



How to Read the Original Binary Coded Wire Tag

Application Note

Introduction

This note discusses how to read Coded Wire Tags produced by Northwest Marine Technology prior to January, 1977. To read tags produced after January, 1977 please see the note titled "Binary Coded Wire Tag Reading Instructions".

Binary background

Data are carried on binary coded wire tags in four-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 means 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:

8s	4s	2s	1s
1	1	0	1

The binary number 1101 thus means the sum of 1 eight, 1 four, 0 twos, and 1 one—i.e., 1101 binary equals 13 decimal.

Tag coding

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.

Binary coded wire tag material is marked with four four-digit binary words written lengthwise on the wire, 90 degrees apart around its circumference. Three of these words carry four digit data as illustrated above. The fourth word on the tag is eight digits and known as the master word.

Master word

The data format on a coded wire tag is keyed to the eight-digit master word. This word is always the same on every tag. The master word is the same on every tag. 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 master word looks like

0 0 0 1 1 1 0 1

Every tag bears this master word, although it may start and end in different places because tags are always cut the same length but can be cut anywhere on the code pattern. For example:

1 1 1 0 1 0 0 0

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.

Data words

After orienting the tag using the master word, the data words may be read. Data words are four-digits long and are repeated along the tag. The repetition of the four-digit data patterns is to provide an increased probability that the tag will provide unambiguous data recovery even when damaged. The notes below will use 'a' and 'b' to refer to the two copies. For example, 8a would be the 8s digit of the 'a' copy of the data word.

The following conventions are used to decode the tag:

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

0 0 0 1 1 1 0 1 Master
 8b 4b 2b 1b 8a 4a 2a 1a 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:

8b 4b 2b 1b 8a 4a 2a 1a COLUMN IDENTIFICATION
 0 0 0 1 1 1 0 1 MASTER WORD
 1 1 0 1 1 1 0 1 DATA 1 = DECIMAL 13
 1 0 1 0 1 0 1 0 AGENCY = DECIMAL 10
 1 0 1 0 1 0 1 0 DATA 2 = DECIMAL 10

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 2b and 4b columns follows:

2b 1b 8a 4a 2a 1a 8b 4b COLUMN IDENTIFICATION
 0 1 1 1 0 1 0 0 MASTER WORD
 0 1 1 1 0 1 1 1 DATA 1 = DECIMAL 13
 1 0 1 0 1 0 1 0 AGENCY = DECIMAL 10
 1 0 1 0 1 0 1 0 DATA 2 = DECIMAL 10

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