

## SECTION H — ELECTRICITY

### H03 BASIC ELECTRONIC CIRCUITRY

**H03M CODING, DECODING OR CODE CONVERSION, IN GENERAL** (using fluidic means F15C 4/00; optical analogue/digital converters G02F 7/00; coding, decoding or code conversion, specially adapted for particular applications, *see* the relevant subclasses, e.g. G01D, G01R, G06F, G06T, G09G, G10L, G11B, G11C, H04B, H04L, H04M, H04N; ciphering or deciphering for cryptography or other purposes involving the need for secrecy G09C) **[4]**

#### Subclass index

##### CODING AND DECODING

|   |       |
|---|-------|
| in general.....                         | 1/00  |
| to or from differential modulation..... | 3/00  |
| in connection with keyboards.....       | 11/00 |

##### CONVERSION

|                                       |      |
|---------------------------------------|------|
| of the form of individual digits..... | 5/00 |
| of the sequence of digits.....        | 7/00 |
| parallel/series or vice versa.....    | 9/00 |

ERROR DETECTION OR ERROR CORRECTION.....13/00

SUBJECT MATTER NOT PROVIDED FOR IN OTHER GROUPS OF THIS SUBCLASS.....99/00

|             |   |      |         |  |
|-------------|---|------|---------|--|
| <b>1/00</b> | <b>Analogue/digital conversion; Digital/analogue conversion</b> (conversion of analogue values to or from differential modulation H03M 3/00) <b>[4, 2006.01]</b>  | 1/36 | • • •   | simultaneously only, i.e. parallel type <b>[4, 2006.01]</b>  |
| 1/02        | • Reversible analogue/digital converters <b>[4, 2006.01]</b>  | 1/38 | • • •   | sequentially only, e.g. successive approximation type (converting more than one bit per step H03M 1/14) <b>[4, 2006.01]</b>  |
| 1/04        | • using stochastic techniques <b>[4, 2006.01]</b>   | 1/40 | • • • • | recirculation type <b>[4, 2006.01]</b>   |
| 1/06        | • Continuously compensating for, or preventing, undesired influence of physical parameters (periodically H03M 1/10) <b>[4, 2006.01]</b>   | 1/42 | • • • • | Sequential comparisons in series-connected stages with no change in value of analogue signal <b>[4, 2006.01]</b>   |
| 1/08        | • • of noise <b>[4, 2006.01]</b>  | 1/44 | • • • • | Sequential comparisons in series-connected stages with change in value of analogue signal <b>[4, 2006.01]</b>  |
| 1/10        | • Calibration or testing <b>[4, 2006.01]</b>  | 1/46 | • • • • | with digital/analogue converter for supplying reference values to converter <b>[4, 2006.01]</b>  |
| 1/12        | • Analogue/digital converters (H03M 1/02-H03M 1/10 take precedence) <b>[4, 2006.01]</b>   | 1/48 | • •     | Servo-type converters <b>[4, 2006.01]</b>  |
| 1/14        | • • Conversion in steps with each step involving the same or a different conversion means and delivering more than one bit <b>[4, 2006.01]</b>  | 1/50 | • •     | with intermediate conversion to time interval (H03M 1/64 takes precedence) <b>[4, 2006.01]</b>   |
| 1/16        | • • • with scale factor modification, i.e. by changing the amplification between the steps <b>[4, 2006.01]</b>  | 1/52 | • • •   | Input signal integrated with linear return to datum <b>[4, 2006.01]</b>  |
| 1/18        | • • Automatic control for modifying the range of signals the converter can handle, e.g. gain ranging <b>[4, 2006.01]</b>  | 1/54 | • • •   | Input signal sampled and held with linear return to datum <b>[4, 2006.01]</b>  |
| 1/20        | • • Increasing resolution using an n bit system to obtain n + m bits, e.g. by dithering <b>[4, 2006.01]</b>   | 1/56 | • • •   | Input signal compared with linear ramp <b>[4, 2006.01]</b>   |
| 1/22        | • • pattern-reading type <b>[4, 2006.01]</b>  | 1/58 | • • •   | Non-linear conversion <b>[4, 2006.01]</b>  |
| 1/24        | • • • using relatively movable reader and disc or strip <b>[4, 2006.01]</b>   | 1/60 | • •     | with intermediate conversion to frequency of pulses <b>[4, 2006.01]</b>  |
| 1/26        | • • • • with weighted coding, i.e. the weight given to a digit depends on the position of the digit within the block or code word, e.g. there is a given radix and the weights are powers of this radix <b>[4, 2006.01]</b> | 1/62 | • • •   | Non-linear conversion <b>[4, 2006.01]</b>  |
| 1/28        | • • • • with non-weighted coding <b>[4, 2006.01]</b>  | 1/64 | • •     | with intermediate conversion to phase of sinusoidal signals <b>[4, 2006.01]</b>  |
| 1/30        | • • • • • incremental <b>[4, 2006.01]</b>   | 1/66 | •       | Digital/analogue converters (H03M 1/02-H03M 1/10 take precedence) <b>[4, 2006.01]</b>  |
| 1/32        | • • • using cathode-ray tubes <b>[4, 2006.01]</b>   | 1/68 | • •     | with conversions of different sensitivity, i.e. one conversion relating to the more significant digital bits and another conversion to the less significant bits <b>[4, 2006.01]</b> |
| 1/34        | • • Analogue value compared with reference values (H03M 1/48 takes precedence) <b>[4, 2006.01]</b>  |      |         |  |

- 1/70 • • Automatic control for modifying converter range [4, 2006.01]
- 1/72 • • Sequential conversion in series-connected stages (H03M 1/68 takes precedence) [4, 2006.01]
- 1/74 • • Simultaneous conversion [4, 2006.01]
- 1/76 • • • using switching tree [4, 2006.01]
- 1/78 • • • using ladder network [4, 2006.01]
- 1/80 • • • using weighted impedances (H03M 1/76 takes precedence) [4, 2006.01]
- 1/82 • • with intermediate conversion to time interval [4, 2006.01]
- 1/84 • • • Non-linear conversion [4, 2006.01]
- 1/86 • • with intermediate conversion to frequency of pulses [4, 2006.01]
- 1/88 • • • Non-linear conversion [4, 2006.01]

### 3/00 Conversion of analogue values to or from differential modulation [4, 2006.01]

- 3/02 • Delta modulation, i.e. one-bit differential modulation [4, 2006.01]
- 3/04 • Differential modulation with several bits [4, 2006.01]

### 5/00 Conversion of the form of the representation of individual digits [4, 2006.01]

#### Note(s) [4]

In groups H03M 5/02-H03M 5/22, the last place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in the last appropriate place.

- 5/02 • Conversion to or from representation by pulses [4, 2006.01]
- 5/04 • • the pulses having two levels [4, 2006.01]
- 5/06 • • • Code representation, e.g. transition, for a given bit cell depending only on the information in that bit cell [4, 2006.01]
- 5/08 • • • • Code representation by pulse width [4, 2006.01]
- 5/10 • • • • Code representation by pulse frequency [4, 2006.01]
- 5/12 • • • • Biphase level code, e.g. split phase code, Manchester code; Biphase space or mark code, e.g. double frequency code [4, 2006.01]
- 5/14 • • • Code representation, e.g. transition, for a given bit cell depending on the information in one or more adjacent bit cells, e.g. delay modulation code, double density code [4, 2006.01]
- 5/16 • • the pulses having three levels [4, 2006.01]
- 5/18 • • • two levels being symmetrical with respect to the third level, i.e. balanced bipolar ternary code [4, 2006.01]
- 5/20 • • the pulses having more than three levels [4, 2006.01]
- 5/22 • Conversion to or from representation by sinusoidal signals [4, 2006.01]

### 7/00 Conversion of a code where information is represented by a given sequence or number of digits to a code where the same information is represented by a different sequence or number of digits [4, 2006.01]

#### Note(s) [4]

In groups H03M 7/02-H03M 7/30, the last place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in the last appropriate place.

- 7/02 • Conversion to or from weighted codes, i.e. the weight given to a digit depending on the position of the digit within the block or code word [4, 2006.01]
- 7/04 • • the radix thereof being two [4, 2006.01]
- 7/06 • • the radix thereof being a positive integer different from two [4, 2006.01]
- 7/08 • • • the radix being ten, i.e. pure decimal code [4, 2006.01]
- 7/10 • • the radix thereof being negative [4, 2006.01]
- 7/12 • • having two radices, e.g. binary-coded-decimal code [4, 2006.01]
- 7/14 • Conversion to or from non-weighted codes [4, 2006.01]
- 7/16 • • Conversion to or from unit-distance codes, e.g. Gray code, reflected binary code [4, 2006.01]
- 7/18 • • Conversion to or from residue codes [4, 2006.01]
- 7/20 • • Conversion to or from n-out-of-m codes [4, 2006.01]
- 7/22 • • • to or from one-out-of-m codes [4, 2006.01]
- 7/24 • • Conversion to or from floating-point codes [4, 2006.01]
- 7/26 • Conversion to or from stochastic codes [4, 2006.01]
- 7/28 • Programmable structures, i.e. where the code converter contains apparatus which is operator-changeable to modify the conversion process [4, 2006.01]
- 7/30 • Compression (speech analysis-synthesis for redundancy reduction G10L 19/00; for image communication H04N); Expansion; Suppression of unnecessary data, e.g. redundancy reduction [4, 2006.01]
- 7/32 • • Conversion to or from delta modulation, i.e. one-bit differential modulation [4, 2006.01]
- 7/34 • • • adaptive [4, 2006.01]
- 7/36 • • Conversion to or from differential modulation with several bits, i.e. the difference between successive samples being coded by more than one bit [4, 2006.01]
- 7/38 • • • adaptive [4, 2006.01]
- 7/40 • • Conversion to or from variable length codes, e.g. Shannon-Fano code, Huffman code, Morse code [4, 2006.01]
- 7/42 • • • using table look-up for the coding or decoding process, e.g. using read-only memory [4, 2006.01]
- 7/44 • • • Suppression of irrelevant zeroes [4, 2006.01]
- 7/46 • • Conversion to or from run-length codes, i.e. by representing the number of consecutive digits, or groups of digits, of the same kind by a code word and a digit indicative of that kind [4, 2006.01]
- 7/48 • • • alternating with other codes during the code conversion process, e.g. run-length coding being performed only as long as sufficiently long runs of digits of the same kind are present [4, 2006.01]
- 7/50 • • Conversion to or from non-linear codes, e.g. companding [4, 2006.01]

### 9/00 Parallel/series conversion or vice versa (digital stores in which the information is moved stepwise G11C 19/00) [4, 2006.01]

### 11/00 Coding in connection with keyboards or like devices, i.e. coding of the position of operated keys (keyboard switch arrangements, structural association of coders and keyboards H01H 13/70, H03K 17/94) [4, 2006.01]

- 11/02 • Details [5, 2006.01]
- 11/04 • • Coding of multifunction keys [5, 2006.01]

- 11/06 • • • by operating the multifunction key itself in different ways [5, 2006.01]
- 11/08 • • • • by operating selected combinations of multifunction keys [5, 2006.01]
- 11/10 • • • • by methods based on duration or pressure detection of keystrokes [5, 2006.01]
- 11/12 • • • • by operating a key a selected number of consecutive times whereafter a separate enter key is used which marks the end of the series [5, 2006.01]
- 11/14 • • • by using additional keys, e.g. shift keys, which determine the function performed by the multifunction key [5, 2006.01]
- 11/16 • • • • wherein the shift keys are operated after the operation of the multifunction keys [5, 2006.01]
- 11/18 • • • • wherein the shift keys are operated before the operation of the multifunction keys [5, 2006.01]
- 11/20 • Dynamic coding, i.e. by key scanning (H03M 11/26 takes precedence) [5, 2006.01]
- 11/22 • Static coding (H03M 11/26 takes precedence) [5, 2006.01]
- 11/24 • • using analogue means [5, 2006.01]
- 11/26 • using opto-electronic means [5, 2006.01]
- 13/00 Coding, decoding or code conversion, for error detection or error correction; Coding theory basic assumptions; Coding bounds; Error probability evaluation methods; Channel models; Simulation or testing of codes** (error detection or error correction for analogue/digital, digital/analogue or code conversion H03M 1/00-H03M 11/00; specially adapted for digital computers G06F 11/08, for information storage based on relative movement between record carrier and transducer G11B, e.g. G11B 20/18, for static stores G11C) [4, 7, 2006.01]
- 13/01 • Coding theory basic assumptions; Coding bounds; Error probability evaluation methods; Channel models; Simulation or testing of codes [7, 2006.01]
- 13/03 • Error detection or forward error correction by redundancy in data representation, i.e. code words containing more digits than the source words [7, 2006.01]
- 13/05 • • using block codes, i.e. a predetermined number of check bits joined to a predetermined number of information bits [7, 2006.01]
- 13/07 • • • Arithmetic codes [7, 2006.01]
- 13/09 • • • Error detection only, e.g. using cyclic redundancy check [CRC] codes or single parity bit [7, 2006.01]
- 13/11 • • • using multiple parity bits [7, 2006.01]
- 13/13 • • • Linear codes [7, 2006.01]
- 13/15 • • • • Cyclic codes, i.e. cyclic shifts of codewords produce other codewords, e.g. codes defined by a generator polynomial, Bose-Chaudhuri-Hocquenghem [BCH] codes (H03M 13/17 takes precedence) [7, 2006.01]
- 13/17 • • • • Burst error correction, e.g. error trapping, Fire codes [7, 2006.01]
- 13/19 • • • • Single error correction without using particular properties of the cyclic codes, e.g. Hamming codes, extended or generalised Hamming codes [7, 2006.01]
- 13/21 • • • Non-linear codes, e.g. m-bit data word to n-bit code word [mBnB] conversion with error detection or error correction [7, 2006.01]
- 13/23 • • using convolutional codes, e.g. unit memory codes [7, 2006.01]
- 13/25 • Error detection or forward error correction by signal space coding, i.e. adding redundancy in the signal constellation, e.g. Trellis Coded Modulation [TCM] [7, 2006.01]
- 13/27 • using interleaving techniques [7, 2006.01]
- 13/29 • combining two or more codes or code structures, e.g. product codes, generalised product codes, concatenated codes, inner and outer codes [7, 2006.01]
- 13/31 • combining coding for error detection or correction and efficient use of the spectrum (without error detection or correction H03M 5/14) [7, 2006.01]
- 13/33 • Synchronisation based on error coding or decoding [7, 2006.01]
- 13/35 • Unequal or adaptive error protection, e.g. by providing a different level of protection according to significance of source information or by adapting the coding according to the change of transmission channel characteristics [7, 2006.01]
- 13/37 • Decoding methods or techniques, not specific to the particular type of coding provided for in groups H03M 13/03-H03M 13/35 [7, 2006.01]
- 13/39 • • Sequence estimation, i.e. using statistical methods for the reconstruction of the original codes [7, 2006.01]
- 13/41 • • • using the Viterbi algorithm or Viterbi processors [7, 2006.01]
- 13/43 • • Majority logic or threshold decoding [7, 2006.01]
- 13/45 • • Soft decoding, i.e. using symbol reliability information (H03M 13/41 takes precedence) [7, 2006.01]
- 13/47 • Error detection, forward error correction or error protection, not provided for in groups H03M 13/01-H03M 13/37 [7, 2006.01]
- 13/49 • • Unidirectional error detection or correction [7, 2006.01]
- 13/51 • • Constant weight codes; n-out-of-m codes; Berger codes [7, 2006.01]
- 13/53 • • Codes using Fibonacci numbers series [7, 2006.01]
- 99/00 Subject matter not provided for in other groups of this subclass [2006.01]**