

Copyright 1988 by Tamco Systems, Inc.  
 393 Jericho Turnpike, Mineola NY 11501

TTTTTTTTTTT	SSSSSSSS
TTT	SSS
TTT	SSSSSSSS
TTT	SSS
TTT	SSSSSSSS

Acoustic Formulae Worksheet  
 Version 2.0

To invoke applications, press "ALT"  
 and "Z" together and choose from menu

INTELLIGIBILITY ANALYSIS

Q of Loudspeaker		
Reverb Time	2.5sec	
Volume of room	185,328cu ft	
Surface Area	20,268sq ft	
Max dist D2	72ft	
M	1	
N	2	
Minimum Q	7.65	X:
		Y:
Max D2	0	Z:
		DIST:
Ref distance	4.0	TIME:
Distance	10.0	
Inverse sq loss	-8.0	

PAG - NAG EQUATIONS

D1	22
DS	0.5
D2	84
EAD	
NOM	3

Maximum DS	0.0
------------	-----

Minimum D1	#DIV/0!
------------	---------

Maximum D2	0.0
------------	-----

Minimum EAD	6.6
-------------	-----

Maximum NOM	0.0
-------------	-----

Read the solution |  
disregarding !all! t  
parameters

<===

X:

Y:

Z:

DIST:

TIME:

## SPL AT EARS

1W SENSITIVITY OF LS	99dB SPL
REFERENCE DIST	3.3Feet
DISTANCE TO EARS	47Feet
APPLIED ELECT PWR	150Watts
SPL AT EARS	97.7dB SPL

NOTE! Loudspeaker maximum levels need not be "linear". Hence "SPL AT EARS" is an ideal figure that should be derated accordingly.

## OR AIP WHEN E IN IS KNOWN

### GIVEN:

-

R in	15,000ohms
R source	115ohms
E in	6.15volts

### CALCULATED:

-

E source	6.20volts	Gain:
AIP	19.22dBm	
Power Out	20volts	
	8ohms	
	50watts	46.99

FOR MORE EQUATIONS, PAGE DOWN

YOU KNOW THE DESIRED AIP

GIVEN:

-

AIP	3.44dBm
R Source	115ohms
R input	15000ohms

CALCULATED:

-

E Source	1.01volts
E in	1.00volts

FOR MORE EQUATIONS, PAGE DOWN

GAIN

R input	15000
R source	115
R load	8
E in	6.1500
E out	20.00

voltage ampl	10.24
coupling factor	-0.07
impedance mismatch	11.58
diff betw O.C. & matched	6.02

-

INSERTION GAIN	27.77
----------------	-------

## OHM'S LAW

FOR MORE EQUATIONS, PAGE DOWN

ENTER:

volts	ohms	watts
16	4	64.00
volts	amps	watts
1	3	3.00
amps	ohms	watts
2	3	12.00
watts	ohms	volts
0.0001	15000	1.22
dBm	watts	ohms
-20	0.000010	15000.00
dBu		volts (ref .775v)
-54		0.00155

## MORE OHM'S LAW AND DECIBELS

Voltage ampl	81dB
	11220.2ratio
Voltage ratio	2
	6.02dB
Power gain	3dB
	2.00power ratio

HEAT LOSS IN BTU'S PER HOUR

POWER DISSIPATED = (AC LINE INPUT PWR - POWER OUTPUT) \* 3.4

P(AC): 152

P(OUT) 20

P(DISS) 448.8

			OK
	<----MICROPHONE-->-----	<----MIXER-->	
	74dB SPL	41dBampl	
IIII	150ohms	115ohms	
III	74dB SPL ref	2100ohms	
III	0.00006v @ ref	6.15V max	
III			
IIII	*	*	*
	Es microphone	E inp (MIX)	
	0.00006	5.6884876E-05volts	
	EIN (30Hz-15kHz)	Ampl	
	-138.3dBm	112.20185	
	S/N	Es,mixout	
	56.1dB	0.006382588volts	
	AIP	AIP	
	-82.2dBm	-40.5dBm	
	*	*	*
	Mixer Gain	41.7	
	Amp gain	43.5	
	Sys Elec Gain	85.2	
		*** PAD A	

If you know:	Source Imp	115
	R1	10000
	R2	250
	R input	15000
Then:		
Effective pad loss:		-32.492723

If you know:		
23FEET	Source Imp	115
34FEET	R2	250
24FEET	dB Loss	-40
47.5FEET	R input	15000
0.042SECONDS	Then:	
	R1	24,229

VOLUME AND SURFACE AREA OF "STANDARD C

WIDTH	36.75
LENGTH	73.3
HT OF SIDE WALLS	18
HT @ APEX	35

VOLUME:

SURFACE AREA:

here,  
he other

36FEET  
6FEET  
0FEET  
36.5FEET  
0.032SECONDS



27.77dB

dBm output

dBm's

48.1

dBm's

34.8

dBm's

40.8

volts

0.39

# objects

1  
2  
3  
4  
5  
6  
7  
8  
9  
10

11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30

SPKRIMP  
SPL AT EA  
SPL AT MI  
TARGET E

245.90164  
0.02373361

{goto}a93~/rv.{end} {dow  
{goto}C91~/rv.{end} {righ

OK  
<----POWER AMP--->  
26dBampl  
15000ohms inp  
20V max

OK  
<----SPEAKER----->  
8ohms  
10ft to target  
93dB SPL sens  
4feet,1 watt  
8watts max

{menubranh o4}

Intelligibility  
Intelligibility analysis, Sab  
{goto}a21~

\* \*  
E inp (PA)  
0.0063340272volts  
Ampl  
19.952623  
Es, amp out  
0.12638046volts

\* \*  
Power out  
0.0019965025watts  
dB loss dist  
-8.0dB

\* \*  
dB Sys Gain  
dB L at ears  
dB

Output level  
3.0dBm  
\* \*  
-16.0dB  
58.0dB-SPL

NALYSIS \*\*\*

ohms  
ohms (R1 balanced =  
ohms 5000ohms)  
ohms

dB

\* OR \*

ohms  
ohms  
dB  
ohms

ohms (and R1 balanced would be  
12,115ohms)

CHURCH"

71,385

10,950

	G22
IR	G40
C	A22
IST	G23



0.01  
245.90164

n}~{right}~{right}/rfh{end} {down}~  
it}~{down}~{down}/rfh{end} {right}~

Stability      LS Sens      Levels      Pads      AIP      Ohm's L  
PAG-NAG equatiHelps predict tlPredicts electHelps in tlAvailable IOhm's Law equ  
{goto}a61~      {goto}a81~      {goto}g1~      {goto}g21{goto}a101{goto}a161~

Heat L

Heat Loss equation based on electrical power consumed

{goto}a201~



