

## I. Introduction

This document is a checklist of the steps involved in creating mask-programmed ICs by Sensory. It is intended to guide developers, especially first-timers who may be unfamiliar with the process, through the steps involved in creating a new mask-programmed part.

It is very important that these steps be done in a timely order to avoid delays in releasing the product to the market.

## II. Sensory ROM Mask Team

The Sensory ROM Mask Team is responsible for creating custom ICs for our customers. The team includes the following members:

- A. Sales Admin – Oversees the entire process and is the main liaison between Sensory and the Customer,
- B. Project Manager – Manages the development cycle jointly with the customer's internal project manager.
- C. Review Engineer – Handles the pre-production review of the customer's design.
- D. Mask Engineer – Processes the customer's binary file, sends counter code back to the customer (ROM masks only).

## III. ROM Mask Release Program Flow

The following is a list of the steps involved in creating custom Sensory ICs.

**Step 1:** 1-2 weeks before masking, the customer must notify the Sensory Sales Admin, Sensory Project Manager and Sensory Mask Engineer of their intention to create a mask-programmed part.

The customer should also provide the following pre-production review ("R2 Review") items to the Sensory Review Engineer:

- Design schematics,
- PCB gerber files (if available),
- Microphone data sheet,
- Mechanical drawing showing how microphone and speakers are mounted,
- 1<sup>st</sup> article or sample of the product,
- Program source code (if full source code cannot be released, then release as much as possible including all sections that relate to voice recognition and program interrupts.)

The review process is fully described in section VII of the Sensory design guide 80-0073 (Speech Recognition Hardware Design). **Please note: only the Sensory VP of Sales can waive this R2 review requirements.** The Sensory Project Manager will contact the end customer to confirm that the product has been internally tested and approved by the customer's QC team.

**Step 2:** If requested, the Sensory Mask Engineer will provide to the customer a unique Sensory part number for the customer to use when ordering mask-programmed ICs. This number can be written in section D-1.

**Step 3:** When the code is ready for masking, the customer must send Sensory the following items:

- The final binary code file(s). NOTE: Only binary files can be accepted. They can and should be zipped or otherwise compressed to reduce the chance of corruption during transmission.
- A completed and signed Sensory ROM Mask Release Form (see section IV),
- A Masking Purchase Order (PO) which should include the Sensory Part # (optionally assigned to the Customer in Step 2),
- A Parts Purchase Order, which should include the Sensory Part # (optionally assigned to the Customer in Step 2).

The items should be sent to the Sensory Sales Admin and Mask Engineer. It is better to send the items to more than one member of the team at Sensory in case one of the members is out of the office that day. If you are unsure who to send the items to, please contact Sensory at one of the following numbers: (408) 625-3330 or (408) 625-3301 or (408) 625-3302

(NOTE: The Mask PO and the Parts PO may be combined into one PO. The last 3 items can be scanned and sent as email attachments to the Sensory Sales Admin, or faxed to Sensory at +1 (408) 625-3350.)

(NOTE: If you are a new customer please contact [accounting@sensoryinc.com](mailto:accounting@sensoryinc.com) to establish and/or confirm payment terms. If this is not done in a timely manner your order may be delayed.)

**Step 4:** The Sensory Mask Engineer will add "fixup" byte(s) and return a Counter Code back to the customer to test and verify.

(NOTE: If the customer has not requested a unique Sensory part number for the custom chips in step 2, then the part number will be provided at this time.)

**Step 5:** Customer must test the Counter Code in their prototype hardware and confirm that it is working 100% correctly. This step is important because the Counter Code is what will be masked into the ICs, not the original customer code. If there are any problems that arise as a result of added fixup byte, this is the last opportunity to find and correct them.

**Step 6:** Once the Counter Code is verified by the Customer, the Customer must give the Sensory Sales Admin the go-ahead (via email) to proceed with masking. The ROM Mask will NOT be started until we receive the final counter code approval from the customer. After the Counter Code verification is received, the Customer will be notified of the estimated ship out date.

## IV.ROM Mask Software Checklist Instructions

Below is a brief description of the fields on the forms.

### A. Customer Information

1. **Company Name** - Enter the name of the company here.
2. **Project Name** - Enter the name of the development project, including major and minor revisions if desired.
3. **Management Contact** - Enter the name and phone number of the contact person in case Sensory has questions regarding billing, Pos and scheduling.
4. **Technical Contact** - Enter the name and phone number of the contact person in case Sensory has technical questions.

### B. Part Information

1. **IC and Package** - Enter the type of IC and, if desired, the package type. Not all packages are available for each part type, but bare die is available for all part types. Refer to the following table for package availability:

Part Type	Available In
RSC-464	Die, LQFP64
RSC-4128	Die, LQFP100

### C. Software Checklist

1. **Binary File Submitted** – Enter the name and checksum of the file submitted for mask/pass production. The CRC32 checksum can be calculated by the program SensoryCheck.exe, which is available for download from the Downloads page of Sensory's website.
2. **Software Tools Version Used** – The developer should use the latest version of the development tools for all new projects. The latest publicly released version for the RSC-4x series is available at Sensory's website. Please check with Sensory tech support ([techsupport@sensoryinc.com](mailto:techsupport@sensoryinc.com)) for information on the most up-to-date version software.
3. **Confirm Reserved Locations are unused** - Certain memory locations are reserved by the ROM masking process and should not be used by the developer. For RSC ROM masks, the reserved address is used as a code checksum and will be overwritten during the mask process.

Part Type	Reserved Locations and Locations Modified
RSC-464	A. The byte at 0xFFFF is changed to insure the 8-bit checksum of the entire file is 0x00.
RSC-4128	A. The byte at 0x1FFFF is changed to 0x00. B. the byte at 0xFFFF is changed to insure the 8-bit checksum of the entire file is 0x00

**NOTE:** the Sensory development tools (FluentChip) are all aware of the reserved locations and automatically keep the necessary locations unused.

4. **Confirm Sensory R2 Design Review** - Sensory offers a free design review service for virtually any product that incorporates the RSC4x microprocessor. The purpose of an R2 review is to thoroughly examine one or more completed pre-production units prior to mass production. This is a one-time, thoroughly extensive review of the product. **Please note: only the Sensory VP of Sales can waive this R2 review requirement.**

## Sensory RSC-464/4128 ROM Mask-Program Release Form

### A. Customer Information

1.	Company Name:			
2.	Project Name:			
3.	Management Contact:		Phone:	
4.	Technical Contact:		Phone:	

### B. Part Information

1.	Choose 1 IC & Package:	RSC-464		RSC-4128	
		Die	LQFP64	Die	LQFP100

### C. Software Checklist

1.	Binary File Submitted:		Checksum:	
2.	Software Tools Version Used (FC, QT2SI, QS4, Phytion):			
3.	Confirm Reserved Locations Are Unused: (RSC-464 = 0xFFFF, RSC-4128 = 0xFFFF, 0x1FFFF):			
4.	Confirm Sensory Design Review Performed:			

### D. Sensory Part Number

1.	Sensory Part Number (assigned by Sensory)	<b>65-</b> _____
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### E. Software Acceptance Agreement

Sensory, Inc (Sensory) and \_\_\_\_\_ (Company) agree to begin masking a custom ROM on a Sensory IC for use in Company products, under the following mutually agreeable conditions:

- Company has fully reviewed and tested a working prototype with the program file named above in section C-1 on (date)\_\_\_\_\_.
- Company hereby acknowledges and agrees that Software has been tested and is accepted by Company,
  - In its Entirety,
  - As Final,
  - As Complete,
  - And Without Exception Whatsoever.
- Company assumes all further responsibility for Software including the operation of the software in its product application.
- Sensory shall be responsible for assuring that Software is accurately transferred to masked ROM on all IC's ordered by Company.
- Company accepts full responsibility for IC's ordered with masked ROM containing Software and understands that no returns or cancellations shall be accepted.
- Company agrees and will accept that yield fluctuations may cause fluctuations in delivery quantities of +/- 10% on all custom masked parts.

\_\_\_\_\_  
Authorized Signature for Company

\_\_\_\_\_  
Authorized Signature for Sensory

\_\_\_\_\_  
Date

\_\_\_\_\_  
Date

#### Instructions:

- Sign and date. FAX back to Sensory at +1 (408) 625-3350 for immediate processing.
- Mail hard copy back to: Sensory Inc, 575 N. Pastoria Ave, Sunnyvale, CA 94085

## The Interactive Speech™ Product Line

Sensory's **Interactive Speech™** product line makes consumer electronics more intelligent by enabling them to talk and hear with speech synthesis, voice recognition, and other advanced audio and interactive technologies. It is designed for integration into cost-sensitive consumer electronic applications such as home electronics, smart toys, music players and personal communication devices. The hardware line includes the award-winning RSC-4x family of mixed signal processors, the *VR Stamp™* 40-pin DIP module, and the SC-691 music and speech synthesis slave processor. Embedded software options include our *FluentSoft™* Recognizer, which enables speech recognition on non-Sensory processors and DSPs. Sensory's *BlueGenie™* Voice User Interface, the first Voice Recognition and Synthesis option for Bluetooth enabled devices, offers user friendly control of headsets, music players and other BT devices requiring hands-free operation.

### **RSC Microcontrollers and Tools**

The RSC product family contains low-cost 8-bit speech-optimized microcontrollers that are fully integrated and include A/D, pre-amplifier, D/A, RAM, and ROM circuitry. With Sensory's *FluentChip™* firmware, the RSC family offers speech recognition, speaker verification, speech and music synthesis, voice recording and playback, and an entire suite of interactive robotic and sonic networking technologies. The family is supported by a complete suite of evaluation and development toolkits that include the ability to quickly create speaker independent recognition sets in many languages.

### **Speech Recognition Modules and Tools**

The *VR Stamp™* is a complete speech recognition module based on the RSC-4x and is ideal for fast design and easy production. A low-noise audio channel and standardized 40-pin DIP footprint allow rapid prototyping, less debugging, and shorter time to market. The *VR Stamp Toolkit* includes everything needed to get started today, including *VR Stamps*, *Module Programming Board*, sample applications, and a complete set of development tools featuring the *Phyton IDE* and limited-life *C compiler*, *QuickSynthesis™ 4* and *Quick T2SI-Lite™* speech tools.

### **SC6 Slave Processor and Tools**

The SC-691 is a standard slave synthesizer that accepts compressed speech data from other microprocessors or microcontrollers and converts it to speech. The chip operates up to 12.32 MIPS, and provides high-quality, low data-rate speech compression and MIDI music synthesis, with unlimited speech duration using external memory. Sensory offers hardware and software tools for analyzing speech files, editing speech data and generating coded speech.

### **FluentSoft™ Recognizer**

The *FluentSoft™* Recognizer is the engine powering the *FluentSoft™* SDK. It provides a noise-robust, large-vocabulary, speaker-independent solution with continuous digit recognition and word-spotting capabilities. This small-footprint software recognizes thousands of words and runs on non-Sensory processors including Intel XScale, TI OMAP, and ARM9, and supports operating systems such as MS Windows, Linux, and Symbian.

### **BlueGenie™ Voice User Interface**

The *BlueGenie* Voice Interface software suite runs on CSR's BC-5 MM Kalimba DSP, and enables manufacturers of Bluetooth products to integrate full voice control and synthetic speech output without the need for visual displays or complex user interfacing. It frees designers to pack functionality onto small form factor Bluetooth devices and answers consumer demand for a truly hands-free experience.

#### **Important notices:**

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#### **Safety Policy:**

Sensory, Inc. products are not designed for use in any systems where malfunction of a Sensory, Inc. product can reasonably be expected to result in a personal injury, including but not limited to life support appliances and devices. Sensory, Inc. customers using or selling Sensory Incorporated products for use in such applications do so at their own risk and agree to fully indemnify Sensory, Inc. for any damages resulting from such improper use or sale.



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