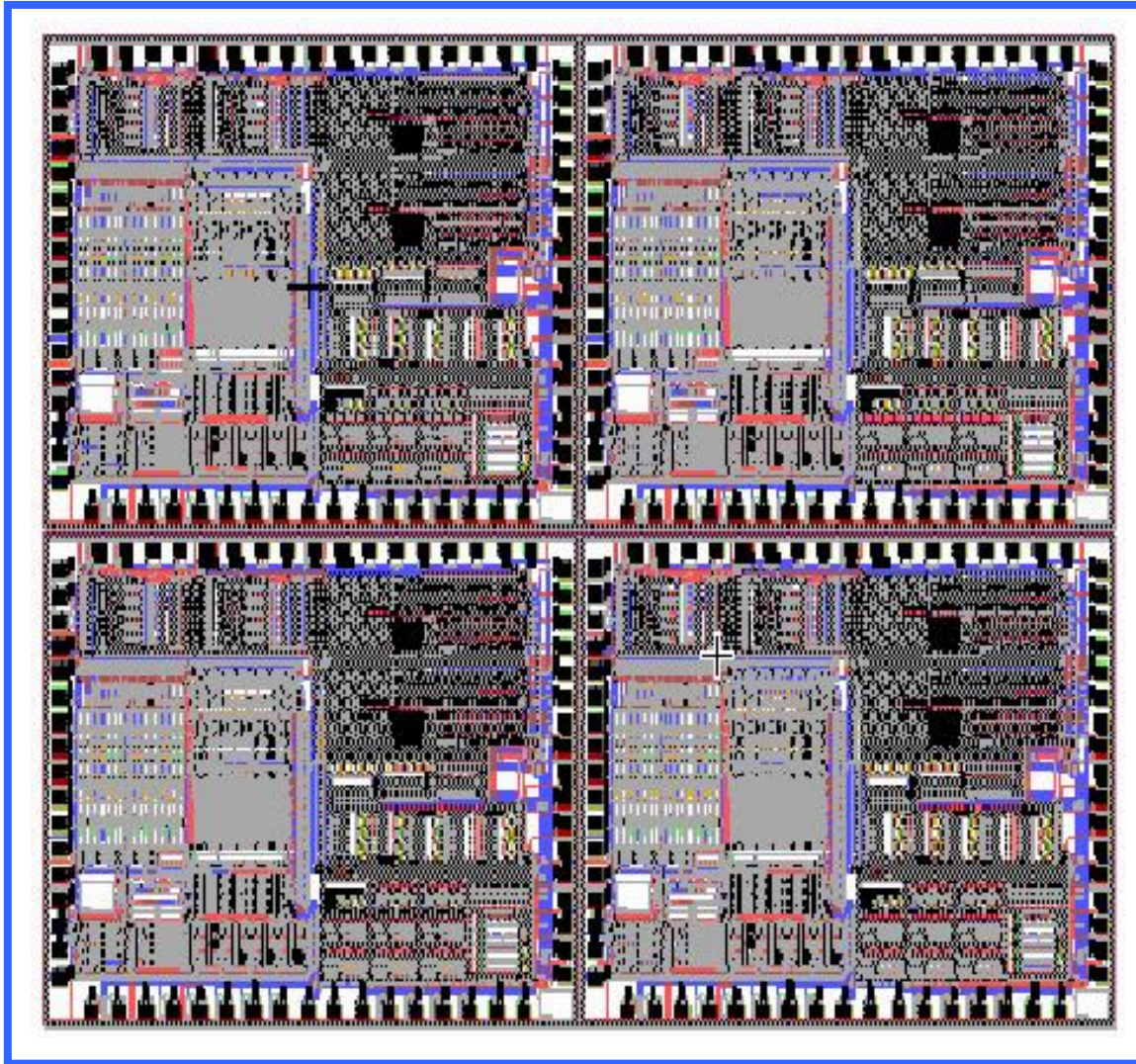


The SPG Analog and Mixed Signal Fastchip™ Chip – A  
cost effective, low volume analog and mixed signal custom  
chip technique



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## Introduction:

There is a perceived need in the industry to design and develop analog and mixed signal custom semiconductor devices at low risk and a lower cost.

The SPG FastChip™ technique is one method to address the issues of low volume, cost, risk and time.

The FastChip™ is a way to develop custom analog devices at a relatively low cost and relatively quickly ( 8 – 10 weeks) and still preserve, to a large extent, the advantages of a full custom device.

## The FastChip™:

The FastChip is a pre-designed, empty piece of silicon, that has four ( quad) empty spaces into which a user can place a selected set of pre-designed and tested functional blocks and interconnect them to each other to realize a functional custom analog / mixed signal device.

The functional blocks are selected from a restricted set. The silicon space inside the quads is limited so that only a certain number of functional blocks can be used. If more space is required another one of the quads can be used. Therefore each quad can be used to design a custom chip with a relatively few functional blocks. However, this is not a great disadvantage, since analog / mixed signal chips are usually small in size (in general).

The value of this architecture is, that it allows quick layout of the chip and is very cost effective which *includes cost of layout, fabrication and packaging*. Only 25 packaged devices are delivered. More devices may be made available ( up to 200) if necessary with an added charge.

## Procedure:

The user specifies a design, draws a schematic, either by hand or with a schematic capture software package. The user sends the drawing to SPG by email, where it is digitized for mask making and sent to the fabrication facility. Within a few weeks the device is fabricated, packaged and sent back to the user. No testing is carried out by SPG under this basic service. Testing may be done, if specified by the customer, for an added charge

Variants of this technique are also available. First if the space taken up by the circuit is larger than available on one quad, then two, or three or four quads may be used. Cost scales linearly with area. The second variant, is if the user needs a functional block that is

not part of the primitive set supplied by SPG ; SPG can develop a new functional block which is specific to the particular user. The user can then use this block in his/her design. Cost and time increases proportionately. (However, before going to this extent, the user should contact SPG and ask if their required block is already available as new blocks are being developed all the time.)

## Advantages:

There are a number of advantages to be gained from such a technique. First these chips can be designed relatively quickly and at low cost. They can be used to reduce risk on larger designs by first testing out parts of the design before the final design is completed or they can be used in multi-chip modules as is. Time to delivery is very reasonable. SPG quotes 8 – 10 weeks from receipt of schematic to finished packaged parts in the users hands.

SPG provides *free consulting* by ‘phone, email, or internet conference on demand so that the risks on the project can be eliminated for the user.

## Its not for everyone:

We need to mention that the FastChip™ is not really meant to be used for every type of analog / mixed signal chip design. It is simply a vehicle to get cost effective designs done quickly with a *somewhat* restricted set of primitives at a low volume and a low price.

## Note:

New primitives are being added every day. The technology for the FastChip™ is the 0.35um/0.8um CMOS mixed signal technology. The maximum voltage of operation varies from 1.8V to 50V depending on option chosen.).

## Basic performance parameters of the technology:

<u>Parameter</u>	<u>Description</u>	<u>Typical</u>	<u>Units</u>
Frequency of operation	Frequency of a ring oscillator or a frequency at which gain is appreciable for a device	1.5 - 75	Ghz ( max)
Voltage of operation	Supply voltage	1.2 - 50	Volts
Currents	Currents obtainable	1.0 – 2.0	Amps ( maximum)
Accuracies	Without trimming of any kind	12 equivalent	Bits

Please call or email for detailed performance levels if needed.

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## Partial list of primitive functional blocks:

Power – ON Reset circuit.	2uA current source	10uA current source
Two stage differential amp.	Single stage GM amp	Output buffer
1.2V band-gap reference	Crystal Oscillator	Phase frequency detector
Analog switches	PNP Bipolars	Low frequency VCO
High frequency VCO	Frequency doubler	3 types of EE memory
Resistors	Capacitors	Voltage regulators
Filters	ZENER diodes	Digital gates/macros
Dual mod dividers	Analog to digital converters	Digital to analog converter
PLL	Charge pumps	LC Oscillators
RAM	ROM	EEPROM

## Expert help:

Expert help from SPG is available to guide users through the process of implementing their FastChip™.

Please call Signal Processing Group Inc (**1 – 866- 487 - 1119**) or email [spg@signalpro.biz](mailto:spg@signalpro.biz) to get started, or for help, technical support or any other questions.