

The Interactive Speech™ line of ICs are developed to “bring life to products” through advanced speech recognition and audio technologies. These chips are designed for cost-sensitive consumer electronic applications such as telephony products, home electronics, toys, and personal security devices. The product line includes:

## RSC-4X SPEECH RECOGNITION PROCESSORS

The **RSC-4x** chips are the world’s most advanced speech processors, and are designed to add sophisticated audio technologies to cost-sensitive embedded and consumer products. Based on an 8-bit microcontroller, the **RSC-4x** integrates speech-optimized digital and analog processing blocks into a single chip solution capable of accurate speech recognition as well as high quality, low data-rate compressed audio playback.

The **RSC-4x** supports **Sensory Speech™ 7 Technologies**, which includes advanced algorithms that add features and increase accuracy, especially in noisy environments. In addition to improved recognition performance, the **RSC-4x** builds on previous **RSC** chips by adding twin-DMA units, a vector accelerator, hardware multiplier, additional timers, and additional RAM. Powerful application code development tools, a C-compiler, and push-button speech compression tools are available, as well as **Quick T2SI™**, Sensory’s revolutionary text-based Speaker Independent Recognition Development Tool.

## SVC FAMILY OF VOICE BIOMETRIC CONTROLLERS

The **SVC/SVC-64** family combines new text-dependent speaker verification technology with an 8-bit microcontroller specifically for password biometric security in consumer electronic products. The **SVC/SVC-64** is a single chip solution that combines the flexibility of a microcontroller with Sensory’s new **Voice Lock™** Technology. The **Voice Lock™** Technology suite includes new noise-robust speaker verification technology and speech synthesis.

The **SVC/SVC-64** line provides further on-chip integration of features including: microphone pre-amplifier, analog-to-digital and digital-to-analog converters, RAM, 16 general-purpose I/O lines, a 4-MIPS dedicated processor and optional 64KBytes on-chip ROM (SVC-64).

## SC-6X SERIES LONG-DURATION SPEECH PROCESSORS

The **SC-6x** series is intended for high-quality, low-cost long-duration audio playback applications. These fully programmable, 12 MIP, 16-bit DSPs provide long battery life and offer snappy button and keyboard response.

Sensory **SC-6x** ICs employ three key speech technologies - **CX**, **MX**, and **LPC** - that produce natural sounding speech while using relatively small amounts of memory. Polyphonic music output is also supported, and can be played back simultaneously with a vocal track. Features include three low-power modes, configurable I/O, two timer interrupts, one DAC interrupt and five general-purpose interrupts.

## ASSPs

**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 programming language. Program code, speech data, and even record and playback information can be stored on a single off-chip Flash memory. Voice Extreme includes a highly efficient on-chip code interpreter, and is supported by a powerful low-cost (\$129) development tool, the *Voice Extreme Toolkit*.

**Voice Direct™ II** is the chip behind the *Voice Direct II Speech Recognition Kit*, which offers hobbyists the ability to test speaker dependent speech recognition concepts quickly and inexpensively. The *VDII SRK* costs \$49.95, and is available through online electronics distributors such as Digi-Key.

## RSC-3x SERIES SPEECH RECOGNITION PROCESSORS

The **RSC-3x series** is a family of single-chip solutions that combine the flexibility of a fully programmable, general-purpose microcontroller with **Sensory Speech™ 6** technologies. Each chip features high-quality speech recognition, speech and music synthesis, speaker verification, and voice record and playback.

The **RSC-3x series** provides a high level of on-chip integration of features, including a microphone preamplifier, hardware multiplier, 2 independent timers, and 2.5 Kbytes of RAM. A complete system may be built by adding only a battery, speaker, microphone, and a few resistors and capacitors. The ROM-less **RSC-300** is designed for applications that need more external memory than the 64K of on-chip ROM provided with the **RSC-364**.

### SUMMARY TABLE

	RSC-4x		SVC Family		SC-6x					ASSPs		RSC-3x	
	4128		SVC	SVC-64	601	604	605	614	691	Voice Direct II	Voice Extreme	300	364
<b>Core</b>	8-bit CPU		8-bit CPU	8-bit CPU	16-bit DSP	16-bit DSP	16-bit DSP	16-bit DSP	16-bit DSP	8-bit CPU	8-bit CPU	8-bit CPU	8-bit CPU
<b>Additional Memory Req'd</b>	No		Yes	No	No	No	No	No	Yes, plus CPU	2MB Flash	2MB Flash	Yes	No
<b>External Memory Bus</b>	Yes <sup>(6)</sup>		Yes	Yes	No	No	No	Yes	Via host CPU	Flash	Flash	Yes	Yes
<b>Maskable ROM</b>	128 KB		0	64 KB	192 KB	64 KB	288 KB	64 KB	0 <sup>(4)</sup>	0	64KB <sup>(1)</sup>	0	64 KB
<b>Speech Duration, max</b>	4 min		Unlimited (off-chip)	40 sec	24 min	6.5 min	37 min	6.5 min	Unlimited (off-chip)	40 sec	100 sec (ext. flash)	Unlimited (off-chip)	50 sec
<b>RAM</b>	4.8 KB		2.5 KB	2.5 KB	1.36KB	1.36KB	1.36KB	1.36KB	0 <sup>(4)</sup>	2.5 KB	2.5 KB <sup>(2)</sup>	2.5 KB	2.5 KB
<b>I/O</b>	24		16	16	32	16	32	64 <sup>(5)</sup>	0	0	14 <sup>(3)</sup>	16	16
<b>Tech. Library</b>	Sensory Speech™ 7		Voice Lock™		CX, MX, ADPCM & Music					Sensory Speech™ 6		Sensory Speech™ 6	
<b>Key Technologies<sup>(7)</sup></b>	SI, SD, CL, SV MultiWord SI/SD WS SX SS 4-Channel Music Wake-up on Audio		SV SD WS CL		CX/MX/ADPCM Speech Synthesis 10-Channel Music + Vocals					SD CL WS		SI, SD, CL, SV SD WS SS 4-Channel Music	
<b>SI Words On-chip</b>	140		0	opt	N/A					0	350 (ext. flash)	0	60
<b>SD/SV Words On-chip</b>			6 SV	6 SV	N/A					60 (ext. flash)	1900 (ext. flash)	6	6
<b>Packages</b>	LQFP-48, die		TQFP-64, die	TQFP-64, die	LQFP-100, die	LQFP-64, die	LQFP-100, die	LQFP-100, die	LQFP-64, die	TQFP-64, die	TQFP-64, die	TQFP-64, die	TQFP-64, die
<b>100k die Price</b>	<\$2.50		<\$1.25		<\$2.00					<\$1.50		<\$1.50	

#### Notes:

- (1) The internal ROM is used to store the C Language Interpreter, speech technology firmware, and memory driver. Voice Extreme uses an external 2 Mb Flash to store code and data.
- (2) The internal RAM is used in part by the C Language Interpreter and the technology library.
- (3) The serial port uses 3 of the 14 I/O lines. Once the external flash has been programmed, these I/Os are available.
- (4) The SC-691 is a slave chip with 4/8-bit parallel interface.
- (5) I/O lines on the SC-614 devices can be configured as I/O, address or data lines.
- (6) External memory bus is only available on the die version.
- (7) SD (speaker dependent), SI (speaker independent), SV (speaker verification), WS (word spotting), CL (continuous listening), SS (speech synthesis)

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