

UTMB 2003 05

Med Mead Ed
COMPOSITION

9 Oct. 2003-10 Jan. '05
100 sheets • 200 pages
9³/₄ x 7¹/₂ in / 24.7 x 19.0 cm
quadrille • 09926

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CB-03 →

QUADRILLE
5 squares per inch

Medical Education (Med Ed)

Oct. 2003

Student Self Teaching System (STS)

STS Auscultation Series

ATA Auscultatory Teaching Aid

Pulse Simulation System

Index

Pulse Hdw. (development of Cardionics driver
Base Spkr. Test

P
2-20
21-22

Review of Prod of Aus Eval.

65

9 Oct. 03

Improved Carotid pulse system -
Original linear solenoid pulse system too complex and expensive. Also demodulation of A.M. tone bursts requires freq. adj. esp. since lessons are recorded at different levels -

Two changes are planned for improved system -
1) Now have a supply of magnet assys. - 2 voice coils only.

Eminence SpKrs.
Eminence KY

$$Z = 7.0 \frac{\Omega}{DC} R + .408 H \frac{L}{1K}$$

$$Wt. = 2.4 \#$$

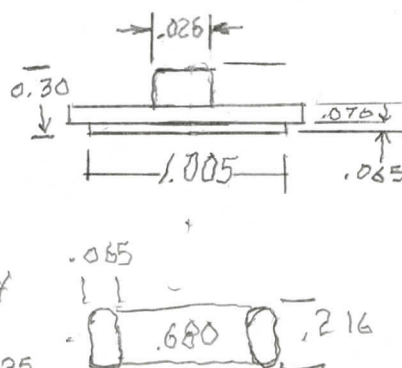
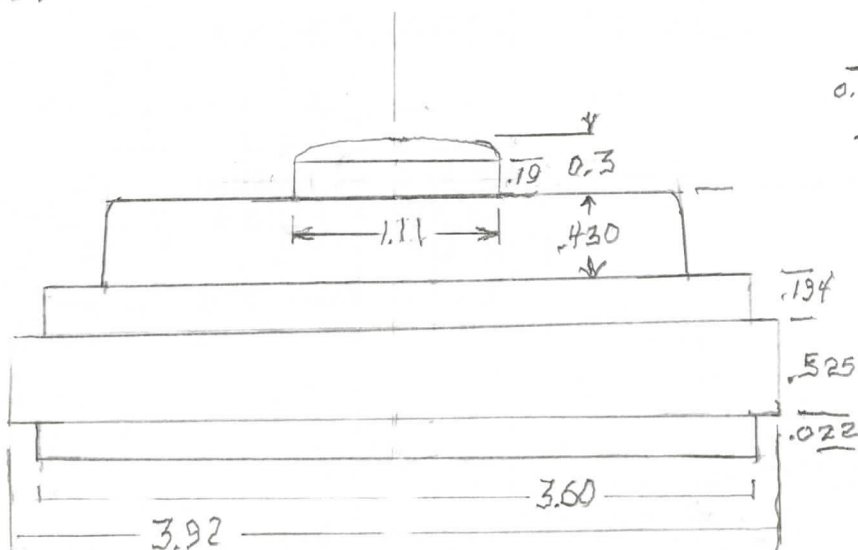
Displ. est.

$$+12.3V \approx \pm 1.5 \text{ mm}$$

$$-12.3V \approx -2 \text{ mm}$$

Seems to limit at $\pm$
2 mm $\pm$ asym. on
appl. of 18 + 20 V.

V.C. depth
= .67"

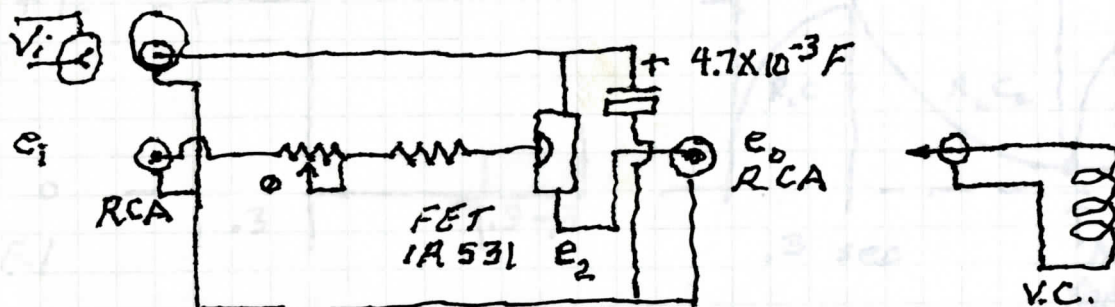


9 Oct. V.C. driver.

2

FET Follower -
(From 8 Oct.)

$V_i = 12 \text{ V Pb Acid Batt.}$



VC leads shorted, blew FET $R_{pl} = ZXM64N035L3$

$e_1, e_2 \approx$ Sample VC conn. $V_i = 12.30 \text{ V.}$

$e_1 - V$	$e_2 - V$	V.C. Characteristics ^{Heath} B+K						12.0V 3
0.00	0.000	I.D.	R	L	Q	Displ.	Max	12.0V 3
1.00	0.000	S N	DC	H ₁₂₀	Q ₁₂₀	±	—	± - 10 ⁻³
2.00	0.002	000 Samp.	7.0	.045	.96			79 161
2.51	0.180		6.9					62 68
3.0	0.556	001	7.0	.408				62 68
3.5	1.04			.019 ₁₂₀	4.3 ₁₂₀			
4.0	1.50	002	7.0	.016	1.6			
5.04	2.47							
6.0	3.40	003	7.0	.017	1.2			
8.0	5.34							
10.0	7.37							
12.0	9.22							
13.2	10.92							

Displacement vs Volt.

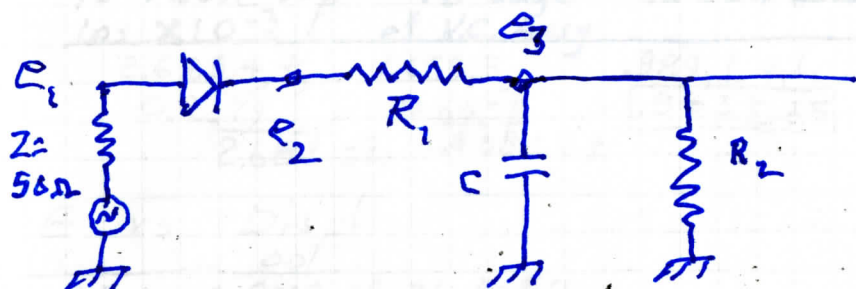
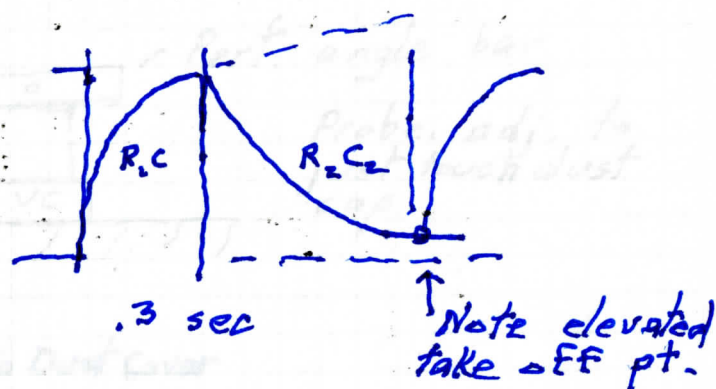
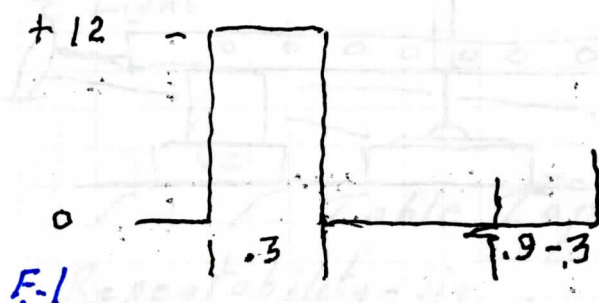
Volts	10^3 in		
	<u>001</u>	<u>000</u>	
0	952, 45, 41	.846, 7, 60	851
+ 12.40	20 881, 90, 80	768, 50, 70	755
0	950, 42, 45	.826, 31, 45	834
- 12.70	13 1.011, 15, 15	.985, 9, 1012	905

Inconsistent

9 Oct.

3

Pulse Shaping:



Use 73% or $T = RC = .3 \text{ sec}$. With $C = 10^{-6} \text{ F}$

$$R = \frac{.3}{10^{-6}} = .3 \times 10^6 \text{ or } 300 \text{ k}\Omega$$

Set Up Scope for E_1 + $\checkmark$ ckt + Calc.

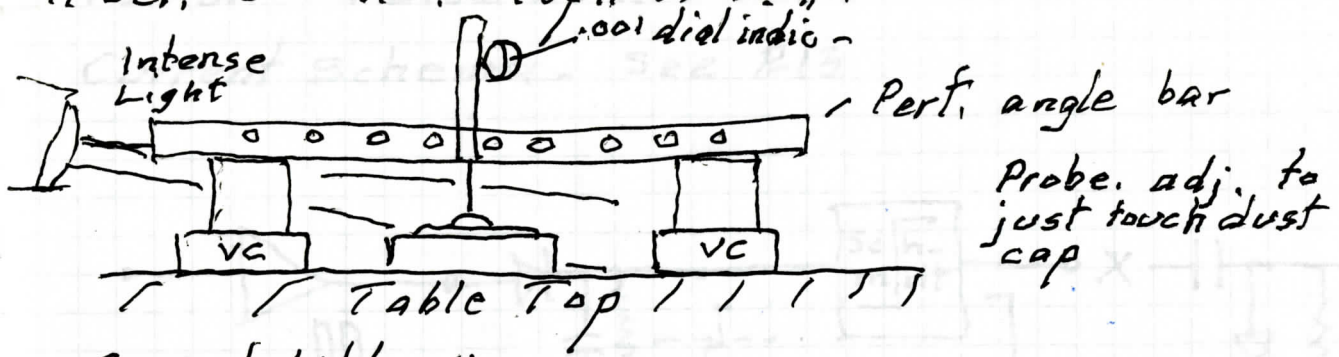
NB probe $Z = 10^6$ so

$$E_1 = \frac{1 \text{ m}}{1.3 \text{ m}} = .77 \times 12 = 9.2 \text{ V}$$

E_1 5V E_2 5V E_3 $\approx .1 \text{ m}$ load on diode
 $E R_1 \approx .1 \text{ m} + C$

Had forgotten (overlooked) effects of large assy. in above RCs. Calculations are fine but this is a psycho sensory prob. + easier to cut + try -
 Rapidly obtained a v. realistic pulse $\approx R_1 = .1 \text{ M} + R_2 = 1 \text{ meg} + C = .4 \mu\text{F}$ - Need inertia equiv. but adequate. Voltage $\approx 6 \text{ PP}$ into filt.

11 Oct, '03 V.C. Displ. vs E.M.F.



Repeatability - Jig
 to Table Top to edge to Dust Cover
 las $\times 10^{-3}$ of V.C. Assy

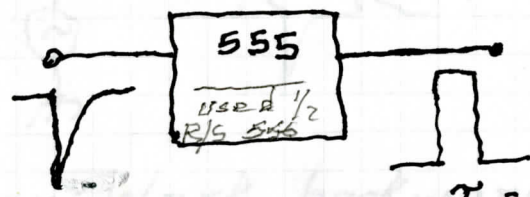
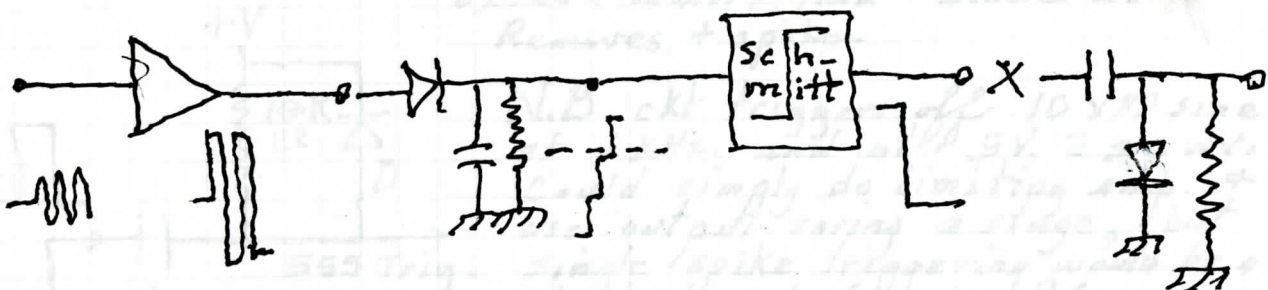
2.683, 4, 4,	1.659, 5,	.989, 1, 4, 1, 1
0, 2, 79	7050.57	.903 $\pm$ 3.5
2.682 $\pm$ 2.1	1.658 $\pm$ 7.4	

E vs Displ	V.	.001
+6.20	0.938, 48, 76	$\Delta = 50$
	34, 33	0.939 $\pm$ 5.4
0	.978, 75, 79	.977
	$\Delta = .038$	
-6.20	1.070, 1.036, 1.019	$\Delta =$
$\Delta \approx 62$	1.040, 1.032, 1.055	65
	1.042 $\pm$ 18	

Dust Cover is inconsis-
 tent, datum - Needs
 hard cap.

15 Oct. Pulse Gen.

Current Schema. See P13



$T = 1.1RC$
for .3 sec & 2 μ

$R = \frac{.3 \times 2}{1.1} \text{ m}$
 $= .545 \text{ m}$
.136

$C = 2.05 \mu$
 $R_1 = 0.54 \text{ m}$
 $T = 1.1RC = 1.21 \text{ Sec}$
 $C = 2.05 \text{ R} = 0.13 \text{ m}$
 $T = 300 \text{ ms}$ on uncal scope
vs 293 calc

$C_c = .1 \mu$

triggers on 9.0V min

CKT behaves as
adv.

NB T sens. to
 $C_c + R_1$

$T = 1.1RC$
 $R = \frac{T}{1.1C} = \frac{6 \times 10^{-2}}{1.1 \times 2.2 \times 10^{-8}}$
 $= \frac{6}{2.42} \times 10^6 \approx 2.2 \text{ M}$

9.2.4 Basic Monostable Operation

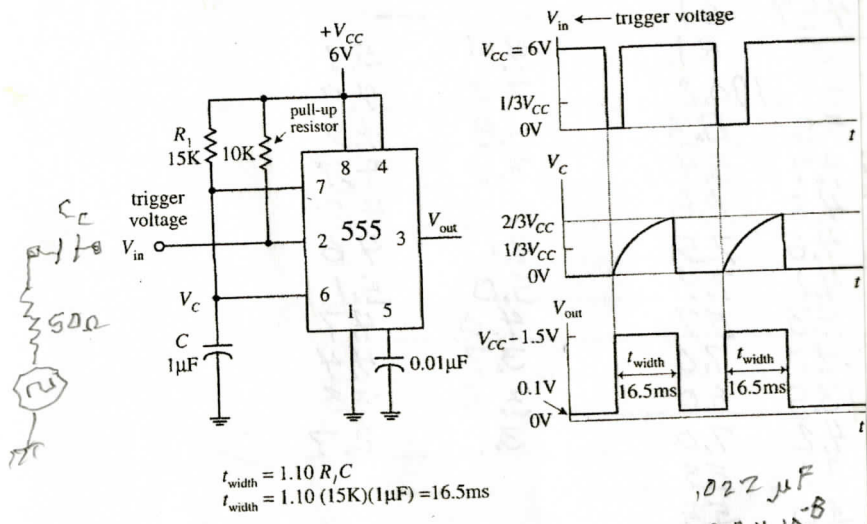


FIGURE 9.10

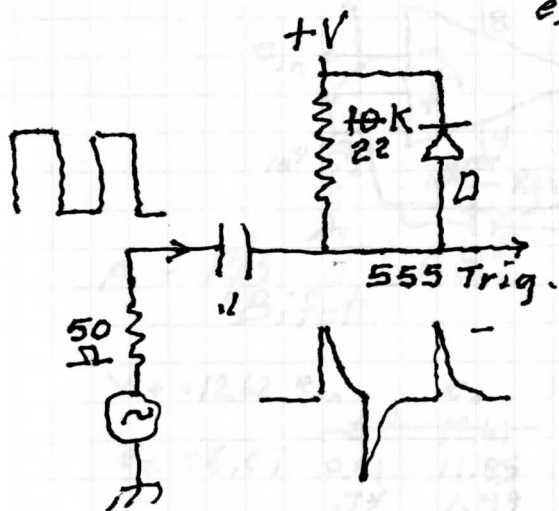
$1022 \mu F$
 2.2×10^{-8}

16 Oct. '03

7

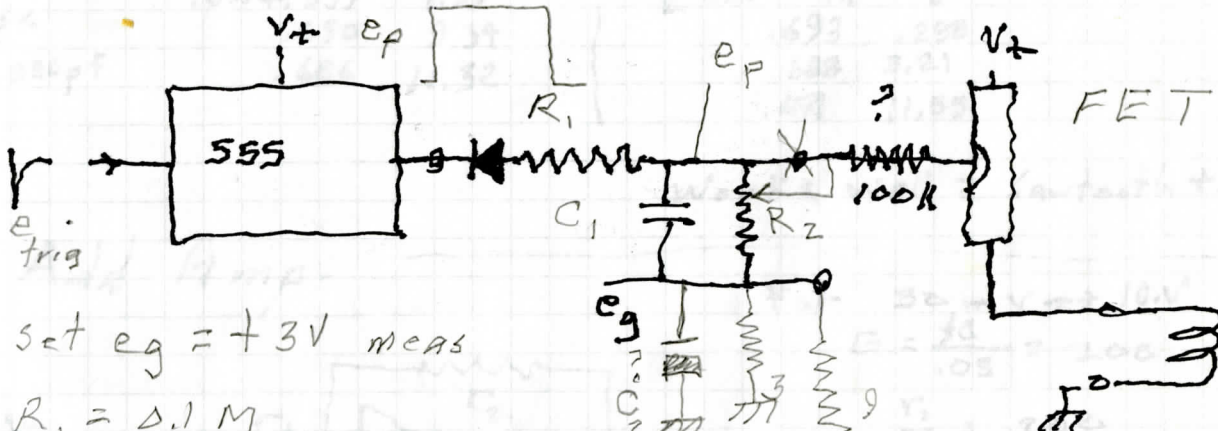
Various Brd. Bd. probs. 555 requires 9+V neg. drive and while a differentiated Sq. wave from the 50Ω source drives it adequately, concern that neg. pos. spike plus V_t may exceed limits. Add diode D.

Removes + spike.



N.B. ckt triggers off 10 vpp sine at 1 KHz. and at 9V. $\bar{c}$ sq. wr. Could simply do limiting amp. & use output saving a stage, but single spike triggering would be a potential prob. Stay $\bar{c}$ P.6

Plan: Work backward from Xducer.



Set $e_g = +3V$ meas

$R_1 = 0.1 M$

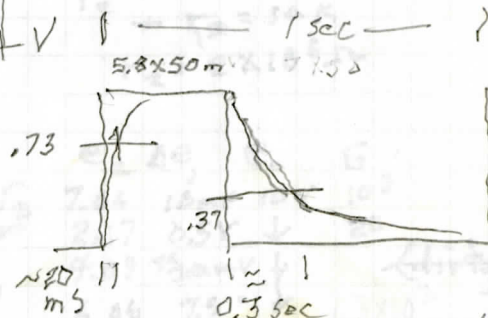
$R_2 = 1.1 M$

$C_1 = 0.3 \mu$

$C_2 = 0.01 \mu$

FET $T_{ab} = 110^\circ F$

$\bar{c} + V = 12.4$
 $e_g = 3.0$
 $e_{trig} \text{ min} = 8.8V$
 $e_p = 5.5 \times e_v$



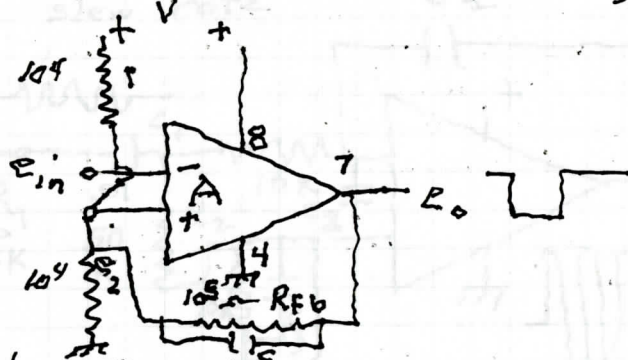
Pulse is palpably real, has 2-3 mm ampli- needs variable R_2

Pulse Gen. V.C. -

17 Oct '03

100

Amp + Trig. Ckt - Still working in reverse.



A = R/S TL082
Bifet

$$V_+ = 12.62 e_{in}$$

$e_2 = 6.07$	0.61	11.85
$.74$	1.49	
$\Delta = .19$	10.36	

ΔR_{fb}	$.695$	6.16
$50k$	$.699$	1.55
$C = 390pf$	$.690$	9.34
	$.686$	11.32

Final Config

As above ex.

$$R_{fb} = 51k$$

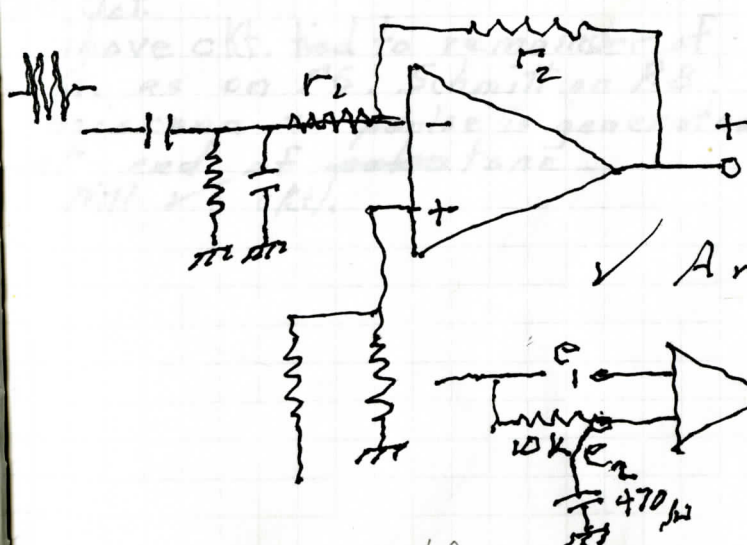
$$C_{fb} = 390pf$$

$$e_v 12.37 e_i = 6.71 \text{ no sig}$$

$e_2 = 6.71$	e_{in}	e_o
$.693$	$.298$	
$.688$	5.21	
$.691$	11.55	

Works well $\approx$ Sawtooth + Sin

Add Amp.



For $50 \text{ mV} \Rightarrow 10 \text{ V}$

$$G = \frac{10}{.05} = 200$$

$$\frac{r_2}{r_e} = 200$$

$$r_2 + r_e = 10k$$

$$r_2 = 2 \times 10^6 \Omega$$

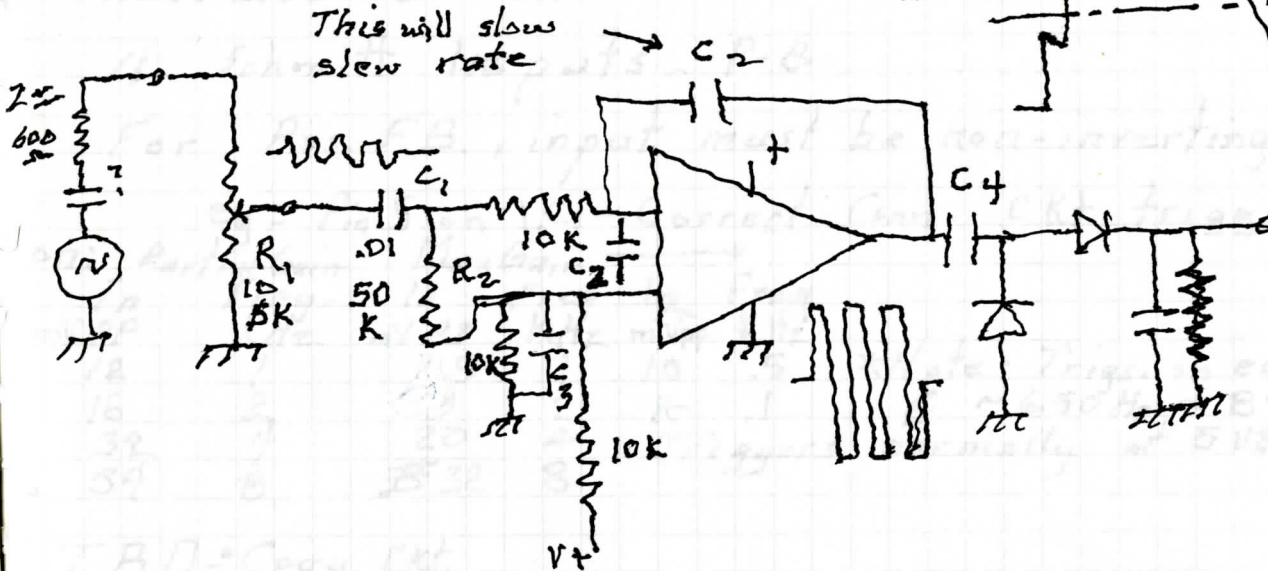
✓ Amp -

e_2	Δe_i	e_o	G
r_2	7.06	10 mV	10^3
$= \infty$	2.17	0.5 V	20
	4.09	15 mV	
	6.06	7.5 V	
r_2	6.06	1.14	1.3×10^3

$$\frac{10}{7.5 \times 10^{-3}} = 1300$$

(dirty)

Pulse Ckt. - Pre amp - Clean Up Schmitt Levels



For 3db pt, $f = \frac{1}{RC}$
 $C = \frac{10^{-3}}{5 \times 10^4} = 0.2 \times 10^{-7}$

$$f_{3db} = \frac{1}{2\pi RC} \Rightarrow C = \frac{1}{2\pi f R}$$

For $f = 10^3$ $R = 5 \times 10^4$

$$C = \frac{1}{2\pi \cdot 5 \cdot 10^4 \cdot 10^3} = \frac{1}{3.14 \cdot 10^{4+3+2}} = .31 \times 10^{-5} = 0.003 \mu F$$

$$= 3.1 \mu \quad X_C = \frac{1}{2\pi f C}$$

$$= \frac{1}{2\pi \cdot 10^3 \times 3.1 \times 10^{-6}}$$

$$= \frac{1}{19.47 \cdot 10^{-3}} =$$

$$db = 20 \log \frac{e_1}{e_2}$$

$$\frac{3}{20} :$$

C	f	Vin	Vout
	Hz	Vrms	
.01	100	5.03	4.02
.01	1K	5.06	5.03
.01	10 ²	5.04	1.67
.01	1K	5.06	4.82

20 Oct.
 Above ckt. tied to remainder of ckt. as on P6. Schmitt on P8, misconn so pulse is generated at end of ~~tone~~ tone - will v ckt.

V.C. Pulse - 20 Oct.

10

Ch. Schmitt Inputs - P-B

For Pos. F.B., input must be non-inverting-

eg - Pin 5 on I.C. - Correct Conn. Ckt triggers

on: Partial Gain Max Gain

I_n	Freq	I_n	Freq	I_n	Freq
mV PP	KHz	mV PP	KHz	mV PP	KHz
12	1	5.5	1	10	.5
16	2	9	2	*	.1
32	4	20	4		
54	8	32	8		

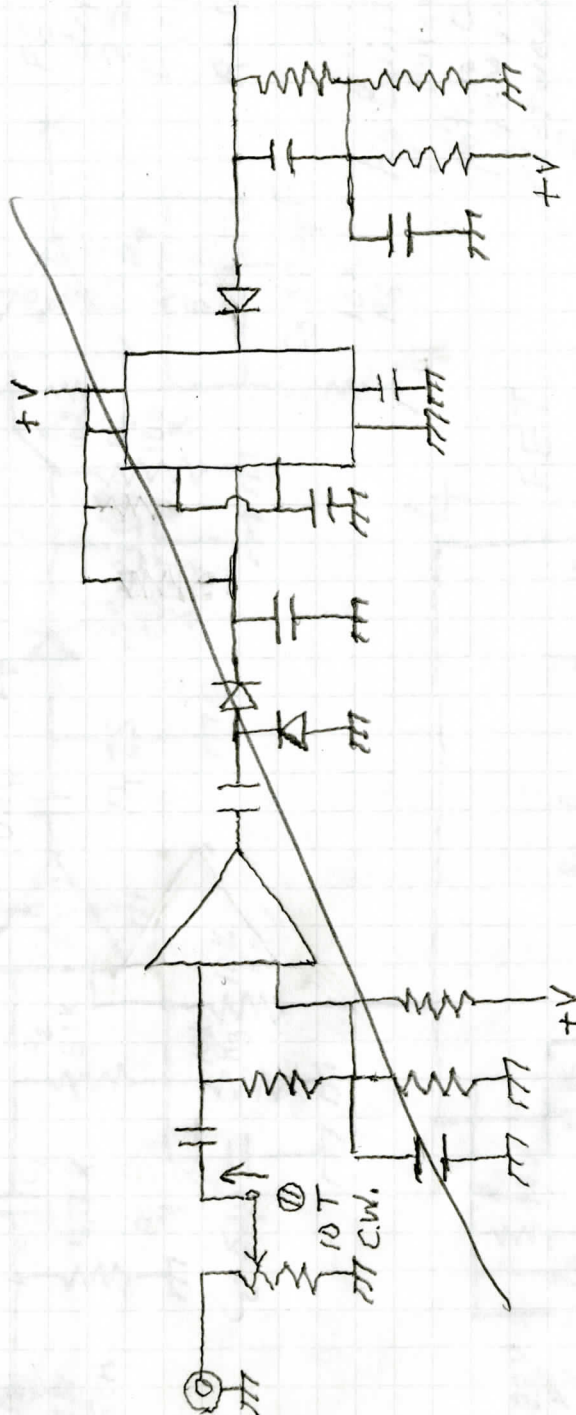
*Note: Trigs. on ea. $\sim$
 $\leq \sim 650\text{Hz} \approx 84\text{mV}$
Triggers normally at 5VPP 1KHz

TBD - Copy Ckt.

- Describe Ckt.
- Transfer to brd. Bd.

Circuit of V.C. Pulse Ckt 20 Oct. 03

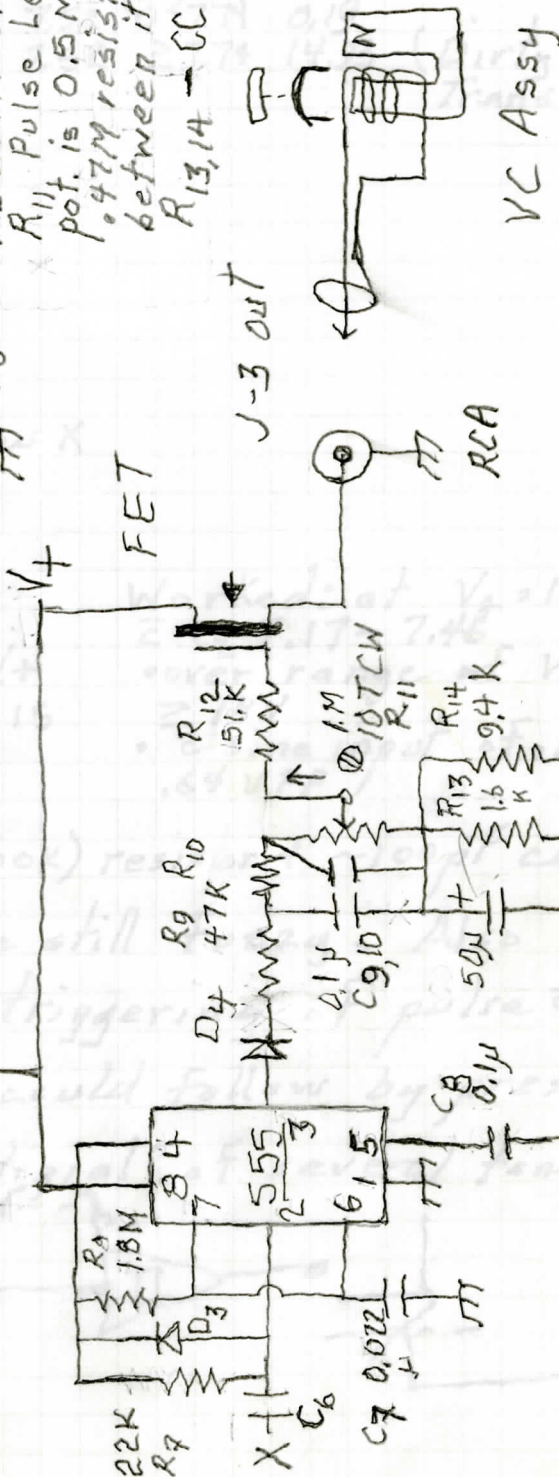
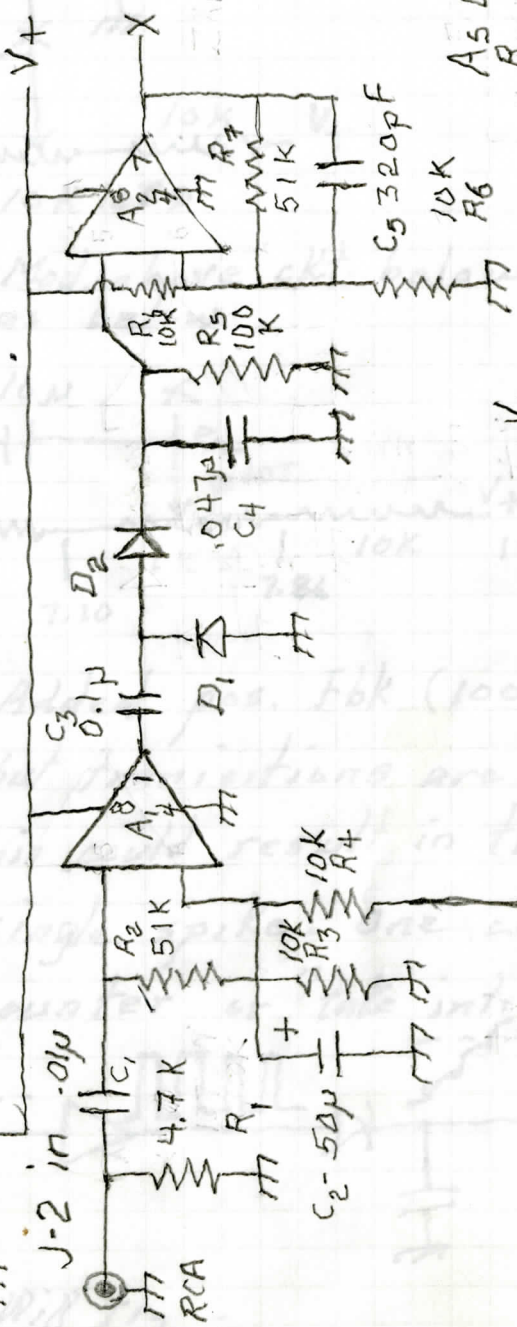
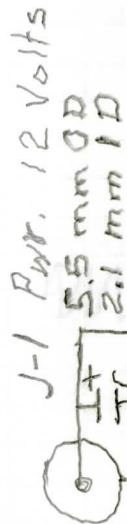
11



$A_1, A_2 = \frac{1}{2} \text{ TL082}$
 $555 = \text{TLC555}$

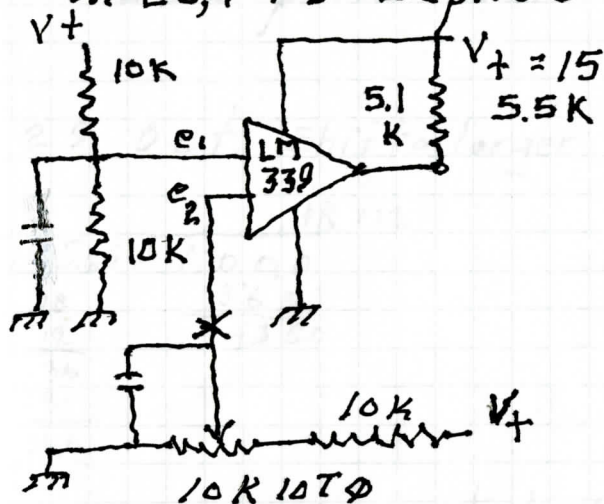
FET = CMOS N
 depletion mode
 $25K2314$
 $D_{1,2,3,4} = 1N914$
 $R = 1/10W 5\%$

As Built ex:
 R_{11} Pulse Level
 pot. is $0.5M$ with
 $.47M$ resistor
 between it and
 $R_{13,14} - CCW = \uparrow$



21 Oct. '03 Summary of Comparator Testing 13

on 26, 7 & 9 Sept. 03

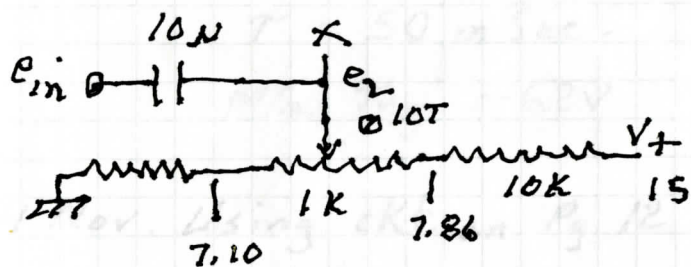


Meas-

e_1	e_2	e_o
$\frac{V}{V}$	$\frac{V}{V}$	$\frac{V}{V}$
7.52	0.774	0.19
7.52	≥ 7.74	14.93

(Dirty Transition)

27 - Mod. above ckt. below X as below



Worked: at $V_+ = 15$
 $\bar{e}_2$ 7.17 - 7.46
 over range of $V_+ = 5$ to $\geq 18V$
 • $\bar{e}$ sine input of 0.1 to 0.64 VPP

29 - Added pos. Fbk (100K) resistor & ~100pF cap but transitions are still Fuzzy - Also this could result in triggering of pulse & single spike. One could follow by preset counter or "take integral" of several time ns.



Will try -

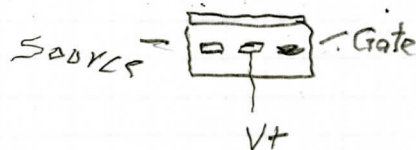
23 Oct. 03 Bread Board V.C. Ckt.

14

$$555 \text{ pulse width} = 1.1 RC = 1.1 \cdot 44 \cdot 10^{-6} = 3.3 \times 10^{-3}$$

29 Oct. Shift to larger Bd. Board. FET Cnns.

$$\begin{array}{r} 5.65 \overline{) 1.000} \\ \underline{565} \\ 4350 \end{array}$$



31 Transferred to bd. w difficulty.

With:

$$C_T = .022 \mu F \text{ \& } R_D = 2.2 M$$

$$\tau = 50 \text{ mSec.}$$

$$\text{Mini. Trig.} = -6.2V$$

4 Nov. Using ckt. on Pg. 12 $V_T = 12.6V$

555 produces ~60 mSec. Pulse out $\bar{c}$

Neg. going Sq. Wave (Fall time = ? V.S.) at min.

level of 8.4V. (thru X at C_d) - Neg. 8.4 spike at

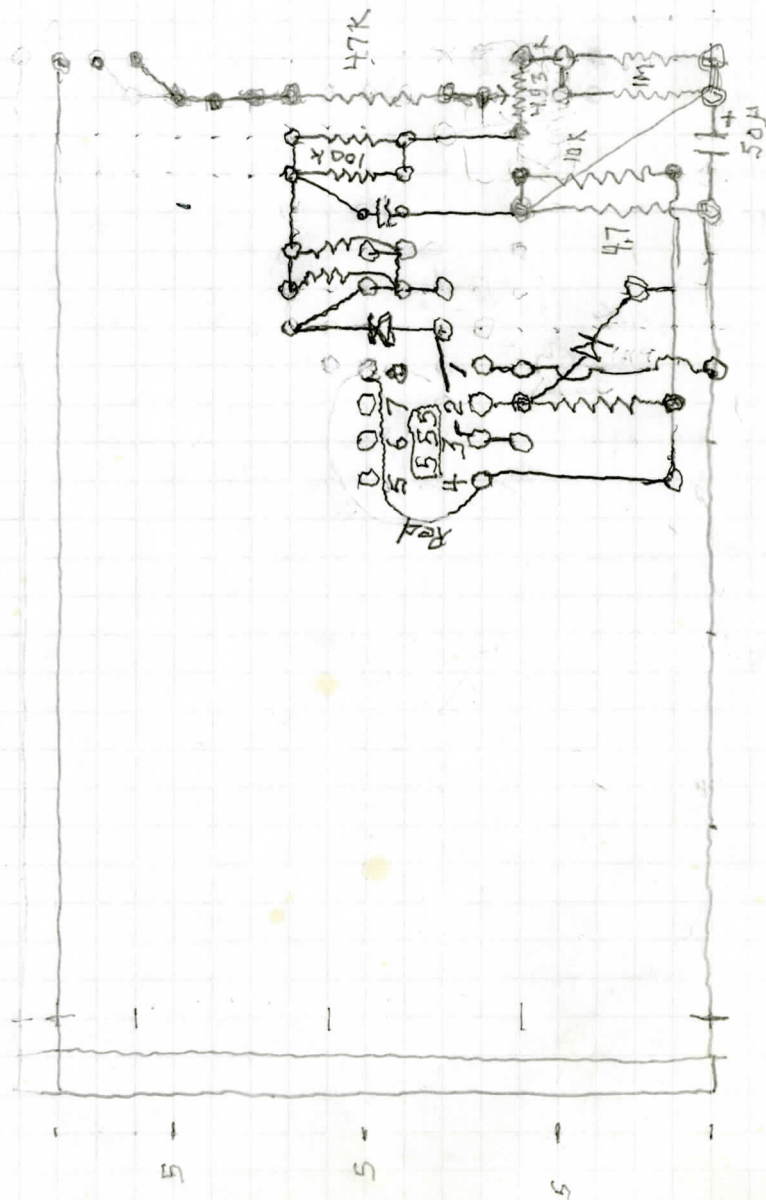
trigger - Out put of Schmitt reversed - Input rev!

5. After correcting reversal - ckt. worked well -

Will document limits and test operation $\bar{p}$
mounting in box: See pgs.

Quiescent voltages
Operating limits
Waveforms

2 Nov. Wiring diagram of abandoned 15
board. (Too small for tools + tremor)



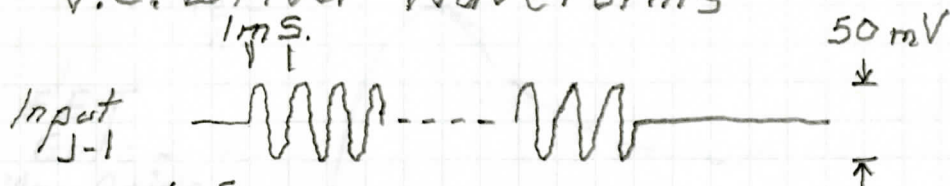
5 Nov. Review of Pulse proto. w/m 16

9 Nov. Conn. completed ckt. to Dell sound card and ran Aus 2 & Rev. of Aus 4 over range of sound levels from 0.1 of to max level. Flawless operation.

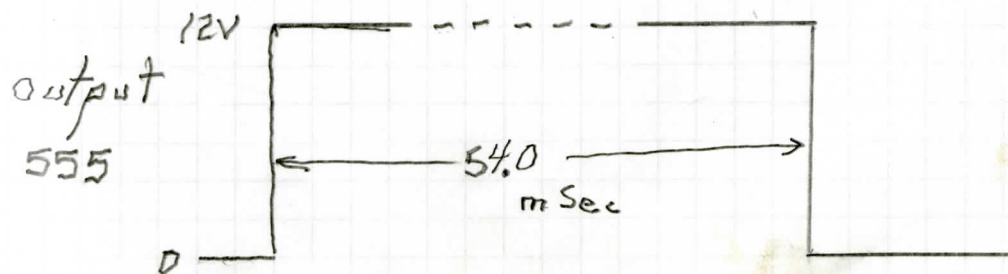
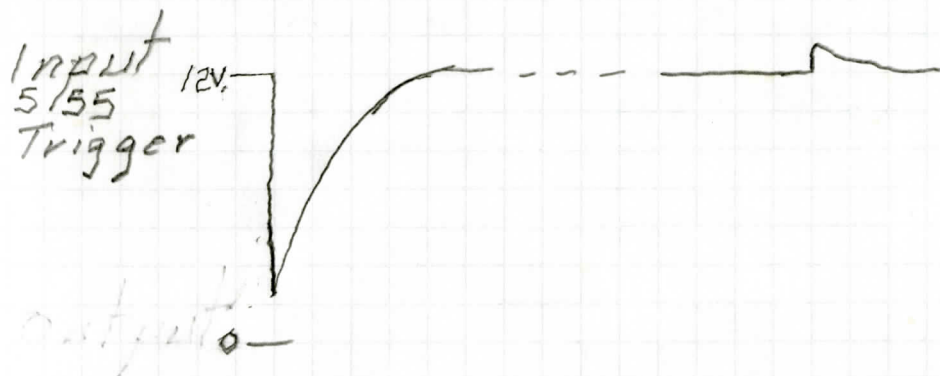
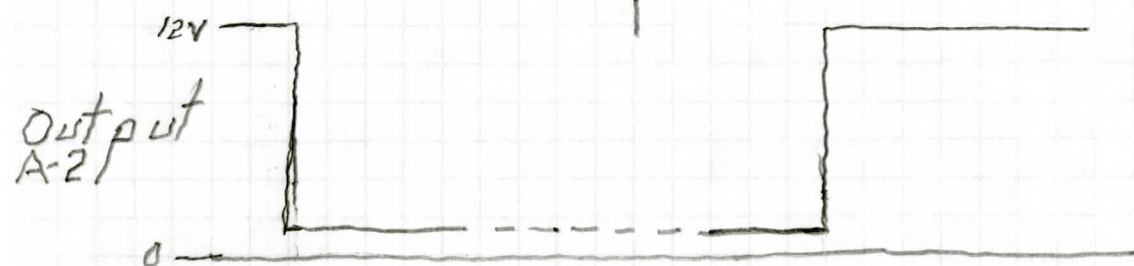
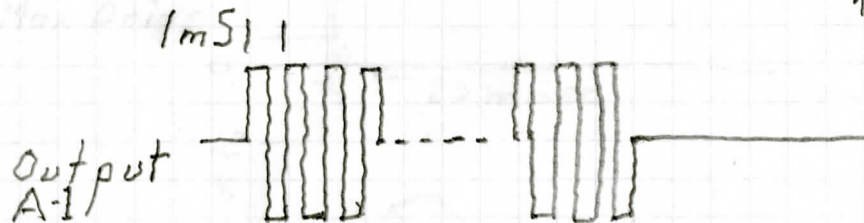


6 Nov. V.C. Driver Waveforms

1817



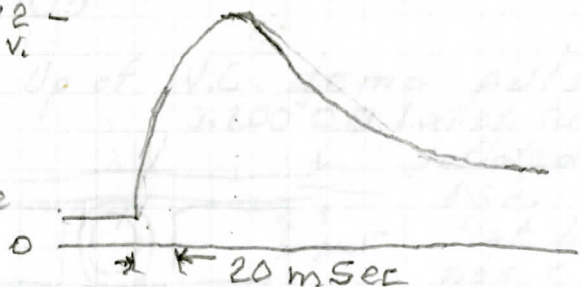
NB. Tone Length varies - nom = 30 m Sec.



8 Nov '03

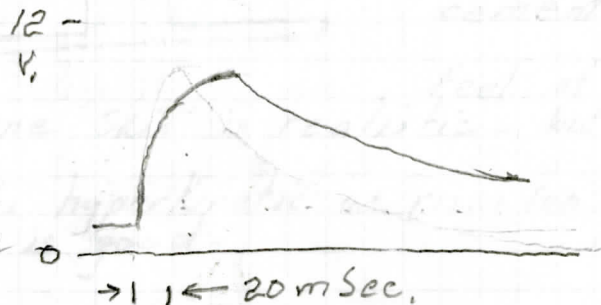
18

FET
Gate -
Max Drive



FET

Source
E.V.C.



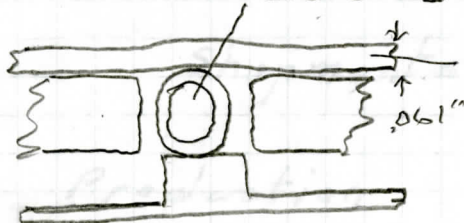
NB. Removing 7.0Ω
(D.C.) Voice coil
incr. peak by .5 V_i

Nov. Demo V.C. pulse to Mark & Keith - Cardiac.
Still need Hs. from UTM.B.
Sent req. ltr. to St., UTM.B. Keith also sent ltr. to him.
Sib. called & a draft of a reasonable agreement
arrived. Rd. corr. copy & reasonable response.
Shipped probe V.C. driver & driver to Cardiacs.
Sched. Provide T.T. E. Aus. ^{eral} _{quies}
Write corrected Syllabus.

10 Nov. '03

19

Clean Up of V.C. demo pulse sys.



0.200" OD Latex tube - .040 Wall Thick.

Inflated to 0.220" D. Press ??

Air. Tied $\bar{c}$.075" wide,
flat linen waxed cable
ties & sealed $\bar{c}$ 3M grammet
cement.

Neoprene 'Skin' is realistic - but too thick
Feel of bare tube or $\bar{c}$

Pulse is hyperkinetic i.e. rises too quickly and too short.
Diastole is good.

Nov. Demord V.C. pulse to Mark & Keith - Cardionics.

Still need ltr. from UTMB.

Sent req. ltr. to S.L., UTMB. Keith also sent ltr. to him.

S.L. called & a draft of a reasonable agreement
arrived. Rtd. corr. copy $\bar{c}$ reasonable response.

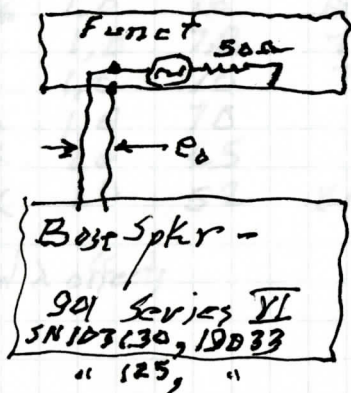
Shipped proto V.C. reducer & driver to Cardionics -

Sched. Provide T.T. $\bar{c}$ Aus $\bar{c}$ ques.

Write corrected Syllabus -

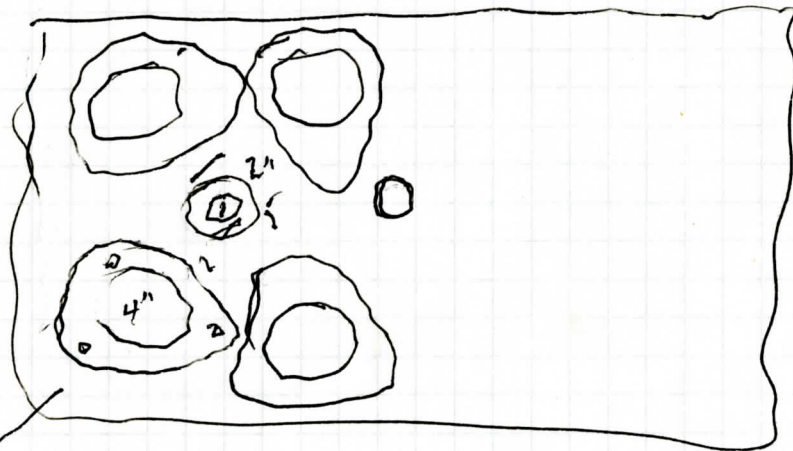
19 Dec. Signed MOLL & UTMB making it legal for me to transfer production V.C. assemblies to Cardianics on 17 Dec. 21

Home audio for Christmas: Don't know where most of the material moved is, except one or two auto radios and the Bose Spkr's which had electronic compensation (freq.).

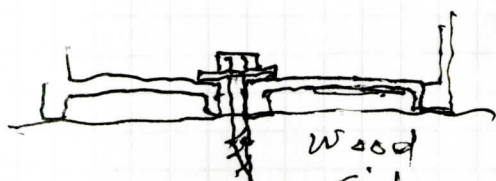


Rear

	12 DC	120	1KHz
Spk 1	26.5	10.5	17mH 612pF
	5.8		
2	25.0	10.6	16.2 615
	7.3		
3	13.2	10.1	7.9 425



Sealed Plastic
enc. compartment for each spkr. vented to rear.
Fibre glass in each compmt.



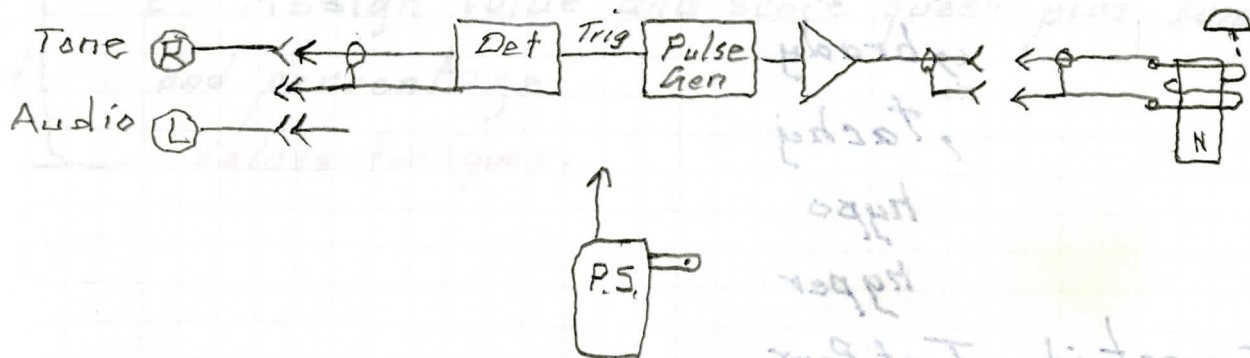
Freq	E	B-1 on axis	B-1 corner	B-1 4th oct
H2		61		
20	.97	<60	<60	
50	.90	67	64	64
75	1.0	59 60	74	75
100	1.0	68	80	78
200	1.0	82	80 87	88
400	.93	76	80 84	-
1K*	1.0	76	83, 2	
2K	1.0	78	78	
4K	1.0	70	70	
8K	1.0	70		
12K	1.0	65		
16K	1.0	52	54	

Marked λ effects

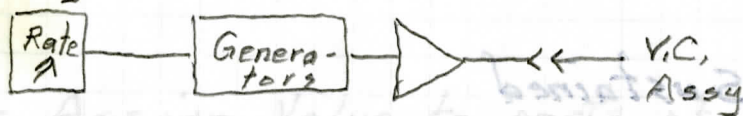
Pulse, Impulse System

24

Ausc. Sys. MK II

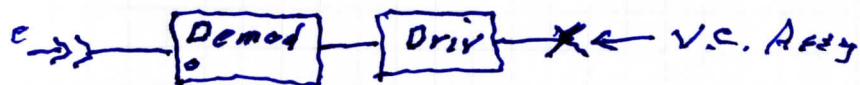


• Pulse System -



• FM tone or digital

c = Comp, or CD or MP3 or mem. stick / μ process.



15 sept.

STS AUS EVAL - Test

25

Review

1 AUS 1-4 Reviewed per module

2 Assign value and score ques. plus summary and percentage

Values for ques.

3 - Assign Value to parts of questions
ID student, time taken, score and grade

4

How to enter

Oct 16-04 Review of 'Executable' A-1 on CD
disc in player

28

Loaded & used media player - Many probs -

Tried My Computer - clicked on -
Started immed - hung briefly ~ 1 sec on 4a

Remove 4d

Video scenes have 2-3 lines out of synch at bottom

16-18-19 - retain

Sound waves irreg.

Disappeared at scene & press. on stetho.

T/WBK- Add cardiac sounds

Note Split S₂ on Q₂

Phono hard to see in
10

? Delete & turn in portion of Self Exam
Video hung on 127

Returned to pt. of hang up & index

Remove Credits

~~Double click My Comp.~~

~~Click on CD icon~~

~~Click on Control A~~

~~Close Window~~

~~Click on Dark Tag~~

~~Click on New~~

~~Click on File~~

3 Dec. Problems & AUS STS

45

Multiple errors are present in the review CD of Aus Eval.

See Rp - 36, L-1

- 41, L-3

- 42, L-2

- 44(+39), L-4

On scrutiny it is obvious that the lessons have some errors including poor or wrong sounds - esp. Aus 4-P44

Also there is some confusion in eject. (m). STS Aus conveys impression that all ej. (m) are quiet, short, cres./decrec. when in fact they may be longer ~~and~~ even innocent ones, and they freq. have S3s & be be primarily decrescendo -

This was emphasized by adding paras. to Txt, W.B. and adding a note to Aus 4.

7 Dec. '04 - Floil & Ttx. cont'd. I had approved a vis. scene in error - Also some snd. file error in the 'clean' sounds rec'd. from JOAT crept in resulting in wrong sound on L1 Q1. I had to modify an answer on a ques. and the echo for L2 QB had too much gain - Tietronix had made 6-10 various ^{man} errors. Causes include:

- I'm a poor editor, communicate, 'detail'
- Lack of proper control from source through production.
- Differences between producers
- Inexperience & modality • Usual production errors

46

Ttx, now wants more money for these have been
costly to Ttx. & me. My posn. is that the prod. chain is:

Original Contract - Substrate provided Ttx.

Ttx. assembles source files, approved by

Ttx. assembles work for review-

W.T. Reviews & Approves

Ttx. assemble Final review -

WT. Reviews & APPROVES

Ttx. produce & records files

New Contr | W.T. finds errors -

8th Ttx. agreed to make requested & corrections to Aus Eval &
deliver 10th

After review of Aus Eval 9 Dec 04, Pg - 39 41 42 & 36

• ~~Doesn't have Jones on Q1 Ch-~~ ✓

• Still has white tag ✓ [will disappear on final]

Comment - Will "Loading take as long" [No]

• Can Q1-L1 be repl. EQ1-L-3? ✓

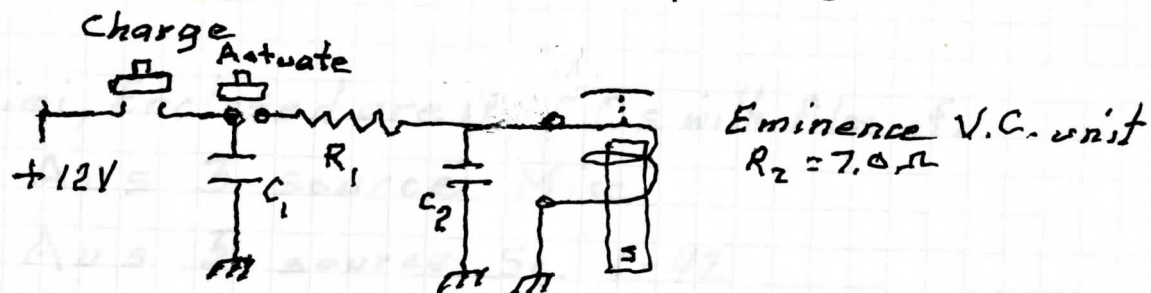
• Q9-L3 See P41 ✓

• Q~~9~~¹¹-L-3 - needs "may be" ✓

• Q~~9~~¹¹-L2 bad echo - also a pathological (m) not
ej. replace E

15 Dec 04 Yesterday reviewed Aus. Ev. - Marco is getting
bid on changing above items.

23 Oct. 04 Observations for pulse generation 49



$$C_1 = 12 \times 10^{-3} \text{ F} \quad R_2 = 7 \Omega$$

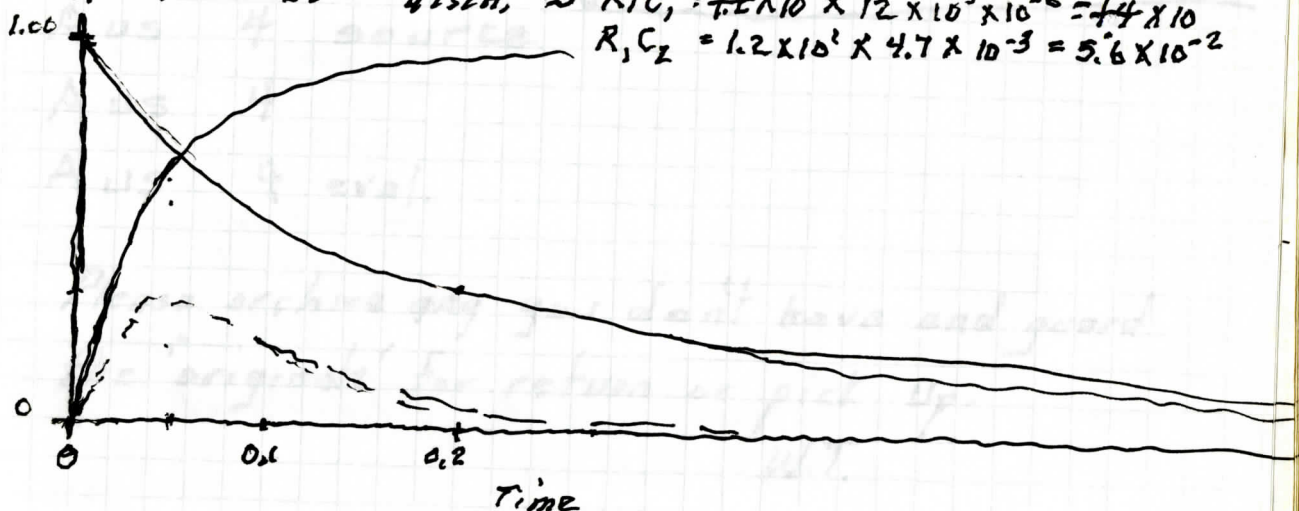
$$C_2 = 4.7 \times 10^{-3} \text{ F}$$

$$R_1 = 12 \Omega$$

With values shown a reasonable pulse $\approx$ min. noise was generated.

Est. of TCs: = disch, $\approx R_1 C_1 = 1.2 \times 10^{-1} \times 12 \times 10^{-3} = 1.44 \times 10^{-3}$ s (1.4 ms)

$R_1 C_2 = 1.2 \times 10^{-1} \times 4.7 \times 10^{-3} = 5.64 \times 10^{-4}$ s (0.56 ms)



25 Oct. '04 Note 2 UPS Shipment to JOaT 50

Jimi, Enclosed are 10 CDs with files of:

Aus 3 source Misc.

Aus 3 source Sc. 1-42

Aus 3 source Sc. 43-95

Aus 3 source Sc. 96-115 + Q/A 1-13

Aus 3 7-03-03

Aus 3 7-07-03

Aus 3 7-09-03

Retrieved from JOaT 12 Nov

Aus 4 source

Aus 4

Aus 4 eval.

Please archive any you don't have and guard
the 'originals' for return or pick up.

W.T.

18 Nov 04

52

JOAT -

- Set of proven source files for:

Aus 1, 2, 3 ? 4a + 4b.

- Summary: Reviewed all of above -

Incl. Aus 1 $\hat{=}$ $\uparrow$ V₆₀ volume - Took copy $\hat{=}$ low vol (~~te~~) + added JOAT label for ID

JOAT will add $\uparrow$ Vol.

- 1 Jimi raised ques. of Proprietary logo $\hat{=}$ restrict. not for comm use - felt this was card. prob.
- 2 Scene + sound $\hat{=}$ jct. box should be removed.
- 3 Jimi can raise sound level + add auto load - #400 Impr. level is low - if sound is $\uparrow$ 2 can probably be done $\hat{=}$ $\uparrow$ cost also.

Aus. will add auto load + use improved pause funct.

Delete sound ~~from~~ "Plug the earphones and -- as directed." $\hat{=}$ scene from 'of jct. box in Sc 4 -

23 Nov. '04

54

Review of: Aus Eval. Rev.

using:
CI Txt./WK-BK-

Aus 1

Q-1 A (Resp. split) Q+A OK [Wrong Phono]
(Wrong Sound)

Q-2 M
O (Wrong) Resp. split Q+A OK Phono OK

Q-3 T (close spl. S_1) Q+A-? either; " OK
2nd sound $\pm$ extra heart sounds:

Q-4 M $S_1 > S_2$ Q+A OK " OK

? How is 2^o try graded?

Q 5 P $S_2 > S_1$, MSC. Q+A OK ? comment on
noise in dias.

Q 6 P $S_2 > S_1$, Pul @ Q+A OK Phono OK

Q 7 P $S_2 > S_1$, P. reg., spl S_2 " " Phono OK

Q 8 A MSC. 2, $S_2 > S_1$, not =
Wrong Ans $S_2 > S_1$

Q 9 M $S_1 > S_2$, sys M? Q+A OK Phono OK

Q 10 P $S_2 > S_1$, Syst & Diastolic
Wrong Ans - only Syst (M) Phono OK

Q 11 P $S_2 > S_1$, sys (M) & S_3

Wrong note
should be
same as Q-7
but "and split"

Should display % when going to index-
or quit

Q 12 M S_1 , S_2 , 2 MSC

24 Nov 04

24 Nov. 04

55

On reviewing TWBk. discovered that spaces for sound diagrams did not match Scenes on lesson files -

Will reconcile 'masters' marked JOT to TWB by running them yet again -

<u>Sc # in twb</u>		<u>Scene # in</u>
90	Aus 1	90
	Aug 002	80 A
	Final Chg	
83 <Delete>		82 A ₂
86		86 P _U
87		87 Tr
88		88 M _L

90	90 P _U
msg <103>	103 A ₂
missing <104>	104 P _U
msg <105>	105 Tr
106 msg <106>	106 M _i

108	108
110	110
112	112
114	114
116	116
118	118
120	120
122	122

Aus 2 -

100
102

Note - Going to Index causes
Exit

Aus Sounds - Commentary -

58

1 ^{Aus 3} Eval 9 Dec -

^{Aus 1} S_1 & S_2 + Tone clean $S_1 < S_2$

1. A - Usual $S_1 < S_2$ - Baseline noise is $\uparrow$ in A.E.

2. P - Normal $S_1 < S_2$ resp. split - Should be usual sound -
^{Aus 1} S_1 & S_2 = tone + clean

3 - $\langle$ I - broad S_1 $\times$ $S_1 > S_2 \rangle$ $\langle S_1 & S_2 \rangle$

4
 $\langle$ A.I.M $S_1 > S_2 \rangle$ $\langle S_1 & S_2 \rangle$

5 $P S_4$ - is high pitched - loud Pulmonic - hint of cleaves. (m)
 $P S_1$

6 $P S_4$ (m) wide S_2

7 P

15 Dec -

64

There are still numerous, est. 6-8, error in Aus Eval. After giving list of proposed final changes to M.Z. found fixes were 1) incomplete & 2) errors? prev. undetected(?) were present.

In any event cannot go as is - MZ wants 450 for 4 small corrections. Part of problem is that Ttx can't or won't handle sound. I have probably made mistakes.

In an effort to control the latter I will make a fresh, detailed review of Ausc. eval. & special emphasis on each sound & problems.

16th Ques.? How much time should be spent?

Possible approaches:

1) Review each ques in detail Using first input:

2) Sound Photo Question Answer

18 - M.Z. sent email of Q/A 'Master Files' & complained to V. & Iz.

Lieb. & Keith want copy of Aus Eval Rev. for demo. Prom. something NLT 1 Jan.

Made copy of 9 Dec vers. Computer said copy couldn't be copied

20 - Sent response to MZ & made 2 additional copies (Keith wanted 3) and in spite of computer rate, a copy of a copy - Will send these 2 note including error locations.

2 - Replied to MZ's complaint pointing out the probs. had been costly to us. Received a \$1400 quote for corrections already made & ques. of whether to proceed - told him no.

2 - Sent Tang req brief summary of Aus Eval & requested mtg. & ell.

22 Earliest mtg. now 10 Jan -

Opening - OK

All corrections were based on
Dig File on C.D.

Text - OK

Preface L-1 OK

Lesson 11. A Sound
Usual $S_1 < S_2$ Quas- Ans-
OK a-2 $S_2 > S_1$ OKPhono

Sy ✓

There is definite baseline noise in orig. but this has been
increase in A Ev- such that it sounds like a decrescendo
dias. (m)

Soln - Find new sound or clean baseline + rerecord phono

Comment. This is usual sound heard in this area Sy ✓
E S_2 louder than S_1 and has slightly higher pitch.
Background noise is present + crescendo in dia-fole.

2. P $S_1 < S_2$, S_2 split in insp. OK a-3 $S_2 > S_1$ OK
xtra heart end

Comment - This sound is frequently heard in this area in
young people. S_2 splits on insp. which can be heard. This
is not the sound most heard (and is single on expir.)

most often which ~~is~~ is
on $S_2 > S_1$ and $\bar{e}$ slightly higher pitch and $\bar{e}$ splitting

3. Tr - $S_1 > S_2$, S_1 v. closely split - S_1 is heard as a Sy ✓
single broad sound by most, it is considered
single -Q - OK 2A - a-2 $S_1 > S_2$ Phono - OK Note - OK4. M $S_1 > S_2$ 2A - a-2 $S_1 > S_2$ Phono - OK Sy ✓5. P $S_4 + S_1 < S_2$ 3A - a-3 Phono - ↓ amplitude
108 $S_1 < S_2$ 6. P $S_2 > S_1 + S_4$ 4A - a-4 Phono - ↓ amplitude
xtra-Heart Snd.
 $S_2 > S_1$
(m), S_4 -

7 P $S_2 > S_1, S_2 \text{ spl.}$ $A: a.4$ Phono - barely acceptable, $S_2 > S_1$ & amplitude Xtra heart sound + (m) $Sy \checkmark$
Acoustic sys (m)
tends to dominate sounds the

8 A $S_1 = S_2 + 2 \text{ msc.}$ $A: a.4$ Phono too low $Sy \checkmark$
 S_2 is arguably $> S_1$ but $xtra \text{ Ht. Snd.}$ $S_1 = S_2$
varies -

9 M $S_1 > S_2$ only $A: a.2$ Phono too low $Sy \checkmark$
 $S_1 > S_2$

10 P $S_2 > S_1 + 2 \text{ (m)}$ $A: a.4$ Phonos too low $Sy \checkmark$
 $S_2 > S_1$
(m), syst dias

11 P $S_1 < S_2 + S_2 + Sys$ $A: a.4$ Phono too low Note: $Sy \checkmark$
 $S_1 < S_2$ A rumble
Xtra Ht. Snd.
 Sys (m)

While S_2 sounds louder than S_2 , the phono $Sy \checkmark$
show the opposite. This is explained by the
relatively low freq. of S_1 and lower sensitivity
of the ear to low frequencies -

12 M $S_1 > S_2$ $A: a.3$ Phono too low $Sy \checkmark$
+ late click $S_1 > S_2$
Xtra H.S.

So

Lesson 2

1. A $S_2 > S_1$ only A a-2 b- $S_2 > S_1$ only a usual - - Phono - OK Synchron - OK
 Note - OK ~~< sound could be used in L1, Q1 >~~
2. T A $S_1 > S_2$ A - a-3 o-m $S_1 > S_2$ nl. var split S_1 Phono OK Sy ✓
3. A $S_2 > S_1$ A - a-2 sys m $S_2 > S_1$ early rises & falls Phono OK Sy ✓
 Does should be "May be" pathology - vs is
4. P A $S_2 > S_1$ + A - a 2, $S_2 > S_1$ m S_1 sys rises & falls early, ej-m Phono OK Sy ✓
5. M $S_1 > S_2$ + S_3 A a 3, $S_1 > S_2$ om, S_3 Phono - Marg. Sy ✓
6. P $S_2 > S_1$ S_2 is quiet A a 2, $S_2 > S_1$ quiet S_1 norm var. Record lvl. too high + so is Phono Sy ✓
 S_2 is loud but this is rel to S_1
7. P $S_2 > S_1$ spl S_2 A a 3, $S_2 > S_1$ om, abnormal, S_2 Fix spl. Phono OK Sy ✓
8. P $S_2 > S_1$ sys m + S_3 A a 4 ~~(o A OK)~~ Bad Sound & Phono: note Sy ✓
 $S_2 > S_1$, extra h.s. Consider rpl & L1 Q11
9. P $S_2 > S_1$ + resp split A a 3 $S_2 > S_1$ om, variant resp. split Sy ✓

4 Jan 05

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Lesson 3

Title has Auscultation (1) -

1. A $S_2 > S_1$ ~~the~~ Sounded is loud & excess noise which shows on Phono-OK
(same as L1, e1) L_2, P_2 $\bar{c}$ note
- 2- P $S_2 > S_1$ Glitch in sound,
Resp. spl. A a 3, $S_2 > S_1$ Phono OK S_y OK
of S_2 o m, nl. split,
(same as L_2, P_2) nl resp spl
- 3- A $S_2 > S_1$ A a 2, $S_2 > S_1$ Phono OK S_y OK
+ ej m T sys. m
(same as L_2, P_2) xtra sound maybe -
" " " innocent
" " " pathologic
prob. - ej. m

~~#~~ Checked Δ sound level in L1 - acceptable

- 4- Tr $S_1 > S_2$ A a 3 nl. var Phono OK S_y OK
 $S_1 > S_2$ spl. S_1
 $C-O$
- 5- M $S_2 \approx S_1$ A a 3 Phono OK S_y OK
 $b S_2$ various Prn
 $C O$

Harsh, loud S_1 + S_2 contrasts; Elow freq S_3 S_y OK

- 6- Tr - $S_1 > S_2$ A a 3 atrial gallop
 S_y $b S_2$ heart attack Phono OK S_y OK
 $C O$

Recording accentuates higher Freqs. producing unusually high pitched S_4 + knocking S_2
(Noise is present - Tr 10 4 AOA)

- 7- M $S_1 > S_2$ A a 3 b. br. blk Phono OK S_y OK
+ Hsr? $b S_2$ abn. vl. open
 $C O$ spl S_1
delgje vl. clus

A sound follows S_1 + could be any of causes noted

- 8- P M is desirable
 $S_1 > S_2$ A a 3 abnormal
extra S_2 sound $b S_1$ " vl. open
 $C O$ " vl. cl.

Irreg. rate - A-fib - prob O/S

4 Jan 05

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L-3 contd

9 M $S_1 \gg S_2$ A: a 3 part. vlv. fail phono OK $S_4 \checkmark$
+ MSE $\begin{matrix} \uparrow \\ b \\ c \end{matrix} \begin{matrix} S_1 \\ S_2 \\ S_3 \end{matrix}$ MSC

Broad almost split S_1 bckg. noise

10 P $S_1 \gg S_2$ A: a 4 $S_3 + S_4$ phono OK $S_4 \checkmark$
(ck. as in L-3) $\begin{matrix} \uparrow \\ b \\ c \end{matrix} \begin{matrix} S_1 \\ S_2 \\ S_3 \end{matrix}$

S_1 is sharp and perceived as $\gg S_2$ although they are almost equal on phono - Unusual in Pulmonic area.

11 P $S_2 \gg S_1$ A: a 3 should be: phono OK $S_4 \checkmark$
 $\begin{matrix} \uparrow \\ b \\ c \end{matrix} \begin{matrix} S_2 \\ S_1 \\ S_3 \end{matrix}$ "may be a flexible --
b br bl

12 P $S_2 \gg S_1$ A: a 3 may be: phono OK $S_4 \checkmark$
 $\begin{matrix} \uparrow \\ b \\ c \end{matrix} \begin{matrix} S_2 \\ S_1 \\ S_3 \end{matrix}$ S_2 pulm. hypert.
 S_2 is prob adm.

(Loud S_2 - comment on confusing & quiet S_1)

13 P $S_2 \gg S_1$ A: a 3 Norm. Var.
 $\begin{matrix} \uparrow \\ b \\ c \end{matrix} \begin{matrix} S_2 \\ S_1 \\ S_3 \end{matrix}$

< S_4 m

Phono is confusing

Repl $\bar{c}$ L-3 m
Poor recording & phono -
subsonic rumble present.

14 M S S A

Same as

1 M $S_1 > S_2$ A a 4 MVP Phone OK Sy ✓
 M.S.C. 2 b 1 t.
 (m) c 1 Click
 late sys (m)

2 M $S_1 > S_2$ A a 3 d 1
 t (m) b 0 low freq (m)
 c 0 diast.
 large Δ between S_1 & S_2 which make loud zipping sound
 could be early MS

3 M $S_1 > S_2$ A a 4 ~~signif.~~ Note & Sy ✓
 b 1 ~~signif.~~ a local (m) Phone OK
 c 1 regurg is early & late
 d 0 ~~signif.~~

Recording artefact simulates dias. (m)
 Part of S_2 is merged c (m)

4 M $S_1 > S_2$ A a 3 early & late Phone
 b 0 severe OK
 c 0 ~~severe~~
 d 1 MS

5 P $S_2 > S_1$ Poor Sound Sy ✓
 + Phone
 Rpl E L, Q II

6 A M S_1, S_2 a 4
 Sys (m) b 1
 c 1
 d 0
 Pres. flow inter. Same sound as Q 3

7 A $S_1 < S_2$ A a 3 early Sound & Phone OK Sy ✓
 Sys (m) b 0 severe
 AR c 0 AR
 d 1

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L-4 8 I S_{1,2} A: a 3 Sounds + Phono OK Sy ✓
buried in VSD
(m) b 0 Note OK
c 0 VSD/TR
d 0 early/late

9 P S_{1,2} (m) PDA A: a 3 Yes Sound/Phono OK No Tone
b 0 Pri
c 0 PDA
d 0

10 P S₂S₁ + A: a 3 early Sound/Phono OK Sy ✓
ej. (m) b 0 All at
c 1 last
d 0 ques.

11 M #S₁S₂ A: a 4 Sys Sound, Phono Sy ✓
+ b 0 MR OK
M. Reg. + c 1 Filling
Filling (m) d 1 (m)

~~#2~~ Review these corrections:

Lessons 1-4 (see next pg.)

Latest M/S - done (" " ")

? Remove Macro Med.?

5 Jan 05 Summary to date:

Corrections were made to MZs master list
plus corrections of master list & transmitted to V.T., Ttx today
by Fax.

- Will start on comparison of Aus 1-3 review sections to Aus Eval Carr.
- Must do upgrade of Txt/WBK.

Attempted Meas. of Δ levels of Files.

Measured at sound card out @ R/S RMSOM.M
Peak

Source	dbm	mV	Lin	Ear -	
Aus 1 - Card Snd -	-23-28	42-72	12		54
Sc 108 Tone	-38	32-34	22		
Aus 1 Tone	-38	46-60	25-30		(1-S ₂ >S ₁)
Sc 108	-25- 28 28	62	20		43
Aus Eval - L1					
Q1 Sound	-16-19	132-140	25		
Tone	-37 42	46-58	30		
Q6 S	-26	28-40	7		
Σ L-2	-28	60-66	15-20		Q1
L-3	-22	65-80	25-30		Q1
Aus 7 Sc 53 V.O.	-17-22	40-60	15-20		
Sc 53					

6 Jan No ans. to proposal to Ttx. that:

- 1) I be present at correction
- 2) We pay reasonable sum to complete

Have call in to V.T.

Remainder of clean up:

Upgrade Txt. WK BK - Wait until revisions are complete
but since sounds are familiar do description of
sound, Q/A's - Place as an appendix.

Pulse-Impulse Simulator (PIP) 75

Purpose - Manual Training

Basic Functions

Amplitude: normal, hyper, hypo

* Rate - Fixed Δ's or Variable, random

Rhythm - regular, random, missed, added

Shape

Radial

normal *

Hyper *

Hypo *

Carotid Pulse

normal *

parv. et tard.

bifid *

hyper *

hypo *

Apical Impulse

normal *

sustained

bifid

S₄ + Sust.

S₃ + Sust.

S₃ + S₄ + Sust.

2° Pulse

* Radial, normal * Pedal, normal

* Radial, delay * Pedal, delay

Rev. of Digi Key Cat: Multi Posn switches - P988

12 poles divided 1:12 2:6 3:4 4:3 etc is max

Ampl. 3 posn

Rate - 12 posn S.P. - 30 -

Rhythm - ?

P - Imp - SPDT

Pulse -

Impulses

} pot & switch

P-918

PIP Controls

Rate Beats/Min, O₂

130 150,
110 170
90 190
72 220

50 Phys. Var.

30 Random

is louder than S₂ which is normal and
in this area. S₃ is also common.
Both components
of S₄ can almost be heard. A faint continuous
background noise may be heard.
Respiratory sounds are present
and are louder than S₂ which is normal and
in this area. A continuous background
noise is present in this recording.

7 Dec. '05 ~~Descriptions of Sound~~
Comments or Explanation of Sounds, Q/A for aus eval

NB This may be excessive - Will work on it for an hour to see if practical

L1 Q1 This is the usual and normal ^{cardiac} sound heard at this area, ^{two heart sounds with} S_2 louder and slightly higher pitched than S_1 .

Q2 This is a normal sound frequently but not most often heard in this area. S_2 is louder than S_1 but it splits on inspiration (Lesson 2 & 3). ^{producing 3 heart sounds} Since more than 2 heart sounds are present the split component p becomes an extra sound. Respiratory sounds ^{also} are present.

Q3

S_1 is louder than S_2 which is normal and usual in this area. S_1 also lasts longer which is also common. Both components of S_1 ^{m_1 & f_1} can almost be heard. A faint continuous background noise may be heard.

^{Only two heart sounds are present.} Q4 S_1 is louder than S_2 which is normal and usual in this area. A continuous background noise is present in this recording.

Q5 An S_1 is present and followed by a loud ^{and} ~~hanging~~ S_2 ^{there} is an extra heart sound, or S_4 which precedes S_1 . S_2 may also prove to be abnormal $\therefore$ additional investigations.

Q6 S_1 & S_2 are usual for this area but S_2 sound a bit hard. There is a rather harsh early systolic crescendo decrescendo ^{ejection} which terminates before the last third of systole and may be an innocent ejection ~~in~~ but which could also prove pathological. Remember the statistical overlap of pathological & normal sounds. (Lesson - 2)

Q7 S_1 is ~~usually~~ lower in frequency but greater in amplitude than S_2 when seen on the phone but the higher frequencies of S_2 make it sound louder ^{to the human ear} (L-1) hence the answer. S_2 is followed by another sharp sound which could be an abnormal valve opening or more likely a delayed ~~delay~~ closure which may result from an obstruction, in ~~emptying~~. This is consistent $\therefore$ the rather coarse murmur that peaks later in systole than an ejection ~~in~~ and continues or through S_2 (Lessons 2 & 4) Noise is present,

Comments, Cont'd 7 Jan

Q-8 The usual S_1 & S_2 for this area are present but there are two short systolic sounds in systole, so called 'mid' systolic clicks from partial ^{prolapse} failure of a mitral or tricuspid valve. (L-3)

Q-9 This is the usual normal ^{cardiac} sound heard at the mitral area $\approx S_1$ louder than S_2 .

A slight background noise is present.

Q-10 This is a ~~can~~ relatively complex sound. S_1 is the only approximately normal sound in this complex cardiac sound. After a ~~short~~ Diastole is short and S_2 is loud and confused, possibly $\approx$ a merged opening snap or the diastolic murmur. This ^{decrecendo} murmur which virtually disappears by the end of a long diastole, ~~and~~ is consistent $\approx$ a ^{large} regurgitant fraction. (L-3) A ~~quiet~~ early ~~dec~~ crescendo/decrecendo systolic ^{primary} ~~may~~ murmur is ~~an~~ also ~~consistent~~ ^{indicated} ~~of a large ejection volume ejection~~ ^{produced by} ~~from~~ the increased stroke volume imposed by the regurgitation. In spite of its sound, the ^{regurgitant} aortic valve is the culprit lesion.

Comment, contd. 10 Jan 05

11 This is comparing amplitudes of S_1 & S_2 & as displayed by the phono ^{cardiogram} vs that heard ^{another} is an example of frequency ^{sound} ~~signature~~ discrimination of the ear. While the pressures of S_1 displayed by the phono, of S_1 ~~is~~ are greater than those of S_2 , S_2 is perceived as louder than S_1 , and answers are based on perception. An inaudible low frequency artefact is present in this recording which makes both a systolic murmur & diastolic S_3 appear prolonged ^{in the phono.} this an early systolic crescendo/decrescent murmur and an S_3 . Since both can be indicators of increased flow this is most likely an innocent or physiologic ejection murmur & S_3 . (Lessons 2 & 4) ^{2, 3, 4}

Q12 This is a usual normal S_1 & S_2 heard in this area & with S_1 louder than S_2 . ^{An extra heart} ~~The dull~~ sound, well separated from S_2 is characteristic of an S_3 (Lessons 2 & 3) which may be innocent depending on other findings.

comment, cont'd. - [Lesson 2] 10 Jan '08

Q-1. This is the usual normal cardiac sound heard in this area; two heart sounds S_1 and S_2 with S_2 greater in amplitude & pitch. (Lesson 1)

2. As usual, in this area S_1 is louder than S_2 but S_1 is closely followed by a lower amplitude similar sound, probably the ^{valve} tricuspid closure so this may be a normal variant in the absence of abnormal findings. (Lesson 3)

3. S_1 and S_2 are what one would normally expect to find in this area but there is a relatively loud somewhat ^{early systolic} coarse crescendo/decrescendo murmur which slightly extends into the last third of systole but which peaks early. ^{This could be an} ~~early~~ ^{ejection murmur or aortic regurgitation} Other findings are required to determine if this is pathological or ^{normal} a variant. Such murmurs are not infrequently ^{heard} in normal children. (Lessons 2 & 4)

4. S_1 & S_2 are normal for this area but a short quiet ~~and~~ murmur follows S_1 and while hard to classify as crescendo/decrescendo it has the other prerequisites of an innocent ejection ~~at~~ murmur however this cannot be said ~~to~~ other data. (Lessons 2 & 4)

Comment Cont'd Lesson 2 18 Jan 05

5. $S_1 + S_2$ are consistent $\hat{=}$ normal heart sounds usually found in this area but the low frequency & amplitude 3rd sound well separated from S_2 ~~has~~ is characteristic of an S_3 which may or may not be innocent.
6. Only $S_1 + S_2$ are heard here but S_1 is unusually quiet. but this could be a normal variation but it could be an abnormally quiet S_1 caused by pathology. Additional information is required.
7. $S_1 + S_2$ are what one would expect to normally find here but S_2 is closely followed by ^{fixed} a second sound of slightly lesser amplitude but of the same pitch. It could be a delayed closure of the aortic valve ^{a₂} which splits ~~S_2~~ ^{S_2} or an abnormal valve opening, an opening snap. ^{an} EKG to look for bundle branch block and other studies are required to determine which pathology is present. (Lesson ^{2 or} 3).
8. This is the combination of a systolic ejection murmur and S_3 repeated for emphasis (Lessons 2, 3, 4) < ~~Add~~ comment from L-1, Q 11 >
See

P 9. L-2 Comments cont'd 10 Jan '05

29 This is the usual ^{normal} $S_1 + S_2$ expected in this area except that a recurring splitting of S_2 is present. Without knowing the phase of respiration one cannot say with assurance that this is the normal variant of respiratory splitting however the lower amplitude a_2 following p_2 makes this likely.

Lesson 3 Comments Contd - 10 Jan 85

Q.1 This is the usual normal $S_1 + S_2$ heard in this area. It is ~~the~~ a copy of the the first ~~sound question and answer sound~~ in Lesson 1 one's review, ~~see~~ repeated here for emphasis and to illustrate a problem you may encounter in real life, especially in recorded sound. ^{noise} ~~A~~ background noise is not only present in systole or diastole but it crescendo / decrescendo in systole & a late peak ^{whose slope} which ~~might~~ be a severe aortic regurgitant stenosis, except that such stenoses are not quiet. This is a (Lesson 1 p. 4), This is an artefact which also appears on the exaggerated photo, Lesson 3 p. 2

This ~~no~~ cardiac sound should be becoming ~~for~~ familiar for it is the variant often heard in this area, respiratory splitting, & consistent respiratory sounds in this case. Unless you are certain you can distinguish ^{it} ~~identify~~ inspiratory respiratory sounds, you should use the withhold judgement that this is normal respiratory splitting without ~~or~~ ^{other} verification of inspiration such as rise of the abdomen. ~~It~~ However in ^{this} case the a_2 following p_2 is another indicator that it is ^{has acquired a transient sound artefact} inspiratory splitting. This copy is

Lesson 3 Comments

Q3. S_1 and S_2 are what one expects from normals in this ~~acoustical~~ auscultatory area; S_2 is louder and slightly higher pitched than S_1 . This is another example of the most common murmur you will encounter, the ^{quiet} early ~~or~~ systolic ejection (m). While this example is crescendo/decrescendo it frequently reaches the last third of systole. Nevertheless this may well be innocent or it may be ~~early~~ caused by an early pathologic process such as ~~aortic~~ ^{an early} stenosis or sclerosis (Les: 2, 4).

4. This is ^{repeated} ~~another~~ example of a variant that you will encounter frequently; the ^{usual} ~~normal~~ S_1, S_2 in the tricuspid area $\bar{c}$ as ~~or~~ closely split S_1 where the ~~tricuspid~~ m_1 t_1 closely follows or is loosely merged $\bar{c}$ the louder ^{m_1} t_1 . Here it definitely split but can only be ~~def~~ designated a normal variant in the absence or the basis of additional ~~evidence~~ studies.

5. S_1 is loud and of a somewhat unusual character while as is S_2 . While almost equal in amplitude S_1 was judged louder. A rather loud & well separated third sound has the low characteristic ~~thud~~ of a

2-3 Comment Contd. 10 Jan

Q-7 S_1 and S_2 are unremarkable for this area but S_1 is followed by a relatively loud ^{extra heart} sound that could have several origins: a branch block could delay ~~ventricular start~~ and consequently ~~and~~ of ventricular contraction, ^{consequently} delaying closure of ^{an inlet} valve and causing ^{the} split (S_1 is also often split) (S_2 is also frequently split) or a stenotic but flexible ^{outlet} valve could cause an abnormal opening sound.

Q8 A loud S_1 is present followed by a quieter S_2 . S_2 is followed by a sound which could be caused by the delayed ^{opening} of a still flexible valve, an opening snap, ~~closure~~ ^{it could be} or a closure delayed by several possible mechanisms. A continuous background noise is present.

Q9 S_2 is slightly louder than S_1 which is slightly almost split. A relatively loud sound near mid systole ^{or mid systolic click} is produced by partial ~~collapse~~ ^{prolapse} failure of the mitral valve.

Respiratory and background noises are present.

L-3
Q 10 Several variations and ^{a definite} abnormality are present here. S_1 is louder than S_2 in this pulmonary area ^{and} S_3 and S_4 are usually best heard in the mitral tricuspid areas, often @ difficulty. Two relatively loud, low pitched sounds well separated from S_1 & S_2 ; S_3 and S_4 . We consider S_4 ^{4s} abnormal and would expect S_3 to also be abnormal in this case.

Q-11 S_1 may be closely split but this is in the ^{aortic} ~~pulmonic~~ not tricuspid ^{area}, hence maybe is presumed abnormal. This could be an S_1 split by a branch block or it may be the opening of a still flexible but stenotic valve. Lesson L-3

Q 12 S_1 is relatively quiet while S_2 is loud and broader than usual. While not a classic drum like or tambour ^{ital} sound it still most likely ~~is~~ abnormal because of increased ~~to~~ pulmonary pressure.

Q 13 This is another copy of thejection (m) and ~~to~~ S_2

15 Nov. - see pgs.

Mtg. 2 Murtaza confd.:

- Demonstrated funct. of "Demo ^{and Release} Cal. Bal."
- Erasure of data folders
- Reset function

+ Erasure and Installation of MKI + MKII
(There is no diff. in loading mem. stck. + C.D.)

NB - Did not adequately cover saving of data

28 Nov.

Phase II CB S/w

Ran program on MK's Mettler + new HP for week.

Items TBD-

Image is too large for screen - M. says it is computer icons on program are the same

* Need file

Need description

" Operators Manual

29 Nov.

Demod. Scott C.B. #1 MK2 prog. to Runge who wanted to try it at home - Took it out + set it up -
Set for CST which makes it ready an hour later -
Runge actually wants it set 05:300 -

Bill Creech wants system -

4 Dec. Murtaza - (To India 25 Dec. - rtn. 26 Jan)

- 1) Send MK P.C. to T.T. - GLS
- 2) Rtn - new P.C. + Release - 5 people -
- 3) C.D. + file
- 4) MK - P.C. to GLS
- 5) New Comp to Sheri + Release Prog -

Call V.T. (1 more computer/scale) + 12ygon (Single bd. comp)