

Mikes Staff Meeting (cont)

5/13/98

- EOS 3.0 bugs - Snap-ship in effect. Lots of talks but seems to boil down to 2 bugs - Playing external sequences from ROM instead of RAM, & 3.0 crashes "more often than 2.5".
- E-IX buss - Hot systems crash with SGS 68001 MFP chip.

IVY Eng Meeting

Meeting time change conflicts
Craig - Wed 10 AM

Ron - Tue Thu

→ 1:30 pm desired

- DAN O'connor? E4 1/2 FPGA work. Will implement Interrupt
- Circuit - ADAT FPGA work. Outputs work. Implementing channel assignment scheme targeting to 10K30 FPGA (\$33). Picked up control surface - started costing, talked to Ken Yppirala.
- Ron - lots of progress on Dynamic Automation. Used ivy to mix soundtrack for Cobillo College version
- Jim - MAC O.S. download works. Jim's O.S. got corrupted during download. Will make O.S. checker more robust. Add reset pushbutton?
- Craig - P-Chip Emulation. FPGA work to exercise P-Chip. Wants more time to write VHDL test modules.
- Tom - Work off. Moved office back to E.mw. 1:30 pm

SUBJECT:

DATE:

5/14/93

TV Budget Worksheet

PCBA'S	Electronics Cost	(Steve T. Est) Mech Cost	Tooling
<u>MMM</u>		400	2K
MAIN	$(500)(1.5) = 750$		
ANALOG	$(100)(1.5) = 150$		
PWR SUPP/CABLES	$(50)(1.5) = 75$ 975		
<u>ANALOG</u>		250	4K
MAIN + EPI	$(200 + 150)(1.5) = 525$		
PWR SUPP/CABLES	$(50)(1.5) = 75$ 600		
<u>ADAT</u>		25	0.5K
MAIN	$(175)(1.5) = 262.5$		
<u>TDIF</u>		25	0.5K
MAIN	$(175)(1.5) = 262.5$		
<u>EPI</u>		25	0.5K
MAIN	$(150)(1.5) = 225$		
<u>SMPLE</u>		25	0.5K
MAIN	$(150)(1.5) = 225$		
PCB'S	5125	750	\$15,000

CONTROL SURF WORKSHEET

PCBA'S	Electronics Cost	(Steve T. Est) Mech Cost	Tooling
Computer		700	40K
PANEL #1			
PANEL #2			
ENCODER			
METERS			
PWR SUPP/CABLEING			

5/19/98

DO THIS -

Try to get VHDL models for
Synch SRAMS:

① Micron MT50LC128K32B4

② CYPRESS CY7C1351

Ivy Lunch Mtg

5/20/98

Circuit • Cont. Surf cost collapse. Current list
is \$3400 - yikes.

• EDF VART prototyping

Tom S. • Ivy Reek - VHDL design of sync
subsystem. • Back at Emv to work instead
of home.

Ron

• Scene Automation development. File system
hierarchy w/ Jim. for projects, libraries, etc

→ { Out back and better. Jean LaRoche, for
ditching out of Bike-to-work Day.

Jim

MAC bug fixes. Graphics impact.

Craig Tech center guys are back on R-Chip.

New emulation effort starts June 2. Final date

for 1st silicon is 10/14/98. Craig working on
FPGA on emulation board. Needs to implement S/PDIF
input, will use S/PDIF I/O VHDL models from Tech Center.

SUBJECT:

DATE:

Craig (cont) New pin on P-chip! get from Craig. Needs help w/ synchronous SRAM support - get samples (dan), make adapter board so can prototype. Will work on ASIC release process for E-mu VLSI

Dan

DJ stuff. Dept Budgets, Int'l studies, etc.

Balance Sheet

Good food. best choice	someone doesn't like balance sheets
Finished on time	Dan O leaving
Someone to take out & best	
Someone likes balance sheets	

100 MMM Mechanical Design
Kickoff meeting,

5/20/98

Dan, Steve T, Girault, Tom S.

Steve took input on 3U chassis design features.
7 slots, "roadworthy" option, etc.

Dan correlated McMike's MRD to Rob's concept

drawing of MMM Chassis 2/15/98. Only difference
is LEDs for option slots 6 & 7, EXT. Lock.

Order - CYPRESS CY7C1351-40AC

5/20/98

Micron MTS0LC128K32B4-10LG

Aries 96-100MB5 QFP to PAA Adapter (Digi-key ^{QFP} AT7S-ND)

Mil-Max 515-13-121-13-061 121-pin PAA Socket
(Digi-key P/N ED2027-ND \$5.61)

~~Aries Electronics 96-100MB5~~

Mike's Staff Meeting

5/27/98

- Recruiting - Mil made offers to 1 full-time & 1 part-time Summer interns for SW.

→ Dept Meeting Thursday 3:30

- Monthly Income Survey - Dan Bennett wants to double the number of servers.
- Budgets are being finalized. → SW development Head

→ Call Scott Reer @ Ensoniq about
IUP/PARTS interface call is HW engineer

- List of vacation plans to Mike P.

SUBJECT:

DATE:

- E-mv/Echo joint venture in Italy Easoniq
- "Bumble Bee" Digital Piano might be mfg'd there.

Ivy Lunch Meeting

5/27/98

MI Mike

- Lots of interest in Ivy at AES in Amsterdam
- Tons of problems with PC. Ron's program crashed.
- Meckie wants us to OEM HUI, but wouldn't let us show it at AES.

Jim W

- Fighting gnarly crash bug.
- How soon will automation be available on MAE version of SW? Long time. Should port automation features into Rack SW.
- Gone Friday & 1/2 next week.

Ron C

- File Hierarchy Hierarchy, Libraries, projects, etc.

Garrett

- Central Surface - Cost rollups & System Design.
- EDI VAKT stuff - 95% done?
- Cost Surf Cost is about \$3500 list now.

Tom S

- Learning VHDL design tools
- Clock/sync system implementable in VHDL
- Vacation Friday → all next week

Dan DV

- E 1/2
- VHDL - Learning tools

Craig

- Liza
- Met Mike Y in bathroom
- Tech Center NOT working on R-Chip. Fixing 8010 bys.
- About finished w/ emulation FPUA

Mike P. Budget Meeting K. Log. Creative CEO
Budget Requirements:

- Quota over quota improvements
- QA run-rate + 1 million
- Make \$500k PBT

Mike P. Ivy meeting Dan F, Steve T.

- Investigate EIP II Ensoniq chip? DSP chip used as FX engine. Core DSP engine in PARIS
- C&A - \$7 Schmalz Feder??

Control Surf:

Girault/Steve T spec, costing

Scott R 7/1/98 Proj Mgr Contr Surf

Ken Y: Implement

Summer Student: Electronic implementation

M.M.M.:

Ivy Lunch Meeting

6/3/98

Rob

- Publish SW schedule + milestones?

Demo

- EA.S
- Prying Grandma

SUBJECT:

DATE:

Ron

- Auto match made
- Project Hierarchy
- Feature additions based on feedback from AES Show

Craig

- 2010 final signoff Friday?
- R-chip work resumes Monday?
- 1st Silicon 10/19/99?
- Updating R-chip Spec for Synchronous SRAM
- Emulation HW done.

Grant

- EDI
- Control surface cost estimated w/ Steve Thompson
- Latest cost based on M-Mike concept is \$3001
 - No LEDs inside switches
 - 2 ch LED sensible strips
 - \$1.50 Faders
 - \$1.50 encoders
- Feature-2ed version is about \$2500.
 - No LED rings - Bar graphs instead
 - CS16 style graphics

6/4/98

Grant's: Ivy Current UML's

	UML	Contingency built in	(includes TB, R cards)
MMN	\$ 1020.77	\$ 73	
ADAT	\$165 material		
TDIF	\$120 material		
ANALOG I/O	\$ 550	\$ 40	

6/5/98

MIKE P, David B, McMike, Dan F Ivy meeting.

- R-Chip schedule poses unacceptable risk to Ivy ship date
- Need to look at ESP2 spec (Ensoniq DSP) & see if we can design it in instead of R-chip.
- Last possibility is to "Jumper over" R-chip
- Alan / Scott Peer / Carl Bader - Contact about ESP 2 chip.

6/9/98

IVY - ESP2 vs. R-chip Discussion

MI Mike
Girault
Craig A
Rob B
Dan F

Use ESP2 FX chip by Ensoniq instead of R-chip to mitigate project risks imposed by R-chip schedule

Assumptions:

R-chip system on MMM:

1 R-chip	\$ 15 (amortized)
4 128Kx8 SRAMS	\$ 20
<hr/>	
	\$ 35

ESP2 system on MMM:

2 ESP2's	\$ 26
6 128Kx8 SRAMS	\$ 30 → is this correct?
2 FPGAs (10K30)	\$ 66
<hr/>	
	\$ 122

Raw parts cost Δ is \$87 if use ESP2

↳ does not include Δ to TBIF core in MMM

SUBJECT:

DATE: 6/18/98 ²³

ESP2
PROS

ESP2
CONS

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- ESP2 EXISTS
- FX Algorithms "Done"
- Alleged plug-in architecture
- Faster time to MKT for ESP2 in MMM?

- 1/4 the HP of R-Chip
- Cost prohibitive
- SW complexity of Support Code - Schedule prohibitive
- 50% Feature hit on FX capabilities
- 24 bit vs. 32 bit precision on DSP math
- Not much in-house expertise on developing FX algorithms on ESP2
- FX algorithms harder to write
- HW design schedule risk

R-Chip
PROS

CONS

- Ivy architecture based on R-Chip design - R-Chip is ideal solution
- Most Cost-effective solution
- 32-bit processing
- Meets Ivy Marketing requirements

- Ivy architecture based on R-Chip design
- R-Chip Schedule: Current 1st Silicon 10/19/98
- R-Chip might not work the first time

6/9/98

CON-T

The "Plan"

- ① Maintain Product architecture w/ R-chip
- ② Accelerate R-chip Design-in:
 - ⓐ Pressure Tech Center
 - ⓑ reduce R-chip DVT from 2 months to 1 month (RISK)
 - ⓒ Reduce Beta from 2 months to 1 month (RISK)
 - ⓓ reduce # of FCS FX
- ③ Ship IVY without R-chips (Contingency Plan)
 - ⓐ R-chips optional stuff on Option card
 - ⓑ R-chip in MMR on internal option card. Card can have outchip instead of R-chip (VMC hit)
 - ↳ to mitigate R-chip schedule risk

Brent E:

6/9/98

J. Schwitalla - Consultant guy who could design Analog I/O module. Dir of Eng at Diamond Audio.

Mike P. Staff meeting 6/10/98

- Summer students - Think of assignments for them. High impact projects only
- New budget sent to Creative. 41M sales, 45% margins, expenses at Q4 run rate, 1M product launch expenses 8M sales for new products.

SUBJECT:

DATE:

- 5.6M budget for R&D vs 4.7M FY 98
 - 450K sound dev, 300K ^{consultant} exp, etc.
- Cash crunch. May may break even, April lost \$300K
- Cash recovery out of inventory is important.
- Next products:

APS July

APS "Lite" September

E4.5 October

composer NOV

Moby II NOV

IVY Apr

Sessions Apr + Sound Module EPROM II Simm

Orca June

steinway June

Ivy lunch meeting

6/10/98

• New meeting time: Wednesdays
at 3 PM

- Don - New features for HEA based on MCM's feature requests
- Time out to document code.

6/10/98

JIM

- working on schedule.
- got HEA working on MAC via virtual PC

Ivy meeting (cont) 6/10/98

CRATG

- Risk w/ret for R-Chip - might be able to get R-Chip 1st silicon by 10/1/98

Circuit

- Control Surface Cost estimates completed, \$3100 model meets MKtg reqmnts, \$2500 model has feature cuts. "New" cost model used
- EDI work

Mikes Staff meeting 6/17/98

- new budget to K. Long at Creative, he didn't object
- lose \$1M in 1st half, make \$2M in 2nd half. Profits depend on Ivy and E4.SXP
- Trying to flush out obsolete inventory to get cash.
- Product mix fluctuations - Stearnway bumped.
- watch out for designing in obsolete parts! 95C89, 82078, 256Kx4 DRAM.
- E4.S Project under strain - schedule pushing out
- Compose next
- N1 - E4.S design - turn into keyboard. Should be no SW port req'd
- OPS Review - Looming
- Presentations: About 10 min, including Q&A. Say 15 min. This means any presentation time is about 5 min.
- Oracle Demo

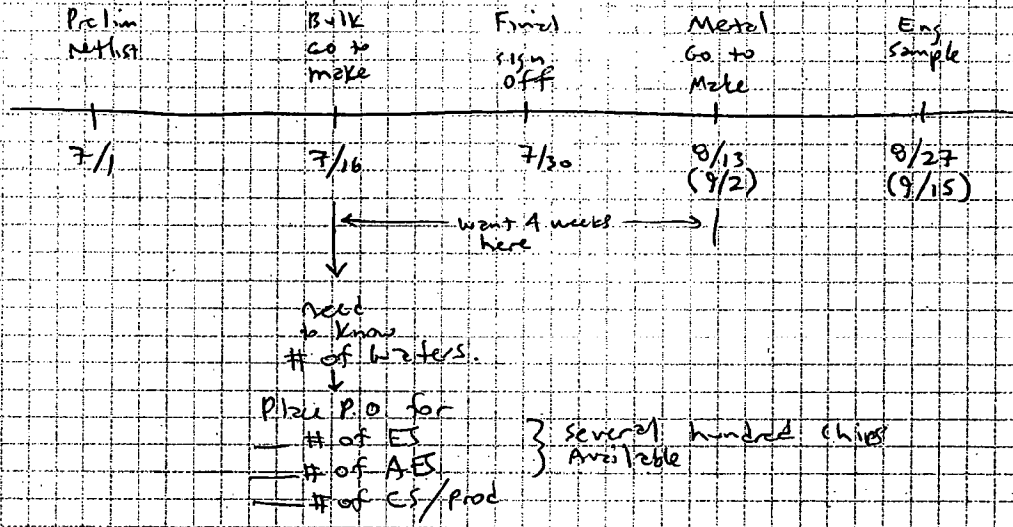
SUBJECT:

DATE:

R-Chip Meeting w/Fujitsu

Brian S., Duke Powers, Kory Khosravi, Craig, Dan F., Carl W., Vincent Shen, Scott F., Daniel M., Jake, Barry

Prelim new schedule:



• Scott F sez we're about 80K gates (no silicon insertion)

ivy Eng Meeting

6/22/90

Jezzie

- Going buy parts - lots of stock!
- Is Tom ordering parts? Heads up!

Tom

- Always late to meetings

McMike

- Showed Ozwin in LA
 - Set up Ivy in posh studio
 - Poor attendance, sold maybe 4 demos.
 - Got HLA suggestions, no HLA crashes
- we need a MFD for the Analog I/O module

Tom

- Push off pass ordering until layout
- Next week - try for white paper Prelim BOM
- Design Rev Monday 6/29
- Computer System Design is gnaty.
- Need 5307 ICE

G. Gault

- delivered EDI card to Rob so he can write driver.
- Resolved AC coupling problem
- Got system ready for FCC testing, Chuck to work on it.
- Got Cold
- Sample accurate time-stamp brainstorm w/ Tom & Scott R

Graig

- Good schedule news: Eng Sample 9/15 best case
- Emulation HW in Tech Center - ready for emulation
- Fujitsu got prelim netlist

[R. Chip volumes: FX Processors, E5]

Rob

- New concept diag for MMU (strike!)
- Clock subsystem
- EDI Core Support
- Make Ron's life Hell

SUBJECT:

DATE:

Ron

- Last panel objects now platform ind
- Synchronization w/ version of Rob's OS.
- Documenting code
-

Jim W

- FIX MAC bugs in channel strip
- Linked channels now work
- User-defined channel layouts
- Investigating Bose ref problem
- Library functions
- Debug window fix

Mikes Staff Meeting 6/24/98

Mike, Penny, Dan F, Steve S, Rob B

Agenda

Roles
 Product map
 Op Plan progress reports
 Development status
 Composer
 Ultra
 Ivy
 Dishwin
 New Business
 WV + BS

- New Product map + forecast passed out. Sound modules biggest chunk.
- Plan includes Ivy Analog line in module, which we do not intend to implement. Disconnect.
- Map will be extended into FY00 next qtr. Will come up with budgets & schedules then. Each QTR we'll extend product map & business plan by 2 QTR.

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(cont)

- Thunder? Feasibility Study continuing, low priority. New Drum head proto in process. Project is not committed. Technology Investigation Only.

OP PLAN REVIEW

- Next Staff mtg - review progress on presentations.
- New Ops Review Agenda will be published next week.
- Extended by 2 1/2 days to allow time for Q&A.
- Some project will go first, to set stage for level of interaction desired, for "Role Model".
- Ivy will probably go first
- Mike will present EHS Ops Plan

Development Status

Vitrz: ~~AKA~~ ~~EAS~~ ~~AKA~~ AKA rocky II

- unhappy surprises on PCBA. Obsolete parts.
- PCBA out for FAB & Assy
- Tony in vacation for 2 weeks
- Denis FPGA work going well.
- SW: Brian Ahead on SCSI & Simidi. SCSI sample dump is 6x faster!
- Colin rev eng'd AKA1 bank format
- SW port to Coldfire difficult. Lots of code restructuring req'd, unanticipated. Machine dependent code.
- Device driver work req'd for new Coldfire implementation
- Mechanical design is done
- need to jump on ^{FCL} scanning early July
- hired summer student to work on ADAT ^{output} #0 card for Vitrz. Andy.

SUBJECT:

DATE:

lvx

- Tom S. underway on new Goldfire design & main PCB design. Behind schedule
- Steve T has new mechanical design - 7 option class.
- Getting Pkg together for Ken Ypparilla for Control Surf design.
- J Schwitzke Consultant Signed MOA for working on analog I/O module
- EDI prototype working, Chuck P

DAN - Schedule for PCB design } Vacation
(ME) for Denny G. } Submissions }

- Need to get Tom H involved in Control Surf

Dzwin

- SMPTE SW release hopefully out next ~~week~~ ^{month}, includes Auto-punch feature.

New Business

- APS - Manual needs to be re-done, bug fixed, FCS right at the end of July?
- APS forecast is 525. Will issue P.O. to Selection for Min Qty of 2000.

Other Items

- Dept meeting Thu 6/25/83
- Roy will talk at Dept. meeting.
- Moby not selling through in Germany? Bad review, too expensive?
- Long discussion about new component design in's. RESIST designing in new stuff.

WV

- MFG people only show up to this mtg on 1st Monday of each month for S&S meeting.
- Program Management in separate meeting - Penny will still

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SUBJECT:

DATE:

(cont)

Balanced Sheet

7

Agenda published & followed.

low attendance - vacations. Brent AWOI

6/29/00 Vacations

Vacation	Dates	PAN Dates
Jim W	4 days end of May + 7/7-7/10 + 2 days August	7/7 - 7/16 (9 days) 8/2 - 8/7
Don F	7/6 - 8/5	PAN Submitted
Ron G	10 days vacation } 1st 10 days unpaid } QTR	PAN Submitted
Tom S	7 already, 3 more @1	
Grant J	10 days vac 1st QTR	PAN needed

SUBJECT:

DATE:

Jim W	10 days Q1	PAN Submitted
Don F	20 days Q1	PAN SUBMITTED 8/6-8/3
Ron G	10 days vaca } 10 days unpaid } Q1	PAN submitted
Tom S	10 days Q1	PAN submitted
Girault J	10 days Q1	PAN submitted 7/14-7/17 8/24-8/31

Daniel McDermott

6/24/98

R-chip Buy schedule.

QTY 5	9/15/98	\$??K (NRE)
QTY 25	9/22/98	\$50/EA
QTY 75	10/5/98	\$25/EA
QTY 150	11/15/98	\$??/EA
Prod QTY 2K	2/1/98	\$7.15/EA

SUBJECT:

DATE:

Freeman

6/23/98

Chip Forecast

where used	QTY		FY99 ⁽¹⁾	FY00 ⁽²⁾
MMM	1		324	1089
Analog I/O	1	(294+195)	294 489	(980+698) 980 1633
ADAT I/O	1	0	162	545
TDIF I/O	1	(129+324)	453	(436+109) 1525
Analog Line In	1		0	653
AES/EBU I/O	1		0	218
Firewire Card	1		0	272
FX/DSP	1		0	590
MDM 8 ch Comp/ED	1		0	590
			1428	7115

IVY
Alpha/Beta/Preproduction Forecast

where used	Alpha QTY	BETA QTY	1st QTR Prod QTY
MMM	15	25	324
Analog I/O (EDI card)	15	25	(294+195) 489
ADAT I/O	15	25	(129+324) 162
TDIF I/O	15	25	(129+324) 453
Subtotals	60	100	1428
Extras (50%)	30	50	(50%)
Total	90	150	2K

SUBJECT:

DATE:

LVY Core team Mtg 6/24/98

- PDP process being applied to LVY
- FCS = April 1999
- Staffing changes:
 - Rob → Dir of Eng
 - Dan → LVY Proj Mgr
 - Den O → EAS, M.I.T.

Tom S. MMM Design Review 6/29/98

Present: Tom, Rob B, Girault, Dan F.

Action Items / Issues:

- ① Add mux in lncchip for AES/EBU main output so can choose any of the 3 S/PDIF's from the R-chip.
- ② Discussion about HP/MON3 implementation. Ideally, MON & HP have independent volume controls. In LVY, HP analog volume not ind. of HP/MON3 volume control in HLB/R-chip.
- ③ On block diagram, don't show 2 Jacks for Headphones.
- ④ Block diag - Option cards have HLB & R-chip reversed
Schem review
- ⑤ Use E-C22 470uF cap SMD part (CA44X)
- ⑥ Use SMD 7905 from EC22?
- ⑦ Use XREF attribute on nets that cross pages so get automatic sheet-to-sheet XREFS.

NEW PARTS

- | | |
|--------------------------------|-----------|
| ① DS 1034 Pwr-up reset circuit | ⑮ II 416 |
| ② Altera 6024 ATQ 144-2 | ⑯ New ADC |
| ③ 100K & R-p20K | ⑰ New DAC |
| ④ SDRAM | |
| ⑤ VACT 245 TSSOP | |
| ⑥ ACT 244 TSSOP | |
| ⑦ Altera 6016 | |
| ⑧ CY 2292 | |
| ⑨ VHC125 | |
| ⑩ Altera 10K10 ? | |
| ⑪ MAX 216 | |
| ⑫ CS 8A20 | |
| ⑬ IM 450 64Kx16 DRAM | |
| ⑭ IC 437 R-chip | |

⑧ 6-layer PCB vs. 4-layer PCB. 6-layer heavily favored by Brent & Dan, supported by Kowitz, Tom gets to make final call.

⑨ Tom Anticipated being in layout on MMM next week. So does Brent on Composer. Brent has priority

PC632
SK632
etc.

⑩ Need for Tom to finish Block diagrams of processor system.

SUBJECT:

DATE:

W/ Eng Mts.

6/29/98

(Circuit)

- Control Surf. Pkg rdy for Ken
- P&AS cost is issue on several components.
 - lit buttons
 - faders. cost up because no volume w/Ensoniq
 - scribble strips \$11/ez.
 - encoders
- Latest cost rollup is right under \$3K. Assumes optimistic costs.
- Steve's working on finding cheaper encoders.
- Negotiations have stalled on control surf - rollup is for \$3K. Mc Mike hasn't given thumbs-up to go. Ensoniq not providing funding. What's next?

Steve Thompson

- doesn't have time to design control surf.
- Therefore can't get Ken V. started.
- Mike P. figures it out.
- Awesome

Ron G

- M W F meetings to discuss SW status. Many issues uncovered.
- Rick + HeA communication issues being worked on
- learned to use pre-compiled headers.

Jim W

- Library / scene management stuff on MAF.

Craig A

- Found Emulator clock sync bug, fixed P-chip clock circuit. PLL bypass mode would be broken otherwise.
- Emulation s/pdif & I2S data coming out. EMU32 data coming out but off by 1 clk.
- Tom Sardoing testing on TRAM engine.
- G2M testing FX engine.
- Found bug in UP I/F
- Emulation going very good.
- Fujitsu conference will talk about floorplanning

7/1/93 Mike Price's Staff MeetingSXS ReportAccomplished:

- Control Surface Architecture & Cost rollup
- Pkg for quote to Ken Y for quote
- Identified consultant to assist with Analog I/O
- EPI interface virtually complete, FCC test underway
- MMM Design Review held, PCB layout can begin early July
- Ops review plan completed

Plans:

- Sign contract with Ken Y
- Get things rolling on Analog I/O design
- Layout & fab MMM main PCB
- Finish EPI electrical design
- Vacations
- Start MMM analog board design

SUBJECT:

DATE:

Problems/Concerns

- Staffing - Control Surface & Analog I/O module
- Control Surface cost too high.

Slides - Dep't

- ① Org Chart, Roles
- ② ~~Interdepartmental~~
- ③ Capabilities, ~~Hardware~~ Anal & Dev plans (checkouts)
- ④ Metrics: Milestones
- ⑤ Interdepartmental Initiatives: R-Chip, Program Mgmt.

Prod Line

- ① Deliverables, Tasks.
- ② Budget
- ③ Risks / mitigation

9/17/90

Tom - Fixed

Steve - Fixed, Sarcastic

Don - Fixed

WTP

2/19/98 Mike's Staff Meeting

• Lay off 7 people.

3/26/98 Staff Meeting, Mike P. on Vacation

White board:

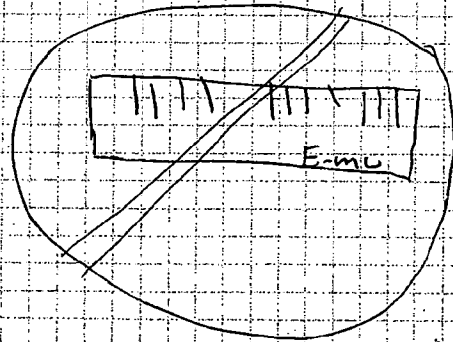
WE'RE MAD AS HELL, AND WE'RE NOT GOING TO TAKE IT ANYMORE

- ① Don't get out of your office & walk around! MBWA
- ② What does Mike Price (not) Do? MBWA
- ③ We gotta ask the tough questions
- ④ Marketing provides no direction
- ⑤ Product priorities seem exactly backwards
DTM/ivy vs. others
- ⑥ Why aren't we benchmarking/reverse engineer successful competitors' products?
- ⑦ Middle management (Eng/Mktg at least) not consulted on key issues & decisions

Express
of
↓
⑤

WE SHOULD OWN HIGH END DTM

Talk to Matt W about DTM mktg.



(NO more E-mu keyboards)

SUBJECT:

DATE:

8/27/98

EO Board Monday 8/31/98

Analog Board - Mid ~~late~~ September

October (end) ADAT Board

PCBA Schedule
Estimates
Girault/Dm

8/31/98 Inv Eng Mtg.

Steve H: McMike is the sanest rat on the ship

What happens if ship control sort late?

- (McMike) Forecast falls off by 80%,
Only the ECE customers will buy.
- scraped product.

What if ship with ~~HUI~~ w/ new silkscreen?

McMike. Don't know.

- Additional effort req'd to integrate HUI
1 month (Rob B)

- HUI should be contingency. Can we mock up new silkscreen for HUI for AEC show?

Mikes Staff meeting 9/2/98

SXS report - Ivy

Accomplishments

- MMU Dig Board designed, fabbed, ready for assembly.
- EDI option card design review - ready for PCB layout this week
- Contract for Control Surf consultant completed, sent to Ken Y
- Ivy team tried to agree on Deliverables possible for Q4 1998 - Assumption is that Control Surf development handled by people outside the Ivy team
- Dan F assigned to Analog I/O module

Outlook

- EDI card layout, fab, Assy - mid September
- MMU Analog Board design, layout, fab - late September
- ADAT option card - late October

Challenges

- Control Surf - Very distracting to Ivy team
- Focus - Need to have each Ivy team member focus on specific deliverables
- Schedule - April 1999 seems unlikely

SUBJECT:

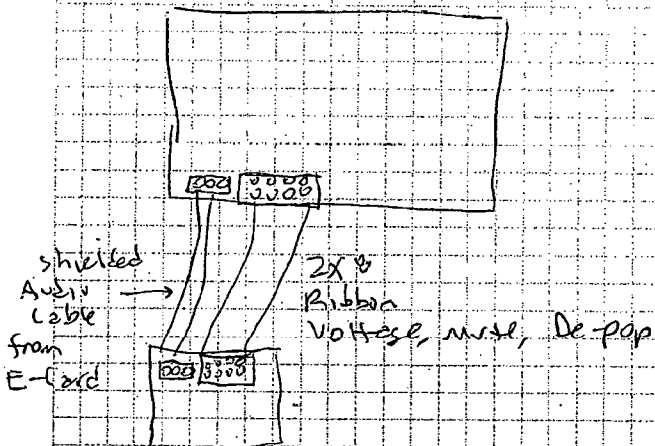
DATE:

IVY MMM Analog Board Design Review
Tom, Wil, Neil, Dan F, Steve S.

9/4/98

1. MMM System Block Diagram

→ Headphones distribution - Need to prototype. }



2. Analog Board Block Diagram

- Pad for left on headphones cable & output jack for FCC compliance.
- How to accommodate different impedance headphones? don't try.
- Use E-Card / E-Drive circuit
- Fix MMM block diagram to show correct Headphones topology 24 vs 20-bit DACs & ADC
- Use buffered to drive ADC signals to MMM Digital Board (VHC125)

3. List of new components

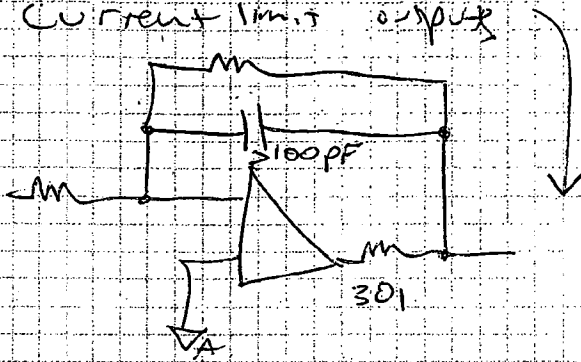
→ Use PCM1716 DAC → Need to measure true dynamic range, A-weighted, need 96 dB

NO
Want to

→ Use CS4390 DAC \$5.50? \$13.50 to UMC

• Get quote on CS5360, CS4390.

- Use homemade differential output Drivers.
Current limit output



- Use 5532 SO8 op Amp
Phillips
ROHM
NJR (composer)
- APC 5360
- Want Blue LED for power.
- VHC125

A. Schedule Activities by other Depts

TASK	DUPLICATE	DATE
Component Sourcing / Quotes / release to Rev A. (Steve Spina)		9/10/00
Schem Design - Review: THH		9/10/00
Placement: 9/14 (Tom)		
Layout: 9/16 (Darryl)		8/21/00 realistic
Feb: 9/20 (Whitney)		
Assy: 10/5/00 (Jeanne)		

SUBJECT:

DATE:

9/10/98

Ivy MMM Analogs B/E Design Review
Nick, Brent, Tom S, Dan F, Nil, Tony D.

1. Prev Action Items

• still need to fix B/E Dwg to show coax cable to HP PCB not Ribbon

→ • QUOTE CS 4390, CS 5360 (Whitney) Steve S.

• Use unused VHC125 to buffer RSTN to DAC.

• Add -5V regulator

Schem Review

see SH1

• use SMD 470 uF on +BVA, -BVA C2, C3, C4

• use SMD Test Points

SH2

• Add test points

• stuff = N on BAV99's

• All pass: use 100 uF bypass caps not 1 uF.

• Put symbol name or P/N on dual stacking jack

• Revisit gain on inputs. Draw Gain Chart

PUT ON WEB

SH 3:

- use 0.1uF bypass
- visit calibration circuit for CSS360
- R163 should be 1K
- use R-PAK for R156, R161, R162

SH 4:

- 0.1uF bypass caps
- swap Tip & Ring on J2
- Fix Gap connections for C26, C27, C31, C23
- Nuke R164
- need GND on D17, D18

SH 5, 6, 7:

- fix as per SH 4

SH 8

- mod HP topology - 301 Ω , 100P 28 per other outputs
- use shielded header as per E-CAE for CNA

SUBJECT:

DATE:

SH2

• use spin deck header for CNS as per E-22K

- Check for L/R Swap on HP jets
- Fix / check Depop - See Brian H.

Schedule

• Same sched as prev.

9/14/98

EDS Board Feb

10 boards 3 day \$2180

5 day \$1900

7 day \$1730

12 boards 3 day \$2217

5 day \$1912.88 \$159

Order 15 (Whitney)

9/14/98 Ivy Eng mtg

- Add Tom ^{Criswell} (PDM mgr) to email list
- Add Steve Spirn
- Scott Ruda
- Thursday 4 PM ? & Ivy Presentation to Mike, Don, & Eng.

AES: (Mike Barnes)

- Ivy Show twice on Sun & Mon
- Mantis (my asshole never tells its ^{source} _{smell})
- Press release Friday

Objectives:

- establish "real" product identity
- Name systems & components, prices
-
- Hype key technologies
- Highlight Linnard Sound w/Tim Burton animation
- Press release
- 15-minute Multimedia Demo

9/14/98

Steve T, Rob O, Dan F.

Steve: Do we really need GUI if we're committed to delivering the control surface?

SUBJECT:

DATE:

9/16/90

Mikes Staff Meeting

- Salary freeze for mgrs ends Jan 1, no other conditions.
- Stock ranking of engineering staff - next week.
- APS: Ramping up. 250, 350, 500 last month.
- New version for Creative for Q3. Soundblaster studio.
- This month - 2M - 2.5M revenue combined E-mu/Ensoniq
Qtr revenue - 6.9, combined. Break even is about 2.5M per month.
- APS Euro - need to ship! Might double sales of APS.
Need new box, Dennis is mgr for box.
- APS Lite might be cancelled. Might do APS for Creative instead. Direct X, WIN-NT, announcement at Comdex.
- Composer Proteus 2000, 12.0 voice
- Rocky Ultra - Nov? (E.T.S.)
- Activity update: Mktg has proposals to boost sales. Only if Saks pick up to at least 160 this month.
- Must move Ensoniq Mfg here - adds \$1M to bottom line. Our parts cost, overhead lower.

SUBJECT:

DATE:

IVY Deliverables & Personnel Assignments
(from 8/11/98)

Tom	
Rob	IVY Main Rack
Steve H	
	ADAT I/O Card
Garrett	TDIF I/O Card
	EOL I/O Card
Dan	Analog I/O Module
Jim	Host Program MAC
Ron	Host Program PC
Steve H	FX Plug-ins
Scott	HUI Support / Integration of CS with mmm
Ron	Dynamic Automation

9/11/98

Chris Neal - Altera.

Floating nodes: No swap of current goals.

We have 6 Goals, we'll get to keep them.

Corporate Site License -

\$10K/year, regardless of how many keys/nodes we have.

if sign up for 70K/yr, we'll get 50% more keys for free. (currently keys Chris will try to sub floating nodes)

SUBJECT:

DATE:

last key expires 10/31/99. → we would owe \$2K then. write check for \$10K instead, on 9/30/99, get 3 floating licenses for free.

5 of 6 keys are out of date, and can't target new devices

P.O. to work by 9/30?

10KE (9.0 SW)

10K50E comes in QFP

2Kx1 ram blocks are now 2Kx2, dual-ports

2.5V core, I/O are 5V tolerant on outputs, 3.3V tolerant on inputs.

Cheaper than 10K50V.

Buy 10K5V15 for IVY

10K50V RP240-4	\$60	100/mo
10K50E RP240-4	\$50	100/mo
10K30A RP240-3	\$25	100/mo
10K30E RP240-3	\$25	100/mo

Budgetary

P2 phase 1: 400K gate part, 10K LE's,
 109 2Kx1 D.P. RAM blocks.
 or each RAM block can be
 16 macrocells.
 Up to 2M Gates. \$1200 QTY 1
 New tool suite

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Incremental compiling, Hooks to
model tech.

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SUBJECT:

DATE:

9/21/98

Voy Eng Meetings

Present: Penny, Tom C, Jim W, Mike B

Late: Tom S, Steve A, Scott R, Rob B,
(Unprepared) Steve T, Girault, Ron G.

Rob: AES show Preparation. Ron: Automation.

Rick FW. Hot plug-in recovery, Serial cable conn.

Steve H: Layer above R-Chip Driver. Count count
on MTC ready for AES. Mtg w/ Tom
More Jot about surround sound. (E minor Audio)
When do we need MAC version? Wed AM.Mike B: After mtg, can see Demo by Kevin M. 1 min
Automation Demo shown at AES. Another Station
at booth w/AUT. 3rd Station has EOS
Setup, will also have MAC HCA.Steve T: M? needs ^{due} Friday. J-F. Starting
Analog I/O module. Option card
Mech design Done. Front Panel Designs
PendingTom: EO1 Fab come in, Kits Finished. PCB35
Analog Board out to FAB, back monday. Kitting
in process. PCB40 front panel board: in
layout. Main digital board. Grinding Halt
due to ~~equipment~~ equipment competition.
Problem with Syschip?Dan F: Task lists. Yes: Girault, Rob, Dan F,
Control Surf. Needs task list, Tom S not done.

SUBJECT:

DATE:

Steve H. Anyone going to Control Surf Delight
workshop at AES Tuesday 2pm?

Open discussion. Schedule. Equipment Competition.

Mike's staff MTD 9/23/88

Liz B	2	3
Mark M	3-	1.5
Danny G	5	6
Josanne M	1	4
Brian H	2+	3.5
Mark C	1	4
Susan F	1	4

Craig
Bob
Brian
Colin
Tony

Craig	1-
Bob	2
Brian	2
Colin	5
Tony	1
John F	1
Ferri	2
Ron	1
Girevlt	5-
John M	2-
Scott	2
Tom	5-
Dzane	5
Mel	2+
Jim	1-

SUBJECT:

DATE:

10/1/88

lv y

Probs Allocation

✓ Rob	2
✓ Ron	2
Steve	1
JSM	1
✓ Tom	1
Girault	2
MKTG	1
FCC	1
✓ DAN	
SPERS	0

SUBJECT:

DATE:

10/1/93

Ivy Schedule Preparation Notes

1st pass schedule:

- Rob B "May", includes some beta testing
- Steve T: May, unscrubbed, 40% confidence, includes beta
- Girault: 8 1/2 months, not including beta testing
- Tom: 7.3 months, not including beta
- Dan: 7 months assuming F/T, includes beta
- Brian: Tape-out Tuesday NOV 1 samples. Fujitsu manpower problems, layout problems. Risk factor! Fujitsu might take on 2-week turn

10/5/93

Ivy Eng Mtg. 9

SW STEPS: Rob - AEI preparation

- S307 port going well. Cache, SRAM, LEDs work.
- Steve: Rchip layer for ~~FX~~ FX System.
- Scheduling
 - next week: Mtgs on Environmental Audio.
 - Automation engine Design Review.
 - MAX FILE I/O (works!)

Mech: Steve T

- chassis in - everything fits (mmm)
- Analog I/O module work

Tom S HW

- Computer/CLK sys works.
- next: Inchip debug, make audio path work
- Circuit: Inchip
- EDI CAD ready for integration
- Analog boards in ASSY done today
- Circuit starting ~~the~~ ADAT board design
- A Clock diagram has been done, on web seen.
- when will there be a SMPTE System diagram? See Circuit
- Audio path, clock/sync, Microprocessor block diagrams in progress by Circuit/Tom

Don: Schedule

- Tom C is Schedule man
 - Andre will do TDF CAD
 - SW in trouble
 - Pchp in trouble
 - Tom C will keep Schedule current bi-monthly
 - Zweckel from now: Tom C initial Schedule
- Mike B: AES
- Nominated for Blue Ribbon award by EQ magazine full wrap-up in November
 - SAL and Ray from Ensoniq are newly interested in the Control Surface
 - Got another HUI from Mackie

SUBJECT:

DATE:

- Will set up Sumand Sound Studio in the MKTO Demo Room.
- "Politics of the Situation"
- Might be able to show log at Comdex 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 30 days
- Talk to Dave Cluquenois
- Dan F. 3 priorities: Spec, 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 Dime when Alexandra when computer is free
- Can buy toolboxes

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

He designed the HUI, and worked on the Digital 0 bus
work at NASA on Galileo. ~~366 560 9467~~
360 794 1196
would be great for Control Surface development or
SMPT E Option Card

10/19/98 - Meeting w/ Mike Price

Agenda:

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

Eng Meeting 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 SIO?
- Getting ready to debug EDI C&E.
- 2 main boards operational
- Analog Board 2 IN & 2 OUT
- Outchip works H-Chip bypassed.
- Jennie Building 10 Systems Eng Lab Staging area.
- Inchip works
- Can set up of Delay FIFO in Inchip if change channel mapping code.

Rob

- Got kernel running - MBI, CLK, LED's, ~~UARTS~~ UARTS, TIMERS, etc.
- Board bring-up Hell.
- "Seems Faster"
- Code Cache works, Data Cache worky
- Jim: MAC File I/O, debugging tools (trace statements), Direct outs meetings

Jim: Ask Brian to debug MMIO modules as ~~soon~~ Jennie builds them.

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

SUBJECT:

DATE:

Steve T:

- building systems. No chassis error.
- 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 PCB simultaneously.
- Craig needs additional Alpha setup.

WV & BS

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

SUBJECT:

DATE:

IVY MRD MEETING 10/21/99

Present: Rob, Jim, Don, Joe, Steve H,
Mike B, Girault

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

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

10/30/99

Horace Newzre 2 - 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?

10/30/99

Frank Reid, Sager FAE for Ben Brown

402 487 0510

X419

SUBJECT:

DATE:

11/2/98 IVY 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 pur-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 reports -
- 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! (on from 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 the A Spec to support direct outs / inserts 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 - I switch.

- • Can we put cordless ADCs on MIC inputs? AXMS391?
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 CIRCUITRY

SUBJECT:

DATE:

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.

11/4/98 Mike P's Staff Meeting

11/9/98 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 orchestrated the whole deal.

- • Find out what RICKK did about JOMS directory.
- MKTG ~~for~~ for Iuy system V2.2 available from Mike B.
- The Iuy financial Analyst (Ozle Holland) is leaving - Darrah is replacement.
- Need Digital Studio - Eng. finances, 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 Rec room) would be ideal.

Simm Demo:

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

Rob Sw Steps

- Parameter updates to support new FX engine
- MAC file I/O code checked in.
- "HezAbeat" feature implemented on MAC
- Major Burnout.
- Ability to automate MMM setup to FLASH. Next: periodic auto save.
- Bus files with correction & comm establishment.
- Steve H.: R-Ship HW drives Setup, FX manager.
- Steve H. in Barcelona, Spain at "Digital Audio FX 2.0" conference.

SUBJECT:

DATE:

- Revert demo on R-Chip "Before NAMM". (Steve H)
Grant HW status

- 4 new mmm Digital boards are ^{partially} working. Brian H is helping to debug.
- Steve H got one, Rob, Circuit k2, 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.
- Dan F: Getting Annex design going. Components sourcing.
- Held Annex design review.
- ADAT board ready for NAMM? EDI more important, so will concentrate efforts here.

11/11/98 Mike P's Staff Meeting

- Sim is coming to E-mu 11/24 & 11/25. Wants to meet managers, have product demos.
- Get 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. Home theatre connection Scotts Valley. Cables
- Barnes - Has HUI
- Rob B owns Dig Studio responsibility.
- Aralex corner game?
- Everyone should be at work on Tuesday 11/24/98

SUBJECT:

DATE:

11/16/98 Iuy Eng Meeting

Present: Consultant, Paul G, Tom C, Joes, Don F,
Cris 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 - Herzberg feature so Herb 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 - R-Chip Drivers are compiled into the code.

- Steve H - has compiler/Debugger Set up in Digital Studio.

- Jim W wants to test R-chip 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.

- Picture code w/OKS

- MPEG Audio player - OPA Walkman.

- If Sim provides funding, can hire 2 engineers & Consultant.

- Hold off until after Thanksgiving on ~~recruiting~~ recruiting efforts.

SUBJECT:

DATE:

My Eng Meeting 11/23/98

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

Combed Report Digital Audio

E-mu ELsoniq station - Black PC, Paris, Iup, 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 Shepherdson spent time with Sim explaining what Iup is all about.
- Kevin S. wants to do a demo "Hollywood" type to demo Live - were in Singapore. E-mu may participate. ~~EAM~~ is highly desired.
- Creative might help us find a NAMM demo at Frank Serfatino's.

Grant the 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 EDI prototype together for demo.
- Syschip FPGA greatly modified, new int Ctrlr code from EA project.
- Control Surface chip: No progress, per se, but will be an extension of current EDI chip. So have a head start.
- Annex module: Mic/output board 1st pass design

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SUBJECT:

DATE:

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 errors on Analog Board. "Brent made him think strange".
- HEA: File I/O changes made to MAC version incorporated into PC version. Can drag folders 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.

11/30/98

1/17 Meeting - Mike P, Tom C, Paul G, Girault, Bryan L, Mike B, Steve T, Rob B, Dan F.

Mike P:

- Jim meeting: ① Jim wants us to get into high volume MKTG.
- ② Pro musician's products vehicle for new ideas & technology, but low volume so need high margins >60%.
- ③ Willing to fund E-mu for many things, as long as those things directly support SoundBlaster line 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. Ecmu does not have this money.

2:30 TUE 12/1/98

Mlt 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 PCBA
- Annex will be sealed down - 16 ch line-in only module
- Term is to "proceed" until new project assignments are made
- Circuit starting ADAT design this week.
- ADAT PCBA's 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 now boot working - p6m or pwr-up
- Clock sync subsystem works. Variable speed feature being tested. Glitchless clock switching works.
- Parameter infrastructure improvements. Design Review next week.

SUBJECT:

DATE:

- RevA feature implemented on R-Chip, works!
"sounds gorgeous".

HW STOPS (Girault)

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

HEA STOPS (Tanner)

- Automation Des Review
- Fixed MAC Conn lag - disconnect problem
- UI enhancements, pop-up menus

Short-term plans

- Implement ADAT-CARD.
- Implement 16 Line-in module, NO MIC inputs.

Open Discussion

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

SUBJECT:

DATE:

Mike P's Staff Meeting

12/16/98

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

\$995 MSRP	Dec-MAR (90K) loss 1000/mo	Q4 300K 1100/mo	Fall '99 \$695 MSRP \$240 UMC
\$560 ASP	\$505 UMC (Current)	\$505 UMC	1500/mo
\$505 UMC	Composer	Composer + Audity 40% GM	Entire S.M. line (Orca, Piano, Composer, Audity)
8% GM			

12/21/98

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

Phantom discussion

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

SUBJECT:

DATE:

SW STANS (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 STANS (Dan)

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

Ivy Eng Meeting

1/10/99

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

Probability that Mike can get back down to start up
 looking to develop Ivy to the degree necessary to
 ship all deliverables.

Steve A	6%
Dan F	1%
Givult	3%
Rob	3%
Ron G	2%
Craig	1/2 %

⇒ < 2%

SUBJECT:

DATE:

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

SW STATUS:

- SW release for NRAM
- SW version for Secretfire Demo
- Steve H implement surround Revrb 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-CAK
- Annex module is ~~still~~ on hold, pending a decision on Ivy project funding
- finished core parameter files in the Ivy Pack (Rob)

1/20/99 Audio Compression Meeting

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

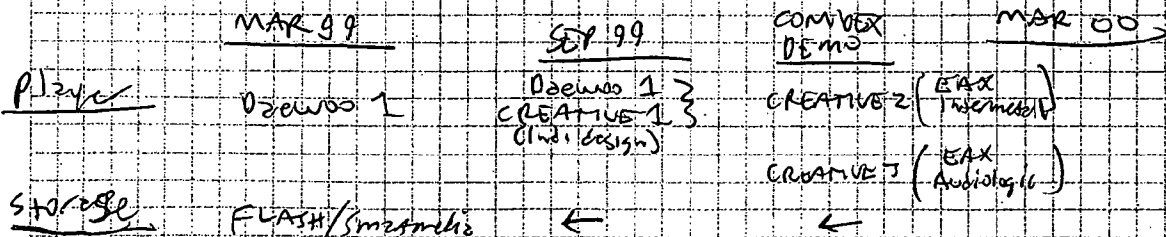
AGENDA

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

Lee:

- PC-based Audio Compression Mastering
- Optical Media Compressed Audio Playback
- Discussions about reqmt for serial # on media
So can control distribution of content.
- Products:
 - Flash-based recording / playback
 - ↳ some units
 - ↳ All units
 - Dock/cable for remote player
 - MIDI / Portable music Synthesizer
 - Encoder - Line level audio in → compressed audio out.

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



SUBJECT:

DATE:

- Chang Soon - Ask for documentation on Windows 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:

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

1/21/99

MP3 Meeting - Creative Mixipros

Nick B, Mike P, Rick H, Brian L, Lee Ray, Chris ^{Smith}, Hock L,
Denz M, Stern T, Den F, ?

Chang 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 Manger - Analyze beats & rhythm in songs, superimpose drum loops, etc in other styles (House, Techno, etc).
Makes a remix of a song in a different style.
- Mix: • CDR playback device. can hold many MP3 songs on CDR.
new 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 power

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, plays:

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

Has: IDE Hard Disk
 MP3 Encoding

TimeFrame: Q3 (Aug 15th)

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

Need direct connectivity to mobile player
 No video

Street Price: \$499 (too high)
 ↳ very high capacity

\$299-399 Highly Desired.

PORTABLE JUKE BOX

Cost target: \$149-199

Assignment for MJP 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 A/S 15.99

Next meeting Feb 2 5 PM

Possible Jukebox Spec

1/25/99

32 MB Flash Mem. \$100
CASHWant 100 MB storage for less than cost
of 2 Flash Cass.

Click Drive.

USB Port

Batt Powered

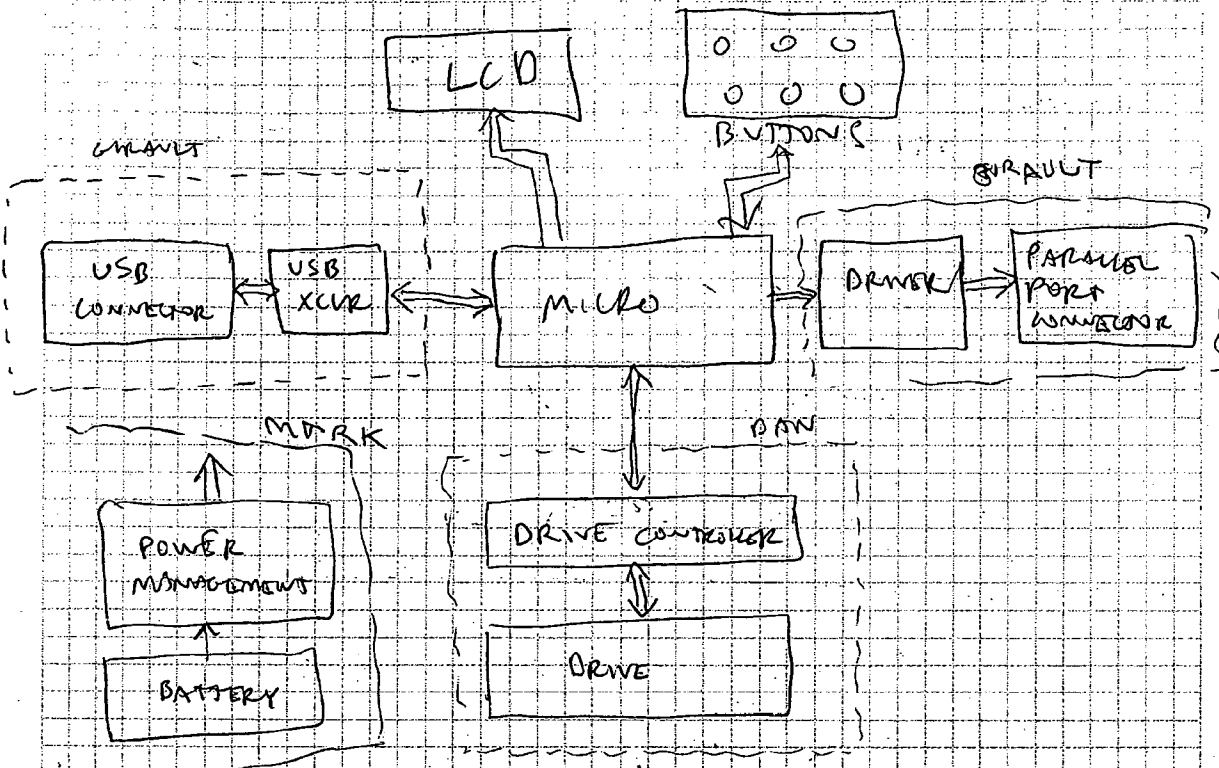
Small connector Parallel Port I/F to Decimo Player

MP3 Proposal Due Mon 2/1/99

Creative Business Model: Mike P

Cost Estimate: Dan F

Big Man: Brent E



CLIK! DISK
 Super Drive
 Hard Disk (FIXED, ZIP)
 ZIP
 Budget: \$30

MP3 JUKEBOX CONCEPT

Des, Brent, Concept
 1/25/99

MAT'L COST. ≤ 50% of Street Price

SUBJECT:

DATE:

MP3 Jukebox
1/26/99

Hitachi, Sony, Toshiba,

Ed Comeau

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) (000) 446 6342

SUPERDISK (IMATION) (000) 466 3456

ZIP DISK (IOMEGA) → ZM374 IOMEGA PIN 10446 895
15710

2.5" HARD DRIVE

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

1/26/99

IMATION (000) 466 3456

Steve Bradley (651) 704 4105 (jettr message)

~~IOMEGA (000) 446 6342 (1) (3) ← bogus~~

000 IOMEGA2 (15265) (3) Amanda
Covad (Covad 274) 663 8538 Tony Legalante
Contact → No Good

Amanda X1151 ZIP: Huge installed Base 22 million sold

Internal CLIK: NOT avail yet OEM

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

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(Cont)

SCSI ZIP Drive will be EOL'd soon.

Mike Knogge (801) 770 3977

1/26/99

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

Internal CLIK! Not Avail yet, but soon.

External CLIK! CLIK mobile package minus PC I/F card.

Next Assignments:

1/26/99

Geralt: FPGA Investigations for IDE, Parallel, USB, LED controller, DRAM controller, Block program.

Don:

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

③ Email Cheng soon

Top-level BOM for Dazzoo Player

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

SUBJECT:

DATE:

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 status.

Chrissy Wilkeson - MP3 Mktg Mgr. @ Creative
Jay Hentel - Another Mktg. Mgr.

Possible team. Dan^(Prod Lead), Brent, Rob, possible Ivy team members. Brian Link.

→ Want to visit Patrick Ang @ Ective

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

→ Cirault - Help Ultra Team debug clock/sync subsystem problem.

Peter Robinson - Orca

1/27/99

SW Key, SW, Lic Management

Capture is unlocked.

Flex Lic 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
\$ 15% Annual Maintenance

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SUBJECT:

DATE:

1/4 Eng Meeting

2/1/98

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

Serifine 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 sup at Erent Electronics, (get NA mm?) also possible partnership discussions.

SW STAFF

- Partner Staff
- EPI Staff
- Code cleanup
- Steve H: Busell computer worked on 10K2 stuff instead.

HW STAFF

- ADAT cards in layout. Film tomorrow
- Will FAB 50 PCBs.
- Will order parts for 30 PCBAs
- 10 of the 30 will have USB ports
- EPI cards are in test.

MP3 Meeting in Milpitas 2/1/98

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

Portable jukebox: Want symmetrical 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:

DATE:

Creative MP3 Guy:

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

Cheng Soon: Prefers Fixed Hard Disk, at least for set-top box. No ^{extra} 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.

Hook: 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 + Set-Top) jukebox

Action Items:

- Mike: 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 IR)
- way to get artist info based on serial # of an audio CD. } for set top box.

SUBJECT:

DATE:

Jobk: Early March meeting, get two firms 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
Proposed:

contacts: Brian Chan, Lou Chen Gee (POP Com)
(Flat-panel monitor)

Epson makes 26x64 bit-mapped LCD
2cm x 3cm for \$4.50.

Diamond player: 90mA @ 3V → 10 hours play time

NOMAD & Nomad II: 100mA @ 3V → 8 hours play time

Anchor KN2131 USB chip 4.7k forwarding
RAM based ~~RAM~~ chip. Needs OK EEPROM (Xilinx chip?)

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

~~Go on~~ Stay this → LCD sup @
Creative

SUBJECT:

DATE:

MP3 Jukebox Systems Analysis Meeting

Mike P, Niel, Circuit, 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 SK Chew for quotes.

⇒ SW tasks

- Song Browser
- Device Detection
- OS Download
- Best Link estimator
- GPS Screen
- 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 -
Propose 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 wait.

McCall

Chang Sun's Microware II Specs.

What does it take to make a player?

(Gloria Marquez)
Phone #

Prototypes & mechanics

So CDs stored on Hard Disk.

USB port

Flash card (CF) interface

DC Jack

2 C batteries

IRDA port

Headphones jack

SUBJECT:

DATE:

Lee Cheng Soon Phone Cell 011 65 8954 0000

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

Goh Siang Thia - Not Avail

NOMAD I - NOMAD II uses Micromas Intometall chip.

MP3 Long Term Planning Meeting ^{2/11/99} (Creative Milpitas)

* Explains \$1.79 (Hosiden is the vendor) for Nomad

Camping Case. 2 vendors, Singapore & Christie.

→ Nomad II officially launched.

Siang Thia - Nomad II specs. New items on MRD: 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 implementation. Need to decode time files.

Staffing:

Sizing 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.

Sizing This:

Voice Recording not implemented on 1st Nomad II
prototype

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

Schedule: Sizing 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:

5 weeks 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

SUBJECT:

DATE:

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

~~CD~~ I solution: OPL4 chip by Yamaha. General MIDI bank, 1 MB ROM built into Yamaha chip.

\$4.50 for Yamaha chip! ^{only} Low power chip?

MRD signoff: 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 Micros chip.

\$0.80 - \$0.90

can program input format of Phillips chip.

Micros 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

<u>NOMAD I</u>	<u>NOMAD II</u>	<u>OASIS</u>	
\$159	≤ \$159	\$199	\$299
64 MB	64 MB	100k/month	10k/month
		2.1 GB	

Chris Smith

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

Go through MKE for 2 Drive

Quote 100k/month

SUBJECT:

DATE:

NOMAD M21 cost is \$190

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: Scrub prices.

Next Thursday 5PM

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

Belfort Bee - Singapore, ask for BOM.

Chris Neal - 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

3.3V prog done bit

7072 AELC44 -10

7128 AETC100 -10

6016 ATC100-3

EPC1441 PCB (DIP)

6016 ATC100

100K

\$2.50

100K

\$1.40

100K

\$6

100K

\$5.50

100K

11.50

100K

\$6.50

500K

\$2.20

500K

\$1.20

500K

\$5

500K

\$5

500K

11.25

Add \$0.20 for TQFP PKG

ALTERA PRICE ESTIMATES

SUBJECT:

DATE:

SANDISK Meeting

2/17/99

Ed Wellar, 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 H04PNC 3336 very cheap 32-bit processor
3337

Toshiba Disk Products 949 457 0777 (2) (8)

HDD Z131 2.16 GB 2.5" Hard Drive \$140.45 10k/month Marshall
(M1K2110MAT)

Joey is sales guy? Irvine
Watkins

Frank McGilung is sales rep (408) 965 420 } left msg

X949 461 7819 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 \$.50 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 Coeller)

CTO Phil ~~Weiser~~
Weiser

BBB Guy ~~Jay~~ Guleria copy protection expert
Sunjay

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

~~FDD~~

MHF 2021 AT

★ ★

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

Rating

Big Deals

- Christmas 99 Sales Start 9/1/99
- 7 • High Capacity (50 40-minute CD.s)
- 1 • Portable (not wearable)
- 8 • 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 • Extensibility

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

parallel video I/F for name I/F
USB
Analog Input
Modem for Internet
IRDA wireless

color LED display
S-video adapter
H.263 video adapter
CONFIDENTIAL
(videoconferencing)
microphone

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RequirementsCONT

- Battery life 8 hours
- Size ~~smaller~~ 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 Headroom
- 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/Girault: Scrub cost + use model

ZPM tomorrow:

Me/Brent: Presentation

Rob: talk to Peng Kost, get APPS SW for Normal II SW

3 Places:

Customer Perspective

Use Scenarios

Competitive Differentiation

~~Business~~ for Creative

Compelling Issues

} Host SW/FW
DSP hardware

Status page

• \$100 disk drive

• TI processor found

• Battery life tests

• Wrote ~~ESP spec~~

~~Met with~~ ESP: \$249

MP3 Long-Term Meeting

2/10/99

Christi, Arne, Dan F, Chas S, Brian L, Hack, Vincent
 Mike P, Brent E. Singapore: Robin, Tony, Tony
 Peng Kuit, Sings Thia, ~~Tom~~ Bryan Chen

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

• Nomad II Proposal - Sings Thia.

→ PCM3002 Burr 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.

→ Sings 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 saw: 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:

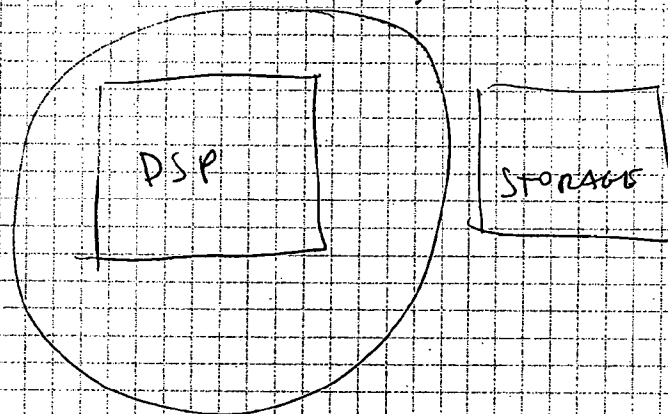
DATE:

E-mu Action Items:

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

Rob

HOCK:
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 Hock updated BOM.

④ Think about Set top.

⑤ HW schedule - mid.

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
bas boost	1 mo + time for licensing
reverb	2 mo

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

3/1/99

Brain L

Reverb on OXSA - Need 64K 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 ~~45~~ sec.
1 min 25 sec.

SUBJECT:

DATE:

~~Brian | Comments on~~

3/1/99

Austin Chip - T.I. Sales Rep 3/2/99
 Randy Cole rcole@csc.ti.com SW Guy 972 997 6172
 T.I. DSP's

TI '5409 - pending, samples July, production October

'5410 - samples 3/22, production 4/30

AAC Decode:

14K program, 32K ^{Data} RAM "won't fit into 5409"

AAC is 60 MIPS, temporal 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 demo system that has Compact Flash drives &
 DSP, would be good start for disk-based product.

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MP3 Long Term Planning Mtg

3/3/99

Ken Fong, Mike P, Arime, Chris, Jack,

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

Oasis MP3 Review

- Strong Resic for Nomad Connectivity. Can we use USB in master mode to upload to Nomad?
- Media Card? Include, so can support Xfer of MP3 to other brand of MP3 Player. Can also satisfy requirement of interface to Nomad.
- Remove Audible Support from M20. Focus on Music playback
- Audio ^{recording} encoding: if 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 best powered due to battery life.
- Implant analog input if easy and cheap
- Want RBV's feedback after next revision.
- Add 2 more outputs

SUBJECT:

DATE:

Start This

- will add external 64KB Flash RAM So
will have enough mem to support S.S.F.P.C.
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)

microns \$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 use regular DC adapter to power the unit. Want separate charging jack.
- charging circuit costs \$1 - \$2.
- LCD = "Board" is what Manid II is using
Hong Kong
- In Singapore, Veritronix

SUBJECT:

DATE:

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

Tray Viers
 4651 7373
 Gen Sales Mgr

Thomas Andersen
 408 434 1122
 Tech Sales Mgr

MP3 Long-Term Meeting 3/11/99

Ack, Mike, NIK B, Brent, Lee R, Brian L.
 Cheng Soon, Peng Kint, Siang Thio, Chve

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. Heck. 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 (750% market share)
- Year 2002: 14 million MP3 units. If we set 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.
- 56c STA017 chip - Hardwired MP3 decoder
 \$5.90

SUBJECT:

DATE:

- rem
: 16R
- PCB: 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 email end of next week. Since this needs to finish schematic, then give to procurement, then get Creative BOM.
 - Special constraints, want to remove MIDI chip.
YES
 - USB connector is too big, see GVO. Can we use smaller connector?
↓
could use PCMCIA 15-pin connector, then need special cable.
USB "Biometer" \$0.07
Custom cable: → \$1

OASIS

checky soon will forward Oasis MRB
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 Rzy with ~~Action Items~~ Agenda Items for meeting with Singapore Engineers
- ② Meet with Cirrus about adding additional I²S output & USB Slave I/F to MP3000 chip.
- ③ Get as much info on Cirrus login as possible for meeting. (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 MRD & get feedback from RBUs, will report feedback on Mon 3/22/99

★ \$25 for IDE CD ROM DRIVE
40x Speed

SUBJECT:

DATE:

Oasis Eng Mtg

3/17/99

Don F, Brent, Jim W, Terri F, Grant, 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: Vermonix visiting 3/30/99
- Contingency planning: Add people to project for contingency mitigation - have someone check horn all project features into ^{single} DSP.
- S.D.M. Spec eval on 6/30, we will need headroom in design to accommodate.

Assignments:

- Jim: Dis into DSP issues, tech center. (1-Luke, 1-Doh)
- John: Figure out what icon we want on graphics LCD display by 3/30.
- Talk to Scott Winkle about DSP work.
- Grant: will draw block diagram, BOM, Theory of Ops for next week meeting with Singapore Engineers
- Ron Co: Work on Host Apps proposal. Meet with Pong first next week. Identify Robost CD ripper.
- Concern: CD Ripper SW is flaky.
- Encoder: where to we set? Eventually, integrated into music match.
- Mike: will ask back if we are hire in editorial SW Apps engineer. Short term: Contractor & DSP Contractor

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SUBJECT:

DATE:

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

Next wed 10 AM

- 3/17/99
- Steve Hussy, Dan O (Cirrus)
- RE: Cirrus MP3000 up
- 2 pieces doing MP3 code for MP3000.
- ① ARM - Code due 2nd 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 Ireton { Do we need to pay NRE \$ to eval ARM or 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.

SUBJECT:

DATE:

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, MIK, Lee R, Girault, John M, Peng King, Fritz, Siang Thio, Vincent T, Cheng Soon, Kent, Christi, Dan F

Non-AP I Schedule (Samsung Players)
 20 QX (4MB FM mobile) (32M Model Also)
 20 Qx Samples 4/2
 30 LA Internet World 4/9
 1K seeding 4/20
 Music Production 5/17 (1st 5K)

Then 1K-2K per day

Branded with players (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 SM: \$49
Non-FM + 8MB 12 months	\$126	
Additional items:		
HP	1.79	CD \$0.50
AC Adpt	1.50	Manual, Box etc: 3.50
Music Merch	3.50 (Royalty)	Shipping/Labor: 1.00
Pouch	0.20	

SUBJECT:

DATE:

MP3 Meeting Minutes

Cont

NOMAD II

64MB: COGS = \$99

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

32MB: \$99 street price

Key Pros:

Diamond 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 ~~total~~ total MAY-September

75K/yr commitment for Music Match sales.

Chast:

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

- ~~Met~~ metallic look - (positive)
 - Want more interaction with music - customization, Bass & Treble controls, EAX 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
- QNO:
- Larger LCD
 - 64 MB
 - D. Stewart "skins" on PC SW

Other:

- No skip
- Needs not interacted in laptop disk

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SUBJECT:

DATE:

Vincent:

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

Negatives:

- MP3 only
- Non Flashable Firmware
- MP3 of Smart Media - where do my songs live?
- Long download times
- Smart Media compatibility (SSPDC support) need to warn user before reformatting SM card.

NOVEMBER Design Solutions

Need to get:

AUG (SOPT)
MICRONES

OCTOBER (CIRIS)

① MS Audio Reqs

- Unique ID

- Unique ID

② When will Ciris show MP3 working or MP3000

- No other CODEC

- Possible other CODEC

- MP3 working

- MP3 in development

③ Schedule of next chip by Micromes

- 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 SDMS

Get SDMS password

SUBJECT:

DATE:

Sting ThisSSFDC!

USB: works both dir

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

- Hbdc. General manager re interested. Proceed.
 - Want to comply to standard USB storage requirements so can
browse OASIS in windows explorer.
 - Remove Smart Media Slot
 - Add: wired interface to NIMAD. 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 350 Intel Celeron system.
- 5/6/99 → Content
Support? MS Audio,
Audible, etc.
• SMI: Not implemented
for FES

SUBJECT:

DATE:

MPS Meeting Milpitas

3/23/99

Set-Top

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

Tero \$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

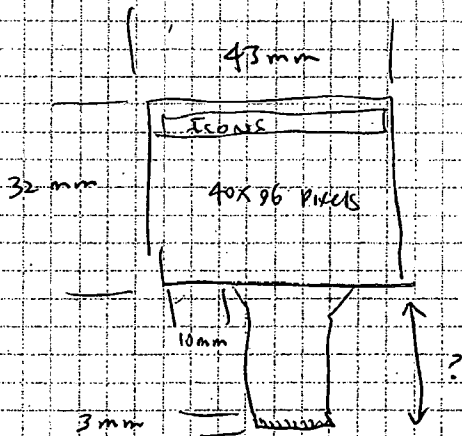
Don F, Sang Thie, Peng Kiet, John M

Sang Thie investigating Hitachi LCD display

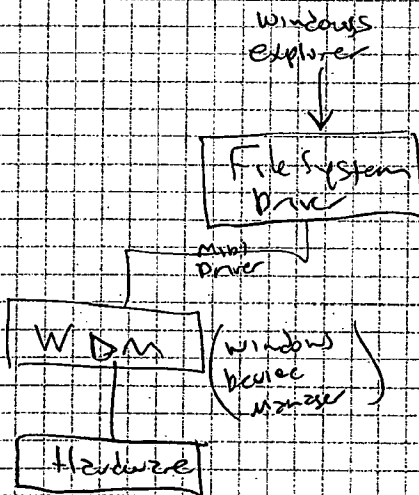
40 x 96 + 1 row icons, \$4.12 for 300K

Volume.

HD066726 Hitachi controller (only for Creative) + Veritronix Glass.



- For USB p2A, check out Phillips D12 \$1.80, they support ATAPI I/F (Drivers Avail)
- Sing this already evaluated this p2A
- If design in chip, get free source code!
- Flash mem: Can use 64K x 8 Flash for \$1.50 by SST.
- Grant's Email Sing this pinout for MP3000
- Email Sing this 72M datasheet & EVAL Board Schematics



SUBJECT:

DATE:

OASIS ENG MTG AGENDA

For
3/24/98
Meeting

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

OASIS Eng Mtg notes 3/24/98

Mike P, Grant, John M, Dan F, Brent,
Steve T, Terril, 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 R&D.
- Want hiring req for SW APPS Eng. Mike forwarded request to Hack.

Milestones Meetings

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

• Steve T. need date by which we can choose
factory type

- Have Andre write code on E-IV to do batt experiments
with IDE done

ShoA-term Assignments

- ✓ Casrault - Send Sizing This pinout info on MP3000, PCM datasheet, Full eval board schematics.
- { Terri F - Compile list of major SW issues so we can track them.
- ✓ Dan F - Orca2 toolset
- Future meetings: limit attendees, every week
- ✓ ID Firm will selected & started by Monday GVO will be doing initial concepts.
- ✓ Buy Polycam phone (Brent)

3/25/99

Ossie DSP meeting

Brent, Tim 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: 90-100 MACs per sample period.
- Initial tests for Scott & Tim: check out SBLive! reverb code, port to ARM Assy or CH, estimate MIPS req'd by ARM processor.
- Buy Matlab pc version

SUBJECT:

DATE:

- MIS: Need bin 45/90 systems with SB Line! caps.

Vantronic LCD Meeting

CS. Wang, Gen Mgr, Vantronic, (Singapore)

Alex Marinescu, Apps Engineer VL Electronics

- Could do graphics display with larger dots & pitch. Will need to pay NRE \$5

0.40 x 0.05

dot gap

- COG (chip on glass) lower NRE

- 120 x 80 is largest graphic display for one-chip solution.

Schedule

Specs: (US)

QUOTE: 1 W

NRE:

SPEC SIGNOFF

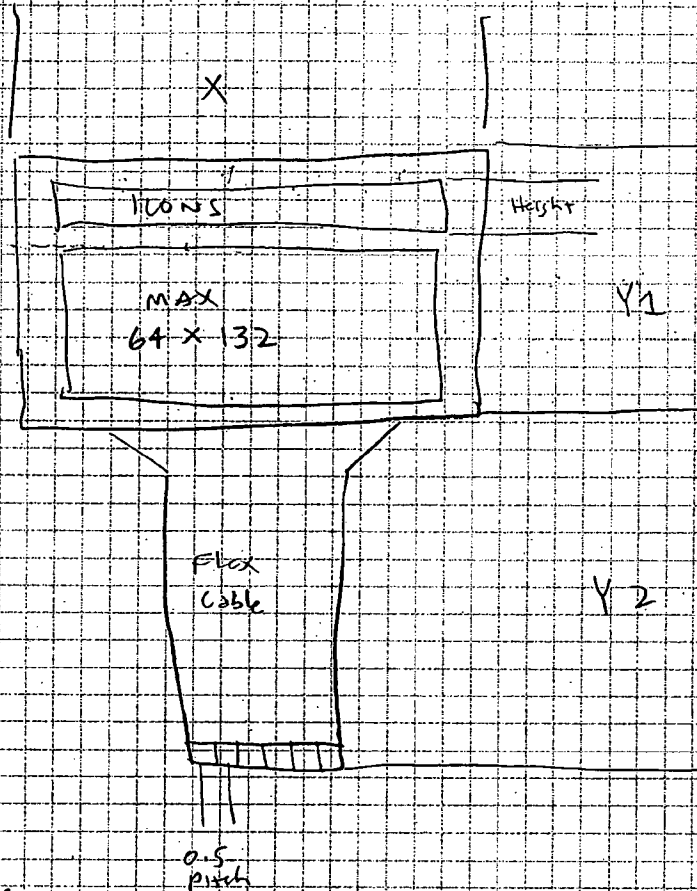
} Pay NRE
 } signoff fee

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) Icon height
- c) Y1 Glass height
- d) Flex length

SUBJECT:

DATE:

Oasis Eng Mtg.

Dr F, Brent E, Girault, John M.

Agenda

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

Notes:

- No SW Project Lead. Schedule will slip. Terry 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 • Revise 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~~
- x A • Don - Start technical spec.
 - Girault working with Andrei on battery life testing
 - concerns that 2MB of memory not sufficient. Want 8MB for single chip solution. 8MB EPROM is \$10.

SUBJECT:

DATE:

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

Oasis Eng Mtg.

4/7/99

Girault (HW)

- Mark Trehan not forthcoming with tech info recently (Girault)
- Have pdf file of U7211, but no pinout or data sheet on MP3000.
- Battery tests: Andrei wrote code on E-IV for battery testing using I.D.E. drive. Waiting for MAX1703 DC-DC converter.
- Schematic Capture has begun. Girault 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 rec'd also rather takes 30 MIPS on ARM.
- Better: Spatialization, 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 & nuke extra outputs.
- Nuke extra outputs? Make this agenda item for Long Term Planning meeting.

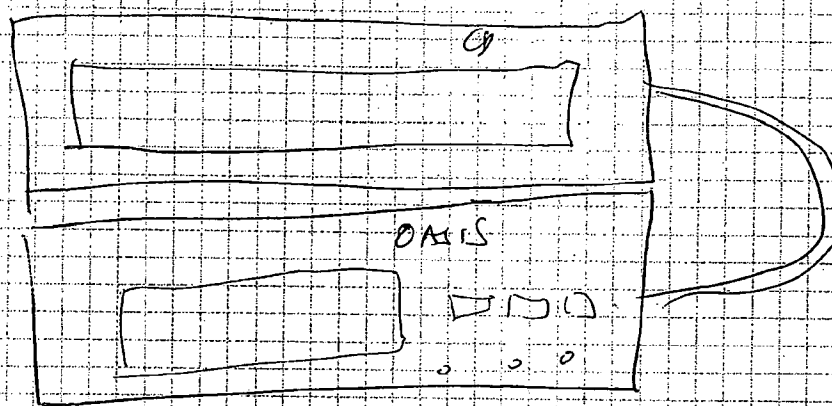
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SUBJECT:

DATE:

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



- Brent: Understand LCP issues.

SW stuff:

Terri: embedded host, tool setup

Jim, Scott: DSP stuff

{ scan logic - ^{Intel} make chip: IDE ↔ USB + drivers }

→ call National about USB Drivers.

- Brent: ask Jess Lee which USB part 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 2 NOMAD?
- Hock: Common look & feel.
- we want our own App SW program. Hock doesn't agree.

Agenda for MP3 Long Term Meeting

4/7/92
(cont)

DAVIS MRD:

- ① Delete 2 extra outputs, Cirrus does not directly support 2 I2S 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 Kristian's group for review.

Brent's Page
chronos.cmu.com/brents/

4/7/92

• 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, WY.
- 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 4/14/99

Industrial 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 Veritronix until we set 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 UI - 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 FES, more features post-FES.

- ✓ ☆ • Need to schedule Peng Kiat ^{SW} review - try for Thursday at 5:15 PM.
- ☆ • Need to get VSD I.D. from SW group in Singapore.

- Oasis
- Protus 2000

- Let's try to hire Andrei for Oasis.
- No project lead on Oasis is hurting us.

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.
- Beant looking at charging circuits.
- Getting all info on batts, 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 Micronic by IBM

- \$299 AC-powered unit
- \$X External Lithium-Ion batt pack

SUBJECT:

DATE:

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

4/14/99

Fujitsu Meeting

Lenny Storer, OEM Program Manager

John Brabley, Account Mgr 408 505 1621

MJP, Brent, Dan F. Garbutt, 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 our PCB to case of HDD.

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

No concern about # of head parks.

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

"Fitty Pink" - good color for case.

4/20/99

Cirrus Conference call - Mark Eaton,

Cirrus

- MP3000 works sister - MP3 decode working @ 74MHz
still need to hook up CODEC
- testing LED Controller
- Tested DRAM Interface.
- UART works fine
- Looks good for having demo.
- MP3 code only uses 29MHz, but they are over budget on memory. (0 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 65 895 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.

4/21/99

~~Oasis Eng Mtg.~~

Action Items:

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

Steve T. leaves on vacation end of next week (2.5 weeks) if we don't fire up GKO for I.B. by next week, might slip schedule by 1 month

✓ ★ Get DSP repos from Scott W.

✓ ★ DSP features are post FCS. TBD

SUBJECT:

DATE:

2 OASIS SCENARIOS FOR HOCK

① MP3000 ONLY

Embedded BitF park

2 OUTPUTS

2 INPUTS (TBD)

REMOTE I/F

MINIMAL OR NONE DSP (NO FAX)

October might be possible

② MP3000 + TI x5402

✓

4 OUTPUTS

2 INPUTS (TBD)

✓

DSP FEATURES

EAX
TIME SCALING
(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. tools investigations

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 exist for WIN 98, Not WIN 95.
better support for USB with WIN 98.
- We want IDE I/F with vendor specific commands.
- ISA Board better because ISA Board allows Pentium to be USB target.
- USB 12 mbps second, 1.5 MB, 1.2 MB/s count 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 4/26/99

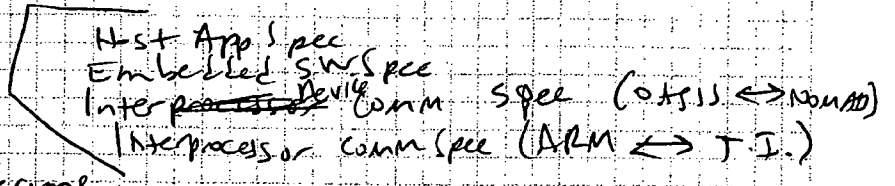
DOS needed

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 Filesystem

" " " " USB I/F HW+SW

" " " " O.S on embedded side

Finalize system Architecture (HW)

Decide which DSP features we will implement

Send Peng Kief SW Functional Spec

Review Peng Kief's SW Specs & give feedback

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

SUBJECT:

DATE:

4/27/99

Company Meeting, HDP MP3 Player Presentation

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

Battery - Sanyo UR-110 3.6V 1350mAh
 Disk IBM DKL A 24320 → Best shock #5
 ESD problems: Buttons. ^{EMI} 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 S6304 (5) 33MHz

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

HP Amp - ^{LT1100} MC33206 810 DAC - CS4350

DRAM KM 416V410A BS-L6

Flash KM 29LV160 B

DC-DC - Max 690

ATX 4 P150 32440

MOT 56K - MOT 63K C compile

ABS S6300 HW debugger via JTAG-res
 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 \$70
 2GB \$110

Cool Rhino Skin Soft Case

Contact: David Redell for Documents
File Formats

Schematics: Viewlogic

Mechanical: Pro E

David.Redell@compaq.com

Presentation: Powerpoint

BOM: Excel

Schedule: MS Project

User's Guide: testfile

Khin Zaw: Hex Schematics

A/29/99

Meeting in Milpitas: Oasis App SW Ideas.

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

Sonique Relationship - Al Riaz is main guy.

Al is "pre-started" 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 component)

Music Match sez they can provide us with all SW components.

Xing got bought by Real.

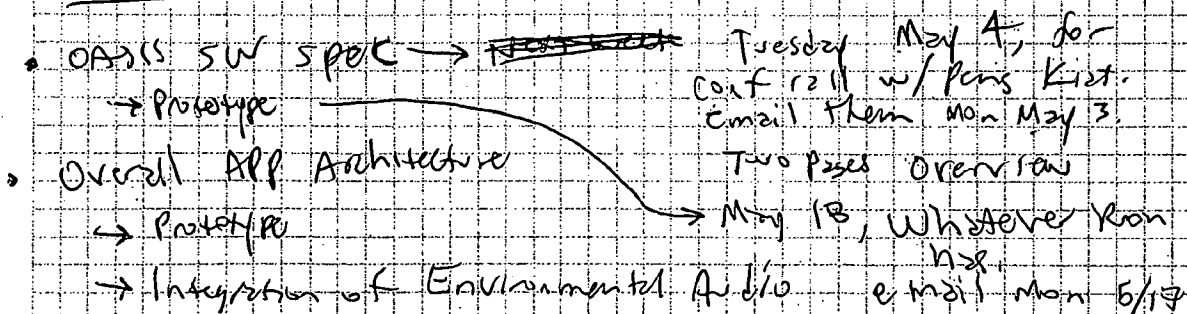
Peng Kiat has CD ripping technology.

* 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 company 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 narrow segment on LCD display.

Peng Kiat: any 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 MP3000's by end of July. Samples available in June.

C4250 CODEC, & U4342 DAC.
 ^ not avail ^ Avail

1A2 MA is power consumption of MP3000 decoding MP3. 220mW is Nominal II power budget.

5/6/99 cont

Nomast II HW: Almost done with
Micro2s solution. FW: Almost done, but
need voice recording & USB code. On track
for August ship.

If use MP3000, two month ship. → OCTOBER.

CINMS said they would give Creative the
source code for MP3 decoding. Sings This
said they needed source to control power consumption
issues.

CINMS DIP APPS: Brad } said we could
& Steve Hagg } have source code

★ Next week: Communicate with Sings This
about remote control interface

will have
ready 5/15/99
firm
w/

Schedule (Nomast II)
10 weeks to releasable HW & FW.
Late October production.

★ 2-3 weeks: Choose MP3000 development tools.

★ Send Sings This email mail on
MP3000 tech questions.

provide
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, ~~Leif~~ 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 XING.
- Need Import function on Next 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 work on SW spec on their side. will provide some bitmap screen.
2. Erno rewrites SW MRD
3. Chris S. Contact Engis from other groups (Kevin S.), & talk about how to Internet.

- ④ Program flow diagram. Prioritize tasks, so can identify most important functions. Want better customer definition in MRP.
- ⑤ Data flow diagrams
- ⑥ Ron G - Drive Datas/GUI look & Feel
NONAD

Lesson learned:

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

→ Send George L DSP papers by 5/14/19
John LeRoche

SW REVIEW

- Cirrus is using the ARM tools.
- ARM TOOLS v2.5 on 60 day loan to Sidney Thid

SUBJECT:

DATE:

Multiplex in Milpitas.

Sizing Thia, Sky, Georse L, Lee M, Paul Murada

MP3000 News from Texas:

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

P/N is 7209

→ GET 7209 Data Sheet

④ Cirrus Removing DRAM

Singpac Team:

Sizing Thia HW
 New Hire HW
 Sky FW
 SR Asst Prototyping

4-bit Micro

\$7C4104 \$0.80

Peng Kidf } 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

→ Sizing Thia 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 - \$1.30 (Din on track)
 ISCI

- ⑥ Sample rate 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 Oasis.

LCD: FS040 Samsung LCD controller.

(mic scrolling + fonts) 128x64, no backlight,
\$6 @ 50¢/month.

SUBJECT:

DATE:

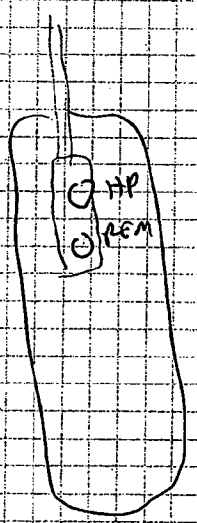
Action Items:

★ Identify which Samsung LCD Controller/Driver chip that accomodates 1280 x 64 (Sizing This)

SOK Lee is Vertronix Mfg MGR
→ NRE Cost is \$850. Quote Backlight Separately.

★ Forward info about National USB chip (Dan)

★ Look at SSI I on MP3000 for download to Nomad II (Muxed with I²S PORT)



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

Vantrox LCD Meeting

5/17/99

Lim Sok Lee, Product Mkt Mgr

soklee@vantrox.com.sg

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

Alex Mannew amarine@earthlink.com

Girault, Lee, Steve, Dzn

LCD Interface over Flex Cable:

MPU interface

3 pair of wires to connect to Tantalum Cap for Voltage doublers

1 pair for LCD Contrast Resistor

PWR, GND

With ES0040 Controller, can have side icons

Quote Request:

64 x 128 + icons on L & 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 & FSTN, both quotes ✓

0.7 mm glass ✓

QTY 200K, 300K, 400K / yr ✓

Steve T will send email RFQ

SUBJECT:

DATE:

Hitzachi. 66727/20 Alternate Controller.

5/18/99

Motrolz meeting

Terry
Flip Lockhart } MOT

Dan, Girault, Brent

MOT 56362 - MP3 decoding planned

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

RVHASD@email.SPS.Mot.Com

Hx 1138@earthlink.net

5/20/99

Peng Kirtis Conference Room

011 65 895 4000 x 4610

AL

CREATIVE
CREATIVE TECHNOLOGY LTD

CONFIDENTIAL

5/21/99

Perd Networks meeting

Tony Falcell

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 S4X, decode.
(70%)_{now} ↑Encode & decode algorithms use 90% of the
same code.

CODEC uses 20K x 106 code space.

will fit in 16K of TI S4X RAM.

G2 Algorithm: 0.4K - 0.6K bps, 40 kHz sample rate.

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

G2 CODEC uses 10% of P2-100.
(Pro)

SUBJECT:

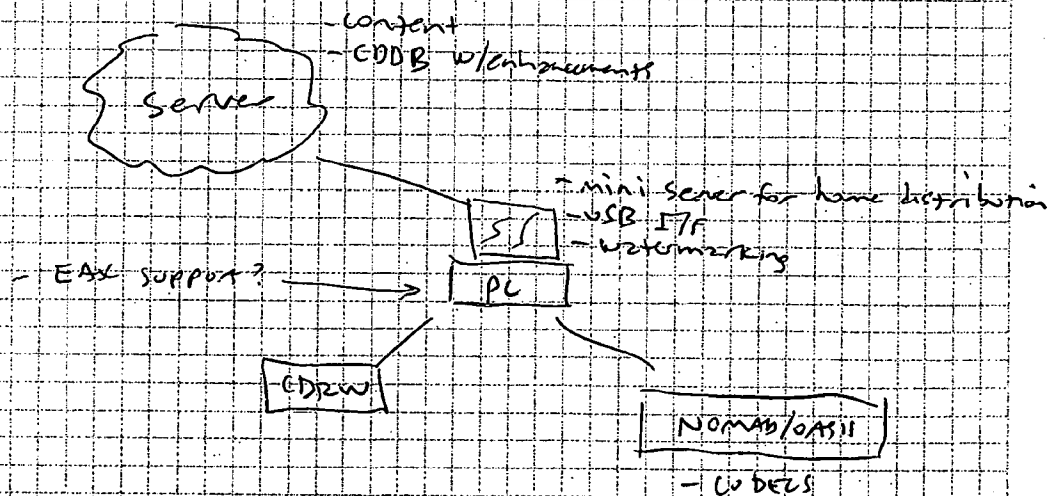
DATE:

→ Contact Jaisimha about issues regarding porting
Co2 CoDEC to our target system.

Security - Co2 will add ^{transparent} watermarking, tethering features.

Benefits of Peer Partnership

- ① Reduces risk in Apps Development for Nowed \$0.25
- ② Reduces Cost
- ③ Promotes Uniform user interface across HW platforms
- ④ Playlist management on OASIS
- 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 & CDROM.
- ★ Hack wants Oasis website restricted. Help Desk ticket for password protection.

Hack:
★ Figure out how to make Oasis work on "Onyshare batteries"

- ★ Look up with patent guy so they can review Oasis for new patents or patent infringement.
- Differentiate Oasis from Nomad - Nomad wearable, Oasis "portable". Tabletop book
- Publish API so others can write SW for product. Also need SDK for developers.

Circuit

- Drawing schematic
- DAC control will be via I²C
- We're using ~~A342~~ DACs ~~with~~ ~~the~~ ~~data~~
A343
A344

- ★ Circuit - put together prelim BOM next week
- Phillips low power low pur ADC Avs1

SUBJECT:

DATE:

Scott W

- people liked time compression/expansion demo.
- feeling is that 115x is max useable compression rate.
- ~~SRP~~ SRP required in OESIS to support multiple sample rates?
- Scott - Unpten different SR's avail from tech center.

Lee M

- kernel development resource - who can implement enhancements?
- ★ Dan - send out SW docs to Singapore.
- Terri - get ic 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

SDM1 Meetings

5/26/99

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

SDM1 Issues for Oasis

Feature	SDM1 COMPLIANCE
"More" Content	✓
Redistribute Content	✓
exchange songs from PP to PP	X
MIC In (Voice Grade)	✓
Backup (voice grade)	✓
Mic In (high quality)	X
Line In (Full Band Stereo)	X
DIG I/O (content), SPDIF, USB, etc, SAC ^{non}	X

Oasis Eng Mtg

6/2/99

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

Staff changes:

- Terry F.
- Vasu
- Andrei
- John M - Filesystem

HR getting Returns.

Cont Calls

Lee will Drive issues re HBSFSW
Ron can attend optionally
Next call

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

SUBJECT:

DATE:

IO / Mechanical

- Normal team wants IRDA - we need to give our opinion. Oasis will want to set rule of wired remote.
- Find out about Creative's wireless remotes from Chris Smith.
- Steve: Holding off on more IO until PCB layout study.
- Leo: 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. Cawly will forward us PCB layout rules for Singapore. Mike P will forward.

HW

- Circuit wrote up feature summary for Oasis prototype. Circuit's 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 Ni/MH 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 Linux Rev system, couldn't get ICE working. ICE eval period ends this week.
- Brent will find out when we can get eval board from Linux (7212)
- Niel & Lee discussed using GNU Ecos real time OS. Opinion: No real advantages over E-mu O.P. Hack wants to see evaluations of OS's we looked at, he wants us to use a commercial OS. (Wind) (Pave)
["Kernel" is our RTOS]
- 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.

SUBJECT:

DATE:

- Dock write & schedule ASAP
- Dan & Lee will update previous schedule.
 \$ John M.
- Nomad II schedule has slipped to November.
- we should ask cheng soon for a schedule
- next week - review next rev of schedule.

Ozsis / NOMAD CONF CALL 6/5/99

Dan F, John M, Lee M

Chung Sean, Robin, Sky, Siang Thia

→ IrDA component list, datasheets, costing

Pers list: do we have lamm protocol Host ↔ Ozsis
 ↳ has " " Host ↔ NOMAD

Lee - Code Sharing: SW provides USB low-level drivers
 EMU provides graphics drivers.

Host SW Meeting Wed 6 PM / THU 9 AM

Lee: provide agenda, send Tuesday Morning

Siang Thia: IR module shares UART 4 with bootstrap (4-bit micro) \$0.10
 4-bit micro: wired remote, bootstrap, deep sleep mode. 4k rom.

MFG TESTING 6/13/99 CONT

- ① PCBA Test: Functional test. (can load some code.
- ② Assembled unit test: load more code, do part-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 mech equiv. need 30-40k mhz/min type for IR remotes.

LCB

- ① Says this likes the K50713 → 5130
- ② Cirrus Ge2 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 lines on top & bottom

SUBJECT:

DATE:

6/3/99 CONT

① Ask G. re: about display interconnect.

Board up by 3rd week of June.

Lee sez GPIO is fine.

→ Plan on using GPIO.

★ ① Send Peng first button layout & Dos.exe.

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

USB

BY TUESDAY AM

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

Chris: 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 first might visit U.S.

SUBJECT:

DATE:

Intertrust Mktg

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 Intertrust:

NOMAD
OASIS
SB LIVE!
DIGITAL VCR
CAMERA

Sound Card 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 Intertrust 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 decryps per millisecond)

SUBJECT:

DATE:

6/11/99 CONT

There could be problems with exporting crypto devices from Japan?

MPPM music 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.

Lite: Ron, Circuit

STAFFING NEWS

- Mike writing AZ for MPE Eng, will place in paper.
- Matthew H possible candidate?
- Andrei starts 6/21, IOE, integration eng
- Neil: will work part time, maybe on Filey skin

Schedule

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

HW STANSDSP STANS

- 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&S's office.

HW

- 3/4 schematics done
- Brent almost done w/ pur supply stuff
- Girault working on PCB
- New cost collup: Pur supply is \$24
- Minimum BOM: \$147
- In 3 weeks: Finish BOM (Prelim), send to Jo S. K. 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 Cont Call.

SW

- Have 1st SW conf call this week. Host & Embedded F/W 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 sez 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 slide 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/SEI.
 - 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 2.5" drive to test Filersystem issues, and startup current issues, etc.
 - we should hire a diagnostics engineer.

Dasis Conf Call 6/10/99

Chens Soon, Lzi Yang, Sizing Thing Brent,
Girault.

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

See Noviz App notes on how to support IR Remote.

Lower cost modules \rightarrow 3mm x 6mm x 5mm
are larger.

Go for 3 meter range

Everlight IRDA equiv to HP HSDC-100)

IP Remote lead time: 4 months to change FW and Screen front panel.

- ② Schematics - 80% ~~FW~~ complete, frozen next week for Nomad II. BOM the following week.
- ③ Cirrus ~~FW~~ Dev Board - They fixed the JTAG port. SKY is trying to make it work. Voice recording doesn't work.
~~FW~~ Auto detect on ~~FW~~ ARM ICE doesn't work. Must configure manually.
 CS4342 not ready.
 D12 chip works with the ARM chip. Phillips D12 chip quoted at \$1.88

SUBJECT:

DATE:

④ LCD - Sok Lee from Varitronix. Soz difficult to route 100ns. S.T. will hold 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 casting, CC CK. 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 Ho ~~to~~ switch - S.T. will provide.

⑨ 1/8" Jack: Hasideeh

Oasis HW Design Review

6/11/99

- We will implement IrDA on 1st prototype
- We will use 4AA batteries.
- 1st 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 + Bundles remote	\$4.50
④ Line Input	\$2.75
⑤ DSP Subsystem + 2 nd output	\$7.00
	<hr/>
	\$27.00

SCHEDULE

• Schematic Design Review	Friday	6/18/99	
• PCB Placement Study	Monday	6/14/99	
• Layout Starts	WED	6/23/99	
• FAB Starts	WED	6/30/99	
• Order Parts	WED	6/23/99	Jeanie
• 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, Dean F, 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 seats. 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 2nd 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.
- Also: ordering Nomad II protob. Oasis proto: vlt 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. ^{building} ^{library} 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 schematics

- Design Review Friday - Schematic review
 - Prepare Set List
 - block Diagram
 - schematic review
- Dan can help on components issues.

} Invite Nil, Tony
Mark C.

DSP

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

Balance Sheet

- +
- Dan is anal
 - meeting ended early

-
- not enough friction bet employees
 - no snacks - want Odwalla's provided
 - Patricia please: Betty Peers pastry?

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 ^{his boss} 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

Loi Yung, Siang Thio, 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 Thio will send us pdf schematic.
- BOM ready, will send.
- Verimonix 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. Steve's Cheng Soon could make official introduction.

CON T

6/17/99

- New electrical interface for LCD! Contacts on bottom of cable, so Flex connector will have contacts on bottom, Lock on top.
- Looking for datasheet on volume encoder.
- Strong this:
 - additional LCD modules QTY 50
 - LCD Drawings to Steve
 - Flex connector. Send to Circuit
 - Schem/Bom to Dan
- MFG Head:
 - Chung Soon: 2 ways to MFG ① Create Internal
→ quek soon Kai (Internal Assy)
 - ② chah ming pat, (Contract MFG) he would coordinate tooling
 - ③ Mech Ind Design chua hiap chew Head
- Rev C of 7252 avail in mid July
- 7202: Current Rev is Rev B with metal changes.
- Strong 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

Jeisimha, 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 could make & when, we could make major changes on our own.
- API: Real has 2 classes: PD API, SD API.
 - Portable 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.

Intertrust, & SOMI

- Real can pursue Intertrust support if we need it.
- SOMI participants, Liquid Audio partnership is being pursued.
- NDA issues prevent further discussion.
- IBM, Liquid Audio, A to 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 phase: 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.
- Jatsimha will be in Bay area next week or week after.

6/21/98

Oasis HW Design Review

Mike P, Tony, Girault, Steve T, Brent, Andrei V,
Lee M, Dan F (scribe)

- BOM (NOT VMC) is now \$175 | r-DA, ADC - Box, AC
cheaper, more \$\$
- PCB: regulators swapped, FTH
- Bypass caps - use 0.01 uF instead of 0.1 uF?
- Input level protection on line inputs? ~~??~~
- Static zap protection on line inputs & outputs?
- RESET pin on ADCs - want under programmed I/O control. Also USB & IDE resets.
- SAZ: backwards jide on U4.

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 ∇ 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[6:5] or SRAM to upper order address pins so can accommodate larger SRAMs.
- SH5: How to connect 8-bit peripheral chips - what part of Data Bus? Find out from Cirrus.
- Need bypass on U16 SH5
- Need pullup on P- or D+ on U16, not IM 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 HOST INT TO EXTIRQ, Shift other interrupts down
- Use another int for BATTERY, don't need Felt int SH7
- Need pullup on PB3, PB2, PB1, PB0
- SH7: put appropriate pu & pd on 7212. Tie off unused inputs.
- SH8: Rename buttons
- Erase SH8
- Draw SH8: KIP interface headers, power supply header, 9-pin serial port. Board holes area
- Add GND testpoints to PCB.

SUBJECT:

DATE:

Part REQS R/LVE OUT

REQ #	QTY	MFG P/N	E-mv P/N	What
0369	50	TMS320VC5402	IC10279	TI DSP
13533	10+50	EP7212		Cirrus 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 PSchedule:

- Don worked on schedule: Lee 45% 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 ~~is~~ a bit possibly.

Staffing

- Girault resigned.
- Andrei started
- Need 2+ SW engs
- Lee identified 2 EE's on this side of Hill
- Need manufacturing engineer - Singapore?
- short term plan
- Girault: ~~Get~~ Get PCB in layout
- Jennie: Order proto parts
- Goal for product demo: EARLY-mid September.
- Could set component eng in SW to help us

SUBJECT:

DATE:

Procore components?

6/23/99

SW

- Storage Manager Spec ready for initial review.
- DSP side of ~~SW~~ reviewed with Niel.
- Ron gave ideas on Host API on Agenda for SIN Conf Call today.
- 4 Host App proposals: Robin, Pearl, 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 & Nomad 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
- Components eng reporting to S.K. Chew is assigned to Oasis.
- Portable USB MassStorage module.
- Chris doesn't expect Oasis to be SDMC compliant.

Math

- Danny started prelim layout & spec study.

Vacation Checklist

6/23/99

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

Oxide Eng mtg (Cont) 6/23/99

• following forward in I.D.

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



SUBJECT:

DATE:

Named / Oasis HW Conf Call

6/24/99

Oasis / Named Connectivity

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

7212 Issues

- Resistor changes req'd to make JTAG work on EVAL board.
- Problems getting boards to work? Contact SKY.
- The I²S 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.
- ISFDC 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 Scanner?
- 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 push button interface on the 7212.
- Change in LCD backlight: want embedded LEDs in light panel. This cost \$0.05. Pins on LED backlight are soldered into PCB.

7/27/99

Named / Oasis Mtg Milpitas

Cheng Soon, Peng Kiat, SKY, Siang Thio, Steve T, Lee M, Dan F, Christi W, Ken F

Named II schedule, etc.

CMU

- 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

EF

- 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.
- Rev C of 7209 is bonded out as 7212, so we can use these for 1st prototypes.
- HW not ready - need to use different CODEC which requires extra SW (of 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 SPC. Must do in SW.
- Standby current is too high.
- AAC CODEC not avail now. Must pay Cirrus for that CODEC.
- SDMT: no specific plans to implement SDMT. Plan is to incorporate intertrust SW support.

- Christi - Went rubberized button, not smooth plastic? Ken? Use hard polymer
- Eval group - 1st one week after next, then next one ~ 3 weeks, 3 different cities.
- BOM cost is currently \$140 for Named II, Not including Remote.
- Docking Station: \$15 BOM
- Remote: b.35, includes headphones
- Minit batter, 4 AA, \$3.60 1600 MAH

★ BATTERIES: Black: 1750 MAH GREEN: 1600 (NIMH)

Cirrus meeting

7/27/99

From Cirrus: Mark Ixtan, Graham Wright, Scott McDonald, Matt Perry, Dan Onorset.

EP740P - Arm 7 core with Analogic Coyote DSP core.

Technical questions/feature suggestions: Scott McDonald

(bsim@crystal.cirrus.com), Eric Greenman

SUBJECT:

DATE:

Sims This Mtg on Oasis / Named
Schematics 7/23/99

Schematic review of Oasis:

- ① F212 PEZ must be pulled down
- ② JTAG PA4: JTAG HOK pins 1 & 13 tie directly to VDD, 3, 5, 7, 9, 11 tie through pullup to VDD. TST0 & TST1 pins must be tied low if want to go into test mode.

to boot up Cirrus system using internal boot code.

- ① Set MECHB PIN ~~to~~ (boot from VAP41) ② 9600 baud
- ② Cirrus sends "Z" character
- ③ Host sends exactly 2K of code to Cirrus
- ④ Cirrus sends another ">" sign
- ④ Cirrus runs from internal memory.

Oasis Eng Mtg

8/4/99

Short-term Proj Plans

- Get Oasis proto running sw ASAP
- Get rest of proto parts
- Get an emulator

HW Status

- Proto board received 7/26/99
- Some of the PWR supply circuitry is working (Mark C)
- Waiting on parts - Cirrus F212, Altera PAL, etc etc.
- ~~Get~~ DAL's from Cirrus: Schedule slip.

SUBJECT:

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Oasis Eng Mtg

8/4/99 (cont)

Lee: New Org, Etc.

- We are then to be innovators. Innovation from our left.
- Working signing deal with Real. Both Real & Creative want exclusive deal. Contracting issues: SIN wants to write host SW, so does MusicMatch. ~~Real~~ ^{Vincent} 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 Irvins starts 8/15/99. will work with Scott on DSP algorithm development & putting.
- 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

- Normal might not use our O.S.

Mech / IP status (Steve)

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

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DSP SW Status (Scott 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 had limitations.
- Got make file working to overcome problems with Proj Mgr.
- Hassles getting linker working, poor documentation, uninitialized variables, etc.
- Looking at USB code SIN team gave us.
- Need to post code in CRB (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 \leftrightarrow HW connection.
- Ensuring that APIs written by 3rd parties (Liquid, Real, etc) will accommodate Oasis. (future extensibility features)

Oasis Eng Mtg

2/11/99 (cont)

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

B.J.

2/18/99

will buy 180 TI320VCS402. will buy
Tape & Reel of 3 other T.I. Pass.

2/11/99

Oasis Eng Mtg

Lee M, Steve T, Scott W, Ron G, Andrei, Dan E

tel:

- Sam announced new org for Creative
- Holdings company: CREATIVE.COM
- Creative US Inc: Sale, R&D
- Mfg arm: Don't only focus on creative products. Can contract mfg other products.
- Development groups: Creative Tech limited, run by Hack
- Hack wants to understand all projects being worked on at creat and determine their contribution to company.

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- 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 his 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 ctrl. 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 Mun Meeting

Peter Hook, Sales, Bill Biedford, Tech Mkt
MSR.

Crystal Code: 4224

9/7/99

Meeting with James Hrica

- could do Orcid Schematic changes
- Uses PADS PCB layout SW - would have to enter Oasis schem from scratch. Cannot convert Allegro to PADS in-house.
- James uses Orcid v 7.2

→ Jhrica@creaf.com

- find out if we can share Orcid 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:

Den: email James URL's to G2's web site.

9/7/99

Meeting with Cyrex -

Bill Erickson

Bill Cross

- NDA - need to modify before Bill E. will sign.
- Outgassing 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.
- Orpad
- Baby Monitor design: 3.3V & 5V 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			
Design Starts	Thu	9/23		Prelim Design Review	
Design Done	Wed	10/4			
		?		Final Design Review	
Layout	Thu	10/5			

SUBJECT:

DATE:

SUPPORT

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

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

MKTG: (Dave)

- wants to confirm MRD. Dave has rewritten MRD, will distribute for approval. Kristi wants this
- Dave will give ideas for product name to Kristi
- Report from Basco's: (focus groups) Respondents love the concept. "portable enough". Storage Capacity & plus willing to pay \$1000.
- Dan to get time to post docs on Oasis web site.
- AT&T doing focus group on subscription music service using Creative products as a delivery vehicle (lead)
- Dave bought ewzi minidisk player for dissection

FOR: Host SW

- Download to Mexico

DSP SW:

- Scott will test out ED this week. Only have 16-bit with so get 14-bit precision.
- write oscilator 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 on 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 DAC1.
- Working on FLASH.
- Howard will work on Messaging
- Howard taking ownership of Lee's ^{SW} architecture diagrams and documentation

Math / ID (Steve)

- Got Display samples. Steve will send final design changes to Ventronix this week.
- Running HO test in ~~closed~~ ^{sealed} enclosure, no temp rise problems.
- Much revision of 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 Hird 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

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

Melch / IP: (Steve)

- ID will engineer shell, will send us 32m model soon
- Display is done, will order tooling. want samples of PCB 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
P3m changes

Embedded SW

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

SUBJECT:

DATE:

Hours:

- Shell DSP mgr. will hook into startup routine

DSP SW Scott

- need another X05510 (ICE). Preventing Scott from doing work.
- Is 16-bit worth good enough? gives 84dB SNR
- Scott is out next week.

Jany:

- working on sine wave test.

HW:

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

Meeting with Syrex

9/20/99

Get for Syrex:

- Disk Drive Data sheet.
- email Bill cross Ooze Schematic billc@316@201.com
- Get P.A. signed for balance of Syrex's hours.
- Get PIN for transmitter from SIN
- Plan for fin can over processors.

Oasis Eng Mts

9/22/99

Missing subject
telDave - MKTS.

- No feedback from Chris or Kristi on new MKD.
- Focus group at Liberty Digital - (5) 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 emu (for ~~LED~~ host demo program)
- Not much new on host SW front. Activity on API's. 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 Mech & ID

- Steve finished the shell design. will get solid model next week.
- got 19 displays in.

DSP sw (Conrad)

- automated DSP environment so can get start-up. easy
- Got CVS working on computer.
- DAC to arrive week.

SUBJECT:

DATE:

Embedded SW

Andrii

- 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, Manage classes, DSP manager Queue management systems working. Playback manager
- worked on Anti-hack countermeasures
- working on simulator for IBE driver & kernel.

HW

- DAC failure
- Syntax signed up
- Joanni can place P.O.s for Oasis components
- David MuB will handle MFRs from SHN stock

Lee Rept News

- Lee going to AES in New York Thu-Fri
- Hack conf cost too high
- Hack back next week
- CES show 1st week in January - who wants to go?

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9/24/99

Bill Cross, Suzex. Meeting

- 1st Draft of power supply schematics for Oasis.
- Bill & Dave Reviewed, things look good.
- Next step:
 - ① Component selection.
 - ② Schematics complete
 - ③ power plane evaluation
 - ④ "alkaline test" - how dangerous
 - ⑤ if charging alkalines?

Procurement Streamlining Meeting

9/27/99

John, Federico, 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 Mtg 9/29/99

- Lee M, Howard, Steve T, Scott W.
- NOMAD SALES
 - CLI - 4.5K Nomad I's
6K November
 - 1KHz signal @ 450 mV signal: 92dB 32 μ load
100 mV 84-86dB
 - download - 80KB/s, limited by SSFDC format
best case: 200KB/s, Rio 500: 500KB/s

Dave M

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

Steve - Math & ID

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

Howard embedded SW

- Block device simulator, SW can start R'ly then
- DAL works
- LED work started. LED not plugged in yet

Scott W - DSP SW

- New version of EQ which uses 32 bits.

HW

- Party - Knitting from Singapore
- Power Supply
- Scheduler - finished

SUBJECT:

DATE:

Ron - Hbst SW

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- writing 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 meetings that are technical.
- Embedded SW layer work - Graphics lib work, fonts, bitmaps, etc.
- Working on UI simulation

EJITSU Mtg 9/29/99
San Jose

Mark - Disk & M.O. guy

Shaun Sankar - Pricing, Customer Support, Forecasting

Larry - Tech Support

John - MKT Mgr

Future Roadmaps

Co-branding

"Specials" - Lower capacity discontinued drives, etc.

Specs

Volume

Pricing

Product Mix, 3GB, 6GB, 9GB

Optical (?)

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:

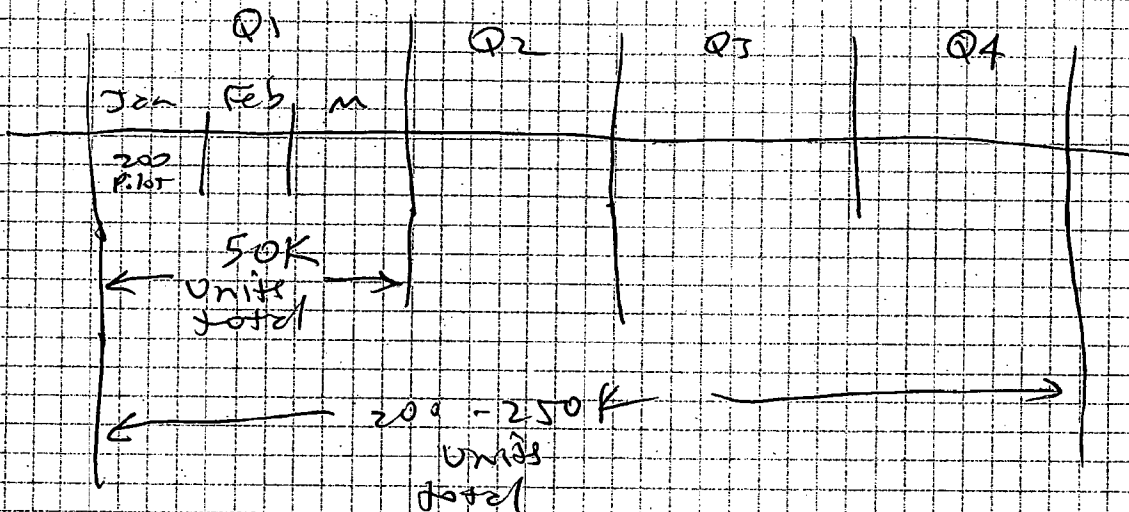
DATE:

Need samples of 12L 6GB Drive.

Options: 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 \$80, assuming we achieve volume

6GB \$108

12GB TBD

~~A~~ For customization, need purchase specification

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

John will give me:

- ① Tech spec on 6.0GB Norret RL
- 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/sw 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 1st week
SQA #2 Release of FW for CES Show Launch	DEC 3rd week

(Don says no shipped Rev 2 PCBAs until 11/21)

So SQA 1st release in 3rd week DEC.

CES Launch (10 protos)	1st week Jan
------------------------	--------------

Tooling online	Jan 21?
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Production	3rd 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

