

SUBJECT:

DATE:

- Will set up Sunand Sound Studio in the MKTA Demo Room.
- "Politics of the Situation"
- Might be able to show log at Condex at Creative's booth in November

10/12/98 meeting w/mike

- Mike will talk to Tony about Andre
- Dan to talk to Debbie about HW resumes during next 10 days
- Talk to Dave Cluquenois
- Dan F: 3 priorities: Spec, <sup>Design</sup> Tradeoffs, Proj Mgmt issues
- Make baseline plans - what can we ship with current resources, w/some "oppers", w/design tradeoffs
- Contingency Broadcast MKT vs. CISPR 22
- STEVE SPIRN is the FCC test man
- Find out from Norm when Alexandra when computer is free
- Can buy toolboxes

10/14/98 Kevin Monahan & Simon Frangler  
Carl Malone is possible consultant.

He designed the GUI, and worked on the Digital 05 bus.  
 worked at NASA on Galileo. ~~366 560 2467~~  
 360 794 1196  
 would be great for Control Surface development or  
 SMPTE Option Cost

10/19/98 - Meeting w/mike price

Agenda:

- Tom's replacement - review resumes. Job Fair?
- Carl Malone - Interview for full-time? Consultant details?
- Concept P.O. - Hesit happened

10/19/98

Present: Dan F, Rob B, Steve T, Craig Grant, Jim Stevett

Tom's status: (Grant)

- Booting up new Dig Board
- Implementing Syschip all in VHDL
- Documenting everything
- Grant will xfer all eng files

Grant: HW Status

- Debugging Computer Subsystem, Worky Cache Subsystem in SJ07?
- Getting ready to debug EPI Card.
- 2 main board operational
- Analog Board 2 IN & 2 OUT
- Outchip worky H-Chip bypassed.
- Jeanie Building 10 Systems in Eng Lab Staging area.
- Inchip worky
- Can set up of Delay FIFO in Inchip if change channel mapping code.

Rob

- Got kernel running - MIB1, CLIX, LED's, ~~UARTS~~ UARTS, TIMES, etc.
- Board bring-up Hell.
- "Seems Faster"
- Cache works, Data cache worky
- Jim: MAC File I/O, debugging tools (trace statements), Direct outs messages

Dan: Ask Brian to debug main modules as ~~soon~~ Jeanie builds them.

- Wed at 4PM: MRD "SisAnoff" preparation meeting
- Evaluating OrCAD & Concept for schem capture
- Papering Des. Rev Pkg for Analog I/O module

SUBJECT:

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Steve T:

- building systems. No chassis eval.
- Bus Rev w/ MFA next week
- John F. almost completed Analog I/O module Mech design.
- Danny G. Available

Team:

- meetings on Bus architectures. Direct out bus. Can achieve 16 or 32 direct outs with little impact on current HW.

Carl Malone:

- Get his resume.
- Technical phone screen
- possible interview

R-Chip:

- Install R-Chip on Beta main & Alpha test PCBs simultaneously.
- Craig needs additional Alpha setup.

WV & BS

- Better meeting format
- Tom was distracting to meeting. Fired

SUBJECT:

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IVY MRD MEETING 10/21/93

Present: Bob, Jim, Don, Joe, Steve H,  
Mike B, Girault.

Mike B: NEED UNC ESTIMATES WHERE POSSIBLE.  
Need to whine to Don?

MKTA research req'd for environmental audio.  
" " " " for Direct outs.

10/30/93

Horace Nuñez - Mike is son, Cal Poly  
State Farm

Junior, EE, Deans List, Presidents Award List,  
Guitar Player.

Call lender about claim check from State  
Farm. What procedure to follow to cash check?

10/30/93

Frank Reid, SAses FAE for Ben Brown

402 437 0510

X419

SUBJECT:

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11/2/98 IUV ENG MEETING

Steve H, MIKE B, KEVIN M, ROB B, GIRAULT,  
JIM W, STEVE T, TOM C, DANF (scrub)

- R-chip works! 2 hours after delivery, R-chip passed Audio.
  - Fixed gnarly computer bug
  - Added OS Loader feature - copies OS from FLASH to RAM on power-up. 5 second boot up time.
  - Everything that worked on the alpha system works on the beta system, SW-wise.
  - Due to staffing pressures, Girault debugging beta units so can proliferate them.
  - Brian H will help to debug boards.
  - Current working system: 2-in, 3 analog out MMM.
  - Girault will try to have ADAT boards by January NAMM.
- Nashville report
- Brian T in Nashville did listening tests. Good results.
  - ADAT / TDIF option cards first priority
  - NAMM expectations: MMM + ADAT working, Fake TDIF card, Fake Annex. → MAYBE NOT! confirm next meeting.
  - Need another Architecture meeting
  - HW system seems adequate to proceed on our plan.
  - Short-term plan: ship MMM, HCA, ADAT, ANNEX.
  - Need additional sections in HeA Spec to support direct outs / inputs to poles.

## IVY Analog I/O Module Design Review

Circuit, Mike B, NIL, John F, Dan F (Scribe)

### Review Notes:

- LED Indicator Blue Power  
GREEN Activity Status
- Phantom PWR - ISwitch.
- • Can we put external ADCs on MIC inputs? AXM5301?  
CS 5394?
- Label Analog Outputs with letters or numbers?  
MUST DECIDE LABELING SCHEME. Need 6 weeks before we need to receive chassis prototypes.
- Want Scribble strips on back panel.
- Rear Panel fuse is desired.
- Auto voltage detect is desired.
- Terry Sorenson - Call about power supply requirements.
- Move Mic Jacks so they are centered over corresponding Line inputs.
- Consider 20 dB pad on insert
- Mark C to perform audio characterization on Alpha HW.
- Add PLL to clean up clock jitter
- ADD DEPOP CIRCUIRY

SUBJECT:

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Ivy SXS Report

11/4/93  
Dan FreemanAccomplishments

- ① MMM Digital Board assembled, 90% debugged. All SW that worked on the alpha system now works in the beta system. Gnarly computer bug fixed.
- ② EDI option card fabbed & assembled, ready for test. on hold until MMM beta units are debugged.
- ③ R-Chip received, installed on beta MMM Digital board. R-Chip passes audio! No bugs found yet.
- ④ MMM Analog board fabbed & assembled, passes audio.
- ⑤ Annex (Analog I/O module) design has started - chassis design under way, top-level design review held.

Challenges

- ① Staffing. Tom Steininger has resigned. Need more manpower.
- ② Cost pressure on Annex module, possibly MMM. Need assistance with rolling up costed BOM's. Documentation Dept swamped with Composer work, so no time to enter Ivy BOM's into Maxcim.
- ③ Schedule. We're in the tank! New set of FCS deliverables needs to be negotiated.
- ④ Morale. The company needs to install a high-wattage light at the end of the Ivy tunnel!

Plans

- ① Debug beta MMM units, proliferate them.
- ② R-Chip integration - Heavy SW work!
- ③ ADAT Card - Begin beta design.
- ④ Annex - begin detailed design.
- ⑤ Staffing - Attend UCSC job fair, begin recruiting efforts.

SUBJECT:

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11/11/98 Mike P's Staff Meeting11/9/98 Iuy eng mtg

Mike B., Steve H, Chris, Givault, Jim W,  
Jim W, Rob, Dan (scribe)

Mike B.:

• NAMM: Other products are featured not Iuy. Frank Serfati has offered to host a 200-person invite-only demo of Iuy. Decision: Yes, o.k. to hold this demo, but we will not spend significant eng time to support this. Mike Bates orchestrates the whole deal.

- • Find out what RICKK did about JOMS directory.
- MKD ~~for~~ for Iuy system v2) available from Mike B.
- The Iuy financial Analyst (Ode Holland) is leaving - Parrish is replacement.
- Need Digital Studio - Eng. financial, but MKTG has access.
- Mike B. made wish list for gear to buy to outfit Digital Studio.
- Mike B. will attempt to have MKTG pay for some equipment.
- Duane Ford's office (Sound Dept room) would be ideal.

Simon Demo:

- Talk to Mike P. w/ Staff mtg. about details.

Rob Sw Steps

- Parameter updates to support new FX engine
- MAC file to code checked in.
- "HeziBeat" feature implemented on MAC
- Major Burnout.
- Ability to automate MMM setup to FLASH. Next: periodic auto save.
- Bug fixes with correction of comm establishment.
- Steve H: R-Chip HW driver setup, FX manager.
- Steve H. in Barcelona Spain at "Digital Audio FX 8.0" conference.



SUBJECT:

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• Revert demo on R-chip "Before NAMM". (Steve H)  
 Girault How Status

- 4 new MMM Digital boards <sup>partially</sup> are working. Brian H is helping to debug.
- Steve H got one, Rob, Girault has 2. • AES/EBU & Sync subsystem not tested, possible Sycchip work req'd.
- Analog Boards require lots of rework. Jeannie will have production techs help.
- Analog Board needs Depop circuit!
- No progress on EDI & ADAT.
- Don F: Getting Annex design going. Components sourcing.
- Held Annex design review.
- ADAT board ready for NAMM? EDI more important, so will concentrate efforts here.

### 11/11/99 Mike P's Staff Meeting

- Sim is coming to E-mu 11/24 & 11/25. Wants to meet managers, have product demos.
- Got Dig Studio going
- Mike P's Computer? No. Use Tom S's.
- Steve T will lock door.
- TGI, Ontario CA. Get Omni mounts from Cutting edge S.F. Have theatre connection Scott's Valley. Cables
- Barnes - Has HUI
- Rob B owns Dig Studio responsibility.
- Aralex corner game?
- Everyone should be at work on Tuesday 11/24/99

11/16/98 Iuy Eng Meeting

Present: Girault, Paul G, Tom C, Joes, Dan F,  
Czob A, Rob B, Steve T, Jim W, Mike P, Steve H.

Paul G -

Rob B -

- Had big Control Surf Resign Reviews. Steve T has everything he needs for consultant
- Jim W - Hostbert feature so Heit stays connected to the Pack. File I/O Problems.
- Rob B - parameter update code work.
- easier way to add/remove modules from Panel.
- Steve H - Rchip Drivers are compiled into the code.
- Steve H - has compiler/debugger set up in Digital Studio.
- Jim W wants to test Rchip code ASAP in R-Chip.

Mike P

- E-mu can't afford to fund Iuy.
- Sim meeting last week, we asked Sim to fund Iuy.
- Sim visiting next week, will push the issue.
- If Sim doesn't fund, we'll have to work on something else.
  - Firmware (old w/OK)
  - MPEG6 Audio player - OHA walkman.
- If Sim provides funding, can hire 2 engineers & 1 consultant.
- Hold off until after Thanksgiving on ~~starting~~ recruiting effort.

SUBJECT:

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My Eng Meeting 11/23/98

Grant, Ron, Rob, Jim, Mike, Steve T, Dan F

Comdex Report Digital Audio

E-mu ELSON 1 station - Black PC, Paris, Ivy, APS. Thrown out there by Creative to test customer reaction. Possible that Dell, Gateway interested in supplying high end systems to Audio/video support.

- EAM was announced. ~~EAM~~ (Environmental Audio Modelling) in secondary pass release.
- Kevin Sheppard spent time with Sim explaining what Ivy is all about.
- Kevin S. wants to do a demo "Hollywood" type to demo Live - wire in Singapore. E-mu may participate. EAM is highly desired.
- Creative might help us find a NAMM demo at Frank Serfati's.

Grant His report.

- 6 beta chassis's assembled & are "working".
- 4 more circuit testing
- Analog board rework in progress. (MMM)
- Building digital studio together (Rob, Steve T, Grant) for Sim demo.
- Grant getting EOI prototype together for demo.
- Syschip FPGA greatly modified, new Init Contr code from EAF project.
- Control Surface <sup>FPGA</sup> chip. No progress per se, but will be an extension of current EOI chip. So have 2 head start.
- Annex Module: Mic/Output board 1st pass design

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## SW Report (Rob)

- Back FW: new parameter control SW, integrated with HEA, will be easier to incorporate FX Plus ins.
- EQ Library work - can save/recall EQ settings from FLASH.
- Gave Tom S shit about design error on Analog Board. "Brent made him think stranger".
- HEA: File I/O changes made to MAC version incorporated into PC version. Can dry solder back & forth bet. MAC & PC and everything works.

## Open discussion:

- Yes, product shipment in jeopardy, but MKTG assuming we'll ship in June & is booking trade shows.

11/30/93

Inv Meeting - Mike P, Tom C, Paul G, Circuit, Bryan L, Mike B, Steve T, Rob B, Dan F.

Mike P:

- Jim meeting: ① Sim wants us to get into high volume MKTG.
- ② Pro musician's product vehicle for new ideas & technology, but low volume so need high margins > 60%.
- ③ Willing to fund Emu for many things as long as those things directly support soundblaster for live sales.

SUBJECT:

DATE:

- Basically, we can't count on Sim to help fund Iuy.
- It will cost approx \$1M to fund the completion of Iuy. Eemu does not have this money.

2:30 TUE 12/1/98

Meet w/mike p. About Iuy futures

Iuy Eng Meeting

12/14/98

Jim W, Steve H, Craig A, Scott R, Rob B, Mike B,  
Kevin M, Dan F.

- E-mu will fund fab of ADAT PCBAs
- Annex will be scaled down - 16 ch line-in only module
- Term is to "proceed" until new project assignments are made
- Circuit starting ADAT design this week.
- ADAT PCBAs available "February-ish".
- Craig: we have contracts to buy minimum volumes of R-chips!
- Iuy is the "Little Engine that could but might not"

SW status. (rob)

- FPGA board not working - power on power-up
- Clock sync subsystem works. Variable speed feature being tested. Glitchless clock switching works.
- Parameter infrastructure improvements. Design Review next week.

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- Revch feature implemented on R-chip, works!  
"sounds gorgeous".

### HW Status (Girault)

- Supporting Rob's efforts.
- ~~System~~ ~~MMM~~ working. Working Digital Boards

### HEA Status (Tim W.)

- Submission Res Review
- Fixed MAC conn bug - disconnect problem
- UI enhancements, pop-up menus

### Short-term plans

- Implement ADAT Card.
- Implement 16 Line-in module, No MIC inputs.

### Open Discussion

- Stewart: Want bug database for HEA
- No R-Chip bug yet!

SUBJECT:

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Mike P's Staff Meeting

12/16/98

Composer list price reduced to \$995 from \$1395.

\$995 MSRP	Dec-MAR (900K) loss	Q4 300K	Fall '99 \$695 MSRP
\$560 ASP	1000/mo	1100/mo	\$240 UMC
\$505 UMC (current)	\$505 UMC	\$331 UMC	1500/mo
8% GM	Composer	Composer + Audity	Entire S.M. line (Orca, Piano, Composer, Audity)
		40% GM	

12/21/98

lv Eng mts: Mike B, Dan F, Steve H, Ron G, Rob B.

Phantom discussion

- Mike B: Pissylback mixing on sampling 32→2 mix (capacitated in Phantom. Annex I and O modules). See "Phantom: Sampling & Keyboard Rig Submix System"
- Rob B: It will be faster and cheaper to complete the ABAT & Annex designs for lv, and ship lv.
- Steve H: Why not just make a C & H chip set for lv, and have that be a development tool? Why not have it be Phantom?
- Dan F: To ship lv, we only need an Annex, an ABAT Feb, QA, & Production Ramp. This is less work than Phantom.

SW STATUS (Rob)

- Internal Architecture discussion about FX w/ Steve, Rob, Jim, Ron.
- FX & Aux controls & Selection mechanisms.
- Moving Full Speed ahead.
- Dynamic Automation subsystem: Full Speed ahead.

HW STATUS (Dan)

- ADAT card Design started
- web page for alpha/beta status.
- EBI beta card works, Rob B writing SW driver.
- Sync Subsystem works very well.

Buy Eng Meeting

1/10/99

Craig, Ron, Rob, Gervolt, Steve A, Dan F (Scribes)

Probability that Mike can get back leave to start up  
 finishing to develop buy to the degree necessary to  
 ship all deliverables:

Steve A	0%
Dan F	1%
Gervolt	3%
Rob	3%
Ron G	2%
Craig	1/2 %

⇒ &lt; 2%



SUBJECT:

DATE:

- Project Status: Iuy is on back burner.
- Possible new project for Iuy team: MP3 player
- Near-term plans for Iuy team: "wrap up", prepare to archive working files so we can pick up at a later time.

SW STATUS:

- SW release for NMM
- SW version for Serative Demo
- Steve A implement surround reverse that is controlled by the pen control. 4-input, 5-output. Wet/dry mix per input channel.

HW Status:

- "Hardware is dead"
- mods from ADAT design - review in process
- Searching for USB chip to put on ADAT card
- Annex module is ~~stalled~~ on hold, pending a decision on Iuy project funding
- finished core parameter files in the Iuy Pack (Rob)

1/20/99 Audio Compression Meeting

Lee Ref, Mike B, Brian L, Mike P, Dan F

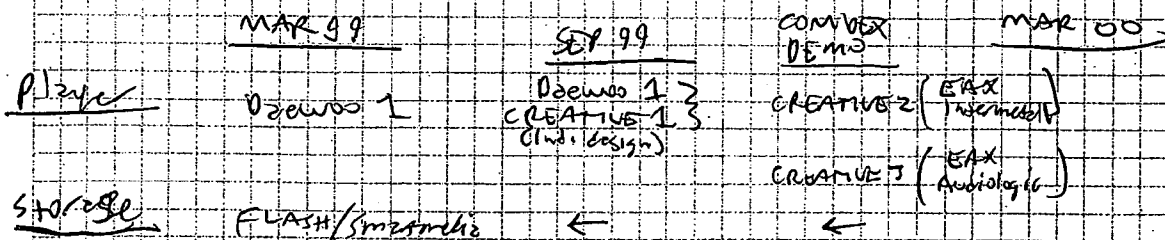
AGENDA

1. Update on Qdesign
2. " " FHG / Xing Encoding
3. Product Roadmap
  - What
  - When
  - How
4. Audiologic (Danzon #1 Issue) / Internet
5. Strategy

Lee:

- PC-based Audio Compression Mastering
- Optical Media Compressed Audio Playback
- Discussion about require for serial # on media so can control distribution of content.
- Products:
  - Flash-based recording / playback
    - ↳ some units
    - ↳ All units
  - Dock/cradle for remote player
  - MIDI / portable music synthesizer
  - Encoder - Line level audio in → compressed audio out.

• MP3 1st generation anticipated volume: 50 K/month



SUBJECT:

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- Cheng Soon - Ask for documentation on Deco's MP3 Player
- Xing: MP3 Host SW Provider. (Ripper/Encoder). We'll probably use Xing for our host Apps.

Rio: 110 KBps download PC → Player

our target: 150 KBps (7 min download for 60 min)

### Jukebox:

- Smart Drive peripheral that hooks up to player?
- Battery, Programming Port, LCD. Jukebox "pushes" data into player.

11/21/98

MP3 Meeting - Creative Miripotes

Nik B, Mike P, Rich H, Brian L, Lee Ray, Chris Smith, Hock L,  
Denz M, Steve T, Don F, ?

Cheng feature ideas: • Digital Audio Broadcast Receiver

- Set top box w/CD Player, Hard Disk storage of MP3 songs that can be recorded from CD's.
- Beat Masher - Analyze beats & rhythm in song, superimpose drum loops, etc in other styles. (House, Techno, etc)  
Makes a remix of a song in a different style.
- MIP: • CDR playback device, can load many MP3 songs on CDR.  
• Nice chip to decode CDR MP3 data.

• MP3 Swatch

• MP3 Headphones

• High Degree of miniaturization (Chris Smith)

• Audio Compression for Games (Denz)

Where to focus efforts: (Criteria)

- Big revenue producer

SUBJECT:

DATE:

1/21/99 (cont)

- Connectivity to SBLive
- Continuous Innovation that doesn't require users to modify their natural behavior.
- Competitive Differentiation
- Cost
- Environmental Audio Support
- Content: Don't want to lock ourselves out of markets because we can't support certain type of Content.

Set top Juke Box, Play:

CD'S } CD-ROM DRIVE  
 CDR'S }  
 MP3

Has: IDE Hard Disk

MP3 Encoding

TimeFrame: Q3 (Aug 15<sup>TH</sup>)

Smart media slot, load player with  
 Flash media card, No cable connection  
 to mobile player

Need direct connectivity to mobile player  
 No video

Street Price \$499 (700k 1.5")  
 ↳ very high capacity

\$299-399 Highly Desired

PORTABLE JUKE Box:)

Cost target: \$149-179

Assignment for MTP team: Portable Jukebox

- Cost
- Comp Differentiation
- Connectivity
- \$149 MSRP: Profit Estimation

SUBJECT:

DATE:

1/21/99 (cont.)

Possible Jukebox \$149-199

- high density media drive
- docking station for player
- Fast I/F
- FCS Aug 15 '99

Next meeting Feb 2 5 PM

Possible Jukebox Spec

1/25/99

32MB Flash per card \$100

want 100MB storage for less than cost of 2 flash cards.

Click Drives.

USB port

Batt powered

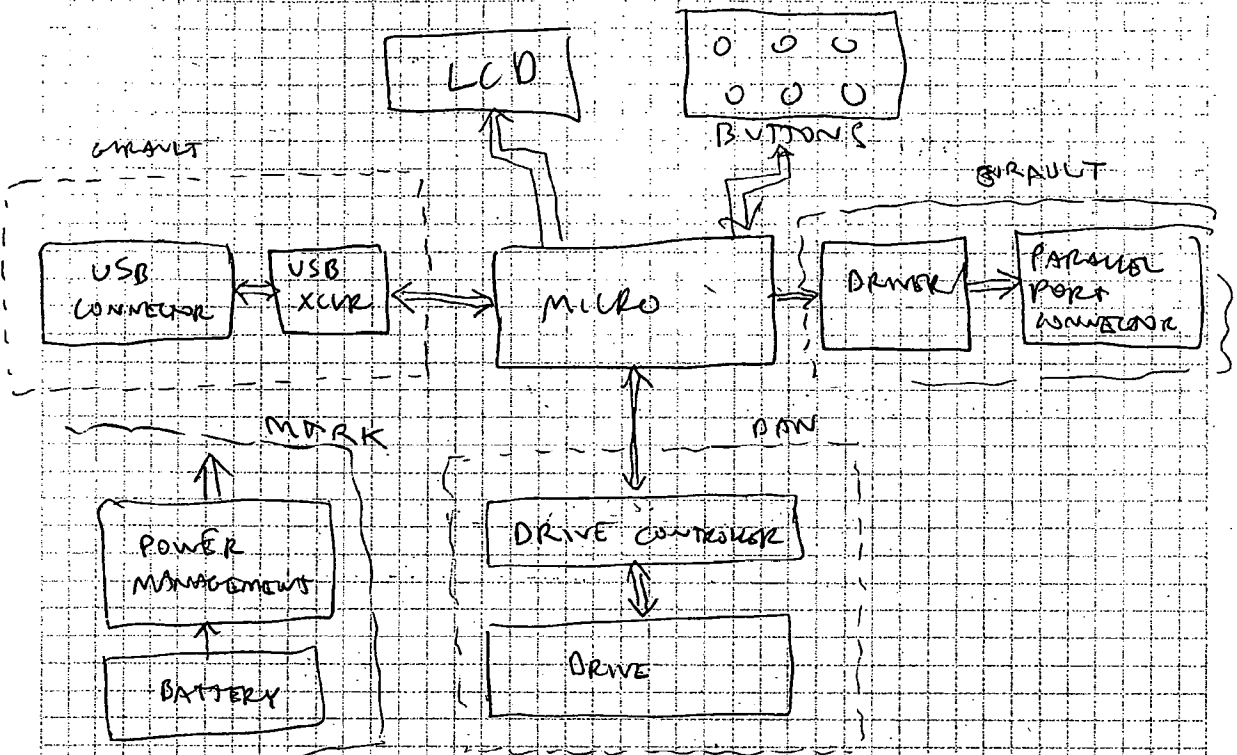
Small connector parallel port I/F to Discman player

MP3 Proposal Due Mon 2/1/99

Creative Business Model: Mike P

Cost Estimate: Dan F

Big Man: Brent E



CLICK! DISK  
 Super Drive  
 Hard Disk (FIXED, ZIP)  
 ZIP  
 Budget: \$38

MP3 JUKEBOX CONCEPT

Don, Brent, Gerald  
 1/25/94

MAT'L COST.  $\leq$  50% of Street Price

SUBJECT:

DATE:

MP3 Jukebox  
1/26/99

Hirochi, Sony, Toshiba

Ed Comezu

Marshall

(400) 942 6056

2 GB Hard Drive: 2 GB 2.5"

~ \$100 (Lower volume) (Toshiba)

2.5" L2KBP H.D.

CLIK? → ??

SuperDisk → ??

ZIP → ??

MP3 Jukebox - Removable Media Sources

CLIK! DISK (IOMEGA) (800) 446 6342

SUPERDISK (IMATION) (800) 466 3456

ZIP DISK (IOMEGA) → ZM374 IOMEGA P/N 1046 595  
10710

2.5" HARD DRIVE

Toshiba (Ed Comezu / Marshall will quote) on or about 1/27/99

1/26/99

IMATION (800) 466 3456

Steve Bradley (651) 704 4105 (jet message)

~~IOMEGA (800) 446 6342 (1) (3) ← bogus~~

800 IOMEGA2 (12 lines) (3) Amanda  
Laura (Cabela 27A) 663 8538 Tony Legalante  
Wright → No Good

Amanda XHSI ZIP: Huge installed Base 20 million sold

Internal CLIK - NOT avail yet OEM

Amanda will call back with info on OEM ZIP (IDE)

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DATE:

(Cont)

SCSI ZIP drive will be EOL'd soon.

Mike Knogge (801) 770 3979

1/26/99

Internal ZIP ATAPI No media 10K/month \$50-60

Internal CLK! Not Avail yet, but soon.

External CLK! CLK mobile Package minus PC I/F Card.

Next Assignments:

1/26/99

Growth: FPGA Investigations for IOE, Parallel, USB, LED controller, DRAM controller, Block Diagram.

Dan:

① Do Drives have Internal Buffers? ② Top-level BOM

③ Email Changs soon

Top-level BOM for Dzeemoo Player

- Tech Specs on Dzeemoo Player
- other tech contact info.



SUBJECT:

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MP3 Staff Meeting

1/27/99

- 1 Jukebox Feasibility
- 2 Proposal for Next-Generation MP3 Player
- 3 Next-Generation MP3 Player Implementation

→ Visit AudioLogic in February?

Monday 2-4pm - Product Development Meeting at Creative. Mike P goes, we give him \$1000.

Chrissy Wilkeson - MP3 Mktg Mgr. @ Creative  
Jay Houtley - Another Mktg. Guy.

Possible team: <sup>(Prod Lead)</sup> Dan, Brent, Rob. possible Ivy team members. Brian Link.

→ Want to visit Patrick Ang @ Ective

→ Ask Darragh to create 2 new MP3 charge #s.  
MP3 Player  
MP3 Jukebox

→ Circuit - Help Ultra team debug clock/sync subsystem problem.

Peter Robinson - Oracle

1/27/99

IBM Key, SW, Lic Management

Capture is unlocked.

Flex LM License, per seat, Capture CIS

250,000 users to upgrade!  
for \$100, can turn it into Network

License. Demo version shipping, limited to 30 parts. End of next week.

\$3995
\$1500 Annual Maintenance

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SUBJECT:

DATE:

1st Eng Meeting

2/1/99

Rob, Steve H, Grant, Jim, Joe S, Dan F (Surber)

Secretive Report

- Didn't go so well - poor demo, not hooked up correctly, etc.
- Mike P met with Pres of TC Electronics, discussed possible partnership.
- Mike talked to guy at Erent Electronics, (at NAMM?) also possible partnership discussions.

SW STAFF

- parameter stuff
- EDI stuff
- Code cleanup
- Steve H: Busted computer. worked on 10K2 stuff instead.

HW STAFF

- ADAT used in layout. Film tomorrow
- will FAB 50 PCB's.
- will order parts for 30 PCB's
- 10 of the 30 will have USB ports
- EDI cards are in test.

MP3 Meeting in Milpitas

2/1/99

Phone conference w/ Hock, Cheng Soon, etc. Mike P, Brian L, Christi W, Brent E, Dan F.

Portable jukebox: Want smartmedia I/F? Want to be able to download from set top box to portable jukebox?

(Christi: Wants both hard disk & Removable Media. "nice to have")

SUBJECT:

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Creative MP3 Guy:

- Shock resistant
- Fits into briefcase, glove box, etc.

Cheng Soon: Prefers Fixed Hard Disk, at least for set-top box. No <sup>extra</sup> media types to keep track of.

• If have hard disk in portable, want flash mem to store index of songs that are on hard disk so don't have to spin up disk to browse songs.

Hock: 2 criteria for these products.

- ① Time Frame. End of August ship date
- ② Must stay in price range! Max = \$200 portable  
Max = \$300 Set-Top
- ③ want killer App.

Estimated volumes: 10 k units for Sept → Xmas.

Portable MP3 Players 100-200k reasonable  
500k max

10%-20% buy (portable) jukebox + set-top

Action Items:

- Make: ① Hard Disk version, propose  
P ② tighter costing
- Team: ③ Method of control: use MP3 player to control jukebox, how? → Next version.  
④ CDDA IRDA (infrared I/F)
- way to get artist info based on serial # of an audio CD. } for set top box

SUBJECT:

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Hook: EZNY March meeting, get two teams together face-to-face. Mike P. wants this month (Feb).

Adobe Acrobat

→ USB data xfer rate: 500kbyte/s using DMA.

→ Mike P. Action Item:

Media Card Compatibility: 2/15/98  
proposal.

contacts: Brian Chan, Lou Chen Gee (Pop Cam)  
(Flat panel monitor)

Epson makes 26 x 64 bit-mapped LCD  
2cm x 3cm for \$4.50.

Diamond player: 80mA @ 3V → 10 hour play time

Noname & Noname II: 100mA @ 3V → 8 hour play time

Anchor KN2131 USB chip 4.75 forward pricing  
RAM based ~~RAM~~ chip. Needs 64K EEPROM (Xilinx chip?)

Next Meeting Time: Thursday 5PM 2/11/99

~~USB~~ Slings This → LCD sup @  
Goh Creative

SUBJECT:

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## MP3 Jukebox Systems Analysis Meeting

Mike P, Niel, Girault, Rob, Dan F.

- New Player has USB port. Our Jukebox will need to have USB master capability.

⇒ 2 USB ports + Parallel port.

⇒ need downloadable OS? Yes.

⇒ Oasis, product nickname?

⇒ Buy Rio, MP3 Man, Yepp,

⇒ want use diagrams for Apps of Set-top Jukebox, Player, Portable Jukebox.

- Power budget - we assume 2.5W during downloads.

⇒ Steve Thompson: Generate mechanical concept drawing by Tuesday PM.

⇒ 3 use scenario diagrams to draw: (Dan)

① At the beach

② Download from PC

③ Download from Set-top box.

⇒ Forward Parts list to JK Chew for quotes.

⇒ SW tests

- Song Browser
- Device Action
- OS Download
- Battery life estimator
- GPS Search
- Upload
- Download

} Progress bars

- TEST APP - write it
- Integrate Portable Jukebox support into Set-top box App.
- FILE SYSTEM
- IDE DRIVER
- USB DRIVERS
- LCD I/F
- Button Scanning
- Parallel Port Driver

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⇒ need 2 sectors of buffer RAM so  
can stream data onto & off of IDE disk?

⇒ 3 FW engineers, 1 APPS Engineer

⇒ 2 Mechanical Eng

⇒ 1 1/2 Electrical Engineers

↳ other 1/2 Proj leader

MP3 Jukebox meeting

2/9/99

Mike P, Steve T, Rob B, Dan F.

Should shift focus of our proposal -  
purpose player based on Hard Drive

① Microware II chipset

② 2 1/2" hard drive

Make this player. Subsumes  
Set-top box. Play it using Well  
Wart.

McCall

Chang Sun, Microware II specs.

What does it take to make a player?

(Gloria Marquez)  
Phone #

Prototypes & mechanics

So EPS stored on Hard Disk.

USB port

Flash vs. (CF) interface

DC Jack

2 C batteries

IROA port

Headphones jack

SUBJECT:

DATE:

Lee Cheng Soon Phone Call 011 65 8954 0000

- Player proposal
  - MP3 decoder electronics cost & details
  - WDEC / Analog cost
  - Schematic / BOM?
  - Backlit LCD
- } Cheng  
Soon  
Not Avail  
on phone

Goh Siang Thio - Not Avail

---

NOMAD I - NOMAD II uses Micrus Intermetal chip.

---

MP3 Long Term Planning Meeting <sup>2/11/99</sup> (Creative Military)

★ Eaphines \$1.79 (Hosiden is the vendor)  
for Nomad

Carrying over 2 vendors, Singapore & Christie

→ Nomad II officially launched.

Siang Thio - Nomad II report. New items on  
MRP: LCD backlight, IrDA transfer, Wired Remote

IrDA Xfer: need additional resources. Need drastic  
changes to HW to accommodate 4Mbit IrDA  
transfer.

LCD: Cost only

Wired Remote: ① OEM Solution

MP3 playback: Problems with implementing MP401. Need to  
decode time files.

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Staffing:

Siang This, New HW Eng for HW  
FW engineer.

Prototyping Engineer

Hock: "Need to shore this up, especially on  
FW side." Need more Senior people on it.  
Even if have to re-prioritize projects in  
company.

Sony coming out with MP3 player in  
2 months. Have no price or Specs yet.

Siang This:

Voice Recording not implemented on 1<sup>st</sup> Nomad II  
prototype

→ Call Sismasel about IrDA interface. (Austin,  
Texas)  
USB to IrDA dongle.

Schedule: Siang This

- 2nd proto 2/22/99 (Schematic capture)  
won't have I.D. yet.. Will implement  
the wired remote.
- Plans for another prototype after finish Industrial  
Design.

Chris Smith:

Success for product research & Industrial Design, then  
will have PCB outline after about 5 weeks.  
I.D. firm uses Pro E.

Mike P:

we have 2 Pro E mechanical engineers available  
to work on this



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Chris Smith: 23 weeks from turn-on until we could get 10,000 working units (Plastic vendor?)

GVO & Alchemy Labs, (I.D. Firms?)

Heck

Getting Items: Industrial Design, and possibly IrDA implementation

Manufacturing and assay will be in Singapore or China

N.K.

wants block diagram of Nomad II. Hand drawn and Faxed is O.K.

Sians Thie:

MIDI Playback

~~REI~~ Solution: OPL4 chip by Yamaha. General

MIDI bank, 1 MB ROM built into Yamaha chip.

\$4.50 for Yamaha chip! <sup>only</sup> Low power chip?

MRD Sismoff: End of this month

Heck/Chris Smith:

Security: Need to encode serial # in units during MFG?

Phillips 20-bit DAC for playback. works well with MIDI chip and Micross chip.

\$0.80 - \$0.90

can program input format of Phillips chip.

Micross chip

\$6.00 end of Q2 '99

★ Strong This - will send me schematic for Nomad I.

Standard USB cable & plug - spec'd for only 1000 insertions. This makes IrDA important.

★ USB Drivers provided by Anchor USB chip vendor.

### OASIS Discussion

How to xfer files from OASIS to NOMAD?

- IrDA
- USB

(LOTS of Discussion about OASIS cost, etc)

Price points

NOMAD I

\$159

64 MB

NOMAD II

≤ \$159

64 MB

OASIS

\$199

100K/month

2.1 GB

\$299

10K/month

Chris Smith

This makes PC based MP3 mobile (OASIS @ \$299)

Go through MPE for a Drive

Quote 100K/month

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NOMAD M21 cost is \$140.

Hook  
Wants this for \$199.

Yikes!

Rio has sold look ruis to the channel.

could use "viewer" (Pop-cam necessary)  
and could hook it up to Oasis so can view  
song lists.

Action items:

MJP: call S.K. Chew, ask MKE to quote  
2.1 GB Hard Drive.

Mc's Scrub prices.

Next Thursday 5PM

Ken Fong - Ask about business model X6439  
for Internet-based sales (Midpriced)

Belfort Bee - Singapore, ask for BOM.

Chris Nest - Altera

2/16/99

EPM7032 2.60 } wyle, "couple of weeks ago" quote  
EPM7064 3.65

old price: \$1.90 / programmed, wyle was losing money due to programming charge.

100K/yr price

Doesn't include programming!

7032-10

7064 AELC44 -10	<u>100K</u>	<u>500K</u>	} Add \$0.20 for TQFP PKG
	\$2.50	\$2.20	

3.3V Prog-Zone bit

7072 AELC44 -10	<u>100K</u>	<u>500K</u>
	\$1.40	\$1.20

7128 AETC100 -10	<u>100K</u>	<u>500K</u>
	\$6	\$5

6010 ATC100-3	<u>100K</u>	<u>500K</u>
	\$5.50	\$5

EPC144 PCB (DIP)	<u>100K</u>	<u>100K</u>
	1.50	1.25

6016 ATC100	<u>100K</u>
	\$6.50

# ALTERA PRICE ESTIMATES

SUBJECT:

DATE:

SANDISK Meeting

2/17/99

Ed Cweller, Prod Mgr Jeff East, Sales Mgr Nob Higuchi, Apps MGR

Multimedia Card 2MB-8MB

SMB connector: JST, Hosiden, 3M

CF 48MB \$40 Q3 '99 bundled price to creative

MMC

Nob Higuchi, Mgr Apps Engineering

nhiguchi@sandisk.com

Knows connector types for memory cards

MMC connector \$0.50 no ejector, SMB  
Low price

MMC: 200KBps write, but if pre-erase, can achieve  
400KBps write with multiblock transfer

CF. 500KBps transfer rates.

Hitachi H04proc 3336 very cheap 32-bit processor  
3337

Toshiba Disk Products 949 457 0777 (2) (x)

HDD Z131 2.16 GB 2.5" Hard Drive \$140.45 10K/month  
(MK2110MAT) Marshall

Joe's Sales Guy? Irvine  
Watkins

Frank McGlone Sales Rep (400) 965 4300 } left msg

X949 461 3019 Theresa Brown

Sandisk pricing

	Q3	Q4
CF 4 MB	< 20	20
8	< 25	< 25
16	< 30	< 30
32	< 40	< 40
48	< 60	< 50
64	< 75	< 65

connector \$125 ballpark

	Q3	Q4
MMC 4 MB	< 17	< 17
8	< 19	< 19
16	< 25	< 20
32	< 40	< 35
64		< 70

connector \$150 ballpark

Smartmedia connector: \$3 ballpark

Have FAT filesystem tools. \$3K for kit.  
One-time fee per company, good for any # of products.

Liquid Audio Contacts (by Ed Cellar)

CTO Phil ~~Weiser~~  
Weiser

BBB Guy ~~Sunjay~~ Guleria copy protection expert

650 549 2056

SUBJECT:

DATE:

Ken Fong - Creative 408 420 6600 x6439

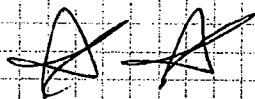
John Bradley @ Fujitsu Drive  
Quote (via Steve Spira)

10 K \$125

Bus Plan + Volume \$100

~~700 7131~~

MHF2021 AT



MP3 Meeting Mike P, Dan F, Girault, Brent,  
Aime, Rob, John M, Steve T.

Review

Big Deals

- Christmas 99 Sales Start 9/1/99
- 2 • High Capacity (50 40-minute C.D.s)
- 1 • Portable (not wearable)
- Player
- < Record PCM >
- 3 • \$199 street
- Sound Finder
- EAX (Spatialization) Headphones
- Time Compression/Expansion
- 4 • Playlist Support (CDDA) (Sound Finder)
- Audio book support (chapter tags/bookmarks)
- 5 • ~~Graphic EQ~~ Bass & Treble
- Alternate compression
- 6 • Editability

- non-audio
- Host SW
- Fast upload
- encoder (MP3)

parallel upload I/F for non-USB  
Analog Input  
Modem for Internet  
IRDA wireless

color LED display  
S-video adapter  
4.263 video adapter  
CONFIDENTIAL  
(video recording)  
microphone

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RequirementsCONT

- Battery Life 8 hours
- Size ~~Small~~ Small as possible
- Play modes: Random, shuffle, etc.
- Disk management / Garbage collection
- UI: Simple, flexible
- Internationalization (Host SW)
- EQ
- ~~Downloadable OS~~
- Serial number for copy protection
- CD Ripper

Other

- Downloadable OS
- Other compression Algorithms
- DSP Hostroom
- Extra DSP on expansion card. → implements features marked with ●

Key Differentiating features:

- Host SW + CD ripper
- Extensibility

Internal Sales Feature

- Platform Technology



SUBJECT:

DATE:

Action Items

(CONT)

me/Rob: Scrub schedule

me/Graet: Scrub cost + use model

2PM tomorrow:

me/Brent: Presentation

Rob, talk to Yang Kit, get APPS SW for Nomad II SW.

3 Plans:

- Customer Perspective
- Use scenarios
- Competitive Differentiation
- ~~Business~~ for Creative } Host SW/FW
- Compelling Issues } DSP hardware

STATUS PAGE

- \$100 disk drive
- TI processor found
- Battery life tests
- Warrant ~~ESP: \$249~~ ~~ESP: \$249~~ ESP: \$249

SUBJECT:

DATE:

MP3 Long-Term Meeting 2/10/99

Christi, Aime, Dan F, Chris S, Brian L, Hack, Vincent  
 Mike P, Brent E. Singapore: Robin, <sup>Tony</sup> Chen, Joony,  
 Peng Kiet, Siang Thia, ~~Chen~~ Bryan Chen

\* Dazoo player is "Junk" looking for another vendor (Samsung) for short-term solution.  
 and "Digital Way"?

- Nomad II Proposal - Siang Thia.
- PCM3002 Burn Brown ADC for voice recording. (PCM3002 is a CODEC)
- No real O.S., just a programming loop that runs tasks. Hack. Someone should investigate whether to use real O.S. i.e. Wind River Systems.
- Siang Thia will send Chris Smith data on LED display so Chris can give it to I.D. Firm
- battery charger will go in docking station (Music Match)
- \$3 licensing fee for MP3 encoder? We should plan to pay this royalty for 24 months, until we can develop our own encoder.

### Jukebox proposal Discussion

Chris Sam. positioning. Light, portable, shock-proof, features not satisfied by disk-based player.

Confusing message to the user.

Could just record MP3 CDs, then 4 of them would store > 2.16 GB.

Christi: HDD jukebox great for Car.

SUBJECT:

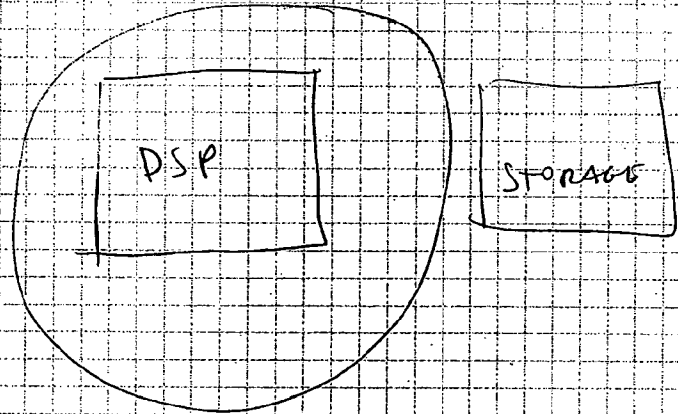
DATE:

### E-mv Action Items:

① Contact Ardible about ~~how~~ what it takes to decode their format. NOMAD II can only allocate 7KB of code space, MOV instruction takes 66ns in play mode on NOMAD.

Rob

HOOK:  
2 parts to  
Design Effort:



Important  
Feasible  
Start now

Delay until  
we get marketing  
data

- ② Size up schedule, especially to estimate DSP effort.
- ③ Send Hook updated BOM.
- ④ Think about Set top.
- ⑤ HW schedule need.

Mark Dobson 2/25/99

EAX Algorithms ready for XMAS MP3 Player

- ① Resource Reqs - 2 months
- ② Computational Reqs - bad for freq domain time scaling.

tone control	1 mo
bass boost	1 mo + 1 mo for licensing
reverb	2 mo

- ③ Where do resources come from? Mark not comfortable providing these resources.

3/1/99

Brain L

Reverb on OX24 - Need 64 K samples of DSP Mem, 100 MAC'S per sample

Headphones EQ: Precompensate for freq. response of speaker in headphones.

Time Scaling - for 2x speed up, need to run the MP3 decoder at 2x rate. Time Domain:  $\pm 10\%$  speed up, before objectionable artifacts.

MP3 Encode: 2 min Audio 128x P166 takes ~~25~~ sec.  
1 min 25 sec

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~~Brain comments on~~~~3/1/99~~

Austin Chiu - T.I. Sales Rep 3/2/99  
 Randy Cole rcole@csc.ti.com SW Guy 972 997 6172  
 T.I. D.S.P.S.

TI 5409 - pending, samples July, production October

5410 - samples 3/22, production 4/30

AAC Decode:

14K program, 32K <sup>data</sup> RAM "won't fit into 5409"

AAC is 60 MIPS, tempered noise shaping 20 MIPS,  
 EQ 20 MIPS.

If use external RAM, should help. Might need to page  
 in data so can keep processing BW high.

AAC - ready to ship in May. Beta code: Avail in April.

MP3 - ready to ship in May. 40% complete now.

Beta code avail in May, 90% confident.

Randy Cole wants list of encoder priorities, & specific  
 DSP capabilities questions.

T.I. working with Audible on decode Algorithms.

T.I. has audio enhancement algorithm "virtual surround"  
 type stuff, "low coloration", takes 10-15 MIPS.

★ Have Deans system that has Compact Flash drives &  
 DSP, would be good start for disk based product.

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MP3 Long term Planning Mts

3/3/99

Ken Fong, Mike P, Aime, Chris, Jack,

Cheng Soon, Peng Kiet, Siang Thia, Lynn (Co-ducted  
MP3 Survey)

### Oasis MP3 Review

- Strong Resic for Normal Connectivity. Can we use USB in master mode to upload to Normal?
- Media Card? Include, so can support xfer of MP3 to other brand of MP3 Player.  
Can also satisfy requirement of interface to Normal.
- Remove Audible Support from Mkt. Focus on Music playback.
- Audio <sup>recording</sup> ~~encoding~~: it can implement encoding to MP3 also, would be interesting. Fraunhofer working on it. Keep in Hw if cost allows, don't plan on implementing in SW or FW.  
Cheng Soon: good for meeting room recording, not good for mobile batt powered due to battery life.
- Implant analog input if easy and cheap.
- Want RBV's Sellback after next revision.
- Add 2 more outputs.

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Siang Thie

- will add external 64KB Flash RAM So  
will have enough mem to support S.S.F.DC  
Compliant SmartMedia. \$2.50

Cost rollup

Flash \$80 64 MB

Manuf cost \$5

conn cables  
plastic case 4.50

(leaves \$10.20 for everything else)

MicroNAS \$6

∴ tough to hit \$100 cost target

BUT QA Flash cost will cost \$10 less.

- Problem with charging circuit. If use DC in jack for charging, can't use regular DC adapter to power the unit. Want separate charging jack.
- charging circuit costs \$1 - \$2.
- LED = "Bond" is what named if is using  
Hans kong
- In Singapore, Veritronix

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Future Electronics Meeting  
 TMS320VC5402 - \$5  
 TI DSP for cheap

Tray Vienne  
 465 7373  
 Gen Sales Mgr

Thomas Andersen  
 408 434 1122  
 Tech Sales Mgr

MP3 Long-Term Meeting 3/11/99

Asok, Mike P, NIK B, Brent, Lee R, Brian L.  
 Cheng Soon, Peng Kiat, Siang Thio, Chue

### NOMAD II

- Mechanical Design - Need resources. No resources avail in Singapore. Discussion about where to do Mech design. Mech tooling on critical path.
- xfer rate: 460 KBPS. Limited by Flash memory write cycle time as implemented in FW. Hack: Need code review. Download: will try to achieve 500 KBPS. Upload: 600 KBPS.
- PCB layout delayed due to CAD/CAM resources not avail.
- LCD: Module from Veritronix is cheaper than Full custom module by Bondi. Will cont w/ Bondi, then need to decide which LCD to use by end of month.
- Two main reasons for Nomad II
  - ① Low cost alternative to Nomad I (< \$100)
  - ② Must have USB
- Sim's Goal: Must dominate MP3 market (75% market share)
- Year 2002: 14 million MP3 units. If we get 30%, 350k/month. 50k-100k/month not unreasonable.
- LCD module: Siang Thio prefers module
  - ① 2 line x 12 char + icons. Backlight included for \$3.70
  - ② 64x128 graphics + icons, has scrolling and inverted display features.
- SGS STA017 chip - Hardwired MP3 decoder  
 \$5.00



SUBJECT:

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sen  
: GR

- PUB: due in 3/24/99
- Not done: voice recording
- Have more resources to do docking station, will include battery charging circuit. Circuit cost \$2-\$3 (Phillips)
- Bill of Mat'l avail end of next week. Sizing this needs to finish schematic, then give to procurement, then get Creative BOM.
- Spill constraints, want to remove MIDI chip.  
YES
- USB connector is too big, Se 2 GVO. Can we use smaller connector?  
↓  
Could use PUMCIA 15-pin connector, then need special cable.  
USB "Biometer" \$0.07  
Custom cable: → \$1

OASIS

cheng soon will forward OASIS MRD  
Christi you clearance

Hook: Wants Singapore Engineers to meet in U.S. with GVO and U.S. design team.

March 22 & 23  
(Mon) (Tue)

Need to set agenda Lee Ray will set agenda, email him with Agenda Items

3.10

## Action Items

- ① Email Lee Ray with ~~Action Items~~ Agenda Items for meeting with Singapore Engineers
- ② Meet with Cirrus about adding additional I<sup>2</sup>S output & USB Slave I/F to MP3000 chip.
- ③ Get as much info on Cirrus login as possible for meetings. (Push them to get info by Monday before).
- ④ Want to buy source code for MP3 decode SW (from Cirrus)?
- ⑤ Cheng soon will send Oasis MKD & get feedback from RBUs, will report feedback on Mon 3/22/99

★ \$25 for IDE CD ROM DRIVE  
40x speed

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Oasis Eng Mtg 3/17/99

Don F, Brent, Jim W, Terri F, Consult, Steve F, John M, Steve S & Mike P

- Staffing: Need DSP Engineers. Mike met with Rich H, "Rich sez would be nice if tech center worked on products"
- LCD: Vantromix visiting 3/30/99
- Contingency planning: Add people to project for contingency mitigation - have someone chock horn all project features into <sup>single</sup> DSP.
- SOMI Spec out on 6/30, we will need headroom in design to accommodate.

Assignments:

- Jim: Dis into DSP issues, tech center. (Luke DeH)
- John: Figure out what icons we want on graphics LCD display by 3/30.
- Talk to Scott Worsle about DSP work.
- Brent: will draw block diagram, BOM Theory of Op for next week meeting with Singapore Engineers
- Ron Co: Work on Host Apps proposal. Meet with Peng Kiat next week. Identify Robust CD ripper.
- Concern: CD Ripper SW is flaky.
- Encoder: where do we set? Currently, integrated into music match.
- Mike: Will ask back if we can hire an additional SW Apps engineer. Share term: Contractor & DSP Contractor

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- Dan: Osis web page.
- Dan: Roles & responsibilities List.
- Rick (Mtl) mailing list for Osis Engineering, include news group.
- Steve S: call LCD meeting so he can get Ventronick started. Steve T, Steve S, Dan F, John M.

Next wed 10 AM

3/17/99

Steve Hegg, Dan O (Cirrus)

RE: Cirrus MP3000 up

2 pieces doing MP3 code for MP3000.

① ARM: Code due 2<sup>nd</sup> week of April

35K code space, written in ASSY

30-32 MHz, "No wait states"

② X-Audio - Have code now, currently porting to Cirrus 7211

120K code space, Object-oriented library C++

35-40 MIPS

Mark Irwin

Do we need to pay NRE \$ to eval ARM on X-Audio MP3 code? ARM is open to discussion.

ARM could make an API available, supposedly in two weeks. Arm code avail soon will not be optimized for speed, only for functionality.

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3/17/99

Steve Hoge Consulting Rates

\$100/hour for 1st 80 hours  
 \$75/hour for next 160 hours  
 \$60/hour minimum thereafter

Yes, he would be interested in working with us.

3/22/99

MP3 Meeting in Milpitas

Chris S, Hock, Brent, Mike P, NIK, Lee R, Girault, John M,  
 Peng King, Fritz, Siang Thio, Vincent T, Cheng Soon, Ken F,  
 Christi, Dan F

Non MP3 Schedule (Samsung Players)  
 QM (GMM FM Module) (32M Model Also)

20 Qm Samples 4/2

30 LA Internet World 4/9

1K Seeking 4/20

Mass Production 5/17 (1st 5K)

Then 1K-2K per day

Bundled with player (from Samsung)

- ① Player
- ② Docking Station
- ③ Parallel port cable
- ④ 2x NiMH batteries (>650mA)

We need to provide AC Adapter (9V, 0.5A)

COGS

32 MB FM Model (300K commitment)	\$121	8MB SIM: \$40
Non-FM + 8MB (12 months)	\$126	
Additional Items:		
HP 1.79	CD \$0.50	
AC Adpt 1.50	Manual, Box, etc!	3.50
Mult Match 3.50 (Royalty)	Shipping/Labor:	4.00
Pouch 0.20		

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MP3 meaning M. P. Ites

Cont

NOMAD II

64MB: COGS = \$99

32MB: "\$40 less" than 64MB } clears soon

32MB: \$99 Street price

Key Facts:

Demand Rio: Sales peaked @ 10K/month.

4:1 retail/Internet sales mix

8-10K/month range until now, now is 5K/6K/mo.

Sales Forecast:

30-50K units ~~forecast~~ total MAY-September

75K/yr commitment for Music Match sales.

Charact.:

Feedback on Nomad (Tech@Home, in San Rafael)

- ~~More~~ metallic look (positive)
  - Want more interaction with music. Customization, Bass & Treble controls, EQX presets
  - Better mic input - want to record classroom lectures.
  - Portable Player with no need for connection to PC.
  - Voice recording - music goes on internal mem, voice on SM card
- W/O:
- Larger LCD
  - 64 MB
  - D. Stream "SFAS" on PC SW

Other:

- No skip
- Users not interested in laptop disk

SUBJECT:

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Vincent:

- more advanced navigation features
- text to speech SW, can download headlines, emails etc into named, listen to later.

Negatives:

- MP3 only
- Non-Flashable Firmware
- Meta-data issues, media - where do my songs live?
- Long download times
- Smart media compatibility (SSPC support) need to warn user before reformatting SM card.

NOMAD II Design Solutions

Need to get:

AUG (SPT)  
Microms

OCTOBER (Cirrus)

① MS Audio Reqs

- Unique ID

- Unique ID

② When will Cirrus show MP3 working or MP3000

- No other CODEC

- Possible other CODEC

- MP3 working

- MP3 in development

③ Schedule of next chip by Microms

- COST 6.00  
4.70  
1.50  
\$ 12.20

- COST 10.50  
1.80  
\$ 12.30

Decision on which chip to use?

- USB  
- lower cost

- USB @ 11 port  
- lower cost

MID APRIL

④ Continued info on SPM

Get SPM Password

SUBJECT:

DATE:

Sizing ThisSSPDC

USB: works both dir

MP3: works up to max ~~the~~ encoding speedsPower consumption: pulling 84 mA. But, only 4 hours of  
best life due to DC-DC converter inefficiencyLCD: 12 char x 2 line + icons. Sample glass due to this  
Also talking to Veritronix about module.SSPDC: Needs more ROM & RAM. Need 32K SRAM  
or efficient mapping table. 13K of ROM for  
the code. Due to ECC complexity, XFE2 ribs  
to SM is reduced. HW solution: xilinx p2A,  
10mA.OASIS Review (MRP)

- Hock: General managers are interested. Project.
  - Want to comply to standard USB storage requirements so can  
browse OASIS in windows explorer.
  - Remove Smart Media Slot
  - Add: wired interface to NAND. MUST do ECC computation.
  - Nice to have: rechargeable batteries
  - Delete time scaling feature.
  - Nice to have: Time scaling
  - Delete: Smart Media Slot
  - Add encoding + ripping + download time to OASIS.  
Assume 333 intel Celeron system.
- 5/6/98 → Content  
Support? MS Audio,  
Audible, etc.  
• SMI Not implemented  
for FES



SUBJECT:

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MPS Meeting Milpitas 3/23/99

Set-Top

Note: Not strictly CE Device. Fewer computer-centric device.

Terco \$499 } check out these  
Replay \$699 } products.

Want Internet connectivity. PC-based product? Show PC in application, sell services over internet. Make profits in services provided over web.

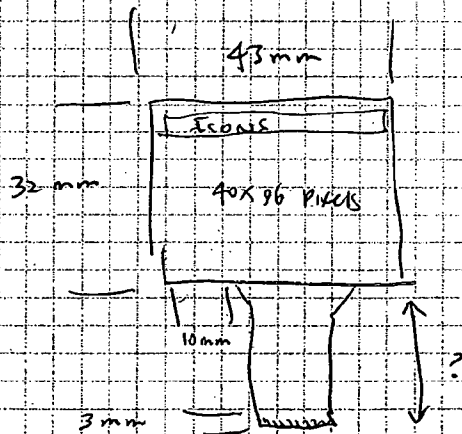
HW/SW review

Don F, Sanyo Thiz, Peng Kizt, John M

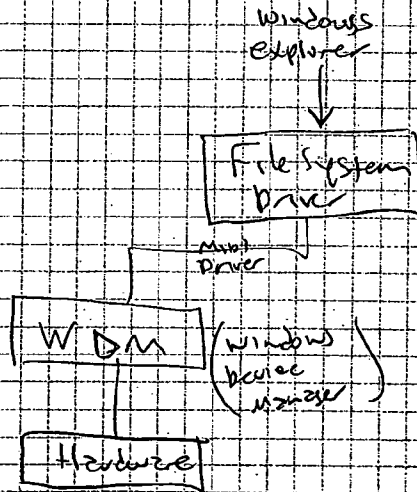
Sanyo Thiz investigating Hitachi LCD display

40 x 96 + 1 row icons, \$4.12 for 300K

Volume. H0066726 Hitachi controller (only  
for Creative) + Veritronix Glass.



- For USB p2A, check out Phillips D12 \$1.80, they support ATAPI I/F (Drivers Avail)
- Using this already evaluated this p2A
- If design in chip, get free source code!
- Flash mem: Can use 64K x 8 Flash for \$1.80 by SST.
- Great! Email Using This pinout for MP3000
- Email Using This Full datasheet & EVAL Board Schematics



SUBJECT:

DATE:

# OASIS ENG MTG AGENDA <sup>For</sup> 3/24/99 Meeting

- ① Meeting Review w/ Singapore Engineers
- ② OASIS MRD Changes
- ③ Industrial & Mechanical Design Schedule & milestones

## ② OASIS ENG Mtg notes 3/24/99

MIKE P., Grant, John M., Don E., Brent,  
Steve J., Tom F., Scott W.

### Resources

- Scott W on loan from Tech center. He can grab a cube.
- Rob B quit.
- Still need SW APPS Eng.
- Might want to partner with Sonique for APPS Pgm.
- Want hiring req for SW APPS Eng. Mike forwarded request to hack.

### HitPics Meetings

- Got thumbs-up from Hack Project is a go.

• Steve J. need date by which we can choose battery type.

• Have Andre write code on E-IV to do beta experiments with IBE drive.

## Short-term Assignments

- ✓ Carl - Send Steve This pinout info on MP3000, PCM dataset, Full eval board schematics.
- { Tom F - Compile list of major SW issues so we can track them.
- ✓ Dan F - Orca, holster
- Future meetings: limit attendees, every week
- ✓ ID Firm will selected & started by Monday. CVO will be doing initial concepts.
- ✓ Buy Polycam phone. (Brent)

3/25/99

## Ozic DSP meeting

Brent, Jim W, John M, Scott W, Dan F

- EAX 1.0 geared towards gaming.
- WMA DSP algorithms that exist for SBLive (Dan)
- use reverb settings for SBLive!
- SBLive reverb: 90 MAC instructions per sample period.
- Virtual Speakers: 40-100 MACs per sample period.
- Initial tasks for Scott & Jim: check out SBLive! reverb code, port to ARM Assy or Ctt, estimate MIPS req'd by ARM processor.
- Buy Matlab PC version

SUBJECT:

DATE:

- MIS: Need Win 95/98 systems with SB Live! cards.

Vantrox LCO Meeting

CS. Wang, Gen Mgr, Vantrox, (Singapore)  
 Alex Mazurkovic, Apps Engineer VL Electronics

- Could do graphics display with larger dots & pitch. Will need to pay NRE \$5  
 $0.40 \times 0.05$   
 dot x gap

- COG (chip in glass) lower NRE

- 128 x 80 in lowest graphics display for one-chip solution.

Schedule:

SPEC: (US)

QUOTE: 1 WK

NRE:

SPEC SIGNOFF

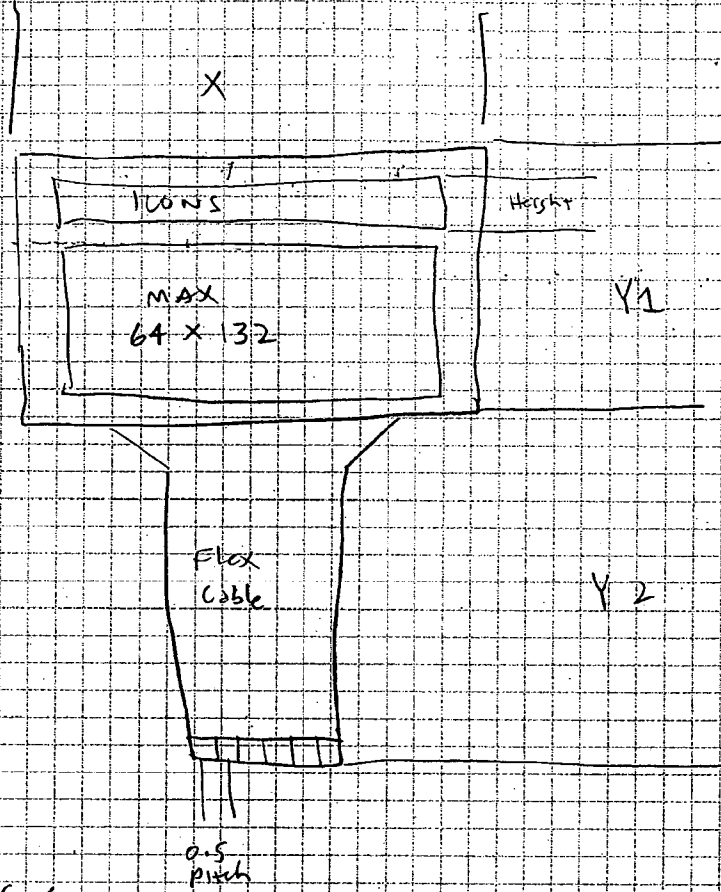
} pay NRE  
 sign-off fee

1ST SAMPLES 5 WK (shipping included)  
 from Hong Kong

PRODUCTION:

- 6% duty to import to U.S.

For LCD Quote



Specify:

- a) X Glass width
- b) Flon height
- c) Y1 Glass height
- d) Flex length

SUBJECT:

DATE:

Oasis Eng Mtg.

Dir F, Brent E, Girault, John M.

Agenda

- ① Schedule
- ② Assignment changes, missing people
- ③ I.D. - Starting late, but reduced time, so on schedule
- ④ DSP - started
- ⑤ HW - LID meeting, Girault status?
- ⑥ Action item tracking needs to start - (Don) (Not done: Oasis web site)

Notes:

- No SW Project Lead. Schedule will slip. Terri F doesn't want the job, John M got promoted to SW Dept MGR
- A • John M. Figure out what you're doing in this project.
- A • parse SW schedule.
- John M will gather SW status for DSP, FW, Apps. (Cost of SW lead will do this, not necessarily John)
- DSP: Jim & Scott investigating algorithms of ARM chip.
- A • ~~Start HW Design~~
- A • Don - Start technical spec.
- Girault working with Andrei on history life writing
- concerns that 2MB of memory not sufficient. Want 8MB for single chip solution. 8MB EDO RAM is \$10.

- A • John M / Dan F - write job desc for SW FW contractor buy.
- Position Desc for SW Apps buy, FW guy for SW tests, USB, ARM, etc.
  - Mike will get Ads placed.

Oasis Eng Mtg.

4/7/99

- Circuit (SW)
- Mark Trolan not forthcoming with tech info recently (Circus)
  - Have pdf file of U7211, but no pinout or data sheet on MP3000.
  - Battery tests: Andrei wrote code on E-W for battery testing using I.O.E drive. Waiting for MAX1703 DC-DC converter.
  - Schematic Capture has begun. Circuit Learning OrCAD - Goal: Schematics by end of month.
  - Brent: Designing power supply solution. Should look at Rio Design, they pulled some tricks.

SW

- four channel revcb algorithm takes 30 mips on ARM.
- Better: Specialization, Bass boost.
- want to specify set of EAX features that are inexpensive in ARM mips.

Product:

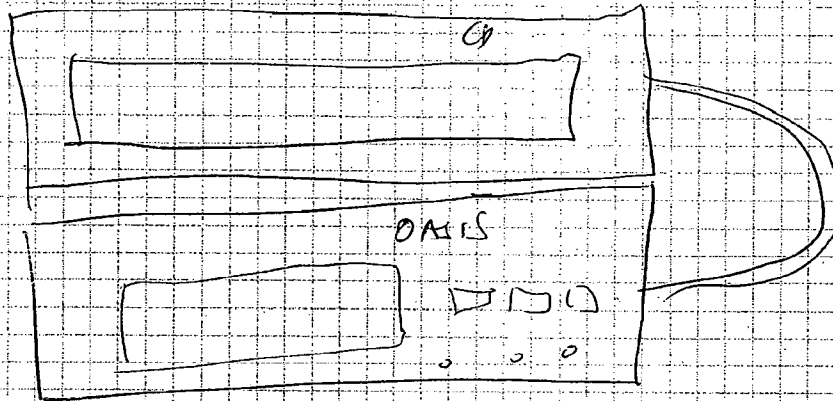
- want to keep analog inputs. Better to keep inputs & make extra outputs.
- Mike extra outputs? Make this agenda item for Long Term Planning meeting.



SUBJECT:

DATE:

- We're confused about use scenarios for 4-channel systems.



- Brent: Understand LCD issues.

SW stuff:

Jeri: embedded host, tool setup

Jim, Scott: DSP stuff

{ scan logic - they make chip; IDE ↔ USB + drivers }

→ call National about USB Drivers.

- Brent: ask Jess Lee which USB P2A is used on POPCAM.

Host SW:

- Ron: on vacation.
- Got SW from Singapore that has the music match SW.
- Do we want to look like a NOMAD?
- Rick: Common look & feel.
- We want our own App SW program. Rick doesn't agree.

Agenda for MP3 Long-term Meeting

4/7/98  
(Cont)

OASIS MRD:

- ① Delete 2 extra outputs, Linux does not directly support 2 I<sup>2</sup>S outs.
- ② Add analog input is must-have: Pass thru mixing, future encoder SW upgrade.
- ③ Make list of EAX algorithms TBD until we figure it out.
- ④ APPS SW: Sonique relationship? We'll write APPS SW spec & send it to Peng Kiat's group for review.

Brent's Page  
chronosiemu.com/brent/

4/7/98

- Ask Chris Smith about Sonique relationship for APPS SW development for Oasis -
- Float internal proposal, Chris Smith will forward to Sony. (Chris's suggestion)

SUBJECT:

DATE:

4/7/99

GVO Industrial Design of NOMAN II

- Docking station is gone Ray, John, W.Y.
- LCD shape is not rectangular, need to review w/ sizing this
- What about "stretching" the design to accommodate an additional battery? NO!

Oasis Eng Meeting 4/14/99Industrial Design-

- GVO 'Starting Over'. we were not happy w/ pre-lin concepts. New round of proposals due Fri this week.
- LCD waiting to submit proposal to Vantronic until we get next round of I.D. proposals.
- Schedule for LCD: we're at least 8 weeks out until LCD samples. ~ 1 July

SW

- Terri chosen tools - ARM tools, since we think Chris might be using them.
- Host U.I. - Ron on vacation, no change in status.
- DSP - Scott w working on doc describing what plans are for DSP features.
- Analog In - plan on lumping to .WAV file for FCS, more features post-FCS.

- ✓★ • Need to schedule Peng Kiat <sup>SW</sup> review - try for Thursday at 5:15 PM.
- ★ • need to get VSD I.D. from SW group in Singapore
  - Oasis
  - Protocor 2000
- Let's try to hire Andrei for Oasis.
- No project lead on Oasis is turning up.

### HW Status

- Battery testing - poor results. 2 C cells last 1 hour. Test: Spin-up, run for 10 sec, sleep for 1 min, 750 mA additional load to simulate other electronics.
- Ordering various battery types.
- Brent looking at charging circuits.
- Getting all info on batteries, chargers, etc, so can make educated solution.
- For Christmas, we can make Bricks.
- Desired solution: removable battery pack: 2 versions, AC powered, AC powered + Batt pack.

- ★ • Investigate Microcnic by IRM.

→ \$299 AC-powered unit

→ \$X External Lithium-Ion batt pack

SUBJECT:

DATE:

- ★ Product Brochure would be desirable. (Mike P did)
- ★ Hock wants speech "news" feature implemented - wants demo w/ time scaling feature
- ★ Need to establish Sanyo relationship. (Mike P will do)

4/14/99

## Fujitsu Meeting

Lenny Storer, OEM Program Manager

John Bradley, Account Mgr 408 505 1621  
MJL, Brent, Dan F. Garzolt, John M

On Hornet 9 Fujitsu Drive, Head crash not so much of a problem. Head rests on 4 pads that are lubed.

"might work while operating a jackhammer"

O.K. to ground out PCB to case of HDD.

Possible to modify drive FW to spin drive up more slowly to save bit life.

No concern about # of head parks.

Noisy part of Drive is by flex cable - avoid analog layout in this area.

"Titty Pink" - good color for case.

SUBJECT:

DATE:

4/20/99

Cirrus Conference call - Mark Sutton,

Cirrus

- MP3000 works so far - MP3 decode working @ 24MHz
- still need to hook up CODEC
- testing LCD Controller
- tested DRAM Interface
- UART works fine
- looks good for having demo.
- MP3 code only uses 29MHz, but they are over budget on memory. (∅ wait state) 33 MHz on practical system (DRAM) → (non-zero wait state)

SUBJECT:

DATE:

## CONF CALLING:

- ① Receive call
- ② Hit Transfer
- ③ Call Chris Smith 408 428 6600 x 6905
- ④ Hit CONF

## OASIS/NOMAD SW CONF CALL

Dan F, John M,  
Peng Kist,

Conference Room X4610 (Peng Kist's Room)

011 65 095 4000 x 4610

## NOMAD II - USB DRIVERS, ACTION ITEMS

- ★ Peng Kist - Wants SW spec on exactly what host side features we need for NOMAD.
- ★ Peng Kist - Coming to E-mu to talk about OASIS SW. for Host, considering May. Mid May.
- ★ Send all info on OASIS about functionality that will be implemented in Host SW, including SW protocols.
- ★ Send list of documents we can provide.
- ✓ Send URL of OASIS Web page.
- ✓ Send organization chart of our team.

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# ★ Rough Schedule Milestones.

Finalize spec,  
Reviews, etc.

4/25/99

Oasis Eng Mtg.

## Action Items:

- ★ By Friday, finish battery tests and determine battery requirements.

Steve T. leaves on vacation end of next week <sup>(2 1/2 weeks)</sup> if we don't fire up GKO for I.C. by next week, might slip schedule by a month

- ✓ ★ Get DSP repos from Scott W.

- ✓ ★ DSP features are post FCS. TBD



SUBJECT:

DATE:

## 2 OASIS SCENARIOS FOR HACK

① MP3000 ONLY

Embedded BitF park

2 OUTPUTS

2 INPUTS (TBD)

REMOTE I/F

MINIMAL OR NONE DSP (EAX)

October might be possible

② MP3000 + TI XS402

✓

4 OUTPUTS

2 INPUTS (TBD)

✓

DSP FEATURES

EAX  
TIME SAVING  
(TBD)

October not possible

Need DSP external so can have enough bandwidth left in the ARM to implement other types of CODECS.

★ Circuit - Update Block Diagram. PUT filename, revision & Date on diagram.

## Action Item Review

DAN - update MCD

DAN - Drive Remote I/F

Circuit - Update block diagram, revision, date, filename

Brent - T.I. tool initialization

John M. - SW task list, Prelim functional spec.

4/21/99

Phillips Semiconductor Conference Call

Phillips Singapore: 011 65 351 7351

Jerome Tjia

Hilbert Zhang

- Drivers avail for WIN 98, Not WIN 95.  
better support for USB with WIN 98.
- We want IOE I/F with vendor specific commands.
- ISA Board better because ISA Board allows  
Pentium to be USB target.
- USB 12 mbit second, 1.5 MB, 1.2 MB/second  
on USB side. D12 handles 2 MB/S.
- D12 supports Isochronous transfer, want block mode  
so can do ECC.
- Talk to Nic about NDA.

SUBJECT:

DATE:

Don F / John M meeting. 4/28/99

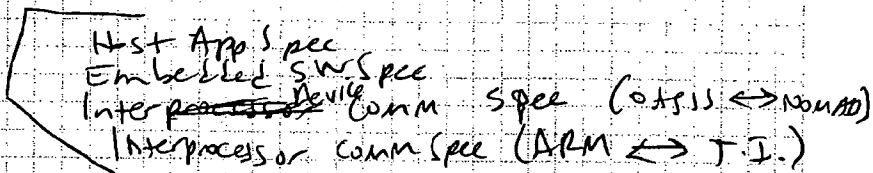
DOS needed

Tech Spec

Functional Specs

Updated MRB

Use Scenario Diagrams



TASK LISTS

Identify & purchase tools for ARM SW dev

" " " " TI DSP SW Dev

Propose strategy for implementing DOS File System

" " " " USB I/F HW+SW

" " " " O.S on embedded side

Finalize system Architecture (HW)

Decide which DSP features we will implement

Send Peng Kiet SW Functional Spec

Review Peng Kiet's SW Specs & give feedback

~~17N to 25 to 10N, University Ave,  
 through spotlight, veer right, ~~to~~ Middlefield,  
 L on Litton Litton & Bryant  
 Phone # 617 3400~~

A/27/99

Company Meeting, HOD MP3 Player Presentation

Kevin Zuo, HW Eng. David Pedell, Mgr. Ed Gould, SW  
Jody Williams, SW. Dan F, Circuit, John M,  
Brent E, Chris S, Noel W, Mike P, Steve J.  
Chris Lehner

Battery - Sanyo UR-110 3.6V 1350mAh  
Disk IBM AKLA 24320 → Best Shock #5  
ESD problems: Buttons. <sup>EMI:</sup> Will coat interior of  
unit with conductive paint, Buttons: will  
coat buttons with conductive coating.  
LCD susceptible to ESD. Adding clear window with  
1/2 mm gap.

DSP - MOT 56309 (S) 33MHz

Adding ribs along edges of housing so get  
grounding to avoid gaps. Adding conductive gasket  
to PCB to contact ribs.

HP Amp - LT 1309 810 DAC - CS4350  
MC 33206D

DRAM KM 416V410A B5-L6

FLASH KM 29LV1160 B

DC-DC - Max 890

ATX 4 P15C 32440

MOT 565 - MOT 65K C compile

AOS 56300 HW debugger via JTAG-req

Current source code: about 40K lines of C

SUBJECT:

DATE:

LCD's { Samsung } (Korea)  
 { Intech }

3.3V Graphic displays

9.5mm IBM Drive 4 GB \$30  
 2GB \$110

Cool Rhino Skin Soft Case

Contact: David Redell for Documents  
File Formats

Schematics: Viewlogic

David.Redell@compaq.com

Mechanical: Pro E

Presentation: Powerpoint

BOM : Excel

Schedule: MS Project

Users Guide: textfile

Khin Zaw: Has schematics

4/29/99

Meeting in Milpitas: Oasis App SW Ideas.

Chris Smith, Dan F, Ron G, John M.

Sonique relationship - Al Rizzo is main guy.  
Al is "pre-alarmed" to our desires to implement  
front end to Oasis ~~Host~~ Host App.

Music Match: \$3.50 Royalty per unit.  
(2.50 to Frankfurter/Thompson  
1.00 to other components)

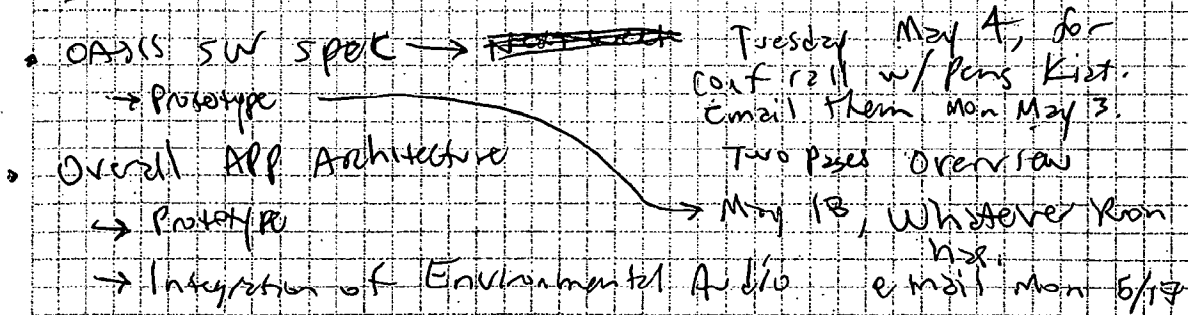
Music Match see they can provide us with all  
Xing got bought by Real SW components.

Peng Kist has CD ripping technology.

\* Ron: Made up his Oasis App without ripping  
and encoding engines.

\* We should get SB-Lives, not SBLive values.

\* Ron: Send Oasis App demo to Chris Smith.  
Follow Up:



SUBJECT:

DATE:

Chris: More important to support multiple CODECS than to provide DSP features.

Dan: Figure out how to scrub compaq BOM. (Brent did)

MP3 Long Term Planning Mtg 5/6/99

Chris S, Mike P, Bob F, Siang Thia, Peng Kiat, Cheng Sean?

Siang Thia: difficult to achieve round <sup>new</sup> segment <sup>on</sup> LCD display.

Peng Kiat: end customization of LCD increases cost.

Chris: Don't want to increase cost. Siang Thia should contact Wy at GVO to discuss

Mike: Get Wy from GVO to email Andrew andrew.baker@creative.ie, & Christie, & Peng Kiat.

Cirrus can ship 100K MP3000s by end of July. Samples available in June.

CS4250 CODEC, & U4342 DAC.  
<sup>^</sup> not avail <sup>^</sup> Avail

142 mA is power consumption of MP3000 decoding MP3. 220mW is Nominal II power budget.

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SUBJECT:

DATE:

5/6/99 cont

Normal II HW: Almost done with  
Micro23 solution. FW: Almost done, but  
need voice recording & USB code. On track  
for August ship.

If use MP3000, two month rhp. -> OCTOBER

Cirrus said they would give Creative the  
source code for MP3 decoding. Since this  
said they needed source to control power consumption  
issues.

Cirrus Dip APPS: Brad } said we could  
& Steve Hagg } have source code

★ Next week: Communicate with Sirig Thia  
about remote control interface

will have  
ready 5/14/99  
for  
firm

Schedule (Normal II)  
10 weeks to releasable HW + FW.  
Late October production.

★ 2-3 weeks: Choose MP3000 development tools.

★ Send Sirig Thia email trail on  
MP3000 tech questions.

passed  
out



Oasis Meeting Agenda for 5/12/99

- ① SOME Compliance - How much time should Oasis team spend dealing with these issues? Should Oasis team member be on email reflector list for next revision of spec? (Mike P) ✓
- ② New employee Introduction. Renee interview? ✓  
News on Andrei?

MP3 Long Term Planning Mtg

5/13/99

Robin, ~~Mike P~~ Lai Yong, Lee M, Chris S,  
Mike P, Dan F

- Review of Oasis SW MRD.
- discussions about encoder technology - we have 2 mtg. with Real Networks next week, they bought KING.
- Need Import function on Host SW. i.e. import from WinAmp, existing MP3, (no wrapper), Real Jukebox
- new API for other applications so other vendors SW can download to Oasis / NAMA.
- Robin has finished API for Normal II download, they will give to MUSICMATCH.

Action Items

1. Lai Yong. Singapore works on SW spec on their side. will provide some bitmap screens.
2. E-mu rewrites SW MRD
3. Chris S. Contact Eng'rs from other groups (Kevin S.) & talk about how to interact.

- ④ Program flow diagram. Prioritize tasks, so can identify most important functions. Want better customer definition in MRP.
- ⑤ Data Flow diagrams.
- ⑥ Run C-Drive Datas/CUI look & feel  
NOMAD

Lesson learned:

→ Pictures/Diagrams drive productive technical interchange discussions. Since E-mu produced system eng. diagrams, we should drive development and continue system eng.

→ Send George L DSP papers by  
Oscar Le Rode  
5/19/19

## SW REVIEW

- Chris is using the ARM tools.
- ARM tools v2.5 on 60 day loan to Sidney

SUBJECT:

DATE:

Meeting in Milpitas

Signs Thira, Sky, George L, Lee M, Paul Morada

MP3000 News from Texas:

- ① JTAG port broken
- ② DAC power-burn pin broken
- ③ Audio is 15 bits, not 16 bits.

PIN is 7209 → GET 7209 Data Sheet

④ Cirrus Removing DRAM

Synapse Team:

Signs Thira HW  
 New Hire HW  
 Sky FW  
 SR Asst Prototyping

4-bit Micro

STC4104 \$0.80

Peng Kinf } convergence SW, Apps SW.  
Robin }

→ other MP3000 problems:

- ⑤ MP3 Demo used 32 bit wide FLASH.  
 16-bit FLASH w/250ns Access, uses 35% more MIPS.  
 99% increase for 8-bit wide

→ Signs Thira will use 64Kx16 SRAM for code space. 4-bit micro is used to bootstrap code. Micro is used for battery monitoring, wired remote, etc.

SRAM cost: \$1.80 (D2m On default)  
ISCI

- ⑥ Simple phase conversion req'd for MP3000, because MP3 FS output is fixed at 44.1 kHz

→ Pursue buying MP3 code directly from ARM

Arm Contact: (for technical info)

lance.howarth@arm.com

Involved in development of MP3 decoder in ARM.

→ T.I. has MP3 decoding available.

Gay Johnson is T.I. guy in charge of MP3 project.

### SW ISSUES

→ Cirrus is using the ARM tools. We should use V2.5 for compatibility with Cirrus.

→ Kernel. P2K & Audigy use a kernel which has a C++ wrapper. Want to add message passing mechanism to this kernel and use it in O2512.

LCD: PS040 Samsung LCD controller.

(nice scrolling + fonts) 128 X 64, No backlight,  
\$6 @ 50k/month.

SUBJECT:

DATE:

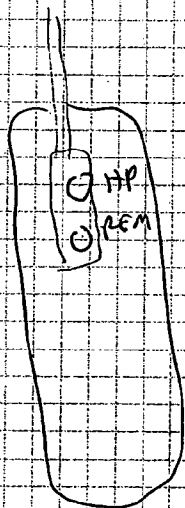
## Action Items:

★ Identify which Samsung LCD Controller/Driver chip that accommodates 1280x64 (Size This)

→ NRE cost is Verizon Mfg MGR  
 → NRE cost is Bonus. Quote Backlight Separately.

★ Forward info about National USB chip (Dan)

★ Look at SSI 1 on MP3000 for download  
 to Nomad II (Mixed with I<sup>2</sup>S PORT)



★ Since This will use Dig I/F Idea outlined for Oasis, POST ON WEB SITE

Vantrox LCD Meeting

5/17/99

Lim Sok Lee, Product MGR MGR

Soklee@vantrox.com.sg

CJ Chang, Mkt Mgr changcj@vmsb.com.my

Alex Marinescu amrinescu@earthlink.com

Girault, Lee, Steve, Dan

LCD Interface over Flex Cable:

MPU interface

3 pairs of wires to connect to Titanium Capd for  
Voltage doublers

1 pair for LCD Contrast Resistor

PWR, GND.

With KS0040 Controller, can have side icons

Quote Request:

64 x 128 + icons on L &amp; R of display ✓

3.3V ✓

One column of icons on each side of glass ✓

.35W x 0.35 H x 0.03 spacing for pixel size ✓

Flex cable off top of display ✓

No backlight ✓

STN &amp; FSTN, both quotes ✓

0.7 mm glass ✓

QTY 200K, 300K, 400K / yr ✓

Steve T will send email RFO

SUBJECT:

DATE:

Hitachi. 66727/29 Alternate Controller.

5/10/99

Motrola meeting

Terry  
Flip Lockhart } MOT

Dan, Girault, Brent

MOT 56362 - MP3 decoding planned.

MOT 56363 - ISO MP, USB slave, 40KW RAM

RUHASO@email.SPS.Mot.Com  
Hnx1138@earthlink.net

5/20/99

Peng Kiat's Conference Room

011 65 895 4000 x4610

AL

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Perd Networks meeting

5/21/99

Tony Folell

Music Strategy & Business Development

M Y Jaisimha

Music Group Manager, Jukebox Mgr  
Embedded Systems

Chris Eddy

Mgr for San Luis Obispo Group

Nick, Chris Smith, Lee M, Dan F, Vincent Tong.

G2 CODEC Requirements.

5x lighter than AAC, 5x smaller, tolerates packet loss & error loss interpolation. Error Recovery.

AAC decoder: Used 50% of 50 mips on fixed point processor. (PowerPC core)

Currently, G2 Encoder/Decoder is just mono. Joint Stereo in the future.

Confident for TI 54X, decode.  
(70%)<sub>now</sub> ↑

Encode & decode algorithms use 90% of the same code.

CODEC uses 20K x 06 code space.

will fit in 16K of TI 54X RAM.

G2 Algorithms @ 4 - 06 x bps, 40 kHz sample rate.

→ Check out Strong Arm processors - 1mw/mip (Intel)

G2 CODEC uses 10% of <sup>(Pro)</sup> P2-Low.



SUBJECT:

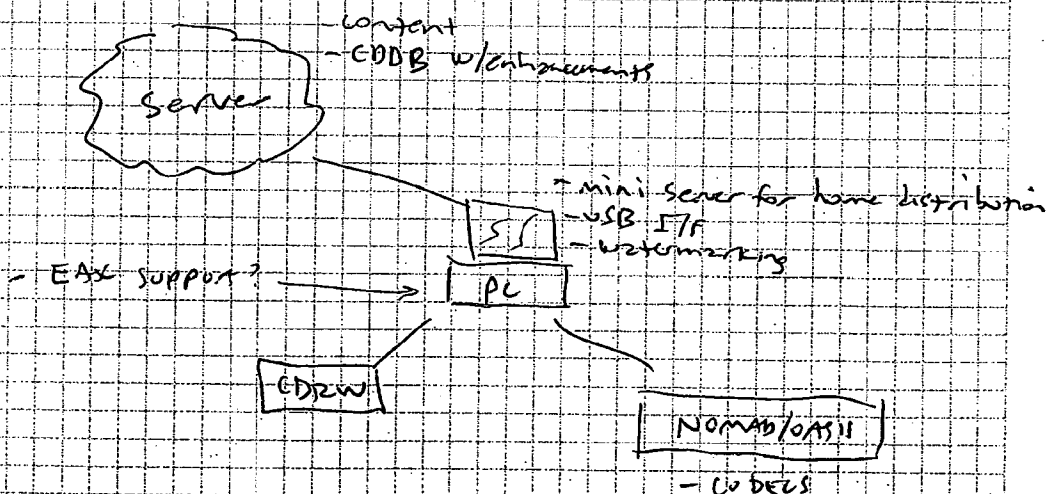
DATE:

→ Contact Jaisimha about issues regarding putting G2 CO DEC to our target system.

Security - G2 will add transparent watermarking, tethering features.

### Benefits of Real Partnership

- ① Reduces risk on Apps Development for Non-Android
- ② Reduces Cost
- ③ Promotes Uniform user interface across HW platforms
- ④ Playlist Management on OAS II
- ⑤ Flexible use of encoder
- ⑥ Multiple Support of encoders
- ⑦ Co-marketing
- ⑧ Content



Oasis Eng Meeting 5/26/99

Hack: News from Mike from Hack

- Singapore has quoted 6 month turnaround to production from drawings.
- Hack visiting Hosiden in Japan, they quoted 3 month turnaround so Hosiden may manufacture Nomad II/Oasis
- We could have VTEC in Malaysia quote production.
- Hack wants IRDA port on Oasis. Creative has infrared remotes for Cambridge & COKOM.
- ★ Hack wants Oasis website restricted. Help Desk ticket for password protection.
- ★ Hack: Figure out how to make Oasis work on "Dingstone batteries"
- ★ Hack up with patent guys so they can review Oasis for new patents or patent infringement.
- Differentiate Oasis from Nomad - Nomad wearable, Oasis "portable". Tablettop book.
- Publish API so others can write SW for product. Also need SDK for developers.

Circuit

- Drawing schematic
- DAC control will be via I<sup>2</sup>C
- We're using ~~4342~~ DACs ~~4342~~ ~~4343~~ ~~4344~~
- ★ Grant - put together prelim BOM next week
- Phillips low power low pur ADC Avail.

SUBJECT:

DATE:

Scott W

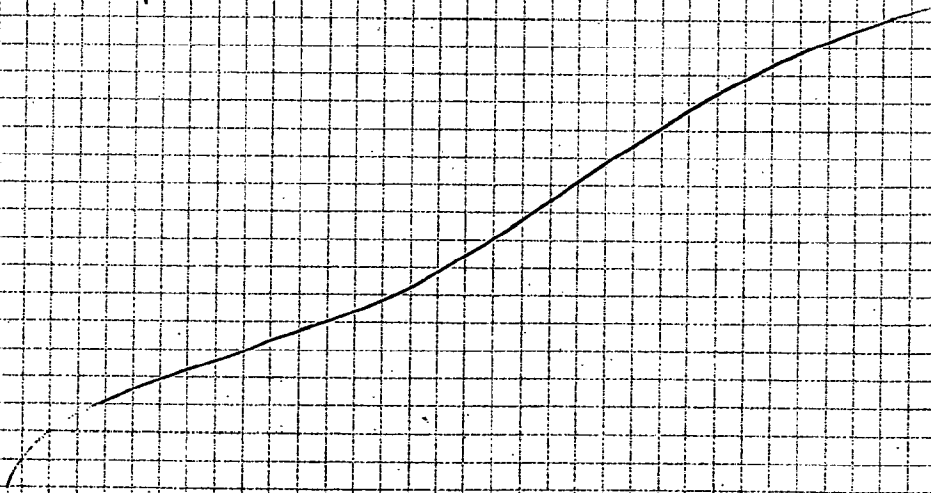
- People liked time compression/expansion demo. feeling is that Linux is max useable compression rate.
- ~~RE~~ SRL required in basis to support multiple sample rates?
- Scott - Unpteen different SRL's avail from tech center.

Lee M

- Kernel development resource - who can implement enhancements?
- Dan - send out SW docs to Singapore.
- Terri - get ice functional
- begin porting of kernel onto ARM. Lee M.
- Discussion of host side dev tools.
- New VI demo avail on Lee's laptop.

Vasu

- Comparison table of 3 filesystems avail. Linux, DOS, Fast Filesystem



SUBJECT:

DATE:

SDMI Meetings

5/26/99

Lee M, Dan F, John M, Lee R, Mike P,  
Chris S, Brian L, Scott W.

• SDMI Issues for Oasis

Feature	SDMI Compliance
"Move" Content	✓
Redistribute Content	✓
Exchange Songs from PP to PP	X
MIC In (Voice Grade)	✓
Backup <del>(Voice Grade)</del>	✓
MIC In (high quality)	X
Line In (Full Band Stereo)	X
DIG I/O (content) SPDIF, USB, etc. <sup>"non-sac"</sup>	X

6/2/99

Oasis Eng Mtg

Scott W, Steve T, Dan F, Lee M, John M  
Brian L, Circuit (next week scribes)

Staff changes:

Terrif,  
VSAU,  
Andrei  
John M - Filesystem

HR getting resumes.

Cont Calls

Lee will drive issues on ABTSW  
Ron can attend optionally

Next call

Cont call from E+M, include Chris, Lee, John,  
me.

SUBJECT:

DATE:

I/O / Mechanical

- Normal team wants IRDA - we need to give our opinion. Oasis will want to get rid of wired remote.
- Find out about Creative wireless remotes from Chris Smith.
- Steve: Holding off on more ID until PCB layout study.
- Leb: Settled on controller, Steve will ask about making pixel column for LCD columns.
- working with circuit on layout issues. PCB space crunch. Might need 6 layers, or 2 4-layer boards.
- J. Cauly will forward of PCB layout rules for Singapore. Mike P will forward.

HW

- Circuit wrote up feature summary for Oasis prototype. Circuit: email Dan does, dan will post on web.
- Sample rates: Brian L will give circuit table of common sample rates for MP3 decoding.
- 44.1 & 48 sample rates supposed in HW, glitchless clock switch method.
- 11 buttons + volume encoder + Lock switch
- LED has backlight under SW control
- No support for "Drugstore" batteries
- Built in batt charger tailored to NiMH batteries only.

Oasis Eng Mtg

6/2/99 CONT

- SIM is going to insist on an I.R remote control for Oasis

DSP

- Scott still doesn't have T.I. Eval board. Not really holding him up.
- Demo for time scaling still available, in Tech Center. Feel free to play with it.
- Need to figure out how to load code into T.I. DSP - another JTAG header for DSP? or can use one JTAG port for both processors?

SW

- Vaso documented environment for Cirrus Rev system, couldn't get ICE working. ICE eval period ends this week.
- Brent will find out when we can get eval board from Cirrus (7212)
- Niel & Lee discussed using GNU Ecos real time OS. Opinion: No real advantages over E-mu OS. Hack wants to see evaluations of OS's are looked at, he wants us to use a commercial OS. (Wind) ("Kernel" is our prop)
- Lee M will send out info on Host API to Singapore Group.
- Lee sent out email outlining division of SW tasks across Oasis & Nomad. No response from Singapore yet.



MFG TESTING 6/3/99 CONT

- ① PCBA Test: Functional test. (can load some code.)
- ② Assembled Unit test: load more code, do post-integration test.

### Remotes:

- ① Infra for CD Rom Drives
- ② CD playback, mouse key emulations
- ③ DVD playback functions.

Remote costs \$1.20  
 battery \$0.25  
 will send us spec

IRDA receiver: HP  
 NOVA  
 SIEMENS } not much equiv. need 30-40K modulation type for IR remotes.

### LCD

- ① Samsung likes the K50713 → 5.30" 132x64
- ② Citrus 6e2 has graphics library for 7212

→ too large for mechanical constraints for Nomad II (Y dimension) so they have problems, and won't have room for icons on top & bottom.



SUBJECT:

DATE:

6/3/99 CONT

① 2st circuit about display interconnect

Board up by 3<sup>rd</sup> week of June.

Lee sez GPIO is fine.

→ Plan on using GPIO.

★ ① Send Peng list button layout &amp; DOS exe.

★ ② Send " " Navigation functions that will be implemented on OZSIS.

USB

BY TUESDAY AM

• use Phillips P2A. Need NOP's between bus accesses.

Circs: Brady will provide tech support. Will have

→ Stuart

20 samples by 6/14/99. (7209)

Next week call (Host SW)

- ① what things do we implement on front panel.
- ② navigation methods
- ③ host side: What is our spec.
- ④ Review SIN protocol spec, give comments
- ⑤ Resources - who does what, especially on host side

→ JULY Peng list might visit U.S.

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SUBJECT:

DATE:

Internet Mfg

6/4/99

Bill Jordan,

Olin Sibert  
Dir. Product ArchitectureRich Landsman  
V.P. Prod Dev & Support

Don F, Lu M, Chris S, Brian L

Products that may employ Internet:

NOMAD  
OASIS  
SB Live!  
DIGITAL VCR  
CAMERA

Sound (2nd Security): Could eeprom store cryptographic key? (Olin's question)

Nomad II Security: want 24K of memory (operating)  
16K of ROM

16K of RAM resident code + data req'd by Internet environment. for (ARM 720)

32K for "strong" security complete system.

16K for "less secure" system.

Expensive step: downloading to device. During playback, continuous "lightweight" decoding. For strong encryption, about 1 MIP.

Raw crypto primitive: 700 bytes. (Internal RAM)

Summary

16K-32K RAM External

more than that in FLASH (~40K)

~1K internal RAM for decoding (strong encoding)

~1 MIP realtime processor overhead (16 byte deskeys per millisecond)

SUBJECT:

DATE:

6/4/99 CONT

There could be problems with exporting crypto devices from Japan?

MPPM micro player Rights Management

MUSICMATCH will implement Internet environment, but MUSICMATCH will need to add features to download songs to Nomad/Oasis.

1st step on Nomad II: Implement downloadable FW with encryption, so later can download secure O.S. that has complete MPPM features.

OASIS ENG MTG

6/9/99

Present: Lee M, Dan E, Scott W, John M.

Liste: Ron, Circuit

STAFFING NEWS

- Mike writing AZ for MFG Eng, will place in paper.
- Matthew H possible candidate?
- Andrei starts 6/21, IDE, integration eng
- Neil: will work part time, maybe on Friday/Saturday

Schedule

- Steve & Dan will update IO & Mechanical & Electrical schedule.
- John & Lee will update SW tasks. Will complete by next week. Will include contingency planning.
- What w.t.p. schedule Monday AM for Mike Price

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HW STATUSDSP STATUS

- GOTTI board yesterday
- Implement EQ feature for SB Live!, will only take a couple of days.
- Need to identify a PC for Scott. Take PC from V&V's office.

HW

- 3/4 schematics done
- Brent almost done w/ Pwr supply stuff
- Girault working on PCB
- New cost collup. Pwr supply is \$24
- Minimum BOM: \$147
- In 3 weeks: Finish BOM (Prelim), send to Mike Chew for costing
- Danny should help Girault with schematics. Danny can finish Brent's schematics also.
- Design Review Friday - Prep for cost vs. feature tradeoff.
- Mark C. write DVT plan & anticipate test SW reqs.
- IRDA I/F - will discuss at Thursday Conf Call.

SW

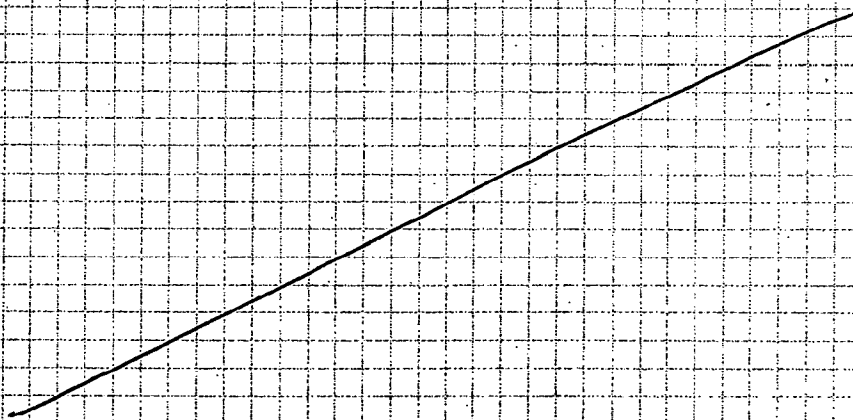
- Have 1<sup>st</sup> SW work call this week. Host & Embedded F.I. will be discussed, Host API, embedded U.I., common Dev. efforts.
- Lee did prelim Filesystem Proposal
- Host API spec Lee wrote up last week. Ron says O.K.
- Haven't responded to Host App proposal from Robin that was sent last week.
- schedule.
- Ron found big collection of "real jukebox" type applications on the web. Must be foreign.

SUBJECT:

DATE:

Hock's Staff meeting news

- Hock wants weekly status reports. Creative has 2 std format
  - ~~Hock~~ Hock wants us to take complete control over Oasis, including MFG issues. Have Creative MFG it if they can, otherwise figure it out.
  - Hock wants our group to focus on Oasis. I.e. not spend too much time working on Audiologic chip w/SET.
  - Hock wondered if we have any MAC programmers.
  - GM meeting will be in Milpitas. Sam will be here, we should present Oasis to him so he can give us feedback in time to incorporate it.
- AOB
- Mike will ~~not~~ send us new product map ideas. Can use this to persuade Fujitsu to give us killer disk price, because she will see future sales.
  - Lee wants highest capacity 215" drive to test FilterSystem issues, and startup current issues, etc.
  - we should hire a diagnostics engineer.



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AL

Desis Conf Call 6/10/99

Cheng Soon, Lai Yong, Siang Theng Brent,  
Growth

- ① IRDA - Height Limit for IRDA module. They will use Siemens Infinium (Low power)

See Nov2 App notes on how to support IR Remote.

Lower cost modules → 3mm x 6mm x 5mm  
or larger.

Go for 3 meter range

Everlight IRDA equiv to HP HSDC-1001

IR Remote lead time: 4 months to change FW and screen front panel.

- ② Schematics - 80% ~~done~~ complete, frozen next week for Nomad II. BOM the following week.

- ③ Cirrus ~~Dev~~ Dev Board - They fixed the JTAG port. SKY is trying to make it work. Voice recording doesn't work.

Auto detect on ~~ARM~~ ARM ICE doesn't work. Must configure manually

CS4342 not ready.

D12 chip works with the ARM chip. Phillips D12 chip quoted at \$1.80

SUBJECT:

DATE:

④ LCD - 50K Lec from Varitronix. Soz difficult to route 110ns. S.T. will load 1mb.

30 pin 0.5mm spec. on flex connector.

\$5.45 for 1st 100K.

\$5.30 after that.

20-30 prototypes for \$12,500 NRE.

(include backlight) design drawing for free)

We should let Varitronix quote backlight.

BOM Cheng Hoon Leong will do BOM costing, CC S.K. Chew.

⑤ Interest

⑥ Components. Volume encoder is Panasonic. Sony uses one also on its voice encoder. \$1,00 plus

⑦ All pushbutton switches are \$0.18

⑧ 16 bit switch - S.T. will provide.

⑨ 1/8" JACK: Haridech

SUBJECT:

DATE:

HW  
Oasis Design Review

6/11/99

- We will implement IrDA on 1<sup>st</sup> prototype
- We will use AAA batteries.
- 1<sup>st</sup> proto board will be out-of-form-factor board with Logic Analyzer Headers, and a prototype area.
- Include power supply header for connection to bench supply.
- Buy another HP bench PWR supply
- order of priority of features to kick off

① Don't bundle batteries	\$8
② Battery Charger	\$4
③ IrDA + bundled remote	\$4.50
④ Line Input	\$2.75
⑤ DSP Subsystem + 2 <sup>nd</sup> output	\$7.00
	<hr/>
	\$27.00

SCHEDULE

• Schematic Design Review	Friday	6/10/99	
• PCB Placement Study	Monday	6/14/99	
• Layout Stress	<del>Monday</del>	6/23/99	
• FAB Starts	WED	6/30/99	
• Order Parts	WED	6/25/99	Jeanne
• BOM	WED	6/23/99	Girault

OTHER

- Brent: When can we get 7212's?

## Oasis Eng Mtg

6/16/99

Present: John M, Ron G, Lee M, Girault, Steve T,  
Dana E, Scott W.

Short term proj. plans

- Must hit CES show for Oasis, January.



SUBJECT:

DATE:

SW

- Lee in "spec mode". Focusing on PC side of Spec world.
- Have new eval board for cirrus.
- Chose ARM tools, will buy 2 sets. Have 90-day trial on tools, so O.K. If we don't get real licenses immed.
- Lee & John flushed out the SW sched. Might be able to justify opening 2<sup>nd</sup> SW req.

Mechanical:

- Decided to use 4 AA batteries. Makes pkg larger, but this is O.K. because Oasis not wearable, it is for desktop.
- LCD: ordering Nomad II protocol. Oasis proto: use E-IV display
- Can chop time off schedule by using Nomad II display. Need to rotate display so can accommodate soft keys, which might not work because of viewing angle.
- Danny getting started on PCB placement study. <sup>building</sup> <sup>library</sup> Taking longer than expected.
- Remote control - If we bundle remote control, need to design new screen & change FW. 4-month lead time.

HW

- Working to finish schematics.
- Working with Danny on PCB Spec study.
- Lack of established procedure for creating Orcad Library parts - extra work incorporating Brent's schematic

SUBJECT:

DATE:

- Design Review Friday - Schematic review
  - Resume Set List
  - Block Diagram
  - Schematic review
- Dan can help on components issues.

DSP

- will come up with schedule estimates soon
- TI development environment is not as "plug and play" as first expected
- Swatt will order sound system for his cube over here.

Balance Sheet

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Dan is anal</li> <li>• meeting ended early</li> </ul> | <ul style="list-style-type: none"> <li>• not enough friction bet employees</li> <li>• no snacks - want Oduwallas provides</li> <li>• Patrick please: Betty's peers party?</li> </ul> |
|--|--|

SUBJECT:

DATE:

6/17/99

S.K. Chew Cont Call

- Want local proj mgr in SIN to coordinate xfer of design from USA to SIN
- S.K. Chew asked <sup>his boss</sup> if someone was available to help us with component sourcing
- We could send S.K. Chew a prelim BOM.
- We're targeting January for full production.
- Fujitsu: They want our product roadmap so they can see future opportunities. Fujitsu may give us better pricing than laptop vendors if there is sufficient volume. Possible they could achieve < \$100 price point.

Nomad II / Oasis Conference Call 6/17/99

Lai Yong, Siang Thia, Steve T, Dan F.

- No IrDA on Nomad II. AM Radio instead
- No mini jack for data xfer, either.
- Use some sort of USB master gizmo to accomplish Nomad / Oasis data XFER
- Siang Thia will send us pdf schematic.
- BOM ready, will send.
- Verimix will finalize quote today. S.T. will fwd.
- \$.30 for LCD backlight.
- Nomad LCD: COG chip on bottom of glass.
- Need to cover chip with tape on other side of glass.
- Might be able to get PRO-E database via ftp  
Side & Cheng Soon could make official introduction.

CONT

6/17/99

- New electrical interface for LCD! Contacts on bottom of cable, so Flex connectors will have contacts on bottom, Lock on top.
- Looking for data sheet on volume encoder.
- Sing this:
  - additional LCD modules QY So
  - LCD Drawings to Steve
  - Flex Connector: send to Stewart
  - Schem/Bom to Dan
- MFG Head:
  - Cheng Soon: 2 ways to MFG ① Great Internet  
→ Quek Siew Kai (Internal Assy)
  - ② Chan Ming Plat, (contract MFG) he would coordinate tooling
  - ③ Mech Ind Design Chua Hiap Chew Head
- Rev C of 7252 avail in mid July
- 7209: current rev is Rev B with metal changes.
- Sing this considering Intel Strong Arm & T.F part, because Cirrus has issues with Triton (sued them & won), could be legal issues if we use Cirrus.
- Oasis should have USB Master capabilities
- 2mm stand off Smartmedia Connector - we can do mechanical study
- 2mm height Smartmedia Slot  
offset

SUBJECT:

DATE:

- we should put SmartMedia slot on Oasis prototype.
- Steve will put drawings on our web site.

## Real Networks Conf Call

Jeisi, Mha, Tony, Fedell, Vincent, Mike P, Ron G, Dan F

### Jukebox SW Issues

- CD Ripper: Real is improving the CD ripper
- GUI: change to customize for Oasis? Major customizations: they give us API. Minor issues: (i.e. branding) They could do
- Ron: proposes "Windows explorer" type UI.
- Jai: we could propose changes we want, they let us know which changes they will make & when, we could make major changes on our own.
- API: Real has 2 classes: PD Api, SD Api.  
 possible device storage device  
 zip, CD, RW, etc
- API set mailed down in 10 days or so. Ron will get these.
- Branding: Compact mode of Real Jukebox is re-skinnable today.

### Internet, & SOMI

- Real can pursue Internet support if we need it.
- SOMI participants, Liquid Audio partnership is being pursued.
- NDA issues prevent further discussion.
- IBM, Liquid Audio, A+B solutions are possible.

SUBJECT:

DATE:

schedule

- 10 days we'll get API
- Ron will list of proposed changes to Real
- Need schedule: Beta/pilot late October
- budget about 4 weeks "after we start" to get first-pass functionality into Real Jukebox for Oasis
- "Gold" version of Real Jukebox is 10 September
- Need list of milestones.

Next Steps

- Vincent & Raj are talking weekly
- in place. MP3 codec, Oasis, Broadband PDS  
Soft DVD Support.
- Could start development based on "letter of intent"
- In about 2 weeks, could start development, if business deals work out.
- Jaisimha will be in Bay area next week or week after.

6/21/99

Oasis HW Design Review

Mike P, Tony, Vincent, Steve T, Brent, Andrew V,  
Lee M, Dan F (scribe)

- BOM (NOT VMC) is now \$175. I/O DA, ADC, Box, AC  
Adapt, etc not included. change more \$\$
- Pb6<sup>5</sup> regulators swapped, fix
- Bypass caps - use 0.01 uF instead of 0.1 uF?
- Input level protection on line inputs? ~~fix~~
- Static Zap protection on line inputs & outputs?
- RESET pins on ADCs - want under programmed I/O control. Also USB & IDE resets.
- SA2: backwards slide on UA

SUBJECT:

DATE:

- BATTERY SOLUTION NEEDS THOUGHT. Built-in charging circuit could damage Alkaline Batteries
- SH3: I/O pins are 3.3V, not 2.5V. Fix symbol for TI DSP
- ~~SH3~~: All sheets: merge  $\nabla$  and  $\equiv$  GND symbols
- Add 4 grounded mounting holes for Disk Drive
- SH3: Want independent resistor for DSP.
- SH3 & related pages: D[15:0], not D[31:0]
- SH3: Tie N[0:5] or SRAM to upper order address pins so can accommodate larger SRAMs.
- SH5: ~~How~~ How to connect 8-bit peripheral chips - what part of Data Bus? Find out from LIMS
- Need bypass on U16 SH5
- Need pullup on P- or D+ on U16, not 1M pull-downs
- SH6: D6 Reversed
- SH6: Q5 & Q6 Backwards?
- SH6: make R37 larger value
- NEED TO REDESIGN BATTERY CIRCUITS FOR SERIAL BATT CONFIGURATION
- SH7: MOVE NOCT INT TO EXTIRQ, Shift other interrupts down
- Use another int for BATTERY, don't need FCT int SH7
- Need pullup on PB3, PB2, PB1, PB0
- SH7: put appropriate pu & pd on 7212 Tie off unused inputs.
- SH8: Rename buttons
- Finish SH8
- Draw SH9: HP analyze headers, power supply header, 9-pin serial port. Boardboard area
- Add GND testpoints to PCB.

part REQS R/100 out.

REQ #	QTY	MFG P/N	E-mv P/N	whse
0369	50	TMS320VC5402	IC10279	TI DSP
13533	10+50	EP7212		Circuit 7212
13534	50	CS4343	IC10277	
"	50	CS4344	IC10278	

Oasis Eng Mtg 6/25/98

Lee M, Mark C, John M, Steve T, Ron G.  
Mike P

Schedule:

- Don worked on schedule: Lee 4500% allocated, PREP ends up being in 2001. Need 2+ SW engs.
- Girault resigned. Need replacement HW eng.
- HW + Mech schedule rolls up to 2/11/00, could pull this in ~~2~~ a bit possibly.

Staffing

- Girault resigned.
  - Andrei started
  - Need 2+ SW engs
  - Lee ~~for~~ identified 2 EE's on this side of Hill
  - Need manufacturing engineer - support?
- short term plan

- Girault: ~~Get~~ Get PCB in layout
- Jennie: Order proto parts
- Goal for product demo: EARLY-mid September.
- Could get component eng in SW to help us



SUBJECT:

DATE:

Provision components?

6/23/98

SIN

- Storage Manager Spec ready for initial review.
- DSP Side of ~~SM~~ reviewed with Niel.
- Ron gave ideas on Host API on Agenda for SIN Conf Call today.
- 4 Host App proposals: Robin, Reel, Music Match, one step.
- Ron will get in contact with Dennis from Music Match.

Mike P

- Chris insists that we come up with a scheme to communicate bet Oasis & Normal II
- Friday: Mike P will meet with MKTG people (& possibly SIM) & discuss Oasis & related issues.

Staff needs:

- Product Mgr
- MFG eng
- 2 SW eng
- 1 HW eng
- Component eng reporting to S-k. Chan is assigned to Oasis.
- Portable USB Mass/Hub module.
- Chris doesn't expect Oasis to be SDMI compliant.

Meeth

- Denny started prelim layout & spec study.

SUBJECT:

DATE:

## Vacation Checklist

6/23/99

- ✓ ~~Update schedule~~
- ✓ ~~Call Dennis Mudd from Medic match~~
- ✓ ~~Get Jennie moving on parts ordering~~
- ✓ ~~Get circuit to author on "Assembly Bom"~~
- ✓ ~~email autoreply setup~~
- ✓ ~~vacation email~~

## OSIS Eng Mtg (Cont) 6/23/99

• planning forward in I-Q.

- Will start up mechanical effort week after next.
- Bagged down doing components sourcing.



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SUBJECT:

DATE:

Nomad / Oasis HW Conf Call

6/24/99

Oasis / Nomad Connectivity

- No IrDA on ~~the~~ Nomad II
- Oasis doesn't need IR transmit, only receive.
- For Nomad  $\Leftrightarrow$  Oasis connectivity, we can make external portable USB Master accessory.

7212 Issues

- Resistor changes req'd to make JTAG work on EVAL board.
- Problems getting board to work? Contact SKY.
- The IFS output interface is MSB justified, forcing us to use Cirrus DACs?
- The Phillips USB chip works.
- MP3 object code doesn't fit into RAM in 7209. We want new object code from Cirrus that fits in RAM. Expected by next week.
- ISFDU logical read is up. Doesn't work streaming to 7209.
- Verify compiled code size for MP3 decoder  $\rightarrow$  WE should do this. Can we get new OBJ code from Cirrus sooner?
- Weekly meetings 8:45 AM (ETW) with Cirrus.
- Siang Thia will send errata list, on his schematics.
- Send ID design concepts to Peng Kiat.
- Need delay on chip select to Phillips D12.
- Siang Thia will not use the pushbutton interface on the 7212.
- Change in LED Backlight: Want embedded LEDs in Light Panel. This cost \$0.05. Pins on LED backlight are soldered into PCB.

7/27/99

Named / Oasis Mts Milpitas

Chang Sean, Peng Kiat, SKY, Siang Thio, Steve T, Lee M, Dan F, Christy W, Ken F

Named II schedule, etc.

H#

- Case is now plastic. Handmade case avail in August
- Mech design done about 6 August
- Mech fabbed in October
- 15 Nov: Mass production starts. 1 round of pilot production.
- Eng Run: 11 October

K#

- HW/SW team went to Texas to get MP3 code working on their board. Brian Kircher was Eng who helped - He is eng that wrote SW for Eval boards from Cirrus.
- For C of 7209 it bonded out as 7212, so we can use these for 1st prototypes.
- HW not ready - need to use different CODEC which requires extra SW (volume control chip?) voice recording quality may drop.
- For voice recording, could use 8-bit ADC (existing) or use another chip (\$1) that would provide 10-12 bits!
- Sample rate conversion? No SW support in Cirrus 7209 for SBC. Must do in SW.
- Standby current is too high.
- AAC CODEC not avail now. Must pay Cirrus for this CODEC.
- SDMT: No specific plans to implement SDMT. Plan is to incorporate Intertrust SW support.

- Christy - want rubberized buttons, not smooth plastic? Ken: use hard polymer
- Focus group - 1st one week after next, then next one in 3 weeks. 3 different cities.
- BOM cost is currently \$140 for Nomad II, Not including Remote.
- Douking Station, \$15 BOM.
- Remote: 6.95, includes headphones
- NIMT batter, 4 AA, \$3.60 1600 mAh

**BATTERIES: Black: 1750 mAh GREEN: 1600 (NIMH)**

7/29/99

Cirrus meeting

from Cirrus: Mark Laxon, Graham Wright, Scott McDonald, Matt Perry, Dan Anderson

EP7409 - Arm 7 core with Analogic Coyote DSP core.

Technical questions/feature suggestions: Scott McDonald

(bsm@crystal.cirrus.com), Eric Lindeman

SUBJECT:

DATE:

Discuss this Mtg on O2115 / named  
Schematics 7/23/99

Schematic review of O2115:

- ① F212 PE2 must be pulled down
- ② JTAG port: JTAG HDR pins 1 & 13 tie directly to VDD, 3, 5, 7, 9, 11 tie through pullup to VDD. TSTP & TSTI pins must be tied low if want to go into test mode.

to boot up cirrus system using internal boot code.

- ① Set MECHG PIN ~~to~~ (boot from VAP1) ② 9600 baud
- ② Cirrus sends "<" character
- ③ Host sends exactly 2K of code to Cirrus
- ④ Cirrus sends another ">" sign
- ⑤ Cirrus runs from internal memory.

O2115 Eng Mtg

8/4/99

Short term Proj Plan

- Get O2115 proto running sw ASAP
- Get rest of proto parts
- Get 2K emulator

HW Status

- Proto board received 7/26/99
- Some of the Pwr Supply circuitry is working (Mark C)
- Waiting on PCBs - Cirrus F212, Altera PAL, etc etc.
- ~~Get~~ Datas from Cirrus - Schedule slip.

SUBJECT:

DATE:

Oasis Eng Mtg

8/4/99 (cont)

Lee: New Org, Etc.

- We are here to be innovators. Innovation from our left.
- Working signing deal with Real. Both Real & Crest want exclusive deal. Contracting issues: SIN wants to write host SW, so does MusicMatch. ~~But~~ <sup>Vincent</sup> will negotiate business deal for Rock.
- Relationship w/ AT&T - Lee is technical contact. AT&T into broadband technology - We will make HW used to distribute content via broadband (Cable modems). This is why AAC is required for CODEC.
- New hires: Jerry Irvin starts 8/15/99. will work with Scott w/ on DSP algorithm development & PWTM.
- Howard Egan - 8/30/99. will work with Andrei on O.S., etc.
- Want to give demo of Oasis in mid-September.
- Ron working on enhanced version of Lee's GUI Oasis Simulator.

SW

- Normed might not use our O.S.

Math / IP starts (Steve)

- Got LCD Quote finally
- Got Board outlines, etc ready to - math design house
- SW tool problems: V2K remaining by AMS
- What are we doing with a docking station? Jim wants a docking station, look at putting custom connector onto Oasis. Use custom breakout cable (USB + PWR + Audio)
- Steve will give Ron specs on Lcd so Ron can simulate Lcd in his GUI Oasis Simulator.

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SUBJECT:

DATE:

DSP SW Status (Suott W)

- finally got his sound system
- ported time-scaling code & linked in T.I. library - linking problems.
- T.I. will provide training session.
- T.I. hasn't figured out how to make their Surround sound daughter card work with their eval board.
- The integrated development environment is really good.
- Tech support slow.

SW Status (Andrei)

- startup code & kernel code ready for debug. Andrei is using ARM simulator to test code.
- Project mgr that came with the development system has limitations.
- Got make file working to overcome problems with Proj Mar.
- Hooks getting linker working, poor documentation. Uninitialized variables, etc.
- Looking at USB code SIN team gave us.
- Need to post code in CRS (from Andrei and SIN)

Host SW Status (Ron)

- SIN group proposed we write a Windows App we can use to storyboard GUI functionality. Ron wants to write this so we can use the Windows code for the Oasis embedded U.I.
- working on API for Host  $\longleftrightarrow$  HW connection.
- Ensuring that APIs written by 3rd parties (liquid, Real, etc) will accommodate Oasis. (future extensibility features)

Oasis Eng Mtg 2/14/99 (cont.)

- Florence Boardogge: Liquid Audio hosting meeting (Ad hoc Subcommittee) at SDMM meeting
- Tech Center II: trying to engage Microsoft to figure out what they are doing, and to help shape the direction of our relationship.
- Redmond Boardogge: Day trip to Microsoft on 2/12.

B.J. 2/19/99

will buy 130 T1320VCS402, will buy tape & reel of 3 other T.I. P2AS.

2/11/99

Oasis Eng Mtg  
Lee M, Steve T, Scott W, Ron G, Andrei, Dan F

tel:

- Sim announced new org for Creative
- Holding company's creative.com
- Creative Labs Inc. sold, RB US
- Mfg sum: Don't only focus on creative products, can contract mfg other products.
- Development groups: creative tech financed, run by Black
- Black wants to understand all projects being worked on to create and determine their contribution to company.

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SUBJECT:

DATE:

- Example: There are only 10 engineers at Creative working on digital audio. Need to grow this group.
- Our group has ONE focus: Deliver OASIS.
- Jerry Irving starts today. (Actually Monday)
- Howard starts end of month
- Hiring Req open for EE
- Dan & Jeannie to figure out better way to purchase parts for Creative projects
- Req signed for MAE SW Eng.
- Hook adding Audio representative to kit staff so he could better understand Sound Card business.

Phillips Meeting

9/1/99

Ed Rouch, Ken Wong, Ken Lundberg

Ken says that Phillips has NDA signed with Creative

CODEC: UDA1341 TS ~ 7.3V, MIC, Bass, Treble, HP AMP, etc. Original part for MiniDisk Player \$3 / low qty low power.  
2.50 / med qty.

DAE: UDA1320ATS, HP Amp, vol contrl.  
Under \$1.

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Will set quotes on:

1341, 1320 ③ 50K/100K/200K

Will set eval board on Friday for 1341.

AM/FM radio chip >

9/2/99

Bell Micro Meetings

Peter Hock, Sales, Bill Brubaker, Tech Mkt  
MSR.

Crystal Cope: 4224

9/7/99

Meeting with James Hrice

- could do Orcad Schematic changes
- Uses PADS PCB layout SW - would have to enter Oasis schem from scratch. Cannot convert Allegro to PADS in-house.

- James uses Orcad v 7.2

→ Jhrice@creaf.com

- find out if we can share Orcad floating licenses (how to access our computers from Creative Labs)
- Next steps: James will talk to Jake H to see how much time will be avail to work on Oasis.

SUBJECT:

DATE:

Don: email James URL's to Gary's web site.

9/7/99

Meeting with Cyrex -

Bill Erickson

Bill Cross

- NDA - need to modify before Bill E. will sign.
- Outsourcing problem must be addressed.
- Cyrex designed batt system for Meter Reader product.
- Need spec sheets on NiMH batteries.
- Need to modify contract to incorporate entire supply/charger design.
- Orved
- Baby Monitor design: 3.3V dSV design.
- Don't have batteries in parallel!

### Schedule:

NDA	Fri	9/10	→ Spec / Product Data	9/13
Contract:	Fri	9/17	(Signed off)	
Spec from Cyrex	Mon	9/20		
Review Spec	Wed	9/22	— Prelim Design Review	
Design Start	Thu	9/23		
Design Done	Wed	10/4		
		?	— Final Design Review	
Layout	Thu	10/5		

SUBJECT:

DATE:

SUPPORT

- 1 identify components based on generic design
- 3 protos for debug fully assembled.
- Product documentation

D2SIS Eng Mtg 9/8/99  
 Dan F, Gerry, Scott, Dave, Howard, Steve, Lee, Andre.

MKTG: (Dave)

- Wants to confirm MRP. Dave has rewritten MRP, will distribute for approval. Kristi wants this
- Dave will give ideas for product name to Kristi
- Report from Bascus: (focus groups) Respondents love the concept. "portable enough". Storage capacity 2 plus willing to pay \$1000.
- Dan to get time to post docs on D2SIS web site.
- AT&T doing focus group on subscription music service using Creative products as a delivery vehicle (lead)
- Dave bought 2uzi minidisk player for dissection.

FOR: Host SW

- Doon Doggle to Mexico

DSP SW:

- Scott will test out EA this week. Only have 16-bit drift, so get 14-bit precision.
- Write oscillator so Gerry can test DSP HW
- Only have one EVM, which is a hassle.
- Gerry ready to output a tone to DAC from DSP tomorrow.

SUBJECT:

DATE:

- Only have one ICE, that is a hassle.
- Tool setup hinders existing schedule.

### Embedded SW (Andrei)

- fixed problems in kernel - our Board vs Cirrus Eval board.
- Serial port works, but not at high speed. Only 38.4 K
- worked out Serial I/F to DACs.
- Working on FLASH.
- Howard will work on Messaging
- Howard taking ownership of <sup>SW</sup> low architecture diagrams and documentation

### Mech / ID (Steve)

- Got Display Samples. Steve will send final design changes to Ventronix this week.
- Running H0 test in ~~closed~~ <sup>sealed</sup> enclosure, no temp rise problems.
- Mech review at I.D., we like their progress & we told them to proceed. Next week they will engineer the shell & work on UI features.

### HW status

- Got Cirrus Processor booted up
- booting up DSP
- Schedule delays due to component issues.
- Interviewed James Hrice for EE help on Oasis. Not a good fit.

SUBJECT:

DATE:

- Interviewed Cyrex for designing Oasis pur supply section. we like them & want to hire them. Lee to deal w / Creative legal & contracts.

Oasis Eng Mtg 9/15/99

Lee Dept News

- Skunker announced at Internet world.
- Steve & Lee going to SIN week of 9/11

Melch / IP: (Steve)

- ID will engineer shell, will give us 32m model soon
- Display is done, will order tooling. want samples of CCD by end October.
- Getting ready for trip to SIN.
- Using custom wall wart
- Need spec on wall wart.

Host SW (Ron)

- Excellence has been achieved
- Ron killed Lee
- New button layout, need Host Simulator Psm changes

Embedded SW

- Andrei:
- Flash programming started
  - Serial downloading started.
  - These might work after 9/16/99

SUBJECT:

DATE:

Howard:

- Shell DSP mgr. will hook into startup routine

DSP SW Scott

- need another XDS510 (ICE). Preventing Scott from doing work
- Is 16-bit math good enough? gives 9 dB SNR
- Scott is out next week.

Jamy:

- working on sine wave test.

HW:

- DAP booted
- DAC rework
- Pur supply consultants - working out business details
- will begin rev 2 scheme
- will have SIN give us partial kit.
- Calculated some capacity of basis of USB transfer time allocated 100 MB for O.S. on Disk.

Meeting with Syvex

9/20/99

Get for Syvex:

- Disk Drive Data Sheet.
- email Bill cross Orc2E Schematic billc@316@aol.com
- Get P.A. signed for balance of Syvex's hours.
- Get PIN for thermistor from SIN
- Plan for fin can over processors.

Oasis Eng Mts

9/22/99

Missing subject  
seeDave - MKTS

- No feedback from Chris or Kniti on new MKD.
- Fours group at Liberty Digital - folks very interested in high capacity player.
- Will meet with Ron today about UI features so he can spell them in MKD & Product Documentation

Ron - Host SW

- Have graphics library functional, from c-mv (for ~~LEA~~ host demo program)
- Not much new on Host SW front. Activity on APIs. Skywalker needs to be patient while we get things rolling. Liquid Audio API will be used, but need agreement first. Plan to use Liquid's SP3 protocol (Secure portable player protocol)

Steve Melch & ID

- IDE finished the shell design. will get solid model next week.
- got 18 displays in.

DSP sw (Gerald)

- automated DSP environment so can get start-up. easy
- Got CPU working on computer.
- DAC for next week.



SUBJECT:

DATE:

Embedded SW

- Andrei
- worked on Serial control part on DAC
  - Got Serial Download & Flash programming features working
  - will work on IDE Driver this week.
  - will fire up display this week.
- Howard
- System Design, Manager classes, DSP manager Queue management systems working. Playback manager.
  - worked on Patch-back countermeasures.
  - working on simulator for IBE devices & kernel.

HW

- DAC failure
- Synta signed up
- Joanni can place P.O.s for Oasis components
- Daniel MCB will handle M.T.S from STM stock

Lee Dept News

- Lee going to AEG in New York Thu-Fri
- Hook conf call tonight
- Hook back next week
- CES show 1st week in January - who wants to go?

9/24/99

Bill Cross, Syuzx Meeting

- 1<sup>st</sup> Draft of power supply schematics for Oasis.
- Bill & Dan Reviewed, things look good.
- Next step:
  - ① Component Selection.
  - ② Schematics complete
  - ③ power plane evaluation
  - ④ "alkaline test" - how dangerous
  - ⑤ is charging alkalines?

Procurement Streamlining Meeting

9/27/99

Jess, Giovanni, Steve, Ed, Daniel Mc, Dan F

- ① Ed will create a procurement database, based on buy parts DB and Purchase Order tool that Ed R has already Electronic
- ② Training session with buyers.
- ③ fields to add to parts DB: Acct #, Vendor address & contact. Electronic Signature.
- ④ Ed will champion the "procurement procedures & tools" effort.
- ⑤ Meet Friday at 10 AM

SUBJECT:

DATE:

Ozsis Eng MTD 9/29/99

Lee M, Howard, Steve T, Swift W.

• NOMAD SALES

CLI - 4.5K Nomad I's  
6K November

• 1KHz signal @ 450 mV signal: 92dB 32  $\Omega$  load  
100 mV 84-86dB

• download - 80KB/s, limited by SSFDC format  
best case: 200KB/s. Rio 500: 500KB/s

Dave Mader

- Ozsis meeting - Focus Group, will go Friday
- UI work w/ Ron & Lee

Steve - Mel & JB

- JB working on button placement
- Got ~~button~~ placement form models

Howard embedded SW

- Block device simulator, so can start file system
- DAE works
- LCD work started. LCD not plugged in yet

Swift W - DSP SW

- New version of EQ which uses 32 bits.

HW

- PCB - Kitoms from Singapore
- Power supply
- Scheduler finished

Ron - Host SW

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- awaiting for legal for contract with Liquid Audio on their SP3 API
- SDMI activity - Florence, Italy meeting wasn't real important. Ron should go to next meeting that are technical.
- Embedded SW layer work. Graphics lib work, fonts, bitmaps, etc.
- Working on UI simulation

Enjitsu Mtg 9/29/99  
San Jose

Mark - Disk & M.O. guy

Shauna Santos - pricing, customer support, forecasting

Larry - Tech support

John - MKT Mgr

Future Roadmap

Co-branding

"Specials" - Lower capacity discontinued drives, etc.

Specs

Volume

Pricing

Product Mix, 3GB, 6GB, 9GB

Options (?)

Action Items

Hornet 11L 3.2GB. Technically, goes EOL in January.

Hornet 12L 3.0GB, single head, single platter.

(Custom design for Creative, then for this new market) (not sure yet?)

Hornet 12L 6.0GB Single platter, 2 heads

12.0GB 2 platter, 4 heads

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SUBJECT:

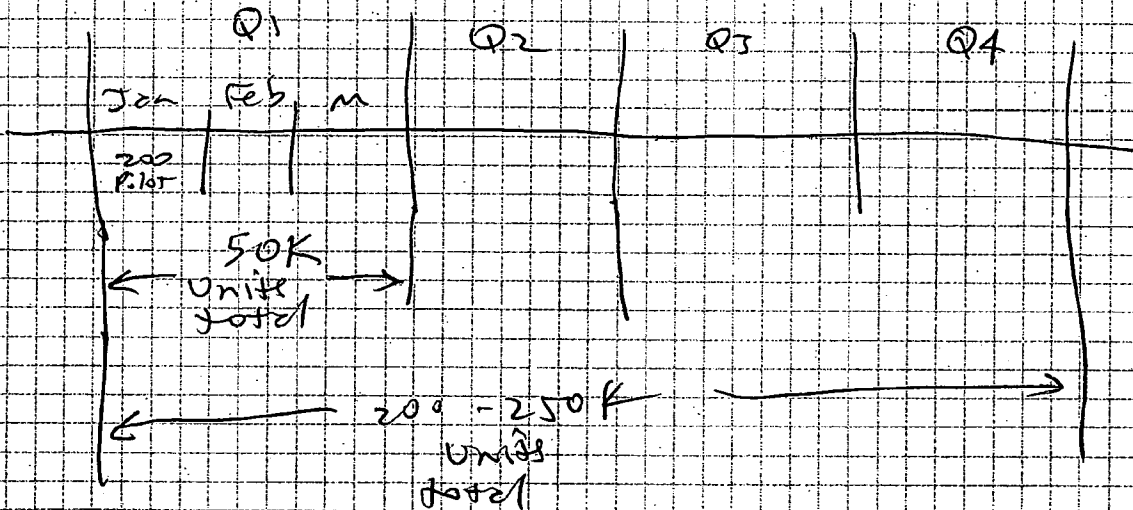
DATE:

Need samples of 12L 6GB Drive.

Optimal: 5-10 GB drives avail 6/2000.

★ Get P.O. to John Bradley for Qty 20 6.0GB Hmet 12L drives

Schedule:  
Volumes



Price Quotes:

based on above volumes Product Mix:

60/30/10 7GB/6GB/12GB

Exclusive relationship

7.0GB: \$80

Low-end target is \$90, assuming we achieve volume

6GB \$108

12GB \$TBD

For customization, need purchase specification

Fujitsu production capacity: 550K/mo by Jan 2000.

John will give me:

- ① Tech spec on 6.0GB Norret 12L
- ② "Boiler plate" tech spec sheet so we can advertise our purchasing specs.

Warranty? Fujitsu has 3 yr warranty. Could reduce this to save cost.

OASIS ENG MTG

10/6/99

Lee

• Skywalker schedule slipped to 12/10/99, due to FW.

Milestone Review

- ✓ Basic HW/bw bootup on 1st proto - SEP
- ✓ DSP playing sounds - SEP
- LATE Basic MP3 playback (RAM) - SEP
- "    "    "    (DISK) - OCT
- HW systems checked out - OCT
- Rev 2 proto, in form factor - NOV
  - Prop models of chassis
  - In form factor PCB
  - Firmware (will become critical path)

SUBJECT:

DATE:

Host App Ready for Integration      AT Rev 2 HW  
SQA release of FW      DEC 1<sup>st</sup> week

SQA #2 Release of FW      DEC 3<sup>rd</sup> week  
for CES (how) launch

(Dan says no stuffed Rev 2 PCBAs until 11/21)

So SQA 1<sup>st</sup> release in 3<sup>rd</sup> week DEC.

CES Launch (10 protos)      1<sup>st</sup> week Jan

Tooling online      Jan 21?

Production      3<sup>rd</sup> week Feb?

}  
MOVE into march

HW Systems Checklist priority:

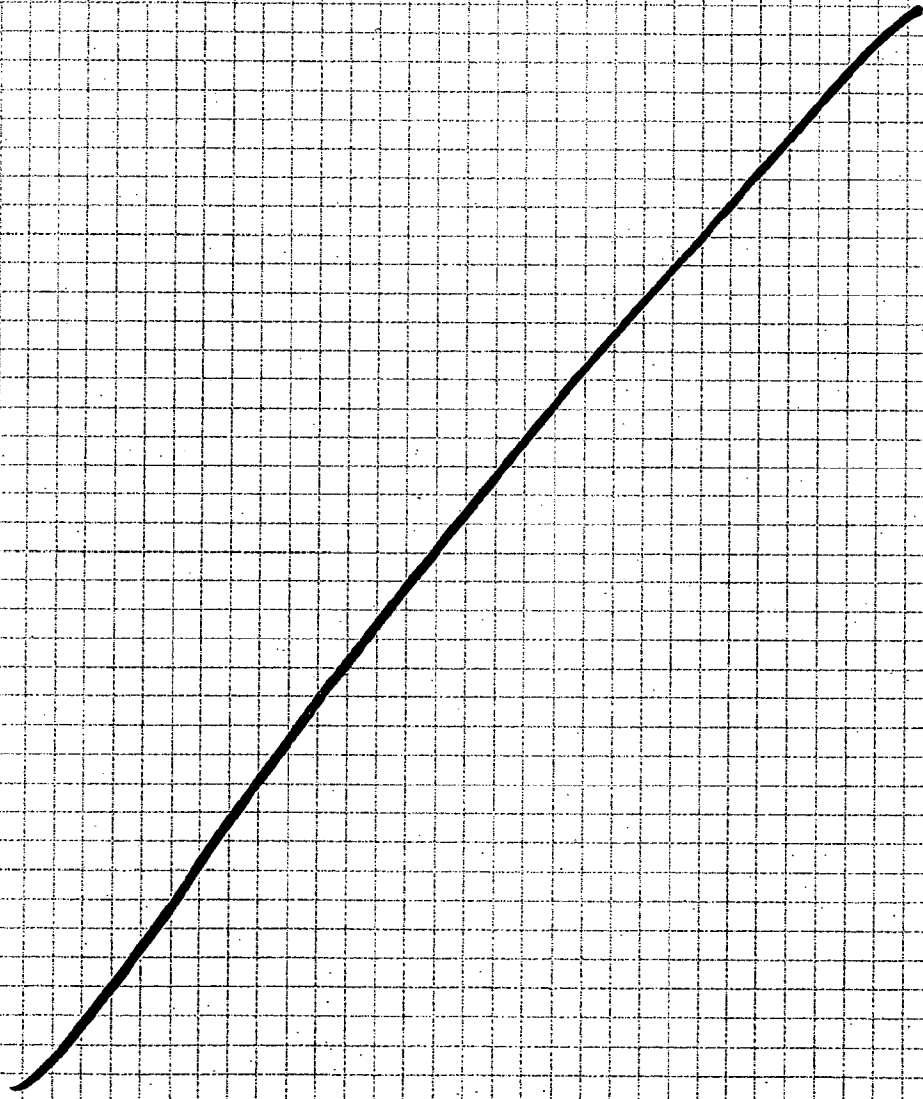
- 1 USB
- 2 Buttons / Backlight
- 3 IRDA
- 4 Power supply - push off until next proto.

Think Blu - Jack Color Coding  
(Soundblaster Standard)

10/6/99

Red microphone  
Blue line in  
green line out front  
BLACK line out rear

4 part #s





# **EXHIBIT W**

H Egan

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BOOK  
TECH  
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employee no: 109344  
department: Emu Engineering  
date of issue: 12/3/97  
logbook no: EE-109344-0004

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FRESH SQUEEZED  
\$2.20

SUBJECT:

DATE:

10/11/99

### Syrex Meeting Agenda

- ① Power supply prototyping - Syrex to fab prototype PCBAs to prove out design?
- ② Thermisto - issue - Syrex to take ownership of making power supply pass UL/FCC/CSA etc.
- ③A Systems Review
- ③ Preliminary Schematic Review
- ④ Preliminary BOM Review - Dan F to order prototype PCBAs for power supply subsystem
- ⑤ Schedule Review

### PCB Layout of Power Supply proto board:

- 3 weeks is soonest we could get board. Assumed PCBAs are avail.
- Syrex has resources avail.
- Doesn't seem worth it to fab a whole new board just for power supply -
- Bill C could come on Thursday to help fix boot-up problem - RSVP ~~over~~, if no RSVP, Bill won't come over. <sup>Thursday</sup>

10 AM ~~Thursday~~ 10/14/99  
FRIDAY

★ Lithium Batteries NOT ACCOMMODATED

★ Want power switch and RTC w/battery?  
(No, because of cost...)

→ want to use Phillips battery circuit.

→ use 2.5V to power core of EP9212 during power down. CHECK.

Then can switch off 3.3V to 7212, use 2.5V logic to latch "wake-up" line to 7212 in response to button press.

Bill C to investigate:

- ① Superceps
- ② RTC IC? (Dallas) DALLAS ID chip?
- ③ Investigate 7212 chip power-down
- ④ Send Prelim BOM

10/13/99

Oasis Eng MTG

Andrei, Howard, Dan, David, Gerald

Howard - Set milestones last week, not hitting them.

Problem: Debugging ARM tool chain, which is currently unreliable. This could hit the HW schedule, because can't spin board until toolchain works.

Oasis electronic design will be happy?

SUBJECT:

DATE:

David - Working w/ Ron & Howard, Storyboarding UI.

→ LIB button wakes up unit

"LIB/pwr-on"

→ Need "emergency" Reset button.

David is on schedule -

Need to get Kristi & Chris up to speed on product design.

Milestone: Be able to evangelize Oasis with confidence.

Andrew

Milestones: Got LCD working. Backlight works.

Started button rxn. USB checkbox is "involved", could use Phillip's code. May do

Problems: ARM tool chain flakey, hitting schedule.

Gerald

Milestones: wrote prog that takes DSP code & hex it into an include file (byte array) so can compile into ARM code.

Problems:

Slow computer in Gerald's office.

Conflicting documentation on TI DSP about code downloading tricked Gerald, got into from TI tech support.

Dzn

Milestones:

- Tech documentation on Oasis HW - in process
- PCO layout next week: might miss milestone

Problems:

got involved in rewriting issues - Steve Baskins,  
contract rewriting service.

10/13/99

Lee M - Singapore

- Hock - choose only 3 colors for Skywalker, <sup>not @ like</sup> nebium
- Kristi - Major navigation problem with U/I on Skywalker
- Sky had to take 2 medical leave days
- U/I under great scrutiny, much activity
- ST - big list of problems to solve -
  - standby → resume: pop on headphones
  - maximum volume setting is 640mV @ 32Ω
  - won't necessarily ship headphones with Oasis
  - reasonable volume = 160mV (crosstalk measurements)
  - 60dB crosstalk
  - 90dB S/N originally, supposedly 100dB with secret trick
- Voice record subsystem, ~~SW~~, SW work.
- SRC Algorithm ~~so noisy~~ makes digital noise that couples into the MIL input section.
- SSFDC 1/1mths Xfer rate to 80-100 kbps
- Battery subsystem - NiMH battery with removed 1/4" of wrapper old 2S Creative-only battery

SUBJECT:

DATE:

- Charging system complex. Is in docking station. Most of pins on docking station connector are for charging. Must gold-plate pins.
- Safe shutdown when battery gets low. Graceful shutdown.
- Power-up: A-bit micro brings up CMOS. Convuluted
- 3 levels of FW: 0 Bootcode. Loads OS from USB. <sup>UPGRADE</sup> Upgrade code loads new application.
- Oasis: could be > \$400 street price

10/15/99

Bill Cross Meeting

- ① we hooked up Bill's Phillips EVAL pwr supply board to Oasis ports, it worked.
- ② Bill will investigate using Dallas DS1670 battery controller IC, and will provide turnkey system design. Alternate: DS1302.

ORDER Phillips <sup>YEA</sup> 1207T. Data sheet online

ORDER DALLAS 1670

ORDER DALLAS 1302

DS1670:	EST	4.00	\$5.00 Subsystem
BATT:	EST	<del>1.00</del> 0.50	
BATT NUMBER:	EST	0.50	



- (3) EMAIL Bill info about Oasis  
web site.
- (4) ORDER MAXCIM ~~600~~ 600  
+ Induser  
~~600~~
- (5) MAX ~~712~~ 712 + Induser  
+ Transister
- (6) 1/2 sense resistor

Oasis Eng Mte

10/20/99

Dave, Ron, Howard, Andrei, Gerald, Scott W, Dan E.

Schedule: Lee wants us to send schedule to  
Chen's soon this week (TTL)

→ Team wants to delay sending schedule until  
Lee approves.

New Features:

power management requires additional HW subsystem  
that requires additional SW. ...  
will definitely affect schedule.

(Adding Dallas DS1630 system controller/real time clock  
IC that has A/B converter to measure battery voltage)

SUBJECT:

DATE:

Schedule milestones:

- HW slipped 1 week
- SW features not implemented/tested:
  - USB
  - I/OA
  - Power Down
  - Power Supply
  - LED?

Balance Sheet

+ Conversation de-generated

10/22/99	<b>PARAGON MEETING</b>
Fred Ockley	

PIC start DV003001                      199.00  
 Programmer

Need Adapter for SSOP. PIC doesn't sell the adapter. Another company sells the adapter. Logical? ~~Emulation~~?  
 Emulation

(BP supports)

FAX: Kurt Kuhlmann 408 436 7950

BILL CROSS - SYUAX

10/22/99

- ① Not using MAX608, USING MAX1771CPA

## OASIS HW DESIGN REVIEW

Thank Bill, Alvin Auyeung, Dan F, Bill Cross

### NOTES:

- ① use 0.001 uF & 0.1 uF bypass caps, all pgs.
- ② On XTALS, provide ~~se~~ gnd strip next to XTAL body so can solder case to GND. Use metal can XTALS, not plastic body.
- ③ On clocks - use series 100- $\Omega$  R + 22pF cap to GND.
- ④ Might not need ferrite beads on DC Pwr Jack
- ⑤ Add VIAS on line & GND on DC Jack so can add cap if needed.
- ⑥ Add ferrites on Line Input Signals
- ⑦ R35 - correct wattage? 2.4 mil spacing on PWR TRACES on USB I/F
- ⑧ Need Watchdog function! PIC could implement watchdog function.
- ⑨ ~~could use SMD 32.768 oscillator~~
- ⑩ Can get rid of PWR ON RESET ~~BOARD~~ PART. ~~THIS~~ Get PORN to CIMS part from PIC
- ⑪ Put static-esp protection diodes in it Room allows

SUBJECT:

DATE:

- (12) Check why Y1 powered by VCC3.3
- (13) USB - 1.5K RES BET USB PINS 1 & 3
- (14) Fix Button Scanning - Run ~~PA~~<sup>COL</sup> to Common on encoder
- (15) Use new switches SW10630
- (16) Make R52, R53 on SH7 0805 pkg for power handling.
- (17) Slide switches - Steve to review position of contact.
- (18) UL cert. on Phillips TEA1287T?
- (19) Check polarity of C99 sh B.
- (20) Delete U21
- (21) ~~SH9 - put 0805 capacitor parallel with R22 - NO~~
- (21) Flip QA sh 9

### Oasis Eng Mtg

Dave -

- UI story board completed & distributed.
- Splash screen button map converter works so can generate splash screen
- reviewed list of environmental audio routines, did listening tests. cool stuff. Need to be picky. Some routines trash music.
- Kristi W. came to visit, got educated on basis details. Kristi is becoming engaged in the project.

Steve T - Mech & ID.

- Hard tooling released for mechanics.
- MID group in SW: Building relationship
- Cosmetic units arrive tomorrow. Casting units at one per day, so many units will arrive when HW arrives.
- PCB's are late. Will arrive next week.
- Hard disk connector came in. Need testing.
- PC10404 layout complete this week.
- Test fixture PCB in progress.
- Need packaging designed to ship raw Oasis units from SAN to Fremont for final packaging.

Andrei - Embedded SW

- got USA SW from SW. Code works on O2813
- working on sound playback from Oasis.
- software has been working on file system. The basic work. Load, save, create files.
- Andrei: Playback mgr, DSP mgr. MP3 decode works in playback mgr.
- Ron's UI stuff integrated into Oasis.

DSP SW - Gerald

- PCB rework problems. Need to audit PCB for rework.
- "Close to playing audio"

HW - Don

- Proc allocation: 10 need to go to CLI

Proc allocation order

SUBJECT:

DATE:

- ① Dan / Mihai
  - ② Andrei
  - ③ Howard Gerald
  - ④ Mark / Bill Cross in parallel with ①
  - ⑤-⑧ repeat ①-④ give one to Think
  - ⑨ Howard
  - ⑩ David
  - ⑪ Peng Kiet
  - ⑫ Lee M
  - ⑬
  - ⑭
  - ⑮
  - ⑯-⑳ CES
- } Spares + Models

- Layout Complete Friday pay for 3-day turn?
- P.C. Febs 11/29
- ASSY'S 12/2

### Lee Dept.

- Sanyo-PDMA group. Sanyo in Sony's pocket
- At CES, Sony will announce 2 CD rippers spec. Anticipate big acceptance in Japan.
- Blaster keys - stamping CD's in Nov. Sound fonts, etc.
- Verus Nomad II production specs. FM, platters, FW, etc.
- 11/26 HW signoff for Nomad II.
- 12/1 FW signoff

Oasis Eng MtgMech/Ind Design

Steve - • Sent mech model to SIN.

- Re engineered battery contacts. Sent design to SIN (for production)
- Mech eng is complete for the moment.
- Meeting with CLI w/Dave Tom. to go over colors. Christi is Mktg. Manager
- Gen Mgrs of Creative excited about

Dan HW

- Oasis PCB in Assy
- Test fixture in fab Thu 12/2/99
- DVT plan being written
- Prog Guide / Theory of Ops doc being written

Howard - SW

- Want Scott W to commit to what can be delivered for CES.
- Gerald work with Scott to get CES DSP SW on track. Involve Mark Dolson.
- DSP code needs to be tested & cured
- Audio playback: MP3 playback works
- MP3 decode from disk works.
- Want quantitative measurements on Proctor or BW
- Need to implement MP3 decode.

SUBJECT:

DATE:

- Need updated MRD
- Need MIPS budget on MP3 decode for 1200 kbps & 160 kbps.

### Host SW

- Host SW dev officially started Monday. (SIN engineers)
- Still bugs in Skywalker Host App code, they will ship anyway.
- Need Skywalker's Host App code. Ron will get to it.
- Latest graphics design for Host App is done, will get graphics back this week.
- CES demo - visual representation of what Host App is, not necessarily functioning SW.
- SIN engineers not coming in Dec to help with Host App.



## Oasis Eng mtg.

12/9/98

Dave, Scott, Howard, Anders,  
Michal, Gerald, Dan, Steve.Steve T. mech.

- Trying new chassis colors - silver, etc.
- want final color decision next week
- Hack boards?
- On schedule. Production 1<sup>st</sup> shots by end of month.

Scott - DSP

- Gerald is ready to debug EQ code
  - Waiting for Gerald to ~~debug~~ HP ~~specialize~~ ~~test~~
  - Need to implement reverb on DSP, since no ARM MIPS left.
- Gerald
- DSP run out of external mem.
  - playing music
  - will get serial output working at 32 bits.

Dave - MKtg

- working with Christi on retail accessories
- splash screen work.
- Trying to decide on color pale grey silver
- Another review meeting Phil week - product logo, etc.
- Batch ripping via CD changers (Kinkas?)
- Joint UI storyboard w/ Vincent (He will) be here Monday 10:30 AM

SUBJECT:

DATE:

## Product launch

Primary audience - MP3 <sup>technology</sup> enthusiasts (1 million)

Secondary - portable audio early adopters (2 million)

Price \$500

Key message: holds an entire CD collection

## David - Embedded SW

- UI Manager task running, button manager
- Library traversal system in place
- Andrei - File transfer over USB by end of week
- "Good headway"
- "Want limping along" unit that can play songs next week (old boards)

Andrei - Interest secure boot loader - we have to write boot loader. Interest pattern in read-only part of boot ROM.

## Pan - Host SW

- Robin write SW App design guideline doc. Very restrictive. Basis Creative SW products.
- Playlist issues.
- Working with SW on minimum GUI requirements.

Oasis Eng Mtg 12/15/99

Lee, Howard, Andrea, Ron, Scott, Mihai, Dave, Dan

Lee

- SOME POAA Group made progress - will recommend  
Intermix + DRM + AAC codec.
- CIMS doesn't have access to AAC codec  
code, so we won't implement AAC at  
FCS (probably).

mach/ID

- Colors: Silver/Champagne, Blue metallic w/silver  
bezel.
- 19 units are being printed now.

MKTG

- Color decision due by Thursday. 19 units  
will be printed & delivered by 12/20.  
4 green, 15 blue.
- Brochure text reviewed by Howard, Dan, Dave,  
Lee.
- Christi wants to know product features well  
for CES so she can draft "interesting documents".

DSP

- EQ code works, but requires 10x too many  
cycles. Need to rewrite code in ASSY.
- All audio outputs active to CES show.

Embedded SW Howard

SUBJECT:

DATE:

- "Limping along" unit could be ready later this week. Then will be made more robust to can survive demo at CES.

### Andrei

- Getting code running on new HW.
- Button hassles - wrong PCB footprint.
- USB - wrong footprint, need PAL change.

### Pen - Host SW

- Need Host SW status from Peng Kiat's group
- responded to VI design guidelines document from Robin
- Vincent Tong visited - Audiobooks mfg don't know how to get pass into their MP3 module.

### HW - Mihai

- working w/Andrei on HW/SW debug.
- working on parts shortages. Don't have enough parts to get 25 boards working. Missing ADC's, connectors, jacks, power supply IC's.
- Assembled PCB's back this week.
- Repair we need to do.

### CES Countdown

- Lee wants unit to show Milpitas next week.
- No official demo. People can come see where we are.

- Messy Code boot loader, because code doesn't fit in Flash.
- Fix DAC control problem.
- Add volume control.
- Encoder SW support.
- VSB functional
- PIC processor programmed
- Battery Subsystem Naming

→ Deliver Qty of working units, JAN 3.

### Risk Management

- PIC Code
- Parts shortages
- Lead times on production parts.

### Conf Call with HL Cheng

Phillips VDA1360 TS - lead time 16 weeks  
 Can we use a substitute? They will send us 25?

J810597 - 2x20 18mm female connector - Asked  
 6-100

SW10366 - will get 60 in January

SW10629 - want 700

ZI10370 - want 60

IL10328 - want 25 now + 35 January

SUBJECT:

DATE:

- ① Send spec for b010544 to HL Cheng  
 DONE 12/19/99
- ② Can we use F4LVX3245 something else?
- ③ Can we use C case size for CC10315  
 Tant cap 100uF 10V. YES. DONE 12/19/99

Steve - send latest project schedule  
 Emailed Steve 12/19/99

- 2 weeks for eng run build. find problems before production, write ssy instructions.
- then pilot production. iron out all problems. 200 pieces. Two-3 weeks start to end.

could we provide units in late January?  
 I said we could provide 10, Steve & I will bring them.

I said mid feb we would go to SIN for Eng run. March Pilot Apr Max production.

SUBJECT:

DATE:

Charlie Payne meetings  
 Parallel assembler for PIC processor  
 Tech-tools.com

Schedule: 12/27-12/31 Busy with another  
 client.

PIC SW meeting

Charlie Payne, Andrei, Dan F, Howard

Commands for PIC

Shut down

Get Battery Voltage Current

Get Min Voltage

Reset Min Voltage Value

Get Serial # (16 bytes)

Get keys ~~(16 bytes)~~ TBD

Decision: Modify Charlie's Serial  
 Comm protocol to accommodate multi-byte  
 transfers.

Charlie will begin coding protocol and  
 will write code to test PIC code via  
 parallel port on PC.

Meet again Tuesday January 11. Time = TBD

SUBJECT:

DATE:

### Oasis Mah/electrical Overview

Dan F, Mihai, Churn Wai, Think Bio, Mihai, Steve T, Alvin

- Churn Wai & Singapore Design group will handle design of production test fixtures.
- Will add "ground rails" to battery area in chassis to prevent contact if batteries are installed backwards.
- Think Bio write "Oasis Product Compliance Test Proposal" - EMI, Safety, Shock & Vibration, heat, etc.
- Think needs hard drive cable

### Oasis SW overview meeting

Dan F, Churn Wai, Gerald, Mihai, Howard, Andrei

- PIC, PAL, Flash, Hard Drive are preprogrammed prior to installation on Oasis board. Creative will need to handle duplication of Hard Drives on site - OS + Content.
- Serial # stored in PIC processor.
- Crypto keys generated by SW on factory floor & programmed into FLASH, then FLASH boot block will be locked. Howard will review this scheme with Intertrust.



SUBJECT:

DATE:

Oasis Review - Get ready for production 1/11/00

Cheng Soon, Chien Yi, Chum Wai, Steve T,  
Dan F, Lee M, Mihzi, Andrei, Howard.

### Responsibilities Assignments

- Top Level Bom: RBV (Christi W) ↓
- Finished Product: Scotts Valley "FG" level
- PCBA: Scotts Valley, then transfer to Chum Wai
- Component Procurement: HL Cheng for long lead items.
- Chum Wai will manage Bom activity in SPW
- Batteries & Transformers are bought by The RBV's
- FTP circuit board database to Chum Wai.  
(Steve T has FTP account) Zip w/ password.  
Also Oracle database.

### Production Plans

- Blue/silver units mfg'd first
- Silver/green units are next.
- Remote control not avail at FCS. Goal is May.  
Need unique I.O for remote & new silkscreen.
- Remote Control Project: Steve T manages
- Howard manages Oasis code support (I.P.)
- Steve: Send silkscreen changed to Chum Wai by 1/21/00  
(Remote control) and button functions.
- Remote Control Silkscreen on 2/25/00

SUBJECT:

DATE:

1/11/00

Responsibilities Assignments (cont.)

- users guide: we provide Rough Draft. Dave Bristow  
~~Yap K~~ ~~Yap Ke H~~ Yap Keh Han - Due at  
engineering run. Then Singapore takes over.
- Reduce # of Translun caps if possible (Dzn)
- Next Rev of PCB: Scotts Valley Fab's PCBs for  
Singapore Engineering Run.
- ICT for PCBAs: Churn Wzi will handle.
- Send us copy of PCB Design Guidelines for  
Creative: Churn Wzi
- Probably no ICT on Osis PCB due to poor  
test point coverage.
- Will have bed of nails fixture for functional  
test.
- Production Diagnostics: Howard/Andre, Osis only.
- SQA: Ed Rudnick in parallel with SQA group  
in Singapore. Ed: test standalone unit. SIN:  
test whole setup
- Bring 10 Engineering Units to SIN for Engineering  
Run.
- Verify that Microchip's Program Serial # is  
(64 bit Serial #)  
SDM ID 120 bit (Random)  
Intanet Certificate (1024 bit) (SW generated)
- PC-based SW on Production Line for SDM ID,  
Intanet Certificate, O.S. Download & Boot Block  
locking.
- Put Serial port test points + BROWN signals  
on PCB so can program FLASH in test fixture.
- Hard Disk Duplication: Test Engineering Dept.
- Give Churn Wzi Latest BOM (Dzn)

SUBJECT:

DATE:

- Plan is to have WMA at CES. we are writing for Cirrus.
- 1394 support - will prototype on next development platform.

Schedule Meeting 1/11/00

- Need to add 2 week period for qualifications ~~for~~ cycle after Engineering Run. Then 1 week QA after each minor Firmware release, pilot.
- For production. 3 week PCB turn, 2 week Assy, and mechanicals
- Team updated schedule up to Eng Run. SW team will schedule past this point.
- Eng Run

PIC SW Meeting 1/13/00

Charlie Payne, Andrei, Dan

- Charlie will write PIC code for serial protocol
- DAN, Email Charlie PIC code.
- Charlie will update serial spec to multi-byte format & email it to Andrei
- Implement power off command (command 0)
- Howard to email you complete command list
- Charlie will wire up 2 parallel interface

SUBJECT:

DATE:

- Meet again Monday afternoon 2 PM

Oasis Eng Mtg 1/26/00

Ron, Lee, Dan,  
 Mihai, Andrei,  
 Steve T, Scott W  
 Howard, David B.

mech / ID (Steve)

- "T2" tooling changes
- Reset hole
- Plastic alignment issues solved
- Battery contact revision
- No schedule on when we get new round of plastic parts.
- working on panel graphics & logos

Mktg (David)

- story boarding. Rewording not tested, might change
- Storyboard Doc distributed to larger group in Creative.
- please distribute Chris Smith
- 2 SW refreshes before Fall.

SW (Howard)

- Firmware Management
- Will put internet stuff into primary bootloader
- Singapore USB code compiled & running.
- Yi Ming's visit is from SW week after next or 3rd week of Feb. (Driver any)
- Test App: could modify Skywalker Test App.
- Chun wai gave positive feedback on Howard's Diagnostic SW proposal.
- Lee gave WMA code set to Howard.

SUBJECT:

DATE:

1/26/00 ZON'T

Tony

- Getting SATO up & running.
- Started working on A20 & D2A test code.

Scott

- Cold from Hell
- SATO Assy code.
- Confident that we can implement all DSP functions in MPD.

Ron

- Not much into on Host App.
- Audio Book & Need content w/urgent
- Cant set features into Embedded code - Howard decides
- Reviewing CES notes & literature

Andrei

- worked on ARM  $\leftrightarrow$  PIC interface.
- USB code - 12 or so commands implemented
- Support for "WAV" file playback. 70% done.
- will try to finish tomorrow

Mihai

- working on Flaky boot problem
- 4 bad boards, difficult to debug
- 3 SPIs, working
- extra board for Scott, Gerald

HWDon

- "on schedule"
- writing SW to test PIC, A20, D2A.
- environmental testing for UL, CSA, Need 3 units for testing, modified for current design.

SUBJECT:

DATE:

- need mfg to prepare for UYLSA testing. Needs SW, Board rework, power supply mods.

Dept News (Lee)

- Must move to new area.
- Friday is cleanup day.
- Need to test phones & ethernet connections email Steve + with requirements.
- Need to start moving Friday/Monday.
- Need to be out by 2/7/00
- Product roadmap from Cheng Soon.
- Editor from Wired interested in Nomad Jukebox, Rolling Stone, & ISO.
- Oasis featured in Good Morning America, Oasis & Kathy Lee, CNN, CNBC.
- Dave & Lee out next thu & Friday, <sup>(NXTM)</sup> then 13TH → week in SIN.

Conf Call

2/1/00

Churn Wei, Dan F, Hwz, Mihai,  
~~Ng KP~~ Ng KP

Singapore - Creative Tech Ltd    011 65 895 4000  
 Churn Wei - Desk                    895 ~~4646~~

895 4444 x1365#

Agenda Items

- Device Programming - FLASH, PIC, PAL, Hard Disk
- Diagnostic SW

2/1/00 CONT

• HW -

① — CAPS CT326 10uF TANT 3528 16V 20%  
0114160101

It actually is 6032 case, our  
description is incorrect

→ We could use 10uF TANT 6032 16V  
Creative P/N?

or

CT

② — KITS - WANT QTY 5 COMPLETE KITS

Conf call notes

① Chun wei will send samples of  
DRAM parts, and ferrite beads and  
choke samples.

② Test fixture built by E-mu not useful for  
production test.

③ PIC parts programmed at factory

→ ④ Email Chun wei info on programmers  
that can program

⑤ Programmed parts by vendors have 10 week lead  
time.

⑥ Don & Howard will outline what we think  
test fixture will need to do.

⑦ Besides test fixture, SIM will need prod diagnostics  
SW that runs on PC on production floor

SUBJECT:

DATE:

② Disk drive vendor will program drives. Final code avail at beginning of pilot.

⑨ Send mail requesting 5 kits.

⑩ Next conf call ~~Wed~~ ~~Thu~~

Tuesday	15TH	SIN
Monday	14TH	CPM USA

OASIS ENG MTG 2/2/00

HW:

- ~~Conf call~~ w/ Chuan Wei & Ng. Test fixtures, Gang programmers, PIC programming
- Have Disk Drive - HL Cheng ~~contacted~~ contacted by IBM.
- Someone needs to take ownership of PIC code.
- Dan should email Lee about conversation I had with Brad Stewart about 7212 boot-up procedures.

SW

Howard:

- Recording function working today. will be ready tomorrow to do A2D quality testing.
  - Playlist Management support.
  - Lee: end of day next wed, have SW image to load into units for European show.
  - Bootloader w/ hardware compliance & support
- Andrew:
- playback of WAV files working.
  - Finalized ARM/PIC interface.



- 2/2/00 Carol
- Latest PIC code from Charlie Payne doesn't work
  - USB: currently 260 KB/200KB per second
  - Reviewed header files for WMA support

Geralt

- reviewing functions
- verified playback & record at all supported frequencies
- playback support in ARM code

Scott

- working on Reverb. partially debugged version. Migrating to Assy language.

Ron

- Audio books
- ID3 v2 organization work. (ID3 tags in mp3 files)
- Voice recognition, working with converse: in Seattle
- Post App design review with Kai Yang tonight

MKGDavid

- Volvo - "Volvo Juicebox" in Europe
- leaving on 16<sup>th</sup> for CLE show in Europe
- need new splash screen for European unit because we can't use NOMAD name in Europe.
- Generating FAQ list
- Creative wants to trademark entire name.
- Trip to NAMM this week

Mark/IDSteve

- no STANS

SUBJECT:

DATE:

Dep't NewsLee

- Back back from "World tour"
- Song coming next Wed. Corporate MKG V.P.
- Interviews next week.
- In Singapore 2/12 - 2/16
- At NAMM this weekend.

Orsis Eng Meeting 2/9/00

Lee, Ron, Steve, David, Howard, Don, Scott, Andrei, Mihai  
Lee Marc - Dept News

- Lee proposed Dept org to Herb: 7 development groups at Scotts Valley camp. Can add 6-8 new head count. 2-3 <sup>seeds</sup> HW+SW, tech, MKG assoc
- Due to poor service from E-mu support groups, "our group will be unplugged" from E-mu and "plugged in" to ATE.
- we can have creative email addresses.
- There is a bonus plan in place.
- Skywalker: Pilot FEB 14<sup>TH</sup>, QTY 200. Currently, 30% fallout due to headphones pop.
- Host SW 2/18/00
- Kenobi - Assy errors halted thurs. Eng on complete FEB 18<sup>TH</sup>.
- May - New Play center/Jukebox
- Microsoft Meeting - WMA issues.
- Lee gone for two weeks, back 2/25/00.

2/8/00 (Cont)

Dave - MKTS

- Position - feedback on storyboard.  
Yipp
- Email Splash screen approved.
- Dave out next week - 2/25/00

Mechanical - Steve

- Wrap up loose ends on mechanical
- T2 plastic due in - requested 30 sets. Date = ? >>
- Two units off to Think Bui.

~~Think 3~~Dan - HW

- plan to build 4 then 4 boards of Rev 3 HW
- SIM will build 3T or so in <sup>more</sup> parallel with us.

Howard - SW

- Structural support for recording in place.
- Need USB file upload to complete process.
- Bootloader in place. Problem: two different flash parts to support with different size boot sectors.
- Gerald - DSP boot manager. Close to done.

Andrei

- USB support - OSS's commands.
- Yi Ming Lim is next week.
- File upload - Norman Comment budgeted to implement.
- USB xfer speed is now 200KB/s.

SUBJECT:

DATE:

Mihai

- Assembled. Shoke & Bake units.
- 3 1/2 hour batt life.
- 3 units for EE bit show.

Don

- WMA audio quality testing
- ID3v2 Support for Audio Books.

Scott

- DSP reverbs, fully implemented, partially debussed.
- Gerald: Moved internal DSP memory for I/O buffers to external memory.

Oasis REV 2 HW Design Review

Changes:

- ① R51 becomes 1502 pg 4
- ② Res switch option PSN or A16 to SRAM A16  
pg 4
- ③ ~~Do not install R52~~ Do install R47.  
Delete ↗
- ④ Tell Chum wai about Multivolt Alterz cable
- ⑤ Delete EXPCLK on PAL? Check behaviour  
of ARM on EXPCLK pin.

SUBJECT:

DATE:

Oris Production Conf Call

2/15/00

ASK Lee:

- Piper Req for Steve T - Signed by Heck
- Dave/Niel want to talk at end of conf call
- How to program 2 hard drive?

H.L. Cheng      Kong Kui

LCD: Steve Thompson - Need to approve LCD Spec so Cheng can negotiate volume purchase.

Hitachi EDO DRAM: Need to approve Hitachi. Need to approve.

ISSI - GSI 12ns Sub, will send to me. GSI G572116TP-12  
PIN will be sent in an email

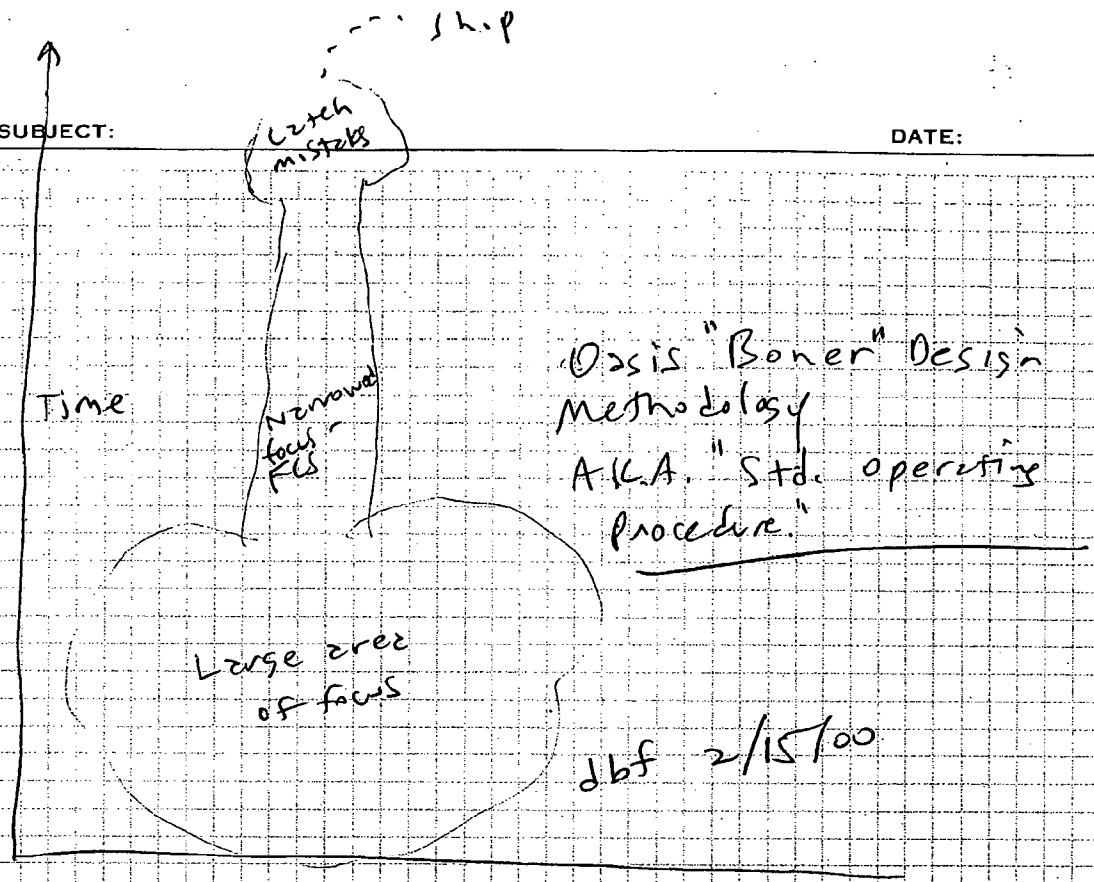
S Kits - will set partial kits.

Programming of Serial #

Next Meeting Feb 22 5PM (Tuesday)

SUBJECT:

DATE:



Oasis Eng Mtg.

2/16/00

News from Lee:

- P2 plastic not avail until 28 Feb
- Production plastic starts 15 March for 50K run. gives 2 weeks to evaluate P2 protos.
- Skywalker line can only produce 500 units/day. at this throughput, Oasis would require 3 production lines to get 50K in one month.

HW status

- HW schedule slip of 2 weeks so far on P1 layout/pcb
- Audio noise when low battery - design change req'd?
- Probably won't have stuffed P3 boards until Mon 2/28
- Still need to do audio quality testing. Ed R made WAV files of test waveform.

SUBJECT:

DATE:

HW Status

2/16/00 (LOWIT)

- Got more units working
- COULD GO TO 64K SRAM FOR DSP MEMORY.

SW

- If don't throw away my FCS SW features, we're slipping schedule a bit. 2 weeks or so, but could mitigate this. ~~Final~~ Final release of OS right at FCS.
- working with Yi Ming on USB.
- Got Battery voltage readings working.
- Gerald will finish DSP playback algorithms, then will work on DAC SW to get rid of power on pop.

Gerrit Andrei

- testing USB functionality with Yi Ming & Howard.
- will write new USB commands, next.

Gerald

- DSP playback Manager
- Environmental Audio parameter set up.

Scott

- Testing Reverb.
- Next, will work on Time Scaling.

SUBJECT:

DATE:

• Ron Host SW

2/16/00 CONT

- Lei Yang sez delays on Skywalker Host SW.
- WMDM Support on Host App could take 4 weeks.  
Windows Media Device Manager
- Will WMDM be req'd for FES on Oasis.
- Progress on Backup/Restore features.

• MPEG 7 work w/ Mark Dolson. (ID3V2 kindz things)

Host SW beta avail 20 March.

Listening tests: Brian L and Ron doing tests on MP3 and WMA.

Steve T

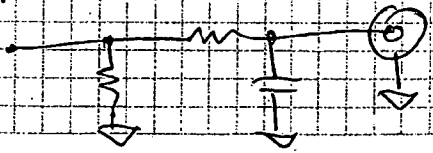
- Waiting for P2 protos. production limited to 3DK/month due to tooling capacity. Might start plastic production sooner than Electronics to meet production targets.
- Steve will go to Singapore to approve P2 plastic. 1st of March or so.
- 4 corners testing this week

T.I. Meetings - Power Supplies

2/21/00

Austin Chiu, Justin Smith, Gunter Sporer (T.I.) Bill Gross (Syntex)

- UCC3741 SIPIC Voltage Controller by unitrade up/down DC-DC converter. Needs 2 FET's
- Benchmark makes battery charger, owned by T.I.





SUBJECT:

DATE:

- J.F. Converters - (in development) can be synchronized to input clk of 500kHz  $\rightarrow$  1kHz.

TPS6200X  $\approx$  90% efficiency.

- Other Products -

- CODECS / DACS
- Microcontrollers (Flash based)
- Power circuits

TP6210X - Step Down converter, April Summer

Oasis EMS MTS

### Mechanics

- 2nd Injection mold to accommodate capacity, gearing up to make 50K/month.
- T2 Plastic fabbed next week, we'll set 30 sets.

### SW

#### Hardware

- USB CMD set on Oasis bug fixes
- Playlists implemented
- Bootloader Oasis to Android
- Power management
- Going to take fair today

#### Android

- USB verification - basic Library Management
- Started diagnostics

SUBJECT:

DATE:

- Boot up diags ready for PI board bring up next Tuesday.

Cwitt

- Time Scaling
- EQ needs optimization -
- Spectralization done & optimized.

Gerald

- playback out of external memory.
- Tried to move recording buffer into external memory, doesn't work yet.
- Got test tones into on Oasis
- Will get 32 bit output with dither implemented.

Ron G

- Oasis Next App Development cancelled.
- Oasis Next code will be merged with Nomad Play Center.

OASIS PRODUCTION DIAGS MTG 2/23/00  
 HL CHENG, CHURN WAI, Dan F, Andrei

Components:

10uF 16V CAP NOT USED NOW

22uF 10V CAP USED INSTEAD

ADD: TI TPS76333 DBVR 3.3V voltage regulator

- Howard email Churn Wai Release Date for PIC, FLASH SW.
- Churn Wai - Need to wait for Ems test until have PIC & Flash.

2/23/00

- Move DSP loopback test to phase II
- I said won't be ready for Eng run for at least 2 weeks.
- Need to outline IrDA test procedure
- Real-time clock test:
  - USB command to enable RTC oscillator

