

## TOWARD A FOCUSED MARKET

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A variety of potential markets for the CoMesh product.

### POTENTIAL TARGET MARKET APPLICATIONS

#### set-top boxes

- direct broadcast reception
- signal encoding and decoding
- multimedia integration
- internet transactions

#### home networking

- residential gateways
- broadband access
- protocol integration and update

#### wireless

- smart appliance communications
- device integration
- smart cell phones and 3G products
- pda integration
- mobile terminals
- multi-band, multi-mode, multi-protocol, multi-function

#### information transaction systems

- smart card readers
- inventory control
- medical access
- dynamic security

#### protocol and standards management

- multiple conflicting standards
- protocol complexity
- rapidly changing specifications

#### information systems management

- console switching
- networked storage and retrieval
- device integration

#### metropolitan area networks

- edge access to the internet backbone
- uncertainty wrt standards and protocols
- 34% CARG

digital TV and DVD  
price too high  
DVD is proof of concept  
many new support products  
(Tivo, plasma screens, digital cameras)  
security and encryption  
highly fluid standards  
mandatory bandwidth conservation using compression

real-time video  
DTV, set-top boxes, cable, satellite  
HDTV conversion  
video conferencing  
Web phones  
generic image processing using DSP algorithms

private networks  
virtual, tunneling across various networks  
\$30B in 2003  
data integrity  
security, authentication and privacy

## **SOME DETAIL ABOUT HOW OUR CHIPS MAY BE USED**

\* = BTC potential

### **Inside settop box**

Viterbi decoder\*  
reed/Solomon decoder\*  
descrambler ASIC\*  
mpeg2 decoder\*  
mpeg1 decoder\*  
Dolby\*  
screen display\* (NTSC decoder)  
video encoder  
RF modulator\*  
satellite QPSK demodulate\*  
cable 64QAM demodulate\*  
phone ADSL demodulate\* (modem codec)  
CPU

### **Inside DVD**

CD-DA decode\*  
cd-DA filter\*  
CDROM decode\*  
PLL and servo control\*  
MPEG2\*

- NTSC decode
- data control and error correct\*

Inside card reader

- 16-32bit uP
- ROM boot code
- security/encryption logic\*
- card reader interface\*
- keypad PIN reader\*
- LCD driver\*
- modem interface with cellular/wireless/radio\*

Inside real-time video

- image compression/decompression\* (MPEG2/MPEG4)
- discrete cosine transform\* (DCT)
- inverse discrete cosine transform\* (IDCT)
- color-space conversion\* (RGB <-> YCbCr)
- image rotation and scaling\*
- color/hue correction, gamma\*
- shadow enhancement and sharpening\*
- median filters, histograms\*
- contiguity analysis\*

Inside DTV

- cpu
- audio codec\*
- tuner, audio decoder\*
- NTSC decoder\*
- 1394 PHY home network\*
- QPSK satellite demodulate\*
- QAM cable demodulate\*
- descrambler\*
- MPEG2 decoder\*
- graphics controller\*
- color conversion and correction\*
- PCI bridge
- i/o control\*

Inside cellphone

- CPU (ARM)
- flash adapter\*
- DSP\*
- RF codec\*
- QPSK modulator
- Bluetooth interface
- HCI bridge\*
- LCD and key matrix interface\*
- voice codec\*

power management\*  
audio i/o controller\*  
security\*

## SOME PRODUCTS THAT USE OUR TECHNICAL CAPABILITIES

### appliances

washer  
dryer  
vacuum  
frig  
microwave  
air conditioner  
toaster  
TV

### consumer electronics

settop box  
HDTV  
direct broadcast receiver  
DVD  
pc  
videophone  
cable modem  
videogame  
digital audio  
pda

## HIGH VOLUME MARKET EXAMPLE REQUIRING LOW POWER, LOW COST

handheld lightweight battery-powered apps

### *smart card readers*

restaurants  
taxis  
buses  
online  
stores

### integrated into

PCs  
cash registers  
vending machines  
pay phones  
settop boxes  
ATMs

- mobile phones
- utility meters
- any authentication

for

- cashless transactions
- store bonuses
- access control
- medical records
- identity card
- driver's license

## UNORGANIZED LIST OF COMPONENT FUNCTIONALITIES WE CAN SERVICE

- wireless transceivers
- flash memory access
- remote diagnostics
- electronics testers
- serial ADC (analog-digital-converter) interface
- I2C (a serial bus) bus controller
- fiber-optic transmission encoders
- UARTs (universal asynchronous receiver transmitter)
- IrDAs (point-to-point data transfer)
- serial peripheral interface master (full-duplex data link)
- embedded microcontrollers
- state machines
  - encoders, decoders, vender controls, device control, bus interface, bus arbitration,
- MP3 portable player
- address mapping in switches
- packet header identification
- pattern recognition in industrial machines
- internet protocol filters
- cache tagging
- MAC (media access control) look-up
- gateway address translation and protocol conversion
- network address lookup
- encoders, decoders
- high speed glue logic
- video system controllers
- hardware emulation and prototyping
- field-test equipment
- portable inventory control
- DMA encryption and controllers
- bit-stream encryption
- HDLC cores
- USB (universal serial bus) controller

cross-bar switches  
PCI (peripheral component interconnect) controller  
SDRAM controller  
convolution decoder  
speech codec  
satellite modulator  
fast Ethernet  
flexibus-4 interface  
inverse multiplexer  
POS-PHY L3 (Packet Over SONET PHYSical Level 3) interface  
Reed-Solomon decoder  
programmable keyboard interface  
bus master/slave  
JPEG decoder  
time code generator  
color space converter  
comparator  
framer/deframer  
Viterbi decoder  
fast Fourier transform  
bit correlator  
combinational filter  
DSP hardware accelerator  
time-skew buffer  
FIR filter  
floating pointer divider  
floating point converter  
MAC (multiply accumulator)  
pipeline divider  
registered adder  
twos complement converter  
asynchronous FIFO  
synchronous FIFO  
CAM (content addressable memory)  
registered look-up table  
programmable timer  
RISC microcontroller  
microprocessor  
java processor  
programmable interrupt controller  
real-time operating system  
echo reduction in packet switching