

## BINARY CODED WIRE TAG READING INSTRUCTIONS FOUR-WORD STANDARD LENGTH FORMAT

Data are carried on binary coded wire tags in six-digit binary words, or numbers. Consider the number 1066. It might similarly be called a four-digit decimal word, and can be written in columns as follows:

1000s	100s	10s	1s
1	0	6	6

Said another way, it mean the sum of 1 thousand, no hundreds, six tens, and six ones.

Binary words, or numbers, can be written in columns in the same way:

32s	16s	8s	4s	2s	1s
1	1	0	1	0	1

The binary number 110101 thus means the sum of 1 thirty-two, 1 sixteen, 0 eights, 1 four, 0 twos, and 1 one—i.e., 110101 binary equals 53 decimal.

Binary coded wire tag material is marked with four six-digit binary words written lengthwise on the wire, 90 degrees apart around its circumference. Three of these words carry data on the six digits as illustrated above, and following them is a seventh digit in each row which is used as an error check as explained below. The fourth word on the tag is known as the master word and is always the same. Its purpose is to mark the beginning of the three data words and to identify the direction in which they are to be read.

The information is carried by the presence (or absence) of notches on the wire at marking positions that are spaced .0048 inch (.12mm) apart. A notch is read as binary 1; no notch is read as binary 0. At the standard tag length of .042 inch (1.07mm), this means there are at least 8 visible mark positions on a tag. The logic in the coding system is such that tags as short as .030 inch (.76mm) will still guarantee unambiguous data recovery. The data format on a coded wire tag is keyed to the seven-bit master word. This word, always the same, is unusual in that it contains an extra, in-between, mark.

The master word looks like:

64s	32s	16s	8s	4s	2s	1s
0	0	1	1	1	1	1

The half-interval mark between the first and second marks (the “1s” and “2s”) is instantly apparent. Every tag bears this master word, although it may start and end in different places, e.g. 1 1 111 0 0 1 (because tags are always cut the same length but can be cut anywhere on the code pattern).

To read a coded wire tag, you must first find the master word and orient the tag horizontally so that the master word reads in the correct direction, 0 0 1 1 1 111. Then the remaining data are to be read according to the following conventions:

1. The column labels for the data words are derived from the master word:

0	0	1	1	1	1 1 1	Master
Ck	32	16	8	4	2 1	Column Identification

2. With the master word on top of the wire and running in the proper direction, rotate the tag on its axis so that the master word moves up. As the three data words come into view, they are, in order:

1. DATA WORD 1
2. AGENCY CODE
3. DATA WORD 2

If you imagine the surface of the tag unrolled like a sheet of paper, it would look like this:

Check	32s	16s	8s	4s	2s	1s	COLUMN IDENTIFICATION
0	0	1	1	1	1	1 1	MASTER WORD
1	1	0	1	1	0	1	DATA 1 = DECIMAL 45
1	0	0	1	1	1	1	AGENCY = DECIMAL 15
0	1	1	0	0	1	0	DATA 2 = DECIMAL 50

3. The convention adopted for the seventh column, the check bit, is that the number of notches in each of the three data rows must always be odd. This provides a check against coding errors in the data. For example, if the required number is:

101101

there are four binary ones, or notches; the number of notches is, therefore, even; and the check bit must also be a one. The data would appear on the tag wire as:

1101101      (decimal 45, with check bit)

If the data were to be: 010110

The checked data would appear on the tag wire as:

0010110      (decimal 22, with no check bit)

since the data word already has an odd number of notches, and the check bit must be zero. Remember, the check bit does not have a numerical value, it is only used to make the number of notches odd for each of the three data words (not the master word).

The information on each of the four sides of the tag wire is repeated continuously every seven spaces. Since tags are cut off the spool of wire every 8.5 spaces, actual tags may be cut at any point in the word. An example of a tag cut between the 4s and 8s columns follows:

4s	2s	1s	Ck	32s	16s	8s	COLUMN IDENTIFICATION
1	1	1	1	0	0	1	MASTER
1	0	1	1	1	0	1	DATA 1 = DECIMAL 45
1	1	1	1	0	0	1	AGENCY = DECIMAL 15
0	1	0	0	1	1	0	DATA 2 = DECIMAL 50

Please feel free to contact us if you have any questions. We are happy to help you.