

# A NOVEL METHOD OF GENERATING AND REMEMBERING INTERNATIONAL MORSE CODES

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**Abstract.**

*A novel method of generating and remembering International Morse Code is presented in this paper. The method requires only memorizing 4 key sentences and requires knowledge of writing binary equivalents of decimal numerals 1 to 16. However much untethered communications have been advanced, despite as S.O.S. International Morse Code will be at rescue as an emergency tool, when all other modes fail. The details of the method and actual codes have been enumerated.*

**Keywords:** Binary numbers, Decimal Numbers, International Morse Code, SOS, untethered communications

**I. Introduction**

Morse Code was invented several years before in 1838 by Samuel F.B. of the U.S. and firstly used with wire for transmission and reception. Since then it is used in line telegraphy and also in Radio telegraphy & submarine cable systems [1]. Though the Morse Code remained unchanged, the invention of sophisticated coding techniques with parity checks and error detecting and correcting codes even in noisy environment improved the present day communication systems. The use of coding techniques used in acoustic telemetry, space telemetry, remote sensing has seen tremendous developments. Present day untethered communication systems (i.e. without cable) owe its roots to the invention of Morse Code. Satellite-based mobile communications is a practical reality and is an indispensable tool of the present day world and ICT techniques and remote sensing techniques facilitates modern communications. Untethered communications find their way into daily life in telemedicine too. Bio-chip technology, molecular & atomic codings and DNA genetic coding techniques exist today. However, as an SOS last tool, Morse code can still be employed in emergency. Baudot teleprinter codes, picture facsimile codes, Gray codes, Error Correcting Codes (ECC), Error Detecting Codes (EDC), Bose Choudhury Haque (BCH) codes all are fine; but when all fail Morse code comes as a rescue as a simple keying “On” & “Off” system. This supplements WLL and Ham Radio.

**ii. Theory, methodology & discussions**

An attempt is made here to present a new method of generating and remembering Morse Code of Alphanumerics. One should remember 4 key sentences in a definite order and also should have knowledge of generating 1-bit, 2-

bit, 3-bit, 4-bit & 5-bit binary codes of decimal numbers 0 to 9 and upto 16.

The key sentences to be remembered for Alphabets are:

1. E xtra Terrestrial. – 2 nos
2. I Am Not Monkey – 4 nos
3. SURe Wind Direction Keeps Good Operation – 8 nos
4. High Video Flux = eLectronic = Priate Junction Branch exchange; Clear Your Zonal Que – 12 nos

Rules to underline and mark the alphabets:

1. In the first 2 sentences underline and mark the first letter of each word
2. In the 3<sup>rd</sup> sentence and in 1<sup>st</sup> word underline and mark 3 characters (because last character viz. ‘e’ is already covered) and then underline 1<sup>st</sup> character of each word.
3. In the 4<sup>th</sup> sentence underline and mark each first character in each of the words, including two hyphens and excepting the already covered ‘e’s in the words ‘eLectronic’ & ‘exchange’.

Now write the underlined & marked characters one below the other in order sequentially and correspondingly the binary equivalents of decimal numerals 0 to 9, with those in 1<sup>st</sup> sentence as 1-bit word, 2<sup>nd</sup> sentence as 2-bit words, in 3<sup>rd</sup> sentence as 3-bit words and in 4<sup>th</sup> sentence as 4-bit words (keeping in mind that hyphens are also taken care in 4<sup>th</sup> sentence).

Now the generated codes will be as per following table:

1-bit letter	Morse Code	4-bit letter	Morse Code
E	0	H	0000
T	1	V	0001
2-bit letter	Code	F	0010
I	00	-	0011
A	01	L	0100
N	10	-	0101
M	11	P	0110
3-bit	Code	J	0111

letter			
S	000	B	1000
U	001	X	1001
R	010	C	1010
W	011	Y	1011
D	100	Z	1100
K	101	Q	1101
G	110		
O	111		

Now assigning morse code (.) to 0 & (-) to 1 with '0' as 1 unit time pulse and '1' as 3 units of time pulse, the above table gives the Morse codes of all the English alphabets. It may be noted that the important time schedule of signals [3] are as following:

• → pulse of unit time (say 't' seconds)

– → pulse of 3 units of time (3t)

Spacing between elements of a character → 1 dot-length of time 't'

Inter-symbol signal → blank spacing (without pulse) of 3 dots equivalent timing i.e. blank spacing of time '3t'.

Inter-word signal → blank spacing (without pulse) of 7 dots equivalent timing i.e. blank spacing of time '7t'.

Other useful 6-bit codes of characters are:  
Period: 010101; comma: 110011; colon: 111000; query: 001100.

Similarly, the decimal numerals may be coded as a series of 5-bit binary nos. with '0's rippling rightwards and when all are '0's then the '1's ripples rightwards. The Morse Code for numerals are given as per following table:

Decimal Number	Morse Code
1	01111
2	00111
3	00011
4	00001
5	00000
6	10000
7	11000
8	11100
9	11110
0	11111

Though the Morse codes for Alphanumerics have been developed, there is no definite clue how the punctual marks, question & other marks have to be coded, for which a standard reference book has to be referred to [1]-[2].

This method of generating Morse code has been developed only for Alphanumerics and intended as a guide which will be useful in emergencies and as a SOS resort. The simplicity is that one has to remember only 4 key sentences and the way of writing down binary numbers for numerals 0 to 9 and upto

16. This method is not available anywhere else and is purely an original idea. We hope the readers, especially the science & engineering students, will adopt this method as a convenience, using conventional telegraphic device, to generate International Morse codes and will be useful in their lives.

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#### References

- (1) Anonymous, Encyclopaedia Britannica, Micropaedia, U.S.A., Vol. VII, pp. 36-37, 1981.
- (2) Handbook of Royal Radio Signals
- (3) N.N. Biswas, Principles of Telegraphy, Asia Publishing House, Bombay, pp. 2-4, 1969.

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