

A Programmable Solution for Standard Video Compression

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Video Compression Algorithms

- **JPEG standard** for still images
- **MPEG standard** for movies and video
- **Px64 H.261 standard** for videophone and conferencing
- **Proprietary algorithms** for
 - backward compatibility
 - certain market segments (e.g. domestic phone lines)

Applications require multiple algorithms

- Video Conferencing requires
 - H.261 **standard** for compatible transmissions
 - **Proprietary** algorithm for backward compatibility
 - JPEG **standard** for still images
- Desktop Multimedia requires
 - H.261 **standard** for conferences over LAN or ISDN
 - MPEG **standard** for movie playback
 - JPEG **standard** for still images

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IIT Vision Processor Chip

World's First **Programmable** Video Signal Processor optimized
for DCT-based algorithms

Executes **H.261, MPEG, JPEG and Proprietary** standards

Programmability allows continual improvement in **image quality**

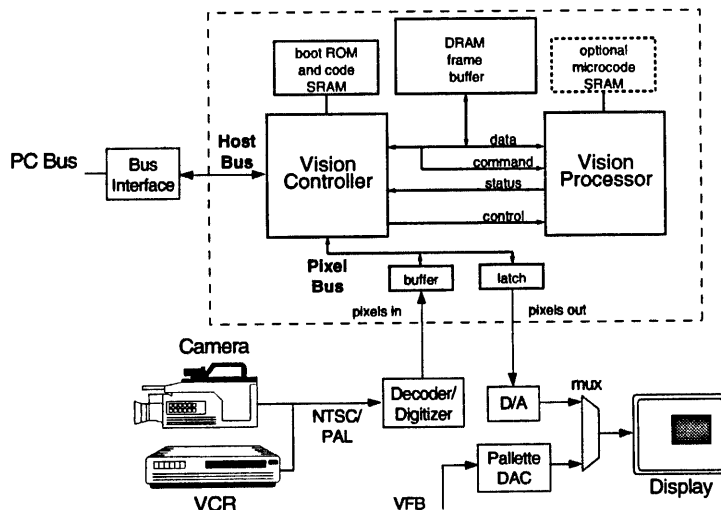
IIT Vision Controller Chip

Companion chip to Vision Processor enables complete Video Compression/Decompression subsystem

uncompressor (host)
compressor (D)
CONTROL DATA

- Clean interface to System through Pixel Bus and Host Bus
- Complete video I/O in RGB or YUV formats
- On-chip 'C' programmable RISC allows for customization
- Full-duplex operation for QCIF VideoPhone

PC MultiMedia (MPEG, JPEG, QCIF H.261)



Capabilities

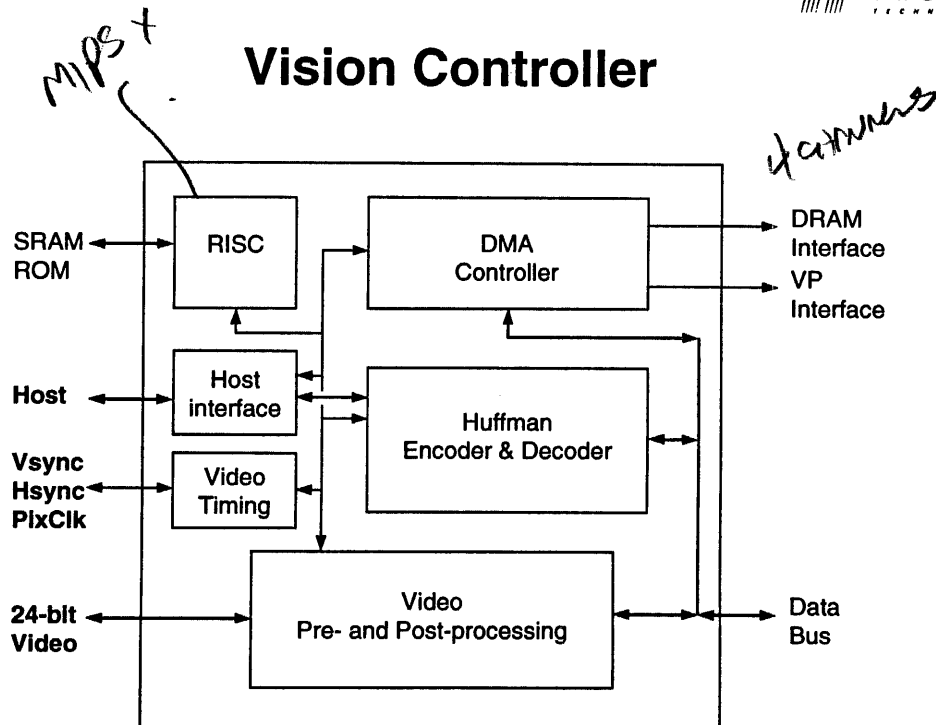
(one VC and one VP with memory)

*VP = 1M 2M512
VC 18M 3M512
~1W area cap*

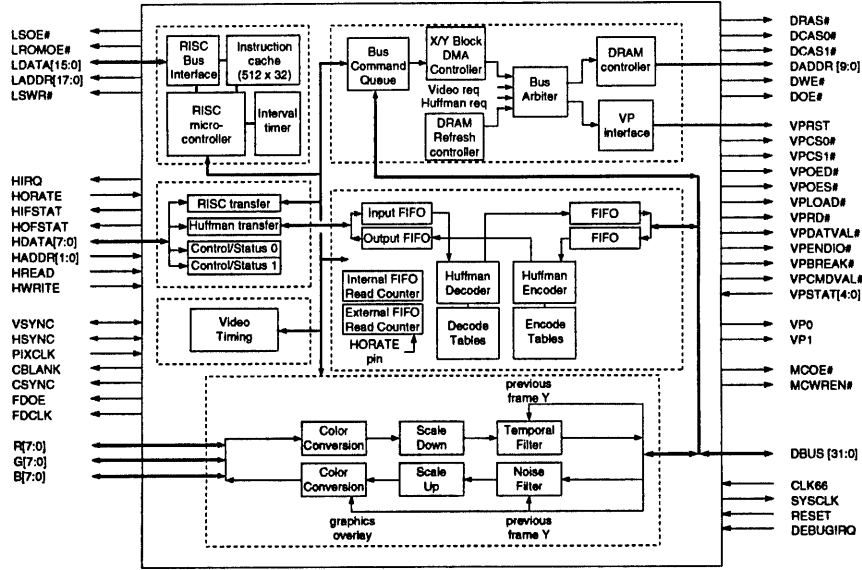
Algorithm	Resoln	Y Pixels	encd/decd	frame rt
H.261	QCIF	176x144	codec	30 fps
H.261	CIF	352x288	decode	30 fps
H.261	CIF	352x288	encode	15(30) fps
MPEG	SIF	352x240	decode	30 fps
MPEG	SIF	352x240	encode	up to 30 fps
JPEG	CIF	352x288	decode	30 fps
JPEG	CIF	352x288	encode	30 fps

*30 FPS WITH DEBRAND MORE
QUALITY & COMPRESSION*

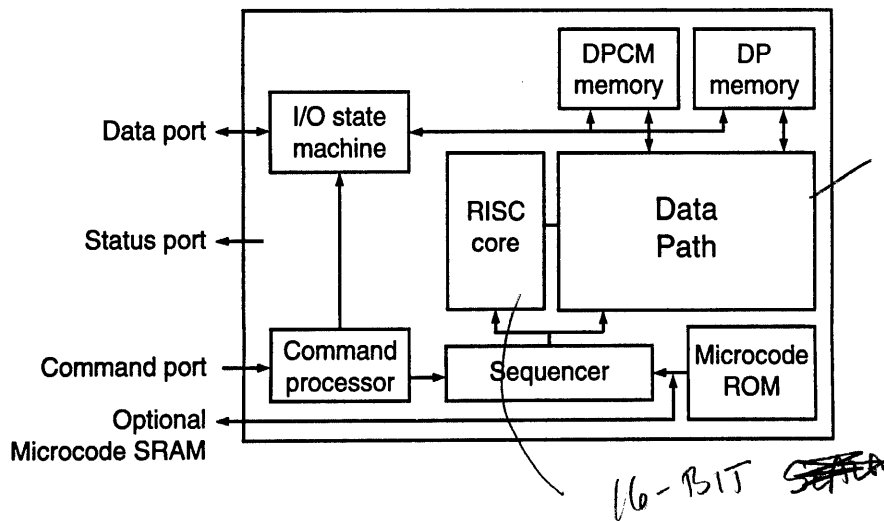
Vision Controller



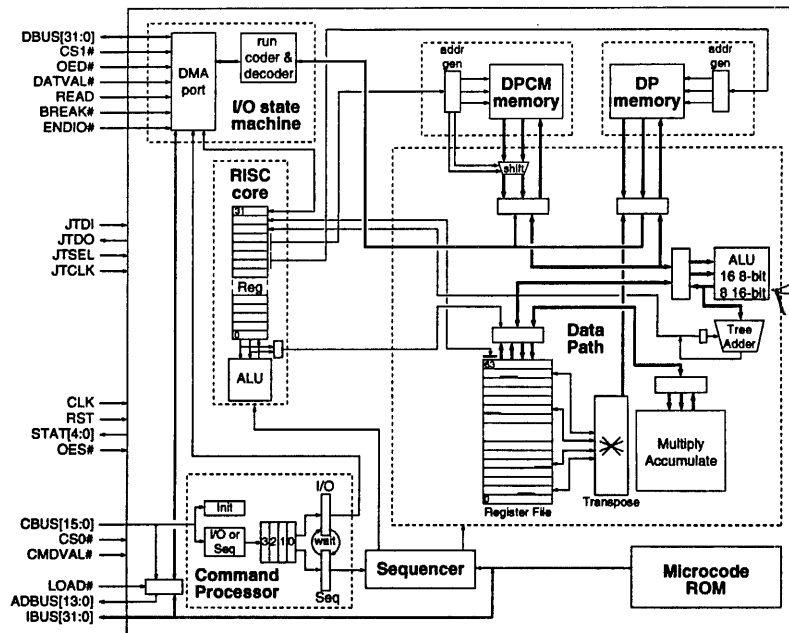
Vision Controller



Vision Processor



Vision Processor



*THAT USES 64 BITS
128 BUS WIDE
NO HARD-WIRED
PARAMETERS. FAST
MICROCODE CENTER
FOR FEASIBILITY*

Programming the VC and VP

1) Vision Control Interface (VCI)

- MPEG, Px64 and JPEG software supplied with all VC/VP chips

2) Customize VC I/O

- Handshaking, bitstream, screen sizes, etc.

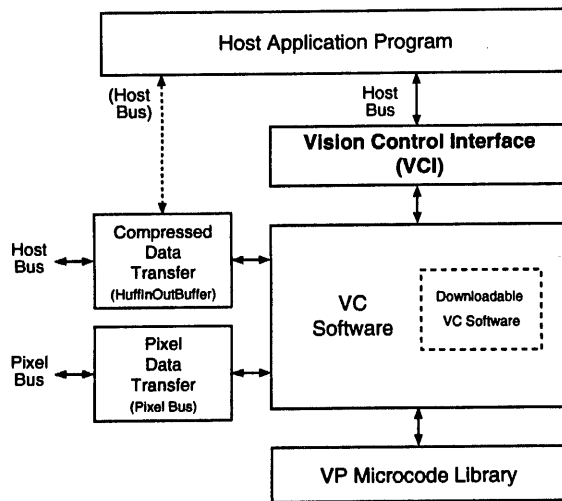
3) Customize VC Encode Strategy

- Encoding decisions and Rate Buffering improve image quality

4) Customize Algorithm

- Use VP microcode library to build custom Algorithm

Vision Control Interface (VCI)



- Video timing
- Video pre- and post-processing
- Compression algorithm and mode
- Compression ratio/data rate
- Buffer sizes
- Picture size and rate
- Test and Loop-back functions

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Future Directions

Higher speed chips provide

- **Larger screen sizes**
 - TV resolution
 - CCIR 601 resolution (MPEG II)
- **Higher integration**
 - System, audio and video processing
 - Data mux/demux and line interface
 - Video pre- and post-processing

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6.3.7

Conclusion

- Programmability is the key to
 - flexibility to execute MPEG, JPEG and H.261
 - best image quality
- The first products have been announced:
 - AT&T VideoPhone 2500
 - CLI Cameo Personal Video System
 - CLI Rembrandt II/VP Video Codec