The IEEE Standard 1451.4 Manufacturer ID

Paul Hufnagel, Kistler Instrument Corporation
**Secretary, IEEE 1451.4 Standard Working Group**

The transducer electronic data sheet (TEDS) in an IEEE 1451.4 transducer is stored in one or more independently addressable memories called nodes. As a minimum, the TEDS must contain a basic TEDS, which is a unique identification for the transducer. Basic TEDS contains a manufacturer ID code for the manufacturer of the transducer.

Manufacturer ID Contained in Basic TEDS
The basic TEDS is made up of 64 bits, including the manufacturer ID (14 bits), model number (15 bits), version letter (5-bit character code), version number (6 bits) and a 24-bit serial number for the transducer. Basic TEDS data is mapped as shown in the figures 1 and 2 below.

Basic TEDS must be stored in the one-time programmable (OTP) application register of any memory node so equipped (Maxim/Dallas DS2430A[1]). The first 14 bits of basic TEDS are assigned to the manufacturer ID. The data is arrayed least significant bit first. The checksum byte for basic TEDS plus the first 255 bits of TEDS data is assigned to the least significant byte of the memory containing the balance of the TEDS data. In the case of the DS2430A, TEDS data is stored in the EEPROM array.

Figure 1: Basic TEDS bit map in OTP application register
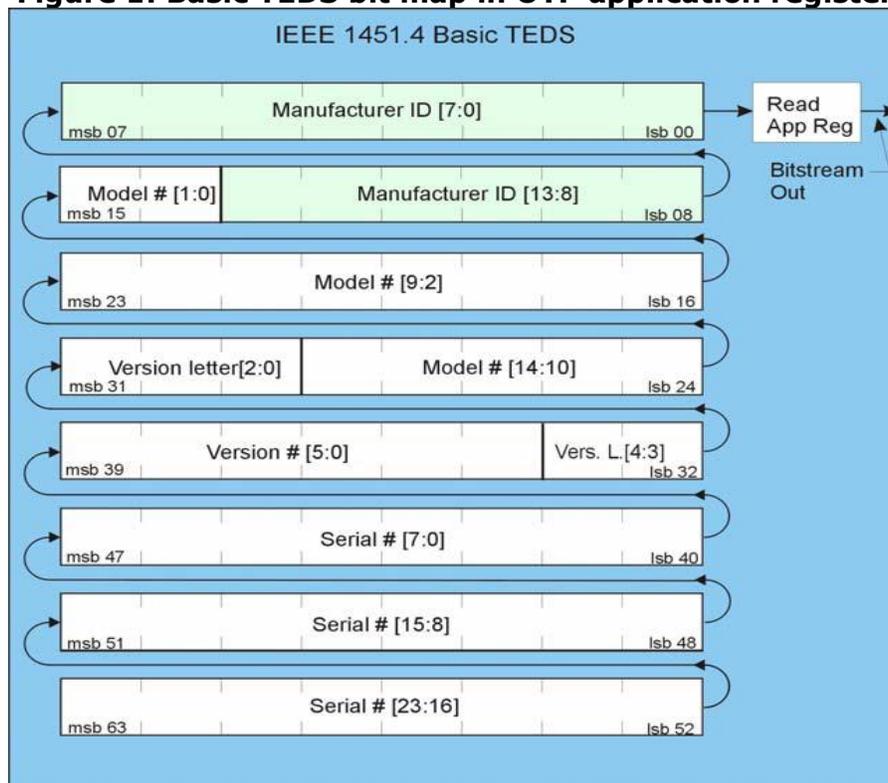
Transducers may also provide storage for the TEDS in memories that do not contain the OTP application register. In this case, the contiguous memory area is divided into pages of 32 bytes (256 bits). The least significant byte of each page is assigned to contain the checksum for the remaining 31 bytes of that page. The least significant page in the memory array will contain the checksum in the least significant byte, followed in order by the 14-bit manufacturer ID code, the balance of the basic TEDS and up to 23 bytes (184 bits) of TEDS data, all arrayed least significant bit first.

Figure 2: Basic TEDS bitmap in contiguous memory
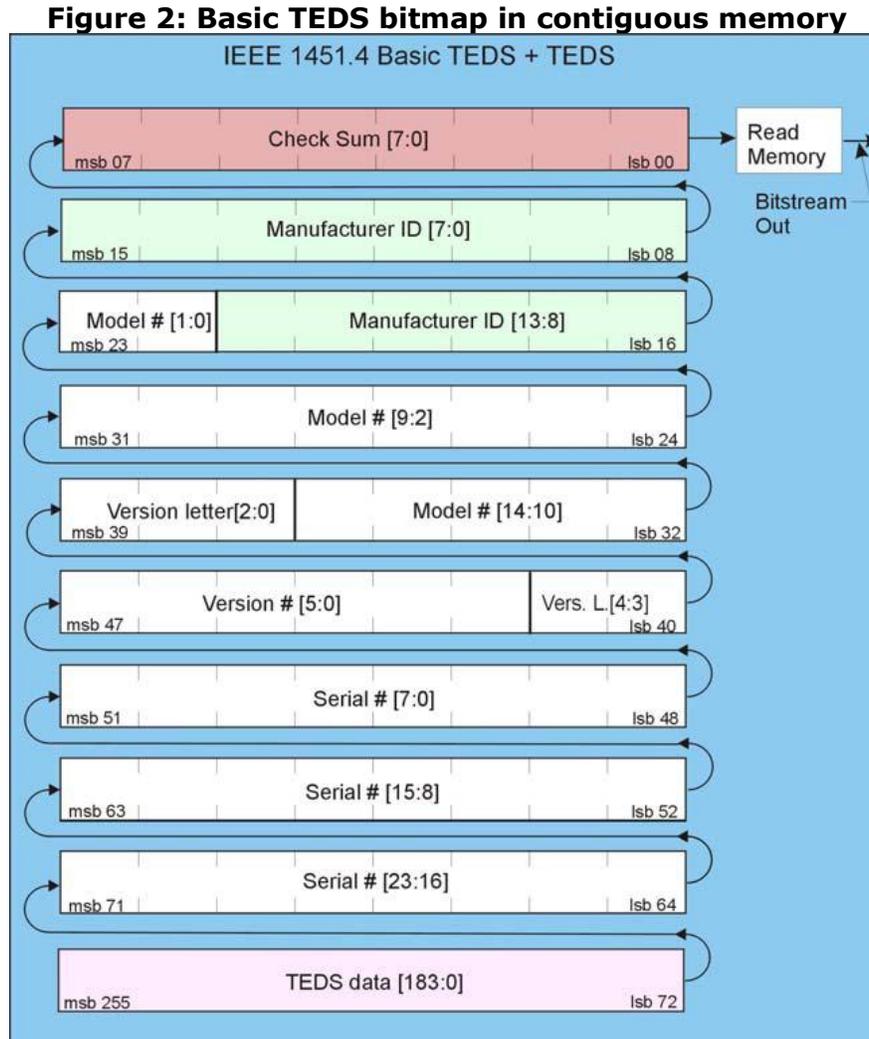
NOTE — Many transducers have been manufactured using draft versions (D0.9x) of IEEE 1451.4, which described a different format for the basic TEDS than that used in IEEE Std 1451.4-2004[2]. For information about these applications see Annex I of this standard.

Obtaining a Manufacturer ID Number

Manufacturers wishing to build transducers conforming to IEEE Std 1451.4-2004 must obtain a manufacturer ID from the IEEE Registration Authority[3]. Manufacturers may obtain a second Manufacturer ID number. However, prior to issuing a second number, IEEE-RA must receive from the manufacturer a statement on letterhead, to the effect that the original ID will be utilized to greater than 95% of the potential transducer identifiers inherent in the ID. A total of about 16,300 Manufacturer Identifiers are

available in the pool of numbers, requiring that the maximum usage be made of each number assigned. The pool of individual transducer model numbers available to each holder of a single Manufacturer ID is in excess of 54.5 million minimum, with an option to expand to 67.1 million, if instead of 26 states (letters A through Z), all 32 states of the version letter field are used. Each model may be produced up to a total in excess of 16.7 million serialized copies. By changing the version number or letter codes, the number of serialized copies of a given model number may be extended. As a minimum, about 9.1 x 1014 individual products may be defined under a single manufacturer ID number.

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[1] DS2430A 256-Bit 1-Wire EEPROM, Maxim/Dallas Semiconductor, pp. 7-8, edition 02-20-02
[2] IEEE Std 1451.4-2004, Standard for a Smart Transducer Interface for Sensors and Actuators- Mixed-Mode Communication Protocols and Transducer Electronic Data Sheet (TEDS) Formats, IEEE Standards Association, Piscataway, NJ, subclause 5.1.1, 2004
[3] c/o IEEE Standards Association, 445 Hoes Lane, Piscataway, NJ 08855-1331, USA, or at www.standards.ieee.org