version of all applicable standards that apply to the United States Department of Defense (DoD) IUID requirement (see section 2.3).

2.2. Assumptions

This document is written under the assumption the user has read and understands all standards applicable to their industry that have been referenced in the DoD IUID requirements.

2.3. Pertinent Documents ²

The following nine documents are the authoritative sources from which the information within this guide is drawn. These documents are occasionally reviewed and updated. If the current version of any of them is different from what is listed below, the reader should be aware the change could affect the usefulness of this guide. In cases where contracts are relevant and cite specific versions of standards, the cited versions must be followed and may be different from what has been used within this guide.

- a) MIL-STD-130N w/CHANGE 1, *Department of Defense Standard Practice Identification Marking of U.S. Military Property*, 16 November 2012

¹ For the purpose of this document, the term "IUID Data Matrix" is used to describe a Data Matrix symbol compliant with all DoD IUID policies and business rules. This is equivalent to the terms "UII Data Matrix Symbol", "IUID compliant Data Matrix, IUID MRI mark", and "Data Matrix containing the UII data set" used in other IUID documents. A Data Matrix not meeting all DoD IUID policies and business rules is referred to as a "non-compliant Data Matrix". The term "Data Matrix" is used to describe a Data Matrix symbol which may or may not meet all DoD IUID requirements.

² Many other documents exist which are crucial to the understanding of IUID as a whole. They have been omitted because they do not pertain to the purpose of this guide. (e.g., information about the IUID Registry does not contribute to the understanding of how to form IUID Data Matrix symbols.)

This standard is the foundation document. It is called out in contract language and DoD Instructions.

The other documents listed hereafter are pertinent because they are required by or associated with MIL-STD 130.

- b) *Department of Defense Guide to Uniquely Identifying Items Assuring Valuation, Accountability and Control of Government Property*, Version 3.0, December 2, 2014

This guide provides a complete list of the DoD IUID specific business rules. It provides a number of examples and detailed explanations of some of the subtleties within MIL-STD 130.

- c) ISO/IEC 16022:2000, *Information technology - International symbology specification - Data Matrix*

This standard defines every aspect of the ECC 200 Data Matrix which is mandated by MIL-STD 130 for IUID. Various permutations of how an IUID Data Matrix can be formed are possible. They are described within ISO/IEC 16022.

- d) ISO/IEC 15434:2006, *Information technology – Automatic identification and data capture techniques – Syntax for high-capacity ADC media*

This standard describes several ways to structure data. MIL-STD 130 mandates the use of ISO/IEC 15434 syntactic structure in IUID. Three of these structures are allowed for use when encoding data in an IUID Data Matrix (i.e. Format Code = 05, 06, or 12). This standard requires the use of specific, standardized codes to be encoded within the IUID Data Matrix symbols to provide intelligence with regard to what type of raw data is encoded, where the data starts and where the data ends (i.e. Application Identifiers (AI), Data Identifiers (DI), Text Element Identifiers (TEI))³.

This standard also requires non-printable control codes to be encoded into IUID Data Matrix symbols in specific places in order to provide structure (i.e. R_s , G_s , E_{OT})⁴.

- e) ISO/IEC 646:1991, *Information technology — ISO 7-bit coded character set for information interchange*

This standard provides a table of numeric values that correspond to letters, digits and non-printable control codes used when encoding data into IUID Data Matrix symbols. This is often referred to as the “ASCII Table”.

- f) *GS1 General Specifications*, Version 15 (issue 2), Jan-2015

³ AIs are required with Format Code = 05. The authoritative document for them is the GS1 General Specifications (they are also listed within ANSI MH10.8.2 however), DIs are required with Format Code = 06. The authoritative document for them is the ANSI MH10.8.2, TEIs are required with Format Code = 12. The authoritative document for them is the ATA CSDD.

⁴ R_s represents one non-printable control code with decimal value 30 in the ISO/IEC 646 standard.

G_s represents one non-printable control code with decimal value 29 in the ISO/IEC 646 standard.

E_{OT} represents one non-printable control code with decimal value 4 in the ISO/IEC 646 standard.

This specification defines every aspect of Application Identifiers³ as well as the context and constraints of the data elements they identify.

- g) *ANSI MH10.8.2, American National Standard Data Identifier and Application Identifier Standard*, 18 May 2010

This specification defines Data Identifiers³ and lists Application Identifiers³ and provides data constraints when using various data qualifiers.

- h) *Airlines for America (A4A) Common Support Data Dictionary*

This dictionary is a catalog of all the Text Element Identifiers, terms, and tags used throughout A4A⁵ specifications. It provides the context and constraints of the data elements they identify.

- i) *Guidelines for Department of Defense Unique Identification (UID) Marking Using the GS1 System*, November 2006

These guidelines provide valuable insight into GS1 specific business rules as they pertain to IUID and encoding IUID Data Matrix symbols. Note: Section 4 of these GS1 guidelines provides details on using the GS1 FNC1 syntax in ECC 200 Data Matrix symbols. MIL-STD 130 conditionally permits this syntax for non-IUID items. FNC1 syntax is not an IUID compliant option. The DoD requirement for IUID require the IUID encoded data string be compliant with ISO/IEC 15434. FNC1 is not to be used in the first position per DoD rules.

3. Conceptual Constructs

In an attempt to appeal to the widest possible audience, this guide presents three conceptual constructs, illustrating how various sources of requirements interact with regard to IUID Data Matrix construction and decoding. Each is notionally equivalent.

3.1. Top-Down Hierarchy Concept

This concept, shown in Figure 1, presents IUID requirements starting as a high-level over-view and subsequently breaking down each element of the overview into increasing levels of detail.

⁵ The Air Transportation Authority (ATA) has changed into the Airlines For America (A4A).

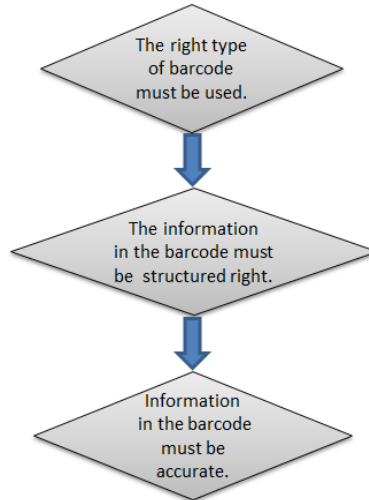


Figure 1. Top-down IUID compliance

3.2. Decision Flow Chart Concept

The chart in Figure 2 was created to walk a user down a consistent, logical path to achieve encode and decode compliance for their IUID. The chart was developed in tiers and each step must be completed for the user to be compliant to IUID policy.

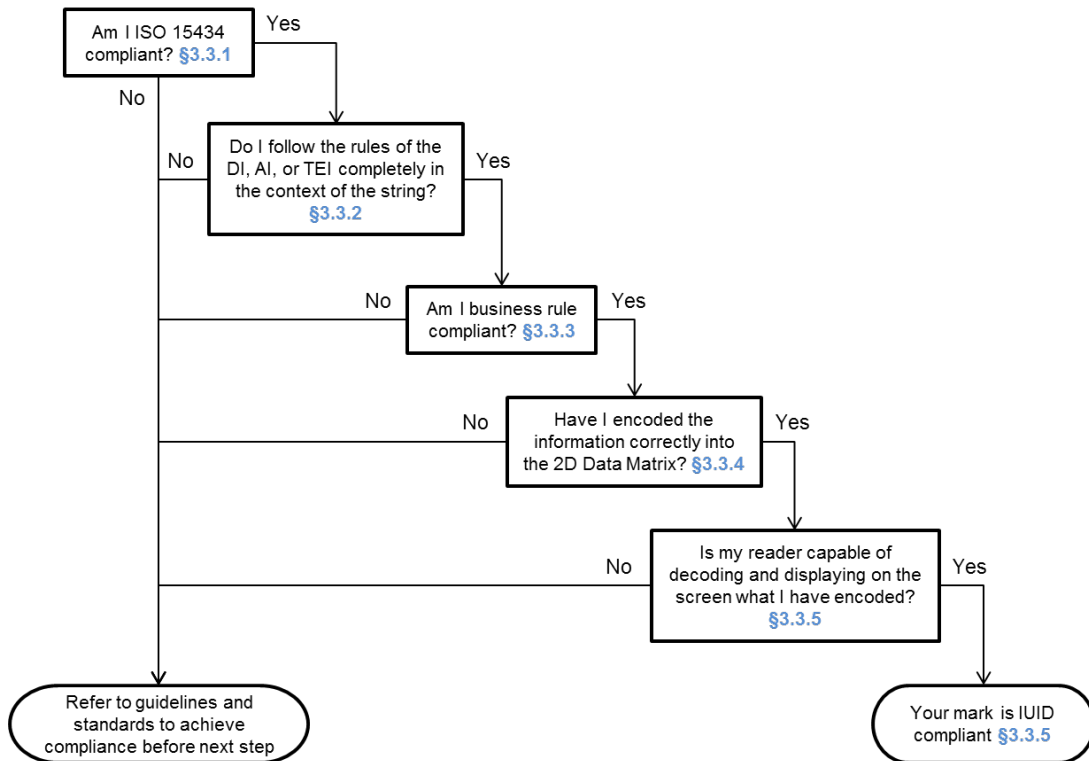


Figure 2. IUID compliance decision flow chart

3.3 Compliance Pyramid Concept

The chart in Figure 3 has been created as an aid to show the levels that need to be present to obtain proper compliance to IUID policy and guidelines. The numbers in the pyramid are section headings; refer to them for additional details.



Figure 3. IUID compliance pyramid

3.3.1 ISO/IEC 15434 Compliance

Compliance with ISO/IEC 15434 requires the specific use of particular characters, as well as the use of select format codes and their respective data qualifiers within the encoded data string.

One such requirement is the use of at least three non-printable control characters. These are:

- R_S where the two letter couplet, superscript R and subscript S, collectively represent a single non-printable control character called Record Separator. The R_S is encoded as a single byte of ASCII decimal value 030 (equivalently hexadecimal value 1E).
- G_S where the two letter couplet, superscript G and subscript S, collectively represent a single non-printable control character called Group Separator. The G_S is encoded as a single byte of ASCII decimal value 029 (equivalently hexadecimal value 1D)
- E_{OT} where the three letter triplet, superscript E, small o and subscript T, represent a single non-printable control character called End of Transmission. The E_{OT} is encoded as a single byte of ASCII decimal value 04 (equivalently hexadecimal value 04)

Note: If the literal letters RS, GS or EoT were encoded in the data string in place of the single non-printable control characters listed above, the resultant data would be in error, and would not be in compliance with ISO/IEC 15434. Annex A contains information regarding how readers can output the non-printable characters.

In the following ISO/IEC 15434 message example the non-printable control characters are visually displayed as shown above; $] >^R_s 06^G_s 25 \text{SUN98765432187654321A2B4C6D8E}^R_s \text{E}^E_o \text{T}$

Each non-printable control character will be encoded according to its ASCII value (listed above), not according to the ASCII value for the individual letters. When they are decoded and visual characters are used to represent the non-printable control characters, they might not appear as shown in this document.

Other requirements for the encoded data string to comply with ISO/IEC 15434 are:

- a) The first 4 characters must be $] >^R_s$.
- b) The last 2 characters must be $\text{E}^E_o \text{T}$.
- c) The 5th and 6th characters must be 2 digits “01” through “12”. These 2 digit characters are known as the format code.⁶
- d) The 7th character must be G_s .
- e) The proper data qualifiers must be used with the format code used.
 - 1) Format code 05 requires Application Identifiers (AI) be used as data qualifiers.
 - 2) Format code 06 requires Data Identifiers (DI) be used as data qualifiers.
 - 3) Format code 12 requires Text Element Identifiers (TEI) be used as data qualifiers.

3.3.2. Swim Lane Standard Compliance

AI, DI and TEI all have their own published standard within which is defined both the supported data qualifiers and constraints on the data itself when using these data qualifiers. These requirements define their swim lane⁷. The IUID standards accommodate use of any of these swim lanes.

When encoding or decoding an IUID Data Matrix to a compliance standard it is necessary to ensure all of the individual rules for the relevant swim lane are followed. That is to say, one of three swim lanes (AI, DI, TEI) must be used and regardless of which is chosen - it comes with its own set of rules to follow.

For example, if format code 12 is used, then TEIs must be used and data qualifiers and data constraints found in the ATA CSDD must be adhered to. CAG 12345 for a TEI is acceptable per the CSDD. The TEI of “C”, “A”, “G”, “space” is correct with the appropriate space as called out in

⁶ IUID data elements may only be within a record envelope using one of the three permissible format codes (i.e., “05”, “06”, “12”) even though ISO15434 allows for others.

⁷ A swim lane is a visual element used in process flow diagrams that visually distinguishes responsibilities for sub-processes within a process. In terms of this guide it specifically refers to choosing one format code to be used within an IUID Data Matrix.

the specification. The data following is compliant as it follows the CSDD rules for the data when the CAG TEI is used, exactly 5 alpha/numeric characters are used.

In a similar fashion, many data are constrained outside of these swim lane standards. In the above example with CAGE codes, the CSDD constrains the data to be exactly 5 characters long and to use only alpha/numeric characters. The organization authorized to issue CAGE codes within the United States has additional constraints however – specifically CAGE codes always begin and end with a digit, no lower case letters are allowed, and the capital letters “O” and “I” are not allowed. CAGE codes issued outside the United States are not constrained in the same way and sometimes begin with a letter and sometimes use “O” and “I”. It is beyond this guide’s scope to detail every possible data constraint; emphasis is made to be mindful of potential nested requirements which must be followed within any chosen swim lane.

3.3.3. Business Rule Compliance

There are many business rules found within MIL-STD-130 and the DoD Guide to Uniquely Identifying Items; there are nearly 40 different business rules in all. Again, it is beyond this guide’s scope to detail every possible business rule; emphasis is made to be mindful that business rules exist and provide an overview of some important aspects.

Some business rules allow swim lane standards deviations shown in Section 3.3.2. As an example, no swim lane standard allows data with a hyphen or forward slash to be encoded using their data qualifiers for part numbers or serial numbers. MIL-STD 130 explicitly allows these characters when they are found within part numbers or serial numbers and are part of the IUID data set.

Some business rules provide additional guidance needed to resolve ambiguities. For example, when multiple IUID constructs are plausible from the encoded data, DIs 25S, 18S, and 18V take precedence and will be considered to specify the UII data regardless of other DIs.

Lastly, the business rules provide additional constraints. For example, part numbers are limited to 32 characters; serial numbers limited to 30 characters, overall UIIs are limited to 50 characters, and the UII should be within the first record of the ISO/IEC 15434 symbol.

3.3.4. Correct Encoding

Correct encoding refers to the process of producing the IUID Data Matrix from the data intended to go into the Data Matrix. In this process a computer and some sort of marking equipment are used together. The fact that the computer must run software is generally understood. The fact that the marking machine must run software (also known as firmware) is less widely known. In order for the IUID Data Matrix to be produced correctly, the operator must understand how the computer’s software and the marking machine’s firmware interact to produce the desired Data Matrix. The problem is as follows:

- **Firmware Level** – There is no requirement that specifies how firmware shall communicate to the marking machine or how it translates the non-printable control code characters. Therefore, operators must become knowledgeable of how the firmware communicates non-printable control code characters to the marking machine.
- **Software Level** – From the software development level there are many possible discrepancies in the user interface and what has been communicated to the marking machine. Software developers must ensure the representation presented to the user

translates to the marking equipment correctly. The Annexes in this guide can help determine if the software and firmware are properly coordinated.

3.3.5. Proper Decoding

Proper decoding refers to the process of producing the UII (or other relevant data) from the IUID Data Matrix. In this process a reader is used that runs firmware to decode the Data Matrix and software that translates the raw decoded data into a UII. In order for the UII to be produced correctly, the data encoded into the Data Matrix must be properly decoded and this decoded data must be processed into a UII using the IUID business rules. The problem, if there is one, falls into one (or more) of these categories:

- a) The reader cannot decode, or perhaps, properly decode the IUID Data Matrix.
- b) The user is not using software to translate the raw decoded data into a UII, or is using software that does not do so correctly.
- c) The user does not understand what the reader output means.

The Annexes can help determine if the reader's software and firmware are operating properly.

3.3.6. IUID Compliance

All pyramid levels in section 3.3 shall be followed to obtain IUID compliance.

4. Examples

4.1 Examples of Variations within the ECC200 Data Matrix Symbology Standard

Examples of IUID Data Matrix symbols are shown in Figure 4. The small number of examples is meant to illustrate acceptable variation with which symbols may be encoded and remain in conformance with IUID policy. More example symbols using the IUID symbology standard are in Annex B.

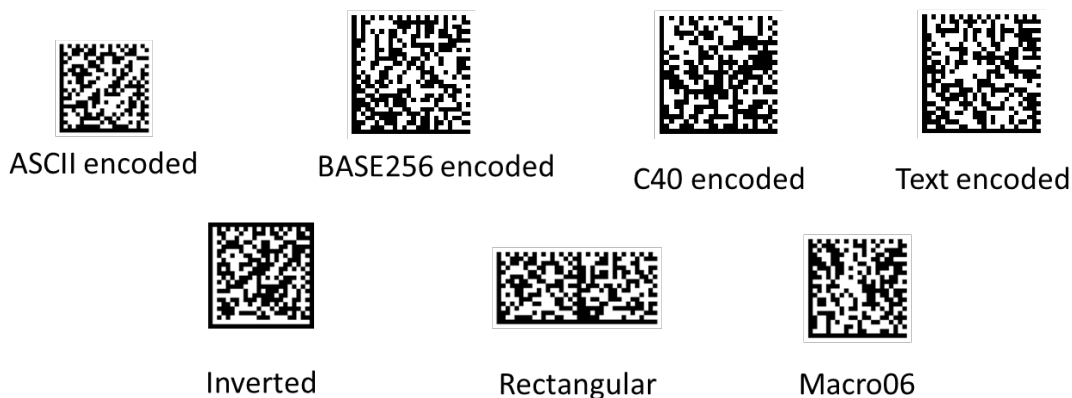


Figure 4. Example IUID Data Matrix symbols showing the variety of encoding options for the same UII (all should resolve to the UII D895368902A3122A02965)

4.2 Examples of Diversity in Unique Item Identifier Construction and Encoding

Much like Section 4.1 above, the following examples in Figure 5 conform to IUID policies and are meant to illustrate variation. In this case the variation is within the various swim lanes used. More examples are found in Annex C.

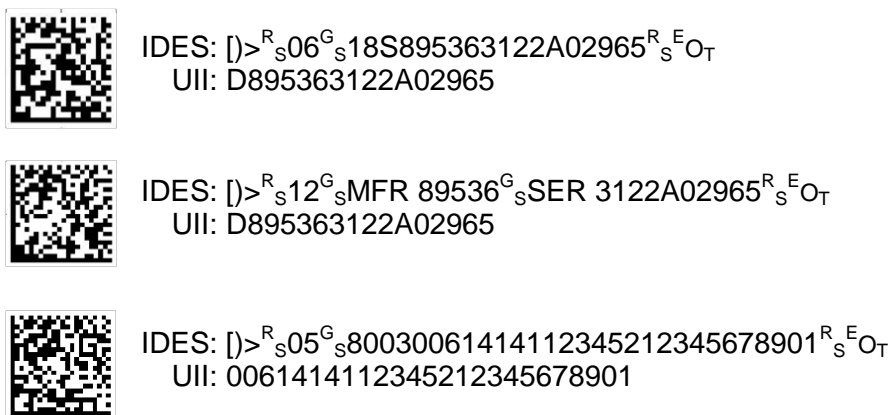


Figure 5. Example IUID Data Matrix symbols showing the three permitted swim lanes for encoding⁸

4.3 Examples of Symbols Intentionally Encoded Wrong

Figure 6 includes examples of symbols which do not conform to IUID policies. More examples containing intentional errors in the IUID symbol are in Annex D.

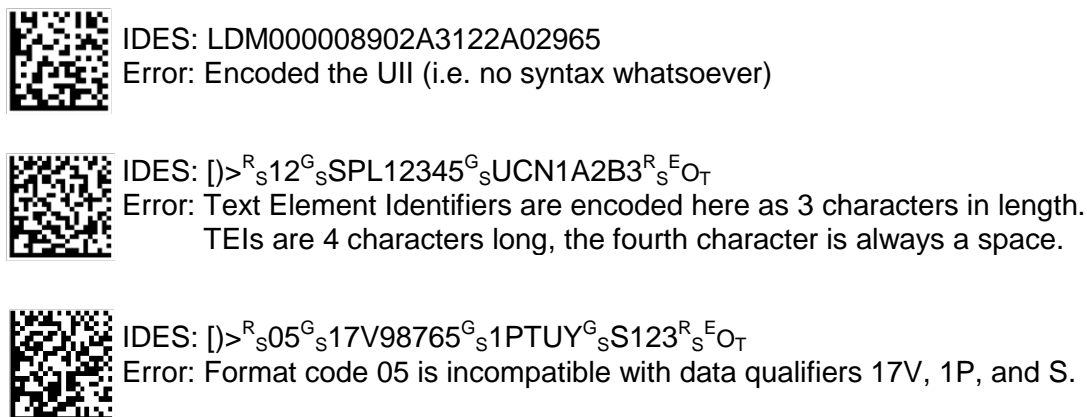


Figure 6. Example non-compliant Data Matrix symbols with the encoded string and error noted

⁸ IDES stands for IUID Data Encoded String and is the actual data encoded into the symbols. UUI stands for Unique Item Identifier and is the globally unique string of characters which is entered into the IUID Registry.

5. Conclusion

There are companies doing business with DoD and organizations within the DoD claiming compliance but they are not. This can be due to misunderstanding the levels of complexity. This standard was developed as a guideline to help identify and define what potential variables are currently present when trying to comply with IUID. By examining the processes and steps that are necessary for compliance hopefully this will help identify ways to help solve problems in the industry using a standardized approach.

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6. Definitions (including acronyms, terms and data qualifiers)

Terms	Definition
1. AI	Application Identifier
2. ASCII	American Standard Code for Information Interchange
3. ATA	Air Transport Association
4. BIOS	Basic Input/Output System
5. CAG	TEI which indicates that the data following is a CAGE Code
6. CAGE	Commercial And Government Entity
7. CSDD	Common Support Data Dictionary
8. DI	Data Identifier
9. ECC	Known as either "Error Checking and Correcting" or "Error Correction Code"
10. E_{OT}	End Of Transmission
11. G_s	Group Separator
12. hexadecimal	A number system using a base of 16
13. IDES	IUID Data Encoded String
14. IEC	International Electrotechnical Commission
15. ISO	International Organization for Standardization
16. IUID	Item Unique Identification
17. MFR	TEI for the Manufacturer's CAGE Code
18. MH10	ANSI Standards committee for material handling. Administered by MHI
19. MHI	Material Handling Industries
20. MIL-STD	Military Standard
21. PNO	TEI for Original Part Number
22. R_s	Record Separator
23. SER	TEI for a Serial Number where it is unique within the enterprise
24. SPL	TEI for a Supplier's CAGE code
25. TEI	Text Element identifier. A four-character designator which is a three-alpha characters followed by a space
26. UCN	TEI for a Unique Component Identification Number
27. UII	A Unique Item Identifier or the Unique Item Identifier itself

Annex A. Symbols For Testing Decoder Output of Non-Printable Control Characters.

The non-printable control characters are a common confusion area for many. Different scanners may output different data. IUID Data Matrix symbols will always encode at least these three non-printable control characters:

- R_S ASCII decimal value 30 “Record Separator”
- G_S ASCII decimal value 29 “Group Separator”
- E_{OT} ASCII decimal value 4 “End of Transmission”

The IUID Data Matrix in Figure 7 has the following data encoded into it:
 $[] > ^R_S 06 ^G_S 25 S 06 14 14 1 M H 8 0 3 1 2 ^R_S ^E_{OT}$.

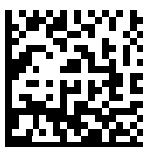


Figure 7. IUID Data Matrix with $[] > ^R_S 06 ^G_S 25 S 06 14 14 1 M H 8 0 3 1 2 ^R_S ^E_{OT}$ encoded

When a randomly selected scanner with a USB connection set to mimic a keyboard (a.k.a. keyboard wedge) is used to decode an IUID Data Matrix, the output information is not possible to know without scanning the symbol. This problem is specific to the non-printable control characters.

As an illustrative example, two different reader outputs from scanning Figure 7 are shown:

Reader #1: $[] > \blacktriangle 06 \leftrightarrow 25 S 06 14 14 1 M H 8 0 3 1 2 \blacktriangle \blacklozenge$

Reader #2: $[] > 06 25 S 06 14 14 1 M H 8 0 3 1 2$

Reader #1 outputs the symbol \blacktriangle when it encounters a Record Separator within the data, where Reader #2 outputs nothing when it encounters a Record Separator. A third reader could potentially output something entirely different when encountering a Record Separator.

It is impractical to provide a definitive list of every possible scenario that could be presented by the readers on the market. Different readers, along with local computer settings (e.g., “Num Lock” and various BIOS settings), can affect how the data is displayed.

To determine your reader output, scan the Data Matrix symbol that encodes the three non-printable control characters in Figure 8.



R_S ASCII decimal value 30, Record Separator, is the only data in this symbol.



G_S ASCII decimal value 29, Group Separator, is the only data in this symbol.



E_{OT} ASCII decimal value 4, End Of Transmission, is the only data in this symbol.

Figure 8. Single-value Data Matrix symbols with R_S , G_S , and E_{OT} encoded, respectively

For example, when Reader #1 scans the first symbol it outputs the symbol ▲. By contrast, Reader #2 outputs nothing. By reading the first symbol with any compliant scanner, and recording the results, you will now know what output to expect when that scanner decodes a Record Separator within the data of a symbol. Read the other two Data Matrix symbols with the same scanner to learn or observe what output to expect when a Group Separator or End Of Transmission is encountered.

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Annex B. Table of Data Matrix symbols to Test Reader Functionality

When trouble-shooting problems with IUID Data Matrix symbols, start with the reader. Readers are relatively complex; some having an array of settings which can affect how the reader functions. For example, some readers can be made more efficient by turning on the capability to decode anticipated symbologies and turn off un-used symbologies. If the capability to decode ECC 200 Data Matrix symbols is turned off, the reader will not read IUID compliant Data Matrix symbols.



Each Data Matrix symbol in Table B.1 shows some permitted variations to encode and display IUID Data Matrix symbols. Therefore, any reader used to decode IUID Data Matrix symbols should be able to decode all of these symbols.



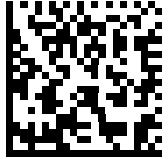



To use Table B.1 to test a reader, make a high quality print of the symbols (a printer with minimum 300 dpi is recommended) and read each of the symbols. If your reader has the ability to translate an IUID Data Matrix symbol into a UII, each of the symbols translates into the same UII (i.e. 0614141MH80312). If your reader outputs raw data without translating it into a UII, each of the symbols has its own translation of expected output specific to that symbol (e.g., $] >^R_s 06^G_s 25 S 0614141 M H 80312^R_s E_{O_T}$).

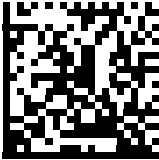

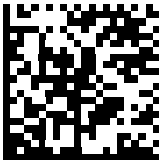


Note that R_s , G_s , and E_{O_T} are data encoded into the Data Matrix symbol which are not printable characters and may cause the reader to provide some kind of output. If you do not know what output to expect from your reader, refer to Annex A to determine what output you should expect from these data.

If your reader fails to provide the output expected during reading and decoding the symbols in Table B.1, review the Encoding Notes associated with the particular symbol. Often reader settings are turned on or off by reading symbols found in the user's manual for the reader.

Table B.1 Symbol encoding, display, and representative output

	Data Matrix	UII, Encoded String (IDES), Reader Output (RO)	Encoding Notes
B1		UII: 0614141MH80312 IDES: $] >^R_s 06^G_s 25 S 0614141 M H 80312^R_s E_{O_T}$ RO: $] >^R_s 06^G_s 25 S 0614141 M H 80312^R_s E_{O_T}$	Square Symbol ASCII Encoding Format Code: 06
B2		UII: 0614141MH80312 IDES: $] >^R_s 06^G_s 25 S 0614141 M H 80312^R_s E_{O_T}$ RO: $] >^R_s 06^G_s 25 S 0614141 M H 80312^R_s E_{O_T}$	Rectangular Symbol

	Data Matrix	UII, Encoded String (IDES), Reader Output (RO)	Encoding Notes
B3		UII: 0614141MH80312 IDES: $() >^R_s 06^G_s 25S0614141MH80312^R_s E_{OT}$ RO: $() >^R_s 06^G_s 25S0614141MH80312^R_s E_{OT}$	Inverted Symbol
B4		UII: 0614141MH80312 IDES: $() >^R_s 06^G_s 25S0614141MH80312^R_s E_{OT}$ RO: $() >^R_s 06^G_s 25S0614141MH80312^R_s E_{OT}$	C40 Encoding
B5		UII: 0614141MH80312 IDES: $() >^R_s 06^G_s 25S0614141MH80312^R_s E_{OT}$ RO: $() >^R_s 06^G_s 25S0614141MH80312^R_s E_{OT}$	Text Encoding
B6		UII: 0614141MH80312 IDES: $() >^R_s 06^G_s 25S0614141MH80312^R_s E_{OT}$ RO: $() >^R_s 06^G_s 25S0614141MH80312^R_s E_{OT}$	Base 256 Encoding
B7		UII: 0614141MH80312 IDES: [06 Macro]25S0614141MH80312 RO: $() >^R_s 06^G_s 25S0614141MH80312^R_s E_{OT}$	Macro 06 used
B8		UII: 0614141MH80312 IDES: [05 Macro]80040614141MH80312 RO: $() >^R_s 05^G_s 80040614141MH80312^R_s E_{OT}$	Macro 05 used

	Data Matrix	UII, Encoded String (IDES), Reader Output (RO)	Encoding Notes
B9		UII: 0614141MH80312 IDES: []> ^R _S 05 ^G _S 80040614141MH80312 ^R _S ^E _O ^T RO: []> ^R _S 05 ^G _S 80040614141MH80312 ^R _S ^E _O ^T	Format Code: 05
B10		UII: 0614141MH80312 IDES: []> ^R _S 12 ^G _S UID 0614141MH80312 ^R _S ^E _O ^T RO: []> ^R _S 12 ^G _S UID 0614141MH80312 ^R _S ^E _O ^T	Format Code: 12
B11		UII: 0614141MH80312 IDES: []> ^R _S DD ^G _S UID 0614141MH80312 ^R _S ^E _O ^T RO: []> ^R _S DD ^G _S UID 0614141MH80312 ^R _S ^E _O ^T	Format Code: DD Note: DD is now obsolete but some legacy items may use this.
B12		UII: 0614141MH80312 IDES: []> ^R _S 05[FNC1]80040614141MH80312 ^R _S ^E _O ^T RO: []> ^R _S 05 ^G _S 80040614141MH80312 ^R _S ^E _O ^T	Using [FNC1] as a field separator
B13		UII: D9N206M2014-2 IDES: []> ^R _S 12 ^G _S UID D9N206M2014-2 ^G _S PNR 7-114110011 ^R _S ^E _O ^T RO: []> ^R _S 12 ^G _S UID D9N206M2014-2 ^G _S PNR 7-114110011 ^R _S ^E _O ^T	UII complete with Part Number (PNR) added as supplemental information

Notes regarding Table B.1:

1. Effort has been taken to render equivalent module sizes for the symbols. Differences in over-all symbol sizes are a result in different encoding efficiencies.
2. The Data Matrix standard (ISO/IEC16022) allows for 6 encoding schemes (ASCII, C40, Text, X12, EDIFACT, and BASE 256). X12 and EDIFACT are not included here because these schemes cannot support encoding the R_S , G_S , or EOT non-printable control codes necessary per IUID policy.
3. The Text Element Identifier UID , has a space in the fourth position. This is required and not a typographical error. (All TEIs are 4 characters long, always ending with a space.)
4. Omission of an example using [12 Macro] is not an oversight. The Data Matrix standard does not support a macro function when the format code is 12.
5. R_S represents one non-printable control code called a Record Separator. It has a decimal value of 30 in the ASCII table.
6. G_S represents one non-printable control code called a Group Separator. It has a decimal value of 29 in the ASCII table.
7. EOT represents one non-printable control code called a End Of Transmission. It has a decimal value of 4 in the ASCII table.
8. [FNC1] in symbol B12 is specified within the Data Matrix standard ISO/IEC16022. FNC1 is achieved by encoding decimal value 232 into a codeword of the Data Matrix. In the first or second symbol character position (or in the fifth or sixth data positions of the first symbol of Structured Append), FNC1 indicates conformance to specific industry standards. In other positions FNC1 is interpreted by the reader and transmitted as a G_S field separator. Symbol B12 exercises FNC1 as a field separator.

Annex C. Table of IUID Data Matrix symbols

When creating an IUID compliant Data Matrix symbol or rendering a UII from an IUID compliant Data Matrix symbol, software algorithms are invariably used. Table C.1 is provided as a way to check these algorithms and how they are employed.




Even when operators of marking machinery understand all the issues in IUID policy required to encode Data Matrix symbols correctly, the resultant symbols can be made incorrectly. If this happens, it is usually because the operator is insufficiently trained in using the controlling software for the marking machinery. When this is a problem, it is most often the result of unfamiliarity of specialized control codes required by the marking machine software to render the non-printable characters.









To use Table C.1 to check the creation of a Data Matrix symbol, produce a Data Matrix symbol on the marking machinery you wish to check using the IDES listed next to one (or more) of the symbols in Table C.1. When the symbol is produced, visually compare the symbol produced with the corresponding symbol in Table C.1 for any differences. Checking different encoding schemes is possible by performing a similar check with information in Annex B.









To check the algorithms which produce UIIs from Data Matrix symbols: make a high quality print of the symbols in Table C.1 (a printer with minimum 300 dpi is recommended). Read each of the symbols using the system in question. Have the system produce a UII and check this against the corresponding UII in Table C.1.









In Table C.1, UII stands for Unique Item Identifier – a unique string of alpha-numeric characters used by the Department of Defense to uniquely identify assets. IDES stands for IUID Data Encoded String – the data encoded into the Data Matrix.

Table C.1 IUID Data Matrix symbols

C1		IDES: []> ^R _s 05 ^G _s 8002268435460012427936 ^R _s ^E _O T UII: 268435460012427936
C2		IDES: []> ^R _s 05 ^G _s 8003281166098923629 ^R _s ^E _O T UII: 281166098923629
C3		IDES: []> ^R _s 05 ^G _s 80040614141MH80312 ^R _s ^E _O T UII: 0614141MH80312

C4		<p>IDES: [)]>^R_s06^G_s17V12345^G_s1P234TYU^G_sS6789^R_s^E_O^T</p> <p>UII: D12345234TYU6789</p>
C5		<p>IDES: [)]>^R_s06^G_s17V12345^G_s1T987GHJ^G_sS6789^R_s^E_O^T</p> <p>UII: D12345987GHJ6789</p>
C6		<p>IDES: [)]>^R_s06^G_s12V123456789^G_s1P234TYU^G_sS6789^R_s^E_O^T</p> <p>UII: UN123456789234TYU6789</p>
C7		<p>IDES: [)]>^R_s06^G_s12V123456789^G_s1T987GHJ^G_sS6789^R_s^E_O^T</p> <p>UII: UN123456789987GHJ6789</p>
C8		<p>IDES: [)]>^R_s06^G_s7LN41164^G_s1P234TYU^G_sS6789^R_s^E_O^T</p> <p>UII: LDN41164234TYU6789</p>
C9		<p>IDES: [)]>^R_s06^G_s7LN41164^G_s1T987GHJ^G_sS6789^R_s^E_O^T</p> <p>UII: LDN41164987GHJ6789</p>
C10		<p>IDES: [)]>^R_s06^G_s18VLDN41164^G_s1P234TYU^G_sS6789^R_s^E_O^T</p> <p>UII: LDN41164234TYU6789</p>
C11		<p>IDES: [)]>^R_s06^G_s18VLDN41164^G_s1T987GHJ^G_sS6789^R_s^E_O^T</p> <p>UII: LDN41164987GHJ6789</p>

C12		IDES: [)]> ^R _s 06 ^G _s 25SLDN41164ABC123 ^R _s ^E _O ^T UII: LDN41164ABC123
C13		IDES: [)]> ^R _s 06 ^G _s 18S12345ABC123 ^R _s ^E _O ^T UII: D12345ABC123
C14		IDES: [)]> ^R _s 06 ^G _s 1FALP62W4WH128703 ^R _s ^E _O ^T UII: 1FALP62W4WH128703
C15		IDES: [)]> ^R _s 06 ^G _s 22S268435460012427936 ^R _s ^E _O ^T UII: 268435460012427936
C16		IDES: [)]> ^R _s 12 ^G _s MFR 12345 ^G _s PNO 234TYU ^G _s SEQ 6789 ^R _s ^E _O ^T UII: D12345234TYU6789
C17		IDES: [)]> ^R _s 12 ^G _s SPL 12345 ^G _s UCN ABC123 ^R _s ^E _O ^T UII: D12345ABC123
C18		IDES: [)]> ^R _s 12 ^G _s CAG 12345 ^G _s PNO 234TYU ^G _s SEQ 6789 ^R _s ^E _O ^T UII: D12345234TYU6789
C19		IDES: [)]> ^R _s 12 ^G _s CAG 12345 ^G _s SER ABC123 ^R _s ^E _O ^T UII: D12345ABC123

C20		<p>IDES: [)]>^R_s12^G_sDUN 123456789^G_sUCN ABC123^R_s^E_O^T</p> <p>UII: UN123456789ABC123</p>
C21		<p>IDES: [)]>^R_s12^G_sSPL 12345^G_sLTN 987GHJ^G_sSEQ 6789^R_s^E_O^T</p> <p>UII: D12345987GHJ6789</p>
C22		<p>IDES: [)]>^R_s12^G_sCAG 12345^G_sLTN 987GHJ^G_sSEQ 6789^R_s^E_O^T</p> <p>UII: D12345987GHJ6789</p>
C23		<p>IDES: [)]>^R_s12^G_sDUN 123456789^G_sLTN 987GHJ^G_sSEQ 6789^R_s^E_O^T</p> <p>UII: UN123456789987GHJ6789</p>
C24		<p>IDES: [)]>^R_s12^G_sSPL 12345^G_sBII 654BNM^G_sSEQ 6789^R_s^E_O^T</p> <p>UII: D12345654BNM6789</p>
C25		<p>IDES: [)]>^R_s12^G_sCAG 12345^G_sBII 654BNM^G_sSEQ 6789^R_s^E_O^T</p> <p>UII: D12345654BNM6789</p>
C26		<p>IDES: [)]>^R_s12^G_sDUN 123456789^G_sBII 654BNM^G_sSEQ 6789^R_s^E_O^T</p> <p>UII: UN123456789654BNM6789</p>
C27		<p>IDES: [)]>^R_s12^G_sUID LDN41164123ABC^R_s^E_O^T</p> <p>UII: LDN41164123ABC</p>

C28		IDES: []> ^R _S 12 ^G _S USN 12345ABC123 ^R _S ^E _O T UII: D12345ABC123
C29		IDES: []> ^R _S 12 ^G _S UST 12345ABC123 ^R _S ^E _O T UII: D12345ABC123
C30		IDES: []> ^R _S 06 ^G _S 25SRHE279ABC123 ^R _S ^E _O T UII: RHE279ABC123
C31		IDES: []> ^R _S 06 ^G _S 25SLHE279ABC123 ^R _S ^E _O T UII: LHE279ABC123

Notes regarding Table C.1

1. Format code 12 requires the use of Text Element Identifiers (TEIs). All TEIs are 4 characters long, beginning with 3 capital letters, and ending with a space.
2. ^R_S represents one non-printable control code called a Record Separator. It has a decimal value of 30 in the ASCII table.
3. ^G_S represents one non-printable control code called a Group Separator. It has a decimal value of 29 in the ASCII table.
4. ^E_OT represents one non-printable control code called an End Of Transmission. It has a decimal value of 4 in the ASCII table.

Annex D. Partial Table of Non-compliant Data Matrix symbols

When creating and/or testing decoding algorithms for readers to perform Quality Assurance (QA) functions for IUID compliance, intentionally flawed symbols can be useful. There are two significant challenges in producing a table of such flawed symbols:

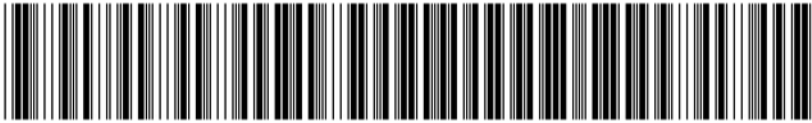

1. The ingenuity of humans is not to be underestimated. Although a great deal of thought and years of real-world experience has gone into the production of Table D.1, users of the table should expect additional, as yet undiscovered, ways to create machine readable symbols which defy IUID policy.
2. An exhaustive collection of flawed symbols would be quite large because of the multiplying effect of slight variations of similar error types. For example, IUID symbols must be encoded into an ECC200 Data Matrix very specifically; so an exhaustive list would require IUID information to be encoded into every other type of symbology (Code 11, Code 39, Code 93, Code128, UPC, PDF417, Aztec, Codabar, Codablock F, Maxicode, MSI Plessey, QR code, RSS, various postal symbologies, etc.).

These challenges are addressed in Table D.1 by not only admitting, but more to the point, emphasizing the list is not exhaustive. A best effort has been made to create a collection of flawed symbols which are useful.





To check algorithms which perform QA functions on the data encoded within IUID compliant Data Matrix symbols (also known as validation), make a high quality print of the symbols in Table D.1 (a printer with minimum 300 dpi is recommended). Read each symbol using the system under test and observe whether or not the algorithms flag an error. Table D.1 provides an error description which can be found in the associated symbol. There may be more than one error or more than one way to express the same error.




Table D.1 Non-compliant Data Matrix symbols⁹




Note: The following symbols each have representative mistakes (i.e., whole classes of errors) the user might encounter when decoding IUID symbols. This list is not exhaustive.




	Symbol	UII, Encoded String, Reader Output, Error, Remedy
D1		<p>UII: D123451 IDES: *[]>^R_s06^G_s25SD123451^R_s^E_OT* RO: []>^R_s06^G_s25SD123451^R_s^E_OT Error: The type of symbol (Code39 (full ASCII)) violates policy. No linear symbologies are permitted. Remedy: Change the type of symbol to an ECC200 Data Matrix.</p>
D2		<p>UII: D12345234TYU6789 IDES: []>^R_s06^G_s17V12345^G_s1P234TYU^G_sS6789^R_s^E_OT RO: []>^R_s06^G_s17V12345^G_s1P234TYU^G_sS6789^R_s^E_OT</p> <p>Error: The type of symbol (PDF417) violates policy. No symbologies are permitted except the ECC200 Data Matrix.</p> <p>Remedy: Change the type of symbol to an ECC200 Data Matrix.</p> <p>(Note: UII's encoded and applied to items require the ECC200 Data Matrix. UII's are encoded into PDF417 symbols when applied to shipping labels per MIL-STD129. This example is not MIL-STD129 compliant either.)</p>





⁹ UII stands for Unique Item Identifier – a unique string of alpha-numeric characters used by the Department of Defense to uniquely identify assets. IDES stands for IUID Data Encoded String – the data encoded into the symbol. RO stands for Reader Output - the data the reader should provide as a result of decoding the symbol. Error is a description of a problem within the symbol keeping it from being compliant with IUID policies. Remedy is a description of a change which could be made to the symbol which would make it compliant with IUID policies.


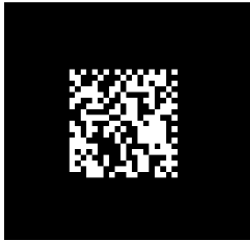

	Symbol	UII, Encoded String, Reader Output, Error, Remedy
D3		<p>UII: D12345234TYU6789 IDES: D12345234TYU6789 RO: D12345234TYU6789 Error: The IDES does not conform to ISO15434 syntax.</p> <p>Remedy: Use syntax specified within ISO15434. Characters 1-4 must be $()>^R_s$, characters 5 and 6 must one of the following two character combinations 05, 06,12, or DD, character 7 must be G_s, the last two characters must be $^R_s, ^E_{O_T}$. Semantics appropriate to the chosen format code (i.e. 05, 06, 12, or DD) must be included with appropriate group separators.</p>
D4		<p>UII: LDN41164123ABC IDES: $()>^R_s 12^G_s UIDLDN41164123ABC^R_s ^E_{O_T}$ RO: $()>^R_s 12^G_s UIDLDN41164123ABC^R_s ^E_{O_T}$</p> <p>Error: The data qualifier ('UID') violates rules for Text Element Identifiers. The error may be characterized as using a non-existent TEI. It may alternatively be characterized as lacking the required space in the fourth position of the TEI.</p> <p>Remedy: Change the TEI from 'UID' to 'UID '.</p>
D5		<p>UII: D12345234TYU6789 IDES: $()>^R_s 12^G_s 17V12345^G_s 1P234TYU^G_s S6789^R_s ^E_{O_T}$ RO: $()>^R_s 12^G_s 17V12345^G_s 1P234TYU^G_s S6789^R_s ^E_{O_T}$</p> <p>Error: The data qualifier (17V, 1P, and S) violate rules for Text Element Identifiers. The error may be characterized as using non-existent data qualifiers necessary when using format code 12. It may alternatively be characterized as using the wrong format code for the data qualifiers used (Data Identifiers in this case).</p> <p>Remedy: Change the fifth and sixth characters (format code) from 12 to 06.</p>
D6		<p>UII: LDN41164123ABC IDES: $()>^R_s 12^G_s UID LDN41164123*ABC^R_s ^E_{O_T}$ RO: $()>^R_s 12^G_s UID LDN41164123*ABC^R_s ^E_{O_T}$</p> <p>Error: Including the asterisk character violates various policies.</p> <p>Remedy: Remove the asterisk from the data.</p>





	Symbol	UII, Encoded String, Reader Output, Error, Remedy
D7		<p>UII: LDN41164123ABC IDES: []>RS12GSUID LDN41164123ABCRSEOT RO: []>RS12GSUID LDN41164123ABCRSEOT</p> <p>Error: The IDES does not conform to ISO15434 syntax. It lacks record separators, the group separator, and terminating end of transmission character. (Note: there are many ways to not encode the non-printable control codes correctly. This is but one example.)</p> <p>Remedy: Replace the two character combination RS with the single non-printable record separator control code ^R_S. Replace the two character combination GS with the single non-printable group separator control code ^G_S. Replace the three character combination EOT with the single non-printable end of transmission control code ^E_O_T.</p>
D8		<p>UII: D12345234TYU6789 IDES: []>^R_S06^G_S17V12345^G_S30P234TYU^G_SS6789^R_S^E_O_T RO: []>^R_S06^G_S17V12345^G_S30P234TYU^G_SS6789^R_S^E_O_T</p> <p>Error: IUID business rules will resolve the IDES into an incorrect UII. The Data Identifier 30P designates a current part number. Without an original part number within the IDES, IUID business rules will produce a construct 1 UII (i.e. D123456789).</p> <p>Remedy: Change the 30P to 1P</p>
D9		<p>UII: LDN41164123ABCDEF GHIJKLMNOPQRSTUVWXYZ-123456789-LTL IDES: []>^R_S12^G_SUID LDN41164123ABCDEF GHIJKLMNOPQRSTUVWXYZ-123456789-LTL^R_S^E_O_T RO: []>^R_S12^G_SUID LDN41164123ABCDEF GHIJKLMNOPQRSTUVWXYZ-123456789-LTL^R_S^E_O_T</p> <p>Error: The UII is longer than the 50 character limit.</p> <p>Remedy: Find or construct a different data set which will result in a compliant UII.</p>




	Symbol	UII, Encoded String, Reader Output, Error, Remedy
D10		<p>UII: LDN41164123ABC IDES: []>^R_S12^G_SUID LDN41164123ABC^R_S^E_OT PNR 456 RO: []>^R_S12^G_SUID LDN41164123ABC^R_S^E_OT PNR 456</p> <p>Error: The IDES does not conform to ISO15434 syntax. The last character in the data stream must be ^E_OT.</p> <p>Remedy: Move PNR 456 inside the format envelope (making sure to add the appropriate ^G_S to separate it from the UID information.) []>^R_S12^G_SUID LDN41164123ABC^G_SPNR 456^R_S^E_OT</p>
D11		<p>UII: D12345234TYU6789 IDES: []>^R_S07^G_SUII: D12345234TYU6789^R_S^E_OT RO: []>^R_S07^G_SUII: D12345234TYU6789^R_S^E_OT</p> <p>Error: The IDES does not conform to IUID business rules (the use of format code 07 is not allowable). Format code 07 is used within the DoD in a specialized way unrelated to IUID. For details see DoD 4000.25 Appendix 1.35</p> <p>Remedy: Use an allowable format code and follow the associated rules. (One possible remedy: []>^R_S06^G_S25SD12345234TYU6789^R_S^E_OT.)</p>
D12		<p>UII: D12345234TYU6789 IDES: []>^R_S06^G_S12V12345^G_S1P234TYU^G_SS6789^R_S^E_OT RO: []>^R_S06^G_S12V12345^G_S1P234TYU^G_SS6789^R_S^E_OT</p> <p>Error: The Data Identifier 12V indicates a DUNS number rather than the CAGE code (which is the enterprise identifier within the UII).</p> <p>Remedy: Change the 12V to 17V.</p>

	Symbol	UII, Encoded String, Reader Output, Error, Remedy
D13		<p>UII: D12345234tyu6789 IDES: []>^R_S06^G_S17V12345^G_S1P234tyu^G_SS6789^R_S^E_O^T RO: []>^R_S06^G_S17V12345^G_S1P234tyu^G_SS6789^R_S^E_O^T</p> <p>Error(s): The UII contains lowercase letters – which are prohibited in a UII. The lowercase letters are also prohibited within the IDES using MH10.8.2 Data Identifiers.</p> <p>Remedy: A relevant business rule from The Guide 3.0, “When lowercase alpha characters are encoded in the IUID Data Matrix, they shall be converted by the reader to uppercase alpha characters when the IUID Data Matrix is decoded to form a UII.” The lowercase letters should be capitalized before they are encoded into the Data Matrix. Again from the Guide 3.0, “If the UII data set elements contain lowercase alpha characters, they shall be converted to uppercase before a UII is derived and encoded in the IUID Data Matrix and/or submitted to the IUID Registry.”</p>
D14		<p>UII: D12345234TYU6789 IDES: []>^R_S06^G_S17VD12345^G_S1P234TYU^G_SS6789^R_S^E_O^T RO: []>^R_S06^G_S17VD12345^G_S1P234TYU^G_SS6789^R_S^E_O^T</p> <p>Error: The Issuing Agency Code (D) should not be encoded into the data when using Data Identifier 17V.</p> <p>Remedy: Remove the D from the IDES: []>^R_S06^G_S17V12345^G_S1P234TYU^G_SS6789^R_S^E_O^T</p>
D15		<p>UII: 06141410048500AX20791 IDES: [FNC1]800406141410048500AX20791 RO: 800406141410048500AX20791</p> <p>Error: MIL-STD 130 does not allow FNC1 GS1 syntax to encode UIIs.</p> <p>Remedy: Use ISO15434 syntax to encode the UII. []>^R_S05^G_S800406141410048500AX20791^R_S^E_O^T</p> <p>(This resolution is compliant with the DOD business rules and it is acknowledged that it is not compliant with the GS1 General Specification. DOD suppliers are required to comply with the marking provisions of their contract.)</p>

	Symbol	UII, Encoded String, Reader Output, Error, Remedy
D16		<p>UII: LDN41164123ABC IDES: []>^R_S12^G_SUID LDN41164123ABC^G_SUID D12345456DEF^R_S^E_O^T RO: []>^R_S12^G_SUID LDN41164123ABC^G_SUID D12345456DEF^R_S^E_O^T</p> <p>Error: Multiple/ambiguous UIIs are found within the IDES.</p> <p>Remedy: Encode exactly one UII into the first record of the IDES unambiguously.</p>
D17		<p>UII: LDN41164123ABC IDES: []>^R_S12^G_SPNR 456^R_S12^G_SUID LDN41164123ABC^R_S^E_O^T RO: []>^R_S12^G_SPNR 456^R_S12^G_SUID LDN41164123ABC^R_S^E_O^T</p> <p>Error: The UII is not encoded into the first record of the IDES.</p> <p>Remedy: Remove the second record trailer (^R_S) and the second format code (12). []>^R_S12^G_SPNR 456^G_SUID LDN41164123ABC^R_S^E_O^T</p> <p>(While placing the UII in the first record is not required by the MH10 rules, it is required by the DOD rules.)</p>
D18		<p>UII: LDN41164123ABC IDES: []>^R_S12^G_SUID LDN41164 123 ABC^R_S^E_O^T RO: []>^R_S12^G_SUID LDN41164 123 ABC^R_S^E_O^T</p> <p>Error: The UII is encoded with spaces within a single element data set.</p> <p>Remedy: Delete the spaces in the data within the IDES. []>^R_S12^G_SUID LDN41164123ABC^R_S^E_O^T (note: the space in the fourth position of the TEI ("UID ") should not be deleted as it is required within the TEI.)</p>
D19		<p>UII: D12345234TYU6789 IDES: []>^R_S06^G_S17V12345^G_S1P234TYU^R_S^E_O^T RO: []>^R_S06^G_S17V12345^G_S1P234TYU^R_S^E_O^T</p> <p>Error: There is not enough information encoded in the IDES to produce a UII. There is no serialization data.</p> <p>Remedy: Add the missing information. []>^R_S06^G_S17V12345^G_S1P234TYU^G_SS6789^R_S^E_O^T</p>

	Symbol	UII, Encoded String, Reader Output, Error, Remedy
D20		<p>UII: D12345234TYU6789 IDES: Macro0617V12345^G_S1P234TYU^G_SS6789^R_S^E_O^T RO: Macro0617V12345^G_S1P234TYU^G_SS6789^R_S^E_O^T</p> <p>Error: The Macro06 has been improperly encoded into the IDES in two ways. 1) The Macro06 should be encoded by encoding the decimal value 237 into the first codeword of the data matrix rather than encoding the text "Macro06". 2) When Macro06 is employed the message trailer should be omitted along with the message header.</p> <p>Remedy: Use the Macro06 properly. [Macro06]17V12345^G_S1P234TYU^G_SS6789</p>
D21		<p>UII: LDN41164ABC123 IDES: []>^R_S06^G_S25SLDN41164ABC123^R_S^E_O^T RO: (No output. Readers will be unable to decode this)</p> <p>Error: The Data Matrix was printed with black ink on a black background. No quiet zone or finder pattern is discernable.</p> <p>Remedy: Either print the Data Matrix with white ink on the black background, or paint a white quiet zone around the Data Matrix at least as wide as the size of one module within the Data Matrix.</p>
D22		<p>UII: D80084909763-1D00546 IDES: []>^R_S06^G_S17V8084^G_S1P909763-1D^G_SS00546^R_S^E_O^T RO: []>^R_S06^G_S17V8084^G_S1P909763-1D^G_SS00546^R_S^E_O^T</p> <p>Error: The CAGE code must be 5 characters long (80084) but is 4 characters long (8084) within the IDES.</p> <p>Remedy: Encode the full CAGE code.</p>

	Symbol	UII, Encoded String, Reader Output, Error, Remedy
D23		<p>UII: D80084909763-1D00743 IDES: []>^R_S06^G_S17V80084^G_S1P909763-1D^G_S1S00743^R_S^E_O^T RO: []>^R_S06^G_S17V80084^G_S1P909763-1D^G_S1S00743^R_S^E_O^T</p> <p>Error: The IDES uses a Data Identifier (1S) which is not specified within MIL-STD 130 as appropriate for encoding IUID information.</p> <p>Remedy: Change the 1S Data Identifier to the S Data identifier.</p>
D24		<p>UII: D80084909763-1D01543 IDES: []>^R_S06^G_S17V80084^G_S1P909763\1D^G_SS01543^R_S^E_O^T RO: []>^R_S06^G_S17V80084^G_S1P909763\1D^G_SS01543^R_S^E_O^T</p> <p>Error: The IDES uses the character \ “backslash”, which is not allowed in a UII. (A typo has occurred encoding the backslash rather than the dash that is in the UII.)</p> <p>Remedy: Ensure encoded data matches intended UII. (Proper decoding of the IDES as given, should yield UII: D800849097631D01543, because illegal characters within the IDES should be deleted in the UII.)</p>
D25		<p>UII: 06141411A0B9C3D6 IDES: []>^R_S05^G_S800406141411A0B9C3D6 RO: []>^R_S05^G_S800406141411A0B9C3D6</p> <p>Error: The IDES is not compliant with ISO15434 syntax. It is missing the ^R_S and the ^E_O^T at the end of the message.</p> <p>Remedy: Add the ^R_S^E_O^T to the end of the IDES.</p>
D26		<p>UII: D80084909763-1D00543 IDES: []> 06 17V80084 1P909763-1D S00543 RO: []> 06 17V80084 1P909763-1D S00543</p> <p>Error: The IDES is not compliant with ISO15434 syntax. It is missing the ^R_S and the ^E_O^T at the end of the message. The IDES uses spaces in place of ^R_S and ^G_S which is also a non-compliance error.</p> <p>Remedy: Employ ISO15434 syntax within the IDES. []>^R_S06^G_S17V80084^G_S1P909763-1D^G_SS00543^R_S^E_O^T</p>

	Symbol	UII, Encoded String, Reader Output, Error, Remedy
D27		<p>UII: D1TZJ4CE138 IDES: []>^R_s12^G_sCAG D1TZJ4^G_sSEQ CE138^R_s^E_O^T RO: []>^R_s12^G_s CAG D1TZJ4^G_sSEQ CE138^R_s^E_O^T</p> <p>Error: There are two errors. 1) The Issuing Agency Code (D) for CAGE codes is encoded into the IDES and should not be. 2) The TEI 'SEQ ' is used to encode the serial number but the TEI 'SER ' should be used instead. ('SEQ ' is used when a part number is also used. 'SER ' is used when the serial number is serialized within the enterprise instead of the part number.</p> <p>Remedy: Remove the IAC and change the TEI 'SEQ ' to 'SER '. []>^R_s12^G_s CAG 1TZJ4^G_sSER CE138^R_s^E_O^T</p>
D28		<p>UII: D1TZJ41UQJS IDES: []>^R_s06^G_sD1TZJ41UQJS^R_s^E_O^T RO: []>^R_s06^G_sD1TZJ41UQJS^R_s^E_O^T</p> <p>Error: The IDES lacks an appropriate Data Identifier.</p> <p>Remedy: The DI 25S should be included in the IDES. []>^R_s06^G_s25SD1TZJ41UQJS^R_s^E_O^T (Note: the IAC is required in the IDES when the UII is encoded with DI 25S.)</p>
D29		<p>UII: LDFA560390976300543 IDES: []>^R_s06^G_s7LFA560^G_s1P909763-1D^G_sS00543^R_s^E_O^T RO: []>^R_s06^G_s7LFA560^G_s1P909763-1D^G_sS00543^R_s^E_O^T</p> <p>Error: The DODAAC (FA560) has too few characters in the IDES. All DODAACs have 6 characters.</p> <p>Remedy: Encode the full DODAAC into the IDES. []>^R_s06^G_s7LFA5603^G_s1P909763-1D^G_sS00543^R_s^E_O^T</p>

Notes regarding Table D.1

1. R_S represents one non-printable control code called a Record Separator. It has a decimal value of 30 in the ASCII table.
2. G_S represents one non-printable control code called a Group Separator. It has a decimal value of 29 in the ASCII table.
3. EOT represents one non-printable control code called an End Of Transmission. It has a decimal value of 4 in the ASCII table.
4. [FNC1] in symbol D15 is specified within the Data Matrix standard ISO/IEC16022. FNC1 is achieved by encoding decimal value 232 into a codeword of the Data Matrix. In the first or second symbol character position (or in the fifth or sixth data positions of the first symbol of Structured Append), FNC1 indicates conformance to specific industry standards. In the first position, as D15 illustrates, FNC1 connotes conformance with the GS1 standard authorized by AIM International. In other positions FNC1 is interpreted by the reader and transmitted as a G_S field separator. Symbol D15 exercises FNC1 as an industry-standard conformance indicator.

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