

CRC RevEng

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Catalogue of parametrised CRC algorithms with 17 or more bits

CRC-17/CAN-FD

width=17 poly=0x1685b init=0x00000 refin=false refout=false xorout=0x00000 check=0x04f03 residue=0x00000 name="CRC-17/CAN-FD"

- Class: [academic](#)
- Robert Bosch GmbH (17 April 2012), [CAN with Flexible Data-Rate: Specification](#), version 1.0 (courtesy of the Internet Archive)
 - I Full definition (except Check); pseudocode (Section 3.2.1, pp.13-14)
- Created: 20 June 2017
- Updated: 3 January 2021

CRC-21/CAN-FD

width=21 poly=0x102899 init=0x000000 refin=false refout=false xorout=0x000000 check=0x0ed841 residue=0x000000 name="CRC-21/CAN-FD"

- Class: [academic](#)
- Robert Bosch GmbH (17 April 2012), [CAN with Flexible Data-Rate: Specification](#), version 1.0 (courtesy of the Internet Archive)
 - I Full definition (except Check); pseudocode (Section 3.2.1, pp.13-14)
- Robert Bosch GmbH (23 December 2011), CRC for CAN with flexible data rate (CAN FD)
 - I Error control properties; theory of polynomial construction (Section 2, p.1; Section 3, p.2)
- Created: 20 June 2017
- Updated: 3 January 2021

CRC-24/BLE

width=24 poly=0x00065b init=0x555555 refin=true refout=true xorout=0x000000 check=0xc25a56 residue=0x000000 name="CRC-24/BLE"

- Class: [attested](#)
- Reference from named polynomial in Prof. Koopman's [CRC Polynomial Zoo](#).
- The Init value applies to Bluetooth Low Energy (BLE) test packets and (device-) advertising channel packets. Data channel packets use a custom Init value defined at connection time.
- BLE sniffer screenshot reference from "volta77" (29 May 2014), [Nordic Developer Zone post](#)
- Bluetooth SIG (31 January 2023), [Bluetooth Specification, Core Version 5.4](#)
 - I Full definition (except Check) (Section 6.B.3.1.1, pp.2746-7)
 - I Shift register diagram (Figure 6.B.3.4, p.2747)
 - IV 2 codewords (Section 6.C.2.1, p.2922; Section 6.C.4.2.1, p.2928)
 - 0003424C45290ACE
 - 0100001010010000011001011010010010010111000101010001011000001110000000100000010110101001011011010111
- Texas Instruments, Inc. (12 March 2013), Processors wiki, BLE sniffer guide
 - II Transcripts confirming implementation with 4 codewords (plus 3 with custom Init)
 - 00119992B1EBD7900201050702031802180418A85DEF
 - 030C5F96EA3018009992B1EBD790DF02EB
 - 04129992B1EBD7900B09486579666F6264656D6D39F03
 - 05225F96EA3018009992B1EBD7901B0A8560A77B22020F0050000000007FFFFFFF1FA948DA02
- Liam Goudge (1 October 2014), ["Custom Bluetooth Low Energy board with 2.4GHz antenna hack and Nordic nRF51822..."](#)
 - II Transcript confirming implementation with 2 codewords (plus 8 with custom Init)
 - 4021EE04A5DDA7F90B094C69616D73424C4576320319410302010607030D180F180A181C929E
 - C52C4A5F2BE7479EE04A5DDA7F9667265500B085B030500180000004800FFFFFFF1FA9E478D0
- Anonymous (7 September 2012), [BLE sniffer screenshot](#) (courtesy of Texas Instruments, Inc. E2E™ Community forum)
 - II Transcript confirming implementation with 2 codewords (plus 7 with custom Init)
 - 00090DEF84B72D3C020105C2E2A4
 - 0522AB2F853118000DEF84B72D3C782118C9567FA202270050000000007FFFFFFF1FAF0F1957
- Unique effective solution of codeword set
- Created: 7 February 2016
- Updated: 4 August 2023

CRC-24/FLEXRAY-A

width=24 poly=0x5d6dcb init=0xfedcba refin=false refout=false xorout=0x000000 check=0x7979bd residue=0x000000 name="CRC-24/FLEXRAY-A"

- Class: [attested](#)
- Channels A and B have different initial vectors to prevent frames crossing channels.
- FlexRay Consortium (October 2010), [FlexRay Communications System Protocol Specification](#), version 3.0.1 (courtesy of nlrp Benchmark)
 - I Definition: Width, Poly, Init, RefOut (Section 4.4, pp.117-8)
 - I Pseudocode (Section 4.5, pp.118-20)
- FlexRay Consortium (October 2010), [FlexRay Protocol Conformance Test Specification](#), version 3.0.1 (courtesy of nlrp Benchmark)
 - IV 5 codewords (Section 2.7.5, p.681)
 - 18020209880000F339C1
 - 600A0248C80102646D70
 - 205606C848102030405060474380
 - 202E06C84810203040506096C9D1
 - 201A06C8481020304050600072EB
- Unique effective solution of codeword set
- Created: 3 November 2007
- Updated: 6 February 2017

CRC-24/FLEXRAY-B

width=24 poly=0x5d6dcb init=0xabcdfe refin=false refout=false xorout=0x000000 check=0x1f23b8 residue=0x000000 name="CRC-24/FLEXRAY-B"

- Class: [attested](#)
- Channels A and B have different initial vectors to prevent frames crossing channels.
- FlexRay Consortium (October 2010), [FlexRay Communications System Protocol Specification](#), version 3.0.1 (courtesy of nlrp Benchmark)
 - I Definition: Width, Poly, Init, RefOut (Section 4.4, pp.117-8)
 - I Pseudocode (Section 4.5, pp.118-20)
- FlexRay Consortium (October 2010), [FlexRay Protocol Conformance Test Specification](#), version 3.0.1 (courtesy of nlrp Benchmark)
 - IV 5 codewords (Section 2.7.5, p.681)
 - 18020209880000D58910
 - 600A0248C8010242EDA1
 - 205606C848102030405060E6D9BE
 - 202E06C8481020304050603753EF
 - 201A06C84810203040506011E8D5
- Unique effective solution of codeword set
- Created: 3 November 2007
- Updated: 6 February 2017

CRC-24/INTERLAKEN

```
width=24 poly=0x328b63 init=0xffffffff refin=false refout=false xorout=0xffffffff check=0xb4f3e6 residue=0x144e63 name="CRC-24/INTERLAKEN"
```

- Class: **academic**
- Reference from named polynomial in Prof. Koopman's [CRC Polynomial Zoo](#).
- [The Interlaken Alliance](#) (7 October 2008), [Interlaken Protocol Definition](#), version 1.2
 - I Definition: Width, Poly (Section 5.3.2.2, p.18)
 - I Definition: Init, Refin, RefOut, XorOut (Appendix B, p.48)
 - IV 1 codeword (Appendix B, p.48)
 - 520BB10470585E00C2B4B01BBAF01000000FCB0B3A8468E1A0A01E1BA38A9DF00003677EEA56DDABEB48D4D93A88A1200001F9515F655DCC3857A641B260C51F1000000000000059E69D
- Created: 10 February 2016
- Updated: 4 August 2023

CRC-24/LTE-A

```
width=24 poly=0x864cfb init=0x000000 refin=false refout=false xorout=0x000000 check=0xcde703 residue=0x000000 name="CRC-24/LTE-A"
```

- Class: **academic**
- Reference from named polynomial in Prof. Koopman's [CRC Polynomial Zoo](#).
- 3rd Generation Partnership Project (3GPP) [TS 36.212](#) version 17.1.0 (March 2022) (zipped MS Word document) — ETSI [TS 136 212](#) version 17.1.0 (April 2022)
 - I Definition: Width, Poly, Init, XorOut, Residue (Section 5.1.1, pp.10–11)
 - I Attachment relation, defining Refin ^ RefOut (Section 5.1.1, p.11)
- 3rd Generation Partnership Project (3GPP) [TS 36.321](#) version 17.5.0 (June 2023) (zipped MS Word document) — ETSI [TS 136 321](#) version 17.5.0 (July 2023)
 - Referenced from TS 136 212 section 5.2.2.1, p.26
 - I Definition: Refin, RefOut (Section 6.1.1, p.90)
- Created: 13 February 2016
- Updated: 5 August 2023

CRC-24/LTE-B

```
width=24 poly=0x800063 init=0x000000 refin=false refout=false xorout=0x000000 check=0x23ef52 residue=0x000000 name="CRC-24/LTE-B"
```

- Class: **academic**
- Reference from named polynomial in Prof. Koopman's [CRC Polynomial Zoo](#).
- 3rd Generation Partnership Project (3GPP) [TS 36.212](#) version 17.1.0 (March 2022) (zipped MS Word document) — ETSI [TS 136 212](#) version 17.1.0 (April 2022)
 - I Definition: Width, Poly, Init, XorOut, Residue (Section 5.1.1, pp.10–11)
 - I Attachment relation, defining Refin ^ RefOut (Section 5.1.1, p.11)
- 3rd Generation Partnership Project (3GPP) [TS 36.321](#) version 17.5.0 (June 2023) (zipped MS Word document) — ETSI [TS 136 321](#) version 17.5.0 (July 2023)
 - Referenced from TS 136 212 section 5.2.2.1, p.26
 - I Definition: Refin, RefOut (Section 6.1.1, p.90)
- Created: 13 February 2016
- Updated: 5 August 2023

CRC-24/OPENPGP

```
width=24 poly=0x864cfb init=0xb704ce refin=false refout=false xorout=0x000000 check=0x21cf02 residue=0x000000 name="CRC-24/OPENPGP"
```

- Class: **attested**
- Alias: **CRC-24**
- [IETF RFC 4880](#) (November 2007)
 - I Definition: Width, Poly, Init (Section 6, p.53)
 - I Code: C (Section 6.1, p.54)
- PVL Team (25 October 2008), CRC .NET control, version 14.0.0.0
 - II Implementation
- Berndt M. Gammel (29 October 2006), [Matpack 1.9.1](#) class `MpCRC` documentation
 - III All parameters (except Residue)
- Created: 2 November 2007
- Updated: 4 August 2023

CRC-24/OS-9

```
width=24 poly=0x800063 init=0xffffffff refin=false refout=false xorout=0xffffffff check=0x200fa5 residue=0x800fe3 name="CRC-24/OS-9"
```

- Class: **attested**
- Microwave Systems Corporation (January 1983), [OS-9 Operating System. System Programmer's Manual](#), revision F-1 (PDF, [HTML](#)) (courtesy of Søren Roug)
 - I Definition: Width, Poly, Init, XorOut, Residue (Section 10.1.4, pp.51–2)
 - I Code: C (Section 10.1.4, p.52)
- Microwave Systems Corporation (August 2000), [OS-9 Technical Manual, version 2.2](#), revision I (courtesy of the Internet Archive)
 - I Definition: Init, Residue (Chapter 8, p.228)
- Microwave Inc., TPUG Inc. (1985), [SuperOS-9 system disk](#) (courtesy of the Internet Archive)
 - II Transcript confirming implementation with at least 7 codewords (selection)
 - 87CD00320021F181D060260029FF000000F0104000001000601010010001001445261ED015242C643626D4473EB0C4EDF
 - 87CD0020000D118108001500FA556E4D6F756EF401113F21265F103F06782872
 - 87CD003C002CF181D0500300033030003051A00000100010100011800180018040117030500070000002C0000546572ED5343C643626D4473EB0E1D4AA
 - 87CD00300021F181D0400240027FF000000F01000000010023010100100010010144B0015242C643626D4473EBA297D0
 - 87CD00300021F181D0400240027FF000000F01010000010023010100100010010144B1015242C643626D4473EBC1CCD5
 - 87CD00300021F181D0400240027FF000000F01020000010023010100100010010144B2015242C643626D4473EB6421CD
 - 87CD00300021F181D0400240027FF000000F01030000010023010100100010010144B3015242C643626D4473EB077AC5
- Søren Roug (15 May 2018), [osnine-java](#), module `os911/src/main/java/org/roug/osnine/os9/OS9.java`
 - III Code: Java (II.953–94)
- Unique effective solution of codeword set
- Created: 25 July 2018
- Updated: 4 August 2023

CRC-30/CDMA

```
width=30 poly=0x2030b9c7 init=0x3fffffff refin=false refout=false xorout=0x3fffffff check=0x04c34abf residue=0x34efa55a name="CRC-30/CDMA"
```

- Class: **academic**
- Reference from named polynomial in Prof. Koopman's [CRC Polynomial Zoo](#).
- CCSA Telecommunication Industry Standard [YD/T 1838.3-2008](#) (5 November 2008; courtesy of the Internet Archive)
 - I Full definition (except Check, Residue) (Section 2.1.1.5.1.2, pp.2-44-5)
- Created: 20 February 2016
- Updated: 4 August 2023

CRC-31/PHILIPS

```
width=31 poly=0x04c11db7 init=0x7fffffff refin=false refout=false xorout=0x7fffffff check=0x0c9e46c residue=0x4eaf26f1 name="CRC-31/PHILIPS"
```

- Class: **confirmed**
- Sincere thanks to Luigi (gigirex) for his assistance.
- AVMagazine.it has a [forum topic](#) on the Philips TV (in Italian).
- Philips 37PF9731 LCD TV
 - II Implementation
- "gigirex" (1 March 2012), Computer Interfacing Forum [topic 1774](#) (courtesy of the Internet Archive)
 - IV 7 codewords (76 bytes each)
- Created: 12 April 2012

- **III Parameters: Width, Poly, RefIn**
- **III Code: C**
- **Created: 19 April 2019**
- **Updated: 4 August 2023**

CRC-32/CKSUM

```
width=32 poly=0x04c1ldb7 init=0x00000000 refin=false refout=false xorout=0xffffffff check=0x765e7680 residue=0xc704dd7b name="CRC-32/CKSUM"
```

- Class: attested
- Alias: **CKSUM, CRC-32/POSIX**
- The `cksum` program processes a representation of the input stream length following the input. It returns 930766865 (0x377A6011) on the check string, processed internally as 31 32 33 34 35 36 37 38 39 09. See the definition for details.
- The Open Group (1997), Single Unix Specification, version 2, Commands & Utilities Issue 5, Reference Pages: [cksum](#)
 - I Full definition (except Check, Residue)
- Q. Frank Xia (December 1999), GNU cksum 2.0a
 - II Implementation
- Michael Niedermayer, Aurélien Jacobs *et al.* (27 February 2023), [FFmpeg 6.0](#) (XZ compressed tarfile), module [ffmpeg-6.0/libavutil/tests/crc.c](#)
 - IV 1 codeword (before XorOut stage)
 - $(i+1*i) \times 1999 + 3F0A451F$ (SOURCE: + C0F5BAE0)
- Created: 30 March 2005
- Updated: 8 August 2024

CRC-32/ISCSI

```
width=32 poly=0x1edc6f41 init=0xffffffff refin=true refout=true xorout=0xffffffff check=0xe3069283 residue=0xb798b438 name="CRC-32/ISCSI"
```

- [illegible]

CRC-32/ISO-HDLC

```
width=32 poly=0x04c1ldb7 init=0xffffffff refin=true refout=true xorout=0xffffffff check=0xcbf43926 residue=0xdebb20e3 name="CRC-32/ISO-HDLC"
```

- Class: **attested**
- Alias: **CRC-32, CRC-32/ADCCP, CRC-32/V-42, CRC-32/XZ, PKZIP**
- HDLC is defined in ISO/IEC 13239.
- [ITU-T Recommendation V.42](#) (March 2002)
 - I Definition: Residue; full mathematical description (Section 8.1.1.6.2, p.17)
- AUTOSAR (24 November 2022), [AUTOSAR Classic Platform](#) release R22-11, [Specification of CRC Routines](#)
 - I Comprehensive primer on CRC theory (Section 7.1, pp.19-22)
 - I All parameters (Section 7.2.3.1, pp.27-8)
 - IV 7 codewords (Section 7.2.3.1, p.28)
 - 000000001CDF4421
 - F20183779DAB24
 - 0FA0805587B2C9B6
 - 00FF55111262A032
 - 332255AABCCDDEEFF3D86AE0B
 - 926B559BA2DE9C
 - FFFFFFFF
- Lasse Collin, Igor Pavlov *et al.* (27 August 2009), [The .xz file format](#), version 1.0.4
 - I Code: C (Section 6)
- [IETF RFC 1662](#) (July 1994)
 - I Code: C (Appendix C.3, pp.21-3)
- PKWARE Inc. (1 February 1993), PKZIP 2.04g
 - II Implementation
- Frank J. T. Wojcik, Guy Eric Schalnat, Andreas Dilger, Glenn Randers-Pehrson *et al.* (15 October 1999), libpng 1.0.5
 - II Implementation
- Lasse Collin, Igor Pavlov *et al.* (21 May 2011), XZ Utils 5.0.3
 - II Implementation
- Lammert Bies (August 2011), [CRC calculator](#)
 - II Implementation
- PVL Team (25 October 2008), CRC.NET control, version 14.0.0.0
 - II Implementation
- Dr Ross N. Williams (19 August 1993), ["A Painless Guide to CRC Error Detection Algorithms"](#) (courtesy of the Internet Archive)
 - III All parameters (except Residue)
- Emil Lenchak, Texas Instruments, Inc. (June 2018), [CRC Implementation With MSP430](#)
 - III All parameters (except Residue) (Section 4.6, p.6)
- Berndt M. Gammel (29 October 2006), [Matpack 1.9.1](#) class MpCRC documentation

