



Before Sensory can begin any failure analysis process, we require that the customer provide us with the necessary tools and information to observe, diagnose and offer solutions to the reported failure. The following is a **minimum** list of required items, including but not limited to:

1. Complete Description of the Failure

- a. The observed symptom or symptoms of failure
Example: High current
- b. The conditions under which the failure occurs
Example: High current in sleep mode
- c. The measured degree or magnitude of the failure
Example: Sleep mode current is 100uA but should be only 20uA
- d. The total number and percentage of units experiencing this failure, and the total number of units NOT experiencing this failure
Example: 5000 units built, 100 units with this failure (2%)
- e. The methods used by the customer to detect this failure
Example: High current measured by customer's test fixture
- f. The corrective action (if any) taken by the customer to correct (or tried to correct) for this failure
Example: Replaced defective parts on 50 units and failure is no longer present
- g. Any additional descriptions or information that may be helpful in understanding the failure

NOTE: If multiple failure types are experienced, each must be reported separately, including separate breakdown of failure description, failure percentage, etc.

2. Samples to Demonstrate and Diagnose the Failure

- a. At least 3 pieces of the Sensory part or parts that demonstrate this failure. A minimum of 3 pieces is required, but more are better and may be needed for successful failure analysis.
- b. At least 3 pieces of the Sensory part or parts that work correctly. A minimum of 3 pieces is required, but more are better and may be needed for successful failure analysis.
- c. At least 2 non-working sample application units (customer's product) that demonstrates the failure. If Sensory die parts are used, it is strongly preferred that the die be exposed and not covered with any sealant. It is OK to temporarily cover them with something for protection during shipping to Sensory. If Sensory must strip back an epoxy "gob top" to expose the die, there is risk of destroying the sample. It is vital that Sensory be able to examine and if necessary physically probe the die to diagnose the failure. A minimum of 2 units is required, but more are better and may be needed for successful failure analysis.
- d. At least 1 working sample unit to be used as a control group for comparison. A minimum of 1 unit is required, but more are better and may be needed for successful failure analysis.
- e. Any additional items that may be helpful in diagnosing and understanding the failure. Examples may include bare un-stuffed PCBs, instructions for using working sample units, adapters for North American AC outlets, etc.

NOTE: If multiple failure types are experienced, then samples of each must be supplied.

3. Additional Information and Resources

- a. Full source code for all processors and DSP components, parts and units. If full source code cannot be provided due to proprietary or trade secrets contained within, then the customer must provide as much source code as possible and whatever is sent must include any and all sections that are related to the reported failure.
- b. Complete schematics for all units
- c. Complete PCB layout files (gerbers) for all boards
- d. Die bonding layouts for all Sensory parts used
- e. The Sensory lot numbers for all parts used in manufacture, both working and non-working, and a description of from which lot each failure came from. The lot number can be found on the shipping bags for die parts and on the top of the devices themselves for packaged parts.
- f. Detailed descriptions, including data sheets, of any other system components that the Sensory parts interface with, and detailed descriptions of the interface and communication protocols, conditions and timing.
- g. If any customer test fixtures were used to test or qualify the Sensory parts and the failures of concern occurred in that context, then a working sample test jig or fixture will be required, plus detailed instructions on how to use it, plus schematics for the test fixture.
- h. The name and contact information of someone at the customer's business who will act as liaison between the Sensory failure analysis team and the customer's design and manufacturing teams
- i. Any additional items that may be helpful in diagnosing and understanding the failure
Examples may include data sheets and manufacturer information of oscillators, speakers, microphones, etc used, especially if they relate directly to the reported failure

NOTE: If multiple failure types are experienced, then the above list of tools and information for each must be supplied. If the PCB, schematics, test fixtures, etc. are identical, then another set need not be sent, but anything in the list that is unique between the multiple failures should be supplied.

The Interactive Speech™ Product Line

The Interactive Speech line of ICs and software was developed to "bring life to products" through advanced speech recognition and audio technology. The Interactive Speech Product Line was designed for consumer telephony products and cost-sensitive consumer electronic applications such as home electronics, personal security, and personal communication. The product line includes award-winning RSC series general-purpose microcontrollers and tools, SC series of speech microcontrollers, plus a line of easy-to-implement chips that can be pin-configured or controlled by an external host microcontroller. Sensory's software technologies run on a variety of microcontrollers and DSPs.

RSC Microcontrollers and Tools

The RSC product line contains low-cost 8-bit speech-optimized microcontrollers designed for use in consumer electronics. All members of the RSC family are fully integrated and include A/D, pre-amplifier, D/A, ROM, and RAM circuitry. The RSC family can perform a full range of speech/audio functions including speech recognition, speaker verification, speech and music synthesis, and voice record/playback. The family is supported by a complete suite of evaluation tools and development kits.



SVC Microcontrollers and Tools

The SVC product line combines text-dependent speaker verification password biometrics with low-cost 8-bit microcontrollers designed for use in consumer electronics. All members of the SVC family are fully integrated for speech applications and include A/D, pre-amplifier, D/A, ROM, and RAM circuitry. The SVC family performs noise robust speaker verification password security functions and speech synthesis. The family is supported by a complete suite of evaluation tools and development kits.

SC Microcontrollers and Tools

The SC-6x product line feature the highest quality speech synthesis ICs at the lowest data rate in the industry. The line includes a 12.32 MIPS processor for high-quality low data-rate speech compression and MIDI music synthesis, with plenty of power left over for other processor and control functions. Members of the SC-6x line can store as much as 37 minutes of speech on chip and include as much as 64 I/O pins for external interfacing. Integrating this broad range of features onto a single chip enables developers to create products with high quality, long duration speech at very competitive price points.

Application Specific Standard Products (ASSPs)

Voice Direct™ II provides inexpensive speaker-dependent speech recognition and speech synthesis. This easy-to-use, pin-configurable chip requires no custom programming and can recognize up to 15 words in 4 pin-programmable modes. Ideal for speaker-dependent command and control of household consumer products, Voice Direct™ II is part of a complete product line that includes the IC, module, and Voice Direct™ II Speech Recognition Kit.



Voice Extreme™ simplifies the creation of fully custom speech-enabled products by offering developers the capability of programming the chip in a high-level C-like language. Program code, speech data, and even record and playback information can be stored on a single off-chip Flash memory. Based on Sensory's RSC-364 speech processor, Voice Extreme includes a highly efficient on-chip code interpreter, and is supported by a comprehensive suite of low-cost development tools.



Software and Technology

Voice Activation™ micro footprint software provides advanced speech technology on a variety of microcontroller and DSP platforms. A flexible design with a broad range of technologies allows manufacturers to easily integrate speech functionality into consumer electronic products.

Fluent Speech™ small footprint software recognizes up to 50,000 words; offers Animated Speech with the ability to automate enunciation and articulation; performs text-to-speech synthesis in either male or female voices; provides noise and echo cancellation, performs word spotting for natural language usage; offers telephone barge-in; and provides continuous digit recognition.



Important notices

Reasonable efforts have been made to verify the accuracy of information contained herein, however no guarantee can be made of accuracy or applicability. Sensory reserves the right to change any specification or description contained herein.



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