ISO/IEC 16022:2024-05 (E)

Information technology - Automatic identification and data capture techniques - Data Matrix bar code symbology specification

Contents

Page

Foreword v

Introduction vi

1 Scope 1

2 Normative references 1

3 Terms and definitions 1

4 Symbols 2

5 Mathematical or logical notations 2

6 Symbol description 2
6.1 Basic characteristics 2
6.2 Summary of additional features 3
6.3 Symbol structure 3
6.3.1 General 3
6.3.2 Finder pattern 4
6.3.3 Symbol sizes and capacities 4

7 Data Matrix code requirements 4
7.1 Encode procedure overview 4
7.1.1 General 4
7.1.2 Step 1: data encodation 4
7.1.3 Step 2: error checking and correcting codeword generation 4
7.1.4 Step 3: module placement in matrix 5
7.2 Data encodation 5
7.2.1 Overview 5
7.2.2 Default character interpretation 5
7.2.3 ASCII encodation 5
7.2.4 Symbology control characters 6
7.2.5 C40 encodation 7
7.2.6 Text encodation 9
7.2.7 ANSI X12 encodation 9
7.2.8 EDIFACT encodation 10
7.2.9 Base 256 encodation 11
7.3 ECI 11
7.3.1 General 11
7.3.2 Encoding ECIs 12
7.3.3 ECIs and Structured Append 12
7.3.4 Post-decode protocol 12
7.4 Data Matrix symbol attributes 13
7.4.1 Symbol sizes and capacity 13
7.4.2 Insertion of Alignment Patterns into larger symbols 14
7.5 Structured Append 14
7.5.1 Basic principles 14
7.5.2 Symbol sequence indicator 14
7.5.3 File identification 15
7.5.4 FNC1 and Structured Append 15
7.5.5 Buffered and unbuffered operation 15
7.6 Error detection and correction 15

7.6.1 Reed-Solomon error correction 15
7.6.2 Generating the error correction codewords 15
7.6.3 Error correction capacity 16
7.7 Symbol construction 17
7.7.1 General 17
7.7.2 Symbol character placement 17
7.7.3 Alignment Pattern module placement 17
7.7.4 Finder Pattern module placement 18
8 Symbol dimensions 18
9 Symbol quality 18
9.1 General 18
9.2 Symbol quality parameters 18
9.2.1 Fixed pattern damage 18
9.2.2 Overall symbol grade 18
9.2.3 Decode 18
9.2.4 Grid non-uniformity 18
9.3 Process control measurements 19
10 Reference decode algorithm for Data Matrix 19
11 User guidelines 30
11.1 Human readable interpretation 30
11.2 Autodiscrimination capability 30
11.3 System considerations 30
12 Transmitted data 30
12.1 General 30
12.2 Protocol for FNC1 30
12.3 Protocol for FNC1 in the second position 30
12.4 Protocol for Macro characters in the first position 31
12.5 Protocol for ECIs 31
12.6 Symbology identifier 31
12.7 Transmitted data example 31
Annex A (normative) Data Matrix interleaving process 33
Annex B (normative) Data Matrix pattern randomising 37
Annex C (normative) Data Matrix encodation character sets 39
Annex D (normative) Data Matrix alignment patterns 42
Annex E (normative) Data Matrix Reed-Solomon error detection and correction 44
Annex F (normative) Symbol character placement 48
Annex G (normative) Data Matrix print quality - symbology-specific aspects 64
Annex H (normative) Symbology identifier 75
Annex I (informative) Encode example 76
Annex J (informative) Encoding data using the minimum symbol data characters 79
Annex K (informative) Autodiscrimination capability 83
Annex L (informative) System considerations 84
Annex M (informative) User considerations 85
Bibliography 86