



FaxEngine™

Design Flexibility Speeds System Introduction for the Widest Range of Fax Machines

Conexant offers the industry's largest selection of fax engines. A FaxEngine, which combines a fax controller and fax modem, provides the center of a complete standalone fax solution. For decades Conexant has led facsimile technology migration, enabling OEMs to quickly bring to market fax-ready products with an optimized balance of features and price.

Today, Conexant's expertise in data communications and its unique capabilities in system integration allow OEMs to support a broad range of applications in a variety of markets, from high-performance office products to low-cost consumer appliances. Recognizing that a major challenge for OEMs is to develop products with an optimal balance between enhanced features and cost, Conexant provides a wide range of FaxEngine solutions permitting OEMs flexibility in features while maintaining production efficiencies.

Conexant has committed to a strong product roadmap that aggressively addresses the importance of fax communications and the market drivers — a growing SOHO segment, increasing popularity of telecommuting and inkjet printing capability.



Distinguishing Features

- G3 fax support with speeds up to 14,400 bps
- More than 75 fax-ready solutions to optimize OEM flexibility
- CCD or CIS scanners support
- Thermal and inkjet print engine support
- Error diffusion or dither table support in halftone modes (up to 64 levels of gray scale)
- Special video processing

FaxEngine

imaging

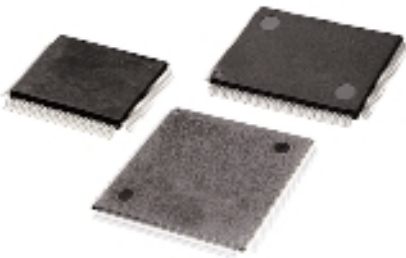
| Device Set Number | Description | Marketing Abbreviation | Single-Chip FaxEngine | Integrated Analog Device | Full-Duplex Speakerphone | DTAM Support |
|-------------------|---|------------------------|-----------------------|--------------------------|--------------------------|--------------|
| DSFE-L400-011 | 9,600 Single-Chip FaxEngine | SCE109 | CXD9450-25 | 20415-11 (one) | No | No |
| DSFE-L400-001 | 9,600 Single-Chip FaxEngine with DTAM | SCE109-V | CXD9450-24 | 20415-11 (one) | No | Yes |
| DSFE-L400-021 | 9,600 Single-Chip FaxEngine with DTAM and Speakerphone Support | SCE109-VS | CXD9450-23 | 20415-11 (two) | Yes | Yes |
| DSFE-L410-001 | 14,400 Single-Chip FaxEngine | SCE114 | CXD9450-15 | 20415-11 (one) | No | No |
| DSFE-L410-011 | 14,400 Single-Chip FaxEngine with DTAM | SCE114-V | CXD9450-14 | 20415-11 (one) | No | Yes |
| DSFE-L410-021 | 14,400 Single-Chip FaxEngine with DTAM and Speakerphone Support | SCE114-VS | CXD9450-13 | 20415-11 (two) | Yes | Yes |

FE100/200 eXtended FaxEngine Device Set

Every FaxEngine packs a complete fax solution in a compact two-device set. Rockwell's FE100/200 FaxEngine adds error diffusion, dark level correction (DLC), and flash memory support to create a new family of comprehensive fax communication products. Plus, the FE100/200 FaxEngine supports a variety of optional advanced features, including digital answering machine, automatic speech recognition (ASR) and full-duplex speakerphone. The FE100/200 is backward compatible with Conexant's popular XFE FaxEngine device set. The pin-to-pin and software compatibility within the XFE and FE100/200 FaxEngine families offers easy and quick upgrades for higher performance and feature flexibility.

Single-Chip FaxEngine (SCE100)

Conexant's newest and most advanced FaxEngine solution offers all of the features and performance of the FE100/200 product line with the addition of many cost-saving features, such as low power mode and power-on detection circuitry. These new capabilities and enhancements along with the integration of the fax controller and modem into one chip continue to push the envelope for highly integrated, low-cost FaxEngine solutions.



The FaxEngine controller performs all common facsimile machine control, monitor and interface functions. Additionally, it contains scanner, printer, keyboard, stepper motor and line interfaces. These programmable functions support a wide range of peripherals including inkjet and thermal transfer plain paper print engines.

FM209 and FM214 MONOFAX® Modem

Conexant's MONOFAX modem family offers the most voice and speech features integrated into a single fax modem device available for OEMs today. Plus, this MONOFAX family is the first to offer ASR in fax modems for applications addressing a range of markets. The ASR technology demonstrates high speech-recognition accuracy, as well as a flexible vocabulary for menu functions. The software can be customized for individual OEM requirements.

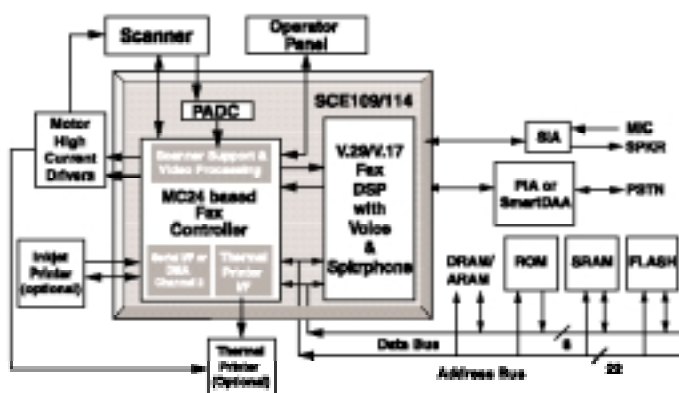
What is a Fax Engine?

Fax technology is diverging into two separate classes of devices: multifunction peripherals (MFPs) and fax phones. MFPs are fax-enabled products that are connected to a host PC, while fax phones are the traditional standalone fax machines. As fax technology improves, features and capabilities that were once found only on high-end and mid-volume machines are migrating downward. Multiple features including speakerphone, answering machine, Caller ID, cordless phones and Automatic Speech Recognition will become a part of every standalone fax machine — evolving into the fax phone. And the fax phone is here to stay.

Despite all the various new document-messaging methods — email, Internet, intranets — market research confirms that the fax machine remains the key communications tool in Fortune 500 and mid-size companies. The standalone fax machine continues to be extremely popular because of reliability, familiarity and ease of use, universal compatibility and speed in delivering information and generating responses.

Within a standalone fax machine, Conexant offers a complete system solution referred to as the FaxEngine™ — including a fax controller and a fax modem. The fax controller acts as the “brain” managing and directing the appropriate processing for fax, copy, print and scan activities. Fax modems are similar to data modems in structure, but implement different algorithms to optimize performance, and are governed by different ITU standards. Conventional fax modems support ITU V.27ter, V.29 and V.17. In addition, fax modems support ITU standard V.21 Ch2 for standard G3 fax handshaking (connections) as well as the tone generation required to complete the handshake.

SCE109/114 System Block Diagram



FE100/200 system block diagram

Product Features

FE100/200 eXtended FaxEngine

Microprocessor and Bus Interface

- **Enhanced MC24 central processing unit**
 - (CPU) up to 10 MHz CPU clock speed — Memory efficient input/output bit manipulation — 8-bit data/24 bit address bus

External Bus

- Address, data, control, status, interrupt, and decoded chip select signals support connection to external ROM, external RAM, and optional peripheral devices

Chip Selects

- ROMCSn for ROM support
- CS0n for SRAM
- MCSn for modem
- Optional general purpose: CS1n, CS2n, CS3n, CS4n and CS5n

DRAM Controllor

- Supports external page and voice memory—battery backup refresh with separate battery power

DMA Controller

- Six dedicated internal DMA channels for scanner, printer, and T.4/T.6 access of internal and/or external memory

RAM: 12 MB

External ROM: 3 MB

- **Interrupt controller**
- **Flash memory controller supports 2 MB flash memories, Samsung NAND-type flash memory, and Toshiba NAND-type flash memory with internal synchronous serial port T.4/T.6 compression and decompression in hardware**

MH/MR for FC100/200

MH/MR/MMR for FC100/200-M

Motor control for scanner and printer

- **Four outputs to external current drivers for the scanner motor and four for the printer motor**
- **Motor outputs can be programmed as general purpose outputs (GPO) for application with a single motor or plain paper machines**

Scanner and video control

CCD and CIS scanners supported

- **Six programmable control signals:**
 - Four programmable scanner control signals
 - Two video output control signals support external signal preprocessing

B4/A4 scanner support

5 ms minimum line time

Line lengths to 2,048 pixels

- Internal 8-bit pipeline A/D converter, clamp, sample and hold and automatic gain circuits are provided internally, A/D reference inputs available for control by external circuits

Video processing per single pixel

- Eight pixel shading correction

- Dark level correction for 27 segments — two-dimensional error diffusion image
- Processing (FE200 and FE200-M only) — two-dimensional edge enhancement
- Up to 8x8 programmable dither table

- **Image data processing port allows access to scan data prior to video processing**

Multilevel B4 to A4 size reduction

Programmable Resolution Conversion (-M only) applicable either to printer or to scanner path

- **Programmable 2-dimensional bi-level resolution conversion provides expansion to 200% and reduction to 33%**

Vertical line ORing

Scanner output bit order reversal thermal printer interface

1 to 4 programmable strobe signals

Traditional printers and latchless "split mode" printers

Line lengths to 4,096 pixels

A/D converter monitors printer head temperature

Fax and voice modem features

- Non-voice and voice versions
- 9.6 Kbps and 14.4 Kbps fax capability
- DTAM and speakerphone support
- ASR version will be available
- 9.6 Kbps or 14.4 Kbps integrated fax modem

- Caller-ID detection (Type I and Type II)
- External PIA, XIA and regular DAA are used
- SmartDAA use is optional

- **Packaging: 176-pin TQFP (SCE109/114)**

Single-Chip FaxEngine (SCE109/114)

- **Added features and improvements over FE100/200:**

- 3.3V CPU
- Integrated modem DSP
- Pads with programmable slew rate and driving capability for EMI reduction
- Optical scan resolution up to 400 dpi
- Improved AGC gain (12 dB) and fixed Vref
- On-chip reset and power-down detection
- Sleep/standby low-power consumption mode
- Wake up on incoming call or key pad activity

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What's next in communications technologies