

## Mixed Signal Integration



Incorporated in 1997, Mixed Signal Integration specializes in analogue and mixed-signal integrated circuits.

MSI offers both standard products and custom ASICs in CMOS technologies. Consumer audio and video, wireless personal communications, automatic test equipment and medical are some of the markets where MSI enjoys excellent customer relationships.

A corporate commitment to continued research and development has allowed MSI to innovate in the areas of low noise, low distortion audio; high frequency filtering and low voltage operation. These breakthroughs are featured in the company's standard products and are available for implementation into custom designs. MSI is particularly strong in integrated circuit filter design, both switched capacitor and integrated RC active filters. MSI works in conjunction with select wafer foundries and assembly vendors to offer its customers a broad choice of processes and packages.

### The Standard IC Product Range

IC Part Number	Description	Application
MSFIPS	FIPS-140 Level 4+ Security Supervisor - 4 physical tamper switch inputs, temperature sensor	POS, Storage security, Cryptography
MSLSA	Low Power Spectrum Analyzer - 2mA @ 5V, 1/6th octave-wide 6 band - can be cascaded	Vibration, Audio, Ultrasonic Analysis
MSSCSA	Single Chip Spectrum Analyzer - 6mA @ 5V, 1/6th octave-wide 6 band - can be cascaded	Vibration, Audio, Ultrasonic Analysis
MSTHDA	Total Harmonic Distortion Analyzer - 1/6th octave-wide, five 6 pole BP filters	RFID Readers, ultrasonic analysis
MSCBT	Communications Baseband Transceiver - 50 x CTCSS Squelch tones filtered, BW 3kHz	LMR, FRS, GMRS, LPRS, Intercom
MSCPSI	Controller Programmable Sensor Interface - CMOS Hybrid processing sensor or MEMs	MEMS, Accelerometer, Pressure
MSSPSI	Smart Programmable Sensor Interface - offset adjust, low power and temperature sensor	MEMS, Accelerometer, Pressure
MSRFIF	RF Interface Front End (RFID) - 50Hz to 7MHz - Powered by RF energy from the reader	Access Cards/ Inventory control
MSVL14	14 MHz Video Lowpass Filter - 4th-order video LP Butterworth response filter	Video filter, Radar
MSLOSC	15 Hz to 64 kHz All Silicon Sine Source - low distortion (0.1%), sine wave (0dB to -63dB)	Test Equipment
MSLFS	Selectable Low Voltage Lowpass/Bandpass Filter - six filter types in one package, variable gain	Spectrum Analyser, Telecom/Datacom
MSEPAF	Electrically Programmable Active Filter - 500kHz to 18 MHz with one external component	Instrumentation filtering
MSHN1-6	Selectable Highpass/Notch Filter - 6 filter types in one package, adjustable gain	Tracking filters, Datacom/telecom
MS2LFS	Dual Selectable Low Voltage Lowpass/Bandpass Filter - 6 filter types in one package	Spectrum Analyser, Telecom/Datacom
MSRAAF	Resistor Programmable Active Audio Filter - LP, BP, HP, allpass or notch filter - up to 20kHz	Spectrum Analyser, Telecom/Datacom
MSNBLP	Switched Capacitor Butterworth Lowpass Filter - Max corner frequency of 20 kHz	Two way radio, Datacom/Telecom
MSCAHF	Selectable High Frequency Active LP/BP Filter - 4 pole RC active filter, center freq of 1MHz to 5MHz	Two way radio, HDTV, Cellular Phone
MSGEQ5A	Five Band Graphic Equalizer Display Filter - 100Hz, 330 Hz, 1kHz, 3.3kHz and 10kHz	Spectrum Analyser, Audio Stereos
MSGEQ7	Seven Band Graphic Equalizer Display Filter - 63Hz, 160Hz, 400Hz, 1kHz, 2.5kHz, 6.25kHz & 16kHz	Spectrum Analyser, Audio Stereos
MSDET	Tone Detector - Center Freq of 1Hz to 100kHz, 2mW @ 2.7V	Satellite radio, Caller ID, FSK demod
MSHFS1-6	Selectable High Frequency LP/BP Filter - six filter types in one package, adjustable gain	Tracking filters, Datacom/telecom
MSFS1-6	Selectable Lowpass/Bandpass Filter - six filter types in one package, adjustable gain	Tracking filters, Datacom/telecom
MSU1F1-4, MSU2F1	Resistor Programmable Universal Active Filter - LP, HP, Elliptic, allpass or notch filter using ext resistors	Instrumentation filtering
MSU1HF1-4, MSU2HF1	High Frequency Resistor Programmable Universal Active Filter - Switched Capacitor Technology	Instrumentation filtering
MSELP	Switched Capacitor Elliptic Lowpass Filter - Max corner Freq is 20kHz	Two way Radio, Telecoms/Datacoms
MSLE/B/C5L/M	Switched Capacitor General Purpose Lowpass Filter - Elliptic, Butterworth or Chabyshev	MEMS, Accelerometer, Pressure

**Custom IC Products**



Engineers working for Mixed Signal Integration have successfully completed more than 100 custom integrated circuit designs. Each designer is an experienced veteran in both analog and mixed signal CMOS technologies. Customers for MSI's designs have included military, medical, consumer, computer and industrial companies. MSI engineers have also developed ICs for major semiconductor companies.

MSI's designers provide the knowledge to integrate analog and mixed signal functions. We offer several key design capabilities. First, low voltage operation, down to as low as 1.2V supply. This is well suited for battery powered portable applications. Second, switched capacitor and active filters including high frequency filtering, with center frequencies as high as 10 MHz. Finally, low noise, low distortion audio in CMOS. Signal to noise ratios (S/N) of 85 dB can be achieved as well as noise levels of -90 dBV.

MSI has system expertise in such diverse areas as camcorders, cellular phones, automatic test equipment, audio systems, hearing aids, sonar and sonobuoys, two way radios and battery management. Among the functional blocks that MSI engineers are fluent with are phase lock loops, limiters, references, serial port interfaces, companders, digital to analog converters, analog to digital converters, op amps, comparators, automatic gain controls, voltage controlled oscillators, and mixers. Mixed Signal Integration is especially well known for its command of both switched capacitor and integrated RC active filters.

Remember that system designs using off the shelf components can be expensive to manufacture and readily copied. Integrating your design will reduce production costs, increase performance, and protect your research and development from competitors. It can also increase the reliability of your system, decrease the board space required, alleviate inventory costs, and cut down on power consumption and heat dissipation. Often alignment and tuning routines can be eliminated by using a custom IC design.

Mixed Signal Integration is especially skilled in chip partitioning and system integration. Our engineers can work with you to suggest other portions of your system for integration. This leads to a better payoff for your custom chip development. Mixed Signal Integration can also show you the optimum cost and performance tradeoffs. We will recommend the correct technology for your project, which can often lead to a higher level of integration.

Mixed Signal Integration provides a turn-key ASIC solution. In addition to design and development of the ASIC, MSI manufactures the production volume parts for its customers. This includes foundry, packaging and testing of the ASICs prior to shipment.

**Broadband Technology 2000 Ltd  
Product Areas**

<p><b>Semiconductors</b></p> <ul style="list-style-type: none"> <li>• VoIP DSP's</li> <li>• Ethernet NPU &amp; NPA</li> <li>• Mixed Signal IC's</li> <li>• Clock &amp; Timing / XO</li> <li>• PCI/PCIE</li> <li>• Powerline Communications</li> <li>• RF Interface</li> <li>• Mixed Signal Active Filter</li> </ul>	<p><b>Wireless/M2M</b></p> <ul style="list-style-type: none"> <li>• Antennae</li> <li>• GSM, GPRS &amp; 3G Modems</li> <li>• 3G Routers</li> <li>• 3G &amp; GPRS Gateways</li> <li>• 4G/LTE</li> <li>• GPS Tracking Units</li> <li>• RF Cables</li> <li>• Connectors</li> </ul>	<p><b>Sensors</b></p> <ul style="list-style-type: none"> <li>• MEMS Accelerometers</li> <li>• MEMS Magnetic Sensors</li> <li>• MEMS Gyroscopes</li> <li>• MEMS Pressure Sensors</li> </ul> <p><b>RF Microwave</b></p> <ul style="list-style-type: none"> <li>• Amplifiers</li> <li>• Attenuators</li> <li>• Switches</li> </ul>	<p><b>Power</b></p> <ul style="list-style-type: none"> <li>• Super Capacitors</li> <li>• Ultra Capacitors</li> <li>• Power Modules</li> <li>• Solid State Batteries</li> <li>• Energy Harvesting</li> </ul> <p><b>Interconnect</b></p> <ul style="list-style-type: none"> <li>• Magnetics</li> <li>• Cable Assembly</li> <li>• Connectors</li> </ul>	<p><b>Systems</b></p> <ul style="list-style-type: none"> <li>• Ethernet NPU &amp; NPA</li> </ul> <p><b>Internet of Things</b></p> <ul style="list-style-type: none"> <li>• Powerline Communications</li> <li>- Narrow &amp; Broadband</li> <li>• Quad ARM Core Dev Board</li> </ul>
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