

Terms used in the IEEE 1451.2 standard specifications

- 1. acknowledgment:** A signal that is used to reply to a message or signal originator that its message or signal was received.
- 2. actuator:** A transducer that accepts an electrical signal and converts it into a physical action.
- 3. address:** A character or group of characters that identifies a register, a particular part of storage, or some other data source or destination. IEEE 1451.2 uses *functional addresses* and *channel addresses* to control the flow of data and configuration information between the NCAP and the STIM.
- 4. analog to digital converter (ADC):** A circuit that accepts an analog input signal and outputs a proportional digital signal.
- 5. buffer:** An intermediate data storage location used to compensate for the difference in rate of flow of data or time of occurrence of events when transmitting information from one device to another.
- 6. buffered channel:** A channel in which the data is placed into a buffer prior to a trigger event and then transmitted or acted upon following that trigger event. This contrasts with an unbuffered channel in which the data is not taken by or available to the channel until following the trigger event.
- 7. byte:** A group of eight bits, also known as an octet.
- 8. calibration:** The determination of the data to reside in the Calibration TEDS and to be used for correction.
- 9. channel:** A single flow path for digital data or an analog signal, usually in distinction from other parallel paths. An IEEE 1451.2 channel provides a path for a single commodity or logical state, either real or virtual, using a single data model and a single set of physical units.
- 10. channel address:** The portion of a full data transport address which specifies the channel to which the read or write is directed.
- 11. channel groupings:** Channel groups are manufacturer specifications which define the inherent relationships between the channels of a multi-channel STIM. This grouping information is not normally used by the STIM itself. This information will normally be used by NCAP applications to properly compose human readable displays or in formulating other computations. For example, channel groupings can be used to indicate which channels represent the three vector axes of a three axis vector measurement.

- 12. correction:** The evaluation of a multinomial function using information from the calibration TEDS together with data from one or more channels.
- 13. data conversion:** The translation of data from one numeric form into another (e.g. converting a digital DAC input bit stream into a voltage).
- 14. data model:** The numeric format in which the STIM will output or accept data.
- 15. data sequence sensor:** A sensor that samples data independent of any triggers from an NCAP.
- 16. data sheet:** A set of information on a device that defines the parameters of operation and conditions of usage (usually produced by the device's manufacturer).
- 17. data structure:** A group of digital data fields organized in some logical order for some specific purpose. A two-dimensional paper version of a data structure is an empty fill-in-the-blanks form or an empty tabular chart with organized column and row headings. A data structure is the template by which data is stored in computer memory.
- 18. digital interface:** A set of wires and a protocol for transferring information by binary means only.
- 19. digital to analog converter (DAC):** A circuit that inputs a digital value and outputs a proportional analog signal.
- 20. electronic data sheet:** A data sheet stored in some form of electrically readable memory (as opposed to a piece of paper).
- 21. enumeration:** The listing of the meaning associated with each binary numeric value possible in a data field's storage. Binary numbers are usually expressed in decimal terms for human convenience. Not all possible numeric values need have a specific meaning. Values without meaning are declared to be unused or reserved for future use. Enumeration is the process of declaring the encoding of human interpretable information in a manner convenient for digital electronic machine storage and interchange. The subclause that defines each TEDS data field that is of data type *enumeration* shall contain a table that defines the meaning of the data field for each binary number possible. The meanings encoded in each data field shall be specific and unique to that data field and only that data field. The value becomes meaningless if not associated with the data field and its defining table.
- 22. event sequence sensor:** A sensor that detects a change of state in the physical world. The instant in time of the change of state, not the state value, is the "measurement."

- 23. full data transport address:** The combination of a functional address and a channel address which specifies whether data is being read or written, to which function, and to which channel.
- 24. functional address:** The portion of a full data transport address which specifies the read or write function which is to be performed.
- 25. hot swap:** The act of connecting or disconnecting a STIM and an NCAP without first turning off the power that the NCAP supplies to the STIM over the TII.
- 26. interrupt:** A signal for a processor to suspend one process and begin another. As implemented in IEEE P1451.2, an interrupt is a signal from the STIM which enables it to request service from the NCAP.
- 27. least significant bit (lsb):** The bit in the binary notation of a number that is the coefficient of the lowest exponent possible.
- 28. meta-:** A Greek prefix meaning: that which pertains to the whole or overall entity or that which is in common or shared with all member entities comprising the whole.
- 29. Meta-TEDS:** The collection of those TEDS data fields that pertain to the whole or overall entity or those which are in common or shared with all member entities (channels) comprising the whole transducer product.
- 30. most significant bit (msb):** The bit in the binary notation of a number that is the coefficient of the highest exponent possible.
- 31. multinomial:** A linear sum of terms involving powers of more than one variable.
- 32.**
$$\sum_{i_1=0}^{N_1} \sum_{i_2=0}^{N_2} \Lambda \sum_{i_m=0}^{N_m} A(i_1, i_2, \Lambda, i_m) x_1^{i_1} x_2^{i_2} \Lambda x_m^{i_m}$$
- 33. negative logic:** An electronic logic system where the voltage representing one, active or true has a more negative value than the voltage representing zero, inactive or false. Also known as negative-true logic. Normally used in electronic and computing data and communications switching systems for noise immunity reasons.
- 34. Network Capable Application Processor (NCAP):** A device between the STIM and the network that performs network communications, STIM communications, and data conversion functions.
- 35. not a number (NaN):** As defined in IEEE 754, a bit pattern of a single or double precision real number data type that is a result of an invalid floating point operation.
- 36. octet:** A group of eight bits, also known as a byte.

- 37. pacing:** A method to regulate the flow of bytes read from or written to a STIM.
- 38. positive logic:** An electronic logic system where the voltage representing one, active or true has a more positive value than the voltage representing zero, inactive or false. Normally used in industrial and commercial control switching systems for safety reasons.
- 39. read frame:** The transfer of data from a STIM to an NCAP.
- 40. sensor:** A transducer which converts a physical, biological, or chemical parameter into an electrical signal.
- 41. setup time:** The time between the initial request for a function to be performed and when the task is actually initiated. See also update time.
- 42. signal conditioning:** Sensor signal processing involving operations such as amplification, compensation, filtering, and normalization.
- 43. smart actuator:** An actuator version of a smart transducer.
- 44. smart sensor:** A sensor version of a smart transducer.
- 45. smart transducer:** A transducer that provides functions beyond those necessary for generating a correct representation of a sensed or controlled quantity. This functionality typically simplifies the integration of the transducer into applications in a networked environment.
- 46. Smart Transducer Interface Module (STIM):** A module that contains the TEDS, logic to implement the transducer interface, the transducer(s) and any signal conversion or signal conditioning. This standard expressly requires that no operating mode of the STIM ever permit these components to be physically separated. They may however be separated during manufacturing and repair.
- 47. transducer:** A device converting energy from one domain into another. The device may either be a sensor or an actuator.
- 48. Transducer Electronic Data Sheet (TEDS):** A data sheet describing a transducer stored in some form of electrically readable memory.
- 49. Transducer Independent Interface (TII):** The digital interface used to connect a STIM to an NCAP.
- 50. transducer interface:** The physical connection by which a transducer communicates with the control or data systems that it is a member of, including the

physical connector, the signal wires used and the rules by which information is passed across the connection.

51. transfer: The act or process of moving a block of information from one digital device to another.

52. trigger: A signal to start an action. As defined in IEEE P51.2 a trigger is a signal from the NCAP serving as a command to the STIM for an action to occur.

53. trigger cycle: A complete cycle comprising the assertion of the trigger signal by the NCAP followed by the acknowledgment by the STIM.

54. virtual channel: A channel which behaves as a transducer from the point of view of the NCAP even though nothing outside of the STIM is sensed or changed. Virtual channels are useful for setting or reading operating parameters of other channels.