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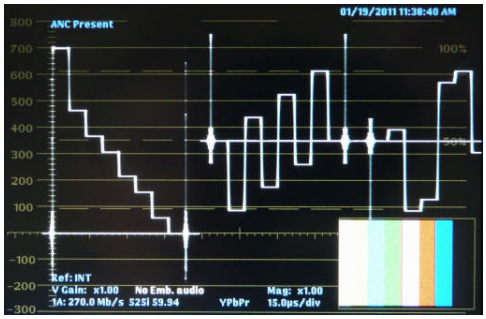
Designers and Manufacturers of Products for Audio, Video, Imaging and Multimedia applications.

SingMai Electronics bring years of experience and design innovation to bear on the creation of a range of products for Audio, Video, Imaging and Multimedia applications.

Standalone Products

Our new range of video and audio standalone products include a standard and high definition video pattern generator/video encoder with noise generator and caption generator, an audio test generator, an RIAA phono pre-amplifier and a video input processor for analogue video sources with a special mode for recovery of bandwidth from VCR tape sources.



Intellectual Property Cores

Video IP cores currently available include broadcast quality NTSC and PAL video decoders and encoders, video pattern generators, video character generators, video noise reduction, histogram equalisation and median filtering.
Device Independent IP cores.
Available as Xilinx FPGA netlist, Altera encrypted netlist or source code Verilog, (RTL compliant).
3 year update guarantee.
6 month e-mail/telephone design in support.
Member of the SignOnce Alliance.

Daniel Ogilvie is company director and hardware architect. He has worked for companies in such diverse fields as university physics research support, high-end broadcast video, DVD recorder front end semiconductors, video decoder IC design and high volume consumer electronics in countries as diverse as Canada, USA, UK, Thailand and Singapore.
Daniel is a senior member of the IEEE and also has a Masters degree in Art History.

Phuttachad Thiencharoenwong is our managing director. She has been involved in the management and sales of a number of companies across the Far East and has run companies in industries as diverse as silver jewellery manufacture, civil engineering, electronic component distribution and catering.

William Wendin is our software consultant. William has extensive experience of real time embedded solutions for networking, telecommunications and audio and visual applications.
William's projects have involved standard and high definition MPEG decoders and encoders, AV decoders, digital television, cable modems and set-top boxes.

Standard Definition can be Higher Definition

Rumours of standard definition's demise are premature:

A large proportion of the population will not see the analogue broadcasting switch off for another decade.

Legacy requirements will be with us for some time to come.

95% of the installed base for security applications in China is for standard definition.

Transcription of analogue sources such as VCRs are usually lacking in quality yet more can be done.

There are new markets for standard definition such as mobile TV reception placing new demands on old components.

Video compression and large size progressive displays put additional demands on standard definition processing.

SD can offer high quality, less power hungry and much less expensive options to HD in a range of applications.

It is not that SingMai are stuck in the Dark Ages, we make HD products too, **but we also offer exemplary standard definition products 'with a twist' that might allow you to make a more affordable and higher quality solution to your customer.**

Not all comb filters are created equally

A comb filter utilises the phase relationship of the colour component of the NTSC/PAL video standards to remove cross-colour/cross-luma components and help restore the full luma bandwidth.

Usually a 2D line comb filter is used as this requires the least memory and most off the shelf video decoder ICs use this method.

However even the basic 2D comb filter can be improved on. The comb filter will not always be able to be used, for example it will fail on diagonal structures, and this has to be detected otherwise artifacts will be produced. Detection is usually done using luminance amplitude differences but that does not detect all instances; different colours with similar luma amplitudes will be undetected.

The SingMai comb filter uses both luma and chroma amplitudes to detect comb failures ensuring we not introduce artifacts into the decoded image.

The NTSC line comb filter uses the line above and below the pixel being combed, (3 line comb), but because of interlace these lines are actually 4 lines apart. For PAL the problem is worse as the PAL line by line phase shift means a 5 line comb is used.

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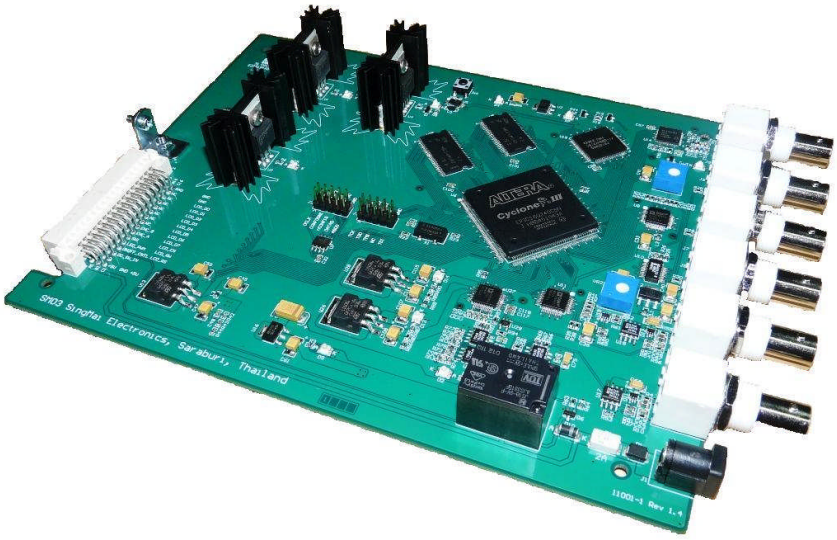
SM03 Video Input Processor



SM03 accepts all analogue video input standards, (e.g. NTSC/PAL/SECAM), which it decodes, noise reduces and frame synchronises to component SDI and YPbPr outputs.

SM03 utilises proprietary algorithms to provide a virtually artifact free output, essential for the display of standard definition video on large screen displays or for subsequent video compression. In both of these cases artifacts remaining from conventional decoding use valuable compression bandwidth or detrimentally affect the performance of the display's de-interlacers and scalers.

A proprietary decoder algorithm also allows the extraction of 'hidden' bandwidth from all VCR recordings allowing for better transcription of these recordings to higher quality media.

2 CVBS inputs.
12-bit analogue to digital converter.
Simultaneous notch/line/field/frame comb filters; (see panel left).
3D luma noise reduction integrated into comb filter.
Stable lock to all unstable and/or noisy inputs.
Full frame synchroniser for stable, jitter free outputs.
SDI and YPbPr outputs.
3 year guarantee.

SM02 HD Video encoder and Pattern Generator

The SM02 offers all of the features of the SM01 encoder and video pattern generator whilst also support HD component analogue outputs and HD-SDI inputs and outputs, (1.485Gb).

In addition to the new standards and patterns the SM02 provides a bull's-eye zone plate which is programmable in frequency, an audio tone generator for embedding onto the (HD)-SDI output and an auxiliary data pattern generator.

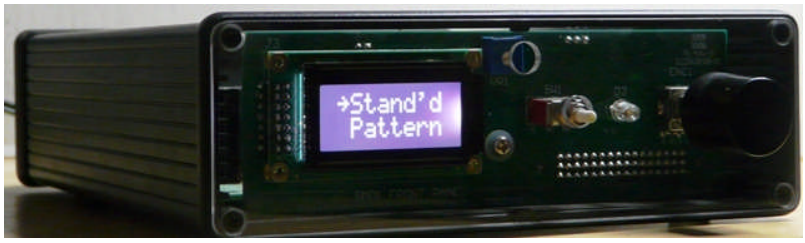
Planned Products

Two further SM series products are in the design phase.

PT50 is a phono, (moving coil, moving magnet), pre-amplifier which features programmable equalisation curves to match the various 78 and 33 rpm manufacturers. A battery powered discrete front end design ensure the lowest possible noise levels and clarity.

PT54 is an audio test generator which provides both analogue and (HD)-SDI outputs. Audio test waveforms may also be embedded into the SDI and HD-SDI input.

SM01 Video Encoder and Pattern Generator



SM01 accepts SDI video inputs which it encodes to very high quality composite (PAL/NTSC/PAL-M and PAL-N), component (Y,Pb,Pr) and SDI outputs with programmable gains and timing. Additionally it includes a video pattern generator with 38 programmable line based patterns. Both the pattern generator and SDI input may have noise and/or captions added to them.
SM01 is a compact unit supplied with a universal input power supply, intuitive control interface and quality construction which allows us to offer it with a 3 year parts and labour guarantee.
Inputs: SDI: BNC - SMPTE259M (525/625 line auto select)
Outputs: CVBS: BNC - PAL-I, PAL-B/G, NTSC-M/J, PAL-M, PAL-N : Component: BNC - Y,Pb,Pr : SDI: BNC - SMPTE259M
Patterns available include:
75%/100%/SMPTE Colour bars
Black/White/50% grey flat fields
75%/100% Red fields
2T, 20T and Pulse bar
CCIR17/18/330 and 331
FCC Comp and FCC MB
N7C MBF and N7C MPF
Ramp
Multiburst
Sweep
10 step linearity
Pathological (SDI test)
Gamut
Bowtie
Sinx/x
Noise: Programmable amplitude 50/60Hz hum (analogue output only), sparkle and white noise.
Captions: Two sizes, which may be scrolled horizontally or vertically.

Not all comb filters are created equally

(….continued from Page 3)

The SingMai PAL line comb uses the same 3 line aperture as the NTSC line comb which means the comb can operate more of the time.
Most video decoders offering 3D comb filters only provide a symmetrical frame tap. This means the apertures are very wide temporally, especially so for PAL which needs a 2 frame interval tap, again because of the 90deg line based phase shift.
The SingMai PAL frame comb uses a novel comb architecture, similar to the line comb, to use a single frame tap, reducing the time interval and meaning the frame comb can operate for longer when there is motion.
Additionally, instead of dropping from frame comb to line comb when there is motion, we offer an interim field comb tap which is closer still in time. Each of the 3D comb filters are asymmetric which means there is no need for a compensating audio delay.
Other comb filter features are reduced chroma bandwidth in the notch mode which helps reduce cross colour effects and individual assessment of each comb failure including the notch filter so the best comb mode and the image with the least artifacts is chosen at all times.

PT5 Video Decoder IP core

Multi-standard high quality analogue video decoder IP core with sample rate converter and 2D/3D comb filter.

Fixed frequency 27MHz input, compatible with IF demodulators or multi-video, single ADC inputs.

Flexible input clocking modes adaptable to various front end architectures.

Robust sync detection and sample rate converter ensures stable lock with unstable or noisy sources.

Sophisticated 2D/3D comb filter (see panel left).

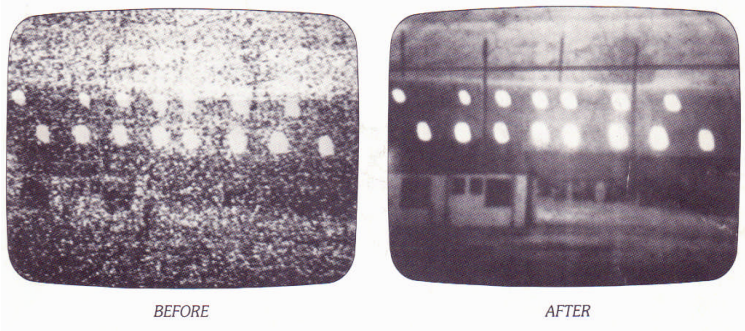
12-bit data paths.

3D motion adaptive luma noise reduction built into comb filter.

BT656 output

Small footprint for low power and cost.

PT12 Video Noise Reduction IP core



BT656 input and output.

Motion adaptive recursive noise reducer.

Requires a single frame of memory.

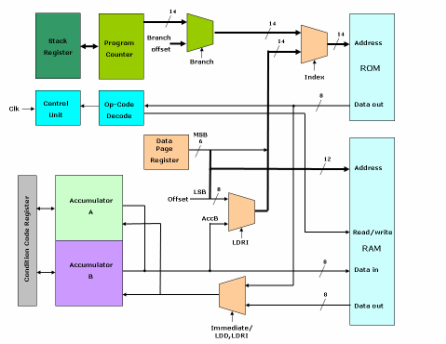
10-bit processing.

Separate chroma and luma processing.

Auto mode using measured noise figure.

PT13

Many applications would benefit from a small degree of local ‘intelligence’ and PT13 is designed for that very function. Whilst most available microprocessor IP cores require external FLASH memory and even external data memory, PT13 is optimized to be completely embedded and use as little FPGA resources as possible allowing it to fit it 'memory-less' CPLDs and small FPGAs or even permit multiple instances in the same FPGA.



PT10

PT10 performs real time histogram calculation of the grey levels of an image in addition to the calculation of the histogram equalisation look-up table for performing real time contrast enhancement of the image. The equalisation may also be restricted to a user defined area of the image.

PT11

PT11 is a 3x3 median filter, useful for the reduction of impulse noise, (salt and pepper noise), or for masking missing pixels in an image.

PT2 Video character Generator IP core

PT2 provides a 60x32, (30 character for 525 line), video character/text overlay.
PT2 is ideal for displaying subtitles or closed captions, time code, user menus, status or error information and channel identifiers.
PT2 is pre-programmed with 112 characters including 0-9, A-Z, a-z and various punctuation marks and symbols and has 16 user programmable characters. Each character has a 12x16 pixel size and is shaped using a raised cosine filter to comply with the system bandwidth requirements..
PT2 accepts a compliant BT656 video stream, (both 625 and 525 standards), and its associated 27MHz clock and it produces a BT656 output with the overlay. The user can choose to have a background to the characters which is programmable in colour; the luminance level of the character is also programmable.

PT6 Video Pattern Generator IP core

The PT6 IP core provides a 525 or 625 line BT656, 10-bit, line based pattern. The core is priced separately so the user may choose which of the 38 available patterns he wishes to use. He may choose either a single pattern or the full suite or anything in-between. In addition the core can be programmed to accept non-standard clock frequencies and custom patterns are also available. The patterns may be multiplexed on a line basis, (e.g. SMPTE bars), or on a frame basis, (e.g. field bounce).

HD-CVI

A high definition analogue transport system designed for long distance transmission of HD over existing infrastructure.

Method for transporting high definition video over existing cable infrastructure.

Expected distances in excess of 500m using RG-59 cable.

'Graceful' degradation of signal quality over distance. (No abrupt digital cut off).

Backward compatible to NTSC/PAL transmission, (same connector).

Helper video insertion test signals, (for automatic equalisation).

Bi-directional data, (during vertical interval), allowing remote control of camera.

Low BOM implementation, (similar to existing NTSC/PAL front/back ends).

60MHz luminance bandwidth, 15 MHz chrominance, (modulated on subcarrier).

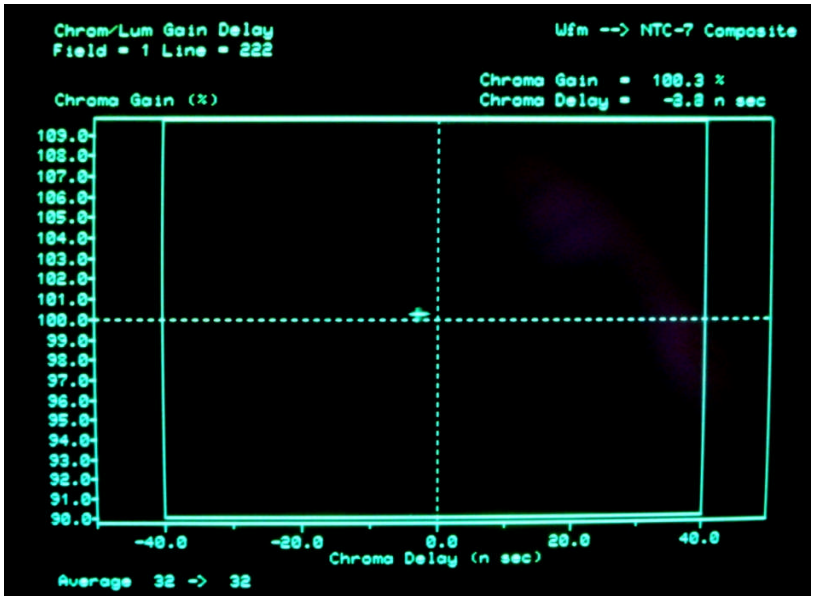
Audio carrier for stereo audio transmission.

PT8/9 Video Encoders IP core

PT8/9 are multi-standard Video encoders supporting PAL-M/N/B/D/G/H/I and NTSC-M/J as well as simultaneous component outputs, (PT9 only).

The intellectual property block accepts BT656 formatted data in either 8- or 10-bit format and the associated 27MHz clock or separate timing (H/V/F) and YCbCr at 13.5MHz/6.75MHz (PT9) which it encodes to a 10-bit, digital composite video signal at 27MHz whilst also providing simultaneous 10-bit YPbPr outputs, (also at 27MHz), which can be used to directly drive a digital to analogue converter, modulator or other output device.

PAL-M/N/B/D/G/H/I and NTSC-M/J outputs.
Broadcast quality video output: <1% DG and <1deg DP, <1% K-factor and <-65dB SNR.
Requires BT656 inputs or separate YCbCr and syncs.
Compatible with PT15 colour space converter for RGB inputs.
Fully programmable for non-standard inputs and outputs.
Outputs up-sampled to 27MHz straight binary digital composite/component video.
12 bit chroma modulator.
Pre-programmed register settings for PAL/NTSC.
Standard 8-bit control interface bus.
Unlimited use/unit license. Other license options available.
Control and status registers are written to and read from using a conventional 8-bit wide microprocessor interface.



Products Built to last

All of the SingMai SM-series products come with a 3 year parts and labour guarantee.
PCB manufacture, assembly and initial testing is subcontracted to ISO-9000 registered Glendale Electronics in Singapore.
Final testing and a 48 hour, full load soak test at elevated temperature is performed by SingMai Electronics on all products before they leave the factory.

SingMai's IP cores are provided with a 3 year update guarantee and 6 months design in support.

About SingMai

Established in September 2007.
SingMai (สิ่งใหม่) means 'new idea' in Thai.
6 fulltime employees and 1 consultant.
Registered office and R&D based in Saraburi, Thailand.
Manufacturing sub-contracted to Glendale Electronics in Singapore.
Working relationships with Osprey Technologies and Tangram Technologies.
Customers include Lockheed (US), Rhode and Schwarz (Germany), L3 (Canada), TeamCast (France), NewPort Media (US) and Scientronic (Taiwan).

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