

THE VENTED LOUDSPEAKER: A RESTATEMENT

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THE VENTED LOUSPFAKER CABINET: A RESTATEMENT

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Additional information on the use and application of A. N. Thiele's alignments [1] for the vented loudspeaker cabinet is presented. A rewritten alignment table which has all the frequency terms normalized to the speaker resonance frequency is included. Computer run frequency responses for all the alignments are displayed along with a new fourth order Chebyshev alignment beyond No. 9. Sensitivity functions for the cabinet output with respect to various system parameters (f_b , f_s , Q_t , V_b) are derived and plotted. Methods of auxiliary filter synthesis are discussed including an equalization method to compensate for incorrect speaker Q_t using a single second-order peak-dip filter. A simple cabinet tuning procedure using computer printed tables is also presented. A possible new set of small box low frequency alignments requiring comparatively high amounts of auxiliary filter boost at the box resonance frequency are suggested.

1. REWRITTEN ALIGNMENT TABLE

To facilitate identification of this papers computer run alignment frequency responses and to simplify design procedures, A. N. Thiele's alignment table [1] p. 388 is reproduced here in somewhat different form (table I). All the frequency terms have been normalized to the speakers free-air resonance frequency instead of the alignments (-3 db) cutoff frequency. The Thiele column giving the ratio C_{as}/C_{ab} has been changed to the reciprocal value $C_{ab}/C_{as} = V_b/V_{as}$ to make the value proportional to the box volume. The constant listed for the auxiliary filter (λ) is the reciprocal of the required filter Q ($\lambda = 1/Q = \sqrt{2 + y}$). Also included in the new table is a listing for the frequencies f_l and f_h the impedance peak frequencies for the driving point impedance of the speaker mounted in the vented cabinet.

The author has found this rewritten alignment table to be much more useful for design purposes because of the loudspeaker free-air resonance frequency normalization. Usually a designer starts with a particular speaker that has a specific free air resonance frequency and then determines the box parameters to place it in a particular alignment. The tabulated values of f_l and f_h help the designer to check the completed system tuning.

2. ALIGNMENT RESPONSES

To ease the computer programming of the Thiele vented cabinet responses, Thiele's equation (19) [1] p. 386 (the operational form of the transfer relationship between the speakers input voltage and the sound pressure output of the speaker mounted in it's cabinet) was rewritten to conform to the standard text book form for transfer functions. After appropriate substitutions and manipulations this equation appears as:

$$E(s) = \frac{s^4}{s^4 + \frac{\omega_s}{Q_t} s^3 + \left[\omega_b^2 + \omega_s^2 \left(1 + \frac{C_{as}}{C_{ab}} \right) \right] s^2 + \frac{\omega_b^2 \omega_s}{Q_t} s + \omega_s^2 \omega_b^2} \quad (1)$$

where $s = \alpha + j\omega$ complex variable
 $\omega_s = 2\pi f_s$ fundamental resonance frequency of loudspeakers in rad/sec
 $\omega_b = 2\pi f_b$ cabinet resonance frequency in rad/sec
 $\frac{C_{as}}{C_{ab}} = \frac{V_{as}}{V_{ab}}$ ratio of the loudspeaker suspension compliance to the box compliance (or alternately, the ratio of loudspeaker compliance equivalent volume to the box volume)
 Q_t effective Q of the speaker connected to the amplifier.¹

To derive the response function which is normalized to the speakers resonance frequency a substitution of $\omega_{bs} = \omega_b/\omega_s$ and $\omega_s = 1$ is made in (1) yielding.

$$E(s) = \frac{s^4}{s^4 + \frac{1}{Q_t} s^3 + \left(\omega_{bs}^2 + 1 + \frac{C_{as}}{C_{ab}} \right) s^2 + \frac{\omega_{bs}^2}{Q_t} s + \omega_{bs}^2} \quad (2)$$

where $\omega_{bs} = \frac{\omega_b}{\omega_s} = \frac{f_b}{f_s}$ normalized frequency variable which is the ratio between the box and speaker resonance frequencies.

In like manner, the normalized transfer functions for the auxiliary filters are derived.

First Order Alignments 10 to 14

$$H_1(s) = \frac{s}{s + \omega_{as}} \quad (3)$$

$$W_{as} = \frac{f_{aux}}{f_s} = \frac{f_3}{f_s} \frac{f_{aux}}{f_3} = \frac{W_{aux}}{W_s}$$

$W_{aux} = 2 \pi f_{aux}$ corner frequency of filter in rad/sec

$W_3 = 2 \pi f_3$ corner frequency of overall response (speaker plus filter) in rad/sec.

Second Order - Alignments 15 to 27

$$H_2(s) = \frac{s^2}{s^2 + X W_{as} s + W_{as}^2} \quad (4)$$

where

$W_{as} = \frac{f_{aux}}{f_s}$ corner frequency of filter in rad/sec

$X = 1/Q_{aux} = \sqrt{y + 2}$ = a constant which is the reciprocal of the filter required Q.

Y_{aux} auxiliary filter constant defined by Thiele and appearing in alignment table

First Order

$$H_3(s) = \frac{s + A}{s + \frac{A}{2}} \quad (5)$$

Computations show that this filter is 3 db down at $W = a/\sqrt{2}$

The overall responses of the fifth and sixth order filters are just the appropriate products of (2), (3), (4) and (5) as shown below:

Fifth Order

$$\begin{aligned} E_{5th}(s) &= E(s)H_1(s) \\ \text{or} &= E(s)H_3(s) \end{aligned} \quad (6)$$

Sixth Order

$$E_{6th}(s) = E(s)H_2(s) \quad (7)$$

The complete set of computer run frequency responses are shown in figures 1 to 16. The alignments which require the use of an auxiliary filter have been shown with separate responses for the speaker, the filter, and the speaker-filter combination. Examination of the speaker only responses for alignments 12, 13, 14, and 27 (Fig. 8 and 11) clearly show why these responses were considered suspect by Thiele [1] p. 389.

3. NEW RIPPLE VALUES

As a result of the computer runs, it was noted that the ripple magnitude quoted by Thiele in his alignment table (for the Chebyshev alignments No. 7, 8, 9) was in excess of the ripple values as determined from the computer responses. For example, Thiele indicates a ripple value of 1.8 db for alignment No. 9, but the computer run response

(see Fig. 3) shows a ripple value of about .55 db. For this paper, the author is defining the ripple as the difference between the maxima and minima in the passband in db [2] pp. 374-375. The rewritten alignment table I in this paper reflects the new ripple values.

4. NEW FOURTH ORDER ALIGNMENT

Because of the comparatively small value of ripple for alignment No. 9, the author was moved to investigate fourth order alignments with a higher value of ripple (and hence a lower cutoff frequency). Alignment 9.5 is a result of this study (see Fig. 2 and 3).² This alignment has a low frequency cutoff nearly a full octave below the speakers resonance frequency ($0.52 f_s$), a ripple of about 1.5 db, a required Q_t of 0.625, and requires a volume of 2.6 times the speakers compliance equivalent volume.

5. PERTURBATION OF SYSTEM PARAMETERS

To illustrate the qualitative effects of variations of the system constants on the frequency response, several responses were run with non-optimum values for the system parameters. The fourth order alignments numbered 1, 5, and 9 were chosen for this perturbation study. The parameters of the speaker system that were varied included: w_b the box resonance frequency, w_g the speaker resonance frequency, Q_t the system Q , and $V_{ab}/V_{as} = C_{ab}/C_{as}$ the ratio between the box volume and the speakers compliance equivalent volume. For a particular variation, all the system parameters were held constant (at their correct alignment values) except one, which was varied in one-sixth octave (ratio of 1.121 to 1., about 11.2%) steps above and below the optimum value. The perturbation responses for variation of f_b and Q_t are very similar to the variational responses illustrated by J. F. Novak in his excellent work [3] pp. 9-10.

The variational responses are shown in figures 17 to 28. The writers observations concerning the parameter perturbations will be withheld until after the next section which displays the alignments parameter sensitivity functions.

6. SENSITIVITY FUNCTIONS

To show the quantitative effects of system parameter changes on the frequency response, the sensitivity functions for the magnitude of equation (1) were derived. Sensitivity is a measure of how some characteristic of a system changes when certain system parameters are perturbed.³ The sensitivity of a system function $M(w)$ with respect to a parameter X is defined by [4] p. 462.

$$S_X^M(w) = \frac{dM(w)/M(w)}{dx/x} = \frac{x}{M(w)} \frac{\partial M(w)}{\partial x} \approx \frac{\Delta M(w) \text{ in } \%}{\Delta X \text{ in } \%} \quad (8)$$

Notice that S_x^M is a normalized variable which indicates the relationships between percentage shifts in $M(W)$ and X . The concept of sensitivity is theoretically valid only for infinitesimal shifts but is accurate enough for engineering purposes for shifts up to about 15% in the independent parameter. For illustration purposes, a sensitivity value of +1 would indicate a 5% increase in S would reflect in an approximate 5% increase in M (5% is about 0.4 db).

To compute the required partial derivatives, equation (1) is first written as a magnitude function of W .

$$E = E(W) = |E(j\omega)| = \frac{\omega^4}{\left\{ \left[\omega^4 - (\omega_L^2 + W_S^2 + W_S^2 \frac{C_{as}}{C_{ab}}) \omega^2 + W_S^2 \omega_L^2 \right]^2 + \frac{W_S^2 \omega^2}{Q_t^2} (\omega_L^2 - \omega^2)^2 \right\}^{1/2}} \quad (9)$$

After much manipulation and pencil work the sensitivity functions appear as follows:

$$\text{Variation of } Q_t. \quad (W_S = 1)$$

$$S_{Q_t}^E = \frac{Q_t}{E} \frac{\partial E}{\partial Q_t} = \frac{E^2 (\omega^2 - \omega_L^2)^2}{Q_t \omega^6} \quad (10)$$

$$\text{Variation of } W_S. \quad (W_S = 1)$$

$$S_{W_S}^E = \frac{W_S}{E} \frac{\partial E}{\partial W_S} = \frac{2W_S^2 E^2}{W^8} \left\{ \frac{\omega^2}{Q_t^2} (\omega^2 - \omega_L^2) - \left[\omega^4 - (1 + \omega_L^2 + \frac{C_{as}}{C_{ab}}) \omega^2 + \omega_L^2 \right] (\omega - \omega_L^2) \right\} \quad (11)$$

$$\text{Variation of } \frac{C_{as}}{C_{ab}}. \quad (W_S = 1)$$

$$S_{\frac{C_{as}}{C_{ab}}}^E = \frac{(\frac{C_{as}}{C_{ab}})}{E} \frac{\partial E}{\partial (\frac{C_{as}}{C_{ab}})} = \frac{(\frac{C_{as}}{C_{ab}})}{W^6} E^2 \left[\omega^4 - (1 + \omega_L^2 + \frac{C_{as}}{C_{ab}}) \omega^2 + \omega_L^2 \right] \quad (12)$$

Variation of W_s

$$S_{W_s}^E = \frac{W_s}{E} \frac{\partial E}{\partial W_s} = \frac{W_s E^2}{W^6} \left\{ 2 \left[\omega^4 - \left(1 + W_k^2 + \frac{C_{as}}{C_{ab}} \right) \omega^2 + W_k^2 \right] \left[\omega^2 \left(1 + \frac{C_{as}}{C_{ab}} \right) - W_k^2 \right] - \frac{W^2}{Q_t^2} (W_k^2 - \omega^2)^2 \right\}$$

(13)

The computer was used to evaluate these functions by using equation (1) and working directly from the definition of the sensitivity function and assuming a 0.1% change in the independent parameter. The computer output for the sensitivity functions of alignments 1, 5, and 9, is shown in figures 29 to 34.

7. OBSERVATIONS AND CONCLUSIONS ON VARIATION OF SYSTEM PARAMETERS

Changes in Q_t

Examination of the graphical data (fig. 31) and equation (10) shows that the magnitude response is effected by variations of Q_t mostly at frequencies about an octave above and below the box resonance frequency. The maximum sensitivities occur at the frequencies f_l and f_h (the frequencies at which the input impedance is maximum for the speaker mounted in the vented box as defined by Thiele). The sensitivity functions indicated that all the alignments are equally sensitive (peaks of +1.0 in sensitivity) for all the alignments. Also shown is the independence of the response with respect to Q_t at the box resonance frequency.

Changes in V_{ab}/V_{as}

Increases in box volume reflect an increased output at frequencies at or near the box resonance frequency (see Fig. 32). The single maximum of about +1.0 in sensitivity occurs at the box resonance frequency. Above f_h and below f_l increases in box volume actually cause a slight decrease in system output. The response at the frequencies f_l and f_h is volume independent for small shifts in volume. All the alignments are about equally sensitive to shifts in the volume ratio. The sensitivity of V_{ab}/V_{as} decays to zero for large and small frequencies (same behavior as sensitivity of Q_t).

Changes in f_b

An increase in the box resonance frequency causes an increase in the output immediately above the optimum required box resonance frequency and

a decrease in the output below this frequency (Fig. 29 and 30). For extremely high frequencies the sensitivity decays to zero. For very low frequencies the sensitivity approaches -2 (this behavior at low frequencies is expected because the denominator of (1) approaches $W_s^2 W_b^2$). The higher numbered alignments exhibit an extreme sensitivity to shifts of W_b at frequencies near the optimum box frequency. Alignment number 9 exhibits a sensitivity peak of nearly -5 just below the optimum box frequency.

Changes in f_s

Examination of Fig. 33 and 34 shows how the response shifts if f_s , the speakers free air resonance frequency, is changed. The graphs indicate a decrease in the response for positive shifts in W_s . A negative peak of -2.2 in sensitivity is found approximately at the alignments box resonance frequency. A negative dip of -1.0 is observed at a frequency of about two-thirds of an octave below the speakers resonance frequency. The sensitive approaches -2 for low frequencies and 0 for high frequencies. Equal sensitivities for all the alignments are exhibited by variation of W_s .

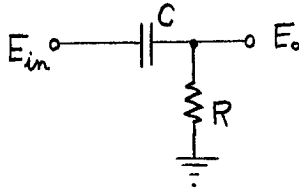
Conclusions on Cabinet Tuning Considering Sensitivity Functions

The graphs displaying sensitivity show that the speakers response is relatively insensitive to variations in Q_t and volume (absolute sensitivities of about 1 or less), moderately sensitive to variations in W_s the speakers resonance frequency (absolute sensitivities of about 2 or less), and quite sensitive to variations of W_b the box resonance frequency for the higher numbered alignments (absolute sensitivities of less than about 5). This data indicates that for a specific alignments cabinet design, the box should be tuned quite accurately to the computed design frequency (considering the speaker free air resonance frequency). It has been the author's experience that out of a typical batch of two to four speakers of the same make and model, a variation of 10% to 20% in free air resonance frequencies is not unusual. This means that large variations in response are to be expected if a higher number alignment cabinet is designed for a specific speaker and another of the same make and model is substituted without appropriate changes in the cabinets resonance frequency.

8. AUXILIARY FILTER SYNTHESIS

Several methods of synthesizing the high pass auxiliary filter, both active and passive, are available to the designer. In this paper only three of the most straightforward methods will be illustrated.

First Order, Passive RC (Alignments No. 10 to 14)



(14)

$$\frac{E_o}{E_{in}}(s) = \frac{s}{s + \frac{1}{RC}} = \frac{s}{s + \omega_o}$$

where

$$\omega_o = 2\pi f_o = 1/RC = (f_{aux}/f_s)\omega_s \quad \text{corner frequency (-3 db) in rad/sec.}$$

Note: The filter as shown must be driven from a source impedance of less than $0.1R$ for correct operation. The resistance R may be the input impedance of the following stage.

Design Procedure

Given: $f_s, \frac{f_{aux}}{f_s}$ (from alignment table)

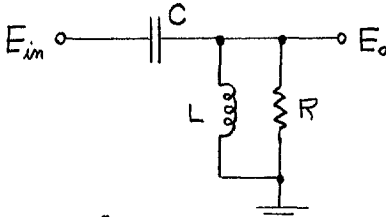
Choose: R

$$\text{Calculate: } \omega_o = 2\pi f_s \left(\frac{f_{aux}}{f_s}\right)$$

$$C = 1/(\omega_o R)$$

The main advantage of the first order passive high pass filter is it's extreme simplicity. If the resistance R , for example, is the input impedance of a power amplifier (assumed resistive over $0.1f_s < f < 10f_s$), the amplifier input coupling capacitor would be changed to the value computed above to generate the correct auxiliary filter response.

Second Order, Passive RLC (Alignments No. 15 to 27)



$$\frac{E_o}{E_{in}}(s) = \frac{s^2}{s^2 + \frac{1}{RC}s + \frac{1}{LC}} = \frac{s^2}{s^2 + X_{aux} \omega_0 s + \omega_0^2} \quad (15)$$

where

$$\omega_0 = 2 \pi f_0 = \sqrt{\frac{1}{LC}} = \left(\frac{f_{aux}}{f_s}\right) \omega_s \quad \text{filter corner frequency in rad/sec}$$

$$X_{aux} = \frac{1}{Q} = \frac{1}{R} \sqrt{\frac{L}{C}} \quad \text{reciprocal of filter } Q$$

Note: This form of second order filter has been optimized for voltage transfer instead of power transfer. The voltage transfer ratio in the pass band is unity. The same assumptions on source and load impedance that apply to the first order filter also apply to this filter.

Design Procedure

Given: f_s , $\frac{f_{aux}}{f_s}$, X_{aux}

Choose: R

Calculate: $\omega_0 = 2 \pi f_s \left(\frac{f_{aux}}{f_s}\right)$

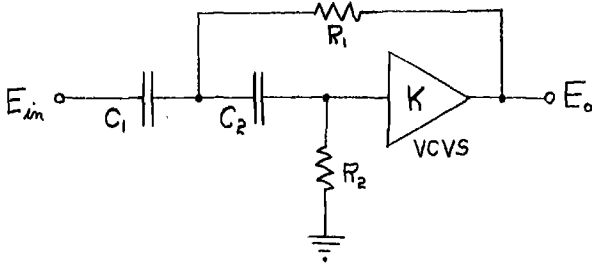
$$C = \frac{1}{X_{aux} \omega_0 R}$$

$$L = \frac{1}{\omega_0^2 C}$$

The disadvantage of this filter is the large values of L and C required for the low frequency alignments. For example, if a filter is designed for a speaker with $f_s = 40$ Hz for alignment No. 24 ($R = 10K\Omega$), the inductance value is 44.7 H and the capacitor value is 0.764 μ F. This disadvantage leads one to consider the next synthesis method.

Second Order, Active RC

The active RC filter considered here is one which uses a unity gain (no phase inversion) voltage-controlled voltage source VCVS (high input impedance, low output impedance) in a multiply feedback arrangement [4] p. 296. The VCVS is easily implemented using an operational amplifier or a high beta transistor in an emitter follower configuration.



(16)

$$\frac{E_o}{E_{in}}(s) = \frac{Ks^2}{s^2 + \left[\frac{1}{R_2 C_1} + \frac{1}{R_2 C_2} + \frac{1-K}{R_1 C_1} \right] s + \frac{1}{R_1 C_1 R_2 C_2}}$$

If we let $K = +1$, and $C_1 = C_2 = C$, we find that

$$\frac{E_o}{E_{in}}(s) = \frac{s^2}{s^2 + \frac{2}{R_2 C} s + \frac{1}{R_1 R_2 C^2}}$$

where

$$\omega_0 = 2\pi f_0 = \frac{1}{\sqrt{R_1 R_2} C} = \left(\frac{f_{aux}}{f_s} \right) \omega_s \quad \text{filter corner frequency in rad/sec}$$

$$X_{aux} = \frac{1}{Q_{aux}} = 2\sqrt{\frac{R_1}{R_2}} \quad \text{reciprocal of filter Q.}$$

Design Procedure

Given: $f_s, \frac{f_{aux}}{f_s}, \chi_{aux}$

Choose: C

Calculate:

$$\omega_0 = 2\pi f_s \left(\frac{f_{aux}}{f_s} \right)$$

$$R_1 = \frac{\chi_{aux}}{2\omega_0 C} = \frac{\chi_{aux}}{2(2\pi f_{aux})}$$

$$R_2 = \frac{2}{\omega_0 C \chi_{aux}} = \frac{4R_1}{\chi_{aux}^2}$$

Design Example

Design an alignment No. 16 auxiliary filter for a speaker with a free air resonance frequency of 52.5 Hz.

Given: $f_s = 52.5 \text{ Hz}$.

$$\left. \begin{array}{l} \frac{f_{aux}}{f_s} = 0.858 \\ \chi_{aux} = 0.420 \end{array} \right\}$$

Choose

$$C = 0.1 \mu\text{F}$$

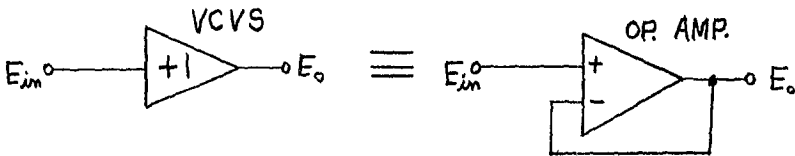
Calculate

$$\omega_0 = (6.28)(52.5)(0.858) = 283 \text{ rad/sec.}$$

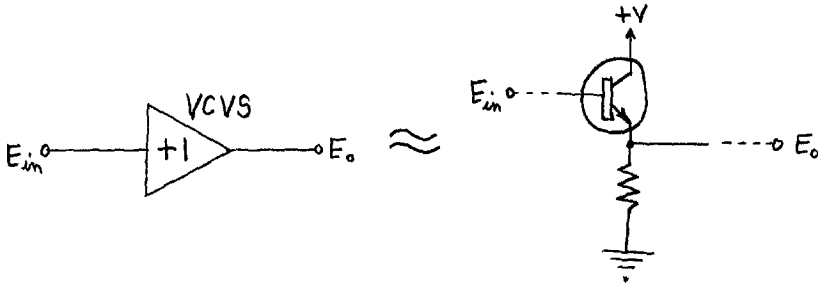
$$R_1 = \frac{0.42}{2(283)(1 \times 10^{-7})} = 7.42 \text{ K}\Omega$$

$$R_2 = \frac{4(7.42 \times 10^3)}{(0.42)^2} = 168 \text{ K}\Omega$$

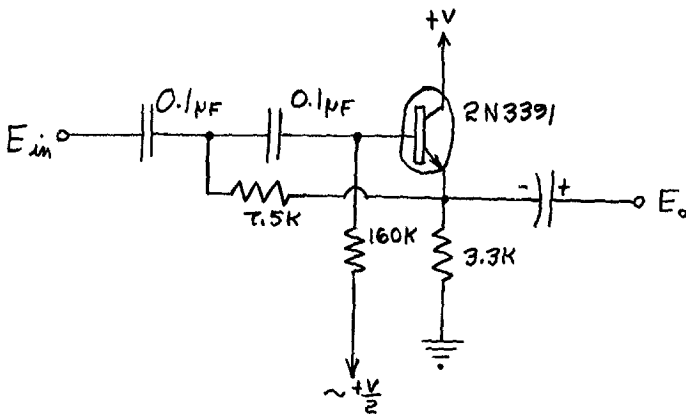
The voltage controlled voltage source can be implemented with an operational amplifier such as the 741 in the following circuit;



or using a super-beta transistor such as the 2N3391 in the following emitter follower configuration:



Choosing the latter route, a practical representative design would appear as:



The completed filter should always be checked to insure that it is generating the correct amount of boost at the peak frequency listed in the alignment table. In the example cited, the filter should boost +7.7 db at a frequency of $f_{pk} = f_s \left(\frac{f_{pk}}{f_s} \right) = 52.5(.901) = 47.2$ Hz.

9. COMPENSATION OF ALIGNMENT INCORRECT Q_t

Thiele points out in his paper [1] p. 475 that if a particular alignment is to be within ± 1 db of the desired magnitude frequency response, the alignments Q_t must be within about $\pm 10\%$ of the designed value (the sensitivity functions for Q_t derived in this paper also confirm this). To achieve this somewhat close tolerance in Q_t means that either a person sticks to the particular alignments which match the measured Q_t of his speaker or use one of two forms of compensation which correct for the response deficiencies introduced by the incorrect Q_t .

The first method, variation of the power amplifiers dynamic output impedance, was covered very thoroughly in Thiele's paper [1] pp. 475-476. This method which adds to or subtracts from (via a negative output impedance) the voice coils resistance compensates very accurately for the response errors by returning the system Q_t back to the designed value. The two main disadvantages of this method are: (1) the requirement that the power amplifier must be modified to change its output impedance and (2) the possibility of amplifier instability when trying to compensate for speakers with overly high Q 's placed in comparatively small boxes. The first disadvantage would cease to be a problem if a manufacturer would develop a line of amplifiers with an adjustable output impedance covering both positive and negative values. This was done to a certain extent in the fifties and early sixties with power amplifiers that contained variable damping factor controls.

The second method, equalization of the response deficiencies by the addition of filters ahead of the power amplifier, will be discussed and investigated in the next section of this paper.

Filter Equalization of Alignment Incorrect Q_t

The compensation of the alignments Q_t response deviations by the addition of filters before the power amplifier will be considered in this section. The main advantage of this method is the fact that the power amplifier does not have to be internally modified because the filter will be designed to operate with a power amplifier that has flat (with respect to frequency) voltage transfer characteristics and an approximate zero output impedance (most existing power amplifiers meet these specifications). The main disadvantage of this filter method is that the response deviations will not be compensated for exactly if a simple peak-dip equalization filter is used for compensation.

To investigate the effects of variation of Q_t on a specific alignments transfer function, the computer was used to make a root locus plot of the denominator of the system transfer function for alignment No. 5. This root locus plot is shown in Figure 35 (see also Fig. 22). The plot suggests that if the system transfer function with incorrect Q_t (in factored form),

$$E_i(s) = \frac{S^4}{(S+P_{i1})(S+\tilde{P}_{i1})(S+P_{i2})(S+\tilde{P}_{i2})} \quad (17)$$

where

$P_{in} = \alpha_n + j\omega_n$ = complex number representing the location of the nth speaker function denominator pole with incorrect Q_t .

$\tilde{}$ = denotes complex conjugation

could be multiplied by another function representing the transfer characteristics of the added compensation filter (assumed to be a fourth order pole-zero filter),

$$H_o(s) = E_i(s) H_c(s) = E_i(s) \left[\frac{(S+Z_1)(S+\tilde{Z}_1)(S+Z_2)(S+\tilde{Z}_2)}{(S+P_1)(S+\tilde{P}_1)(S+P_2)(S+\tilde{P}_2)} \right] \quad (18)$$

where

$Z_n = \alpha_n + j\omega_n$ = complex number representing the location of the nth compensation filter function zero.

$P_n = \alpha_n + j\omega_n$ = complex number representing the location of the nth compensation filter function pole.

and then letting the filter zeros approach the speakers functions poles $Z_n = P_{in}$ and the filters poles approach the correct alignments poles $P_n = P_{cn}$, the overall response would be compensated precisely.

$$H_o(s) = \frac{S^4}{(S+P_1)(S+\tilde{P}_1)(S+P_2)(S+\tilde{P}_2)} \quad (19)$$

In effect the added filters zeros would be cancelling the effect of the speaker functions incorrect poles and the correct poles of the filter would be substituted in their place. The disadvantage of this specific filter method is the complexity and difficulty of synthesizing this fourth order pole-zero filter.

The author's further investigation at this point was directed primarily at using a single second order peak-dip filter to compensate for incorrect response. The transfer function of the proposed compensation filter appears as:

$$H_{pd}(s) = \frac{s^2 + \frac{G_{pd} W_{pd}}{Q_{pd}} s + W_{pd}^2}{s^2 + \frac{W_{pd}}{Q_{pd}} s + W_{pd}^2} \quad (20)$$

where

G_{pd} = gain of filter at center frequency ($W_0 = W_{pd}$, $0 < G_{pd} < \infty$)

$W_{pd} = 2\pi f_{pd}$ = center frequency of filter where maximum filter effect is observed.

Q_{pd} = Q of compensation filter

Figure [45] shows some of the possible responses available from this filter. The passive RLC synthesis of this type of filter is covered quite well in the book "Electronic Designers' Handbook" by Landee, Davis, and Albrecht [5] chap. 17 section 2.

Minimization of Error

To select the parameters of the second order peak-dip filter f_{pd} , Q_{pd} , and G_{pd} a computer program was written that implemented the method of steepest descents [6] to minimize the error between the alignment's incorrect response and the alignment's response with a specific value of incorrect Q_t modified by the peak-dip filter.

To program the method of steepest descents for this specific case a single performance index A which is a function of the three adjustable parameters was needed. The performance index chosen was the root mean square (RMS) difference between the correct frequency response and the incorrect frequency response over a specific frequency interval,

$$A_{rms} = A_{rms}(W_{pd}, Q_{pd}, G_{pd}) = \left[\frac{1}{\omega_2 - \omega_1} \int_{\omega_1}^{\omega_2} (M_i - M_c)^2 d\omega \right]^{\frac{1}{2}} \quad (21)$$

where

A_{RMS} = root mean square error

$M_c = M_c(w) =$ magnitude response of correct alignment

$M_i = M_i(w) =$ magnitude response of alignment with incorrect Q_t modified by the response of the peak-dip filter.

Higher or lower order error averages such as the absolute error or the cube root mean cubed error could have been used for the performance index. The higher order averages give more weight to the extreme deviations in error. The author did not have enough time to fully investigate these other forms of error averages and their effect on the correct response. The RMS error was judged to be sufficiently sensitive to be used as a performance index for this preliminary investigation.

The method of steepest descents to minimize the error was implemented using the following steps:

(1) Starting at an arbitrary point in the three dimensional parameter space (w_{pd} , Q_{pd} , G_{pd}) with a performance index A_0 , compute the partial derivatives $\frac{\partial A}{\partial w_{pd}}$, $\frac{\partial A}{\partial Q_{pd}}$, $\frac{\partial A}{\partial G_{pd}}$ and form the normalized gradient vector,

$$\vec{V}_g = \frac{\text{grad } A}{|\text{grad } A|} = \frac{\vec{\nabla} A}{|\nabla A|} = \left(\frac{\partial A}{\partial w_{pd}} \vec{a}_w + \frac{\partial A}{\partial Q_{pd}} \vec{a}_Q + \frac{\partial A}{\partial G_{pd}} \vec{a}_G \right) \frac{1}{|\nabla A|} \quad (22)$$

where

$\vec{a}_w, \vec{a}_Q, \vec{a}_G =$ base unit vectors in the coordinate directions

(2) Assuming an initial vector magnitude step size of D , go to a new point in the parameter space which is a distance D away from the previous point and in the direction of minus the gradient of A (the direction of the minimum error) as follows:

$$\vec{P}_1 = \vec{P}_0 - \frac{D \vec{\nabla} A}{|\nabla A|} = \vec{P}_0 - D \vec{V}_g \quad (23)$$

where

$\vec{P}_0 =$ vector from the origin to the starting point

$\vec{P}_1 =$ vector from the origin to the new point

$D =$ magnitude of vector step

(3) Check the new point to see if the gradient has changed directions (components all change sign), if it has - half the step size D and repeat the above, if it hasn't - leave D the same and repeat the above.

(4) After each shift in parameter space check to see whether D is below a certain minimum value, if it is - the current values of W, Q, and G are the minimized values.

In the batch computer program which accomplished the previous steps the initial vector step size was 0.05 while the final comparison step size was 0.005. The RMS error was evaluated over an interval from f_b the box resonance frequency to $8 f_b$ with 25 steps to approximate the error integral. Each minimization was accomplished in about 12 steps and required approximately 15 seconds of the computers central processing unit time (CPU, IBM System 360). The peak-dip filter parameters for alignments No. 3, 5, and 9 which were computed are displayed in table II along with the compensated and uncompensated error values. Also displayed are the error values for a set of approximate peak-dip filter parameters chosen according to the following equations:

$$\begin{aligned}W_{pd} &= 1.08 W_h \\Q_{pd} &= 1 \\C_{pd} &= Q_t/Q_{ti}\end{aligned}\tag{24}$$

where

W_h = frequency of upper impedance peak under condition of high Q_a .

Q_t = optimum alignment Q

Q_{ti} = incorrect alignment Q

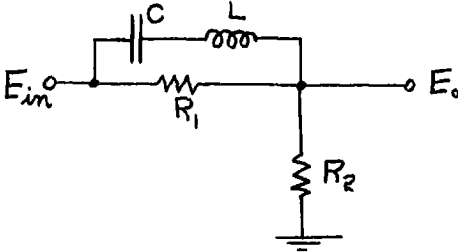
Table II shows that using equations (24) the error values are not too much higher than the minimized error values. Equations (24) can be extended to compensation filters for any of the alignments. Several selected error compensation frequency responses are shown in Fig. 36 to 44 for alignments No. 3, 5, and 9. The Q_t compensation was judged to be very good for alignments No. 3 and 5 but fair to good for alignment No. 9 (especially for values of Q much lower than the optimum value). With lower than optimum system Q for the higher numbered Chebyshev alignments the response has a sharp peak at the box resonance frequency which is difficult to equalize out with just a single second order peak-dip filter.

Synthesis of Q_t Compensation Peak-Dip Filters

Only two synthesis schemes, one passive the other active, will be covered in any detail in this paper.

Passive RLC

Peaking Filter



(25)

$$\frac{E_o}{E_{in}}(s) = \frac{R_2}{R_1 + R_2} \left(\frac{s^2 + \frac{R_1}{L}s + \frac{1}{LC}}{s^2 + \frac{R_1 R_2}{(R_1 + R_2)L}s + \frac{1}{LC}} \right)$$

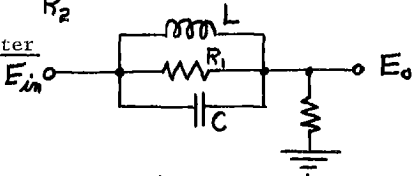
where

$$W_{pd} = 1/\sqrt{LC}$$

$$Q_{pd} = \frac{R_1 + R_2}{R_1 R_2} \sqrt{\frac{L}{C}}$$

$$G_{pd} = \frac{R_1 + R_2}{R_2}$$

Dipping Filter



(26)

$$\frac{E_o}{E_{in}}(s) = \frac{s^2 + \frac{1}{CR_1}s + \frac{1}{LC}}{s^2 + \frac{R_1 + R_2}{R_1 R_2 C}s + \frac{1}{LC}}$$

where

$$W_{pd} = 1/\sqrt{LC}$$

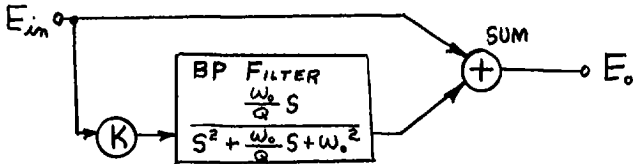
$$Q_{pd} = \frac{R_1 R_2}{R_1 + R_2} \sqrt{\frac{C}{L}}$$

$$G_{pd} = \frac{R_2}{R_1 + R_2}$$

Knowing W_{pd} , Q_{pd} , and G_{pd} the previous equations can be solved for L , C , R_1 , and R_2 .

Active

The following system block diagram illustrates a straight forward method of synthesizing the peak dip filter with an active second order band pass filter.



(27)

$$\frac{E_o}{E_{in}}(s) = \frac{S^2 + \frac{\omega_0}{Q}(K+1)S + \omega_0^2}{S^2 + \frac{\omega_0}{Q}S + \omega_0^2}$$

where

$$\omega_{pd} = \omega_0$$

$$Q_{pd} = Q$$

$$G_{pd} = K + 1$$

By proper selection of the constant K this filter will peak or dip.

The writer will not amplify on this particular active synthesis scheme. The implementation of each individual block will be left to the reader. The designer is referred to the excellent work Operational Amplifiers By Burr-Brown [4].

10. A PRACTICAL CABINET TUNING METHOD

For those who do not have access to a digital computing system for doing their calculations, the following enclosure tuning method which uses two sets of tables for computing respectively, the port cross-sectional area to port effective length ratio ($\alpha = S_v/L_v$) given the box volume and resonance frequencies, and the square port cross-section side dimension given α and the actual port length, has been found quite useful by the author.

The standard form for the equation that gives the resonance frequency of a Helmholtz resonator [7 / p. 193 (using Thiele's variables) is:

$$\omega_0 = C \sqrt{\frac{S_v}{L_v V_b}} \quad (28)$$

where

$\omega_b = 2\pi f_b$ box resonance frequency in rad/sec

S_v cross-sectional area of the vent

L_v effective length of the vent

V_b volume of cabinet

C speed of sound in air

Solving for the ratio S_v/L_v in the preceding equation yields

$$\frac{S_v}{L_v} = V_b \left(\frac{\omega_b}{C} \right)^2 = \alpha \quad (29)$$

which is recognized as the reciprocal of equation (61) in Thiele's work [1] p. 391. This equation was used to derive this papers "Alpha Table" which relates the variables $f_b(H_z)$, V_b (cubic inches or cubic feet), and α (inches or inches squared per inch).

Substituting into (29) the expression for the effective length ($L_v = L + 1.46 R$, where L = the actual vent length, R = the effective radius of the vent, and assuming one end flanged and one end free standing) and solving for L gives,

$$L = \frac{S_v}{\alpha} - 1.46 R \quad (30)$$

The above equation can be rewritten for the special case of the vent of square cross-section of side D and Length L yielding,

$$L = \frac{D^2}{\alpha} - 1.46 R = \frac{D^2}{\alpha} - \frac{1.46 D}{\sqrt{\pi}} = \frac{D^2}{\alpha} - 0.825 D \quad (31)$$

The D Table contained in this paper uses relation⁽³¹⁾ to relate the variables D (inches), L (inches), and α (inches or inches squared per inch).

It has been the author's experience that no matter how carefully and accurately the vent dimensions are calculated (with respect to the vent radiation assumptions etc.) a person is doing good if the cabinet resonance frequency ends up being within $\pm 5\%$ of the designed value. The author usually adds a correction factor of between 10 and 20 percent to the computed vent length so that the vent can be experimentally shortened to make the cabinet resonance frequency correct.⁴ The following partial

derivative relating f_b and L from equation (28) has been found quite useful in experimentally changing the vent length.

$$\frac{\partial f_b}{\partial L} = -\frac{f_b}{2L\nu} \approx -\frac{f_b}{2L} \quad (32)$$

Noting carefully the comments Thiele makes about the vent length and area in section VII of his paper, the following procedure can be used to choose the vent dimension.⁵

Design Procedure

Given: V_b , f_b

Choose: L

Calculate: $\alpha = \left(\frac{W_b}{C}\right)^2 V_b$ (Look this up in the Alpha Table)

Calculate: D from relation $D^2 - .825 \alpha D - \alpha L = 0$
(Look this up in the D table)

Design Example

Tune a cabinet of 7.8 cubic feet to a frequency of 25.0 Hz. The approximate cabinet depth is 18 inches.

Given: $V_b = 7.8 \text{ ft.}^3$

$f_b = 25.0 \text{ Hz}$

Look up: $\alpha = 1.92 \text{ in.}^2/\text{in.}$ (On Alpha Table No. 6)

Choose: $L = 10 \text{ in.}$

Look up: $D = 5.37 \text{ in.}$ (On D Table No. 9)

Therefore, the final vent dimensions would be approximately 5.37 x 5.37 x 12 in. deep (allowing a 20% overage in length). The cabinet should now be tuned using the above calculated vent dimensions and the box resonance frequency measured.⁶ Assuming a measured f_b of 22 Hz, the amount of vent length to remove can be calculated by applying relationship

$$\frac{\partial f_b}{\partial L} \approx \frac{\Delta f_b}{\Delta L} \approx -\frac{f_b}{2L} = -\frac{22}{2(12)} = -0.916 \frac{\text{Hz}}{\text{in.}} \quad (32)$$

$$\therefore \Delta L = \frac{\Delta f_b}{-0.916} = \frac{f_{\text{wanted}} - f_{\text{measured}}}{-0.916} = \frac{25 - 22}{-0.916} = -3.25 \text{ in.}$$

This calculation shows that if 3.25 inches is removed from the duct length the cabinet resonance frequency should be very close to the designed value. If the sign had been positive it would indicate that length must be added to the vent because the measured box frequency was higher than desired.

11. -A POSSIBLE NEW SET OF ALIGNMENTS

Thiele states that alignment Nos. 17 - 19 should be avoided because of large cone excursions and the high amount of boost requiring excessive power from the amplifier. Examination of the speaker only response figure 9 and the response of the auxiliary filter figure 14 for these alignments show the reasons for Thiele's recommendation. All three of these alignments have a comparatively low value of f_3/f_b (as stated by Thiele / 17 / p. 389) and in addition have a low value of f_{pk}/f_b . The following table tabulates these ratios for alignments No. 15 to 25 for comparison.

Table III
Some Comparisons for the Sixth Order Alignments

Alignment No.	f_3/f_b	f_{pk}/f_b	Aux. Filter Peak Lift in db
15	1.000	1.070	+ 6.0
16	.868	.922	+ 7.7
17	.750	.788	+10.1
18	.698	.733	+11.6
19	.659	.685	+13.2
20	1.000	-----	-----
21	.954	2.25	+ 0.2
22	.917	1.61	+ 1.1
23	.902	1.47	+ 1.9
24	.890	1.38	+ 3.0
25	.876	1.29	+ 6.0

A low value of f_{pk}/f_b implies that the auxiliary filter is boosting in a frequency range which is significantly below the box resonance frequency and down into the range where the vented box distortion rises quite rapidly because of excessive cone displacement and out of phase vent radiation. The author believes that the low value of f_{pk}/f_b is primarily the main reason to reject alignment numbers 17 to 19, not specifically because of the high value of peak lift.⁷

Figures 46 and 47 show the effect on alignment Nos. 2 and 5 of tuning the box resonance frequency to lower and lower values. The last frequency response shown in each of these graphs is the output of the closed box (with the correct closed box Q_t) with the same value of V_b/V_{as} . An examination of these responses suggests that a new set of sixth or eighth order alignments could be derived for the lower values of V_b/V_{as} (values of V_b/V_{as} less than 0.707, Thiele's definition of a small box) which would constrain the frequency of maximum auxiliary filter boost to frequencies no less than about $0.95 f_b$. Thiele's alignment No. 15, with No. 16 as a border line case, now meets these requirements. For a particular value of V_b/V_{as} , a whole list of alignments could be generated which differ mainly in the low frequency cutoff f_3 , box resonance frequency f_b , and the amount of auxiliary filter boost. The primary advantage of these new suggested small box low frequency alignments lies in the constraint that the auxiliary filter boost must occur at frequencies at or above the box resonance frequency. This constraint minimizes the system distortion because the boost is primarily effective for frequencies where the vented box loading is the greatest. An illustrative alignment meeting the suggested specifications for a V_b/V_{as} ratio the same as alignment No. 2 would have the following possible characteristics: $f_3/f_s = 1.00$, $f_b/f_s = 1.10$, $f_{pk}/f_s = 1.10$, and a peak auxiliary filter lift of about 16 db.

If the author pursues any investigation along these lines, he will report the results in the "Project Notes and Engineering Briefs" section of the AES Journal.

SUMMARY

The sensitivity functions derived for variation of the box resonance frequency for the vented loudspeaker cabinet show the extreme sensitivity of the system output for variations of this parameter. Because of the wide variance of free air resonance frequencies in a batch of the same make and model loudspeaker, the designer must nearly individually tune the resonance frequency of each cabinet to the speaker that it will be used with to eliminate wide variations of the response in the passband of the system.

The peak-dip filter equalization method of the speaker system with incorrect Q_t was shown to be quite practical for all the alignments with incorrect system Q_t 's higher than the optimum value. For Q_t 's less than the correct value the method works best for alignments with V_b/V_{as} ratios less than about one.

The cabinet tuning tables exhibited in this paper help the designer to rapidly tune a specific cabinet without the help of a digital computer or involved hand computations.

The additional fourth order Chebyshev derived alignment makes it possible to extend the response of a speaker nearly a full octave below the speakers free air resonance frequency without the help of auxiliary filters.

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- [7] L. E. Kinsler, A. R. Frey, Fundamentals of Acoustics, (John Wiley and Sons, Inc., New York, 1962).
- [8] J. R. Ashley, M. D. Swan, "Improved Measurement of Loudspeaker Parameters," AES Preprint No. 803 (E-2) for the 40th AES Convention.

FOOTNOTES

¹This Q includes all the losses due to the speaker (suspension and radiation losses, voice coil I^2R losses etc.) plus amplifier losses. In the deviation of E(S) Thiele assumes a high Q for the cabinet mesh ($Q_b > 30$).

²If any reader has a better idea on how this alignment might be made, the author is open for suggestions.

³A good explanation of sensitivity fundamentals may be found in the appendix of [4] p. 461.

⁴The sensitivity functions for f_b derived in this paper (Sections 4 to 6 and Fig. 29 and 30) show that the alignments are extremely sensitive to shifts in the box resonance frequency.

⁵In this paper the author has made no pre-assumptions concerning what values of cabinet parameters are or are not valid for listings in the tuning tables.

⁶The phase method suggested by Ashley [8] would be an excellent way to measure the box resonance frequency.

⁷Analyze a speaker system such as the Bose 901 (a closed box) which operates the speakers in a stiffness controlled mode (below the system resonance frequency) over a significant part of the low frequency range. This type of system requires a significantly high amount of bass lift to make the system flat. For normal home systems inefficiency per se does not seem to be a problem

Table No. 1
 REWRITTEN ALIGNMENT DATA

		Alignment Details				Box Design				Auxiliary Circuits				Impedance Peak Frequencies			
		No.	Type	K	Ripple (db)	f_3/f_s	f_b/f_s	V_b/V_{as}	Q_r	f_{aux}/f_s	X_{aux}	Peak Lift (db)	f_{pk}/f_s	f_1/f_s	f_2/f_s	f_3/f_1	
Quasi-Third Order	1	QB3	--			2.68	2.000	.0954	.180	--	--	--	--	.5127	3.901	7.61	
	2	QB3	--			2.28	1.730	.1337	.209	--	--	--	--	.5161	3.346	6.48	
	3	QB3	--			1.77	1.420	.2242	.259	--	--	--	--	.5282	2.681	5.075	
	4	QB3	--			1.45	1.230	.3390	.303	--	--	--	--	.5406	2.273	4.205	
Fourth Order	5	B4	1.0	--		1.000	1.000	.7072	.383	--	--	--	--	.5688	1.758	3.09	
	6	C4	.8	--		.867	.927	.9479	.415	--	--	--	--	.5771	1.607	2.78	
	7	C4	.6	.13		.729	.829	1.372	.466	--	--	--	--	.5741	1.445	2.52	
	8	C4	--	.25		.641	.757	1.790	.518	--	--	--	--	.5615	1.348	2.40	
	9	C4	--	.55		.600	.716	2.062	.557	--	--	--	--	.5499	1.302	2.37	
9.5	C4	--	1.52		.520	.638	2.60	.625	--	--	--	--	.5166	1.235	2.39		
Fifth Order	10	B5	1.0	--		1.000	1.000	1.000	.447	1.000	--	--	--	.6180	1.618	2.62	
	11	C5	.7	--		.852	.912	1.715	.545	1.218	--	--	--	.6451	1.414	2.19	
	12	C5	.4	.25		.724	.814	3.663	.810	1.810	--	--	--	.6666	1.221	1.83	
	13	C5	.355	.5		.704	.798	4.405	.924	2.06	--	--	--	.6713	1.189	1.77	
	14	C5	.278	1.0		.685	.781	5.236	1.102	2.47	--	--	--	.6725	1.161	1.73	
Sixth Order Class I	15	B6	1.0	--		1.000	1.000	.366	.299	1.000	.518	+ 6.0	1.070	.4710	2.123	4.51	
	16	C6	.8	--		.850	.979	.429	.317	.858	.420	+ 7.7	.901	.4864	2.013	4.14	
	17	C6	.6	--		.698	.931	.552	.348	.712	.318	+10.1	.733	.5032	1.850	3.68	
	18	C6	.5	--		.620	.888	.662	.371	.639	.265	+11.6	.651	.5094	1.743	3.42	
	19	C6	.414	.1		.554	.841	.800	.399	.576	.2215	+13.2	.576	.5123	1.642	3.20	
Sixth Order Class II	20	B6	1.0	--		1.000	1.000	1.000	.408	1.000	1.414	--	--	.6180	1.618	2.62	
	21	C6	.8	--		.844	.885	1.385	.431	.928	1.250	+ 0.2	1.992	.6051	1.463	2.42	
	22	C6	.6	--		.677	.738	2.000	.461	.819	1.029	+ 1.1	1.181	.5611	1.315	2.34	
	23	C6	.5	--		.592	.656	2.415	.484	.752	.895	+ 1.9	.965	.5235	1.253	2.39	
	24	C6	.414	.1		.520	.584	2.832	.513	.681	.766	+ 3.0	.806	.4832	1.208	2.50	
	25	C6	.268	.6		.404	.461	3.623	.616	.553	.518	+ 6.0	.594	.4000	1.153	2.88	
Sixth Order Class III	26	B6	1.0	--		1.000	1.000	1.366	.518	1.000	1.931	--	--	.6599	1.515	2.30	
	27	C6	.268	.6		.778	.854	9.091	1.503	2.12	1.414	--	--	.7605	1.123	1.48	
	27	QB3	--	--		.952	.971	.529	.328	1.028	--	+ 6.0	0	.5140	1.889	3.68	

Table No. II
 CHARACTERISTICS OF PEAK-DIP FILTER TO COMPENSATE FOR INCORRECT Q

Alignment Details			Filter Design (Minimum Error)					Filter Design (Approximate Values)				
No.	Correct Q_r	Incorrect Q_i	Q_i/Q_r	f_{pd}/f_s	Q_{pd}	G_{pd}	RMS Error Unequalized (db)	RMS Error Equalized (db)	$f_{pd}/f_s =$ $1.08f_h/f_s$	Q_{pd}	$G_{pd} =$ f_s/f_{pd}	RMS Error Equalized (db)
3	.259	.207	.80	2.9834	1.0054	1.2488	1.20	.20	2.8951	1.0000	1.2500	.21
		.324	1.25	2.9244	1.0031	.8002	1.10	.18	2.3951	1.0000	.8000	.18
		.414	1.60	2.9170	1.0007	.6229	2.20	.35	2.8951	1.0000	.6250	.35
		.518	2.00	2.8815	.9955	.4995	3.08	.48	2.8951	1.0000	.5000	.48
		.647	2.50	2.8477	.9870	.4004	3.88	.60	2.8951	1.0000	.4000	.62
		.816	3.15	2.8186	.9876	.3157	4.61	.70	2.8951	1.0000	.3175	.76
		1.036	4.00	2.7924	.9821	.2492	5.27	.79	2.8951	1.0000	.2500	.94
		1.295	5.00	2.7728	.9773	.1998	5.81	.86	2.8951	1.0000	.2000	1.14
		1.632	6.30	2.7568	.9736	.1578	6.30	.92	2.8951	1.0000	.1587	1.35
		5	.383	.191	.50	2.0954	.9405	1.9771	4.08	.56	1.8986	1.0000
.241	.63			2.0590	.9481	1.5794	2.62	.38	1.8986	1.0000	1.5873	.46
.306	.80			2.0179	.9749	1.2512	1.21	.18	1.8986	1.0000	1.2500	.21
.479	1.25			1.9706	.9852	.7992	1.11	.17	1.8986	1.0000	.8000	.18
.613	1.60			1.9263	.9602	.6256	2.22	.34	1.8986	1.0000	.6250	.35
.766	2.00			1.9004	.9585	.5007	3.12	.43	1.8986	1.0000	.5000	.49
.957	2.50			1.8766	.9494	.3989	3.92	.60	1.8986	1.0000	.4000	.63
1.206	3.15			1.8561	.9448	.3195	4.66	.71	1.8986	1.0000	.3175	.78
1.532	4.00			1.8381	.9411	.2516	5.34	.81	1.8986	1.0000	.2500	.95
9	.557			.175	.315	1.5151	.9475	3.1589	7.34	.69	1.4062	1.0000
		.223	.40	1.5013	.9408	2.4861	5.63	.58	1.4062	1.0000	2.5000	.70
		.278	.50	1.4863	.9495	1.9973	4.11	.45	1.4062	1.0000	2.0000	.53
		.351	.63	1.4662	.9534	1.5888	2.64	.31	1.4062	1.0000	1.5873	.34
		.446	.80	1.4457	.9826	1.2547	1.22	.15	1.4062	1.0000	1.2500	.16
		.696	1.25	1.4111	.9792	.7971	1.12	.14	1.4062	1.0000	.8000	.15
		.891	1.60	1.3923	.9579	.6201	2.25	.28	1.4062	1.0000	.6250	.30
		1.114	2.00	1.3776	.9516	.4943	3.16	.39	1.4062	1.0000	.5000	.43
		1.392	2.50	1.3649	.9322	.3963	3.98	.48	1.4062	1.0000	.4000	.58

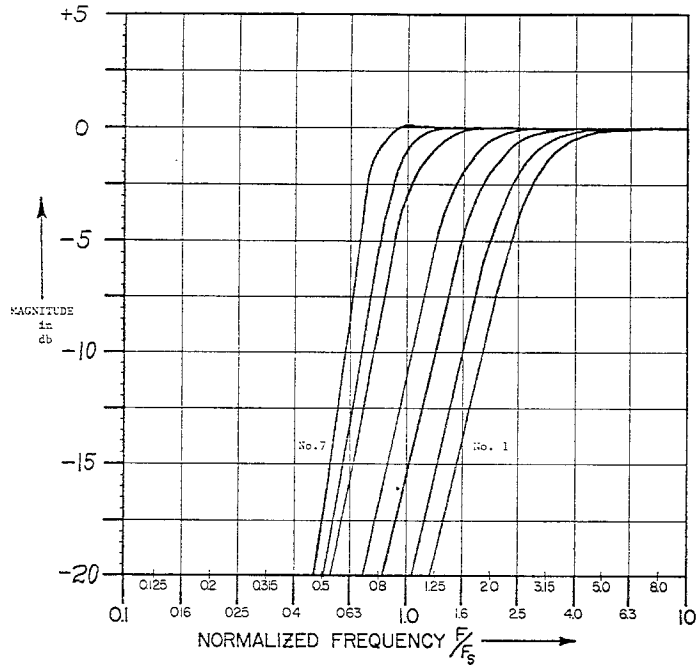


Fig. 1 The frequency response of the first seven Thiele alignments, reading from right to left.

No. 1, 2, 3, 4 Quasi-Butterworth, Fourth Order.
 No. 5 Butterworth, Fourth Order.
 No. 6, 7 Chebyshev, Fourth Order

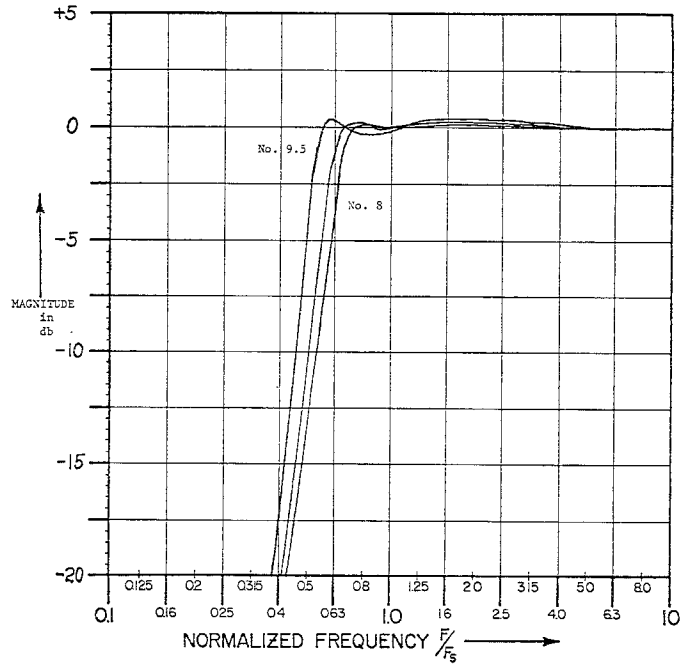


Fig. 2 The frequency response of the Thiele alignments No. 8, No. 9 and the authors C4 alignment called No. 9.5, reading from right to left.

No. 8, 9, 9.5 Chebyshev, Fourth Order.

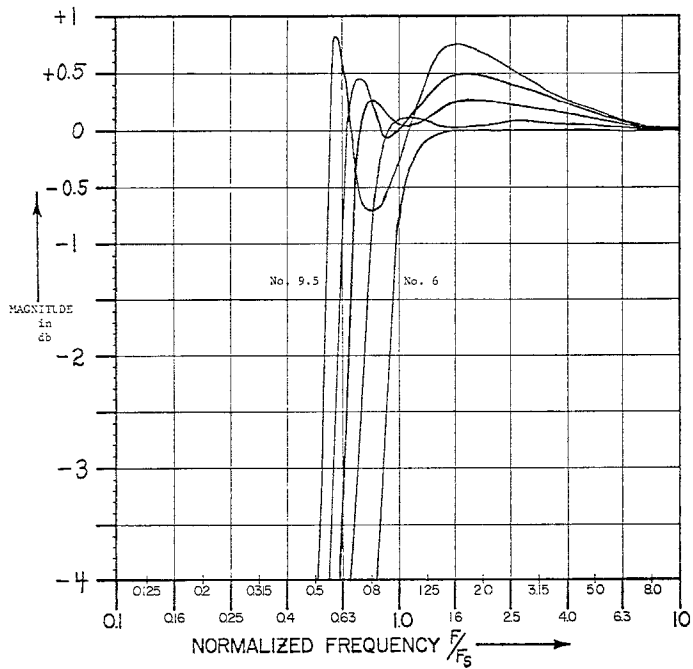


Fig. 3 The frequency response of alignments No. 6 to No. 9.5, reading from right to left, on an expanded db scale to illustrate ripple magnitude.

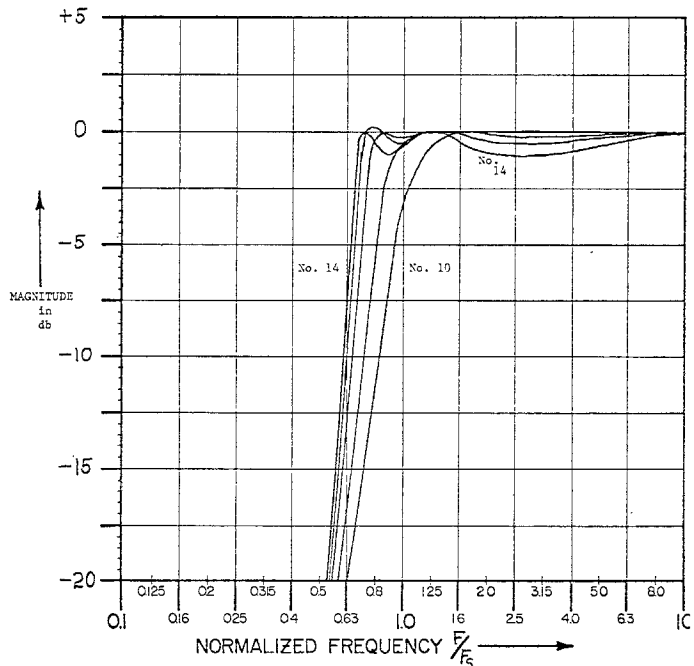


Fig. 4 The frequency response of the fifth order alignments No. 10 through No. 14, reading from right to left. The ripple magnitude increases as the alignment number gets higher.

No. 10 Butterworth, Fifth Order.
 No. 11 to 14 Chebychev, Fifth Order.

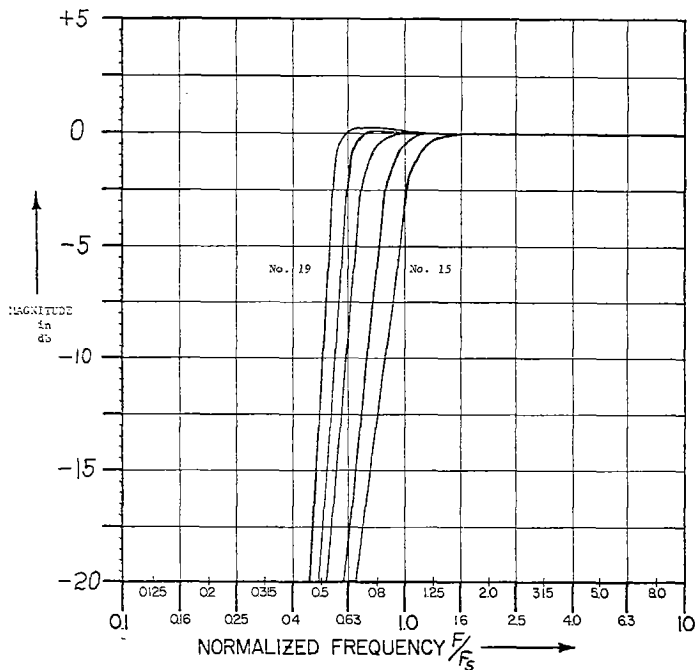


Fig. 5 The frequency response of alignments No. 15 through No. 19, reading from right to left.

No. 15 Butterworth, Sixth Order, Class I.
 No. 16 to 19 Chebyshev, Sixth Order, Class I.

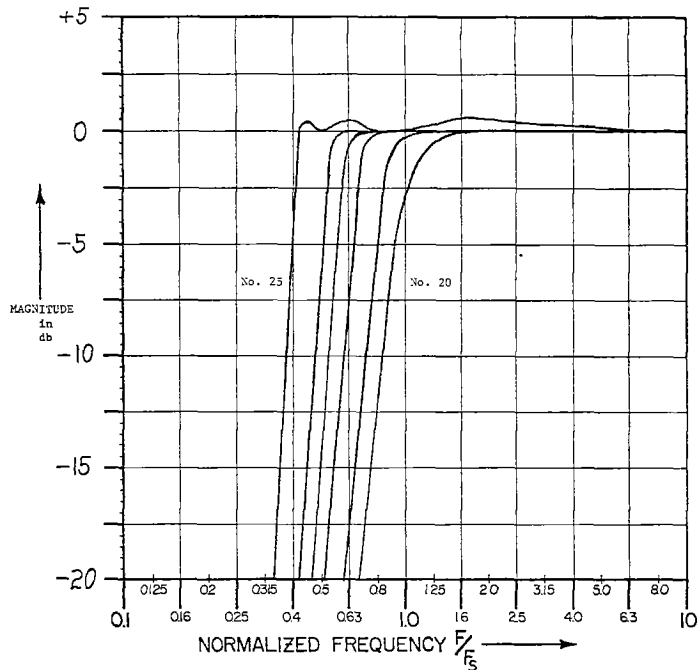


Fig. 6 The frequency response of alignments No. 20 through No. 25, reading from right to left. Alignment No. 25 accounts for all the passband ripple.

No. 20 Butterworth, Sixth Order, Class II
 No. 21 to 25 Chebyshev, Sixth Order, Class II

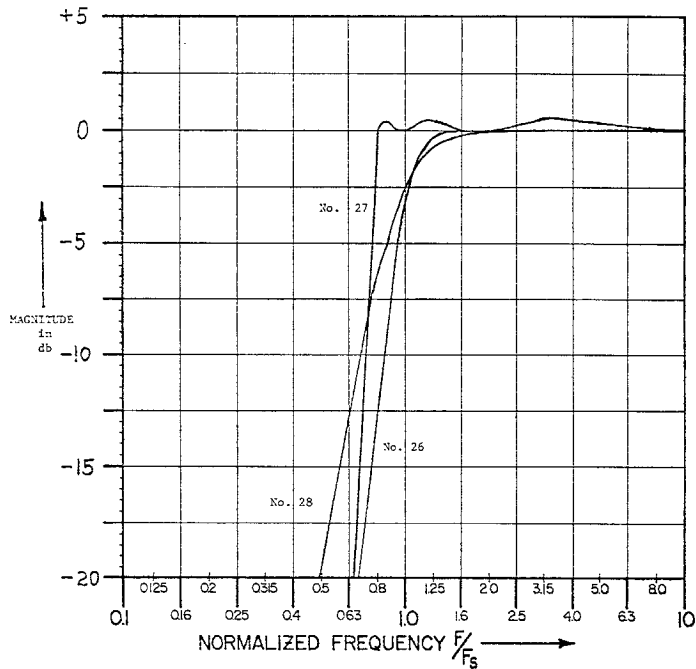


Fig. 7 The frequency response of alignments No. 26, No. 27, and No. 28. Alignment No. 27 accounts for all the ripple.

No. 26 Butterworth, Sixth Order, Class III.
 No. 27 Chebyshev, Sixth Order, Class III.
 No. 28 Quasi-Butterworth, Fourth Order, using first order lift auxiliary filter.

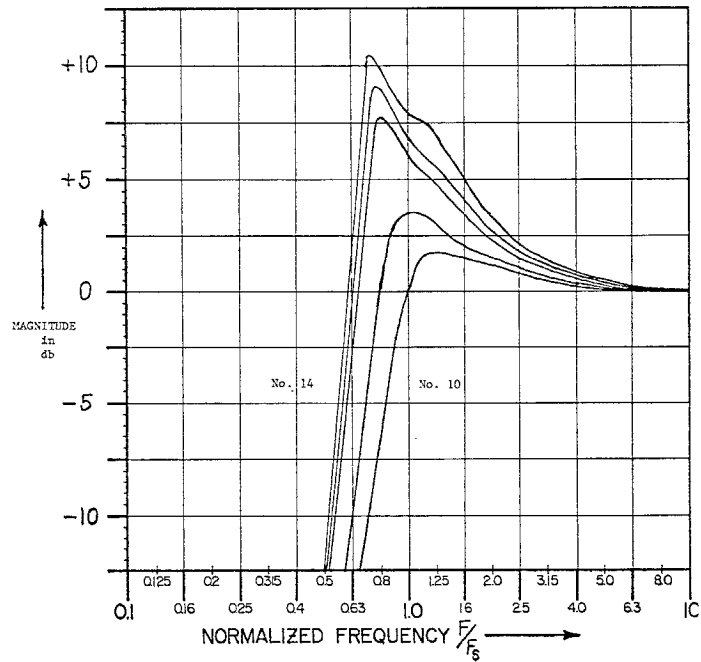


Fig. 8 Frequency response of speaker without auxiliary filter for alignments No. 10 through No. 14, reading right to left.

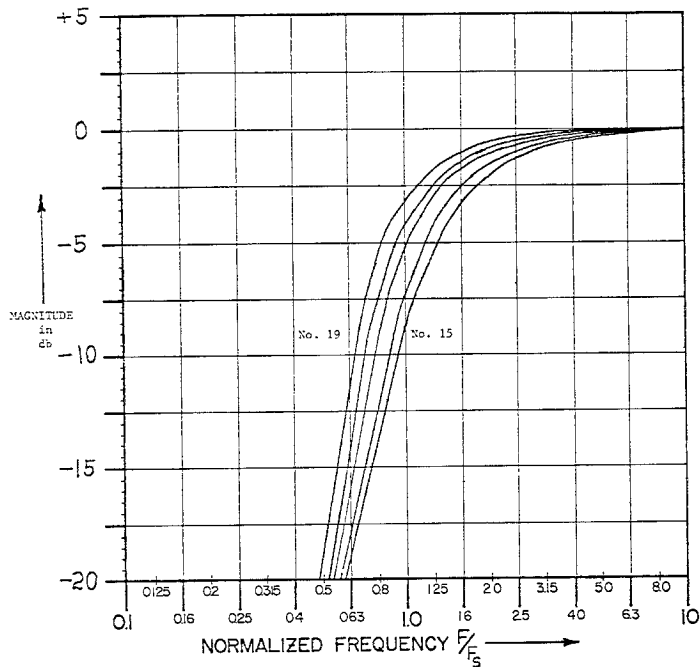


Fig. 9 Frequency response of speaker without auxiliary filter for alignments No. 15 through No. 19, reading from right to left.

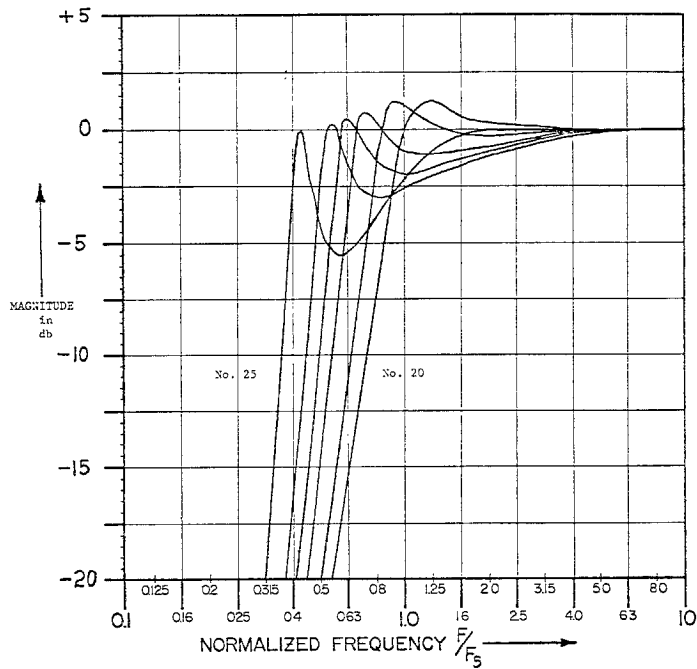


Fig. 10 Frequency response of speaker without auxiliary filter for alignments No. 20 through No. 25, reading from right to left.

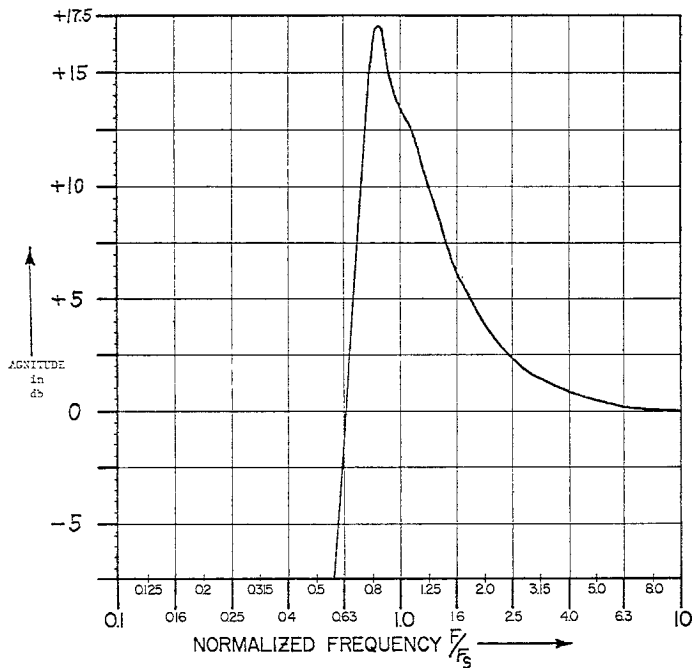


Fig. 11 Frequency response of speaker without auxiliary filter for alignment No. 27.

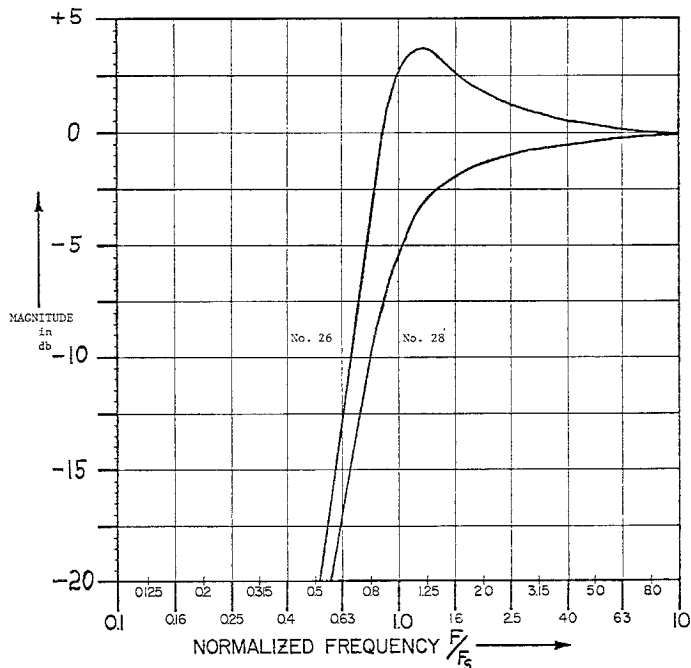


Fig. 12 Frequency response of speaker without auxiliary filter for alignments No. 26 and No. 28.

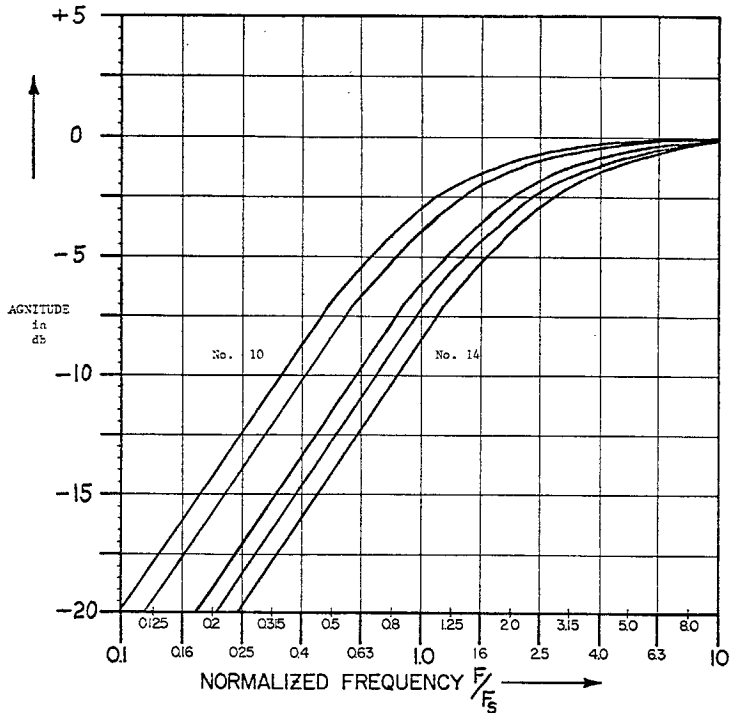


Fig. 13 Frequency Response of auxiliary filter for alignments No. 10 through No. 14, reading from left to right. This filter is a first order high pass with a transfer function of:

$$H(s) = \frac{s}{s + \omega_{aux}}$$

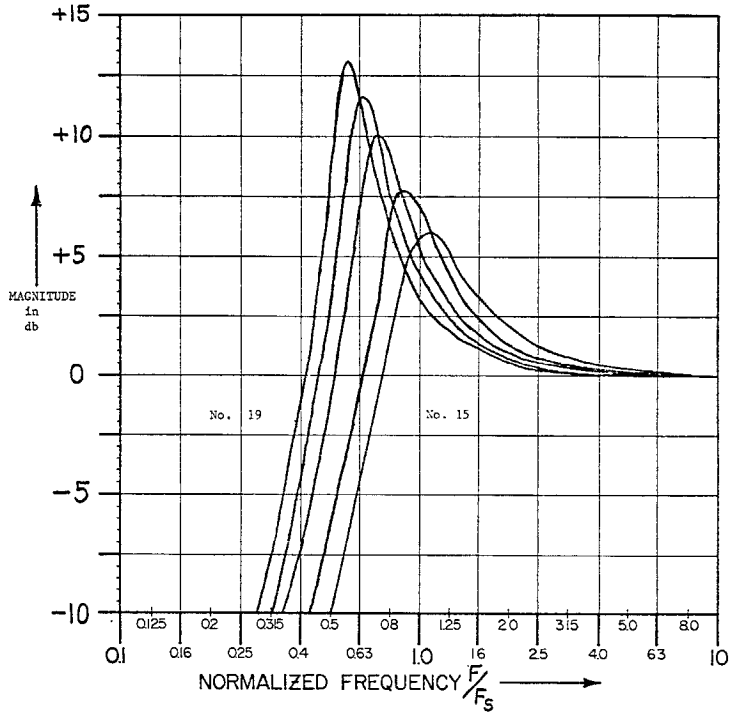


Fig. 14 Frequency response of auxiliary filter for alignments No. 15 through No. 19, reading from right to left. This filter is a second order high pass with a transfer function of:

$$H(s) = \frac{s^2}{s^2 + 2\omega_{aux} s + \omega_{aux}^2}$$

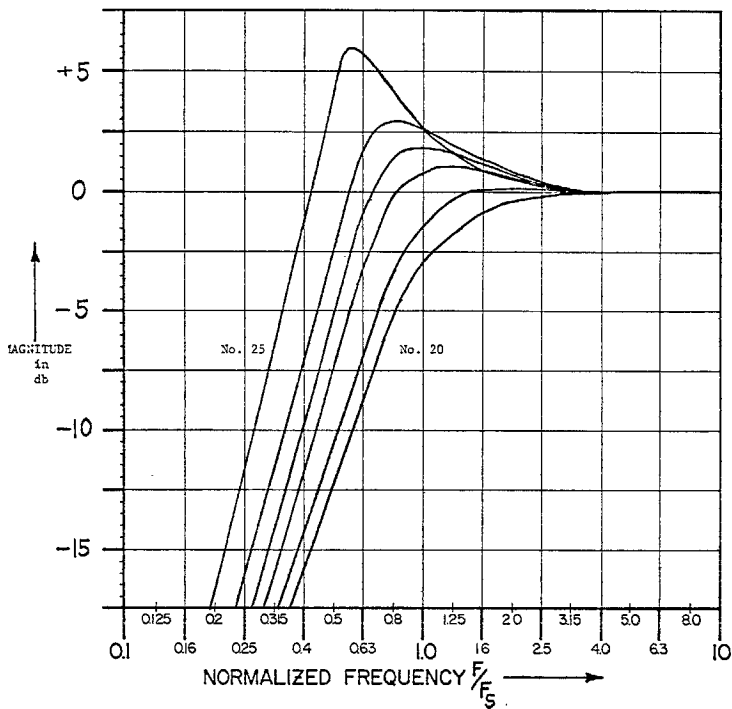


Fig. 15 Frequency response of auxiliary filter for alignments No. 20 through No. 25, reading from right to left. This filter is a second order high pass.

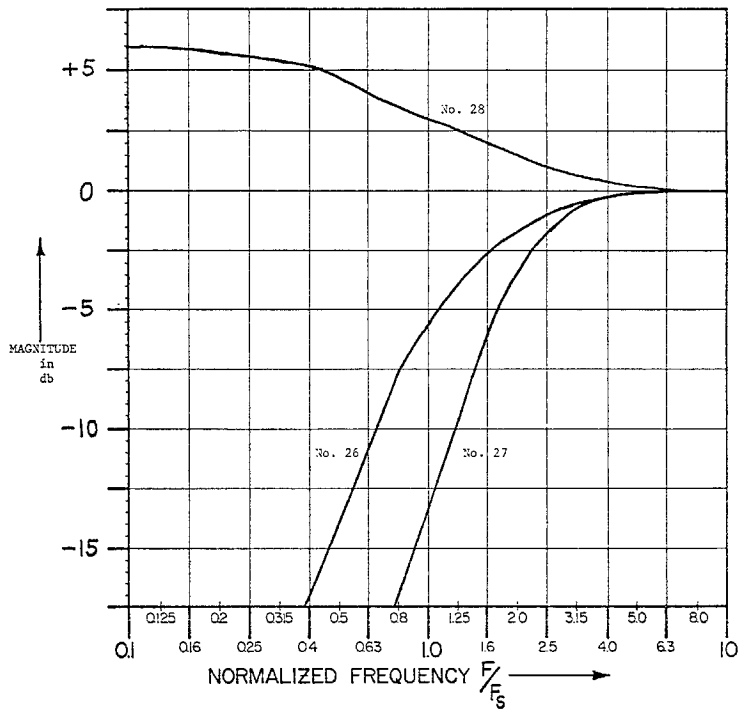


Fig. 16 Frequency response of auxiliary filter for alignments No. 26, No. 27, and No. 28. The filter for No. 26 and No. 27 is a second order high pass. The filter for No. 28 is a first order low frequency lift with a transfer function of:

$$H(s) = \frac{s + 2\omega_{aux}}{s + \omega_{aux}}$$

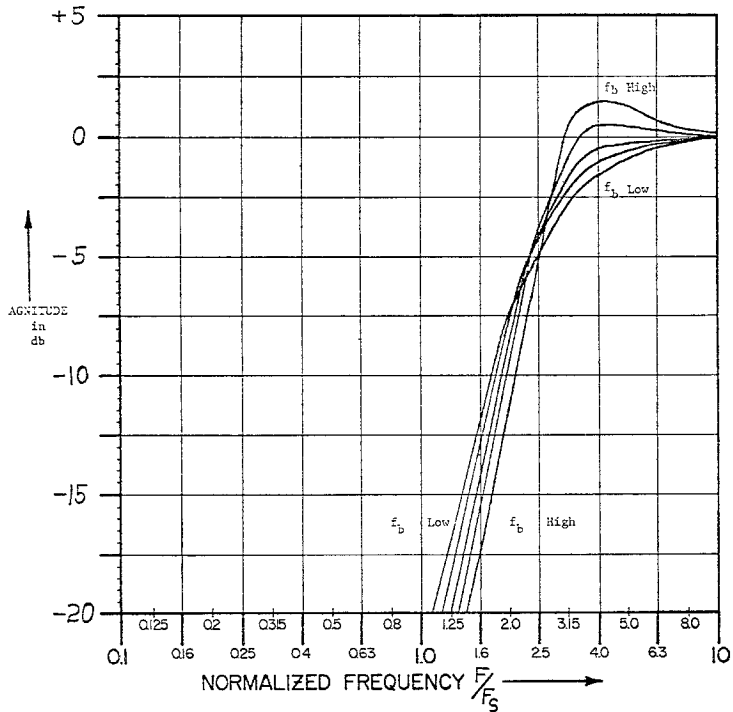


Fig. 17 Variation of the box resonance frequency f_b on alignment No. 1. Step factors of 0.794, 0.890, 1.000, 1.120, 1.259 above and below the optimum box frequency are illustrated.

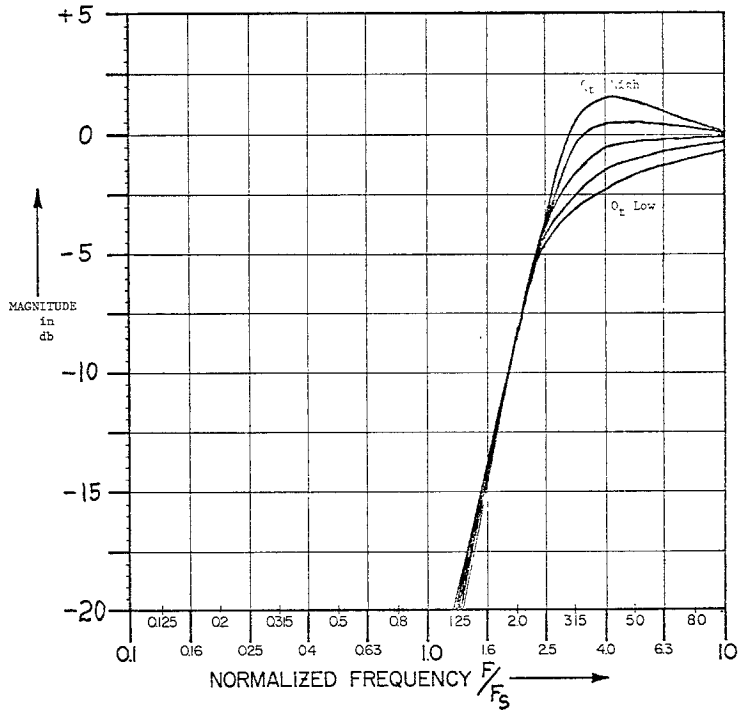


Fig. 18 Variation of the system Q_z on alignment No. 1. Step factors of 0.794, 0.890, 1.000, 1.120, 1.259 above and below the optimum Q are illustrated. Notice the responses independence of Q at the box resonance frequency of 20.

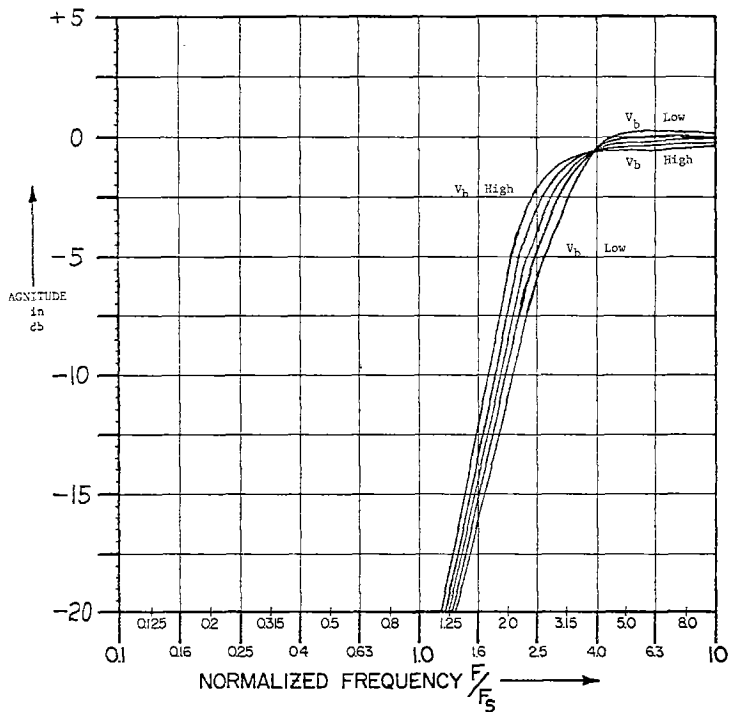


Fig. 19 Variation of box volume V_b on alignment No. 1. Step factors of 0.794, 0.890, 1.000, 1.120, 1.259 above and below the optimum box volume are illustrated

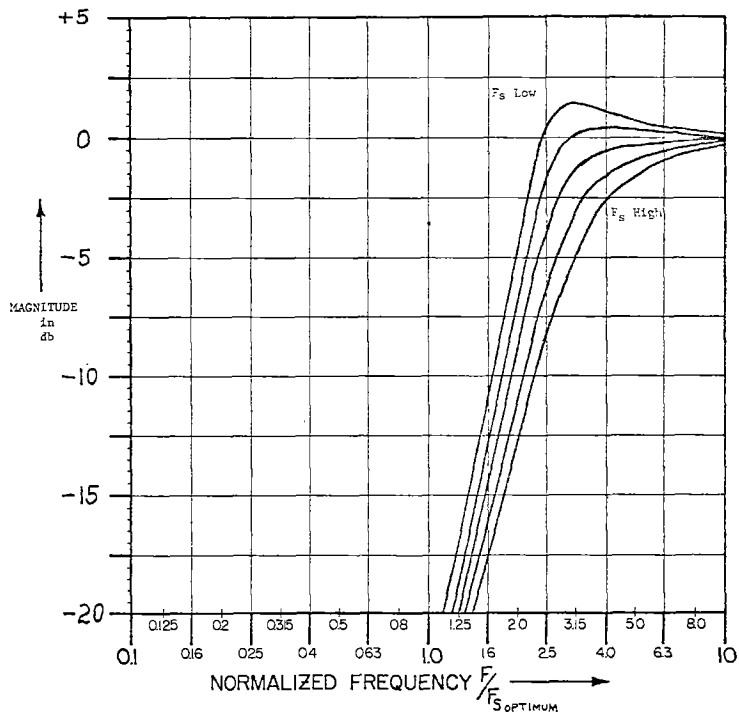


Fig. 20 Variation of the speaker's free air resonance frequency F_s on alignment No. 1. Step factors of 0.794, 0.890, 1.000, 1.120, 1.259 above and below the optimum speaker frequency are illustrated.

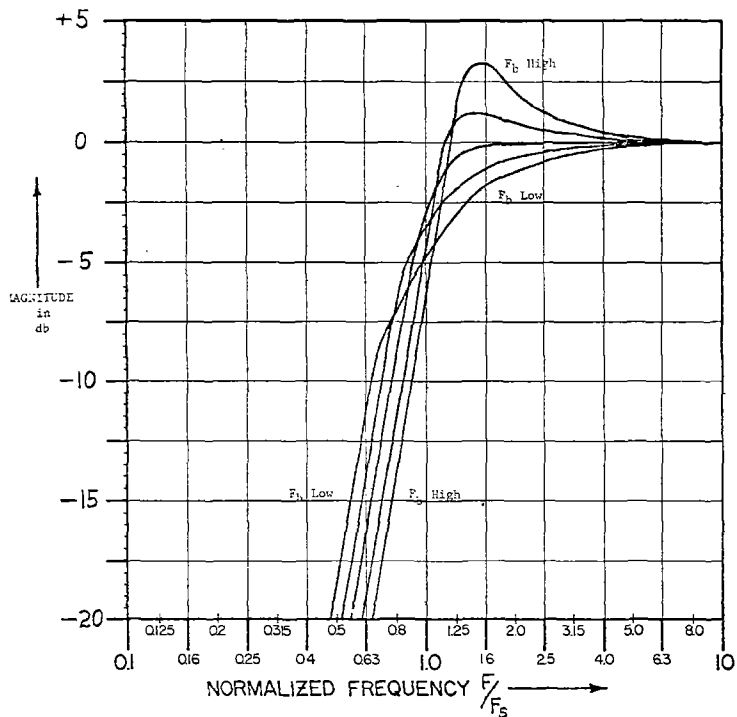


Fig. 21 Variation of the box resonance frequency F_b on alignment No. 5. Step factors of 0.794, 0.890, 1.000, 1.120, 1.259 above and below the optimum box frequency are illustrated.

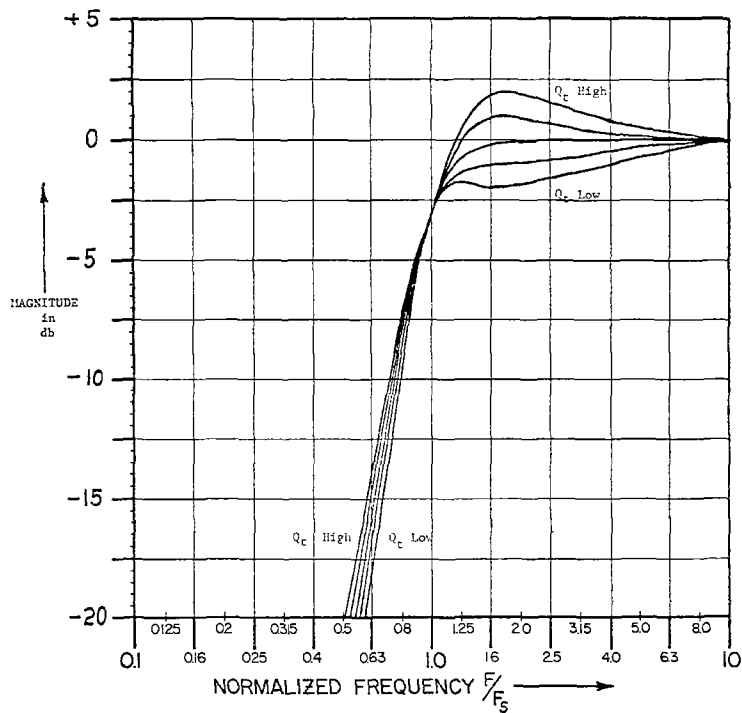


Fig. 22 Variation of the system Q_t on alignment No. 5. Step factors of 0.794, 0.890, 1.000, 1.120, 1.259 above and below the optimum Q are illustrated. Variation of Q_t has no effect on the response at the box resonance frequency of 1.0.

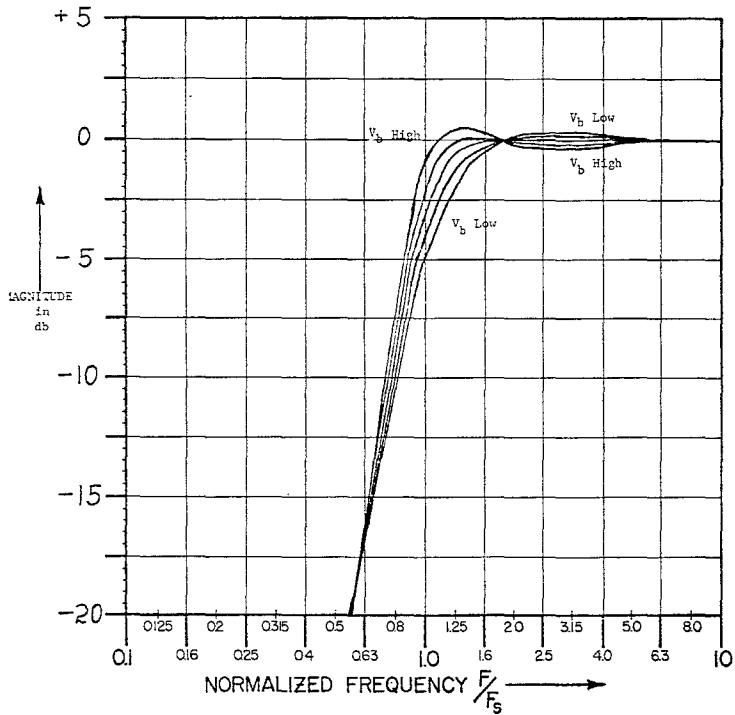


Fig. 23 Variation of box volume V_b on alignment No. 5. Step factors of 0.794, 0.890, 1.000, 1.120, 1.259, above and below the optimum box volume are illustrated.

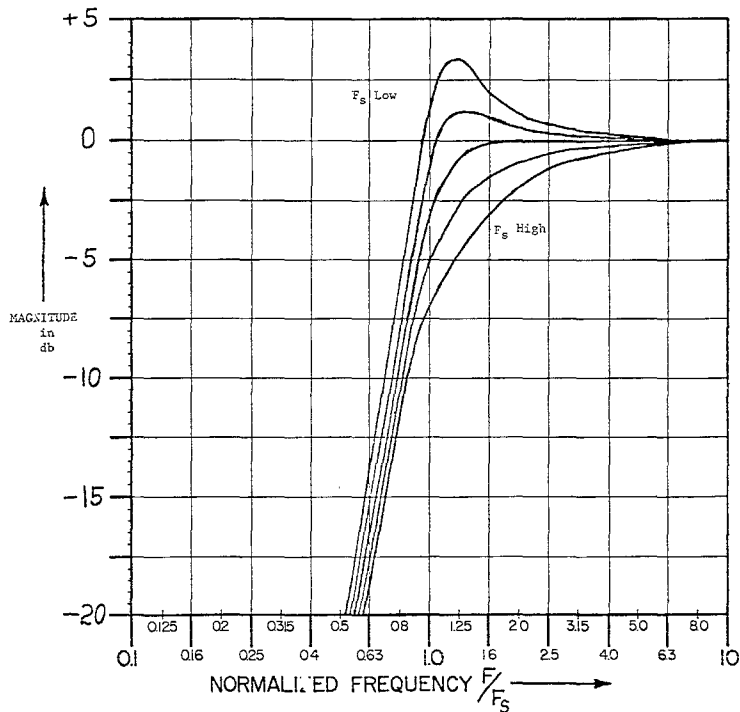


Fig. 24 Variation of the speaker's free air resonance frequency F_s on alignment No. 5. Step factors of 0.794, 0.890, 1.000, 1.120, 1.259 above and below the optimum speaker frequency are illustrated.

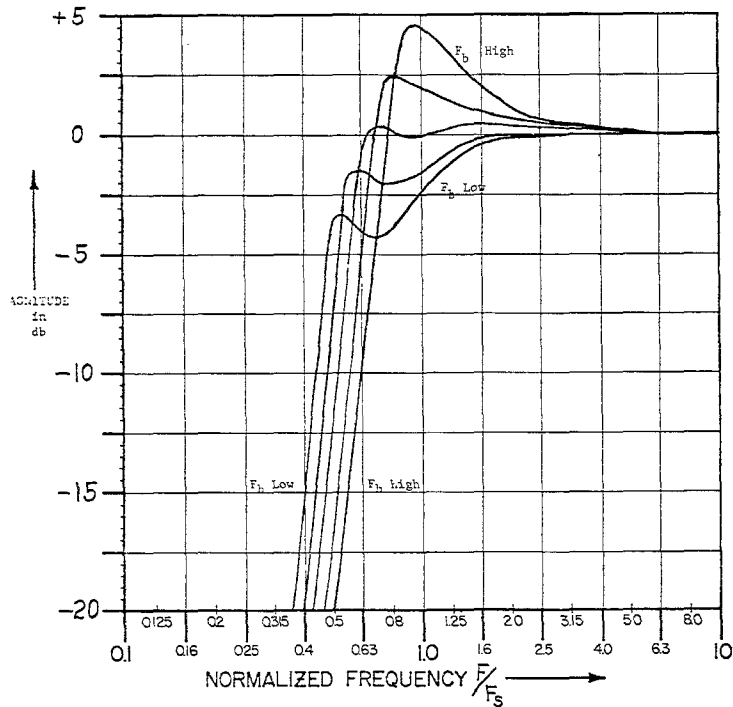


Fig. 25 Variation of the box resonance frequency F_b on alignment No. 9. Step factors of 0.794, 0.890, 1.000, 1.120, 1.259 above and below the optimum box frequency are illustrated.

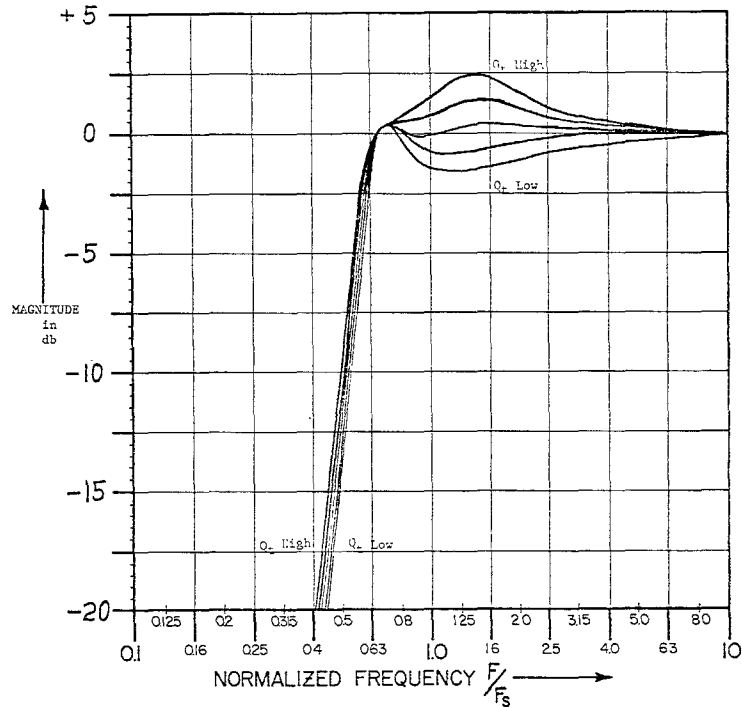


Fig. 26 Variation of the system Q_2 on alignment No. 9. Step factors of 0.794, 0.890, 1.000, 1.120, 1.259 above and below the optimum Q are illustrated. The box resonance frequency for this alignment is 0.715.

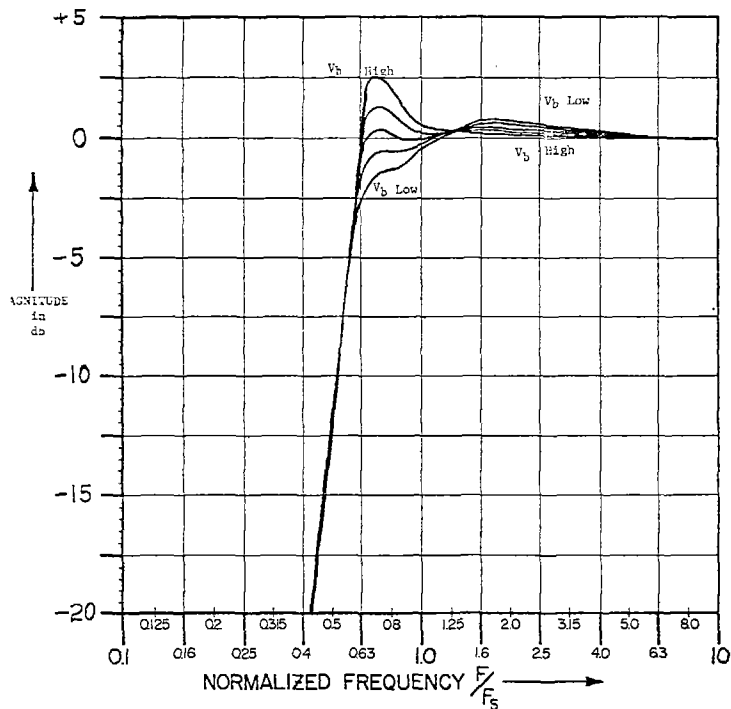


Fig. 27 Variation of box volume V_b on alignment No. 9. Step factors of 0.794, 0.890, 1.000, 1.120, 1.259 above and below the optimum box volume are illustrated.

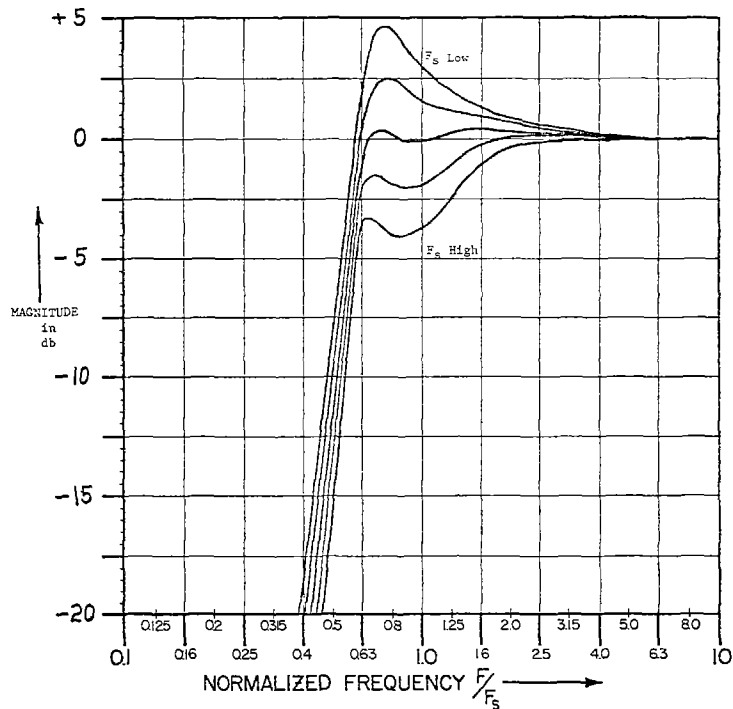


Fig. 28 Variation of the speakers free air resonance frequency F_5 on alignment No. 9. Step factors of 0.794, 0.890, 1.000, 1.120, 1.259 above and below the optimum speaker resonance frequency are illustrated.

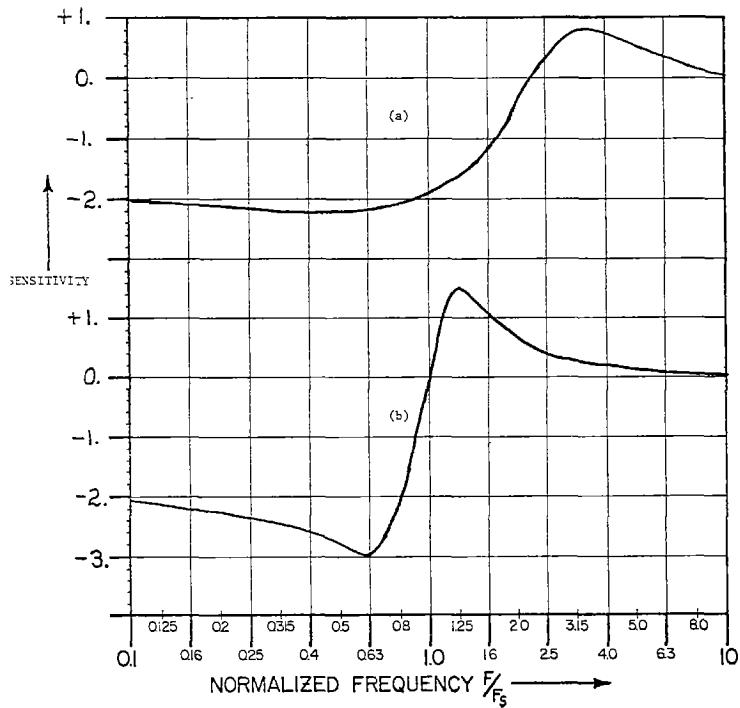


Fig. 29 Sensitivity functions for variation of F_b , the box resonance frequency, for alignments (a) No. 1, and (b) No. 5.

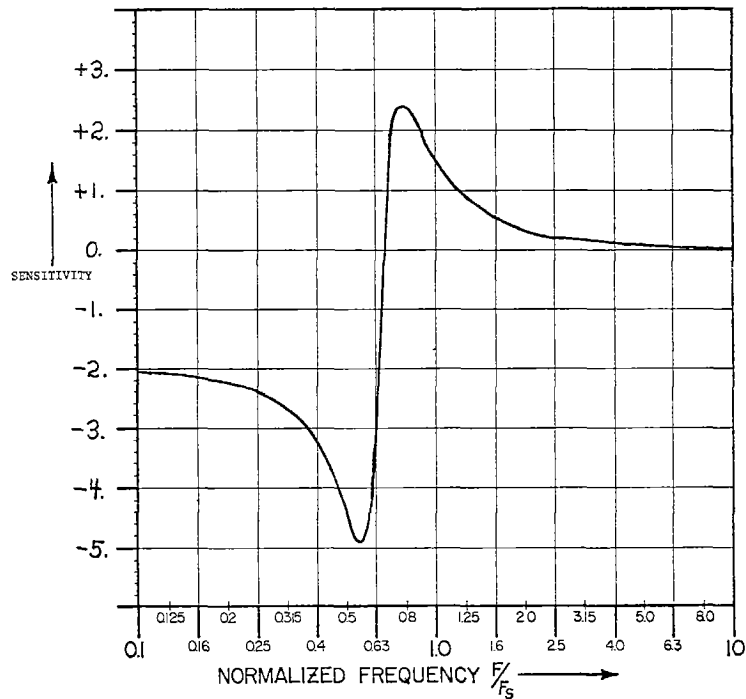


Fig. 30 Sensitivity function for variation of F_b for alignment No. 9. Note the extreme values of this function for frequencies near the alignments normal box resonance frequency.

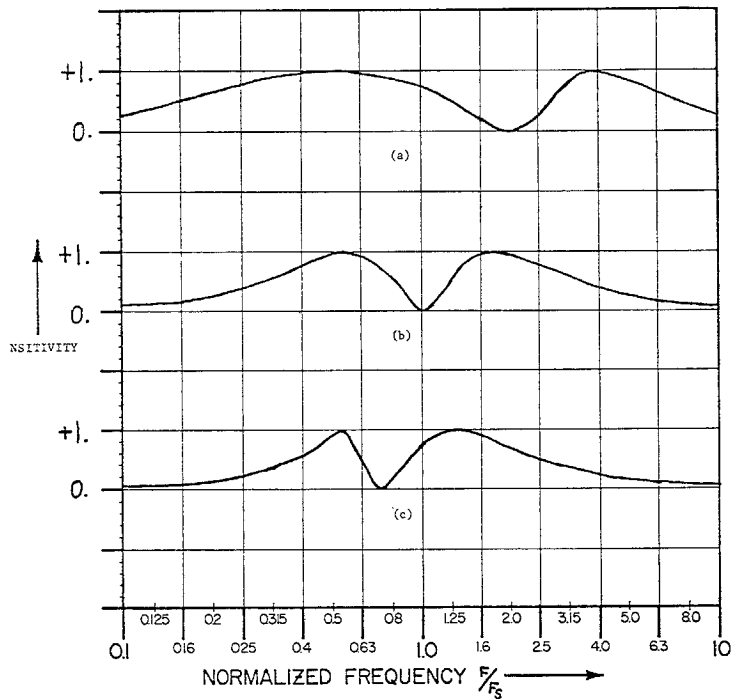


Fig. 31 Sensitivity functions for variation of Q_t for alignments (a) No. 1, (b) No. 5, and (c) No. 9.

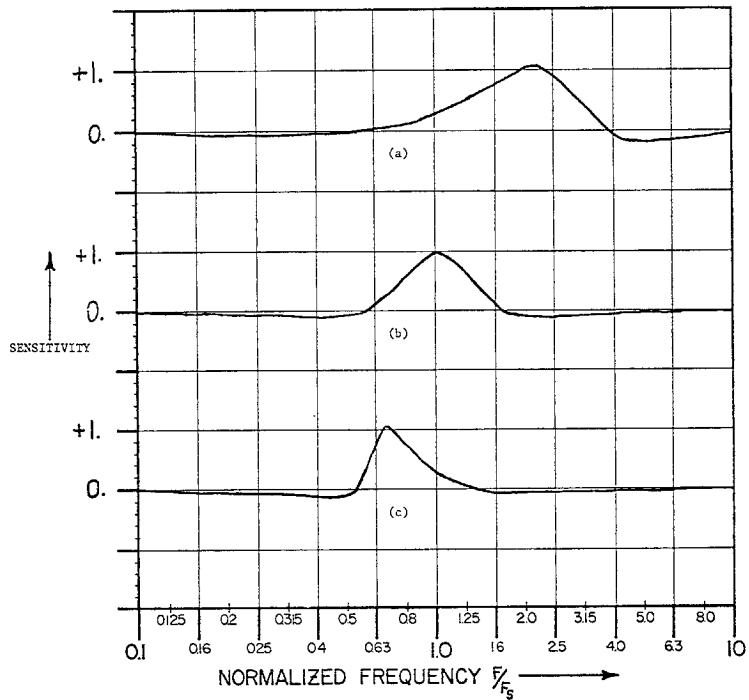


Fig. 32 Sensitivity functions for variation of $V_{ab}/V_{as} - C_{ab}/C_{as}$ for alignments (a) No. 1, (b) No. 5, and (c) No. 9.

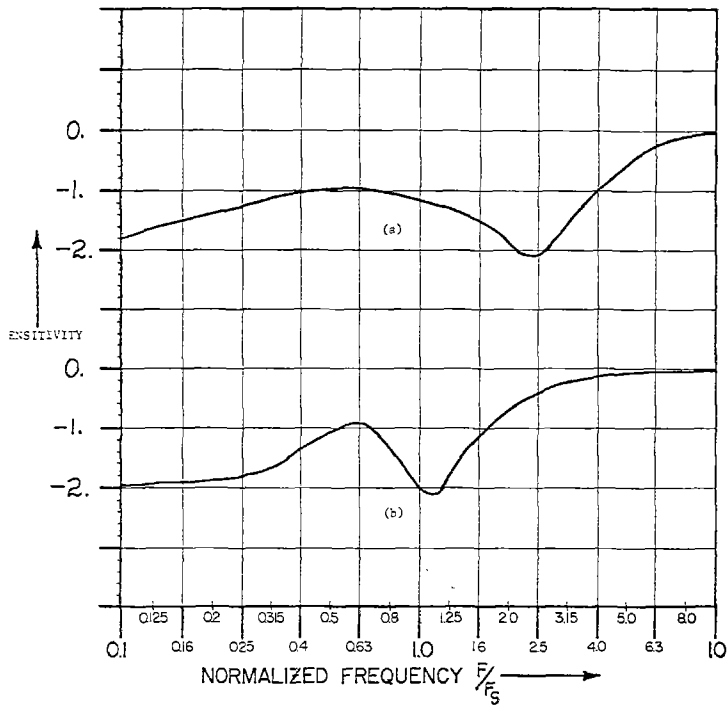


Fig. 33 Sensitivity functions for variation of F_0 , the speakers free air resonance frequency, for alignments (a) No. 1, and (b) No. 5.

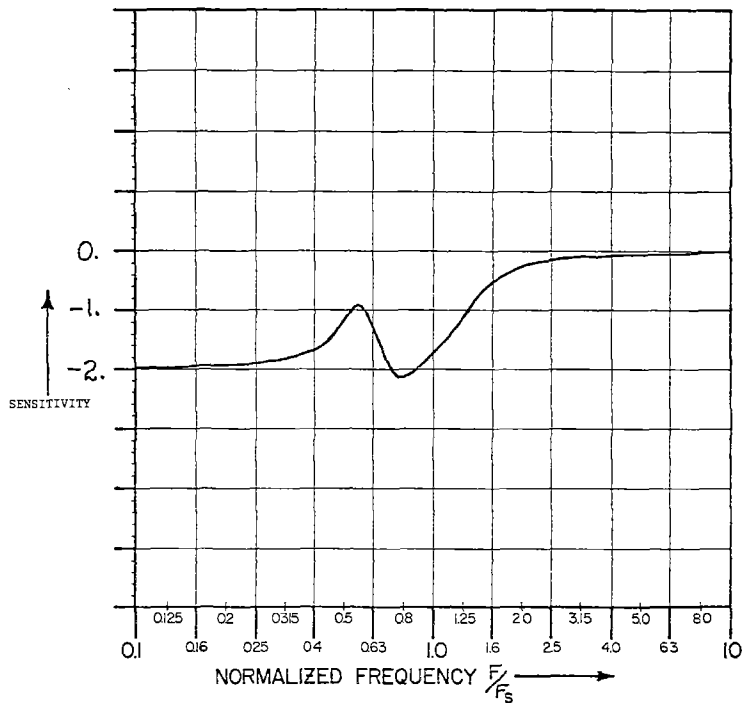


Fig. 34 Sensitivity function for variation of F_0 for alignment No. 9.

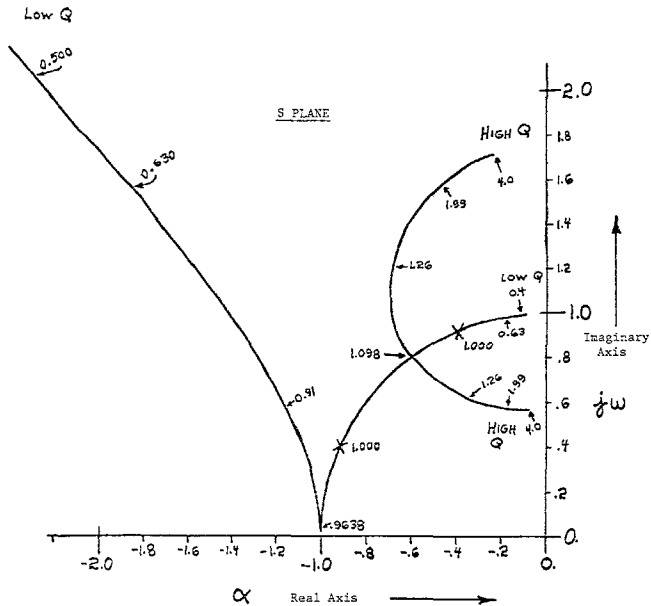


Fig. 35 Root locus plot of the poles of the denominator of alignments No. 5 transfer function as a function of the variation of the alignments Q_2 . The numbers along the plot refer to the ratio of the actual Q to the correct Q . The X points are the pole locations for the correct Q values. The complex conjugate poles below the real axis, which execute the same variation but reflected about the real axis, are not shown.

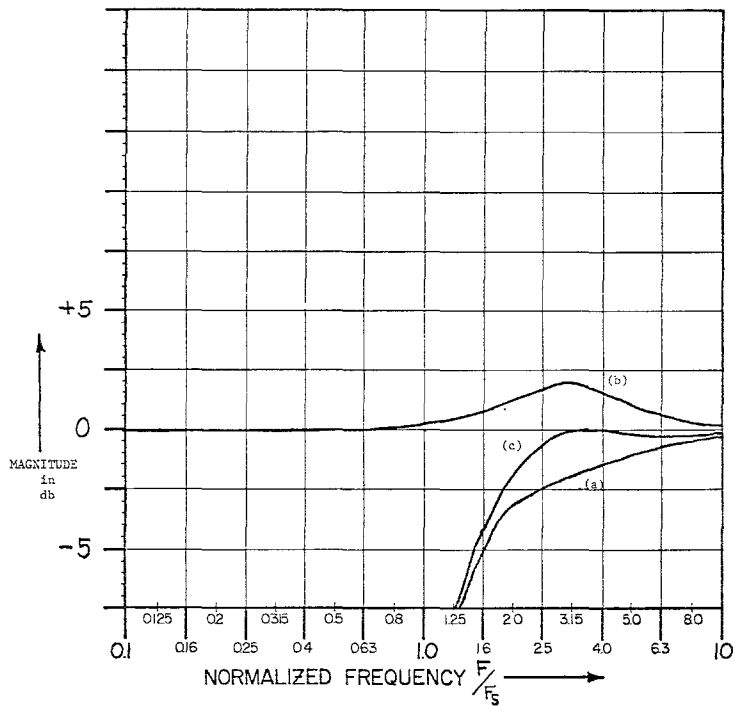


Fig. 36 Peak equalization of incorrect Q_2 . These frequency responses illustrate the effect of a second order peaking filter on alignment No. 3 with a Q_2 lower than the proper value by a factor of 0.8. The characteristics of the peak filter were chosen to minimize the RMS error over the interval of f_b to $8f_b$.

- (a) Response before equalization
- (b) Peak filter response
- (c) Response after equalization

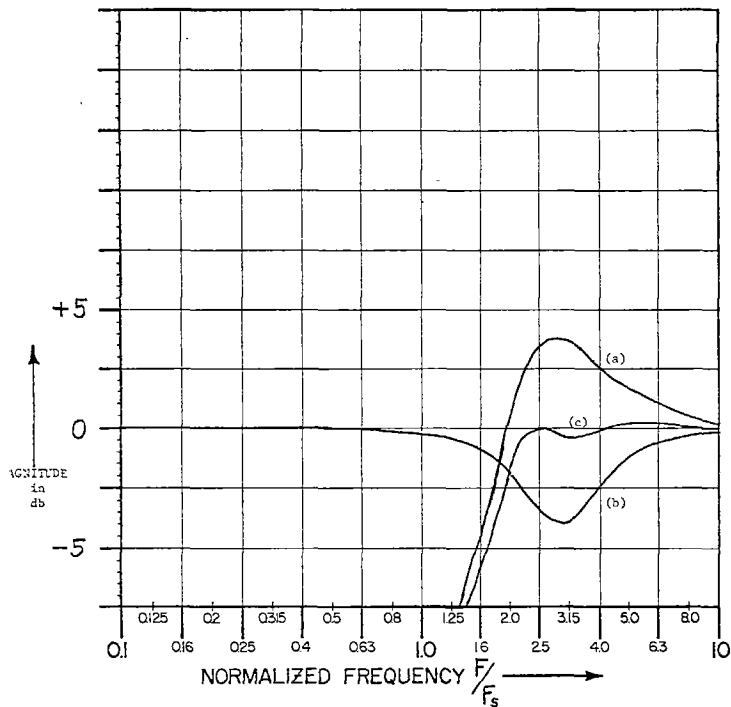


Fig. 37 Dip equalization of incorrect Q_c . These responses illustrate the effect of a dip filter on alignment No. 3 with a Q_c which is higher than the correct value by a factor of 1.6. The dip filter characteristics were chosen to minimize the RMS error over the interval of f_b to $8 f_b$.

- (a) Response before equalization
- (b) Dip filter response
- (c) Response after equalization

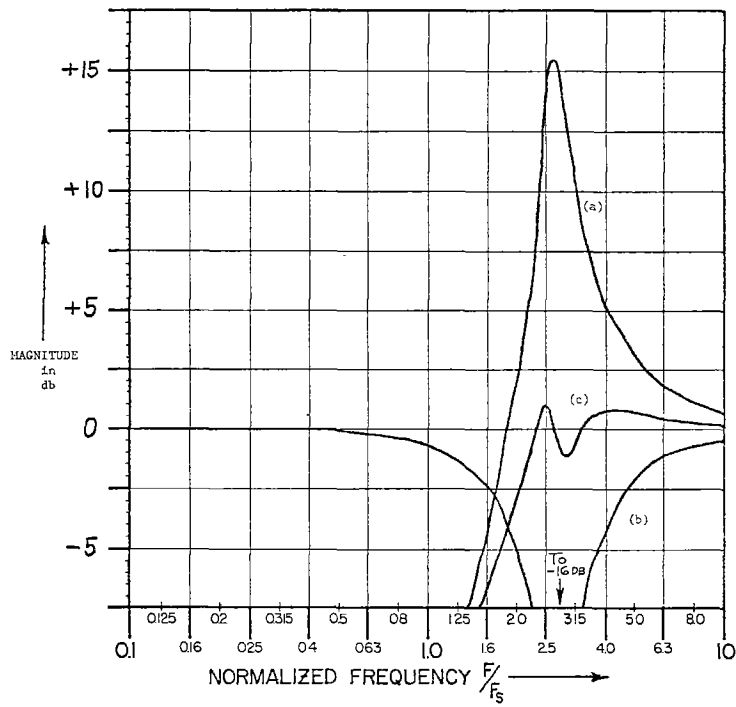


Fig. 38 Dip equalization of incorrect Q_c . These responses illustrate the effect of a dip equalizer filter on alignment No. 3 with a Q_c which is higher than the optimum value by a factor of 6.3. The characteristics of the dip filter were chosen to minimize the RMS error over the interval of f_b to $8 f_b$.

- (a) Response before equalization
- (b) Response of dip filter
- (c) Response after equalization

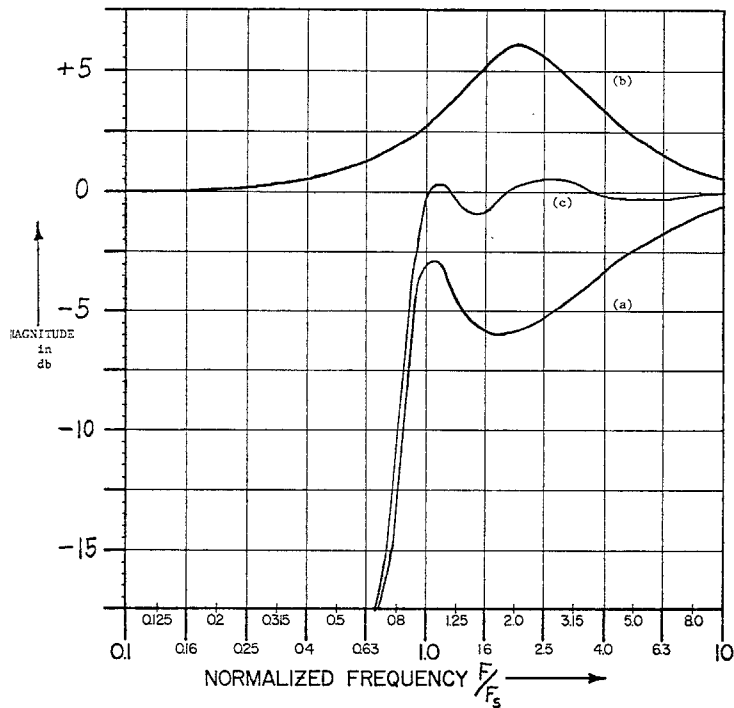


Fig. 39 Peak equalization of incorrect Q_c . These frequency responses illustrate the effect of a second order peaking filter on alignment No. 5 with a Q_c lower than the correct value by a factor of 0.5. The characteristics of the peak filter were chosen to minimize the RMS error over the interval from f_b to $8 f_b$.

- (a) Response before equalization
- (b) Frequency response of peak filter
- (c) Response after equalization

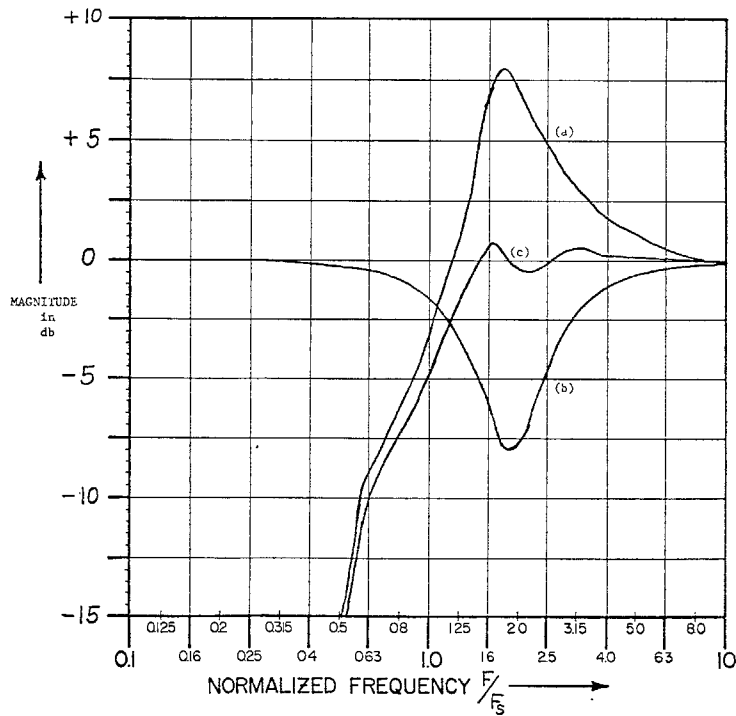


Fig. 40 Dip equalization of incorrect Q_c . These frequency responses illustrate the effect of a second order dip equalizer on alignment No. 5 with a Q_c higher than the optimum Q_c by a factor of 2.5. The characteristics of the auxiliary dip filter were chosen to minimize the RMS error on an interval from f_b to $8f_b$.

- (a) Response before equalization
- (b) Frequency response of dip filter
- (c) Response after equalization

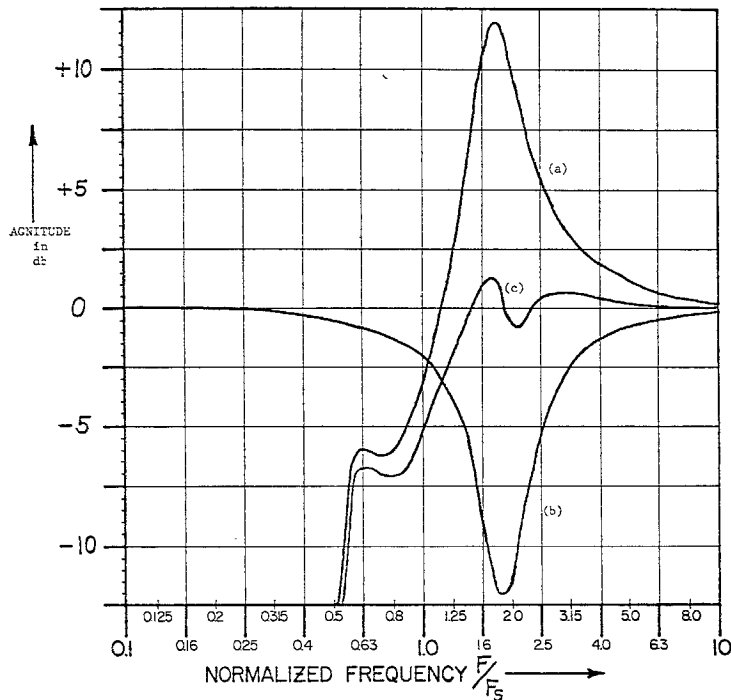


Fig. 41 Dip equalization of incorrect Q_r . These frequency responses illustrate the effect of a dip equalizer on alignment No. 5 with a Q_r higher than the correct Q_r by a factor of 4.0. The characteristics of the dip filter were chosen to minimize the RMS error over the interval from f_b to $8f_b$.

- (a) Response before equalization
- (b) Dip filter response
- (c) Response after equalization

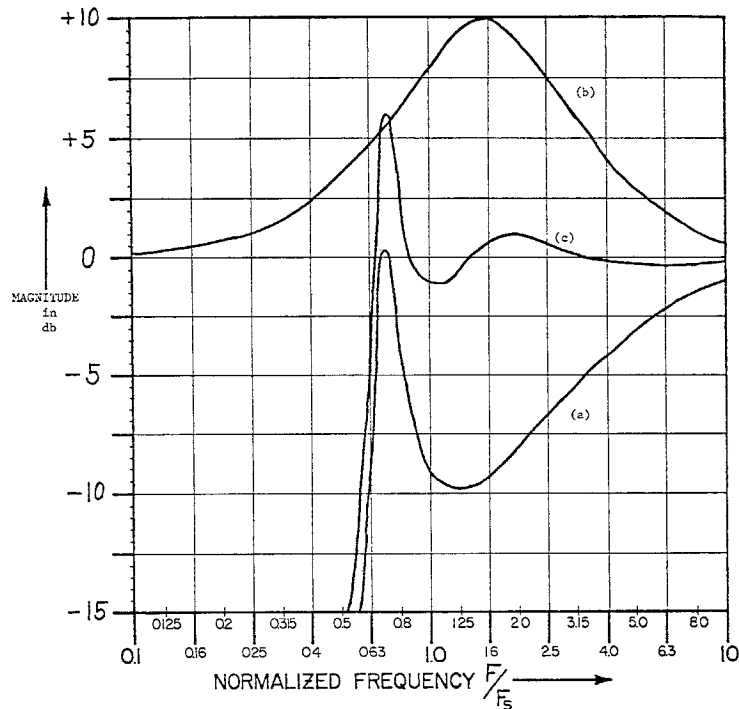


Fig. 42 Peak equalization of incorrect Q_r . These responses illustrate the effect of a dip equalizer on alignment No. 9 with a Q_r which is lower than the optimum value by a factor of 0.315. The characteristics of the equalization filter were chosen to minimize the RMS error over an interval of f_b to $8f_b$.

- (a) Response before compensation
- (b) Response of peak filter
- (c) Response after compensation

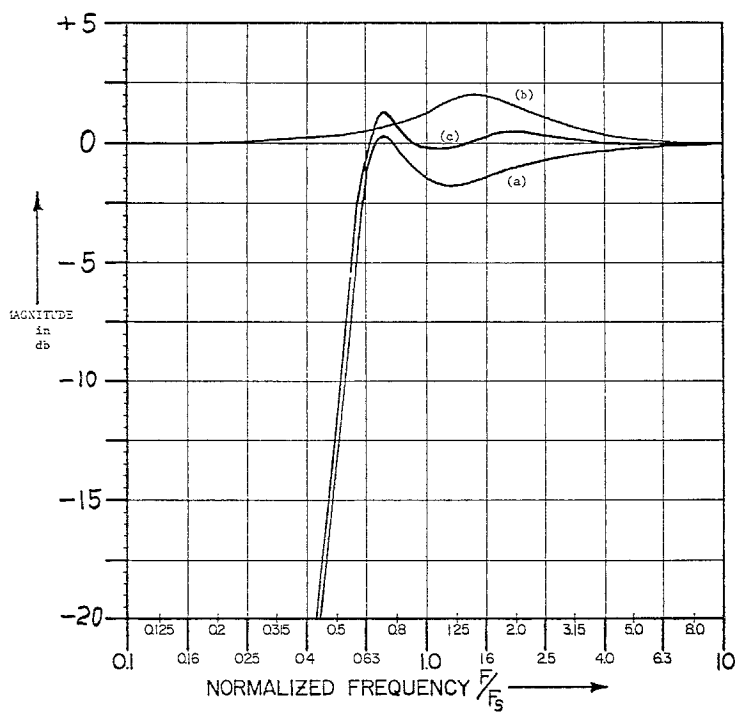


Fig. 43 Peak equalization of incorrect Q_L . These responses illustrate the effect of a second order peaking filter on alignment No. 9 with a Q_L lower than the correct value by a factor of 0.8. The filter characteristics were chosen to minimize the RMS error over the interval of f_b to $8f_b$.

- (a) Response before equalization
- (b) Response of correction filter
- (c) Response after equalization

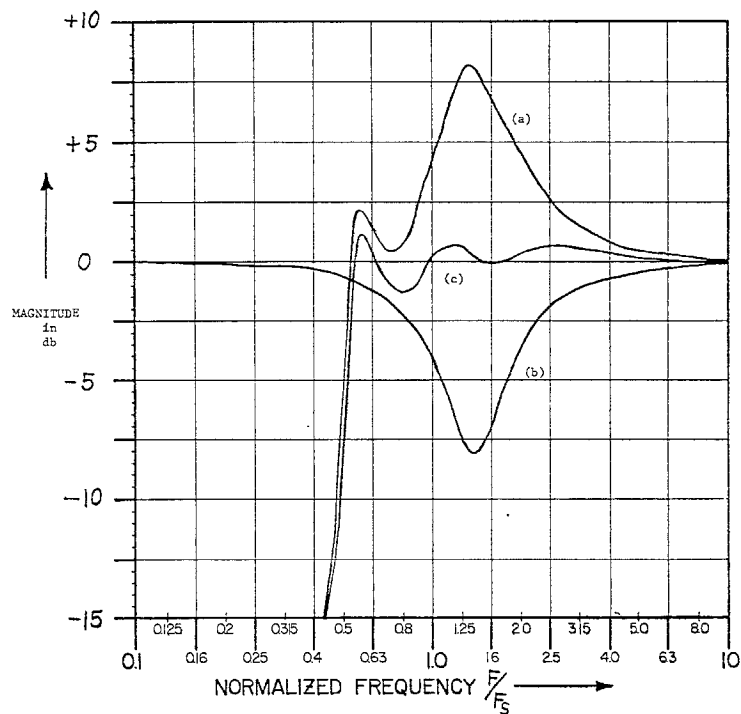


Fig. 44 Dip equalization of incorrect Q_L . These responses illustrate the effect of a dip equalizer filter on alignment No. 9 with a Q_L which is higher than the correct Q_L value by a factor of 2.5. The dip filter characteristics were chosen to minimize the RMS error over the interval f_b to $8f_b$.

- (a) Response before equalization
- (b) Dip filter response
- (c) Response after equalization

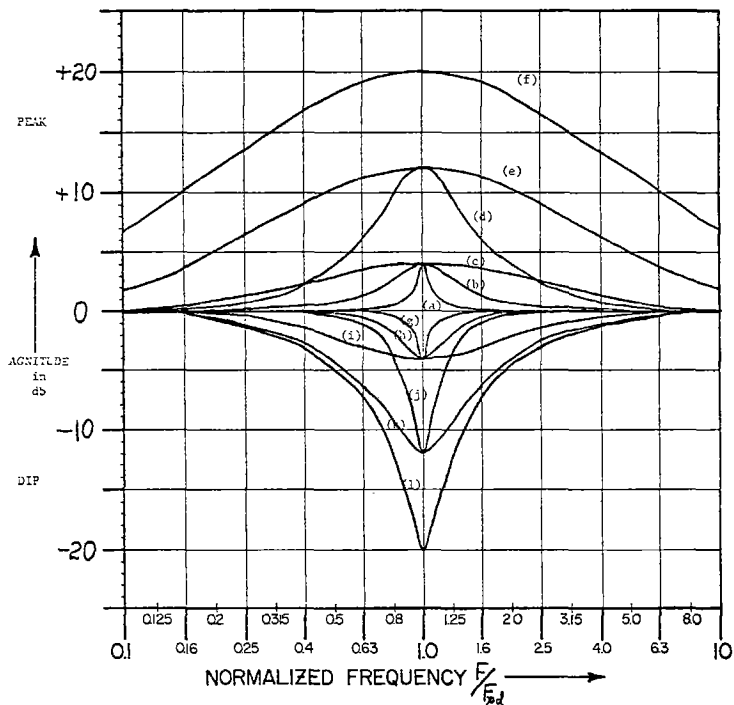


Fig. 45 Family of possible frequency response curves for the second order peak-dip compensation filter with the transfer function
$$H_{pd}(s) = \frac{s^2 + (C_{pd} W_{pd}/Q_{pd})s + W_{pd}^2}{s^2 + (W_{pd}/Q_{pd})s + W_{pd}^2}$$

Peak		Dip	
C_{pd}	Q_{pd}	C_{pd}	Q_{pd}
(a) 1.582	8.0	(g) 0.63	8.0
(b) 1.382	2.0	(h) 0.63	2.0
(c) 1.582	0.5	(i) 0.63	0.5
(d) 4.0	2.0	(j) 0.25	2.0
(e) 4.0	0.5	(k) 0.25	0.5
(f) 10	2.0	(l) 0.10	2.0

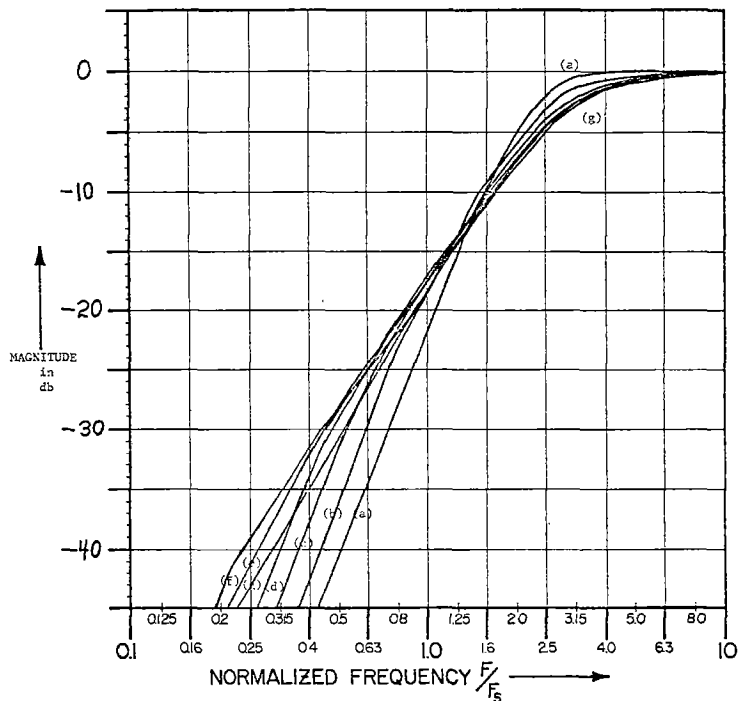


Fig. 46 The effect on alignment No. 2 of tuning the box resonance frequency to lower and lower values. Curve (a) is the optimum ventral box alignment while curve (g) is the optimum closed box alignment with the same V_b/V_{2S} ratio.

	f_b/f_s	Q_t
(a)	1.73	0.209
(b)	1.37	0.213
(c)	1.09	0.217
(d)	0.865	0.220
(e)	0.688	0.224
(f)	0.546	0.228
(g)	0.000	0.234

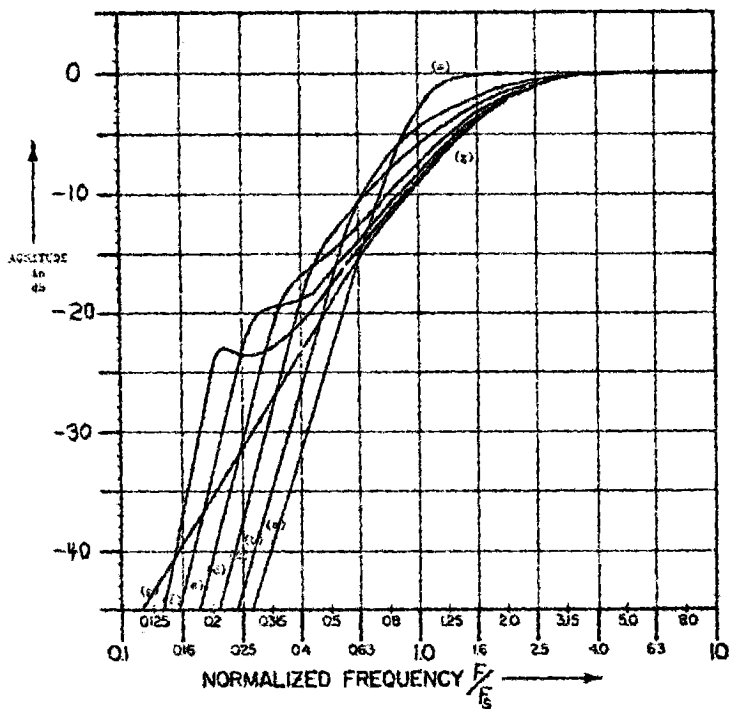


Fig. 67 The effect on alignment No. 5 of tuning the box resonance frequency to lower and lower values. Curve (a) is the optimum vented box alignment while curve (g) is the optimum closed box alignment with the same V_b/V_{bg} ratio. Note that for frequencies less than $0.61 f_b$ the lowered box resonance frequency curves have more output than either the optimum vented or closed box alignments.

	f_b/f_g	Q_t
(a)	1.00	0.383
(b)	0.80	0.391
(c)	0.63	0.399
(d)	0.50	0.407
(e)	0.40	0.415
(f)	0.315	0.423
(g)	0.200	0.435

***** ALPHA TABLE NO. 1 FOR CABINET TUNING *****

BCX VOLUMES FROM 0.010 TO 0.028 CUBIC FEET OR 1.73E 01 TO 4.87E 01 CUBIC INCHES.
 VOLUME (ACROSS) ALPHA (PCBT AREA) CUBIC EFFECTIVE LENGTH IN SQUARE INCHES PER INCH.
 CU. FT. = 1.00E-02 1.12E-02 1.26E-02 1.41E-02 1.58E-02 1.78E-02 2.00E-02 2.24E-02 2.51E-02 2.82E-02
 CU. IN. = 1.73E 01 1.94E 01 2.18E 01 2.44E 01 2.74E 01 3.07E 01 3.45E 01 3.87E 01 4.34E 01 4.87E 01
 F-BCX HZ (DOWN)

10.60	* 3.73E-04	4.19E-04	4.70E-04	5.27E-04	5.91E-04	6.63E-04	7.44E-04	8.35E-04	9.37E-04	1.05E-03
10.32	* 3.97E-04	4.45E-04	4.97E-04	5.61E-04	6.29E-04	7.06E-04	7.92E-04	8.89E-04	9.97E-04	1.12E-03
10.04	* 4.22E-04	4.74E-04	5.32E-04	5.97E-04	6.70E-04	7.51E-04	8.43E-04	9.46E-04	1.06E-03	1.19E-03
10.98	* 4.50E-04	5.05E-04	5.66E-04	6.35E-04	7.13E-04	7.99E-04	8.97E-04	1.01E-03	1.13E-03	1.27E-03
11.33	* 4.78E-04	5.37E-04	6.02E-04	6.76E-04	7.59E-04	8.51E-04	9.55E-04	1.07E-03	1.20E-03	1.35E-03
11.08	* 5.09E-04	5.71E-04	6.41E-04	7.19E-04	8.07E-04	9.05E-04	1.02E-03	1.14E-03	1.28E-03	1.43E-03
12.05	* 5.42E-04	6.08E-04	6.82E-04	7.65E-04	8.59E-04	9.64E-04	1.08E-03	1.21E-03	1.36E-03	1.53E-03
12.43	* 5.77E-04	6.47E-04	7.26E-04	8.15E-04	9.14E-04	1.03E-03	1.15E-03	1.29E-03	1.45E-03	1.63E-03
12.83	* 6.14E-04	6.89E-04	7.73E-04	8.67E-04	9.73E-04	1.09E-03	1.22E-03	1.37E-03	1.54E-03	1.73E-03
13.23	* 6.53E-04	7.33E-04	8.22E-04	9.22E-04	1.04E-03	1.16E-03	1.30E-03	1.46E-03	1.64E-03	1.84E-03
13.65	* 6.95E-04	7.80E-04	8.75E-04	9.82E-04	1.10E-03	1.24E-03	1.39E-03	1.56E-03	1.75E-03	1.96E-03
14.08	* 7.40E-04	8.30E-04	9.31E-04	1.04E-03	1.17E-03	1.32E-03	1.49E-03	1.68E-03	1.88E-03	2.08E-03
14.53	* 7.87E-04	8.82E-04	9.91E-04	1.11E-03	1.25E-03	1.41E-03	1.57E-03	1.76E-03	1.96E-03	2.22E-03
14.99	* 8.38E-04	9.42E-04	1.05E-03	1.18E-03	1.33E-03	1.49E-03	1.67E-03	1.88E-03	2.10E-03	2.36E-03
15.46	* 8.91E-04	1.00E-03	1.12E-03	1.26E-03	1.41E-03	1.59E-03	1.78E-03	2.00E-03	2.24E-03	2.51E-03
15.95	* 9.49E-04	1.06E-03	1.19E-03	1.34E-03	1.50E-03	1.69E-03	1.89E-03	2.12E-03	2.38E-03	2.67E-03
16.45	* 1.01E-03	1.13E-03	1.27E-03	1.43E-03	1.60E-03	1.80E-03	2.01E-03	2.26E-03	2.54E-03	2.85E-03
16.97	* 1.07E-03	1.21E-03	1.35E-03	1.52E-03	1.70E-03	1.91E-03	2.14E-03	2.41E-03	2.70E-03	3.03E-03
17.51	* 1.14E-03	1.28E-03	1.44E-03	1.62E-03	1.81E-03	2.03E-03	2.28E-03	2.56E-03	2.87E-03	3.22E-03
18.06	* 1.22E-03	1.37E-03	1.53E-03	1.72E-03	1.93E-03	2.16E-03	2.43E-03	2.72E-03	3.06E-03	3.43E-03
18.63	* 1.29E-03	1.45E-03	1.63E-03	1.83E-03	2.05E-03	2.30E-03	2.58E-03	2.90E-03	3.25E-03	3.65E-03
19.22	* 1.38E-03	1.55E-03	1.73E-04	1.95E-03	2.18E-03	2.45E-03	2.75E-03	3.09E-03	3.46E-03	3.88E-03
19.83	* 1.47E-03	1.65E-03	1.85E-03	2.07E-03	2.32E-03	2.61E-03	2.93E-03	3.28E-03	3.66E-03	4.13E-03
20.46	* 1.56E-03	1.75E-03	1.96E-03	2.20E-03	2.47E-03	2.78E-03	3.11E-03	3.49E-03	3.92E-03	4.40E-03
21.10	* 1.66E-03	1.86E-03	2.09E-03	2.35E-03	2.63E-03	2.95E-03	3.31E-03	3.72E-03	4.17E-03	4.68E-03
21.77	* 1.77E-03	1.98E-03	2.23E-03	2.57E-03	2.88E-03	3.14E-03	3.53E-03	3.96E-03	4.44E-03	4.98E-03
22.46	* 1.88E-03	2.11E-03	2.37E-03	2.66E-03	2.98E-03	3.35E-03	3.75E-03	4.21E-03	4.73E-03	5.30E-03
23.17	* 2.00E-03	2.25E-03	2.52E-03	2.83E-03	3.17E-03	3.56E-03	3.99E-03	4.48E-03	5.03E-03	5.64E-03
23.90	* 2.13E-03	2.39E-03	2.68E-03	3.01E-03	3.38E-03	3.79E-03	4.25E-03	4.77E-03	5.35E-03	6.00E-03
24.65	* 2.27E-03	2.56E-03	2.85E-03	3.20E-03	3.59E-03	4.03E-03	4.52E-03	5.08E-03	5.69E-03	6.39E-03
25.43	* 2.41E-03	2.71E-03	3.04E-03	3.41E-03	3.82E-03	4.29E-03	4.81E-03	5.40E-03	6.06E-03	6.80E-03
26.24	* 2.57E-03	2.88E-03	3.23E-03	3.63E-03	4.07E-03	4.57E-03	5.12E-03	5.75E-03	6.45E-03	7.24E-03
27.07	* 2.73E-03	3.07E-03	3.44E-03	3.86E-03	4.33E-03	4.86E-03	5.45E-03	6.12E-03	6.86E-03	7.70E-03
27.92	* 2.91E-03	3.26E-03	3.66E-03	4.11E-03	4.61E-03	5.17E-03	5.80E-03	6.51E-03	7.30E-03	8.20E-03
28.80	* 3.09E-03	3.47E-03	3.90E-03	4.37E-03	4.90E-03	5.50E-03	6.17E-03	6.93E-03	7.77E-03	8.72E-03

ALPHA TABLE NO. 1 CONTINUED.

29.71	* 3.29E-03	3.71E-03	4.15E-03	4.65E-03	5.22E-03	5.86E-03	6.57E-03	7.37E-03	8.27E-03	9.28E-03
30.65	* 3.50E-03	3.93E-03	4.41E-03	4.95E-03	5.55E-03	6.23E-03	6.99E-03	7.85E-03	8.80E-03	9.85E-03
31.62	* 3.73E-03	4.19E-03	4.70E-03	5.27E-03	5.91E-03	6.63E-03	7.44E-03	8.35E-03	9.37E-03	1.05E-02
32.62	* 3.97E-03	4.45E-03	5.00E-03	5.61E-03	6.29E-03	7.06E-03	7.92E-03	8.89E-03	9.97E-03	1.12E-02
33.65	* 4.22E-03	4.74E-03	5.32E-03	5.97E-03	6.70E-03	7.51E-03	8.43E-03	9.46E-03	1.06E-02	1.19E-02
34.72	* 4.50E-03	5.05E-03	5.66E-03	6.35E-03	7.13E-03	7.99E-03	8.97E-03	1.01E-02	1.13E-02	1.27E-02
35.81	* 4.78E-03	5.37E-03	6.02E-03	6.76E-03	7.59E-03	8.51E-03	9.55E-03	1.07E-02	1.20E-02	1.35E-02
36.95	* 5.09E-03	5.71E-03	6.41E-03	7.19E-03	8.07E-03	9.05E-03	1.02E-02	1.14E-02	1.28E-02	1.43E-02
38.11	* 5.42E-03	6.08E-03	6.82E-03	7.65E-03	8.59E-03	9.64E-03	1.08E-02	1.21E-02	1.36E-02	1.53E-02
39.32	* 5.77E-03	6.47E-03	7.26E-03	8.15E-03	9.14E-03	1.03E-02	1.15E-02	1.29E-02	1.45E-02	1.63E-02
40.56	* 6.14E-03	6.89E-03	7.73E-03	8.67E-03	9.73E-03	1.09E-02	1.22E-02	1.37E-02	1.54E-02	1.73E-02
41.84	* 6.53E-03	7.33E-03	8.22E-03	9.22E-03	1.04E-02	1.16E-02	1.30E-02	1.46E-02	1.64E-02	1.84E-02
43.17	* 6.95E-03	7.80E-03	8.75E-03	9.82E-03	1.10E-02	1.24E-02	1.39E-02	1.56E-02	1.75E-02	1.96E-02
44.53	* 7.40E-03	8.30E-03	9.31E-03	1.04E-02	1.17E-02	1.32E-02	1.48E-02	1.66E-02	1.86E-02	2.08E-02
45.94	* 7.87E-03	8.81E-03	9.91E-03	1.11E-02	1.25E-02	1.41E-02	1.57E-02	1.76E-02	1.96E-02	2.22E-02
47.39	* 8.38E-03	9.42E-03	1.05E-02	1.18E-02	1.33E-02	1.49E-02	1.67E-02	1.88E-02	2.10E-02	2.36E-02
48.89	* 8.91E-03	1.00E-02	1.12E-02	1.26E-02	1.41E-02	1.59E-02	1.78E-02	2.00E-02	2.24E-02	2.51E-02
50.43	* 9.49E-03	1.06E-02	1.19E-02	1.34E-02	1.50E-02	1.69E-02	1.89E-02	2.12E-02	2.38E-02	2.67E-02
52.03	* 1.01E-02	1.13E-02	1.27E-02	1.43E-02	1.60E-02	1.80E-02	2.01E-02	2.26E-02	2.54E-02	2.85E-02
53.67	* 1.07E-02	1.21E-02	1.35E-02	1.52E-02	1.70E-02	1.91E-02	2.14E-02	2.41E-02	2.70E-02	3.03E-02
55.37	* 1.14E-02	1.28E-02	1.44E-02	1.62E-02	1.81E-02	2.03E-02	2.28E-02	2.56E-02	2.87E-02	3.22E-02
57.12	* 1.22E-02	1.37E-02	1.53E-02	1.72E-02	1.93E-02	2.16E-02	2.43E-02	2.72E-02	3.06E-02	3.43E-02
58.92	* 1.29E-02	1.45E-02	1.63E-02	1.83E-02	2.05E-02	2.30E-02	2.58E-02	2.90E-02	3.25E-02	3.65E-02
60.78	* 1.38E-02	1.55E-02	1.73E-02	1.95E-02	2.18E-02	2.45E-02	2.75E-02	3.09E-02	3.46E-02	3.88E-02
62.70	* 1.47E-02	1.65E-02	1.85E-02	2.07E-02	2.32E-02	2.61E-02	2.93E-02	3.28E-02	3.66E-02	4.13E-02
64.69	* 1.56E-02	1.75E-02	1.96E-02	2.20E-02	2.47E-02	2.78E-02	3.11E-02	3.49E-02	3.92E-02	4.40E-02
66.73	* 1.66E-02	1.86E-02	2.09E-02	2.35E-02	2.63E-02	2.95E-02	3.31E-02	3.72E-02	4.17E-02	4.68E-02
68.84	* 1.77E-02	1.98E-02	2.23E-02	2.57E-02	2.88E-02	3.14E-02	3.53E-02	3.96E-02	4.44E-02	4.98E-02
71.02	* 1.88E-02	2.11E-02	2.37E-02	2.66E-02	2.98E-02	3.35E-02	3.75E-02	4.21E-02	4.73E-02	5.30E-02
73.26	* 2.00E-02	2.25E-02	2.52E-02	2.83E-02	3.17E-02	3.56E-02	3.99E-02	4.48E-02	5.03E-02	5.64E-02
75.58	* 2.13E-02	2.39E-02	2.68E-02	3.01E-02	3.38E-02	3.79E-02	4.25E-02	4.77E-02	5.35E-02	6.00E-02
77.96	* 2.27E-02	2.56E-02	2.85E-02	3.20E-02	3.59E-02	4.03E-02	4.52E-02	5.08E-02	5.69E-02	6.39E-02
80.43	* 2.41E-02	2.71E-02	3.04E-02	3.41E-02	3.82E-02	4.29E-02	4.81E-02	5.40E-02	6.06E-02	6.80E-02
82.97	* 2.57E-02	2.88E-02	3.23E-02	3.63E-02	4.07E-02	4.57E-02	5.12E-02	5.75E-02	6.45E-02	7.24E-02
85.59	* 2.73E-02	3.07E-02	3.44E-02	3.86E-02	4.33E-02	4.86E-02	5.45E-02	6.12E-02	6.86E-02	7.70E-02
88.30	* 2.91E-02	3.26E-02	3.66E-02	4.11E-02	4.61E-02	5.17E-02	5.80E-02	6.51E-02	7.30E-02	8.20E-02
91.09	* 3.09E-02	3.47E-02	3.90E-02	4.37E-02	4.90E-02	5.50E-02	6.17E-02	6.93E-02	7.77E-02	8.72E-02
93.97	* 3.29E-02	3.70E-02	4.15E-02	4.65E-02	5.22E-02	5.86E-02	6.57E-02	7.37E-02	8.27E-02	9.28E-02
96.94	* 3.50E-02	3.93E-02	4.41E-02	4.95E-02	5.55E-02	6.23E-02	6.99E-02	7.85E-02	8.80E-02	9.85E-02
100.00	* 3.73E-02	4.19E-02	4.70E-02	5.27E-02	5.91E-02	6.63E-02	7.44E-02	8.35E-02	9.37E-02	1.05E-01

***** ALPHA TABLE NO. 2 FOR CABINET TUNING *****

BOX VOLUMES FROM 0.032 TO 0.089 CUBIC FEET OR 5.46E 01 TO 1.54E 02 CUBIC INCHES.
 VOLUME (ACROSS) ALPHA=(PCRT ARFA)/(PORT EFFECTIVE LENGTH) IN SQUARE INCHES PER INCH.
 CU. FT.= 3.16E-02 3.55E-02 3.98E-02 4.47E-02 5.01E-02 5.62E-02 6.31E-02 7.08E-02 7.94E-02 8.91E-02
 CU. IN.= 5.46E 01 6.13E 01 6.88E 01 7.72E 01 8.66E 01 9.72E 01 1.09E 02 1.22E 02 1.37E 02 1.54E 02
 f-BOX HZ (DOWN)

10.00	*	1.18E-03	1.32E-03	1.48E-03	1.67E-03	1.87E-03	2.10E-03	2.35E-03	2.64E-03	2.96E-03	3.32E-03
10.32	*	1.26E-03	1.41E-03	1.58E-03	1.77E-03	1.99E-03	2.23E-03	2.50E-03	2.81E-03	3.15E-03	3.54E-03
10.64	*	1.34E-03	1.50E-03	1.68E-03	1.89E-03	2.12E-03	2.38E-03	2.67E-03	2.99E-03	3.36E-03	3.76E-03
10.98	*	1.42E-03	1.59E-03	1.78E-03	2.01E-03	2.25E-03	2.53E-03	2.84E-03	3.18E-03	3.57E-03	4.00E-03
11.33	*	1.51E-03	1.70E-03	1.90E-03	2.14E-03	2.40E-03	2.69E-03	3.02E-03	3.39E-03	3.80E-03	4.26E-03
11.68	*	1.61E-03	1.81E-03	2.02E-03	2.27E-03	2.55E-03	2.86E-03	3.21E-03	3.60E-03	4.04E-03	4.54E-03
12.05	*	1.71E-03	1.92E-03	2.16E-03	2.42E-03	2.72E-03	3.05E-03	3.42E-03	3.84E-03	4.30E-03	4.83E-03
12.43	*	1.82E-03	2.05E-03	2.30E-03	2.58E-03	2.89E-03	3.24E-03	3.64E-03	4.08E-03	4.58E-03	5.14E-03
12.83	*	1.94E-03	2.18E-03	2.44E-03	2.74E-03	3.08E-03	3.45E-03	3.87E-03	4.34E-03	4.87E-03	5.47E-03
13.23	*	2.06E-03	2.32E-03	2.60E-03	2.92E-03	3.27E-03	3.67E-03	4.12E-03	4.62E-03	5.19E-03	5.82E-03
13.65	*	2.20E-03	2.47E-03	2.77E-03	3.10E-03	3.48E-03	3.91E-03	4.38E-03	4.92E-03	5.52E-03	6.19E-03
14.08	*	2.34E-03	2.62E-03	2.94E-03	3.30E-03	3.71E-03	4.16E-03	4.67E-03	5.24E-03	5.87E-03	6.59E-03
14.53	*	2.49E-03	2.79E-03	3.12E-03	3.52E-03	3.94E-03	4.43E-03	4.97E-03	5.57E-03	6.25E-03	7.01E-03
14.99	*	2.65E-03	2.97E-03	3.33E-03	3.74E-03	4.20E-03	4.71E-03	5.28E-03	5.93E-03	6.65E-03	7.46E-03
15.46	*	2.82E-03	3.16E-03	3.55E-03	3.98E-03	4.47E-03	5.01E-03	5.62E-03	6.31E-03	7.08E-03	7.94E-03
15.95	*	3.00E-03	3.37E-03	3.78E-03	4.24E-03	4.75E-03	5.33E-03	5.99E-03	6.72E-03	7.53E-03	8.45E-03
16.45	*	3.19E-03	3.59E-03	4.02E-03	4.51E-03	5.06E-03	5.68E-03	6.37E-03	7.15E-03	8.02E-03	9.00E-03
16.97	*	3.40E-03	3.81E-03	4.28E-03	4.80E-03	5.34E-03	6.04E-03	6.78E-03	7.61E-03	8.53E-03	9.57E-03
17.51	*	3.62E-03	4.06E-03	4.55E-03	5.11E-03	5.73E-03	6.43E-03	7.21E-03	8.09E-03	9.08E-03	1.02E-02
18.06	*	3.85E-03	4.32E-03	4.84E-03	5.43E-03	6.10E-03	6.84E-03	7.69E-03	8.61E-03	9.66E-03	1.09E-02
18.63	*	4.09E-03	4.59E-03	5.15E-03	5.78E-03	6.49E-03	7.28E-03	8.17E-03	9.17E-03	1.03E-02	1.15E-02
19.22	*	4.36E-03	4.89E-03	5.49E-03	6.16E-03	6.91E-03	7.75E-03	8.69E-03	9.76E-03	1.09E-02	1.23E-02
19.83	*	4.64E-03	5.20E-03	5.84E-03	6.55E-03	7.35E-03	8.25E-03	9.25E-03	1.04E-02	1.16E-02	1.31E-02
20.46	*	4.94E-03	5.54E-03	6.21E-03	6.97E-03	7.82E-03	8.78E-03	9.85E-03	1.10E-02	1.24E-02	1.39E-02
21.10	*	5.25E-03	5.89E-03	6.61E-03	7.42E-03	8.32E-03	9.34E-03	1.05E-02	1.18E-02	1.32E-02	1.48E-02
21.77	*	5.59E-03	6.27E-03	7.04E-03	7.89E-03	8.86E-03	9.94E-03	1.12E-02	1.25E-02	1.40E-02	1.58E-02
22.46	*	5.95E-03	6.67E-03	7.49E-03	8.40E-03	9.43E-03	1.06E-02	1.19E-02	1.33E-02	1.49E-02	1.68E-02
23.17	*	6.33E-03	7.10E-03	7.97E-03	8.94E-03	1.00E-02	1.13E-02	1.26E-02	1.42E-02	1.59E-02	1.78E-02
23.90	*	6.74E-03	7.56E-03	8.48E-03	9.51E-03	1.07E-02	1.21E-02	1.34E-02	1.51E-02	1.69E-02	1.90E-02
24.65	*	7.17E-03	8.04E-03	9.03E-03	1.01E-02	1.14E-02	1.27E-02	1.43E-02	1.60E-02	1.80E-02	2.02E-02
25.43	*	7.63E-03	8.56E-03	9.60E-03	1.08E-02	1.21E-02	1.36E-02	1.52E-02	1.71E-02	1.92E-02	2.15E-02
26.24	*	8.12E-03	9.11E-03	1.02E-02	1.15E-02	1.29E-02	1.44E-02	1.62E-02	1.82E-02	2.04E-02	2.29E-02
27.07	*	8.64E-03	9.65E-03	1.09E-02	1.22E-02	1.37E-02	1.54E-02	1.72E-02	1.93E-02	2.17E-02	2.44E-02
27.92	*	9.20E-03	1.03E-02	1.16E-02	1.30E-02	1.46E-02	1.64E-02	1.83E-02	2.06E-02	2.31E-02	2.59E-02
28.80	*	9.79E-03	1.10E-02	1.23E-02	1.39E-02	1.55E-02	1.74E-02	1.95E-02	2.19E-02	2.46E-02	2.76E-02

ALPHA TABLE NO. 2 CONTINUED.

29.71	*	1.04E-02	1.17E-02	1.31E-02	1.47E-02	1.65E-02	1.85E-02	2.08E-02	2.33E-02	2.62E-02	2.94E-02
30.65	*	1.11E-02	1.24E-02	1.40E-02	1.57E-02	1.76E-02	1.97E-02	2.21E-02	2.48E-02	2.78E-02	3.12E-02
31.62	*	1.18E-02	1.32E-02	1.48E-02	1.67E-02	1.87E-02	2.10E-02	2.35E-02	2.64E-02	2.96E-02	3.32E-02
32.62	*	1.26E-02	1.41E-02	1.58E-02	1.77E-02	1.99E-02	2.23E-02	2.50E-02	2.81E-02	3.15E-02	3.54E-02
33.65	*	1.34E-02	1.50E-02	1.68E-02	1.89E-02	2.12E-02	2.38E-02	2.67E-02	2.99E-02	3.36E-02	3.76E-02
34.72	*	1.42E-02	1.59E-02	1.79E-02	2.01E-02	2.25E-02	2.53E-02	2.84E-02	3.18E-02	3.57E-02	4.01E-02
35.81	*	1.51E-02	1.70E-02	1.90E-02	2.14E-02	2.40E-02	2.69E-02	3.02E-02	3.39E-02	3.80E-02	4.26E-02
36.95	*	1.61E-02	1.81E-02	2.02E-02	2.27E-02	2.55E-02	2.86E-02	3.21E-02	3.60E-02	4.04E-02	4.54E-02
38.11	*	1.71E-02	1.92E-02	2.16E-02	2.42E-02	2.72E-02	3.05E-02	3.42E-02	3.84E-02	4.30E-02	4.83E-02
39.32	*	1.82E-02	2.05E-02	2.30E-02	2.58E-02	2.89E-02	3.24E-02	3.64E-02	4.08E-02	4.58E-02	5.14E-02
40.56	*	1.94E-02	2.18E-02	2.44E-02	2.74E-02	3.08E-02	3.45E-02	3.87E-02	4.34E-02	4.87E-02	5.47E-02
41.84	*	2.06E-02	2.32E-02	2.60E-02	2.92E-02	3.27E-02	3.67E-02	4.12E-02	4.62E-02	5.19E-02	5.82E-02
43.17	*	2.20E-02	2.47E-02	2.77E-02	3.10E-02	3.48E-02	3.91E-02	4.38E-02	4.92E-02	5.52E-02	6.19E-02
44.53	*	2.34E-02	2.62E-02	2.94E-02	3.30E-02	3.71E-02	4.16E-02	4.67E-02	5.24E-02	5.87E-02	6.59E-02
45.94	*	2.49E-02	2.79E-02	3.12E-02	3.52E-02	3.94E-02	4.43E-02	4.97E-02	5.57E-02	6.25E-02	7.01E-02
47.39	*	2.65E-02	2.97E-02	3.33E-02	3.74E-02	4.20E-02	4.71E-02	5.28E-02	5.93E-02	6.65E-02	7.46E-02
48.89	*	2.82E-02	3.16E-02	3.55E-02	3.98E-02	4.47E-02	5.01E-02	5.62E-02	6.31E-02	7.08E-02	7.94E-02
50.43	*	3.00E-02	3.37E-02	3.78E-02	4.24E-02	4.75E-02	5.33E-02	5.99E-02	6.72E-02	7.53E-02	8.45E-02
52.03	*	3.19E-02	3.58E-02	4.02E-02	4.51E-02	5.06E-02	5.68E-02	6.37E-02	7.15E-02	8.02E-02	9.00E-02
53.67	*	3.40E-02	3.81E-02	4.28E-02	4.80E-02	5.34E-02	6.04E-02	6.78E-02	7.61E-02	8.53E-02	9.57E-02
55.37	*	3.62E-02	4.06E-02	4.55E-02	5.11E-02	5.73E-02	6.43E-02	7.21E-02	8.09E-02	9.08E-02	1.02E-01
57.12	*	3.85E-02	4.32E-02	4.84E-02	5.43E-02	6.10E-02	6.84E-02	7.68E-02	8.61E-02	9.66E-02	1.08E-01
58.92	*	4.09E-02	4.59E-02	5.15E-02	5.78E-02	6.49E-02	7.28E-02	8.17E-02	9.17E-02	1.03E-01	1.15E-01
60.78	*	4.36E-02	4.89E-02	5.49E-02	6.16E-02	6.91E-02	7.75E-02	8.69E-02	9.76E-02	1.09E-01	1.23E-01
62.70	*	4.64E-02	5.20E-02	5.84E-02	6.55E-02	7.35E-02	8.25E-02	9.25E-02	1.04E-01	1.16E-01	1.31E-01
64.65	*	4.94E-02	5.54E-02	6.21E-02	6.97E-02	7.82E-02	8.78E-02	9.85E-02	1.10E-01	1.24E-01	1.39E-01
66.73	*	5.25E-02	5.89E-02	6.61E-02	7.42E-02	8.32E-02	9.34E-02	1.05E-01	1.18E-01	1.32E-01	1.48E-01
68.84	*	5.59E-02	6.27E-02	7.04E-02	7.89E-02	8.86E-02	9.94E-02	1.12E-01	1.25E-01	1.40E-01	1.58E-01
71.02	*	5.95E-02	6.67E-02	7.49E-02	8.40E-02	9.43E-02	1.06E-01	1.19E-01	1.33E-01	1.49E-01	1.68E-01
73.26	*	6.33E-02	7.10E-02	7.97E-02	8.94E-02	1.00E-01	1.13E-01	1.26E-01	1.42E-01	1.59E-01	1.78E-01
75.58	*	6.74E-02	7.56E-02	8.48E-02	9.52E-02	1.07E-01	1.20E-01	1.34E-01	1.51E-01	1.69E-01	1.92E-01
77.96	*	7.17E-02	8.04E-02	9.03E-02	1.01E-01	1.14E-01	1.27E-01	1.43E-01	1.60E-01	1.80E-01	2.02E-01
80.43	*	7.63E-02	8.56E-02	9.60E-02	1.08E-01	1.21E-01	1.36E-01	1.52E-01	1.71E-01	1.92E-01	2.15E-01
82.97	*	8.12E-02	9.11E-02	1.02E-01	1.15E-01	1.29E-01	1.44E-01	1.62E-01	1.82E-01	2.04E-01	2.29E-01
85.59	*	8.64E-02	9.69E-02	1.08E-01	1.22E-01	1.37E-01	1.54E-01	1.72E-01	1.93E-01	2.17E-01	2.44E-01
88.30	*	9.20E-02	1.03E-01	1.16E-01	1.30E-01	1.46E-01	1.64E-01	1.83E-01	2.06E-01	2.31E-01	2.59E-01
91.09	*	9.79E-02	1.10E-01	1.23E-01	1.38E-01	1.55E-01	1.74E-01	1.95E-01	2.19E-01	2.46E-01	2.76E-01
93.97	*	1.04E-01	1.17E-01	1.31E-01	1.47E-01	1.65E-01	1.85E-01	2.08E-01	2.33E-01	2.62E-01	2.94E-01
96.94	*	1.11E-01	1.24E-01	1.40E-01	1.57E-01	1.76E-01	1.97E-01	2.21E-01	2.48E-01	2.78E-01	3.12E-01
100.00	*	1.18E-01	1.32E-01	1.48E-01	1.67E-01	1.87E-01	2.10E-01	2.35E-01	2.64E-01	2.96E-01	3.32E-01

***** ALPHA TABLE NO. 3 FOR CABINET TUNING *****

BOX VOLUMES FROM 5.13 TO 8.782 CUBIC FEET OR 1.732 TO 4.877 CUBIC INCHES.
 Wavelength (inches) ALPHA-FREQ (MHz) PORT # (A/B/C/D) EFFECTIVE LENGTH (inches) THE SQUARE ROOT OF THE WAVELENGTH IN FEET INCH.
 CU. FT. = 1.707-01 1.121-01 1.267-01 1.414-01 1.561-01 1.708-01 1.855-01 2.002-01 2.149-01 2.296-01
 CU. IN. = 1.732-02 1.544-02 2.188-02 2.448-02 2.748-02 3.078-02 3.458-02 3.878-02 4.348-02 4.878-02
 F-LX FZ (DOWN)

10.00	*	3.731-03	4.197-03	4.707-03	5.277-03	5.911-03	6.633-03	7.447-03	8.353-03	9.373-03	1.057-02	1.057-02
10.32	*	3.977-03	4.443-03	4.953-03	5.612-03	6.299-03	7.061-03	7.927-03	8.893-03	9.973-03	1.127-02	1.127-02
10.64	*	4.223-03	4.747-03	5.327-03	5.977-03	6.707-03	7.513-03	8.433-03	9.463-03	1.067-02	1.197-02	1.197-02
10.98	*	4.507-03	5.043-03	5.663-03	6.357-03	7.133-03	7.997-03	8.977-03	1.012-02	1.132-02	1.132-02	1.272-02
11.33	*	4.787-03	5.377-03	6.077-03	6.767-03	7.583-03	8.513-03	9.557-03	1.077-02	1.207-02	1.207-02	1.357-02
11.68	*	5.197-03	5.713-03	6.413-03	7.197-03	8.077-03	9.057-03	1.027-02	1.147-02	1.287-02	1.437-02	1.437-02
12.05	*	5.427-03	6.083-03	6.823-03	7.657-03	8.597-03	9.647-03	1.077-02	1.217-02	1.367-02	1.527-02	1.527-02
12.43	*	5.777-03	6.473-03	7.267-03	8.157-03	9.147-03	1.037-02	1.157-02	1.297-02	1.457-02	1.637-02	1.637-02
12.83	*	6.147-03	6.893-03	7.737-03	8.677-03	9.737-03	1.097-02	1.227-02	1.377-02	1.547-02	1.737-02	1.737-02
13.23	*	6.537-03	7.337-03	8.227-03	9.227-03	1.047-02	1.167-02	1.337-02	1.467-02	1.647-02	1.847-02	1.847-02
13.65	*	6.957-03	7.807-03	8.757-03	9.827-03	1.107-02	1.247-02	1.397-02	1.567-02	1.757-02	1.967-02	1.967-02
14.08	*	7.407-03	8.307-03	9.317-03	1.047-02	1.177-02	1.327-02	1.487-02	1.667-02	1.867-02	2.087-02	2.087-02
14.53	*	7.877-03	8.837-03	9.917-03	1.117-02	1.257-02	1.407-02	1.577-02	1.767-02	1.987-02	2.227-02	2.227-02
14.99	*	8.367-03	9.477-03	1.057-02	1.187-02	1.337-02	1.497-02	1.677-02	1.887-02	2.107-02	2.367-02	2.367-02
15.46	*	8.877-03	1.007-02	1.127-02	1.287-02	1.447-02	1.597-02	1.787-02	2.007-02	2.247-02	2.517-02	2.517-02
15.95	*	9.497-03	1.067-02	1.197-02	1.347-02	1.507-02	1.697-02	1.887-02	2.127-02	2.387-02	2.677-02	2.677-02
16.45	*	1.017-02	1.137-02	1.277-02	1.437-02	1.607-02	1.807-02	2.017-02	2.267-02	2.547-02	2.857-02	2.857-02
16.97	*	1.077-02	1.217-02	1.357-02	1.527-02	1.707-02	1.917-02	2.147-02	2.417-02	2.707-02	3.037-02	3.037-02
17.51	*	1.147-02	1.287-02	1.447-02	1.627-02	1.817-02	2.037-02	2.287-02	2.567-02	2.877-02	3.237-02	3.237-02
18.06	*	1.227-02	1.377-02	1.537-02	1.727-02	1.937-02	2.167-02	2.427-02	2.727-02	3.067-02	3.427-02	3.427-02
18.63	*	1.297-02	1.457-02	1.637-02	1.837-02	2.057-02	2.307-02	2.587-02	2.907-02	3.257-02	3.657-02	3.657-02
19.22	*	1.387-02	1.557-02	1.747-02	1.957-02	2.187-02	2.437-02	2.757-02	3.097-02	3.467-02	3.887-02	3.887-02
19.83	*	1.477-02	1.657-02	1.857-02	2.077-02	2.327-02	2.577-02	2.937-02	3.287-02	3.687-02	4.137-02	4.137-02
20.46	*	1.567-02	1.757-02	1.967-02	2.207-02	2.477-02	2.787-02	3.117-02	3.497-02	3.927-02	4.467-02	4.467-02
21.16	*	1.667-02	1.867-02	2.087-02	2.357-02	2.637-02	2.957-02	3.317-02	3.727-02	4.177-02	4.687-02	4.687-02
21.77	*	1.777-02	1.987-02	2.237-02	2.507-02	2.807-02	3.147-02	3.537-02	3.967-02	4.447-02	4.987-02	4.987-02
22.46	*	1.887-02	2.117-02	2.377-02	2.667-02	2.987-02	3.357-02	3.757-02	4.217-02	4.737-02	5.337-02	5.337-02
23.17	*	2.007-02	2.257-02	2.527-02	2.837-02	3.177-02	3.567-02	3.997-02	4.467-02	5.037-02	5.647-02	5.647-02
23.90	*	2.137-02	2.397-02	2.687-02	3.017-02	3.367-02	3.797-02	4.257-02	4.777-02	5.357-02	6.007-02	6.007-02
24.65	*	2.277-02	2.547-02	2.857-02	3.207-02	3.597-02	4.037-02	4.527-02	5.087-02	5.697-02	6.397-02	6.397-02
25.43	*	2.417-02	2.717-02	2.947-02	3.417-02	3.827-02	4.297-02	4.817-02	5.407-02	6.067-02	6.807-02	6.807-02
26.24	*	2.577-02	2.887-02	2.977-02	3.487-02	3.977-02	4.477-02	5.017-02	5.757-02	6.457-02	7.247-02	7.247-02
27.07	*	2.737-02	3.077-02	3.447-02	3.867-02	4.337-02	4.867-02	5.457-02	6.127-02	6.867-02	7.707-02	7.707-02
27.92	*	2.917-02	3.267-02	3.687-02	4.117-02	4.617-02	5.177-02	5.807-02	6.517-02	7.307-02	8.207-02	8.207-02
28.80	*	3.097-02	3.477-02	3.907-02	4.377-02	4.907-02	5.507-02	6.177-02	6.937-02	7.777-02	8.727-02	8.727-02

ALPHA TABLE NO. 3 CONTINUED.

29.71	*	3.297-02	3.727-02	4.157-02	4.657-02	5.227-02	5.867-02	6.577-02	7.377-02	8.277-02	9.287-02	9.287-02
30.65	*	3.567-02	3.937-02	4.417-02	4.957-02	5.557-02	6.237-02	6.997-02	7.857-02	8.807-02	9.887-02	9.887-02
31.62	*	3.737-02	4.197-02	4.707-02	5.277-02	5.917-02	6.637-02	7.447-02	8.357-02	9.377-02	1.057-01	1.057-01
32.62	*	3.977-02	4.457-02	4.957-02	5.612-02	6.299-02	7.061-02	7.927-02	8.893-02	9.973-02	1.127-01	1.127-01
33.65	*	4.227-02	4.747-02	5.327-02	5.977-02	6.707-02	7.513-02	8.433-02	9.463-02	1.067-01	1.197-01	1.197-01
34.72	*	4.507-02	5.047-02	5.667-02	6.357-02	7.133-02	7.997-02	8.977-02	1.012-01	1.132-01	1.272-01	1.272-01
35.81	*	4.787-02	5.377-02	6.077-02	6.767-02	7.583-02	8.513-02	9.557-02	1.077-01	1.207-01	1.357-01	1.357-01
36.95	*	5.097-02	5.713-02	6.413-02	7.197-02	8.077-02	9.057-02	1.027-01	1.147-01	1.287-01	1.437-01	1.437-01
38.11	*	5.427-02	6.083-02	6.823-02	7.657-02	8.597-02	9.647-02	1.077-01	1.217-01	1.367-01	1.527-01	1.527-01
39.32	*	5.777-02	6.473-02	7.267-02	8.157-02	9.147-02	1.037-01	1.157-01	1.297-01	1.457-01	1.637-01	1.637-01
40.56	*	6.147-02	6.893-02	7.737-02	8.677-02	9.737-02	1.097-01	1.227-01	1.377-01	1.547-01	1.737-01	1.737-01
41.84	*	6.537-02	7.337-02	8.227-02	9.227-02	1.047-01	1.167-01	1.337-01	1.467-01	1.647-01	1.847-01	1.847-01
43.17	*	6.957-02	7.807-02	8.757-02	9.827-02	1.107-01	1.247-01	1.397-01	1.567-01	1.757-01	1.967-01	1.967-01
44.53	*	7.407-02	8.307-02	9.317-02	1.047-01	1.177-01	1.327-01	1.487-01	1.667-01	1.867-01	2.087-01	2.087-01
45.94	*	7.877-02	8.837-02	9.917-02	1.117-01	1.257-01	1.407-01	1.577-01	1.767-01	1.987-01	2.227-01	2.227-01
47.39	*	8.367-02	9.477-02	1.057-01	1.187-01	1.337-01	1.497-01	1.677-01	1.887-01	2.107-01	2.367-01	2.367-01
48.89	*	8.877-02	1.007-01	1.127-01	1.287-01	1.447-01	1.597-01	1.787-01	2.007-01	2.247-01	2.517-01	2.517-01
50.43	*	9.497-02	1.067-01	1.197-01	1.347-01	1.507-01	1.697-01	1.897-01	2.127-01	2.387-01	2.677-01	2.677-01
52.03	*	1.017-01	1.137-01	1.277-01	1.437-01	1.607-01	1.807-01	2.017-01	2.267-01	2.547-01	2.857-01	2.857-01
53.67	*	1.077-01	1.217-01	1.357-01	1.527-01	1.707-01	1.917-01	2.147-01	2.417-01	2.707-01	3.037-01	3.037-01
55.37	*	1.147-01	1.287-01	1.447-01	1.627-01	1.817-01	2.037-01	2.287-01	2.567-01	2.877-01	3.237-01	3.237-01
57.12	*	1.227-01	1.377-01	1.537-01	1.727-01	1.937-01	2.167-01	2.437-01	2.727-01	3.067-01	3.427-01	3.427-01
58.92	*	1.297-01	1.457-01	1.637-01	1.837-01	2.057-01	2.307-01	2.587-01	2.907-01	3.257-01	3.657-01	3.657-01
60.78	*	1.387-01	1.557-01	1.747-01	1.957-01	2.187-01	2.437-01	2.757-01	3.097-01	3.467-01	3.887-01	3.887-01
62.70	*	1.477-01	1.657-01	1.857-01	2.077-01	2.327-01	2.617-01	2.937-01	3.287-01	3.687-01	4.137-01	4.137-01
64.69	*	1.567-01	1.757-01	1.967-01	2.207-01	2.477-01	2.787-01	3.117-01	3.497-01	3.927-01	4.407-01	4.407-01
66.73	*	1.667-01	1.867-01	2.097-01	2.357-01	2.637-01	2.957-01	3.317-01	3.727-01	4.177-01	4.687-01	4.687-01
68.84	*	1.777-01	1.987-01	2.237-01	2.507-01	2.807-01	3.147-01	3.537-01	3.967-01	4.447-01	4.987-01	4.987-01
71.02	*	1.887-01	2.117-01	2.377-01	2.667-01	2.987-01	3.357-01	3.757-01	4.217-01	4.737-01	5.307-01	5.307-01
73.26	*	2.007-01	2.257-01	2.527-01	2.837-01	3.177-01	3.567-01	3.997-01	4.467-01	5.037-01	5.647-01	5.647-01
75.58	*	2.137-01	2.397-01	2.687-01	3.017-01	3.367-01	3.797-01	4.257-01	4.777-01	5.357-01	6.007-01	6.007-01
77.96	*	2.277-01	2.547-01	2.857-01	3.207-01	3.597-01	4.037-01	4.527-01	5.087-01	5.697-01	6.397-01	6.397-01
80.43	*	2.417-01	2.717-01	3.047-01	3.417-01	3.827-01	4.297-01	4.817-01	5.407-01	6.067-01	6.807-01	6.807-01
82.97	*	2.577-01	2.887-01	3.237-01	3.637-01	4.077-01	4.577-01	5.127-01	5.757-01	6.457-01	7.247-01	7.247-01
85.59	*	2.737-01	3.077-01	3.447-01	3.867-01	4.337-01	4.867-01	5.457-01	6.127-01	6.867-01	7.707-01	7.707-01
88.30	*	2.917-01	3.267-01	3.687-01	4.117-01	4.617-01	5.177-01	5.807-01	6.517-01	7.307-01	8.207-01	8.207-01
91.09	*	3.097-01	3.477-01	3.907-01	4.377-01	4.907-01	5.507-01	6.177-01	6.937-01	7.777-01	8.727-01	8.727-01

***** ALPHA TABLE NO. 4 FOR CABINET TUNING *****
 HDX VOLU% 5 FREQ 0.316 TO 0.353 CUBIC FEET 08 8.66E 02 TO 1.56E 03 CUBIC INCHES,
 WLLWME (ACROSS) ALPHA (PCFT AREA)/PCFT EFFECTIVE LENGTH IN SQUARE INCHES PLS INCH,
 CU. FT.= 3.16E-01 3.55E-01 3.98E-01 4.47E-01 5.01E-01 5.62E-01 6.31E-01 7.08E-01 7.94E-01 8.91E-01
 CU. IN.= 5.46E 02 6.13E 02 6.88E 02 7.72E 02 8.66E 02 9.72E 02 1.09E 03 1.22E 03 1.37E 03 1.54E 03
 -BXC HZ (DOWN)

10.00	* 1.18E-02	1.32E-02	1.44E-02	1.67E-02	1.87E-02	2.10E-02	2.35E-02	2.64E-02	2.96E-02	3.32E-02
10.32	* 1.26E-02	1.41E-02	1.58E-02	1.77E-02	1.99E-02	2.23E-02	2.50E-02	2.81E-02	3.15E-02	3.54E-02
10.64	* 1.34E-02	1.50E-02	1.68E-02	1.89E-02	2.12E-02	2.38E-02	2.67E-02	2.99E-02	3.36E-02	3.76E-02
10.98	* 1.42E-02	1.59E-02	1.79E-02	2.01E-02	2.25E-02	2.53E-02	2.84E-02	3.18E-02	3.57E-02	4.01E-02
11.33	* 1.51E-02	1.70E-02	1.92E-02	2.16E-02	2.40E-02	2.69E-02	3.02E-02	3.39E-02	3.80E-02	4.26E-02
11.68	* 1.61E-02	1.81E-02	2.06E-02	2.27E-02	2.55E-02	2.86E-02	3.21E-02	3.60E-02	4.04E-02	4.54E-02
12.05	* 1.71E-02	1.92E-02	2.19E-02	2.42E-02	2.72E-02	3.05E-02	3.42E-02	3.84E-02	4.30E-02	4.83E-02
12.43	* 1.82E-02	2.05E-02	2.33E-02	2.58E-02	2.89E-02	3.24E-02	3.64E-02	4.08E-02	4.58E-02	5.14E-02
12.83	* 1.94E-02	2.18E-02	2.46E-02	2.74E-02	3.08E-02	3.45E-02	3.87E-02	4.34E-02	4.87E-02	5.47E-02
13.23	* 2.06E-02	2.32E-02	2.60E-02	2.92E-02	3.27E-02	3.67E-02	4.12E-02	4.62E-02	5.19E-02	5.82E-02
13.65	* 2.20E-02	2.47E-02	2.77E-02	3.10E-02	3.48E-02	3.91E-02	4.38E-02	4.92E-02	5.52E-02	6.19E-02
14.08	* 2.34E-02	2.62E-02	2.94E-02	3.31E-02	3.71E-02	4.16E-02	4.67E-02	5.24E-02	5.87E-02	6.59E-02
14.53	* 2.49E-02	2.79E-02	3.13E-02	3.52E-02	3.94E-02	4.43E-02	4.97E-02	5.57E-02	6.25E-02	7.01E-02
14.99	* 2.65E-02	2.97E-02	3.33E-02	3.74E-02	4.20E-02	4.71E-02	5.29E-02	5.93E-02	6.65E-02	7.46E-02
15.46	* 2.82E-02	3.16E-02	3.55E-02	3.98E-02	4.47E-02	5.01E-02	5.62E-02	6.31E-02	7.08E-02	7.94E-02
15.95	* 3.00E-02	3.37E-02	3.78E-02	4.24E-02	4.75E-02	5.33E-02	5.99E-02	6.72E-02	7.53E-02	8.45E-02
16.45	* 3.19E-02	3.58E-02	4.02E-02	4.51E-02	5.06E-02	5.68E-02	6.37E-02	7.15E-02	8.02E-02	9.01E-02
16.97	* 3.40E-02	3.81E-02	4.28E-02	4.80E-02	5.38E-02	6.04E-02	6.78E-02	7.61E-02	8.53E-02	9.57E-02
17.51	* 3.62E-02	4.06E-02	4.55E-02	5.11E-02	5.73E-02	6.43E-02	7.21E-02	8.09E-02	9.08E-02	1.02E-01
18.06	* 3.85E-02	4.32E-02	4.84E-02	5.43E-02	6.10E-02	6.84E-02	7.68E-02	8.61E-02	9.66E-02	1.08E-01
18.63	* 4.09E-02	4.59E-02	5.15E-02	5.78E-02	6.49E-02	7.28E-02	8.17E-02	9.17E-02	1.03E-01	1.15E-01
19.22	* 4.36E-02	4.89E-02	5.49E-02	6.16E-02	6.91E-02	7.75E-02	8.69E-02	9.74E-02	1.09E-01	1.23E-01
19.83	* 4.64E-02	5.20E-02	5.84E-02	6.55E-02	7.35E-02	8.25E-02	9.25E-02	1.04E-01	1.16E-01	1.31E-01
20.46	* 4.94E-02	5.54E-02	6.21E-02	6.97E-02	7.83E-02	8.78E-02	9.85E-02	1.10E-01	1.24E-01	1.39E-01
21.10	* 5.25E-02	5.85E-02	6.56E-02	7.42E-02	8.32E-02	9.34E-02	1.05E-01	1.18E-01	1.32E-01	1.48E-01
21.77	* 5.59E-02	6.27E-02	7.04E-02	7.98E-02	8.96E-02	9.94E-02	1.12E-01	1.25E-01	1.40E-01	1.58E-01
22.46	* 5.95E-02	6.67E-02	7.49E-02	8.48E-02	9.43E-02	1.06E-01	1.19E-01	1.33E-01	1.49E-01	1.68E-01
23.17	* 6.33E-02	7.10E-02	7.97E-02	8.94E-02	1.00E-01	1.13E-01	1.26E-01	1.42E-01	1.59E-01	1.79E-01
23.90	* 6.74E-02	7.56E-02	8.48E-02	9.52E-02	1.07E-01	1.20E-01	1.34E-01	1.51E-01	1.69E-01	1.90E-01
24.65	* 7.17E-02	8.04E-02	9.03E-02	1.01E-01	1.14E-01	1.27E-01	1.43E-01	1.60E-01	1.80E-01	2.02E-01
25.43	* 7.63E-02	8.56E-02	9.60E-02	1.08E-01	1.21E-01	1.36E-01	1.52E-01	1.71E-01	1.92E-01	2.15E-01
26.24	* 8.12E-02	9.11E-02	1.02E-01	1.15E-01	1.29E-01	1.44E-01	1.62E-01	1.82E-01	2.04E-01	2.29E-01
27.07	* 8.62E-02	9.65E-02	1.08E-01	1.22E-01	1.37E-01	1.53E-01	1.72E-01	1.94E-01	2.17E-01	2.43E-01
27.92	* 9.14E-02	1.01E-01	1.16E-01	1.30E-01	1.46E-01	1.64E-01	1.83E-01	2.06E-01	2.31E-01	2.59E-01
28.80	* 9.79E-02	1.10E-01	1.23E-01	1.38E-01	1.55E-01	1.74E-01	1.95E-01	2.19E-01	2.46E-01	2.76E-01

ALPHA TABLE NO. 4 CONTINUED.

29.71	* 1.34E-01	1.17E-01	1.31E-01	1.47E-01	1.65E-01	1.85E-01	2.08E-01	2.33E-01	2.62E-01	2.94E-01
30.65	* 1.11E-01	1.24E-01	1.40E-01	1.57E-01	1.76E-01	1.97E-01	2.21E-01	2.48E-01	2.78E-01	3.12E-01
31.62	* 1.18E-01	1.32E-01	1.48E-01	1.67E-01	1.87E-01	2.10E-01	2.35E-01	2.64E-01	2.96E-01	3.32E-01
32.62	* 1.26E-01	1.41E-01	1.58E-01	1.77E-01	1.99E-01	2.23E-01	2.50E-01	2.81E-01	3.15E-01	3.54E-01
33.65	* 1.34E-01	1.50E-01	1.68E-01	1.89E-01	2.12E-01	2.38E-01	2.67E-01	2.99E-01	3.36E-01	3.76E-01
34.72	* 1.42E-01	1.59E-01	1.79E-01	2.01E-01	2.25E-01	2.53E-01	2.84E-01	3.18E-01	3.57E-01	4.01E-01
35.81	* 1.51E-01	1.70E-01	1.92E-01	2.16E-01	2.40E-01	2.69E-01	3.02E-01	3.39E-01	3.80E-01	4.26E-01
36.95	* 1.61E-01	1.81E-01	2.03E-01	2.27E-01	2.55E-01	2.86E-01	3.21E-01	3.60E-01	4.04E-01	4.54E-01
38.11	* 1.71E-01	1.92E-01	2.16E-01	2.42E-01	2.72E-01	3.05E-01	3.42E-01	3.84E-01	4.30E-01	4.83E-01
39.32	* 1.82E-01	2.05E-01	2.33E-01	2.58E-01	2.89E-01	3.24E-01	3.64E-01	4.08E-01	4.58E-01	5.14E-01
40.56	* 1.94E-01	2.18E-01	2.46E-01	2.74E-01	3.08E-01	3.45E-01	3.87E-01	4.34E-01	4.87E-01	5.47E-01
41.84	* 2.06E-01	2.32E-01	2.60E-01	2.92E-01	3.27E-01	3.67E-01	4.12E-01	4.62E-01	5.19E-01	5.82E-01
43.17	* 2.20E-01	2.47E-01	2.77E-01	3.10E-01	3.48E-01	3.91E-01	4.38E-01	4.92E-01	5.52E-01	6.19E-01
44.53	* 2.34E-01	2.62E-01	2.94E-01	3.30E-01	3.71E-01	4.16E-01	4.67E-01	5.24E-01	5.87E-01	6.59E-01
45.94	* 2.49E-01	2.79E-01	3.13E-01	3.52E-01	3.94E-01	4.43E-01	4.97E-01	5.57E-01	6.25E-01	7.01E-01
47.35	* 2.65E-01	2.97E-01	3.33E-01	3.74E-01	4.20E-01	4.71E-01	5.29E-01	5.93E-01	6.65E-01	7.46E-01
48.89	* 2.82E-01	3.16E-01	3.55E-01	3.98E-01	4.47E-01	5.01E-01	5.62E-01	6.31E-01	7.08E-01	7.94E-01
50.43	* 3.00E-01	3.37E-01	3.78E-01	4.24E-01	4.75E-01	5.33E-01	5.99E-01	6.72E-01	7.53E-01	8.45E-01
52.03	* 3.19E-01	3.58E-01	4.02E-01	4.51E-01	5.06E-01	5.68E-01	6.37E-01	7.15E-01	8.02E-01	9.01E-01
53.67	* 3.40E-01	3.81E-01	4.28E-01	4.80E-01	5.38E-01	6.04E-01	6.78E-01	7.61E-01	8.53E-01	9.57E-01
55.37	* 3.62E-01	4.06E-01	4.55E-01	5.11E-01	5.73E-01	6.43E-01	7.21E-01	8.09E-01	9.08E-01	1.02E 02
57.12	* 3.85E-01	4.32E-01	4.84E-01	5.43E-01	6.10E-01	6.84E-01	7.68E-01	8.61E-01	9.66E-01	1.08E 02
58.92	* 4.09E-01	4.59E-01	5.15E-01	5.78E-01	6.49E-01	7.28E-01	8.17E-01	9.17E-01	1.03E 02	1.15E 02
60.78	* 4.36E-01	4.85E-01	5.49E-01	6.16E-01	6.91E-01	7.75E-01	8.69E-01	9.74E-01	1.09E 02	1.23E 02
62.70	* 4.64E-01	5.20E-01	5.84E-01	6.55E-01	7.35E-01	8.25E-01	9.25E-01	1.04E 02	1.16E 02	1.31E 02
64.69	* 4.94E-01	5.54E-01	6.21E-01	6.97E-01	7.82E-01	8.78E-01	9.85E-01	1.10E 02	1.24E 02	1.39E 02
66.73	* 5.25E-01	5.85E-01	6.56E-01	7.42E-01	8.32E-01	9.34E-01	1.05E 02	1.18E 02	1.32E 02	1.48E 02
68.84	* 5.59E-01	6.27E-01	7.04E-01	7.97E-01	8.96E-01	9.94E-01	1.12E 02	1.25E 02	1.40E 02	1.58E 02
71.02	* 5.95E-01	6.67E-01	7.49E-01	8.48E-01	9.43E-01	1.06E 02	1.19E 02	1.33E 02	1.49E 02	1.68E 02
73.26	* 6.33E-01	7.10E-01	7.97E-01	8.94E-01	1.00E 02	1.13E 02	1.26E 02	1.42E 02	1.59E 02	1.79E 02
75.58	* 6.74E-01	7.56E-01	8.48E-01	9.52E-01	1.07E 02	1.20E 02	1.34E 02	1.51E 02	1.69E 02	1.90E 02
77.96	* 7.17E-01	8.04E-01	9.03E-01	1.01E 02	1.14E 02	1.27E 02	1.43E 02	1.60E 02	1.80E 02	2.02E 02
80.43	* 7.63E-01	8.56E-01	9.60E-01	1.08E 02	1.21E 02	1.36E 02	1.52E 02	1.71E 02	1.92E 02	2.15E 02
82.97	* 8.12E-01	9.11E-01	1.02E 02	1.15E 02	1.29E 02	1.44E 02	1.62E 02	1.82E 02	2.04E 02	2.29E 02
85.59	* 8.62E-01	9.65E-01	1.08E 02	1.22E 02	1.37E 02	1.53E 02	1.72E 02	1.93E 02	2.17E 02	2.43E 02
88.30	* 9.20E-01	1.03E 02	1.16E 02	1.33E 02	1.46E 02	1.64E 02	1.83E 02	2.06E 02	2.31E 02	2.59E 02
91.09	* 9.79E-01	1.10E 02	1.23E 02	1.38E 02	1.55E 02	1.74E 02	1.95E 02	2.19E 02	2.46E 02	2.76E 02
93.97	* 1.04E 02	1.17E 02	1.31E 02	1.47E 02	1.65E 02	1.85E 02	2.08E 02	2.33E 02	2.62E 02	2.94E 02
96.94	* 1.11E 02	1.24E 02	1.40E 02	1.57E 02	1.76E 02	1.97E 02	2.21E 02	2.48E 02	2.78E 02	3.12E 02
00.00	* 1.18E 02	1.32E 02	1.44E 02	1.67E 02	1.87E 02	2.10E 02	2.35E 02	2.64E 02	2.96E 02	3.32E 02

***** ALPHA TABLE NO. 5 FOR CABINET TUNING *****

BUX VOLUMES FROM 1.000 TO 7.913 CUBIC FEET OR 1.735 TO 4.878 CUBIC INCHES.
 VOLUME (ACROSS) ALPHA (PORT AREA) / (PORT EFFECTIVE LENGTH) IN SQUARE INCHES PER INCH.
 CO. FT. = 1.000 1.120 1.260 1.410 1.580 1.770 2.000 2.240 2.510 2.820 3.170
 CO. IN. = 1.735 1.945 2.180 2.440 2.740 3.080 3.460 3.870 4.340 4.870

F=HCK HZ (DOWN)

13.00	*	3.73E-02	4.19E-02	4.70E-02	5.27E-02	5.91E-02	6.63E-02	7.44E-02	8.35E-02	9.37E-02	1.05E-01
13.25	*	3.97E-02	4.45E-02	5.00E-02	5.61E-02	6.29E-02	7.06E-02	7.92E-02	8.89E-02	9.97E-02	1.12E-01
10.84	*	4.22E-02	4.74E-02	5.32E-02	5.97E-02	6.70E-02	7.51E-02	8.43E-02	9.46E-02	1.06E-01	1.19E-01
10.58	*	4.50E-02	5.06E-02	5.61E-02	6.35E-02	7.13E-02	7.99E-02	8.97E-02	1.01E-01	1.13E-01	1.27E-01
11.43	*	4.78E-02	5.37E-02	6.02E-02	6.76E-02	7.58E-02	8.51E-02	9.55E-02	1.07E-01	1.20E-01	1.35E-01
11.78	*	5.09E-02	5.71E-02	6.41E-02	7.19E-02	8.07E-02	9.05E-02	1.02E-01	1.14E-01	1.28E-01	1.43E-01
12.05	*	5.42E-02	6.08E-02	6.82E-02	7.65E-02	8.59E-02	9.64E-02	1.08E-01	1.21E-01	1.36E-01	1.53E-01
12.43	*	5.77E-02	6.47E-02	7.26E-02	8.15E-02	9.14E-02	1.03E-01	1.15E-01	1.29E-01	1.45E-01	1.63E-01
12.83	*	6.14E-02	6.89E-02	7.73E-02	8.67E-02	9.73E-02	1.09E-01	1.22E-01	1.37E-01	1.54E-01	1.73E-01
13.23	*	6.53E-02	7.35E-02	8.27E-02	9.27E-02	1.04E-01	1.16E-01	1.29E-01	1.46E-01	1.64E-01	1.84E-01
13.65	*	6.95E-02	7.81E-02	8.75E-02	9.82E-02	1.10E-01	1.22E-01	1.39E-01	1.56E-01	1.75E-01	1.96E-01
14.08	*	7.40E-02	8.30E-02	9.31E-02	1.04E-01	1.17E-01	1.32E-01	1.48E-01	1.66E-01	1.86E-01	2.07E-01
14.53	*	7.87E-02	8.83E-02	9.91E-02	1.11E-01	1.25E-01	1.40E-01	1.57E-01	1.76E-01	1.97E-01	2.19E-01
14.99	*	8.38E-02	9.40E-02	1.051E-01	1.18E-01	1.33E-01	1.49E-01	1.67E-01	1.88E-01	2.10E-01	2.33E-01
15.46	*	8.91E-02	1.00E-01	1.12E-01	1.26E-01	1.41E-01	1.59E-01	1.78E-01	2.00E-01	2.24E-01	2.51E-01
15.95	*	9.49E-02	1.07E-01	1.19E-01	1.34E-01	1.50E-01	1.69E-01	1.89E-01	2.12E-01	2.38E-01	2.67E-01
16.45	*	1.01E-01	1.13E-01	1.27E-01	1.43E-01	1.60E-01	1.80E-01	2.01E-01	2.26E-01	2.54E-01	2.85E-01
16.97	*	1.07E-01	1.21E-01	1.35E-01	1.52E-01	1.70E-01	1.91E-01	2.14E-01	2.41E-01	2.70E-01	3.03E-01
17.51	*	1.14E-01	1.29E-01	1.44E-01	1.62E-01	1.81E-01	2.03E-01	2.28E-01	2.56E-01	2.87E-01	3.22E-01
18.06	*	1.22E-01	1.37E-01	1.53E-01	1.72E-01	1.93E-01	2.16E-01	2.43E-01	2.72E-01	3.06E-01	3.43E-01
18.63	*	1.29E-01	1.45E-01	1.63E-01	1.83E-01	2.05E-01	2.30E-01	2.58E-01	2.90E-01	3.25E-01	3.65E-01
19.22	*	1.38E-01	1.55E-01	1.73E-01	1.95E-01	2.18E-01	2.45E-01	2.75E-01	3.09E-01	3.46E-01	3.88E-01
19.83	*	1.47E-01	1.65E-01	1.85E-01	2.07E-01	2.32E-01	2.61E-01	2.93E-01	3.28E-01	3.68E-01	4.13E-01
20.46	*	1.56E-01	1.75E-01	1.96E-01	2.20E-01	2.47E-01	2.78E-01	3.11E-01	3.49E-01	3.92E-01	4.40E-01
21.10	*	1.66E-01	1.86E-01	2.09E-01	2.35E-01	2.63E-01	2.95E-01	3.31E-01	3.72E-01	4.17E-01	4.68E-01
21.77	*	1.77E-01	1.98E-01	2.23E-01	2.50E-01	2.80E-01	3.14E-01	3.53E-01	3.96E-01	4.44E-01	4.98E-01
22.46	*	1.88E-01	2.11E-01	2.37E-01	2.66E-01	2.98E-01	3.35E-01	3.75E-01	4.21E-01	4.73E-01	5.30E-01
23.17	*	2.00E-01	2.25E-01	2.52E-01	2.83E-01	3.17E-01	3.56E-01	3.99E-01	4.48E-01	5.03E-01	5.64E-01
23.90	*	2.13E-01	2.39E-01	2.68E-01	3.01E-01	3.39E-01	3.79E-01	4.25E-01	4.77E-01	5.35E-01	6.00E-01
24.65	*	2.27E-01	2.56E-01	2.85E-01	3.20E-01	3.59E-01	4.03E-01	4.52E-01	5.08E-01	5.69E-01	6.39E-01
25.43	*	2.41E-01	2.71E-01	3.04E-01	3.41E-01	3.82E-01	4.29E-01	4.81E-01	5.40E-01	6.06E-01	6.78E-01
26.24	*	2.57E-01	2.88E-01	3.23E-01	3.63E-01	4.07E-01	4.57E-01	5.12E-01	5.75E-01	6.45E-01	7.24E-01
27.07	*	2.73E-01	3.07E-01	3.46E-01	3.86E-01	4.33E-01	4.86E-01	5.45E-01	6.12E-01	6.86E-01	7.70E-01
27.92	*	2.91E-01	3.26E-01	3.64E-01	4.11E-01	4.61E-01	5.17E-01	5.80E-01	6.51E-01	7.30E-01	8.20E-01
28.80	*	3.09E-01	3.47E-01	3.90E-01	4.37E-01	4.90E-01	5.50E-01	6.17E-01	6.93E-01	7.77E-01	8.72E-01

ALPHA TABLE NO. 5 CONTINUED.

29.71	*	3.29E-01	3.70E-01	4.15E-01	4.65E-01	5.22E-01	5.86E-01	6.57E-01	7.37E-01	8.27E-01	9.28E-01
30.65	*	3.50E-01	3.94E-01	4.41E-01	4.95E-01	5.55E-01	6.23E-01	6.99E-01	7.85E-01	8.80E-01	9.88E-01
31.62	*	3.73E-01	4.19E-01	4.70E-01	5.27E-01	5.91E-01	6.63E-01	7.44E-01	8.35E-01	9.37E-01	1.05E-01
32.62	*	3.97E-01	4.45E-01	5.00E-01	5.61E-01	6.29E-01	7.06E-01	7.92E-01	8.89E-01	9.97E-01	1.12E-01
33.65	*	4.22E-01	4.74E-01	5.32E-01	5.97E-01	6.70E-01	7.51E-01	8.43E-01	9.46E-01	1.06E-01	1.19E-01
34.72	*	4.50E-01	5.06E-01	5.66E-01	6.35E-01	7.13E-01	7.99E-01	8.97E-01	1.01E-01	1.13E-01	1.27E-01
35.81	*	4.78E-01	5.37E-01	6.02E-01	6.76E-01	7.58E-01	8.51E-01	9.55E-01	1.07E-01	1.20E-01	1.35E-01
36.95	*	5.09E-01	5.71E-01	6.41E-01	7.19E-01	8.07E-01	9.05E-01	1.02E-01	1.14E-01	1.28E-01	1.43E-01
38.11	*	5.42E-01	6.08E-01	6.82E-01	7.65E-01	8.59E-01	9.64E-01	1.08E-01	1.21E-01	1.36E-01	1.53E-01
39.32	*	5.77E-01	6.47E-01	7.26E-01	8.15E-01	9.14E-01	1.03E-01	1.15E-01	1.29E-01	1.45E-01	1.63E-01
41.56	*	6.14E-01	6.89E-01	7.73E-01	8.67E-01	9.73E-01	1.09E-01	1.22E-01	1.37E-01	1.54E-01	1.73E-01
41.84	*	6.53E-01	7.34E-01	8.22E-01	9.22E-01	1.04E-01	1.16E-01	1.30E-01	1.46E-01	1.64E-01	1.84E-01
43.17	*	6.95E-01	7.80E-01	8.75E-01	9.82E-01	1.10E-01	1.24E-01	1.39E-01	1.56E-01	1.75E-01	1.96E-01
44.53	*	7.40E-01	8.30E-01	9.31E-01	1.04E-01	1.17E-01	1.32E-01	1.48E-01	1.66E-01	1.86E-01	2.08E-01
45.94	*	7.87E-01	8.83E-01	9.91E-01	1.11E-01	1.25E-01	1.40E-01	1.57E-01	1.76E-01	1.97E-01	2.22E-01
47.39	*	8.38E-01	9.40E-01	1.05E-01	1.18E-01	1.33E-01	1.49E-01	1.67E-01	1.88E-01	2.10E-01	2.36E-01
48.89	*	8.91E-01	1.00E-01	1.12E-01	1.26E-01	1.41E-01	1.59E-01	1.78E-01	2.00E-01	2.24E-01	2.51E-01
50.43	*	9.49E-01	1.07E-01	1.19E-01	1.34E-01	1.50E-01	1.69E-01	1.89E-01	2.12E-01	2.38E-01	2.67E-01
52.03	*	1.01E-01	1.13E-01	1.27E-01	1.43E-01	1.60E-01	1.80E-01	2.01E-01	2.26E-01	2.54E-01	2.85E-01
53.67	*	1.07E-01	1.21E-01	1.35E-01	1.52E-01	1.70E-01	1.91E-01	2.14E-01	2.41E-01	2.70E-01	3.03E-01
55.37	*	1.14E-01	1.29E-01	1.44E-01	1.62E-01	1.81E-01	2.03E-01	2.28E-01	2.56E-01	2.87E-01	3.22E-01
57.12	*	1.22E-01	1.37E-01	1.53E-01	1.72E-01	1.93E-01	2.16E-01	2.43E-01	2.72E-01	3.06E-01	3.43E-01
58.92	*	1.29E-01	1.45E-01	1.63E-01	1.83E-01	2.05E-01	2.30E-01	2.58E-01	2.90E-01	3.25E-01	3.65E-01
60.78	*	1.38E-01	1.55E-01	1.73E-01	1.95E-01	2.18E-01	2.45E-01	2.75E-01	3.09E-01	3.46E-01	3.88E-01
62.70	*	1.47E-01	1.65E-01	1.85E-01	2.07E-01	2.32E-01	2.61E-01	2.93E-01	3.28E-01	3.68E-01	4.13E-01
64.69	*	1.56E-01	1.75E-01	1.96E-01	2.20E-01	2.47E-01	2.78E-01	3.11E-01	3.49E-01	3.92E-01	4.40E-01
66.73	*	1.66E-01	1.86E-01	2.09E-01	2.35E-01	2.63E-01	2.95E-01	3.31E-01	3.72E-01	4.17E-01	4.68E-01
68.84	*	1.77E-01	1.98E-01	2.23E-01	2.50E-01	2.80E-01	3.14E-01	3.53E-01	3.96E-01	4.44E-01	4.98E-01
71.02	*	1.88E-01	2.11E-01	2.37E-01	2.66E-01	2.98E-01	3.35E-01	3.75E-01	4.21E-01	4.73E-01	5.30E-01
73.26	*	2.00E-01	2.25E-01	2.52E-01	2.83E-01	3.17E-01	3.56E-01	3.99E-01	4.48E-01	5.03E-01	5.64E-01
75.58	*	2.13E-01	2.39E-01	2.68E-01	3.01E-01	3.39E-01	3.79E-01	4.25E-01	4.77E-01	5.35E-01	6.00E-01
77.96	*	2.27E-01	2.56E-01	2.85E-01	3.20E-01	3.59E-01	4.03E-01	4.52E-01	5.08E-01	5.69E-01	6.39E-01
80.43	*	2.41E-01	2.71E-01	3.04E-01	3.41E-01	3.82E-01	4.29E-01	4.81E-01	5.40E-01	6.06E-01	6.80E-01
82.97	*	2.57E-01	2.88E-01	3.23E-01	3.63E-01	4.07E-01	4.57E-01	5.12E-01	5.75E-01	6.45E-01	7.24E-01
85.59	*	2.73E-01	3.07E-01	3.46E-01	3.86E-01	4.33E-01	4.86E-01	5.45E-01	6.12E-01	6.86E-01	7.70E-01
88.30	*	2.91E-01	3.26E-01	3.64E-01	4.11E-01	4.61E-01	5.17E-01	5.80E-01	6.51E-01	7.30E-01	8.20E-01
91.09	*	3.09E-01	3.47E-01	3.90E-01	4.37E-01	4.90E-01	5.50E-01	6.17E-01	6.93E-01	7.77E-01	8.72E-01
93.97	*	3.29E-01	3.70E-01	4.15E-01	4.65E-01	5.22E-01	5.86E-01	6.57E-01	7.37E-01	8.27E-01	9.28E-01
96.94	*	3.50E-01	3.94E-01	4.41E-01	4.95E-01	5.55E-01	6.23E-01	6.99E-01	7.85E-01	8.80E-01	9.88E-01
100.00	*	3.73E-01	4.19E-01	4.70E-01	5.27E-01	5.91E-01	6.63E-01	7.44E-01	8.35E-01	9.37E-01	1.05E-01

***** ALPHA TABLE NO. 6 FOR CABINET TUNING *****

BGX VOLUMES FROM 3.152 TO 8.911 CUBIC FEET CR 5.466 OZ TO 1.544 94 CUBIC INCHES.
 VOLUME (ACROSS) ALPH-A-PCFT PERAL (INCH) EFFECTIVE LENGTH IN SQUARE INCHES PER INCH.
 CL. IN.: 5.46E 03 6.15E 03 6.88E 03 7.72E 03 8.66E 03 9.72E 03 1.09F 04 1.22F 04 1.37E 04 1.54E 04

F-BOX HZ (DOWN)

10.00	*	1.18E-01	1.32E-01	1.46E-01	1.67E-01	1.87E-01	2.10E-01	2.35F-01	2.64E-01	2.96E-01	3.32E-01	3.76E-01
10.32	*	1.26E-01	1.41E-01	1.58E-01	1.77E-01	1.99E-01	2.23E-01	2.50F-01	2.81E-01	3.15E-01	3.54E-01	
10.64	*	1.34E-01	1.50E-01	1.68E-01	1.89E-01	2.12E-01	2.38E-01	2.67E-01	2.99E-01	3.36E-01	3.76E-01	
10.96	*	1.42E-01	1.59E-01	1.78E-01	2.01E-01	2.25E-01	2.53E-01	2.84E-01	3.18E-01	3.57E-01	4.01E-01	
11.33	*	1.51E-01	1.70E-01	1.90E-01	2.14E-01	2.40E-01	2.69E-01	3.02E-01	3.39E-01	3.80E-01	4.26E-01	
11.68	*	1.61E-01	1.81E-01	2.03E-01	2.27E-01	2.55E-01	2.86E-01	3.21E-01	3.60E-01	4.04E-01	4.54E-01	
12.05	*	1.71E-01	1.92E-01	2.16E-01	2.42E-01	2.72E-01	3.05E-01	3.42E-01	3.84E-01	4.30E-01	4.83E-01	
12.43	*	1.82E-01	2.05E-01	2.30E-01	2.58E-01	2.89E-01	3.24E-01	3.64E-01	4.08E-01	4.58E-01	5.14E-01	
12.83	*	1.94E-01	2.18E-01	2.44E-01	2.74E-01	3.08E-01	3.45E-01	3.87E-01	4.34E-01	4.87E-01	5.47E-01	
13.23	*	2.06F-01	2.32E-01	2.60E-01	2.92E-01	3.27E-01	3.67E-01	4.12E-01	4.62E-01	5.19E-01	5.82E-01	
13.65	*	2.20E-01	2.47E-01	2.77E-01	3.10E-01	3.48E-01	3.91E-01	4.39E-01	4.92E-01	5.52E-01	6.19E-01	
14.08	*	2.34E-01	2.62E-01	2.94E-01	3.30E-01	3.71E-01	4.16E-01	4.67E-01	5.24E-01	5.87E-01	6.59E-01	
14.53	*	2.49E-01	2.79E-01	3.12E-01	3.52E-01	3.94E-01	4.43E-01	4.97E-01	5.57E-01	6.25E-01	7.01E-01	
14.99	*	2.65E-01	2.97E-01	3.33E-01	3.74E-01	4.20E-01	4.71E-01	5.28E-01	5.93E-01	6.65E-01	7.46E-01	
15.46	*	2.82E-01	3.16E-01	3.55E-01	3.98E-01	4.47E-01	5.01E-01	5.62E-01	6.31E-01	7.08E-01	7.94E-01	
15.95	*	3.00E-01	3.37E-01	3.78E-01	4.24E-01	4.75E-01	5.33E-01	5.95E-01	6.72E-01	7.53E-01	8.45E-01	
16.45	*	3.19E-01	3.58E-01	4.02E-01	4.51E-01	5.06E-01	5.68E-01	6.37E-01	7.15E-01	8.02E-01	9.03E-01	
16.97	*	3.40F-01	3.81E-01	4.28E-01	4.80E-01	5.38E-01	6.04E-01	6.78E-01	7.61E-01	8.53E-01	9.57E-01	
17.51	*	3.62E-01	4.06E-01	4.55E-01	5.11E-01	5.73E-01	6.43E-01	7.21E-01	8.09E-01	9.08E-01	1.02E 00	
18.06	*	3.85E-01	4.32E-01	4.84E-01	5.43E-01	6.10E-01	6.84E-01	7.68E-01	8.61E-01	9.66E-01	1.08E 00	
18.63	*	4.09E-01	4.59E-01	5.15E-01	5.78E-01	6.49E-01	7.28E-01	8.17E-01	9.17E-01	1.03E 00	1.15E 00	
19.22	*	4.36E-01	4.89E-01	5.46E-01	6.16E-01	6.99E-01	7.95E-01	8.99E-01	1.02E 00	1.09E 00	1.23E 00	
19.83	*	4.64E-01	5.20E-01	5.84E-01	6.55E-01	7.35E-01	8.25E-01	9.29E-01	1.04E 00	1.16E 00	1.31E 00	
20.46	*	4.94E-01	5.54E-01	6.21E-01	6.97E-01	7.82E-01	8.78E-01	9.85E-01	1.10E 00	1.24E 00	1.39E 00	
21.10	*	5.25E-01	5.89E-01	6.61E-01	7.42E-01	8.32E-01	9.34E-01	1.05E 00	1.18E 00	1.32E 00	1.48E 00	
21.77	*	5.59E-01	6.27E-01	7.04E-01	7.89E-01	8.86E-01	9.94E-01	1.12E 00	1.25E 00	1.40E 00	1.58E 00	
22.46	*	5.95E-01	6.67E-01	7.49E-01	8.40E-01	9.43E-01	1.06E 00	1.19E 00	1.33E 00	1.49E 00	1.68E 00	
23.17	*	6.33E-01	7.10E-01	7.97E-01	8.94E-01	1.00E 00	1.13E 00	1.26E 00	1.42E 00	1.59E 00	1.78E 00	
23.90	*	6.74E-01	7.56E-01	8.48E-01	9.52E-01	1.07E 00	1.20E 00	1.34E 00	1.51E 00	1.69E 00	1.90E 00	
24.65	*	7.17E-01	8.04E-01	9.03E-01	1.01E 00	1.14E 00	1.27E 00	1.44E 00	1.63E 00	1.80E 00	2.02E 00	
25.43	*	7.63E-01	8.56E-01	9.60E-01	1.08E 00	1.21E 00	1.36E 00	1.52E 00	1.71E 00	1.92E 00	2.15E 00	
26.24	*	8.12E-01	9.11E-01	1.02E 00	1.15E 00	1.29E 00	1.44E 00	1.62E 00	1.82E 00	2.04E 00	2.29E 00	
27.07	*	8.64E-01	9.69E-01	1.08E 00	1.22E 00	1.37E 00	1.54E 00	1.73E 00	1.93E 00	2.17E 00	2.44E 00	
27.92	*	9.20E-01	1.03E 00	1.18E 00	1.36E 00	1.46E 00	1.64E 00	1.83E 00	2.06E 00	2.31E 00	2.59E 00	
28.80	*	9.79E-01	1.10E 00	1.23E 00	1.38E 00	1.55E 00	1.74E 00	1.95E 00	2.19E 00	2.46E 00	2.76E 00	

ALPHA TABLE NO. 6 CONTINUED.

29.71	*	1.04E 00	1.17E 00	1.31E 00	1.47E 00	1.65E 00	1.85E 00	2.08E 00	2.33E 00	2.62E 00	2.94E 00	
30.65	*	1.11E 00	1.24E 00	1.40E 00	1.57E 00	1.76E 00	1.97E 00	2.21E 00	2.48E 00	2.78E 00	3.12E 00	
31.62	*	1.18E 00	1.32E 00	1.48E 00	1.67E 00	1.87E 00	2.10E 00	2.35E 00	2.64E 00	2.96E 00	3.32E 00	
32.62	*	1.26E 00	1.41E 00	1.58E 00	1.77E 00	1.99E 00	2.23E 00	2.50E 00	2.81E 00	3.15E 00	3.54E 00	
33.65	*	1.34E 00	1.50E 00	1.68E 00	1.89E 00	2.12E 00	2.38E 00	2.67E 00	2.99E 00	3.36E 00	3.76E 00	
34.72	*	1.42E 00	1.59E 00	1.78E 00	2.01E 00	2.25E 00	2.53E 00	2.84E 00	3.18E 00	3.57E 00	4.01E 00	
35.81	*	1.51E 00	1.70E 00	1.90E 00	2.14E 00	2.40E 00	2.69E 00	3.02E 00	3.39E 00	3.80E 00	4.26E 00	
36.95	*	1.61E 00	1.81E 00	2.03E 00	2.27E 00	2.55E 00	2.86E 00	3.21E 00	3.60E 00	4.04E 00	4.54E 00	
38.11	*	1.71E 00	1.92E 00	2.16E 00	2.42E 00	2.72E 00	3.05E 00	3.42E 00	3.84E 00	4.30E 00	4.83E 00	
39.32	*	1.82E 00	2.05E 00	2.30E 00	2.58E 00	2.89E 00	3.24E 00	3.64E 00	4.08E 00	4.58E 00	5.14E 00	
40.56	*	1.94E 00	2.18E 00	2.44E 00	2.74E 00	3.08E 00	3.45E 00	3.87E 00	4.34E 00	4.87E 00	5.47E 00	
41.84	*	2.06E 00	2.32E 00	2.60E 00	2.92E 00	3.27E 00	3.67E 00	4.12E 00	4.62E 00	5.19E 00	5.82E 00	
43.17	*	2.20E 00	2.47E 00	2.77E 00	3.10E 00	3.48E 00	3.91E 00	4.39E 00	4.92E 00	5.52E 00	6.19E 00	
44.53	*	2.34E 00	2.62E 00	2.94E 00	3.30E 00	3.71E 00	4.16E 00	4.67E 00	5.24E 00	5.87E 00	6.59E 00	
45.94	*	2.49E 00	2.79E 00	3.12E 00	3.52E 00	3.94E 00	4.43E 00	4.97E 00	5.57E 00	6.25E 00	7.01E 00	
47.49	*	2.65E 00	2.97E 00	3.33E 00	3.74E 00	4.20E 00	4.71E 00	5.28E 00	5.93E 00	6.65E 00	7.46E 00	
48.99	*	2.82E 00	3.16E 00	3.55E 00	3.98E 00	4.47E 00	5.01E 00	5.62E 00	6.31E 00	7.08E 00	7.94E 00	
50.43	*	3.00E 00	3.37E 00	3.78E 00	4.24E 00	4.75E 00	5.33E 00	5.95E 00	6.72E 00	7.53E 00	8.45E 00	
52.03	*	3.19E 00	3.58E 00	4.02E 00	4.51E 00	5.06E 00	5.68E 00	6.37E 00	7.15E 00	8.02E 00	9.00E 00	
53.67	*	3.40E 00	3.81E 00	4.28E 00	4.80E 00	5.38E 00	6.04E 00	6.78E 00	7.61E 00	8.53E 00	9.57E 00	
55.37	*	3.62E 00	4.06E 00	4.55E 00	5.11E 00	5.73E 00	6.43E 00	7.21E 00	8.09E 00	9.08E 00	1.02E 01	
57.12	*	3.85E 00	4.32E 00	4.84E 00	5.43E 00	6.10E 00	6.84E 00	7.68E 00	8.61E 00	9.66E 00	1.08E 01	
58.92	*	4.09E 00	4.59E 00	5.15E 00	5.78E 00	6.49E 00	7.28E 00	8.17E 00	9.17E 00	1.03E 01	1.15E 01	
60.78	*	4.36E 00	4.89E 00	5.46E 00	6.16E 00	6.91E 00	7.79E 00	8.69E 00	9.78E 00	1.09E 01	1.23E 01	
62.70	*	4.64E 00	5.20E 00	5.84E 00	6.55E 00	7.35E 00	8.25E 00	9.25E 00	1.04E 01	1.16E 01	1.31E 01	
64.69	*	4.94E 00	5.54E 00	6.21E 00	6.97E 00	7.82E 00	8.78E 00	9.85E 00	1.10E 01	1.24E 01	1.39E 01	
66.73	*	5.25E 00	5.89E 00	6.61E 00	7.42E 00	8.32E 00	9.34E 00	1.05E 01	1.18E 01	1.32E 01	1.48E 01	
68.84	*	5.59E 00	6.27E 00	7.04E 00	7.89E 00	8.86E 00	9.94E 00	1.12E 01	1.25E 01	1.40E 01	1.58E 01	
71.02	*	5.95E 00	6.67E 00	7.49E 00	8.40E 00	9.43E 00	1.06E 01	1.19E 01	1.33E 01	1.49E 01	1.68E 01	
73.26	*	6.33E 00	7.10E 00	7.97E 00	8.94E 00	1.00E 01	1.13E 01	1.26E 01	1.42E 01	1.59E 01	1.78E 01	
75.58	*	6.74E 00	7.56E 00	8.48E 00	9.52E 00	1.07E 01	1.20E 01	1.34E 01	1.51E 01	1.69E 01	1.90E 01	
77.96	*	7.17E 00	8.04E 00	9.03E 00	1.01E 01	1.14E 01	1.27E 01	1.43E 01	1.60E 01	1.80E 01	2.02E 01	
80.43	*	7.63E 00	8.56E 00	9.60E 00	1.08E 01	1.21E 01	1.36E 01	1.52E 01	1.71E 01	1.92E 01	2.15E 01	
82.97	*	8.12E 00	9.11E 00	1.02E 01	1.15E 01	1.29E 01	1.44E 01	1.62E 01	1.82E 01	2.04E 01	2.29E 01	
85.59	*	8.64E 00	9.69E 00	1.08E 01	1.22E 01	1.37E 01	1.54E 01	1.72E 01	1.93E 01	2.17E 01	2.44E 01	
88.30	*	9.20E 00	1.03E 01	1.18E 01	1.36E 01	1.46E 01	1.64E 01	1.83E 01	2.06E 01	2.31E 01	2.59E 01	

***** ALPHA TABLE NO. 7 FOR CABINET TUNING *****
 BOX VOLUMES FROM 10,000 TO 20,180 CUBIC FEET OR 1.73E 04 TO 4.87E 04 CUBIC INCHES.
 VOLUME (ACROSS) ALPHA=(PORT AREA)/(PERT EFFECTIVE LENGTH) IN SQUARE INCHES PER INCH.
 CO. FT.= 1.00E 01 1.12E 01 1.26E 01 1.41E 01 1.58E 01 1.78E 01 2.00E 01 2.24E 01 2.51E 01 2.82E 01
 CO. IN.= 1.73E 04 1.94E 04 2.18E 04 2.44E 04 2.74E 04 3.07E 04 3.45E 04 3.87E 04 4.34E 04 4.87E 04
 F-BOX IZ (DOWN)

10.00	*	3.73E-01	4.19E-01	4.70E-01	5.27E-01	5.91E-01	6.63E-01	7.44E-01	8.35E-01	9.37E-01	1.05E 00	1.18E 00
10.32	*	2.67E-01	4.45E-01	5.00E-01	5.61E-01	6.29E-01	7.06E-01	7.92E-01	8.89E-01	9.97E-01	1.12E 00	1.26E 00
10.64	*	4.22E-01	4.74E-01	5.32E-01	5.97E-01	6.70E-01	7.51E-01	8.43E-01	9.46E-01	1.06E 00	1.19E 00	1.34E 00
10.98	*	4.80E-01	5.04E-01	5.66E-01	6.35E-01	7.13E-01	7.99E-01	8.97E-01	1.01E 00	1.13E 00	1.27E 00	1.42E 00
11.33	*	4.78E-01	5.37E-01	6.02E-01	6.76E-01	7.58E-01	8.51E-01	9.55E-01	1.07E 00	1.20E 00	1.35E 00	1.50E 00
11.68	*	5.04E-01	5.71E-01	6.41E-01	7.19E-01	8.07E-01	9.05E-01	1.02E 00	1.14E 00	1.28E 00	1.43E 00	1.58E 00
12.05	*	5.42E-01	6.09E-01	6.82E-01	7.65E-01	8.59E-01	9.64E-01	1.08E 00	1.21E 00	1.36E 00	1.51E 00	1.66E 00
12.43	*	5.77E-01	6.47E-01	7.26E-01	8.15E-01	9.14E-01	1.03E 00	1.15E 00	1.29E 00	1.45E 00	1.60E 00	1.75E 00
12.83	*	6.14E-01	6.85E-01	7.73E-01	8.67E-01	9.73E-01	1.09E 00	1.22E 00	1.37E 00	1.54E 00	1.70E 00	1.85E 00
13.23	*	6.53E-01	7.23E-01	8.22E-01	9.22E-01	1.04E 00	1.16E 00	1.30E 00	1.46E 00	1.64E 00	1.80E 00	1.95E 00
13.65	*	6.95E-01	7.82E-01	8.85E-01	9.82E-01	1.10E 00	1.24E 00	1.39E 00	1.56E 00	1.75E 00	1.96E 00	2.16E 00
14.08	*	7.40E-01	8.30E-01	9.31E-01	1.04E 00	1.17E 00	1.32E 00	1.48E 00	1.66E 00	1.86E 00	2.08E 00	2.28E 00
14.53	*	7.87E-01	8.83E-01	9.91E-01	1.11E 00	1.25E 00	1.41E 00	1.57E 00	1.76E 00	1.98E 00	2.22E 00	2.44E 00
14.99	*	8.38E-01	9.40E-01	1.05E 00	1.18E 00	1.33E 00	1.49E 00	1.67E 00	1.88E 00	2.10E 00	2.36E 00	2.59E 00
15.46	*	8.91E-01	1.03E 00	1.12E 00	1.26E 00	1.41E 00	1.59E 00	1.78E 00	2.00E 00	2.24E 00	2.51E 00	2.75E 00
15.95	*	9.49E-01	1.06E 00	1.19E 00	1.34E 00	1.50E 00	1.69E 00	1.89E 00	2.12E 00	2.38E 00	2.67E 00	2.93E 00
16.45	*	1.01E 00	1.13E 00	1.27E 00	1.43E 00	1.60E 00	1.80E 00	2.01E 00	2.26E 00	2.54E 00	2.85E 00	3.13E 00
16.97	*	1.07E 00	1.21E 00	1.35E 00	1.52E 00	1.70E 00	1.91E 00	2.14E 00	2.41E 00	2.70E 00	3.03E 00	3.33E 00
17.51	*	1.14E 00	1.28E 00	1.44E 00	1.62E 00	1.81E 00	2.03E 00	2.28E 00	2.56E 00	2.87E 00	3.22E 00	3.54E 00
18.06	*	1.22E 00	1.37E 00	1.53E 00	1.72E 00	1.93E 00	2.16E 00	2.43E 00	2.72E 00	3.06E 00	3.43E 00	3.76E 00
18.63	*	1.29E 00	1.45E 00	1.63E 00	1.83E 00	2.05E 00	2.30E 00	2.58E 00	2.90E 00	3.25E 00	3.65E 00	3.99E 00
19.22	*	1.38E 00	1.55E 00	1.73E 00	1.95E 00	2.18E 00	2.45E 00	2.75E 00	3.09E 00	3.46E 00	3.88E 00	4.24E 00
19.83	*	1.47E 00	1.65E 00	1.85E 00	2.07E 00	2.32E 00	2.61E 00	2.93E 00	3.28E 00	3.68E 00	4.13E 00	4.50E 00
20.46	*	1.56E 00	1.75E 00	1.96E 00	2.20E 00	2.47E 00	2.78E 00	3.11E 00	3.49E 00	3.92E 00	4.40E 00	4.79E 00
21.10	*	1.66E 00	1.86E 00	2.09E 00	2.35E 00	2.63E 00	2.95E 00	3.31E 00	3.72E 00	4.17E 00	4.68E 00	5.10E 00
21.77	*	1.77E 00	1.98E 00	2.23E 00	2.50E 00	2.80E 00	3.14E 00	3.53E 00	3.96E 00	4.44E 00	4.98E 00	5.40E 00
22.46	*	1.89E 00	2.11E 00	2.37E 00	2.66E 00	2.98E 00	3.35E 00	3.75E 00	4.21E 00	4.73E 00	5.30E 00	5.73E 00
23.17	*	2.02E 00	2.25E 00	2.52E 00	2.83E 00	3.17E 00	3.56E 00	3.99E 00	4.48E 00	5.03E 00	5.64E 00	6.07E 00
23.90	*	2.13E 00	2.38E 00	2.68E 00	3.01E 00	3.38E 00	3.79E 00	4.25E 00	4.77E 00	5.35E 00	6.00E 00	6.43E 00
24.65	*	2.27E 00	2.56E 00	2.85E 00	3.20E 00	3.59E 00	4.03E 00	4.52E 00	5.08E 00	5.69E 00	6.39E 00	6.82E 00
25.43	*	2.41E 00	2.71E 00	3.04E 00	3.41E 00	3.82E 00	4.29E 00	4.81E 00	5.40E 00	6.06E 00	6.80E 00	7.33E 00
26.24	*	2.57E 00	2.88E 00	3.23E 00	3.63E 00	4.07E 00	4.57E 00	5.12E 00	5.75E 00	6.45E 00	7.24E 00	7.77E 00
27.07	*	2.73E 00	3.07E 00	3.44E 00	3.86E 00	4.33E 00	4.86E 00	5.45E 00	6.12E 00	6.86E 00	7.70E 00	8.23E 00
27.92	*	2.91E 00	3.28E 00	3.66E 00	4.11E 00	4.61E 00	5.17E 00	5.80E 00	6.51E 00	7.30E 00	8.20E 00	8.72E 00
28.80	*	3.09E 00	3.47E 00	3.90E 00	4.37E 00	4.90E 00	5.50E 00	6.17E 00	6.93E 00	7.77E 00	8.70E 00	9.22E 00

ALPHA TABLE NO. 7 CONTINUED.

29.71	*	3.29E 00	3.71E 00	4.15E 00	4.65E 00	5.22E 00	5.86E 00	6.57E 00	7.37E 00	8.27E 00	9.28E 00	10.30E 00
30.65	*	3.50E 00	3.93E 00	4.41E 00	4.95E 00	5.55E 00	6.23E 00	6.99E 00	7.85E 00	8.80E 00	9.80E 00	10.80E 00
31.62	*	3.73E 00	4.16E 00	4.70E 00	5.27E 00	5.91E 00	6.63E 00	7.44E 00	8.35E 00	9.37E 00	1.05E 01	1.18E 01
32.62	*	3.97E 00	4.43E 00	5.00E 00	5.61E 00	6.29E 00	7.06E 00	7.92E 00	8.89E 00	9.97E 00	1.12E 01	1.26E 01
33.65	*	4.22E 00	4.74E 00	5.32E 00	5.97E 00	6.70E 00	7.51E 00	8.43E 00	9.46E 00	1.06E 01	1.19E 01	1.34E 01
34.72	*	4.50E 00	5.04E 00	5.66E 00	6.35E 00	7.13E 00	7.99E 00	8.97E 00	1.01E 01	1.13E 01	1.27E 01	1.42E 01
35.83	*	4.78E 00	5.37E 00	6.02E 00	6.76E 00	7.58E 00	8.51E 00	9.55E 00	1.07E 01	1.20E 01	1.35E 01	1.50E 01
36.98	*	5.04E 00	5.71E 00	6.41E 00	7.19E 00	8.07E 00	9.05E 00	1.02E 01	1.14E 01	1.28E 01	1.43E 01	1.58E 01
38.11	*	5.42E 00	6.09E 00	6.82E 00	7.65E 00	8.59E 00	9.64E 00	1.08E 01	1.21E 01	1.36E 01	1.51E 01	1.66E 01
39.32	*	5.77E 00	6.47E 00	7.26E 00	8.15E 00	9.14E 00	1.03E 01	1.15E 01	1.29E 01	1.45E 01	1.60E 01	1.75E 01
40.56	*	6.14E 00	6.85E 00	7.73E 00	8.67E 00	9.73E 00	1.09E 01	1.22E 01	1.37E 01	1.54E 01	1.70E 01	1.85E 01
41.84	*	6.53E 00	7.23E 00	8.22E 00	9.22E 00	1.04E 01	1.16E 01	1.30E 01	1.46E 01	1.64E 01	1.80E 01	1.95E 01
43.17	*	6.95E 00	7.82E 00	8.85E 00	9.82E 00	1.10E 01	1.24E 01	1.39E 01	1.56E 01	1.75E 01	1.96E 01	2.16E 01
44.53	*	7.40E 00	8.30E 00	9.31E 00	1.04E 01	1.17E 01	1.32E 01	1.48E 01	1.66E 01	1.86E 01	2.08E 01	2.28E 01
45.93	*	7.87E 00	8.83E 00	9.91E 00	1.11E 01	1.25E 01	1.41E 01	1.57E 01	1.76E 01	1.98E 01	2.22E 01	2.44E 01
47.39	*	8.38E 00	9.40E 00	1.05E 01	1.18E 01	1.33E 01	1.49E 01	1.67E 01	1.88E 01	2.10E 01	2.36E 01	2.59E 01
48.89	*	8.91E 00	1.03E 01	1.12E 01	1.26E 01	1.41E 01	1.59E 01	1.78E 01	2.00E 01	2.24E 01	2.51E 01	2.75E 01
50.43	*	9.49E 00	1.06E 01	1.19E 01	1.34E 01	1.50E 01	1.69E 01	1.89E 01	2.12E 01	2.38E 01	2.67E 01	2.93E 01
52.03	*	1.01E 01	1.13E 01	1.27E 01	1.43E 01	1.60E 01	1.80E 01	2.01E 01	2.26E 01	2.54E 01	2.85E 01	3.13E 01
53.67	*	1.07E 01	1.21E 01	1.35E 01	1.52E 01	1.70E 01	1.91E 01	2.14E 01	2.41E 01	2.70E 01	3.03E 01	3.33E 01
55.37	*	1.14E 01	1.29E 01	1.44E 01	1.62E 01	1.81E 01	2.03E 01	2.28E 01	2.56E 01	2.87E 01	3.22E 01	3.54E 01
57.12	*	1.22E 01	1.37E 01	1.53E 01	1.72E 01	1.93E 01	2.16E 01	2.43E 01	2.72E 01	3.06E 01	3.43E 01	3.76E 01
58.92	*	1.29E 01	1.45E 01	1.63E 01	1.83E 01	2.05E 01	2.30E 01	2.58E 01	2.90E 01	3.25E 01	3.65E 01	3.99E 01
60.78	*	1.38E 01	1.55E 01	1.73E 01	1.95E 01	2.18E 01	2.45E 01	2.75E 01	3.09E 01	3.46E 01	3.88E 01	4.24E 01
62.72	*	1.47E 01	1.65E 01	1.85E 01	2.07E 01	2.32E 01	2.61E 01	2.93E 01	3.28E 01	3.68E 01	4.13E 01	4.50E 01
64.69	*	1.56E 01	1.75E 01	1.96E 01	2.20E 01	2.47E 01	2.78E 01	3.11E 01	3.49E 01	3.92E 01	4.40E 01	4.79E 01
66.73	*	1.66E 01	1.86E 01	2.09E 01	2.35E 01	2.63E 01	2.95E 01	3.31E 01	3.72E 01	4.17E 01	4.68E 01	5.10E 01
68.84	*	1.77E 01	1.98E 01	2.23E 01	2.50E 01	2.80E 01	3.14E 01	3.53E 01	3.96E 01	4.44E 01	4.98E 01	5.40E 01
71.02	*	1.89E 01	2.11E 01	2.37E 01	2.66E 01	2.98E 01	3.35E 01	3.75E 01	4.21E 01	4.73E 01	5.30E 01	5.73E 01
73.26	*	2.02E 01	2.25E 01	2.52E 01	2.83E 01	3.17E 01	3.56E 01	3.99E 01	4.48E 01	5.03E 01	5.64E 01	6.07E 01
75.58	*	2.13E 01	2.39E 01	2.68E 01	3.01E 01	3.38E 01	3.79E 01	4.25E 01	4.77E 01	5.35E 01	6.00E 01	6.43E 01
77.96	*	2.27E 01	2.56E 01	2.85E 01	3.20E 01	3.59E 01	4.03E 01	4.52E 01	5.08E 01	5.69E 01	6.39E 01	6.82E 01
80.43	*	2.41E 01	2.71E 01	3.04E 01	3.41E 01	3.82E 01	4.29E 01	4.81E 01	5.40E 01	6.06E 01	6.80E 01	7.33E 01
82.97	*	2.57E 01	2.88E 01	3.23E 01	3.63E 01	4.07E 01	4.57E 01	5.12E 01	5.75E 01	6.45E 01	7.24E 01	7.77E 01
85.54	*	2.73E 01	3.07E 01	3.44E 01	3.86E 01	4.33E 01	4.86E 01	5.45E 01	6.12E 01	6.86E 01	7.70E 01	8.23E 01
88.30	*	2.91E 01	3.28E 01	3.66E 01	4.11E 01	4.61E 01	5.17E 01	5.80E 01	6.51E 01	7.30E 01	8.20E 01	8.72E 01
91.09	*	3.09E 01	3.47E 01	3.90E 01	4.37E 01	4.90E 01	5.50E 01	6.17E 01	6.93E 01	7.77E 01	8.70E 01	9.22E 01
93.97	*	3.29E 01	3.71E 01	4.15E 01	4.65E 01	5.22E 01	5.86E 01	6.57E 01	7.37E 01	8.27E 01	9.28E 01	10.30E 01
96.94	*	3.50E 01	3.93E 01	4.41E 01	4.95E 01	5.55E 01						

***** ALPHA TABLE NO. 5 FOR CABINET TUNING *****
 BCX VOLUMES FROM 31.620 TO 89.165 CUBIC FEET OR 5.466 TO 1.546 75 CUBIC INCHES.
 VOLUME (ACROSS) ALPHA=(POPT AREA)/(PCRT EFFECTIVE LENGTH) IN SQUARE INCHES PER INCH.
 CU. FT.= 3.16E 01 3.55E C1 4.47E 01 5.31E 01 5.62E 01 6.31E 01 7.00E 01 7.94E 01 8.91E 01
 CU. IN.= 5.46E 04 6.13E C4 6.88E 04 7.72E 04 8.66E 04 9.72E 04 1.09E 05 1.22E 05 1.37E 05 1.54E 05
 F-BCX HZ (DOWN)

10.00	*	1.18E 00	1.32E 00	1.49E 00	1.67E 00	1.87E 00	2.10E 00	2.35E 00	2.64E 00	2.95E 00	3.32E 00
10.32	*	1.26E 00	1.41E 00	1.58E 00	1.77E 00	1.99E 00	2.24E 00	2.53E 00	2.85E 00	3.19E 00	3.54E 00
10.64	*	1.34E 00	1.50E 00	1.68E 00	1.89E 00	2.12E 00	2.38E 00	2.67E 00	2.99E 00	3.36E 00	3.76E 00
10.98	*	1.42E 00	1.59E 00	1.78E 00	2.01E 00	2.25E 00	2.53E 00	2.84E 00	3.18E 00	3.57E 00	4.01E 00
11.33	*	1.51E 00	1.70E 00	1.90E 00	2.14E 00	2.40E 00	2.69E 00	3.02E 00	3.39E 00	3.80E 00	4.26E 00
11.68	*	1.61E 00	1.81E 00	2.03E 00	2.27E 00	2.55E 00	2.86E 00	3.21E 00	3.60E 00	4.04E 00	4.54E 00
12.05	*	1.71E 00	1.92E 00	2.16E 00	2.42E 00	2.72E 00	3.05E 00	3.42E 00	3.84E 00	4.30E 00	4.83E 00
12.43	*	1.82E 00	2.05E 00	2.30E 00	2.58E 00	2.89E 00	3.24E 00	3.64E 00	4.08E 00	4.58E 00	5.14E 00
12.83	*	1.94E 00	2.18E 00	2.44E 00	2.74E 00	3.08E 00	3.45E 00	3.87E 00	4.34E 00	4.87E 00	5.47E 00
13.23	*	2.06E 00	2.32E 00	2.60E 00	2.92E 00	3.27E 00	3.67E 00	4.12E 00	4.62E 00	5.19E 00	5.82E 00
13.65	*	2.20E 00	2.47E 00	2.77E 00	3.10E 00	3.48E 00	3.91E 00	4.38E 00	4.92E 00	5.52E 00	6.19E 00
14.08	*	2.34E 00	2.62E 00	2.94E 00	3.30E 00	3.71E 00	4.16E 00	4.67E 00	5.24E 00	5.87E 00	6.59E 00
14.53	*	2.49E 00	2.79E 00	3.13E 00	3.52E 00	3.94E 00	4.43E 00	4.97E 00	5.57E 00	6.25E 00	7.01E 00
14.99	*	2.65E 00	2.97E 00	3.33E 00	3.74E 00	4.20E 00	4.71E 00	5.28E 00	5.93E 00	6.65E 00	7.46E 00
15.46	*	2.82E 00	3.16E 00	3.55E 00	3.98E 00	4.47E 00	5.01E 00	5.62E 00	6.31E 00	7.08E 00	7.94E 00
15.95	*	3.00E 00	3.37E 00	3.78E 00	4.24E 00	4.75E 00	5.33E 00	5.99E 00	6.72E 00	7.53E 00	8.45E 00
16.45	*	3.19E 00	3.58E 00	4.02E 00	4.51E 00	5.06E 00	5.68E 00	6.37E 00	7.15E 00	8.02E 00	9.00E 00
16.97	*	3.40E 00	3.81E 00	4.28E 00	4.80E 00	5.38E 00	6.04E 00	6.78E 00	7.61E 00	8.53E 00	9.57E 00
17.51	*	3.62E 00	4.06E 00	4.55E 00	5.11E 00	5.73E 00	6.43E 00	7.21E 00	8.09E 00	9.08E 00	1.02E 01
18.06	*	3.85E 00	4.32E 00	4.84E 00	5.43E 00	6.10E 00	6.84E 00	7.68E 00	8.61E 00	9.66E 00	1.08E 01
18.63	*	4.09E 00	4.59E 00	5.15E 00	5.78E 00	6.49E 00	7.28E 00	8.17E 00	9.17E 00	1.03E 01	1.15E 01
19.22	*	4.36E 00	4.89E 00	5.49E 00	6.16E 00	6.91E 00	7.75E 00	8.69E 00	9.76E 00	1.09E 01	1.23E 01
19.83	*	4.64E 00	5.20E 00	5.84E 00	6.55E 00	7.35E 00	8.25E 00	9.25E 00	1.04E 01	1.16E 01	1.31E 01
20.46	*	4.94E 00	5.54E 00	6.21E 00	6.97E 00	7.82E 00	8.78E 00	9.85E 00	1.10E 01	1.24E 01	1.39E 01
21.10	*	5.25E 00	5.85E 00	6.61E 00	7.42E 00	8.32E 00	9.34E 00	1.05E 01	1.18E 01	1.32E 01	1.48E 01
21.77	*	5.59E 00	6.27E 00	7.04E 00	7.89E 00	8.86E 00	9.94E 00	1.12E 01	1.25E 01	1.40E 01	1.58E 01
22.46	*	5.95E 00	6.67E 00	7.49E 00	8.40E 00	9.43E 00	1.06E 01	1.19E 01	1.33E 01	1.49E 01	1.68E 01
23.17	*	6.33E 00	7.10E 00	7.97E 00	8.94E 00	1.00E 01	1.13E 01	1.26E 01	1.42E 01	1.59E 01	1.76E 01
23.90	*	6.74E 00	7.56E 00	8.48E 00	9.52E 00	1.07E 01	1.20E 01	1.34E 01	1.51E 01	1.69E 01	1.87E 01
24.65	*	7.17E 00	8.04E 00	8.97E 00	1.01E 01	1.14E 01	1.27E 01	1.43E 01	1.60E 01	1.80E 01	2.02E 01
25.43	*	7.63E 00	8.56E 00	9.52E 00	1.08E 01	1.21E 01	1.36E 01	1.52E 01	1.71E 01	1.92E 01	2.15E 01
26.24	*	8.12E 00	9.11E 00	1.02E 01	1.15E 01	1.29E 01	1.44E 01	1.62E 01	1.82E 01	2.04E 01	2.29E 01
27.07	*	8.64E 00	9.69E 00	1.05E 01	1.22E 01	1.37E 01	1.54E 01	1.72E 01	1.93E 01	2.17E 01	2.44E 01
27.92	*	9.20E 00	1.03E 01	1.16E 01	1.30E 01	1.46E 01	1.64E 01	1.83E 01	2.05E 01	2.31E 01	2.59E 01
28.80	*	9.79E 00	1.10E 01	1.23E 01	1.38E 01	1.55E 01	1.74E 01	1.95E 01	2.19E 01	2.46E 01	2.76E 01

ALPHA TABLE NO. 8 CONTINUED.

29.71	*	1.04E 01	1.17E 01	1.31E 01	1.47E 01	1.65E 01	1.85E 01	2.08E 01	2.33E 01	2.62E 01	2.94E 01
30.65	*	1.11E 01	1.24E 01	1.40E 01	1.57E 01	1.76E 01	1.97E 01	2.21E 01	2.48E 01	2.78E 01	3.12E 01
31.62	*	1.18E 01	1.32E 01	1.48E 01	1.67E 01	1.87E 01	2.10E 01	2.35E 01	2.64E 01	2.96E 01	3.32E 01
32.62	*	1.26E 01	1.41E 01	1.58E 01	1.77E 01	1.99E 01	2.23E 01	2.50E 01	2.81E 01	3.15E 01	3.54E 01
33.65	*	1.34E 01	1.50E 01	1.68E 01	1.89E 01	2.12E 01	2.38E 01	2.67E 01	2.99E 01	3.36E 01	3.76E 01
34.72	*	1.42E 01	1.59E 01	1.79E 01	2.01E 01	2.25E 01	2.53E 01	2.84E 01	3.18E 01	3.57E 01	4.01E 01
35.81	*	1.51E 01	1.70E 01	1.90E 01	2.14E 01	2.40E 01	2.69E 01	3.02E 01	3.39E 01	3.80E 01	4.26E 01
36.95	*	1.61E 01	1.81E 01	2.03E 01	2.27E 01	2.55E 01	2.86E 01	3.21E 01	3.60E 01	4.04E 01	4.54E 01
38.11	*	1.71E 01	1.92E 01	2.16E 01	2.42E 01	2.72E 01	3.05E 01	3.42E 01	3.84E 01	4.30E 01	4.83E 01
39.32	*	1.82E 01	2.05E 01	2.30E 01	2.58E 01	2.89E 01	3.24E 01	3.64E 01	4.08E 01	4.58E 01	5.14E 01
40.56	*	1.94E 01	2.18E 01	2.44E 01	2.74E 01	3.08E 01	3.45E 01	3.87E 01	4.34E 01	4.87E 01	5.47E 01
41.84	*	2.06E 01	2.32E 01	2.60E 01	2.92E 01	3.27E 01	3.67E 01	4.12E 01	4.62E 01	5.19E 01	5.82E 01
43.17	*	2.20E 01	2.47E 01	2.77E 01	3.10E 01	3.48E 01	3.91E 01	4.38E 01	4.92E 01	5.52E 01	6.19E 01
44.53	*	2.34E 01	2.62E 01	2.94E 01	3.30E 01	3.71E 01	4.16E 01	4.67E 01	5.24E 01	5.87E 01	6.59E 01
45.94	*	2.49E 01	2.79E 01	3.13E 01	3.52E 01	3.94E 01	4.43E 01	4.97E 01	5.57E 01	6.25E 01	7.01E 01
47.39	*	2.65E 01	2.97E 01	3.33E 01	3.74E 01	4.20E 01	4.71E 01	5.28E 01	5.93E 01	6.65E 01	7.46E 01
48.89	*	2.82E 01	3.16E 01	3.55E 01	3.98E 01	4.47E 01	5.01E 01	5.62E 01	6.31E 01	7.08E 01	7.94E 01
50.43	*	3.00E 01	3.37E 01	3.78E 01	4.24E 01	4.75E 01	5.33E 01	5.99E 01	6.72E 01	7.53E 01	8.45E 01
52.03	*	3.19E 01	3.58E 01	4.02E 01	4.51E 01	5.06E 01	5.68E 01	6.37E 01	7.15E 01	8.02E 01	9.00E 01
53.67	*	3.40E 01	3.81E 01	4.28E 01	4.80E 01	5.38E 01	6.04E 01	6.78E 01	7.61E 01	8.53E 01	9.57E 01
55.37	*	3.62E 01	4.06E 01	4.55E 01	5.11E 01	5.73E 01	6.43E 01	7.21E 01	8.09E 01	9.08E 01	1.02E 02
57.12	*	3.85E 01	4.32E 01	4.84E 01	5.43E 01	6.10E 01	6.84E 01	7.68E 01	8.61E 01	9.66E 01	1.08E 02
58.92	*	4.09E 01	4.59E 01	5.15E 01	5.78E 01	6.49E 01	7.28E 01	8.17E 01	9.17E 01	1.03E 02	1.15E 02
60.78	*	4.36E 01	4.89E 01	5.49E 01	6.16E 01	6.91E 01	7.75E 01	8.69E 01	9.76E 01	1.09E 02	1.23E 02
62.70	*	4.64E 01	5.20E 01	5.84E 01	6.55E 01	7.35E 01	8.25E 01	9.25E 01	1.04E 02	1.16E 02	1.31E 02
64.69	*	4.94E 01	5.54E 01	6.21E 01	6.97E 01	7.82E 01	8.78E 01	9.85E 01	1.10E 02	1.24E 02	1.39E 02
66.73	*	5.25E 01	5.85E 01	6.61E 01	7.42E 01	8.32E 01	9.34E 01	1.05E 02	1.18E 02	1.32E 02	1.48E 02
68.84	*	5.59E 01	6.27E 01	7.04E 01	7.89E 01	8.86E 01	9.94E 01	1.12E 02	1.25E 02	1.40E 02	1.58E 02
71.02	*	5.95E 01	6.67E 01	7.49E 01	8.40E 01	9.43E 01	1.06E 02	1.19E 02	1.33E 02	1.49E 02	1.68E 02
73.26	*	6.33E 01	7.11E 01	7.97E 01	8.94E 01	1.00E 02	1.13E 02	1.26E 02	1.42E 02	1.59E 02	1.78E 02
75.58	*	6.74E 01	7.56E 01	8.48E 01	9.52E 01	1.07E 02	1.20E 02	1.34E 02	1.51E 02	1.69E 02	1.90E 02
77.96	*	7.17E 01	8.04E 01	8.97E 01	1.01E 02	1.14E 02	1.27E 02	1.43E 02	1.60E 02	1.80E 02	2.02E 02
80.43	*	7.63E 01	8.56E 01	9.52E 01	1.08E 02	1.21E 02	1.36E 02	1.52E 02	1.71E 02	1.92E 02	2.15E 02
82.97	*	8.12E 01	9.11E 01	1.02E 02	1.15E 02	1.29E 02	1.44E 02	1.62E 02	1.82E 02	2.04E 02	2.29E 02
85.59	*	8.64E 01	9.69E 01	1.05E 02	1.22E 02	1.37E 02	1.54E 02	1.72E 02	1.93E 02	2.17E 02	2.44E 02
88.30	*	9.20E 01	1.03E 02	1.16E 02	1.30E 02	1.46E 02	1.64E 02	1.83E 02	2.06E 02	2.31E 02	2.58E 02
91.09	*	9.79E 01	1.10E 02	1.23E 02	1.38E 02	1.55E 02	1.74E 02	1.95E 02	2.19E 02	2.46E 02	2.76E 02
93.97	*	1.04E 02	1.17E 02	1.31E 02	1.47E 02	1.65E 02	1.85E 02	2.08E 02	2.33E 02	2.62E 02	2.94E 02
96.94	*	1.11E 02	1.24E 02	1.40E 02	1.57E 02	1.76E 02	1.97E 02	2.21E 02	2.48E 02	2.78E 02	3.12E 02
100.00	*	1.18E 02	1.32E 02	1.48E 02	1.67E 02	1.87E 02	2.10E 02	2.35E 02	2.64E 02	2.96E 02	3.32E 02

***** ALPHA TABLE NO. 9 FOR CABINET TUNING *****
 BOX VOLUMES FROM 170.00 TO 201.80 CUBIC FEET OR 1.73E 05 TO 4.87E 05 CUBIC INCHES.
 VOLUME (ACROSS) ALPHA=(PCRT AREA)/(PCRT EFFECTIVE LENGTH) IN SQUARE INCHES PER INCH.
 CU. FT.= 1.00E 02 1.12E 02 1.26E 02 1.41E 02 1.58E 02 1.78E 02 2.00E 02 2.24E 02 2.51E 02 2.82E 02
 F-BOX HZ. (LOW) 1.94E 05 2.18E 05 2.44E 05 2.74E 05 3.07E 05 3.45E 05 3.87E 05 4.34E 05 4.87E 05

10.00	*	3.73E 00	4.15E 00	4.70E 00	5.27E 00	5.91E 00	6.63E 00	7.44E 00	8.35E 00	9.37E 00	1.05E 01	1.19E 01
10.22	*	3.97E 00	4.45E 00	5.00E 00	5.61E 00	6.29E 00	7.06E 00	7.92E 00	8.85E 00	9.97E 00	1.12E 01	1.28E 01
10.64	*	4.22E 00	4.76E 00	5.32E 00	5.97E 00	6.70E 00	7.51E 00	8.43E 00	9.46E 00	1.06E 01	1.19E 01	1.27E 01
10.98	*	4.50E 00	5.06E 00	5.66E 00	6.35E 00	7.13E 00	7.99E 00	8.97E 00	1.01E 01	1.13E 01	1.27E 01	1.43E 01
11.33	*	4.78E 00	5.37E 00	6.02E 00	6.76E 00	7.58E 00	8.51E 00	9.55E 00	1.07E 01	1.20E 01	1.35E 01	1.53E 01
11.60	*	5.09E 00	5.71E 00	6.41E 00	7.19E 00	8.07E 00	9.05E 00	1.02E 01	1.14E 01	1.28E 01	1.43E 01	1.63E 01
12.05	*	5.42E 00	6.08E 00	6.82E 00	7.65E 00	8.59E 00	9.64E 00	1.08E 01	1.21E 01	1.36E 01	1.53E 01	1.73E 01
12.43	*	5.77E 00	6.47E 00	7.26E 00	8.15E 00	9.14E 00	1.03E 01	1.15E 01	1.29E 01	1.45E 01	1.63E 01	1.83E 01
12.83	*	6.14E 00	6.85E 00	7.73E 00	8.65E 00	9.73E 00	1.09E 01	1.22E 01	1.37E 01	1.54E 01	1.73E 01	1.93E 01
13.23	*	6.53E 00	7.33E 00	8.22E 00	9.22E 00	1.04E 01	1.16E 01	1.30E 01	1.46E 01	1.64E 01	1.84E 01	2.04E 01
13.65	*	6.95E 00	7.80E 00	8.75E 00	9.82E 00	1.10E 01	1.24E 01	1.35E 01	1.56E 01	1.75E 01	1.96E 01	2.18E 01
14.08	*	7.40E 00	8.30E 00	9.31E 00	1.04E 01	1.17E 01	1.32E 01	1.44E 01	1.66E 01	1.86E 01	2.08E 01	2.31E 01
14.53	*	7.87E 00	8.83E 00	9.91E 00	1.11E 01	1.25E 01	1.40E 01	1.57E 01	1.77E 01	1.98E 01	2.21E 01	2.45E 01
14.99	*	8.38E 00	9.40E 00	1.05E 01	1.18E 01	1.33E 01	1.49E 01	1.67E 01	1.88E 01	2.10E 01	2.36E 01	2.61E 01
15.46	*	8.91E 00	1.00E 01	1.12E 01	1.26E 01	1.41E 01	1.59E 01	1.78E 01	2.00E 01	2.24E 01	2.51E 01	2.78E 01
15.95	*	9.49E 00	1.06E 01	1.19E 01	1.34E 01	1.50E 01	1.69E 01	1.89E 01	2.12E 01	2.38E 01	2.67E 01	2.95E 01
16.45	*	1.01E 01	1.13E 01	1.27E 01	1.43E 01	1.60E 01	1.80E 01	2.01E 01	2.26E 01	2.54E 01	2.85E 01	3.17E 01
16.97	*	1.07E 01	1.21E 01	1.35E 01	1.52E 01	1.70E 01	1.91E 01	2.14E 01	2.41E 01	2.70E 01	3.03E 01	3.37E 01
17.51	*	1.14E 01	1.28E 01	1.44E 01	1.62E 01	1.81E 01	2.03E 01	2.28E 01	2.56E 01	2.87E 01	3.22E 01	3.59E 01
18.06	*	1.22E 01	1.37E 01	1.53E 01	1.72E 01	1.93E 01	2.16E 01	2.43E 01	2.72E 01	3.06E 01	3.43E 01	3.83E 01
18.63	*	1.29E 01	1.45E 01	1.63E 01	1.83E 01	2.05E 01	2.30E 01	2.56E 01	2.90E 01	3.25E 01	3.65E 01	4.08E 01
19.22	*	1.38E 01	1.55E 01	1.73E 01	1.95E 01	2.18E 01	2.45E 01	2.75E 01	3.09E 01	3.46E 01	3.88E 01	4.33E 01
19.83	*	1.47E 01	1.65E 01	1.85E 01	2.07E 01	2.32E 01	2.61E 01	2.92E 01	3.28E 01	3.68E 01	4.13E 01	4.60E 01
20.46	*	1.56E 01	1.75E 01	1.96E 01	2.20E 01	2.47E 01	2.78E 01	3.11E 01	3.49E 01	3.92E 01	4.40E 01	4.90E 01
21.10	*	1.66E 01	1.86E 01	2.09E 01	2.35E 01	2.63E 01	2.95E 01	3.31E 01	3.72E 01	4.17E 01	4.68E 01	5.21E 01
21.77	*	1.77E 01	1.98E 01	2.23E 01	2.50E 01	2.80E 01	3.14E 01	3.53E 01	3.96E 01	4.44E 01	4.98E 01	5.56E 01
22.46	*	1.88E 01	2.11E 01	2.37E 01	2.66E 01	2.98E 01	3.35E 01	3.75E 01	4.21E 01	4.73E 01	5.30E 01	5.91E 01
23.17	*	2.00E 01	2.25E 01	2.52E 01	2.83E 01	3.17E 01	3.56E 01	3.99E 01	4.48E 01	5.03E 01	5.64E 01	6.29E 01
23.90	*	2.13E 01	2.39E 01	2.68E 01	3.01E 01	3.38E 01	3.79E 01	4.25E 01	4.77E 01	5.35E 01	6.00E 01	6.70E 01
24.65	*	2.27E 01	2.54E 01	2.85E 01	3.20E 01	3.59E 01	4.03E 01	4.52E 01	5.08E 01	5.69E 01	6.39E 01	7.14E 01
25.43	*	2.41E 01	2.71E 01	3.04E 01	3.41E 01	3.82E 01	4.29E 01	4.81E 01	5.40E 01	6.06E 01	6.80E 01	7.63E 01
26.24	*	2.57E 01	2.88E 01	3.23E 01	3.63E 01	4.07E 01	4.57E 01	5.12E 01	5.75E 01	6.45E 01	7.24E 01	8.11E 01
27.07	*	2.73E 01	3.07E 01	3.44E 01	3.86E 01	4.33E 01	4.86E 01	5.45E 01	6.12E 01	6.86E 01	7.70E 01	8.64E 01
27.92	*	2.91E 01	3.26E 01	3.66E 01	4.11E 01	4.61E 01	5.17E 01	5.80E 01	6.51E 01	7.30E 01	8.20E 01	9.19E 01
28.80	*	3.09E 01	3.47E 01	3.90E 01	4.37E 01	4.90E 01	5.50E 01	6.17E 01	6.93E 01	7.77E 01	8.72E 01	9.78E 01

ALPHA TABLE NO. 9 CONTINUED.

29.71	*	3.29E 01	3.70E 01	4.15E 01	4.65E 01	5.22E 01	5.86E 01	6.57E 01	7.37E 01	8.27E 01	9.28E 01	1.04E 02
30.65	*	3.50E 01	3.93E 01	4.41E 01	4.95E 01	5.55E 01	6.23E 01	6.99E 01	7.85E 01	8.80E 01	9.88E 01	1.11E 02
31.62	*	3.73E 01	4.19E 01	4.70E 01	5.27E 01	5.91E 01	6.63E 01	7.44E 01	8.35E 01	9.37E 01	1.05E 02	1.19E 02
32.62	*	3.97E 01	4.45E 01	5.00E 01	5.61E 01	6.29E 01	7.06E 01	7.92E 01	8.85E 01	9.97E 01	1.12E 02	1.28E 02
33.65	*	4.22E 01	4.76E 01	5.32E 01	5.97E 01	6.70E 01	7.51E 01	8.43E 01	9.46E 01	1.06E 02	1.19E 02	1.27E 02
34.72	*	4.50E 01	5.06E 01	5.66E 01	6.35E 01	7.13E 01	7.99E 01	8.97E 01	1.01E 02	1.13E 02	1.27E 02	1.43E 02
35.81	*	4.78E 01	5.37E 01	6.02E 01	6.76E 01	7.58E 01	8.51E 01	9.55E 01	1.07E 02	1.20E 02	1.35E 02	1.53E 02
36.95	*	5.09E 01	5.71E 01	6.41E 01	7.19E 01	8.07E 01	9.05E 01	1.02E 02	1.14E 02	1.28E 02	1.43E 02	1.63E 02
38.11	*	5.42E 01	6.08E 01	6.82E 01	7.65E 01	8.59E 01	9.64E 01	1.08E 02	1.21E 02	1.36E 02	1.53E 02	1.73E 02
39.32	*	5.77E 01	6.47E 01	7.26E 01	8.15E 01	9.14E 01	1.03E 02	1.15E 02	1.29E 02	1.45E 02	1.63E 02	1.83E 02
40.56	*	6.14E 01	6.85E 01	7.73E 01	8.65E 01	9.73E 01	1.09E 02	1.22E 02	1.37E 02	1.54E 02	1.73E 02	1.93E 02
41.84	*	6.53E 01	7.33E 01	8.22E 01	9.22E 01	1.04E 02	1.16E 02	1.30E 02	1.46E 02	1.64E 02	1.84E 02	2.04E 02
43.17	*	6.95E 01	7.80E 01	8.75E 01	9.82E 01	1.10E 02	1.24E 02	1.35E 02	1.56E 02	1.75E 02	1.96E 02	2.18E 02
44.53	*	7.40E 01	8.30E 01	9.31E 01	1.04E 02	1.17E 02	1.32E 02	1.44E 02	1.66E 02	1.86E 02	2.08E 02	2.31E 02
45.94	*	7.87E 01	8.83E 01	9.91E 01	1.11E 02	1.25E 02	1.40E 02	1.57E 02	1.77E 02	1.98E 02	2.21E 02	2.45E 02
47.39	*	8.38E 01	9.40E 01	1.05E 02	1.18E 02	1.33E 02	1.49E 02	1.67E 02	1.88E 02	2.10E 02	2.36E 02	2.61E 02
48.89	*	8.91E 01	1.00E 02	1.12E 02	1.26E 02	1.41E 02	1.59E 02	1.78E 02	2.00E 02	2.24E 02	2.51E 02	2.78E 02
50.43	*	9.49E 01	1.06E 02	1.19E 02	1.34E 02	1.50E 02	1.69E 02	1.89E 02	2.12E 02	2.38E 02	2.67E 02	2.95E 02
52.03	*	1.01E 02	1.13E 02	1.27E 02	1.43E 02	1.60E 02	1.80E 02	2.01E 02	2.26E 02	2.54E 02	2.85E 02	3.17E 02
53.67	*	1.07E 02	1.21E 02	1.35E 02	1.52E 02	1.70E 02	1.91E 02	2.14E 02	2.41E 02	2.70E 02	3.03E 02	3.37E 02
55.37	*	1.14E 02	1.28E 02	1.44E 02	1.62E 02	1.81E 02	2.03E 02	2.28E 02	2.56E 02	2.87E 02	3.22E 02	3.59E 02
57.12	*	1.22E 02	1.37E 02	1.53E 02	1.72E 02	1.93E 02	2.16E 02	2.43E 02	2.72E 02	3.06E 02	3.43E 02	3.83E 02
58.92	*	1.29E 02	1.45E 02	1.63E 02	1.83E 02	2.05E 02	2.30E 02	2.56E 02	2.90E 02	3.25E 02	3.65E 02	4.08E 02
60.78	*	1.38E 02	1.55E 02	1.73E 02	1.95E 02	2.18E 02	2.45E 02	2.75E 02	3.09E 02	3.46E 02	3.88E 02	4.33E 02
62.70	*	1.47E 02	1.65E 02	1.85E 02	2.07E 02	2.32E 02	2.61E 02	2.92E 02	3.28E 02	3.68E 02	4.13E 02	4.60E 02
64.65	*	1.56E 02	1.75E 02	1.96E 02	2.20E 02	2.47E 02	2.78E 02	3.11E 02	3.49E 02	3.92E 02	4.40E 02	4.90E 02
66.73	*	1.66E 02	1.86E 02	2.09E 02	2.35E 02	2.63E 02	2.95E 02	3.31E 02	3.72E 02	4.17E 02	4.68E 02	5.21E 02
68.84	*	1.77E 02	1.98E 02	2.23E 02	2.50E 02	2.80E 02	3.14E 02	3.53E 02	3.96E 02	4.44E 02	4.98E 02	5.56E 02
71.02	*	1.88E 02	2.11E 02	2.37E 02	2.66E 02	2.98E 02	3.35E 02	3.75E 02	4.21E 02	4.73E 02	5.30E 02	5.91E 02
73.26	*	2.00E 02	2.25E 02	2.52E 02	2.83E 02	3.17E 02	3.56E 02	3.99E 02	4.48E 02	5.03E 02	5.64E 02	6.29E 02
75.58	*	2.13E 02	2.39E 02	2.68E 02	3.01E 02	3.38E 02	3.79E 02	4.25E 02	4.77E 02	5.35E 02	6.00E 02	6.70E 02
77.96	*	2.27E 02	2.54E 02	2.85E 02	3.20E 02	3.59E 02	4.03E 02	4.52E 02	5.08E 02	5.69E 02	6.39E 02	7.14E 02
80.43	*	2.41E 02	2.71E 02	3.04E 02	3.41E 02	3.82E 02	4.29E 02	4.81E 02	5.40E 02	6.06E 02	6.80E 02	7.63E 02
82.97	*	2.57E 02	2.88E 02	3.23E 02	3.63E 02	4.07E 02	4.57E 02	5.12E 02	5.75E 02	6.45E 02	7.24E 02	8.11E 02
85.59	*	2.73E 02	3.07E 02	3.44E 02	3.86E 02	4.33E 02	4.86E 02	5.45E 02	6.12E 02	6.86E 02	7.70E 02	8.64E 02
88.30	*	2.91E 02	3.26E 02	3.66E 02	4.11E 02	4.61E 02	5.17E 02	5.80E 02	6.51E 02	7.30E 02	8.20E 02	9.19E 02
91.09	*	3.09E 02	3.47E 02	3.90E 02	4.37E 02	4.90E 02	5.50E 02	6.17E 02	6.93E 02	7.77E 02	8.72E 02	9.78E 02
93.97	*	3.29E 02	3.70E 02	4.15E 02	4.65E 02	5.22E 02	5.86E 02	6.57E 02	7.37E 02	8.27E 02	9.28E 02	1.04E 03
96.94	*	3.50E 02	3.93E 02	4.41E 02	4.95E 02	5.55E 02	6.23E 02					

***** ALPHA TABLE NO. 1 FOR CABINET TUNING *****

BOX VOLUMES FROM 316.276 TO 831.051 CURIC FEET OR 5.466 TO 1.546 76 CURIC INCHES.

VOLUME (ACR/SS) ALPHA=(PI RT ANLA)/PERT EFFECTIVE LENGTH IN SQUAR INCHES PER INCH.
 CO. FT = 3.161 J2 3.551 C2 3.988 J2 4.478 J2 5.018 J2 5.628 J2 6.318 J2 7.088 J2 7.948 J2 8.918 J2
 CU. IN. = 5.948 J5 6.131 C5 6.898 J5 7.728 C5 8.668 J5 9.728 J5 1.098 C6 1.228 J6 1.378 J6 1.548 J6
 F-BX HZ (DOWN)

10.00	*	1.13E J1	1.13E J1	1.68E J1	1.67E J1	1.87E J1	2.10E J1	2.35E J1	2.66E J1	2.96E J1	2.96E J1	3.32E J1	3.32E J1
10.32	*	1.26E J1	1.41E J1	1.91E J1	1.93E J1	2.13E J1	2.23E J1	2.52E J1	2.81E J1	3.15E J1	3.58E J1	3.94E J1	3.94E J1
10.64	*	1.34E J1	1.52E J1	1.66E J1	1.87E J1	2.12E J1	2.33E J1	2.67E J1	2.99E J1	3.36E J1	3.76E J1	4.11E J1	4.11E J1
10.98	*	1.42E J1	1.55E J1	1.79E J1	2.01E J1	2.25E J1	2.53E J1	2.84E J1	3.18E J1	3.57E J1	4.01E J1	4.41E J1	4.41E J1
11.33	*	1.51E J1	1.70E J1	1.90E J1	2.14E J1	2.40E J1	2.69E J1	3.02E J1	3.39E J1	3.80E J1	4.26E J1	4.76E J1	4.76E J1
11.68	*	1.61E J1	1.81E J1	2.03E J1	2.27E J1	2.55E J1	2.86E J1	3.21E J1	3.60E J1	4.02E J1	4.50E J1	5.02E J1	5.02E J1
12.05	*	1.71E J1	1.92E J1	2.16E J1	2.42E J1	2.72E J1	3.05E J1	3.42E J1	3.84E J1	4.30E J1	4.80E J1	5.34E J1	5.34E J1
12.43	*	1.82E J1	2.05E J1	2.30E J1	2.58E J1	2.89E J1	3.24E J1	3.64E J1	4.08E J1	4.56E J1	5.07E J1	5.64E J1	5.64E J1
12.83	*	1.94E J1	2.19E J1	2.44E J1	2.74E J1	3.06E J1	3.45E J1	3.87E J1	4.34E J1	4.84E J1	5.37E J1	5.94E J1	5.94E J1
13.23	*	2.06E J1	2.32E J1	2.60E J1	2.92E J1	3.27E J1	3.67E J1	4.12E J1	4.62E J1	5.15E J1	5.72E J1	6.32E J1	6.32E J1
13.65	*	2.20E J1	2.48E J1	2.77E J1	3.10E J1	3.49E J1	3.91E J1	4.39E J1	4.92E J1	5.50E J1	6.12E J1	6.78E J1	6.78E J1
14.08	*	2.24E J1	2.62E J1	2.93E J1	3.33E J1	3.71E J1	4.16E J1	4.67E J1	5.24E J1	5.87E J1	6.56E J1	7.30E J1	7.30E J1
14.53	*	2.45E J1	2.79E J1	3.13E J1	3.52E J1	3.94E J1	4.43E J1	4.95E J1	5.57E J1	6.25E J1	7.01E J1	7.84E J1	7.84E J1
14.99	*	2.65E J1	2.97E J1	3.33E J1	3.74E J1	4.20E J1	4.71E J1	5.28E J1	5.93E J1	6.65E J1	7.46E J1	8.34E J1	8.34E J1
15.46	*	2.82E J1	3.16E J1	3.55E J1	3.98E J1	4.47E J1	5.01E J1	5.62E J1	6.31E J1	7.08E J1	7.94E J1	8.91E J1	8.91E J1
15.95	*	3.01E J1	3.37E J1	3.78E J1	4.24E J1	4.75E J1	5.35E J1	5.99E J1	6.72E J1	7.53E J1	8.45E J1	9.50E J1	9.50E J1
16.45	*	3.19E J1	3.58E J1	4.02E J1	4.51E J1	5.06E J1	5.68E J1	6.37E J1	7.15E J1	8.02E J1	9.00E J1	10.10E J1	10.10E J1
16.97	*	3.40E J1	3.81E J1	4.28E J1	4.80E J1	5.38E J1	6.04E J1	6.78E J1	7.61E J1	8.55E J1	9.57E J1	10.70E J1	10.70E J1
17.51	*	3.62E J1	4.06E J1	4.55E J1	5.11E J1	5.75E J1	6.43E J1	7.21E J1	8.09E J1	9.07E J1	10.17E J1	11.30E J1	11.30E J1
18.06	*	3.85E J1	4.32E J1	4.84E J1	5.43E J1	6.10E J1	6.86E J1	7.69E J1	8.61E J1	9.66E J1	1.08E J2	1.20E J2	1.20E J2
18.63	*	4.05E J1	4.59E J1	5.15E J1	5.78E J1	6.49E J1	7.28E J1	8.17E J1	9.17E J1	1.03E J2	1.15E J2	1.27E J2	1.27E J2
19.22	*	4.26E J1	4.84E J1	5.49E J1	6.16E J1	6.91E J1	7.75E J1	8.69E J1	9.74E J1	1.09E J2	1.23E J2	1.37E J2	1.37E J2
19.83	*	4.46E J1	5.02E J1	5.74E J1	6.55E J1	7.35E J1	8.25E J1	9.26E J1	1.04E J2	1.16E J2	1.31E J2	1.46E J2	1.46E J2
20.46	*	4.94E J1	5.54E J1	6.21E J1	7.07E J1	7.92E J1	8.79E J1	9.85E J1	1.10E J2	1.24E J2	1.39E J2	1.54E J2	1.54E J2
21.10	*	5.25E J1	5.89E J1	6.61E J1	7.47E J1	8.32E J1	9.30E J1	1.05E J2	1.18E J2	1.32E J2	1.48E J2	1.64E J2	1.64E J2
21.77	*	5.59E J1	6.27E J1	7.04E J1	8.00E J1	8.86E J1	9.94E J1	1.12E J2	1.25E J2	1.40E J2	1.58E J2	1.75E J2	1.75E J2
22.46	*	5.95E J1	6.67E J1	7.49E J1	8.48E J1	9.43E J1	1.06E J2	1.19E J2	1.33E J2	1.49E J2	1.67E J2	1.85E J2	1.85E J2
23.17	*	6.33E J1	7.10E J1	7.97E J1	9.04E J1	1.00E J2	1.13E J2	1.26E J2	1.42E J2	1.59E J2	1.78E J2	1.97E J2	1.97E J2
23.90	*	6.74E J1	7.56E J1	8.48E J1	9.52E J1	1.07E J2	1.20E J2	1.34E J2	1.51E J2	1.69E J2	1.90E J2	2.10E J2	2.10E J2
24.65	*	7.17E J1	8.04E J1	9.03E J1	1.01E J2	1.14E J2	1.27E J2	1.43E J2	1.60E J2	1.80E J2	2.02E J2	2.24E J2	2.24E J2
25.43	*	7.63E J1	8.55E J1	9.57E J1	1.08E J2	1.21E J2	1.36E J2	1.52E J2	1.71E J2	1.92E J2	2.15E J2	2.38E J2	2.38E J2
26.24	*	8.12E J1	9.11E J1	1.02E J2	1.15E J2	1.29E J2	1.44E J2	1.62E J2	1.82E J2	2.04E J2	2.29E J2	2.54E J2	2.54E J2
27.07	*	8.64E J1	9.69E J1	1.09E J2	1.22E J2	1.37E J2	1.54E J2	1.72E J2	1.93E J2	2.17E J2	2.44E J2	2.71E J2	2.71E J2
27.92	*	9.20E J1	1.03E J2	1.16E J2	1.30E J2	1.46E J2	1.64E J2	1.83E J2	2.06E J2	2.31E J2	2.59E J2	2.87E J2	2.87E J2
28.80	*	9.79E J1	1.10E J2	1.23E J2	1.38E J2	1.55E J2	1.74E J2	1.95E J2	2.19E J2	2.46E J2	2.76E J2	3.06E J2	3.06E J2

ALPHA TABLE NO. 1) CONTINUED.

29.71	*	1.04E J2	1.17E J2	1.31E J2	1.47E J2	1.65E J2	1.85E J2	2.09E J2	2.33E J2	2.62E J2	2.94E J2	3.29E J2	3.29E J2
30.65	*	1.11E J2	1.24E J2	1.40E J2	1.57E J2	1.76E J2	1.97E J2	2.21E J2	2.46E J2	2.80E J2	3.12E J2	3.48E J2	3.48E J2
31.62	*	1.19E J2	1.32E J2	1.50E J2	1.67E J2	1.87E J2	2.10E J2	2.35E J2	2.60E J2	2.96E J2	3.32E J2	3.70E J2	3.70E J2
32.62	*	1.26E J2	1.41E J2	1.58E J2	1.77E J2	1.99E J2	2.23E J2	2.50E J2	2.81E J2	3.15E J2	3.54E J2	3.94E J2	3.94E J2
33.65	*	1.34E J2	1.50E J2	1.68E J2	1.89E J2	2.12E J2	2.38E J2	2.67E J2	2.99E J2	3.36E J2	3.76E J2	4.18E J2	4.18E J2
34.72	*	1.42E J2	1.59E J2	1.79E J2	2.01E J2	2.25E J2	2.53E J2	2.84E J2	3.18E J2	3.57E J2	4.01E J2	4.41E J2	4.41E J2
35.81	*	1.51E J2	1.70E J2	1.90E J2	2.14E J2	2.40E J2	2.69E J2	3.02E J2	3.39E J2	3.80E J2	4.26E J2	4.76E J2	4.76E J2
36.95	*	1.61E J2	1.81E J2	2.03E J2	2.27E J2	2.55E J2	2.86E J2	3.21E J2	3.60E J2	4.02E J2	4.50E J2	5.02E J2	5.02E J2
38.11	*	1.71E J2	1.92E J2	2.16E J2	2.42E J2	2.72E J2	3.05E J2	3.42E J2	3.84E J2	4.30E J2	4.80E J2	5.34E J2	5.34E J2
39.32	*	1.82E J2	2.05E J2	2.30E J2	2.58E J2	2.89E J2	3.24E J2	3.64E J2	4.08E J2	4.56E J2	5.07E J2	5.64E J2	5.64E J2
40.58	*	1.94E J2	2.19E J2	2.44E J2	2.74E J2	3.06E J2	3.45E J2	3.87E J2	4.34E J2	4.84E J2	5.37E J2	5.94E J2	5.94E J2
41.84	*	2.06E J2	2.32E J2	2.60E J2	2.92E J2	3.27E J2	3.67E J2	4.12E J2	4.62E J2	5.15E J2	5.72E J2	6.32E J2	6.32E J2
43.17	*	2.20E J2	2.48E J2	2.77E J2	3.10E J2	3.49E J2	3.91E J2	4.39E J2	4.92E J2	5.50E J2	6.12E J2	6.78E J2	6.78E J2
44.53	*	2.24E J2	2.62E J2	2.93E J2	3.33E J2	3.71E J2	4.16E J2	4.67E J2	5.24E J2	5.87E J2	6.56E J2	7.30E J2	7.30E J2
45.94	*	2.45E J2	2.79E J2	3.13E J2	3.52E J2	3.94E J2	4.43E J2	4.95E J2	5.57E J2	6.25E J2	7.01E J2	7.84E J2	7.84E J2
47.39	*	2.65E J2	2.97E J2	3.33E J2	3.74E J2	4.20E J2	4.71E J2	5.28E J2	5.93E J2	6.65E J2	7.46E J2	8.34E J2	8.34E J2
48.89	*	2.82E J2	3.16E J2	3.55E J2	3.98E J2	4.47E J2	5.01E J2	5.62E J2	6.31E J2	7.08E J2	7.94E J2	8.91E J2	8.91E J2
50.43	*	3.01E J2	3.37E J2	3.78E J2	4.24E J2	4.75E J2	5.35E J2	5.99E J2	6.72E J2	7.53E J2	8.45E J2	9.50E J2	9.50E J2
52.03	*	3.19E J2	3.58E J2	4.02E J2	4.51E J2	5.06E J2	5.68E J2	6.37E J2	7.15E J2	8.02E J2	9.00E J2	10.10E J2	10.10E J2
53.67	*	3.40E J2	3.81E J2	4.28E J2	4.80E J2	5.38E J2	6.04E J2	6.78E J2	7.61E J2	8.55E J2	9.57E J2	10.70E J2	10.70E J2
55.37	*	3.62E J2	4.06E J2	4.55E J2	5.11E J2	5.75E J2	6.43E J2	7.21E J2	8.09E J2	9.07E J2	10.17E J2	11.30E J2	11.30E J2
57.12	*	3.85E J2	4.32E J2	4.84E J2	5.43E J2	6.10E J2	6.86E J2	7.69E J2	8.61E J2	9.66E J2	1.08E J3	1.20E J3	1.20E J3
58.92	*	4.05E J2	4.59E J2	5.15E J2	5.78E J2	6.49E J2	7.28E J2	8.17E J2	9.17E J2	1.03E J3	1.15E J3	1.27E J3	1.27E J3
60.78	*	4.26E J2	4.84E J2	5.49E J2	6.16E J2	6.91E J2	7.75E J2	8.69E J2	9.74E J2	1.09E J3	1.23E J3	1.37E J3	1.37E J3
62.70	*	4.46E J2	5.02E J2	5.74E J2	6.55E J2	7.35E J2	8.25E J2	9.26E J2	1.04E J3	1.16E J3	1.31E J3	1.46E J3	1.46E J3
64.69	*	4.66E J2	5.24E J2	5.97E J2	6.77E J2	7.59E J2	8.49E J2	9.50E J2	1.10E J3	1.24E J3	1.39E J3	1.54E J3	1.54E J3
66.73	*	4.86E J2	5.46E J2	6.21E J2	7.07E J2	7.92E J2	8.79E J2	9.85E J2	1.10E J3	1.25E J3	1.40E J3	1.55E J3	1.55E J3
68.84	*	5.07E J2	5.69E J2	6.47E J2	7.35E J2	8.20E J2	9.06E J2	1.00E J3	1.15E J3	1.30E J3	1.45E J3	1.60E J3	1.60E J3
71.02	*	5.25E J2	5.89E J2	6.71E J2	7.62E J2	8.49E J2	9.36E J2	1.06E J3	1.21E J3	1.36E J3	1.51E J3	1.66E J3	1.66E J3
73.26	*	5.45E J2	6.11E J2	6.97E J2	7.92E J2	8.80E J2	9.68E J2	1.06E J3	1.21E J3	1.36E J3	1.51E J3	1.66E J3	1.66E J3
75.57	*	5.65E J2	6.33E J2	7.23E J2	8.19E J2	9.10E J2	1.00E J3	1.15E J3	1.30E J3	1.45E J3	1.60E J3	1.75E J3	1.75E J3
77.94	*	5.85E J2	6.55E J2	7.47E J2	8.44E J2	9.38E J2	1.03E J3	1.18E J3	1.33E J3	1.48E J3	1.63E J3	1.78E J3	1.78E J3
80.37	*	6.05E J2	6.77E J2	7.71E J2	8.69E J2	9.66E J2	1.06E J3	1.21E J3	1.36E J3	1.51E J3	1.66E J3	1.81E J3	1.81E J3
82.87	*	6.25E J2	6.99E J2	7.95E J2	8.94E J2	9.94E J2	1.09E J3	1.24E J3	1.39E J3	1.54E J3	1.69E J3	1.84E J3	1.84E J3
85.43	*	6.45E J2	7.21E J2	8.19E J2	9.20E J2	1.02E J3	1.17E J3	1.32E J3	1.47E J3	1.62E J3	1.77E J3	1.92E J3	1.92E J3
88.06	*	6.65E J2	7.43E J2	8.43E J2	9.46E J2	1.05E J3	1.20E J3	1.35E J3	1.50E J3	1.65E J3	1.80E J3	1.95E J3	1.95E J3
90.76	*	6.85E J2	7.65E J2	8.67E J2	9.72E J2	1.08E J3							

***** D TABLE NC. 1 FOR CABINET TUNING *****

ALPHA VALUES FROM 1.00E-04 TC 2.82E-04 SQUARE INCHES PER INCH.
ALPHA (ACRGSS) C=SIDE DIMENSION OF SQUARE FCRT CRCS=SECTION IN INCHES.
SQ IN/IN= 1.00E-04 1.12E-04 1.26E-04 1.41E-04 1.58E-04 1.78E-04 2.00E-04 2.24E-04 2.51E-04 2.82E-04

0.0	*	8.25E-05	9.26E-05	1.04E-04	1.17E-04	1.31E-04	1.47E-04	1.65E-04	1.85E-04	2.07E-04	2.33E-04
0.5	*	7.11E-03	7.54E-03	7.95E-03	8.46E-03	8.97E-03	9.50E-03	1.01E-02	1.07E-02	1.13E-02	1.20E-02
1.0	*	1.00E-02	1.06E-02	1.13E-02	1.19E-02	1.27E-02	1.34E-02	1.42E-02	1.51E-02	1.60E-02	1.69E-02
1.5	*	1.23E-02	1.30E-02	1.38E-02	1.46E-02	1.55E-02	1.64E-02	1.74E-02	1.84E-02	1.95E-02	2.07E-02
2.0	*	1.42E-02	1.50E-02	1.59E-02	1.69E-02	1.79E-02	1.89E-02	2.01E-02	2.13E-02	2.25E-02	2.39E-02
2.5	*	1.59E-02	1.68E-02	1.78E-02	1.88E-02	2.00E-02	2.12E-02	2.24E-02	2.38E-02	2.52E-02	2.67E-02
3.0	*	1.74E-02	1.84E-02	1.95E-02	2.06E-02	2.19E-02	2.32E-02	2.45E-02	2.60E-02	2.76E-02	2.92E-02
3.5	*	1.87E-02	1.99E-02	2.10E-02	2.23E-02	2.36E-02	2.50E-02	2.65E-02	2.81E-02	2.98E-02	3.15E-02
4.0	*	2.00E-02	2.12E-02	2.25E-02	2.38E-02	2.52E-02	2.67E-02	2.83E-02	3.00E-02	3.18E-02	3.37E-02
4.5	*	2.13E-02	2.25E-02	2.39E-02	2.53E-02	2.68E-02	2.84E-02	3.00E-02	3.18E-02	3.37E-02	3.57E-02
5.0	*	2.24E-02	2.37E-02	2.51E-02	2.66E-02	2.82E-02	2.99E-02	3.17E-02	3.35E-02	3.55E-02	3.77E-02
5.5	*	2.35E-02	2.49E-02	2.64E-02	2.79E-02	2.96E-02	3.13E-02	3.32E-02	3.52E-02	3.73E-02	3.95E-02
6.0	*	2.45E-02	2.60E-02	2.75E-02	2.92E-02	3.09E-02	3.27E-02	3.47E-02	3.67E-02	3.89E-02	4.12E-02
6.5	*	2.55E-02	2.71E-02	2.87E-02	3.04E-02	3.22E-02	3.41E-02	3.61E-02	3.82E-02	4.05E-02	4.29E-02
7.0	*	2.65E-02	2.81E-02	2.97E-02	3.15E-02	3.34E-02	3.54E-02	3.75E-02	3.97E-02	4.20E-02	4.45E-02
7.5	*	2.74E-02	2.91E-02	3.08E-02	3.26E-02	3.45E-02	3.66E-02	3.88E-02	4.11E-02	4.35E-02	4.61E-02
8.0	*	2.83E-02	3.00E-02	3.18E-02	3.37E-02	3.57E-02	3.78E-02	4.00E-02	4.24E-02	4.49E-02	4.76E-02
8.5	*	2.92E-02	3.09E-02	3.28E-02	3.47E-02	3.68E-02	3.90E-02	4.13E-02	4.37E-02	4.63E-02	4.91E-02
9.0	*	3.00E-02	3.18E-02	3.37E-02	3.57E-02	3.78E-02	4.01E-02	4.25E-02	4.50E-02	4.77E-02	5.05E-02
9.5	*	3.09E-02	3.27E-02	3.46E-02	3.67E-02	3.89E-02	4.12E-02	4.36E-02	4.62E-02	4.90E-02	5.19E-02
10.0	*	3.17E-02	3.35E-02	3.55E-02	3.76E-02	3.99E-02	4.22E-02	4.48E-02	4.74E-02	5.02E-02	5.32E-02
10.5	*	3.24E-02	3.44E-02	3.64E-02	3.86E-02	4.09E-02	4.33E-02	4.59E-02	4.86E-02	5.15E-02	5.45E-02
11.0	*	3.32E-02	3.52E-02	3.73E-02	3.95E-02	4.18E-02	4.43E-02	4.69E-02	4.97E-02	5.27E-02	5.58E-02
11.5	*	3.40E-02	3.60E-02	3.81E-02	4.04E-02	4.28E-02	4.53E-02	4.80E-02	5.08E-02	5.39E-02	5.70E-02
12.0	*	3.47E-02	3.67E-02	3.89E-02	4.12E-02	4.37E-02	4.63E-02	4.90E-02	5.19E-02	5.50E-02	5.83E-02
12.5	*	3.54E-02	3.75E-02	3.97E-02	4.21E-02	4.46E-02	4.72E-02	5.00E-02	5.30E-02	5.61E-02	5.95E-02
13.0	*	3.61E-02	3.82E-02	4.05E-02	4.29E-02	4.55E-02	4.82E-02	5.10E-02	5.40E-02	5.72E-02	6.06E-02
13.5	*	3.68E-02	3.90E-02	4.13E-02	4.37E-02	4.63E-02	4.91E-02	5.20E-02	5.51E-02	5.83E-02	6.18E-02
14.0	*	3.75E-02	3.97E-02	4.20E-02	4.45E-02	4.72E-02	5.00E-02	5.29E-02	5.61E-02	5.94E-02	6.29E-02
14.5	*	3.81E-02	4.04E-02	4.28E-02	4.53E-02	4.80E-02	5.09E-02	5.39E-02	5.71E-02	6.05E-02	6.40E-02
15.0	*	3.88E-02	4.11E-02	4.35E-02	4.61E-02	4.88E-02	5.17E-02	5.48E-02	5.80E-02	6.15E-02	6.51E-02
15.5	*	3.94E-02	4.17E-02	4.42E-02	4.68E-02	4.96E-02	5.26E-02	5.57E-02	5.90E-02	6.25E-02	6.62E-02
16.0	*	4.00E-02	4.24E-02	4.49E-02	4.76E-02	5.04E-02	5.34E-02	5.66E-02	5.99E-02	6.35E-02	6.73E-02
16.5	*	4.07E-02	4.31E-02	4.56E-02	4.83E-02	5.12E-02	5.42E-02	5.75E-02	6.09E-02	6.45E-02	6.83E-02
17.0	*	4.13E-02	4.37E-02	4.63E-02	4.91E-02	5.20E-02	5.51E-02	5.83E-02	6.18E-02	6.55E-02	6.93E-02

C TABLE NC. 1 CONTINUED.

17.5	*	4.19E-02	4.44E-02	4.70E-02	4.98E-02	5.27E-02	5.59E-02	5.92E-02	6.27E-02	6.64E-02	7.03E-02
18.0	*	4.25E-02	4.50E-02	4.77E-02	5.05E-02	5.35E-02	5.66E-02	6.00E-02	6.36E-02	6.73E-02	7.13E-02
18.5	*	4.31E-02	4.56E-02	4.83E-02	5.12E-02	5.42E-02	5.74E-02	6.08E-02	6.44E-02	6.83E-02	7.23E-02
19.0	*	4.36E-02	4.62E-02	4.90E-02	5.19E-02	5.49E-02	5.82E-02	6.17E-02	6.53E-02	6.92E-02	7.33E-02
19.5	*	4.42E-02	4.68E-02	4.96E-02	5.25E-02	5.57E-02	5.90E-02	6.25E-02	6.62E-02	7.01E-02	7.43E-02
20.0	*	4.48E-02	4.74E-02	5.02E-02	5.32E-02	5.64E-02	5.97E-02	6.33E-02	6.70E-02	7.10E-02	7.52E-02
20.5	*	4.53E-02	4.80E-02	5.09E-02	5.39E-02	5.71E-02	6.05E-02	6.40E-02	6.78E-02	7.19E-02	7.61E-02
21.0	*	4.59E-02	4.86E-02	5.15E-02	5.45E-02	5.78E-02	6.12E-02	6.48E-02	6.87E-02	7.27E-02	7.70E-02
21.5	*	4.64E-02	4.92E-02	5.21E-02	5.52E-02	5.84E-02	6.19E-02	6.56E-02	6.95E-02	7.36E-02	7.80E-02
22.0	*	4.69E-02	4.97E-02	5.27E-02	5.58E-02	5.91E-02	6.26E-02	6.63E-02	7.03E-02	7.44E-02	7.89E-02
22.5	*	4.75E-02	5.03E-02	5.33E-02	5.64E-02	5.98E-02	6.33E-02	6.71E-02	7.11E-02	7.53E-02	7.97E-02
23.0	*	4.80E-02	5.08E-02	5.39E-02	5.71E-02	6.04E-02	6.40E-02	6.78E-02	7.18E-02	7.61E-02	8.06E-02
23.5	*	4.85E-02	5.14E-02	5.44E-02	5.77E-02	6.11E-02	6.47E-02	6.86E-02	7.26E-02	7.69E-02	8.15E-02
24.0	*	4.90E-02	5.19E-02	5.50E-02	5.83E-02	6.17E-02	6.54E-02	6.93E-02	7.34E-02	7.77E-02	8.24E-02
24.5	*	4.95E-02	5.25E-02	5.56E-02	5.89E-02	6.24E-02	6.61E-02	7.00E-02	7.42E-02	7.86E-02	8.32E-02
25.0	*	5.00E-02	5.30E-02	5.62E-02	5.95E-02	6.30E-02	6.67E-02	7.07E-02	7.49E-02	7.93E-02	8.41E-02
25.5	*	5.05E-02	5.35E-02	5.67E-02	6.01E-02	6.36E-02	6.74E-02	7.14E-02	7.56E-02	8.01E-02	8.49E-02
26.0	*	5.10E-02	5.41E-02	5.73E-02	6.07E-02	6.43E-02	6.81E-02	7.21E-02	7.64E-02	8.09E-02	8.57E-02
26.5	*	5.15E-02	5.46E-02	5.78E-02	6.12E-02	6.49E-02	6.87E-02	7.28E-02	7.71E-02	8.17E-02	8.65E-02
27.0	*	5.20E-02	5.51E-02	5.84E-02	6.18E-02	6.55E-02	6.94E-02	7.35E-02	7.78E-02	8.25E-02	8.73E-02
27.5	*	5.25E-02	5.56E-02	5.89E-02	6.24E-02	6.61E-02	7.00E-02	7.42E-02	7.86E-02	8.32E-02	8.82E-02
28.0	*	5.30E-02	5.61E-02	5.94E-02	6.29E-02	6.67E-02	7.06E-02	7.48E-02	7.93E-02	8.40E-02	8.90E-02
28.5	*	5.34E-02	5.66E-02	6.00E-02	6.35E-02	6.73E-02	7.13E-02	7.55E-02	8.00E-02	8.47E-02	8.97E-02
29.0	*	5.39E-02	5.71E-02	6.05E-02	6.41E-02	6.79E-02	7.19E-02	7.61E-02	8.07E-02	8.55E-02	9.05E-02
29.5	*	5.44E-02	5.76E-02	6.10E-02	6.46E-02	6.84E-02	7.25E-02	7.68E-02	8.14E-02	8.62E-02	9.13E-02
30.0	*	5.48E-02	5.81E-02	6.15E-02	6.52E-02	6.90E-02	7.31E-02	7.75E-02	8.20E-02	8.69E-02	9.21E-02
30.5	*	5.53E-02	5.85E-02	6.20E-02	6.57E-02	6.96E-02	7.37E-02	7.81E-02	8.27E-02	8.76E-02	9.28E-02
31.0	*	5.57E-02	5.90E-02	6.25E-02	6.62E-02	7.02E-02	7.43E-02	7.87E-02	8.34E-02	8.83E-02	9.36E-02
31.5	*	5.62E-02	5.95E-02	6.30E-02	6.68E-02	7.07E-02	7.49E-02	7.94E-02	8.41E-02	8.91E-02	9.43E-02
32.0	*	5.66E-02	6.00E-02	6.35E-02	6.73E-02	7.13E-02	7.55E-02	8.00E-02	8.47E-02	8.98E-02	9.51E-02
32.5	*	5.71E-02	6.04E-02	6.40E-02	6.78E-02	7.18E-02	7.61E-02	8.06E-02	8.54E-02	9.05E-02	9.58E-02
33.0	*	5.75E-02	6.09E-02	6.45E-02	6.83E-02	7.24E-02	7.67E-02	8.12E-02	8.60E-02	9.11E-02	9.66E-02
33.5	*	5.79E-02	6.14E-02	6.50E-02	6.88E-02	7.29E-02	7.73E-02	8.18E-02	8.67E-02	9.18E-02	9.73E-02
34.0	*	5.84E-02	6.18E-02	6.55E-02	6.94E-02	7.35E-02	7.78E-02	8.24E-02	8.73E-02	9.25E-02	9.80E-02
34.5	*	5.88E-02	6.23E-02	6.60E-02	6.99E-02	7.40E-02	7.84E-02	8.31E-02	8.80E-02	9.32E-02	9.87E-02
35.0	*	5.92E-02	6.27E-02	6.64E-02	7.04E-02	7.45E-02	7.90E-02	8.36E-02	8.86E-02	9.39E-02	9.94E-02
35.5	*	5.96E-02	6.32E-02	6.69E-02	7.09E-02	7.51E-02	7.95E-02	8.42E-02	8.92E-02	9.45E-02	1.00E-01
36.0	*	6.00E-02	6.36E-02	6.74E-02	7.14E-02	7.56E-02	8.01E-02	8.48E-02	8.99E-02	9.52E-02	1.01E-01
36.5	*	6.05E-02	6.40E-02	6.78E-02	7.19E-02	7.61E-02	8.06E-02	8.54E-02	9.05E-02	9.59E-02	1.02E-01
37.0	*	6.09E-02	6.45E-02	6.83E-02	7.24E-02	7.66E-02	8.12E-02	8.60E-02	9.11E-02	9.65E-02	1.02E-01

***** D TABLE NC. 2 FOR CAJNET TUNING *****
 ALPHA VALUES FROM 3.16E-04 TO 8.91E-04 SQUARE INCHES PER INCH.
 ALPHA (ACROSS) C=SIDE DIMENSION CF SQUARE FRT CROSS-SECTION IN INCHES.
 SQ IN/IN= 3.16E-04 3.55E-04 3.98E-04 4.47E-04 5.01E-04 5.62E-04 6.31E-04 7.08E-04 7.94E-04 8.91E-04
 L INCHES (DOWN)

0.0	* 2.61E-04	2.93E-04	3.28E-04	3.68E-04	4.13E-04	4.64E-04	5.20E-04	5.84E-04	6.55E-04	7.35E-04
0.5	* 1.27E-02	1.35E-02	1.43E-02	1.51E-02	1.60E-02	1.70E-02	1.80E-02	1.91E-02	2.03E-02	2.15E-02
1.0	* 1.79E-02	1.90E-02	2.01E-02	2.13E-02	2.26E-02	2.39E-02	2.54E-02	2.69E-02	2.85E-02	3.02E-02
1.5	* 2.19E-02	2.32E-02	2.46E-02	2.61E-02	2.76E-02	2.93E-02	3.10E-02	3.29E-02	3.48E-02	3.69E-02
2.0	* 2.53E-02	2.68E-02	2.84E-02	3.01E-02	3.19E-02	3.38E-02	3.58E-02	3.79E-02	4.02E-02	4.26E-02
2.5	* 2.82E-02	2.99E-02	3.17E-02	3.36E-02	3.56E-02	3.77E-02	4.00E-02	4.24E-02	4.49E-02	4.76E-02
3.0	* 3.09E-02	3.28E-02	3.47E-02	3.68E-02	3.90E-02	4.13E-02	4.38E-02	4.64E-02	4.91E-02	5.21E-02
3.5	* 3.34E-02	3.54E-02	3.75E-02	3.97E-02	4.21E-02	4.46E-02	4.73E-02	5.01E-02	5.31E-02	5.62E-02
4.0	* 3.57E-02	3.78E-02	4.01E-02	4.25E-02	4.50E-02	4.77E-02	5.05E-02	5.35E-02	5.67E-02	6.01E-02
4.5	* 3.79E-02	4.01E-02	4.25E-02	4.50E-02	4.77E-02	5.05E-02	5.35E-02	5.67E-02	6.01E-02	6.37E-02
5.0	* 3.99E-02	4.23E-02	4.48E-02	4.74E-02	5.03E-02	5.33E-02	5.64E-02	5.98E-02	6.33E-02	6.71E-02
5.5	* 4.18E-02	4.43E-02	4.70E-02	4.97E-02	5.27E-02	5.58E-02	5.92E-02	6.27E-02	6.64E-02	7.04E-02
6.0	* 4.37E-02	4.63E-02	4.90E-02	5.20E-02	5.50E-02	5.83E-02	6.18E-02	6.55E-02	6.94E-02	7.35E-02
6.5	* 4.55E-02	4.82E-02	5.10E-02	5.41E-02	5.73E-02	6.07E-02	6.43E-02	6.81E-02	7.22E-02	7.65E-02
7.0	* 4.72E-02	5.00E-02	5.30E-02	5.61E-02	5.94E-02	6.30E-02	6.67E-02	7.07E-02	7.49E-02	7.94E-02
7.5	* 4.88E-02	5.17E-02	5.48E-02	5.81E-02	6.15E-02	6.52E-02	6.90E-02	7.32E-02	7.75E-02	8.21E-02
8.0	* 5.04E-02	5.34E-02	5.66E-02	6.00E-02	6.35E-02	6.73E-02	7.13E-02	7.55E-02	8.00E-02	8.48E-02
8.5	* 5.20E-02	5.51E-02	5.83E-02	6.18E-02	6.55E-02	6.94E-02	7.35E-02	7.79E-02	8.25E-02	8.74E-02
9.0	* 5.35E-02	5.67E-02	6.00E-02	6.36E-02	6.74E-02	7.14E-02	7.56E-02	8.01E-02	8.49E-02	8.99E-02
9.5	* 5.49E-02	5.82E-02	6.17E-02	6.53E-02	6.92E-02	7.33E-02	7.77E-02	8.23E-02	8.72E-02	9.24E-02
10.0	* 5.64E-02	5.97E-02	6.33E-02	6.70E-02	7.10E-02	7.52E-02	7.97E-02	8.44E-02	8.94E-02	9.48E-02
10.5	* 5.78E-02	6.12E-02	6.48E-02	6.87E-02	7.27E-02	7.71E-02	8.17E-02	8.65E-02	9.17E-02	9.71E-02
11.0	* 5.91E-02	6.26E-02	6.63E-02	7.03E-02	7.45E-02	7.89E-02	8.36E-02	8.85E-02	9.38E-02	9.94E-02
11.5	* 6.04E-02	6.40E-02	6.78E-02	7.19E-02	7.61E-02	8.06E-02	8.54E-02	9.05E-02	9.59E-02	1.02E-01
12.0	* 6.17E-02	6.54E-02	6.93E-02	7.34E-02	7.78E-02	8.24E-02	8.73E-02	9.25E-02	9.80E-02	1.04E-01
12.5	* 6.30E-02	6.67E-02	7.07E-02	7.49E-02	7.94E-02	8.41E-02	8.91E-02	9.44E-02	1.00E-01	1.06E-01
13.0	* 6.42E-02	6.81E-02	7.21E-02	7.64E-02	8.09E-02	8.57E-02	9.08E-02	9.62E-02	1.02E-01	1.08E-01
13.5	* 6.55E-02	6.94E-02	7.35E-02	7.78E-02	8.25E-02	8.74E-02	9.25E-02	9.80E-02	1.04E-01	1.10E-01
14.0	* 6.67E-02	7.06E-02	7.48E-02	7.93E-02	8.40E-02	8.90E-02	9.42E-02	9.98E-02	1.06E-01	1.12E-01
14.5	* 6.78E-02	7.19E-02	7.61E-02	8.07E-02	8.55E-02	9.05E-02	9.59E-02	1.02E-01	1.08E-01	1.14E-01
15.0	* 6.90E-02	7.31E-02	7.74E-02	8.20E-02	8.69E-02	9.21E-02	9.75E-02	1.03E-01	1.09E-01	1.16E-01
15.5	* 7.01E-02	7.43E-02	7.87E-02	8.34E-02	8.83E-02	9.36E-02	9.91E-02	1.05E-01	1.11E-01	1.18E-01
16.0	* 7.13E-02	7.55E-02	8.00E-02	8.47E-02	8.98E-02	9.51E-02	1.01E-01	1.07E-01	1.13E-01	1.20E-01
16.5	* 7.24E-02	7.67E-02	8.12E-02	8.60E-02	9.11E-02	9.66E-02	1.02E-01	1.08E-01	1.15E-01	1.22E-01
17.0	* 7.34E-02	7.78E-02	8.24E-02	8.73E-02	9.25E-02	9.80E-02	1.04E-01	1.10E-01	1.17E-01	1.23E-01

D TABLE NC. 2 CONTINUED.

17.5	* 7.45E-02	7.89E-02	8.36E-02	8.84E-02	9.39E-02	9.94E-02	1.05E-01	1.12E-01	1.18E-01	1.25E-01
18.0	* 7.56E-02	8.01E-02	8.48E-02	8.98E-02	9.52E-02	1.01E-01	1.07E-01	1.13E-01	1.20E-01	1.27E-01
18.5	* 7.66E-02	8.12E-02	8.60E-02	9.11E-02	9.65E-02	1.02E-01	1.08E-01	1.15E-01	1.22E-01	1.29E-01
19.0	* 7.76E-02	8.22E-02	8.71E-02	9.23E-02	9.78E-02	1.04E-01	1.10E-01	1.16E-01	1.23E-01	1.30E-01
19.5	* 7.87E-02	8.33E-02	8.83E-02	9.35E-02	9.91E-02	1.05E-01	1.11E-01	1.18E-01	1.25E-01	1.32E-01
20.0	* 7.97E-02	8.44E-02	8.94E-02	9.47E-02	1.00E-01	1.06E-01	1.13E-01	1.19E-01	1.26E-01	1.34E-01
20.5	* 8.06E-02	8.54E-02	9.05E-02	9.59E-02	1.02E-01	1.08E-01	1.14E-01	1.21E-01	1.28E-01	1.36E-01
21.0	* 8.16E-02	8.65E-02	9.16E-02	9.70E-02	1.03E-01	1.09E-01	1.15E-01	1.22E-01	1.29E-01	1.37E-01
21.5	* 8.26E-02	8.75E-02	9.27E-02	9.82E-02	1.04E-01	1.10E-01	1.17E-01	1.24E-01	1.31E-01	1.39E-01
22.0	* 8.35E-02	8.85E-02	9.37E-02	9.93E-02	1.05E-01	1.11E-01	1.18E-01	1.25E-01	1.33E-01	1.40E-01
22.5	* 8.45E-02	8.95E-02	9.48E-02	1.00E-01	1.06E-01	1.13E-01	1.19E-01	1.26E-01	1.34E-01	1.42E-01
23.0	* 8.54E-02	9.05E-02	9.58E-02	1.02E-01	1.08E-01	1.14E-01	1.21E-01	1.28E-01	1.35E-01	1.44E-01
23.5	* 8.63E-02	9.15E-02	9.69E-02	1.03E-01	1.09E-01	1.15E-01	1.22E-01	1.29E-01	1.37E-01	1.45E-01
24.0	* 8.72E-02	9.24E-02	9.79E-02	1.04E-01	1.10E-01	1.16E-01	1.23E-01	1.31E-01	1.38E-01	1.47E-01
24.5	* 8.81E-02	9.34E-02	9.89E-02	1.05E-01	1.11E-01	1.18E-01	1.25E-01	1.32E-01	1.40E-01	1.48E-01
25.0	* 8.90E-02	9.43E-02	9.99E-02	1.06E-01	1.12E-01	1.19E-01	1.26E-01	1.33E-01	1.41E-01	1.50E-01
25.5	* 8.99E-02	9.53E-02	1.01E-01	1.07E-01	1.13E-01	1.20E-01	1.27E-01	1.35E-01	1.43E-01	1.51E-01
26.0	* 9.08E-02	9.62E-02	1.02E-01	1.08E-01	1.14E-01	1.21E-01	1.28E-01	1.36E-01	1.44E-01	1.53E-01
26.5	* 9.17E-02	9.71E-02	1.03E-01	1.09E-01	1.15E-01	1.22E-01	1.30E-01	1.37E-01	1.45E-01	1.54E-01
27.0	* 9.25E-02	9.80E-02	1.04E-01	1.10E-01	1.17E-01	1.23E-01	1.31E-01	1.39E-01	1.47E-01	1.55E-01
27.5	* 9.34E-02	9.89E-02	1.05E-01	1.11E-01	1.18E-01	1.25E-01	1.32E-01	1.40E-01	1.48E-01	1.57E-01
28.0	* 9.42E-02	9.98E-02	1.06E-01	1.12E-01	1.19E-01	1.26E-01	1.33E-01	1.41E-01	1.49E-01	1.58E-01
28.5	* 9.51E-02	1.01E-01	1.07E-01	1.13E-01	1.20E-01	1.27E-01	1.34E-01	1.42E-01	1.51E-01	1.60E-01
29.0	* 9.59E-02	1.02E-01	1.08E-01	1.14E-01	1.21E-01	1.28E-01	1.36E-01	1.44E-01	1.52E-01	1.61E-01
29.5	* 9.67E-02	1.02E-01	1.09E-01	1.15E-01	1.22E-01	1.29E-01	1.37E-01	1.45E-01	1.53E-01	1.63E-01
30.0	* 9.75E-02	1.03E-01	1.09E-01	1.16E-01	1.23E-01	1.30E-01	1.38E-01	1.46E-01	1.55E-01	1.64E-01
30.5	* 9.83E-02	1.04E-01	1.10E-01	1.17E-01	1.24E-01	1.31E-01	1.39E-01	1.47E-01	1.56E-01	1.65E-01
31.0	* 9.91E-02	1.05E-01	1.11E-01	1.18E-01	1.25E-01	1.32E-01	1.40E-01	1.48E-01	1.57E-01	1.67E-01
31.5	* 9.99E-02	1.06E-01	1.12E-01	1.19E-01	1.26E-01	1.33E-01	1.41E-01	1.50E-01	1.59E-01	1.68E-01
32.0	* 1.01E-01	1.07E-01	1.13E-01	1.20E-01	1.27E-01	1.34E-01	1.42E-01	1.51E-01	1.60E-01	1.69E-01
32.5	* 1.02E-01	1.08E-01	1.14E-01	1.21E-01	1.28E-01	1.35E-01	1.43E-01	1.52E-01	1.61E-01	1.71E-01
33.0	* 1.02E-01	1.08E-01	1.15E-01	1.22E-01	1.29E-01	1.36E-01	1.45E-01	1.53E-01	1.62E-01	1.72E-01
33.5	* 1.03E-01	1.09E-01	1.16E-01	1.23E-01	1.30E-01	1.37E-01	1.46E-01	1.54E-01	1.63E-01	1.73E-01
34.0	* 1.04E-01	1.10E-01	1.17E-01	1.23E-01	1.31E-01	1.38E-01	1.47E-01	1.55E-01	1.65E-01	1.74E-01
34.5	* 1.05E-01	1.11E-01	1.17E-01	1.24E-01	1.32E-01	1.40E-01	1.48E-01	1.57E-01	1.66E-01	1.76E-01
35.0	* 1.05E-01	1.12E-01	1.18E-01	1.25E-01	1.33E-01	1.41E-01	1.49E-01	1.58E-01	1.67E-01	1.77E-01
35.5	* 1.06E-01	1.12E-01	1.19E-01	1.26E-01	1.34E-01	1.42E-01	1.50E-01	1.59E-01	1.68E-01	1.78E-01
36.0	* 1.07E-01	1.13E-01	1.20E-01	1.27E-01	1.35E-01	1.43E-01	1.51E-01	1.60E-01	1.69E-01	1.79E-01
36.5	* 1.08E-01	1.14E-01	1.21E-01	1.28E-01	1.36E-01	1.44E-01	1.52E-01	1.61E-01	1.71E-01	1.81E-01
37.0	* 1.08E-01	1.15E-01	1.22E-01	1.29E-01	1.36E-01	1.44E-01	1.53E-01	1.62E-01	1.72E-01	1.82E-01

***** D TABLE NC. 3 FOR CABINET TUNING *****

ALPHA VALUES FROM 1.00E-03 TO 2.82E-03 SQUARE INCHES PER INCH.
 ALPHA (ACROSS) C=5 DIMENSION OF SQUARE FCRT CROSS-SECTION IN INCHES.
 SQ IN/IN= 1.00E-03 1.12E-03 1.26E-03 1.41E-03 1.58E-03 1.78E-03 2.00E-03 2.24E-03 2.51E-03 2.82E-03
 L INCHES (DOWN)

0.0	*	8.25E-04	9.26E-04	1.04E-03	1.17E-03	1.31E-03	1.47E-03	1.65E-03	1.85E-03	2.07E-03	2.33E-03
0.5	*	2.28E-02	2.42E-02	2.56E-02	2.72E-02	2.88E-02	3.06E-02	3.24E-02	3.44E-02	3.65E-02	3.87E-02
1.0	*	3.20E-02	3.40E-02	3.60E-02	3.82E-02	4.05E-02	4.29E-02	4.55E-02	4.82E-02	5.12E-02	5.43E-02
1.5	*	3.91E-02	4.15E-02	4.40E-02	4.66E-02	4.94E-02	5.24E-02	5.55E-02	5.89E-02	6.24E-02	6.62E-02
2.0	*	4.51E-02	4.78E-02	5.07E-02	5.37E-02	5.70E-02	6.04E-02	6.40E-02	6.78E-02	7.19E-02	7.62E-02
2.5	*	5.04E-02	5.34E-02	5.66E-02	6.00E-02	6.36E-02	6.74E-02	7.15E-02	7.57E-02	8.03E-02	8.51E-02
3.0	*	5.52E-02	5.85E-02	6.20E-02	6.57E-02	6.96E-02	7.38E-02	7.82E-02	8.29E-02	8.79E-02	9.31E-02
3.5	*	5.96E-02	6.31E-02	6.69E-02	7.09E-02	7.51E-02	7.96E-02	8.44E-02	8.94E-02	9.48E-02	1.00E-01
4.0	*	6.37E-02	6.75E-02	7.15E-02	7.58E-02	8.03E-02	8.51E-02	9.02E-02	9.56E-02	1.01E-01	1.07E-01
4.5	*	6.75E-02	7.15E-02	7.58E-02	8.03E-02	8.51E-02	9.02E-02	9.56E-02	1.01E-01	1.07E-01	1.14E-01
5.0	*	7.11E-02	7.54E-02	7.99E-02	8.46E-02	8.97E-02	9.50E-02	1.01E-01	1.07E-01	1.13E-01	1.20E-01
5.5	*	7.46E-02	7.90E-02	8.37E-02	8.87E-02	9.40E-02	9.96E-02	1.06E-01	1.12E-01	1.19E-01	1.26E-01
6.0	*	7.79E-02	8.25E-02	8.74E-02	9.26E-02	9.82E-02	1.04E-01	1.10E-01	1.17E-01	1.24E-01	1.31E-01
6.5	*	8.10E-02	8.58E-02	9.08E-02	9.64E-02	1.02E-01	1.08E-01	1.15E-01	1.22E-01	1.29E-01	1.37E-01
7.0	*	8.41E-02	8.91E-02	9.44E-02	1.00E-01	1.06E-01	1.12E-01	1.19E-01	1.26E-01	1.34E-01	1.42E-01
7.5	*	8.70E-02	9.22E-02	9.77E-02	1.04E-01	1.10E-01	1.16E-01	1.23E-01	1.31E-01	1.38E-01	1.47E-01
8.0	*	8.99E-02	9.52E-02	1.01E-01	1.07E-01	1.13E-01	1.20E-01	1.27E-01	1.35E-01	1.43E-01	1.51E-01
8.5	*	9.26E-02	9.81E-02	1.04E-01	1.10E-01	1.17E-01	1.24E-01	1.31E-01	1.39E-01	1.47E-01	1.56E-01
9.0	*	9.53E-02	1.01E-01	1.07E-01	1.13E-01	1.20E-01	1.27E-01	1.35E-01	1.43E-01	1.51E-01	1.60E-01
9.5	*	9.79E-02	1.04E-01	1.10E-01	1.16E-01	1.23E-01	1.31E-01	1.39E-01	1.47E-01	1.56E-01	1.65E-01
10.0	*	1.00E-01	1.06E-01	1.13E-01	1.19E-01	1.27E-01	1.34E-01	1.42E-01	1.51E-01	1.60E-01	1.69E-01
10.5	*	1.03E-01	1.09E-01	1.15E-01	1.22E-01	1.30E-01	1.37E-01	1.46E-01	1.54E-01	1.63E-01	1.73E-01
11.0	*	1.05E-01	1.12E-01	1.18E-01	1.25E-01	1.33E-01	1.41E-01	1.49E-01	1.58E-01	1.67E-01	1.77E-01
11.5	*	1.08E-01	1.14E-01	1.21E-01	1.28E-01	1.36E-01	1.44E-01	1.52E-01	1.61E-01	1.71E-01	1.81E-01
12.0	*	1.10E-01	1.16E-01	1.23E-01	1.31E-01	1.39E-01	1.47E-01	1.56E-01	1.65E-01	1.75E-01	1.85E-01
12.5	*	1.12E-01	1.19E-01	1.26E-01	1.33E-01	1.41E-01	1.50E-01	1.59E-01	1.68E-01	1.78E-01	1.89E-01
13.0	*	1.14E-01	1.21E-01	1.28E-01	1.36E-01	1.44E-01	1.53E-01	1.62E-01	1.72E-01	1.82E-01	1.93E-01
13.5	*	1.17E-01	1.24E-01	1.31E-01	1.39E-01	1.47E-01	1.56E-01	1.65E-01	1.75E-01	1.85E-01	1.96E-01
14.0	*	1.19E-01	1.26E-01	1.33E-01	1.41E-01	1.50E-01	1.59E-01	1.68E-01	1.78E-01	1.89E-01	2.00E-01
14.5	*	1.21E-01	1.28E-01	1.36E-01	1.44E-01	1.52E-01	1.61E-01	1.71E-01	1.81E-01	1.92E-01	2.03E-01
15.0	*	1.23E-01	1.30E-01	1.38E-01	1.46E-01	1.55E-01	1.64E-01	1.74E-01	1.84E-01	1.95E-01	2.07E-01
15.5	*	1.25E-01	1.32E-01	1.40E-01	1.49E-01	1.57E-01	1.67E-01	1.77E-01	1.87E-01	1.98E-01	2.10E-01
16.0	*	1.27E-01	1.34E-01	1.42E-01	1.51E-01	1.60E-01	1.69E-01	1.79E-01	1.90E-01	2.02E-01	2.14E-01
16.5	*	1.29E-01	1.37E-01	1.45E-01	1.53E-01	1.62E-01	1.72E-01	1.82E-01	1.93E-01	2.05E-01	2.17E-01
17.0	*	1.31E-01	1.39E-01	1.47E-01	1.56E-01	1.65E-01	1.75E-01	1.85E-01	1.96E-01	2.08E-01	2.20E-01

C TABLE NC. 3 CONTINUED.

17.5	*	1.33E-01	1.41E-01	1.49E-01	1.58E-01	1.67E-01	1.77E-01	1.88E-01	1.99E-01	2.11E-01	2.23E-01
18.0	*	1.35E-01	1.43E-01	1.51E-01	1.60E-01	1.70E-01	1.80E-01	1.90E-01	2.02E-01	2.14E-01	2.26E-01
18.5	*	1.36E-01	1.45E-01	1.53E-01	1.62E-01	1.72E-01	1.82E-01	1.93E-01	2.04E-01	2.17E-01	2.30E-01
19.0	*	1.38E-01	1.46E-01	1.55E-01	1.64E-01	1.74E-01	1.85E-01	1.96E-01	2.07E-01	2.20E-01	2.33E-01
19.5	*	1.40E-01	1.48E-01	1.57E-01	1.67E-01	1.76E-01	1.87E-01	1.98E-01	2.10E-01	2.22E-01	2.36E-01
20.0	*	1.42E-01	1.50E-01	1.59E-01	1.69E-01	1.79E-01	1.89E-01	2.01E-01	2.13E-01	2.25E-01	2.39E-01
20.5	*	1.44E-01	1.52E-01	1.61E-01	1.71E-01	1.81E-01	1.92E-01	2.03E-01	2.15E-01	2.28E-01	2.42E-01
21.0	*	1.45E-01	1.54E-01	1.63E-01	1.73E-01	1.83E-01	1.94E-01	2.06E-01	2.18E-01	2.31E-01	2.44E-01
21.5	*	1.47E-01	1.56E-01	1.65E-01	1.75E-01	1.85E-01	1.96E-01	2.08E-01	2.20E-01	2.33E-01	2.47E-01
22.0	*	1.49E-01	1.58E-01	1.67E-01	1.77E-01	1.87E-01	1.99E-01	2.10E-01	2.23E-01	2.36E-01	2.50E-01
22.5	*	1.50E-01	1.59E-01	1.69E-01	1.79E-01	1.89E-01	2.01E-01	2.13E-01	2.25E-01	2.39E-01	2.53E-01
23.0	*	1.52E-01	1.61E-01	1.71E-01	1.81E-01	1.92E-01	2.03E-01	2.15E-01	2.28E-01	2.41E-01	2.56E-01
23.5	*	1.54E-01	1.63E-01	1.73E-01	1.83E-01	1.94E-01	2.05E-01	2.17E-01	2.30E-01	2.44E-01	2.59E-01
24.0	*	1.55E-01	1.65E-01	1.74E-01	1.85E-01	1.96E-01	2.07E-01	2.20E-01	2.33E-01	2.47E-01	2.61E-01
24.5	*	1.57E-01	1.66E-01	1.76E-01	1.87E-01	1.98E-01	2.09E-01	2.22E-01	2.35E-01	2.49E-01	2.64E-01
25.0	*	1.59E-01	1.68E-01	1.78E-01	1.89E-01	2.00E-01	2.12E-01	2.24E-01	2.38E-01	2.52E-01	2.67E-01
25.5	*	1.60E-01	1.70E-01	1.80E-01	1.90E-01	2.02E-01	2.14E-01	2.26E-01	2.40E-01	2.54E-01	2.69E-01
26.0	*	1.62E-01	1.71E-01	1.81E-01	1.92E-01	2.04E-01	2.16E-01	2.29E-01	2.42E-01	2.57E-01	2.72E-01
26.5	*	1.63E-01	1.73E-01	1.83E-01	1.94E-01	2.06E-01	2.18E-01	2.31E-01	2.44E-01	2.59E-01	2.74E-01
27.0	*	1.65E-01	1.75E-01	1.85E-01	1.96E-01	2.08E-01	2.20E-01	2.33E-01	2.47E-01	2.61E-01	2.77E-01
27.5	*	1.66E-01	1.76E-01	1.87E-01	1.98E-01	2.09E-01	2.22E-01	2.35E-01	2.49E-01	2.64E-01	2.80E-01
28.0	*	1.68E-01	1.78E-01	1.88E-01	1.99E-01	2.11E-01	2.24E-01	2.37E-01	2.51E-01	2.66E-01	2.82E-01
28.5	*	1.69E-01	1.79E-01	1.90E-01	2.01E-01	2.13E-01	2.26E-01	2.39E-01	2.54E-01	2.69E-01	2.85E-01
29.0	*	1.71E-01	1.81E-01	1.92E-01	2.03E-01	2.15E-01	2.28E-01	2.41E-01	2.56E-01	2.71E-01	2.87E-01
29.5	*	1.72E-01	1.82E-01	1.93E-01	2.05E-01	2.17E-01	2.30E-01	2.43E-01	2.58E-01	2.73E-01	2.90E-01
30.0	*	1.74E-01	1.84E-01	1.95E-01	2.06E-01	2.19E-01	2.32E-01	2.45E-01	2.60E-01	2.76E-01	2.92E-01
30.5	*	1.75E-01	1.85E-01	1.96E-01	2.08E-01	2.21E-01	2.34E-01	2.48E-01	2.62E-01	2.78E-01	2.94E-01
31.0	*	1.76E-01	1.87E-01	1.98E-01	2.10E-01	2.22E-01	2.36E-01	2.50E-01	2.64E-01	2.80E-01	2.97E-01
31.5	*	1.78E-01	1.88E-01	2.00E-01	2.12E-01	2.24E-01	2.37E-01	2.52E-01	2.66E-01	2.82E-01	2.99E-01
32.0	*	1.79E-01	1.90E-01	2.01E-01	2.13E-01	2.26E-01	2.39E-01	2.54E-01	2.69E-01	2.85E-01	3.01E-01
32.5	*	1.81E-01	1.91E-01	2.03E-01	2.15E-01	2.28E-01	2.41E-01	2.56E-01	2.71E-01	2.87E-01	3.04E-01
33.0	*	1.82E-01	1.93E-01	2.04E-01	2.16E-01	2.29E-01	2.43E-01	2.57E-01	2.73E-01	2.89E-01	3.06E-01
33.5	*	1.83E-01	1.94E-01	2.06E-01	2.18E-01	2.31E-01	2.45E-01	2.59E-01	2.75E-01	2.91E-01	3.08E-01
34.0	*	1.85E-01	1.96E-01	2.07E-01	2.20E-01	2.33E-01	2.47E-01	2.61E-01	2.77E-01	2.93E-01	3.11E-01
34.5	*	1.86E-01	1.97E-01	2.09E-01	2.21E-01	2.34E-01	2.48E-01	2.63E-01	2.79E-01	2.95E-01	3.13E-01
35.0	*	1.87E-01	1.99E-01	2.10E-01	2.23E-01	2.36E-01	2.50E-01	2.65E-01	2.81E-01	2.98E-01	3.15E-01
35.5	*	1.89E-01	2.00E-01	2.12E-01	2.25E-01	2.38E-01	2.52E-01	2.67E-01	2.83E-01	3.00E-01	3.17E-01
36.0	*	1.90E-01	2.01E-01	2.13E-01	2.26E-01	2.40E-01	2.54E-01	2.69E-01	2.85E-01	3.02E-01	3.20E-01
36.5	*	1.91E-01	2.03E-01	2.15E-01	2.28E-01	2.41E-01	2.56E-01	2.71E-01	2.87E-01	3.04E-01	3.22E-01
37.0	*	1.93E-01	2.04E-01	2.16E-01	2.29E-01	2.43E-01	2.57E-01	2.73E-01	2.89E-01	3.06E-01	3.24E-01

***** D TABLE NC. 4 FOR CABINET TUNING *****

ALPHA VALUES FROM ALPHA (ACROSS) SQ IN/IN# L INCHES (DOWN)	3.16E-03	3.55E-03	3.98E-03	4.47E-03	5.01E-03	5.62E-03	6.31E-03	7.08E-03	7.94E-03	8.91E-03
0.0	* 2.61E-03	2.93E-03	3.28E-03	3.68E-03	4.13E-03	4.64E-03	5.20E-03	5.84E-03	6.55E-03	7.35E-03
0.5	* 4.11E-02	4.36E-02	4.63E-02	4.91E-02	5.22E-02	5.54E-02	5.88E-02	6.25E-02	6.64E-02	7.05E-02
1.0	* 5.76E-02	6.10E-02	6.48E-02	6.87E-02	7.29E-02	7.73E-02	8.21E-02	8.71E-02	9.25E-02	9.81E-02
1.5	* 7.02E-02	7.44E-02	7.89E-02	8.37E-02	8.88E-02	9.42E-02	9.99E-02	1.06E-01	1.12E-01	1.19E-01
2.0	* 8.08E-02	8.57E-02	9.09E-02	9.64E-02	1.02E-01	1.08E-01	1.15E-01	1.22E-01	1.29E-01	1.37E-01
2.5	* 5.62E-02	5.97E-02	6.31E-02	6.68E-02	7.08E-02	7.51E-02	7.97E-02	8.46E-02	8.97E-02	9.50E-02
3.0	* 9.87E-02	1.05E-01	1.11E-01	1.18E-01	1.25E-01	1.32E-01	1.40E-01	1.49E-01	1.58E-01	1.67E-01
3.5	* 1.07E-01	1.13E-01	1.20E-01	1.27E-01	1.35E-01	1.43E-01	1.51E-01	1.60E-01	1.70E-01	1.80E-01
4.0	* 1.14E-01	1.21E-01	1.28E-01	1.36E-01	1.44E-01	1.52E-01	1.61E-01	1.71E-01	1.82E-01	1.93E-01
4.5	* 1.21E-01	1.28E-01	1.35E-01	1.44E-01	1.52E-01	1.61E-01	1.71E-01	1.81E-01	1.92E-01	2.04E-01
5.0	* 1.27E-01	1.35E-01	1.43E-01	1.51E-01	1.60E-01	1.70E-01	1.80E-01	1.91E-01	2.03E-01	2.15E-01
5.5	* 1.33E-01	1.41E-01	1.50E-01	1.59E-01	1.68E-01	1.78E-01	1.89E-01	2.00E-01	2.12E-01	2.25E-01
6.0	* 1.39E-01	1.47E-01	1.56E-01	1.66E-01	1.75E-01	1.86E-01	1.97E-01	2.09E-01	2.22E-01	2.35E-01
6.5	* 1.45E-01	1.53E-01	1.63E-01	1.72E-01	1.83E-01	1.94E-01	2.05E-01	2.17E-01	2.31E-01	2.44E-01
7.0	* 1.50E-01	1.59E-01	1.69E-01	1.79E-01	1.89E-01	2.01E-01	2.13E-01	2.26E-01	2.39E-01	2.53E-01
7.5	* 1.55E-01	1.65E-01	1.74E-01	1.85E-01	1.96E-01	2.08E-01	2.20E-01	2.33E-01	2.47E-01	2.62E-01
8.0	* 1.60E-01	1.70E-01	1.80E-01	1.91E-01	2.02E-01	2.14E-01	2.27E-01	2.41E-01	2.55E-01	2.71E-01
8.5	* 1.65E-01	1.75E-01	1.86E-01	1.97E-01	2.08E-01	2.21E-01	2.34E-01	2.48E-01	2.63E-01	2.79E-01
9.0	* 1.70E-01	1.80E-01	1.91E-01	2.02E-01	2.14E-01	2.27E-01	2.41E-01	2.55E-01	2.71E-01	2.87E-01
9.5	* 1.75E-01	1.85E-01	1.96E-01	2.08E-01	2.20E-01	2.33E-01	2.47E-01	2.62E-01	2.78E-01	2.95E-01
10.0	* 1.79E-01	1.90E-01	2.01E-01	2.13E-01	2.26E-01	2.39E-01	2.54E-01	2.69E-01	2.85E-01	3.02E-01
10.5	* 1.84E-01	1.94E-01	2.06E-01	2.18E-01	2.31E-01	2.45E-01	2.60E-01	2.76E-01	2.92E-01	3.10E-01
11.0	* 1.88E-01	1.99E-01	2.11E-01	2.24E-01	2.37E-01	2.51E-01	2.66E-01	2.82E-01	2.99E-01	3.17E-01
11.5	* 1.92E-01	2.03E-01	2.16E-01	2.28E-01	2.42E-01	2.57E-01	2.72E-01	2.88E-01	3.06E-01	3.24E-01
12.0	* 1.96E-01	2.08E-01	2.20E-01	2.33E-01	2.47E-01	2.62E-01	2.78E-01	2.94E-01	3.12E-01	3.31E-01
12.5	* 2.00E-01	2.12E-01	2.25E-01	2.38E-01	2.52E-01	2.67E-01	2.83E-01	3.00E-01	3.18E-01	3.37E-01
13.0	* 2.04E-01	2.16E-01	2.29E-01	2.43E-01	2.57E-01	2.73E-01	2.89E-01	3.06E-01	3.25E-01	3.44E-01
13.5	* 2.08E-01	2.20E-01	2.33E-01	2.47E-01	2.62E-01	2.78E-01	2.94E-01	3.12E-01	3.31E-01	3.51E-01
14.0	* 2.12E-01	2.24E-01	2.38E-01	2.52E-01	2.67E-01	2.83E-01	3.00E-01	3.18E-01	3.37E-01	3.57E-01
14.5	* 2.15E-01	2.28E-01	2.42E-01	2.56E-01	2.72E-01	2.88E-01	3.05E-01	3.23E-01	3.43E-01	3.63E-01
15.0	* 2.19E-01	2.32E-01	2.46E-01	2.61E-01	2.76E-01	2.93E-01	3.10E-01	3.29E-01	3.48E-01	3.69E-01
15.5	* 2.23E-01	2.36E-01	2.50E-01	2.65E-01	2.81E-01	2.98E-01	3.15E-01	3.34E-01	3.54E-01	3.75E-01
16.0	* 2.26E-01	2.40E-01	2.54E-01	2.69E-01	2.85E-01	3.02E-01	3.20E-01	3.39E-01	3.60E-01	3.81E-01
16.5	* 2.30E-01	2.43E-01	2.58E-01	2.73E-01	2.90E-01	3.07E-01	3.25E-01	3.45E-01	3.65E-01	3.87E-01
17.0	* 2.33E-01	2.47E-01	2.62E-01	2.77E-01	2.94E-01	3.12E-01	3.30E-01	3.50E-01	3.71E-01	3.93E-01

D TABLE NC. 4 CONTINUED.

17.5	* 2.37E-01	2.51E-01	2.66E-01	2.81E-01	2.98E-01	3.16E-01	3.35E-01	3.55E-01	3.76E-01	3.99E-01
18.0	* 2.40E-01	2.54E-01	2.69E-01	2.85E-01	3.02E-01	3.20E-01	3.40E-01	3.60E-01	3.81E-01	4.04E-01
18.5	* 2.43E-01	2.58E-01	2.73E-01	2.89E-01	3.07E-01	3.25E-01	3.44E-01	3.65E-01	3.87E-01	4.10E-01
19.0	* 2.46E-01	2.61E-01	2.77E-01	2.93E-01	3.11E-01	3.29E-01	3.49E-01	3.70E-01	3.92E-01	4.15E-01
19.5	* 2.50E-01	2.64E-01	2.80E-01	2.97E-01	3.15E-01	3.33E-01	3.53E-01	3.74E-01	3.97E-01	4.21E-01
20.0	* 2.53E-01	2.68E-01	2.84E-01	3.01E-01	3.19E-01	3.38E-01	3.58E-01	3.79E-01	4.02E-01	4.26E-01
20.5	* 2.56E-01	2.71E-01	2.87E-01	3.04E-01	3.23E-01	3.42E-01	3.64E-01	3.84E-01	4.07E-01	4.31E-01
21.0	* 2.59E-01	2.74E-01	2.91E-01	3.08E-01	3.26E-01	3.46E-01	3.67E-01	3.88E-01	4.12E-01	4.36E-01
21.5	* 2.62E-01	2.78E-01	2.94E-01	3.12E-01	3.30E-01	3.50E-01	3.71E-01	3.93E-01	4.17E-01	4.41E-01
22.0	* 2.65E-01	2.81E-01	2.98E-01	3.15E-01	3.34E-01	3.54E-01	3.75E-01	3.98E-01	4.21E-01	4.46E-01
22.5	* 2.68E-01	2.84E-01	3.01E-01	3.19E-01	3.38E-01	3.58E-01	3.79E-01	4.02E-01	4.26E-01	4.51E-01
23.0	* 2.71E-01	2.87E-01	3.04E-01	3.22E-01	3.42E-01	3.62E-01	3.84E-01	4.06E-01	4.31E-01	4.56E-01
23.5	* 2.74E-01	2.90E-01	3.08E-01	3.26E-01	3.45E-01	3.66E-01	3.88E-01	4.11E-01	4.35E-01	4.61E-01
24.0	* 2.77E-01	2.93E-01	3.11E-01	3.29E-01	3.49E-01	3.70E-01	3.92E-01	4.15E-01	4.40E-01	4.66E-01
24.5	* 2.80E-01	2.96E-01	3.14E-01	3.33E-01	3.52E-01	3.73E-01	3.96E-01	4.19E-01	4.44E-01	4.71E-01
25.0	* 2.82E-01	2.99E-01	3.17E-01	3.36E-01	3.56E-01	3.77E-01	4.00E-01	4.24E-01	4.49E-01	4.76E-01
25.5	* 2.85E-01	3.02E-01	3.20E-01	3.39E-01	3.60E-01	3.81E-01	4.04E-01	4.28E-01	4.53E-01	4.80E-01
26.0	* 2.88E-01	3.05E-01	3.23E-01	3.43E-01	3.63E-01	3.85E-01	4.08E-01	4.32E-01	4.58E-01	4.85E-01
26.5	* 2.91E-01	3.08E-01	3.26E-01	3.46E-01	3.66E-01	3.88E-01	4.11E-01	4.36E-01	4.62E-01	4.90E-01
27.0	* 2.93E-01	3.11E-01	3.29E-01	3.49E-01	3.70E-01	3.92E-01	4.15E-01	4.40E-01	4.66E-01	4.94E-01
27.5	* 2.96E-01	3.14E-01	3.33E-01	3.52E-01	3.73E-01	3.96E-01	4.19E-01	4.44E-01	4.71E-01	4.99E-01
28.0	* 2.99E-01	3.17E-01	3.36E-01	3.55E-01	3.77E-01	3.99E-01	4.23E-01	4.48E-01	4.75E-01	5.03E-01
28.5	* 3.02E-01	3.19E-01	3.38E-01	3.59E-01	3.80E-01	4.03E-01	4.27E-01	4.52E-01	4.79E-01	5.08E-01
29.0	* 3.04E-01	3.22E-01	3.41E-01	3.62E-01	3.83E-01	4.06E-01	4.30E-01	4.56E-01	4.83E-01	5.12E-01
29.5	* 3.07E-01	3.25E-01	3.44E-01	3.65E-01	3.87E-01	4.10E-01	4.34E-01	4.60E-01	4.87E-01	5.16E-01
30.0	* 3.09E-01	3.28E-01	3.47E-01	3.68E-01	3.90E-01	4.13E-01	4.38E-01	4.64E-01	4.91E-01	5.21E-01
30.5	* 3.12E-01	3.30E-01	3.50E-01	3.71E-01	3.93E-01	4.16E-01	4.41E-01	4.68E-01	4.95E-01	5.25E-01
31.0	* 3.14E-01	3.33E-01	3.53E-01	3.74E-01	3.96E-01	4.20E-01	4.45E-01	4.71E-01	4.99E-01	5.29E-01
31.5	* 3.17E-01	3.36E-01	3.56E-01	3.77E-01	3.99E-01	4.23E-01	4.48E-01	4.75E-01	5.03E-01	5.34E-01
32.0	* 3.19E-01	3.38E-01	3.59E-01	3.80E-01	4.03E-01	4.27E-01	4.52E-01	4.79E-01	5.07E-01	5.38E-01
32.5	* 3.22E-01	3.41E-01	3.61E-01	3.83E-01	4.06E-01	4.30E-01	4.55E-01	4.83E-01	5.11E-01	5.42E-01
33.0	* 3.24E-01	3.44E-01	3.64E-01	3.86E-01	4.09E-01	4.33E-01	4.59E-01	4.86E-01	5.15E-01	5.46E-01
33.5	* 3.27E-01	3.46E-01	3.67E-01	3.89E-01	4.12E-01	4.36E-01	4.62E-01	4.90E-01	5.19E-01	5.50E-01
34.0	* 3.29E-01	3.49E-01	3.70E-01	3.92E-01	4.15E-01	4.40E-01	4.66E-01	4.94E-01	5.23E-01	5.54E-01
34.5	* 3.32E-01	3.51E-01	3.72E-01	3.94E-01	4.18E-01	4.43E-01	4.69E-01	4.97E-01	5.27E-01	5.58E-01
35.0	* 3.34E-01	3.54E-01	3.75E-01	3.97E-01	4.21E-01	4.46E-01	4.73E-01	5.01E-01	5.31E-01	5.62E-01
35.5	* 3.36E-01	3.56E-01	3.78E-01	4.00E-01	4.24E-01	4.49E-01	4.76E-01	5.04E-01	5.34E-01	5.66E-01
36.0	* 3.39E-01	3.59E-01	3.80E-01	4.03E-01	4.27E-01	4.79E-01	5.08E-01	5.38E-01	5.70E-01	5.70E-01
36.5	* 3.41E-01	3.61E-01	3.83E-01	4.06E-01	4.30E-01	4.55E-01	4.82E-01	5.11E-01	5.42E-01	5.74E-01
37.0	* 3.43E-01	3.64E-01	3.85E-01	4.08E-01	4.33E-01	4.58E-01	4.86E-01	5.15E-01	5.45E-01	5.78E-01

***** D TABLE NC. 5 FOR CAENET TUNING *****

ALPHA VALUES FROM 1.00E-02 TO 2.82E-02 SQUARE INCHES PER INCH.
 ALPHA (ACROSS) D=SIDE DIMENSION OF SQUARE PORT CROSS-SECTION IN INCHES.
 SQ IN/IN= 1.00E-02 1.12E-02 1.26E-02 1.41E-02 1.58E-02 1.78E-02 2.00E-02 2.24E-02 2.51E-02 2.82E-02
 L INCHES (DOWN)

0.0	*	8.25E-03	9.26E-03	1.04E-02	1.17E-02	1.31E-02	1.47E-02	1.65E-02	1.85E-02	2.07E-02	2.33E-02
0.5	*	7.50E-02	7.97E-02	8.47E-02	9.01E-02	9.58E-02	1.02E-01	1.08E-01	1.15E-01	1.23E-01	1.31E-01
1.0	*	1.04E-01	1.11E-01	1.18E-01	1.25E-01	1.31E-01	1.41E-01	1.50E-01	1.59E-01	1.69E-01	1.80E-01
1.5	*	1.27E-01	1.34E-01	1.43E-01	1.52E-01	1.61E-01	1.71E-01	1.81E-01	1.93E-01	2.05E-01	2.18E-01
2.0	*	1.46E-01	1.55E-01	1.64E-01	1.74E-01	1.85E-01	1.96E-01	2.08E-01	2.21E-01	2.35E-01	2.49E-01
2.5	*	1.62E-01	1.72E-01	1.83E-01	1.94E-01	2.06E-01	2.18E-01	2.32E-01	2.46E-01	2.61E-01	2.77E-01
3.0	*	1.77E-01	1.88E-01	2.00E-01	2.12E-01	2.25E-01	2.38E-01	2.53E-01	2.69E-01	2.85E-01	3.03E-01
3.5	*	1.91E-01	2.03E-01	2.15E-01	2.28E-01	2.42E-01	2.57E-01	2.73E-01	2.89E-01	3.07E-01	3.26E-01
4.0	*	2.04E-01	2.17E-01	2.30E-01	2.44E-01	2.58E-01	2.74E-01	2.91E-01	3.09E-01	3.28E-01	3.48E-01
4.5	*	2.16E-01	2.29E-01	2.43E-01	2.58E-01	2.74E-01	2.90E-01	3.08E-01	3.27E-01	3.47E-01	3.68E-01
5.0	*	2.28E-01	2.42E-01	2.56E-01	2.72E-01	2.88E-01	3.06E-01	3.24E-01	3.44E-01	3.65E-01	3.87E-01
5.5	*	2.39E-01	2.53E-01	2.68E-01	2.85E-01	3.02E-01	3.20E-01	3.40E-01	3.60E-01	3.82E-01	4.06E-01
6.0	*	2.49E-01	2.64E-01	2.80E-01	2.97E-01	3.15E-01	3.34E-01	3.54E-01	3.76E-01	3.99E-01	4.23E-01
6.5	*	2.59E-01	2.75E-01	2.91E-01	3.09E-01	3.28E-01	3.48E-01	3.68E-01	3.91E-01	4.15E-01	4.40E-01
7.0	*	2.69E-01	2.85E-01	3.02E-01	3.20E-01	3.40E-01	3.60E-01	3.82E-01	4.05E-01	4.30E-01	4.56E-01
7.5	*	2.78E-01	2.95E-01	3.13E-01	3.31E-01	3.51E-01	3.73E-01	3.95E-01	4.19E-01	4.45E-01	4.72E-01
8.0	*	2.87E-01	3.04E-01	3.23E-01	3.42E-01	3.63E-01	3.85E-01	4.08E-01	4.33E-01	4.59E-01	4.87E-01
8.5	*	2.96E-01	3.13E-01	3.32E-01	3.52E-01	3.74E-01	3.96E-01	4.20E-01	4.46E-01	4.73E-01	5.01E-01
9.0	*	3.04E-01	3.22E-01	3.42E-01	3.62E-01	3.84E-01	4.07E-01	4.32E-01	4.58E-01	4.86E-01	5.15E-01
9.5	*	3.12E-01	3.31E-01	3.51E-01	3.72E-01	3.95E-01	4.18E-01	4.44E-01	4.70E-01	4.99E-01	5.29E-01
10.0	*	3.20E-01	3.40E-01	3.60E-01	3.82E-01	4.05E-01	4.29E-01	4.55E-01	4.82E-01	5.12E-01	5.43E-01
10.5	*	3.28E-01	3.48E-01	3.69E-01	3.91E-01	4.15E-01	4.40E-01	4.66E-01	4.94E-01	5.24E-01	5.56E-01
11.0	*	3.36E-01	3.56E-01	3.77E-01	4.00E-01	4.24E-01	4.50E-01	4.77E-01	5.05E-01	5.36E-01	5.69E-01
11.5	*	3.43E-01	3.64E-01	3.86E-01	4.09E-01	4.34E-01	4.60E-01	4.87E-01	5.15E-01	5.48E-01	5.81E-01
12.0	*	3.51E-01	3.72E-01	3.94E-01	4.18E-01	4.43E-01	4.69E-01	4.98E-01	5.28E-01	5.59E-01	5.93E-01
12.5	*	3.58E-01	3.79E-01	4.02E-01	4.26E-01	4.52E-01	4.79E-01	5.08E-01	5.38E-01	5.71E-01	6.05E-01
13.0	*	3.65E-01	3.87E-01	4.10E-01	4.34E-01	4.60E-01	4.88E-01	5.18E-01	5.49E-01	5.82E-01	6.17E-01
13.5	*	3.72E-01	3.94E-01	4.17E-01	4.43E-01	4.69E-01	4.97E-01	5.27E-01	5.59E-01	5.93E-01	6.29E-01
14.0	*	3.78E-01	4.01E-01	4.25E-01	4.51E-01	4.78E-01	5.06E-01	5.37E-01	5.69E-01	6.03E-01	6.40E-01
14.5	*	3.85E-01	4.08E-01	4.32E-01	4.58E-01	4.86E-01	5.15E-01	5.46E-01	5.79E-01	6.14E-01	6.51E-01
15.0	*	3.91E-01	4.15E-01	4.40E-01	4.66E-01	4.94E-01	5.24E-01	5.55E-01	5.89E-01	6.24E-01	6.62E-01
15.5	*	3.98E-01	4.22E-01	4.47E-01	4.74E-01	5.02E-01	5.32E-01	5.64E-01	5.98E-01	6.34E-01	6.73E-01
16.0	*	4.04E-01	4.28E-01	4.54E-01	4.81E-01	5.10E-01	5.41E-01	5.73E-01	6.08E-01	6.44E-01	6.83E-01
16.5	*	4.10E-01	4.35E-01	4.61E-01	4.89E-01	5.18E-01	5.49E-01	5.82E-01	6.17E-01	6.54E-01	6.94E-01
17.0	*	4.16E-01	4.41E-01	4.68E-01	4.96E-01	5.26E-01	5.57E-01	5.91E-01	6.26E-01	6.64E-01	7.04E-01

C TABLE NC. 5 CONTINUED.

17.5	*	4.22E-01	4.48E-01	4.75E-01	5.03E-01	5.33E-01	5.65E-01	5.99E-01	6.35E-01	6.73E-01	7.14E-01
18.0	*	4.28E-01	4.54E-01	4.81E-01	5.10E-01	5.41E-01	5.73E-01	6.08E-01	6.44E-01	6.83E-01	7.24E-01
18.5	*	4.34E-01	4.60E-01	4.88E-01	5.17E-01	5.48E-01	5.81E-01	6.16E-01	6.52E-01	6.92E-01	7.34E-01
19.0	*	4.40E-01	4.66E-01	4.94E-01	5.24E-01	5.55E-01	5.89E-01	6.24E-01	6.61E-01	7.01E-01	7.43E-01
19.5	*	4.46E-01	4.72E-01	5.01E-01	5.31E-01	5.63E-01	5.96E-01	6.32E-01	6.70E-01	7.10E-01	7.53E-01
20.0	*	4.51E-01	4.78E-01	5.07E-01	5.37E-01	5.70E-01	6.04E-01	6.40E-01	6.78E-01	7.19E-01	7.62E-01
20.5	*	4.57E-01	4.84E-01	5.13E-01	5.44E-01	5.77E-01	6.11E-01	6.48E-01	6.87E-01	7.28E-01	7.72E-01
21.0	*	4.62E-01	4.90E-01	5.19E-01	5.50E-01	5.83E-01	6.18E-01	6.56E-01	6.95E-01	7.37E-01	7.81E-01
21.5	*	4.68E-01	4.96E-01	5.25E-01	5.57E-01	5.90E-01	6.26E-01	6.63E-01	7.03E-01	7.45E-01	7.90E-01
22.0	*	4.73E-01	5.01E-01	5.31E-01	5.63E-01	5.97E-01	6.33E-01	6.71E-01	7.11E-01	7.54E-01	7.99E-01
22.5	*	4.78E-01	5.07E-01	5.37E-01	5.70E-01	6.04E-01	6.40E-01	6.78E-01	7.19E-01	7.62E-01	8.08E-01
23.0	*	4.84E-01	5.13E-01	5.43E-01	5.76E-01	6.10E-01	6.47E-01	6.86E-01	7.27E-01	7.71E-01	8.17E-01
23.5	*	4.89E-01	5.18E-01	5.49E-01	5.82E-01	6.17E-01	6.54E-01	6.93E-01	7.35E-01	7.79E-01	8.26E-01
24.0	*	4.94E-01	5.24E-01	5.55E-01	5.88E-01	6.23E-01	6.61E-01	7.00E-01	7.42E-01	7.87E-01	8.34E-01
24.5	*	4.99E-01	5.29E-01	5.61E-01	5.94E-01	6.30E-01	6.67E-01	7.07E-01	7.50E-01	7.95E-01	8.43E-01
25.0	*	5.04E-01	5.34E-01	5.66E-01	6.00E-01	6.36E-01	6.74E-01	7.15E-01	7.57E-01	8.03E-01	8.51E-01
25.5	*	5.09E-01	5.40E-01	5.72E-01	6.06E-01	6.42E-01	6.81E-01	7.22E-01	7.65E-01	8.11E-01	8.59E-01
26.0	*	5.14E-01	5.45E-01	5.77E-01	6.12E-01	6.48E-01	6.87E-01	7.29E-01	7.72E-01	8.19E-01	8.68E-01
26.5	*	5.19E-01	5.50E-01	5.83E-01	6.18E-01	6.55E-01	6.94E-01	7.35E-01	7.80E-01	8.26E-01	8.76E-01
27.0	*	5.24E-01	5.55E-01	5.88E-01	6.23E-01	6.61E-01	7.00E-01	7.42E-01	7.87E-01	8.34E-01	8.84E-01
27.5	*	5.29E-01	5.60E-01	5.94E-01	6.29E-01	6.67E-01	7.07E-01	7.49E-01	7.94E-01	8.42E-01	8.92E-01
28.0	*	5.33E-01	5.65E-01	5.99E-01	6.35E-01	6.73E-01	7.13E-01	7.56E-01	8.01E-01	8.49E-01	9.00E-01
28.5	*	5.38E-01	5.70E-01	6.04E-01	6.40E-01	6.79E-01	7.19E-01	7.62E-01	8.08E-01	8.57E-01	9.08E-01
29.0	*	5.43E-01	5.75E-01	6.09E-01	6.46E-01	6.85E-01	7.25E-01	7.69E-01	8.15E-01	8.64E-01	9.16E-01
29.5	*	5.47E-01	5.80E-01	6.15E-01	6.51E-01	6.90E-01	7.32E-01	7.75E-01	8.22E-01	8.71E-01	9.24E-01
30.0	*	5.52E-01	5.85E-01	6.20E-01	6.57E-01	6.96E-01	7.38E-01	7.82E-01	8.29E-01	8.79E-01	9.31E-01
30.5	*	5.56E-01	5.90E-01	6.25E-01	6.62E-01	7.02E-01	7.44E-01	7.88E-01	8.36E-01	8.86E-01	9.39E-01
31.0	*	5.61E-01	5.94E-01	6.30E-01	6.68E-01	7.08E-01	7.50E-01	7.95E-01	8.42E-01	8.93E-01	9.46E-01
31.5	*	5.65E-01	5.99E-01	6.35E-01	6.73E-01	7.13E-01	7.56E-01	8.01E-01	8.49E-01	9.00E-01	9.54E-01
32.0	*	5.70E-01	6.04E-01	6.40E-01	6.78E-01	7.19E-01	7.62E-01	8.07E-01	8.56E-01	9.07E-01	9.61E-01
32.5	*	5.74E-01	6.09E-01	6.45E-01	6.83E-01	7.24E-01	7.68E-01	8.14E-01	8.62E-01	9.14E-01	9.69E-01
33.0	*	5.79E-01	6.13E-01	6.50E-01	6.89E-01	7.30E-01	7.73E-01	8.20E-01	8.69E-01	9.21E-01	9.76E-01
33.5	*	5.83E-01	6.18E-01	6.55E-01	6.94E-01	7.35E-01	7.79E-01	8.26E-01	8.75E-01	9.28E-01	9.83E-01
34.0	*	5.87E-01	6.22E-01	6.59E-01	6.99E-01	7.41E-01	7.85E-01	8.32E-01	8.82E-01	9.35E-01	9.91E-01
34.5	*	5.92E-01	6.27E-01	6.64E-01	7.04E-01	7.46E-01	7.91E-01	8.38E-01	8.88E-01	9.41E-01	9.98E-01
35.0	*	5.96E-01	6.31E-01	6.69E-01	7.09E-01	7.51E-01	7.96E-01	8.44E-01	8.94E-01	9.48E-01	1.00E 00
35.5	*	6.00E-01	6.36E-01	6.74E-01	7.14E-01	7.57E-01	8.02E-01	8.50E-01	9.01E-01	9.55E-01	1.01E 00
36.0	*	6.04E-01	6.40E-01	6.78E-01	7.19E-01	7.62E-01	8.07E-01	8.56E-01	9.07E-01	9.61E-01	1.02E 00
36.5	*	6.08E-01	6.45E-01	6.83E-01	7.24E-01	7.67E-01	8.13E-01	8.62E-01	9.13E-01	9.68E-01	1.03E 00
37.0	*	6.12E-01	6.49E-01	6.88E-01	7.29E-01	7.72E-01	8.19E-01	8.67E-01	9.19E-01	9.74E-01	1.03E 00

***** D TABLE NO. 6 FOR CABINET TUNING *****

ALPHA VALUES FROM 3.16E-02 TO 8.91E-02 SQUARE INCHES PER INCH.
 ALPHA (ACROSS) D=SIDE DIMENSION OF SQUARE FCRT CRCS=SECTION IN INCHES.
 SQ IN/IN= 3.16E-02 3.55E-02 3.98E-02 4.47E-02 5.01E-02 5.62E-02 6.31E-02 7.08E-02 7.94E-02 8.91E-02
 L INCHES (DOWN)

0.0	*	2.61E-02	2.93E-02	3.28E-02	3.68E-02	4.13E-02	4.64E-02	5.20E-02	5.84E-02	6.55E-02	7.35E-02
0.5	*	1.39E-01	1.49E-01	1.58E-01	1.69E-01	1.80E-01	1.92E-01	2.06E-01	2.20E-01	2.35E-01	2.51E-01
1.0	*	1.91E-01	2.04E-01	2.17E-01	2.31E-01	2.45E-01	2.61E-01	2.79E-01	2.97E-01	3.16E-01	3.38E-01
1.5	*	2.31E-01	2.46E-01	2.61E-01	2.78E-01	2.96E-01	3.15E-01	3.35E-01	3.56E-01	3.79E-01	4.04E-01
2.0	*	2.65E-01	2.81E-01	2.99E-01	3.18E-01	3.38E-01	3.59E-01	3.82E-01	4.07E-01	4.33E-01	4.61E-01
2.5	*	2.95E-01	3.13E-01	3.32E-01	3.53E-01	3.75E-01	3.99E-01	4.24E-01	4.51E-01	4.80E-01	5.10E-01
3.0	*	3.21E-01	3.41E-01	3.62E-01	3.85E-01	4.09E-01	4.35E-01	4.62E-01	4.91E-01	5.22E-01	5.55E-01
3.5	*	3.46E-01	3.67E-01	3.90E-01	4.14E-01	4.40E-01	4.67E-01	4.97E-01	5.28E-01	5.61E-01	5.96E-01
4.0	*	3.69E-01	3.92E-01	4.16E-01	4.42E-01	4.69E-01	4.98E-01	5.29E-01	5.62E-01	5.97E-01	6.35E-01
4.5	*	3.90E-01	4.14E-01	4.40E-01	4.67E-01	4.96E-01	5.27E-01	5.59E-01	5.94E-01	6.32E-01	6.71E-01
5.0	*	4.11E-01	4.36E-01	4.63E-01	4.91E-01	5.22E-01	5.54E-01	5.88E-01	6.25E-01	6.64E-01	7.05E-01
5.5	*	4.30E-01	4.57E-01	4.85E-01	5.14E-01	5.46E-01	5.80E-01	6.16E-01	6.54E-01	6.93E-01	7.38E-01
6.0	*	4.49E-01	4.76E-01	5.05E-01	5.36E-01	5.69E-01	6.04E-01	6.42E-01	6.82E-01	7.24E-01	7.69E-01
6.5	*	4.67E-01	4.95E-01	5.25E-01	5.58E-01	5.92E-01	6.28E-01	6.67E-01	7.08E-01	7.52E-01	7.99E-01
7.0	*	4.84E-01	5.13E-01	5.45E-01	5.78E-01	6.13E-01	6.51E-01	6.91E-01	7.34E-01	7.79E-01	8.27E-01
7.5	*	5.00E-01	5.31E-01	5.63E-01	5.97E-01	6.34E-01	6.73E-01	7.14E-01	7.58E-01	8.05E-01	8.55E-01
8.0	*	5.16E-01	5.48E-01	5.81E-01	6.16E-01	6.54E-01	6.94E-01	7.37E-01	7.82E-01	8.31E-01	8.82E-01
8.5	*	5.32E-01	5.64E-01	5.98E-01	6.35E-01	6.74E-01	7.15E-01	7.59E-01	8.05E-01	8.55E-01	9.08E-01
9.0	*	5.47E-01	5.80E-01	6.15E-01	6.53E-01	6.93E-01	7.35E-01	7.80E-01	8.28E-01	8.79E-01	9.33E-01
9.5	*	5.61E-01	5.95E-01	6.32E-01	6.70E-01	7.11E-01	7.54E-01	8.01E-01	8.50E-01	9.02E-01	9.58E-01
10.0	*	5.76E-01	6.10E-01	6.48E-01	6.87E-01	7.29E-01	7.73E-01	8.21E-01	8.71E-01	9.25E-01	9.81E-01
10.5	*	5.89E-01	6.25E-01	6.63E-01	7.03E-01	7.46E-01	7.92E-01	8.42E-01	8.92E-01	9.47E-01	1.00E 00
11.0	*	6.03E-01	6.40E-01	6.78E-01	7.20E-01	7.63E-01	8.10E-01	8.59E-01	9.12E-01	9.68E-01	1.03E 00
11.5	*	6.16E-01	6.54E-01	6.93E-01	7.35E-01	7.80E-01	8.28E-01	8.78E-01	9.32E-01	9.89E-01	1.05E 00
12.0	*	6.29E-01	6.67E-01	7.08E-01	7.51E-01	7.96E-01	8.45E-01	8.97E-01	9.51E-01	1.01E 00	1.07E 00
12.5	*	6.42E-01	6.81E-01	7.22E-01	7.66E-01	8.12E-01	8.62E-01	9.14E-01	9.70E-01	1.03E 00	1.09E 00
13.0	*	6.54E-01	6.94E-01	7.36E-01	7.81E-01	8.28E-01	8.78E-01	9.32E-01	9.89E-01	1.05E 00	1.11E 00
13.5	*	6.67E-01	7.07E-01	7.50E-01	7.95E-01	8.43E-01	8.95E-01	9.49E-01	1.01E 00	1.07E 00	1.13E 00
14.0	*	6.79E-01	7.20E-01	7.63E-01	8.09E-01	8.59E-01	9.11E-01	9.66E-01	1.03E 00	1.09E 00	1.15E 00
14.5	*	6.90E-01	7.32E-01	7.76E-01	8.23E-01	8.73E-01	9.26E-01	9.83E-01	1.04E 00	1.11E 00	1.17E 00
15.0	*	7.02E-01	7.44E-01	7.89E-01	8.37E-01	8.88E-01	9.42E-01	9.99E-01	1.06E 00	1.12E 00	1.19E 00
15.5	*	7.13E-01	7.56E-01	8.02E-01	8.51E-01	9.02E-01	9.57E-01	1.02E 00	1.08E 00	1.14E 00	1.21E 00
16.0	*	7.24E-01	7.68E-01	8.15E-01	8.64E-01	9.16E-01	9.72E-01	1.03E 00	1.09E 00	1.16E 00	1.23E 00
16.5	*	7.35E-01	7.80E-01	8.27E-01	8.77E-01	9.30E-01	9.87E-01	1.05E 00	1.11E 00	1.18E 00	1.25E 00
17.0	*	7.46E-01	7.91E-01	8.39E-01	8.90E-01	9.44E-01	1.00E 00	1.06E 00	1.13E 00	1.20E 00	1.27E 00

C TABLE NO. 6 CONTINUED.

17.5	*	7.57E-01	8.03E-01	8.51E-01	9.03E-01	9.57E-01	1.02E 00	1.08E 00	1.14E 00	1.21E 00	1.29E 00
18.0	*	7.68E-01	8.14E-01	8.63E-01	9.15E-01	9.71E-01	1.03E 00	1.09E 00	1.16E 00	1.23E 00	1.30E 00
18.5	*	7.78E-01	8.25E-01	8.75E-01	9.28E-01	9.84E-01	1.04E 00	1.11E 00	1.17E 00	1.25E 00	1.32E 00
19.0	*	7.88E-01	8.36E-01	8.86E-01	9.40E-01	9.97E-01	1.06E 00	1.12E 00	1.19E 00	1.26E 00	1.34E 00
19.5	*	7.98E-01	8.47E-01	8.98E-01	9.52E-01	1.01E 00	1.07E 00	1.14E 00	1.20E 00	1.28E 00	1.36E 00
20.0	*	8.08E-01	8.57E-01	9.09E-01	9.64E-01	1.02E 00	1.08E 00	1.15E 00	1.22E 00	1.29E 00	1.37E 00
20.5	*	8.18E-01	8.68E-01	9.20E-01	9.75E-01	1.03E 00	1.10E 00	1.16E 00	1.23E 00	1.31E 00	1.39E 00
21.0	*	8.28E-01	8.78E-01	9.31E-01	9.87E-01	1.05E 00	1.11E 00	1.18E 00	1.25E 00	1.32E 00	1.41E 00
21.5	*	8.38E-01	8.88E-01	9.42E-01	9.99E-01	1.06E 00	1.12E 00	1.19E 00	1.26E 00	1.34E 00	1.42E 00
22.0	*	8.47E-01	8.98E-01	9.52E-01	1.01E 00	1.07E 00	1.14E 00	1.20E 00	1.28E 00	1.36E 00	1.44E 00
22.5	*	8.57E-01	9.08E-01	9.59E-01	1.02E 00	1.08E 00	1.15E 00	1.22E 00	1.29E 00	1.37E 00	1.45E 00
23.0	*	8.66E-01	9.18E-01	9.73E-01	1.03E 00	1.09E 00	1.16E 00	1.23E 00	1.31E 00	1.38E 00	1.47E 00
23.5	*	8.75E-01	9.28E-01	9.84E-01	1.04E 00	1.11E 00	1.17E 00	1.24E 00	1.32E 00	1.40E 00	1.48E 00
24.0	*	8.84E-01	9.38E-01	9.94E-01	1.05E 00	1.12E 00	1.19E 00	1.26E 00	1.33E 00	1.41E 00	1.50E 00
24.5	*	8.93E-01	9.47E-01	1.00E 00	1.06E 00	1.13E 00	1.20E 00	1.27E 00	1.35E 00	1.43E 00	1.51E 00
25.0	*	9.02E-01	9.57E-01	1.01E 00	1.08E 00	1.14E 00	1.21E 00	1.28E 00	1.36E 00	1.44E 00	1.53E 00
25.5	*	9.11E-01	9.66E-01	1.02E 00	1.09E 00	1.15E 00	1.22E 00	1.29E 00	1.37E 00	1.46E 00	1.54E 00
26.0	*	9.20E-01	9.75E-01	1.03E 00	1.10E 00	1.16E 00	1.23E 00	1.31E 00	1.39E 00	1.47E 00	1.56E 00
26.5	*	9.29E-01	9.84E-01	1.04E 00	1.11E 00	1.17E 00	1.24E 00	1.32E 00	1.40E 00	1.48E 00	1.57E 00
27.0	*	9.37E-01	9.93E-01	1.05E 00	1.12E 00	1.18E 00	1.26E 00	1.33E 00	1.41E 00	1.50E 00	1.59E 00
27.5	*	9.46E-01	1.00E 00	1.06E 00	1.13E 00	1.19E 00	1.27E 00	1.34E 00	1.42E 00	1.51E 00	1.60E 00
28.0	*	9.54E-01	1.01E 00	1.07E 00	1.14E 00	1.21E 00	1.28E 00	1.36E 00	1.44E 00	1.52E 00	1.62E 00
28.5	*	9.62E-01	1.02E 00	1.08E 00	1.15E 00	1.22E 00	1.29E 00	1.37E 00	1.45E 00	1.54E 00	1.63E 00
29.0	*	9.71E-01	1.03E 00	1.09E 00	1.16E 00	1.23E 00	1.30E 00	1.38E 00	1.46E 00	1.55E 00	1.64E 00
29.5	*	9.79E-01	1.04E 00	1.10E 00	1.17E 00	1.24E 00	1.31E 00	1.39E 00	1.47E 00	1.56E 00	1.66E 00
30.0	*	9.87E-01	1.05E 00	1.11E 00	1.18E 00	1.25E 00	1.32E 00	1.40E 00	1.49E 00	1.58E 00	1.67E 00
30.5	*	9.95E-01	1.05E 00	1.12E 00	1.19E 00	1.26E 00	1.33E 00	1.41E 00	1.50E 00	1.59E 00	1.69E 00
31.0	*	1.00E 00	1.06E 00	1.13E 00	1.20E 00	1.27E 00	1.34E 00	1.42E 00	1.51E 00	1.60E 00	1.70E 00
31.5	*	1.01E 00	1.07E 00	1.14E 00	1.20E 00	1.28E 00	1.35E 00	1.44E 00	1.52E 00	1.61E 00	1.71E 00
32.0	*	1.02E 00	1.08E 00	1.15E 00	1.21E 00	1.29E 00	1.36E 00	1.45E 00	1.53E 00	1.63E 00	1.73E 00
32.5	*	1.03E 00	1.09E 00	1.15E 00	1.22E 00	1.30E 00	1.38E 00	1.46E 00	1.55E 00	1.64E 00	1.74E 00
33.0	*	1.03E 00	1.10E 00	1.16E 00	1.23E 00	1.31E 00	1.39E 00	1.47E 00	1.56E 00	1.65E 00	1.75E 00
33.5	*	1.04E 00	1.10E 00	1.17E 00	1.24E 00	1.32E 00	1.40E 00	1.48E 00	1.57E 00	1.66E 00	1.76E 00
34.0	*	1.05E 00	1.11E 00	1.18E 00	1.25E 00	1.33E 00	1.41E 00	1.49E 00	1.58E 00	1.68E 00	1.78E 00
34.5	*	1.06E 00	1.12E 00	1.19E 00	1.26E 00	1.34E 00	1.42E 00	1.50E 00	1.59E 00	1.69E 00	1.79E 00
35.0	*	1.07E 00	1.13E 00	1.20E 00	1.27E 00	1.35E 00	1.43E 00	1.51E 00	1.60E 00	1.70E 00	1.80E 00
35.5	*	1.07E 00	1.14E 00	1.21E 00	1.28E 00	1.36E 00	1.44E 00	1.52E 00	1.61E 00	1.71E 00	1.82E 00
36.0	*	1.08E 00	1.14E 00	1.21E 00	1.29E 00	1.37E 00	1.45E 00	1.53E 00	1.62E 00	1.72E 00	1.83E 00
36.5	*	1.09E 00	1.15E 00	1.22E 00	1.30E 00	1.37E 00	1.46E 00	1.54E 00	1.64E 00	1.74E 00	1.84E 00
37.0	*	1.09E 00	1.16E 00	1.23E 00	1.30E 00	1.38E 00	1.47E 00	1.55E 00	1.65E 00	1.75E 00	1.85E 00

***** D TABLE NO. 7 FOR CABINET TUNING *****										
ALPHA VALUES FROM 1.00E-01 TO 2.82E-01 SQUARE INCHES PER INCH.										
ALPHA (ACRCS)	DIMENSION OF SQUARE FEET CROSS-SECTION IN INCHES.									
SC IN/IN = 1.00E-01	1.12E-01	1.26E-01	1.41E-01	1.58E-01	1.78E-01	2.00E-01	2.24E-01	2.51E-01	2.82E-01	
L INCHES (CGW)	*****									
0.0 *	8.25E-02	9.26E-02	1.04E-01	1.17E-01	1.31E-01	1.47E-01	1.65E-01	1.85E-01	2.07E-01	2.33E-01
0.5 *	2.69E-01	2.88E-01	3.08E-01	3.30E-01	3.54E-01	3.80E-01	4.09E-01	4.39E-01	4.73E-01	5.09E-01
1.0 *	3.60E-01	3.84E-01	4.11E-01	4.39E-01	4.69E-01	5.01E-01	5.37E-01	5.74E-01	6.15E-01	6.60E-01
1.5 *	4.31E-01	4.59E-01	4.90E-01	5.22E-01	5.57E-01	5.95E-01	6.36E-01	6.79E-01	7.26E-01	7.77E-01
2.0 *	4.90E-01	5.22E-01	5.56E-01	5.93E-01	6.32E-01	6.74E-01	7.19E-01	7.68E-01	8.20E-01	8.76E-01
2.5 *	5.43E-01	5.78E-01	6.15E-01	6.55E-01	6.98E-01	7.44E-01	7.93E-01	8.46E-01	9.03E-01	9.64E-01
3.0 *	5.91E-01	6.28E-01	6.69E-01	7.12E-01	7.58E-01	8.07E-01	8.60E-01	9.17E-01	9.78E-01	1.04E 00
3.5 *	6.34E-01	6.75E-01	7.18E-01	7.64E-01	8.13E-01	8.66E-01	9.22E-01	9.82E-01	1.05E 00	1.12E 00
4.0 *	6.75E-01	7.18E-01	7.63E-01	8.12E-01	8.64E-01	9.20E-01	9.79E-01	1.04E 00	1.11E 00	1.17E 00
4.5 *	7.13E-01	7.58E-01	8.06E-01	8.58E-01	9.12E-01	9.71E-01	1.03E 00	1.10E 00	1.17E 00	1.25E 00
5.0 *	7.50E-01	7.97E-01	8.47E-01	9.01E-01	9.58E-01	1.02E 00	1.08E 00	1.15E 00	1.23E 00	1.31E 00
5.5 *	7.84E-01	8.33E-01	8.86E-01	9.42E-01	1.00E 00	1.07E 00	1.13E 00	1.21E 00	1.28E 00	1.37E 00
6.0 *	8.17E-01	8.68E-01	9.23E-01	9.81E-01	1.04E 00	1.11E 00	1.18E 00	1.25E 00	1.34E 00	1.42E 00
6.5 *	8.49E-01	9.02E-01	9.58E-01	1.02E 00	1.08E 00	1.15E 00	1.22E 00	1.30E 00	1.39E 00	1.47E 00
7.0 *	8.79E-01	9.34E-01	9.92E-01	1.05E 00	1.12E 00	1.19E 00	1.27E 00	1.35E 00	1.43E 00	1.53E 00
7.5 *	9.08E-01	9.65E-01	1.03E 00	1.09E 00	1.16E 00	1.23E 00	1.31E 00	1.39E 00	1.48E 00	1.57E 00
8.0 *	9.37E-01	9.95E-01	1.06E 00	1.12E 00	1.19E 00	1.27E 00	1.35E 00	1.43E 00	1.52E 00	1.62E 00
8.5 *	9.64E-01	1.02E 00	1.09E 00	1.16E 00	1.23E 00	1.30E 00	1.39E 00	1.47E 00	1.57E 00	1.67E 00
9.0 *	9.91E-01	1.05E 00	1.12E 00	1.19E 00	1.26E 00	1.34E 00	1.42E 00	1.51E 00	1.61E 00	1.71E 00
9.5 *	1.02E 00	1.08E 00	1.15E 00	1.22E 00	1.29E 00	1.38E 00	1.46E 00	1.55E 00	1.65E 00	1.76E 00
10.0 *	1.04E 00	1.11E 00	1.18E 00	1.25E 00	1.33E 00	1.41E 00	1.50E 00	1.59E 00	1.69E 00	1.80E 00
10.5 *	1.07E 00	1.13E 00	1.20E 00	1.28E 00	1.36E 00	1.44E 00	1.53E 00	1.63E 00	1.73E 00	1.84E 00
11.0 *	1.09E 00	1.16E 00	1.23E 00	1.31E 00	1.39E 00	1.47E 00	1.57E 00	1.66E 00	1.77E 00	1.88E 00
11.5 *	1.11E 00	1.18E 00	1.26E 00	1.33E 00	1.42E 00	1.51E 00	1.60E 00	1.70E 00	1.81E 00	1.92E 00
12.0 *	1.14E 00	1.21E 00	1.28E 00	1.36E 00	1.45E 00	1.54E 00	1.63E 00	1.73E 00	1.84E 00	1.96E 00
12.5 *	1.16E 00	1.23F 00	1.31E 00	1.39E 00	1.47E 00	1.57E 00	1.66E 00	1.77E 00	1.88E 00	2.00E 00
13.0 *	1.18E 00	1.25E 00	1.33E 00	1.41E 00	1.50E 00	1.60E 00	1.69E 00	1.80E 00	1.91E 00	2.03E 00
13.5 *	1.20E 00	1.28E 00	1.36E 00	1.44E 00	1.53E 00	1.62E 00	1.73E 00	1.83E 00	1.95E 00	2.07E 00
14.0 *	1.23E 00	1.30E 00	1.38E 00	1.47E 00	1.56E 00	1.65E 00	1.76E 00	1.87E 00	1.98E 00	2.11E 00
14.5 *	1.25E 00	1.32E 00	1.40E 00	1.49E 00	1.58E 00	1.68E 00	1.79E 00	1.90E 00	2.01E 00	2.14E 00
15.0 *	1.27E 00	1.34E 00	1.43E 00	1.52E 00	1.61E 00	1.71E 00	1.81E 00	1.93E 00	2.05E 00	2.18E 00
15.5 *	1.29E 00	1.37E 00	1.45E 00	1.54E 00	1.63E 00	1.74E 00	1.84E 00	1.96E 00	2.08E 00	2.21E 00
16.0 *	1.31E 00	1.39E 00	1.47E 00	1.56E 00	1.66E 00	1.76E 00	1.87E 00	1.99E 00	2.11E 00	2.24E 00
16.5 *	1.33E 00	1.41E 00	1.49E 00	1.59E 00	1.68E 00	1.79E 00	1.90E 00	2.02E 00	2.14E 00	2.28E 00
17.0 *	1.35E 00	1.43E 00	1.52E 00	1.61E 00	1.71E 00	1.81E 00	1.93E 00	2.05E 00	2.17E 00	2.31E 00
C TABLE NO. 7 CONTINUED.										
17.5 *	1.36E 00	1.45E 00	1.54E 00	1.63E 00	1.73E 00	1.84E 00	1.95E 00	2.07E 00	2.20E 00	2.34E 00
18.0 *	1.38E 00	1.47E 00	1.56E 00	1.65E 00	1.76E 00	1.86E 00	1.98E 00	2.10E 00	2.23E 00	2.37E 00
18.5 *	1.40E 00	1.49E 00	1.58E 00	1.68E 00	1.78E 00	1.89E 00	2.01E 00	2.13E 00	2.26E 00	2.40E 00
19.0 *	1.42E 00	1.51E 00	1.60E 00	1.70E 00	1.80E 00	1.91E 00	2.03E 00	2.16E 00	2.29E 00	2.43E 00
19.5 *	1.44E 00	1.53E 00	1.62E 00	1.72E 00	1.82E 00	1.92E 00	2.04E 00	2.18E 00	2.32E 00	2.46E 00
20.0 *	1.46E 00	1.55E 00	1.64E 00	1.74E 00	1.85E 00	1.96E 00	2.08E 00	2.21E 00	2.35E 00	2.49E 00
20.5 *	1.47E 00	1.56E 00	1.66E 00	1.76E 00	1.87E 00	1.98E 00	2.11E 00	2.24E 00	2.38E 00	2.52E 00
21.0 *	1.49E 00	1.58E 00	1.68E 00	1.78E 00	1.89E 00	2.01E 00	2.13E 00	2.26E 00	2.40E 00	2.55E 00
21.5 *	1.51E 00	1.60E 00	1.70E 00	1.80E 00	1.91E 00	2.03E 00	2.16E 00	2.29E 00	2.43E 00	2.58E 00
22.0 *	1.53E 00	1.62E 00	1.72E 00	1.82E 00	1.93E 00	2.05E 00	2.18E 00	2.31E 00	2.46E 00	2.61E 00
22.5 *	1.54E 00	1.64E 00	1.74E 00	1.84E 00	1.95E 00	2.07E 00	2.20E 00	2.34E 00	2.48E 00	2.64E 00
23.0 *	1.56E 00	1.65E 00	1.75E 00	1.86E 00	1.98E 00	2.10E 00	2.23E 00	2.36E 00	2.51E 00	2.66E 00
23.5 *	1.57E 00	1.67E 00	1.77E 00	1.88E 00	2.00E 00	2.12E 00	2.25E 00	2.39E 00	2.54E 00	2.69E 00
24.0 *	1.59E 00	1.69E 00	1.79E 00	1.90E 00	2.02E 00	2.14E 00	2.27E 00	2.41E 00	2.56E 00	2.72E 00
24.5 *	1.61E 00	1.70E 00	1.81E 00	1.92E 00	2.04E 00	2.16E 00	2.29E 00	2.44E 00	2.59E 00	2.75E 00
25.0 *	1.62E 00	1.72E 00	1.83E 00	1.94E 00	2.06E 00	2.18E 00	2.32E 00	2.46E 00	2.61E 00	2.77E 00
25.5 *	1.64E 00	1.74E 00	1.84E 00	1.96E 00	2.08E 00	2.20E 00	2.34E 00	2.49E 00	2.64E 00	2.80E 00
26.0 *	1.65E 00	1.75E 00	1.86E 00	1.98E 00	2.10E 00	2.22E 00	2.36E 00	2.51E 00	2.66E 00	2.83E 00
26.5 *	1.67E 00	1.77E 00	1.88E 00	1.99E 00	2.12E 00	2.25E 00	2.38E 00	2.53E 00	2.68E 00	2.85E 00
27.0 *	1.68E 00	1.79E 00	1.90E 00	2.01E 00	2.14E 00	2.27E 00	2.40E 00	2.55E 00	2.71E 00	2.88E 00
27.5 *	1.70E 00	1.80E 00	1.91E 00	2.03E 00	2.15E 00	2.29E 00	2.43E 00	2.58E 00	2.73E 00	2.90E 00
28.0 *	1.72E 00	1.82E 00	1.93E 00	2.05E 00	2.17E 00	2.31E 00	2.45E 00	2.60E 00	2.76E 00	2.93E 00
28.5 *	1.73E 00	1.84E 00	1.95E 00	2.07E 00	2.19E 00	2.33E 00	2.47E 00	2.62E 00	2.78E 00	2.95E 00
29.0 *	1.74E 00	1.85E 00	1.96E 00	2.08E 00	2.21E 00	2.35E 00	2.49E 00	2.64E 00	2.80E 00	2.98E 00
29.5 *	1.76E 00	1.87E 00	1.98E 00	2.10E 00	2.23E 00	2.36E 00	2.51E 00	2.66E 00	2.83E 00	3.00E 00
30.0 *	1.77E 00	1.88E 00	2.00E 00	2.12E 00	2.25E 00	2.38E 00	2.53E 00	2.69E 00	2.85E 00	3.03E 00
30.5 *	1.79E 00	1.90E 00	2.01E 00	2.13E 00	2.26E 00	2.40E 00	2.55E 00	2.71E 00	2.87E 00	3.05E 00
31.0 *	1.80E 00	1.91E 00	2.03E 00	2.15E 00	2.28E 00	2.42E 00	2.57E 00	2.73E 00	2.90E 00	3.07E 00
31.5 *	1.82E 00	1.93E 00	2.04E 00	2.17E 00	2.30E 00	2.44E 00	2.59E 00	2.75E 00	2.92E 00	3.10E 00
32.0 *	1.83E 00	1.94E 00	2.06E 00	2.19E 00	2.32E 00	2.46E 00	2.61E 00	2.77E 00	2.94E 00	3.12E 00
32.5 *	1.84E 00	1.96E 00	2.08E 00	2.20E 00	2.34E 00	2.48E 00	2.63E 00	2.79E 00	2.96E 00	3.14E 00
33.0 *	1.86E 00	1.97E 00	2.09E 00	2.22E 00	2.35E 00	2.50E 00	2.65E 00	2.81E 00	2.98E 00	3.17E 00
33.5 *	1.87E 00	1.99E 00	2.11E 00	2.23E 00	2.37E 00	2.52E 00	2.67E 00	2.83E 00	3.01E 00	3.19E 00
34.0 *	1.89E 00	2.00E 00	2.12E 00	2.25E 00	2.39E 00	2.53E 00	2.69E 00	2.85E 00	3.03E 00	3.21E 00
34.5 *	1.90E 00	2.01E 00	2.14E 00	2.27E 00	2.40E 00	2.55E 00	2.71E 00	2.87E 00	3.05E 00	3.24E 00
35.0 *	1.91E 00	2.03E 00	2.15E 00	2.28E 00	2.42E 00	2.57E 00	2.73E 00	2.89E 00	3.07E 00	3.26E 00
35.5 *	1.93E 00	2.04E 00	2.17E 00	2.30E 00	2.44E 00	2.59E 00	2.74E 00	2.91E 00	3.09E 00	3.28E 00
36.0 *	1.94E 00	2.06E 00	2.18E 00	2.31E 00	2.45E 00	2.60E 00	2.76E 00	2.93E 00	3.11E 00	3.30E 00
36.5 *	1.95E 00	2.07E 00	2.20E 00	2.33E 00	2.47E 00	2.62E 00	2.78E 00	2.95E 00	3.13E 00	3.33E 00
37.0 *	1.97E 00	2.08E 00	2.21E 00	2.35E 00	2.49E 00	2.64E 00	2.80E 00	2.97E 00	3.15E 00	3.35E 00

***** D TABLE NC. 8 FOR CABINET TUNING *****											
ALPHA VALUES FROM 3.16E-01 TO 8.91E-01 SQUARE INCHES PER INCH.											
ALPHA (ACROSS)	C=SIDE DIMENSION OF SQUARE FCRT CROSS-SECTION IN INCHES.										
SC IN/IN=	3.16E-01	3.55E-01	3.98E-01	4.47E-01	5.01E-01	5.62E-01	6.31E-01	7.08E-01	7.94E-01	8.91E-01	
L INCHES (DOWN)											
0.0	*	2.61E-01	2.93E-01	3.28E-01	3.68E-01	4.13E-01	4.64E-01	5.20E-01	5.84E-01	6.55E-01	7.35E-01
0.5	*	5.49E-01	5.92E-01	6.44E-01	6.91E-01	7.48E-01	8.11E-01	8.79E-01	9.55E-01	1.04E 00	1.13F 00
1.0	*	7.08E-01	7.60E-01	8.16E-01	8.77E-01	9.44E-01	1.021 00	1.10E 00	1.18E 00	1.28E 00	1.38E 00
1.5	*	8.31E-01	8.90E-01	9.54E-01	1.02E 00	1.10E 00	1.18E 00	1.27E 00	1.36E 00	1.47E 00	1.58E 00
2.0	*	9.36E-01	1.00E 00	1.07E 00	1.15E 00	1.23E 00	1.32E 00	1.41E 00	1.52E 00	1.63E 00	1.75E 00
2.5	*	1.03E 00	1.10E 00	1.18E 00	1.26E 00	1.34E 00	1.44E 00	1.54E 00	1.65E 00	1.77E 00	1.90E 00
3.0	*	1.11E 00	1.19E 00	1.27E 00	1.36E 00	1.45E 00	1.55E 00	1.66E 00	1.78E 00	1.91E 00	2.04E 00
3.5	*	1.19E 00	1.27E 00	1.36E 00	1.45E 00	1.55E 00	1.65F 00	1.77E 00	1.89E 00	2.03E 00	2.17E 00
4.0	*	1.26E 00	1.35E 00	1.44E 00	1.53E 00	1.64F 00	1.75E 00	1.87E 00	2.00E 00	2.14E 00	2.29E 00
4.5	*	1.33E 00	1.42E 00	1.51E 00	1.61E 00	1.72E 00	1.84E 00	1.97E 00	2.10E 00	2.25F 00	2.40E 00
5.0	*	1.39E 00	1.49E 00	1.58E 00	1.69E 00	1.80E 00	1.92E 00	2.06E 00	2.20E 00	2.35E 00	2.51E 00
5.5	*	1.46E 00	1.55E 00	1.65E 00	1.76E 00	1.88E 00	2.01E 00	2.14E 00	2.29E 00	2.44E 00	2.61E 00
6.0	*	1.51E 00	1.61E 00	1.72E 00	1.83E 00	1.95E 00	2.08E 00	2.22E 00	2.37E 00	2.54E 00	2.71E 00
6.5	*	1.57E 00	1.67E 00	1.78E 00	1.90E 00	2.02E 00	2.16E 00	2.30E 00	2.46E 00	2.62E 00	2.80E 00
7.0	*	1.62E 00	1.73E 00	1.84E 00	1.96E 00	2.09E 00	2.23E 00	2.38E 00	2.54E 00	2.71E 00	2.89E 00
7.5	*	1.68E 00	1.78E 00	1.90E 00	2.02E 00	2.16E 00	2.30E 00	2.45E 00	2.61E 00	2.79E 00	2.98E 00
8.0	*	1.73E 00	1.84E 00	1.96E 00	2.08E 00	2.22E 00	2.37E 00	2.52E 00	2.69E 00	2.87E 00	3.06E 00
8.5	*	1.78E 00	1.89E 00	2.01E 00	2.14E 00	2.28E 00	2.43E 00	2.59E 00	2.76E 00	2.95E 00	3.14E 00
9.0	*	1.82E 00	1.94E 00	2.06E 00	2.20E 00	2.34E 00	2.49E 00	2.66E 00	2.83E 00	3.02E 00	3.22E 00
9.5	*	1.87E 00	1.99E 00	2.12E 00	2.25E 00	2.40E 00	2.55E 00	2.72E 00	2.90E 00	3.09E 00	3.30E 00
10.0	*	1.91E 00	2.04E 00	2.17E 00	2.31E 00	2.45E 00	2.61E 00	2.79E 00	2.97E 00	3.16E 00	3.38E 00
10.5	*	1.96E 00	2.09E 00	2.22E 00	2.36E 00	2.51E 00	2.67E 00	2.85E 00	3.03E 00	3.23E 00	3.45E 00
11.0	*	2.00E 00	2.13E 00	2.26E 00	2.41E 00	2.56E 00	2.73E 00	2.91E 00	3.10E 00	3.30E 00	3.52E 00
11.5	*	2.04E 00	2.17E 00	2.31E 00	2.46E 00	2.62E 00	2.79E 00	2.97E 00	3.16E 00	3.37E 00	3.59E 00
12.0	*	2.08E 00	2.21E 00	2.36E 00	2.51E 00	2.67E 00	2.84E 00	3.02E 00	3.22E 00	3.43E 00	3.66E 00
12.5	*	2.12E 00	2.26E 00	2.40E 00	2.55E 00	2.72E 00	2.89E 00	3.08E 00	3.28E 00	3.50E 00	3.73E 00
13.0	*	2.16E 00	2.30E 00	2.44E 00	2.60E 00	2.77E 00	2.95E 00	3.14E 00	3.34E 00	3.56E 00	3.79E 00
13.5	*	2.20E 00	2.34E 00	2.49E 00	2.65E 00	2.82E 00	3.00E 00	3.19E 00	3.40E 00	3.62E 00	3.86E 00
14.0	*	2.24E 00	2.38E 00	2.53E 00	2.69E 00	2.86E 00	3.05E 00	3.24E 00	3.45E 00	3.68E 00	3.92E 00
14.5	*	2.28E 00	2.42E 00	2.57E 00	2.74E 00	2.91E 00	3.10E 00	3.30E 00	3.51E 00	3.74E 00	3.98E 00
15.0	*	2.31E 00	2.46E 00	2.61E 00	2.78E 00	2.96E 00	3.15E 00	3.35E 00	3.56E 00	3.79E 00	4.04E 00
15.5	*	2.35E 00	2.50E 00	2.65E 00	2.82E 00	3.00E 00	3.19E 00	3.40E 00	3.62E 00	3.85E 00	4.10E 00
16.0	*	2.38E 00	2.53E 00	2.69E 00	2.86E 00	3.05E 00	3.24E 00	3.45E 00	3.67E 00	3.91E 00	4.16E 00
16.5	*	2.42E 00	2.57E 00	2.73E 00	2.91E 00	3.09E 00	3.29E 00	3.50E 00	3.72E 00	3.96E 00	4.22E 00
17.0	*	2.45E 00	2.61E 00	2.77E 00	2.95E 00	3.13E 00	3.33E 00	3.55E 00	3.77E 00	4.02E 00	4.28E 00
D TABLE NC. 8 CONTINUED.											
17.5	*	2.49E 00	2.64E 00	2.81E 00	2.99E 00	3.18E 00	3.38E 00	3.59E 00	3.82E 00	4.07E 00	4.33E 00
18.0	*	2.52E 00	2.68E 00	2.85E 00	3.03E 00	3.22E 00	3.42E 00	3.64E 00	3.87E 00	4.12E 00	4.39E 00
18.5	*	2.55E 00	2.71E 00	2.88E 00	3.06E 00	3.26E 00	3.47E 00	3.69E 00	3.92E 00	4.17E 00	4.44E 00
19.0	*	2.58E 00	2.75E 00	2.92E 00	3.10E 00	3.30E 00	3.51E 00	3.73E 00	3.97E 00	4.23E 00	4.50E 00
19.5	*	2.62E 00	2.78E 00	2.96E 00	3.14E 00	3.34E 00	3.55E 00	3.78E 00	4.02E 00	4.28E 00	4.55E 00
20.0	*	2.65E 00	2.81E 00	2.99E 00	3.18E 00	3.38E 00	3.59E 00	3.82E 00	4.07E 00	4.33E 00	4.61E 00
20.5	*	2.68E 00	2.85E 00	3.03E 00	3.22E 00	3.42E 00	3.63E 00	3.87E 00	4.11E 00	4.38E 00	4.66E 00
21.0	*	2.71E 00	2.88E 00	3.06E 00	3.25E 00	3.46E 00	3.68E 00	3.91E 00	4.16E 00	4.42E 00	4.71E 00
21.5	*	2.74E 00	2.91E 00	3.09E 00	3.29E 00	3.50E 00	3.72E 00	3.95E 00	4.20E 00	4.47E 00	4.76E 00
22.0	*	2.77E 00	2.94E 00	3.13E 00	3.32E 00	3.53E 00	3.76E 00	3.99E 00	4.25E 00	4.52E 00	4.81E 00
22.5	*	2.80E 00	2.98E 00	3.16E 00	3.36E 00	3.57E 00	3.80E 00	4.04E 00	4.29E 00	4.57E 00	4.86E 00
23.0	*	2.83E 00	3.01E 00	3.19E 00	3.39E 00	3.61E 00	3.84E 00	4.08E 00	4.34E 00	4.61E 00	4.91E 00
23.5	*	2.86E 00	3.04E 00	3.23E 00	3.43E 00	3.64E 00	3.87E 00	4.12E 00	4.38E 00	4.66E 00	4.96E 00
24.0	*	2.89E 00	3.07E 00	3.26E 00	3.46E 00	3.68E 00	3.91E 00	4.16E 00	4.42E 00	4.71E 00	5.01E 00
24.5	*	2.92E 00	3.10E 00	3.29E 00	3.50E 00	3.72E 00	3.95E 00	4.20E 00	4.47E 00	4.75E 00	5.05E 00
25.0	*	2.95E 00	3.13E 00	3.32E 00	3.53E 00	3.75E 00	3.99E 00	4.24E 00	4.51E 00	4.80E 00	5.10E 00
25.5	*	2.97E 00	3.16E 00	3.35E 00	3.56E 00	3.79E 00	4.03E 00	4.28E 00	4.55E 00	4.84E 00	5.15E 00
26.0	*	3.00E 00	3.19E 00	3.39E 00	3.60E 00	3.82E 00	4.06E 00	4.32E 00	4.59E 00	4.88E 00	5.20E 00
26.5	*	3.03E 00	3.22E 00	3.42E 00	3.63E 00	3.86E 00	4.10E 00	4.36E 00	4.63E 00	4.93E 00	5.24E 00
27.0	*	3.06E 00	3.24E 00	3.45E 00	3.66E 00	3.89E 00	4.14E 00	4.40E 00	4.67E 00	4.97E 00	5.29E 00
27.5	*	3.08E 00	3.27E 00	3.48E 00	3.69E 00	3.92E 00	4.17E 00	4.42E 00	4.71E 00	5.01E 00	5.33E 00
28.0	*	3.11E 00	3.30E 00	3.51E 00	3.73E 00	3.96E 00	4.21E 00	4.47E 00	4.75E 00	5.05E 00	5.38E 00
28.5	*	3.14E 00	3.33E 00	3.54E 00	3.76E 00	3.99E 00	4.24E 00	4.51E 00	4.79E 00	5.10E 00	5.42E 00
29.0	*	3.16E 00	3.36E 00	3.57E 00	3.79E 00	4.02E 00	4.28E 00	4.55E 00	4.83E 00	5.14E 00	5.46E 00
29.5	*	3.19E 00	3.38E 00	3.59E 00	3.82E 00	4.06E 00	4.31E 00	4.58E 00	4.87E 00	5.18E 00	5.51E 00
30.0	*	3.21E 00	3.41E 00	3.62E 00	3.85E 00	4.09E 00	4.35E 00	4.62E 00	4.91E 00	5.22E 00	5.55E 00
30.5	*	3.24E 00	3.44E 00	3.65E 00	3.88E 00	4.12E 00	4.38E 00	4.65E 00	4.95E 00	5.26E 00	5.59E 00
31.0	*	3.26E 00	3.47E 00	3.68E 00	3.91E 00	4.15E 00	4.41E 00	4.69E 00	4.99E 00	5.30E 00	5.64E 00
31.5	*	3.29E 00	3.49E 00	3.71E 00	3.94E 00	4.19E 00	4.45E 00	4.73E 00	5.02E 00	5.34E 00	5.68E 00
32.0	*	3.31E 00	3.52E 00	3.74E 00	3.97E 00	4.22E 00	4.48E 00	4.76E 00	5.06E 00	5.38E 00	5.72E 00
32.5	*	3.34E 00	3.55E 00	3.76E 00	4.00E 00	4.25E 00	4.51E 00	4.80E 00	5.10E 00	5.42E 00	5.76E 00
33.0	*	3.36E 00	3.57E 00	3.79E 00	4.03E 00	4.28E 00	4.55E 00	4.83E 00	5.13E 00	5.46E 00	5.80E 00
33.5	*	3.39E 00	3.60E 00	3.82E 00	4.06E 00	4.31E 00	4.58E 00	4.86E 00	5.17E 00	5.50E 00	5.84E 00
34.0	*	3.41E 00	3.62E 00	3.85E 00	4.09E 00	4.34E 00	4.61E 00	4.90E 00	5.21E 00	5.53E 00	5.88E 00
34.5	*	3.44E 00	3.65E 00	3.87E 00	4.11E 00	4.37E 00	4.64E 00	4.93E 00	5.24E 00	5.57E 00	5.92E 00
35.0	*	3.46E 00	3.67E 00	3.90E 00	4.14E 00	4.40E 00	4.67E 00	4.97E 00	5.28E 00	5.61E 00	5.96E 00
35.5	*	3.48E 00	3.70E 00	3.93E 00	4.17E 00	4.43E 00	4.71E 00	5.00E 00	5.31E 00	5.65E 00	6.00E 00
36.0	*	3.51E 00	3.72E 00	3.95E 00	4.20E 00	4.46E 00	4.74E 00	5.03E 00	5.35E 00	5.68E 00	6.04E 00
36.5	*	3.53E 00	3.75E 00	3.98E 00	4.23E 00	4.49E 00	4.77E 00	5.07E 00	5.38E 00	5.72E 00	6.08E 00
37.0	*	3.55E 00	3.77E 00	4.01E 00	4.25E 00	4.52E 00	4.80E 00	5.10E 00	5.42E 00	5.76E 00	6.12E 00

***** D TABLE NO. 9 FOR CABINET TUNING *****

ALPHA VALUES FROM 1.00E 00 TO 2.82E 00 SQUARE INCHES PER INCH.
 ALPHA (ACROSS) D=SIDE DIMENSION OF SQUARE POINT CROSS-SECTION IN INCHES.
 SQ LN/IN= 1.00E 00 1.12E 00 1.26E 00 1.41E 00 1.58E 00 1.78E 00 2.00E 00 2.24E 00 2.51E 00 2.82E 00

0.0	*	8.25E-01	9.26E-01	1.04E 00	1.17E 00	1.31E 00	1.47E 00	1.65E 00	1.85E 00	2.07E 00	2.33E 00
0.5	*	1.23E 00	1.34E 00	1.47E 00	1.61E 00	1.76E 00	1.93E 00	2.12E 00	2.33E 00	2.56E 00	2.82E 00
1.0	*	1.49E 00	1.62E 00	1.76E 00	1.91E 00	2.07E 00	2.26E 00	2.46E 00	2.68E 00	2.93E 00	3.20E 00
1.5	*	1.70E 00	1.84E 00	1.99E 00	2.15E 00	2.33E 00	2.52E 00	2.74E 00	2.98E 00	3.24E 00	3.52E 00
2.0	*	1.89E 00	2.03E 00	2.19E 00	2.36E 00	2.55E 00	2.76E 00	2.98E 00	3.23E 00	3.51E 00	3.81E 00
2.5	*	2.05E 00	2.20E 00	2.37E 00	2.55E 00	2.75E 00	2.97E 00	3.20E 00	3.46E 00	3.75E 00	4.06E 00
3.0	*	2.19E 00	2.35E 00	2.53E 00	2.72E 00	2.93E 00	3.16E 00	3.40E 00	3.67E 00	3.97E 00	4.29E 00
3.5	*	2.33E 00	2.50E 00	2.68E 00	2.88E 00	3.10E 00	3.33E 00	3.59E 00	3.87E 00	4.18E 00	4.51E 00
4.0	*	2.45E 00	2.63E 00	2.82E 00	3.03E 00	3.26E 00	3.50E 00	3.77E 00	4.06E 00	4.37E 00	4.72E 00
4.5	*	2.57E 00	2.76E 00	2.96E 00	3.17E 00	3.40E 00	3.66E 00	3.93E 00	4.23E 00	4.55E 00	4.91E 00
5.0	*	2.69E 00	2.88E 00	3.08E 00	3.30E 00	3.54E 00	3.80E 00	4.09E 00	4.39E 00	4.73E 00	5.09E 00
5.5	*	2.79E 00	2.99E 00	3.20E 00	3.43E 00	3.68E 00	3.95E 00	4.24E 00	4.55E 00	4.89E 00	5.27E 00
6.0	*	2.90E 00	3.10E 00	3.32E 00	3.55E 00	3.81E 00	4.08E 00	4.38E 00	4.70E 00	5.05E 00	5.44E 00
6.5	*	3.00E 00	3.20E 00	3.43E 00	3.67E 00	3.93E 00	4.21E 00	4.52E 00	4.85E 00	5.21E 00	5.60E 00
7.0	*	3.09E 00	3.30E 00	3.53E 00	3.78E 00	4.05E 00	4.34E 00	4.65E 00	4.99E 00	5.36E 00	5.75E 00
7.5	*	3.18E 00	3.40E 00	3.64E 00	3.89E 00	4.16E 00	4.46E 00	4.78E 00	5.12E 00	5.50E 00	5.90E 00
8.0	*	3.27E 00	3.49E 00	3.74E 00	3.99E 00	4.27E 00	4.58E 00	4.90E 00	5.26E 00	5.64E 00	6.05E 00
8.5	*	3.36E 00	3.59E 00	3.83E 00	4.10E 00	4.38E 00	4.69E 00	5.02E 00	5.38E 00	5.77E 00	6.19E 00
9.0	*	3.44E 00	3.67E 00	3.93E 00	4.20E 00	4.49E 00	4.80E 00	5.14E 00	5.51E 00	5.90E 00	6.33E 00
9.5	*	3.52E 00	3.76E 00	4.02E 00	4.29E 00	4.59E 00	4.91E 00	5.25E 00	5.63E 00	6.03E 00	6.47E 00
10.0	*	3.60E 00	3.84E 00	4.11E 00	4.39E 00	4.69E 00	5.01E 00	5.37E 00	5.74E 00	6.15E 00	6.60E 00
10.5	*	3.68E 00	3.93E 00	4.19E 00	4.48E 00	4.79E 00	5.12E 00	5.47E 00	5.85E 00	6.26E 00	6.73E 00
11.0	*	3.75E 00	4.01E 00	4.28E 00	4.57E 00	4.88E 00	5.22E 00	5.58E 00	5.97E 00	6.39E 00	6.88E 00
11.5	*	3.83E 00	4.08E 00	4.36E 00	4.65E 00	4.97E 00	5.31E 00	5.68E 00	6.08E 00	6.51E 00	6.97E 00
12.0	*	3.90E 00	4.16E 00	4.44E 00	4.74E 00	5.06E 00	5.41E 00	5.78E 00	6.19E 00	6.62E 00	7.09E 00
12.5	*	3.97E 00	4.24E 00	4.52E 00	4.82E 00	5.15E 00	5.50E 00	5.88E 00	6.29E 00	6.73E 00	7.21E 00
13.0	*	4.04E 00	4.31E 00	4.60E 00	4.91E 00	5.24E 00	5.60E 00	5.98E 00	6.40E 00	6.84E 00	7.33E 00
13.5	*	4.11E 00	4.38E 00	4.67E 00	4.99E 00	5.33E 00	5.69E 00	6.08E 00	6.50E 00	6.95E 00	7.44E 00
14.0	*	4.18E 00	4.45E 00	4.75E 00	5.07E 00	5.41E 00	5.78E 00	6.17E 00	6.60E 00	7.06E 00	7.55E 00
14.5	*	4.24E 00	4.52E 00	4.82E 00	5.15E 00	5.49E 00	5.86E 00	6.26E 00	6.70E 00	7.16E 00	7.66E 00
15.0	*	4.31E 00	4.59E 00	4.90E 00	5.22E 00	5.57E 00	5.95E 00	6.36E 00	6.79E 00	7.26E 00	7.77E 00
15.5	*	4.37E 00	4.66E 00	4.97E 00	5.30E 00	5.65E 00	6.03E 00	6.46E 00	6.89E 00	7.36E 00	7.87E 00
16.0	*	4.43E 00	4.73E 00	5.04E 00	5.37E 00	5.73E 00	6.12E 00	6.53E 00	6.98E 00	7.46E 00	7.98E 00
16.5	*	4.50E 00	4.79E 00	5.11E 00	5.45E 00	5.81E 00	6.20E 00	6.62E 00	7.07E 00	7.56E 00	8.08E 00
17.0	*	4.56E 00	4.85E 00	5.17E 00	5.52E 00	5.89E 00	6.28E 00	6.70E 00	7.16E 00	7.65E 00	8.18E 00

D TABLE NO. 9 CONTINUED.

17.5	*	4.62E 00	4.92E 00	5.24E 00	5.59E 00	5.96E 00	6.36E 00	6.79E 00	7.25E 00	7.75E 00	8.28E 00
18.0	*	4.68E 00	4.98E 00	5.31E 00	5.66E 00	6.03E 00	6.44E 00	6.87E 00	7.34E 00	7.84E 00	8.38E 00
18.5	*	4.73E 00	5.04E 00	5.37E 00	5.73E 00	6.11E 00	6.52E 00	6.95E 00	7.42E 00	7.93E 00	8.48E 00
19.0	*	4.79E 00	5.10E 00	5.44E 00	5.80E 00	6.18E 00	6.59E 00	7.03E 00	7.51E 00	8.02E 00	8.57E 00
19.5	*	4.85E 00	5.16E 00	5.50E 00	5.86E 00	6.25E 00	6.67E 00	7.11E 00	7.59E 00	8.11E 00	8.67E 00
20.0	*	4.90E 00	5.22E 00	5.56E 00	5.93E 00	6.32E 00	6.74E 00	7.19E 00	7.68E 00	8.20E 00	8.76E 00
20.5	*	4.96E 00	5.28E 00	5.63E 00	6.00E 00	6.39E 00	6.82E 00	7.27E 00	7.76E 00	8.29E 00	8.85E 00
21.0	*	5.01E 00	5.34E 00	5.69E 00	6.06E 00	6.46E 00	6.89E 00	7.35E 00	7.84E 00	8.37E 00	8.94E 00
21.5	*	5.07E 00	5.40E 00	5.75E 00	6.12E 00	6.53E 00	6.96E 00	7.42E 00	7.92E 00	8.46E 00	9.03E 00
22.0	*	5.12E 00	5.45E 00	5.81E 00	6.19E 00	6.59E 00	7.03E 00	7.50E 00	8.00E 00	8.54E 00	9.12E 00
22.5	*	5.17E 00	5.51E 00	5.87E 00	6.25E 00	6.66E 00	7.10E 00	7.57E 00	8.08E 00	8.63E 00	9.21E 00
23.0	*	5.23E 00	5.56E 00	5.93E 00	6.31E 00	6.73E 00	7.17E 00	7.65E 00	8.16E 00	8.71E 00	9.30E 00
23.5	*	5.28E 00	5.62E 00	5.98E 00	6.37E 00	6.79E 00	7.24E 00	7.72E 00	8.24E 00	8.79E 00	9.38E 00
24.0	*	5.33E 00	5.67E 00	6.04E 00	6.43E 00	6.86E 00	7.31E 00	7.79E 00	8.31E 00	8.87E 00	9.47E 00
24.5	*	5.38E 00	5.73E 00	6.10E 00	6.49E 00	6.92E 00	7.37E 00	7.86E 00	8.39E 00	8.95E 00	9.55E 00
25.0	*	5.43E 00	5.78E 00	6.15E 00	6.55E 00	6.98E 00	7.44E 00	7.93E 00	8.46E 00	9.03E 00	9.64E 00
25.5	*	5.48E 00	5.83E 00	6.21E 00	6.61E 00	7.04E 00	7.51E 00	8.00E 00	8.54E 00	9.11E 00	9.72E 00
26.0	*	5.53E 00	5.88E 00	6.26E 00	6.67E 00	7.11E 00	7.57E 00	8.07E 00	8.61E 00	9.18E 00	9.80E 00
26.5	*	5.58E 00	5.94E 00	6.32E 00	6.73E 00	7.17E 00	7.64E 00	8.14E 00	8.68E 00	9.26E 00	9.88E 00
27.0	*	5.62E 00	5.99E 00	6.37E 00	6.79E 00	7.23E 00	7.70E 00	8.21E 00	8.75E 00	9.34E 00	9.96E 00
27.5	*	5.67E 00	6.04E 00	6.43E 00	6.84E 00	7.29E 00	7.76E 00	8.28E 00	8.82E 00	9.41E 00	1.00E 01
28.0	*	5.72E 00	6.09E 00	6.48E 00	6.90E 00	7.35E 00	7.83E 00	8.34E 00	8.89E 00	9.49E 00	1.01E 01
28.5	*	5.77E 00	6.14E 00	6.53E 00	6.95E 00	7.41E 00	7.89E 00	8.41E 00	8.96E 00	9.56E 00	1.02E 01
29.0	*	5.81E 00	6.19E 00	6.58E 00	7.01E 00	7.46E 00	7.95E 00	8.47E 00	9.03E 00	9.63E 00	1.03E 01
29.5	*	5.86E 00	6.23E 00	6.64E 00	7.06E 00	7.52E 00	8.01E 00	8.54E 00	9.10E 00	9.71E 00	1.04E 01
30.0	*	5.91E 00	6.28E 00	6.69E 00	7.12E 00	7.58E 00	8.07E 00	8.60E 00	9.17E 00	9.78E 00	1.04E 01
30.5	*	5.95E 00	6.33E 00	6.74E 00	7.17E 00	7.64E 00	8.13E 00	8.67E 00	9.24E 00	9.85E 00	1.05E 01
31.0	*	6.00E 00	6.38E 00	6.79E 00	7.23E 00	7.69E 00	8.19E 00	8.73E 00	9.31E 00	9.92E 00	1.06E 01
31.5	*	6.04E 00	6.43E 00	6.84E 00	7.28E 00	7.75E 00	8.25E 00	8.79E 00	9.37E 00	9.99E 00	1.07E 01
32.0	*	6.09E 00	6.47E 00	6.89E 00	7.33E 00	7.81E 00	8.31E 00	8.86E 00	9.44E 00	1.01E 01	1.07E 01
32.5	*	6.13E 00	6.52E 00	6.94E 00	7.38E 00	7.86E 00	8.37E 00	8.92E 00	9.50E 00	1.01E 01	1.08E 01
33.0	*	6.17E 00	6.57E 00	6.99E 00	7.43E 00	7.92E 00	8.43E 00	8.98E 00	9.57E 00	1.02E 01	1.09E 01
33.5	*	6.22E 00	6.61E 00	7.03E 00	7.49E 00	7.97E 00	8.49E 00	9.04E 00	9.63E 00	1.03E 01	1.09E 01
34.0	*	6.26E 00	6.66E 00	7.08E 00	7.54E 00	8.02E 00	8.54E 00	9.10E 00	9.70E 00	1.03E 01	1.10E 01
34.5	*	6.30E 00	6.70E 00	7.13E 00	7.59E 00	8.08E 00	8.60E 00	9.16E 00	9.76E 00	1.04E 01	1.11E 01
35.0	*	6.34E 00	6.75E 00	7.18E 00	7.64E 00	8.13E 00	8.66E 00	9.22E 00	9.82E 00	1.05E 01	1.12E 01
35.5	*	6.38E 00	6.79E 00	7.22E 00	7.69E 00	8.18E 00	8.71E 00	9.28E 00	9.89E 00	1.05E 01	1.12E 01
36.0	*	6.43E 00	6.84E 00	7.27E 00	7.74E 00	8.24E 00	8.77E 00	9.34E 00	9.95E 00	1.06E 01	1.13E 01
36.5	*	6.47E 00	6.88E 00	7.32E 00	7.79E 00	8.29E 00	8.82E 00	9.40E 00	1.00E 01	1.07E 01	1.14E 01
37.0	*	6.51E 00	6.92E 00	7.36E 00	7.84E 00	8.34E 00	8.88E 00	9.45E 00	1.01E 01	1.07E 01	1.14E 01

***** D TABLE NO. 10 FOR CABINET TUNING *****
 ALPHA VALUES FROM 3.16E 00 TO 8.91E 00 SQUARE INCHES PER INCH.
 ALPHA (ACROSS) D-SIDE DIMENSION OF SQUARE PORT CROSS-SECTION IN INCHES.
 SO IN/IN= 3.16E 00 3.55E 00 3.98E 00 4.47E 00 5.01E 00 5.62E 00 6.31E 00 7.08E 00 7.94E 00 8.91E 00
 L (INCHES (DOWN))

0.0	*	2.61E 00	2.93E 00	3.28E 00	3.68E 00	4.13E 00	4.64E 00	5.20E 00	5.84E 00	6.55E 00	7.35E 00
0.5	*	3.12E 00	3.44E 00	3.81E 00	4.21E 00	4.67E 00	5.18E 00	5.75E 00	6.39E 00	7.11E 00	7.92E 00
1.0	*	3.51E 00	3.85E 00	4.23E 00	4.65E 00	5.11E 00	5.64E 00	6.22E 00	6.87E 00	7.60E 00	8.41E 00
1.5	*	3.84E 00	4.20E 00	4.59E 00	5.02E 00	5.50E 00	6.04E 00	6.63E 00	7.30E 00	8.04E 00	8.86E 00
2.0	*	4.14E 00	4.50E 00	4.91E 00	5.35E 00	5.85E 00	6.40E 00	7.01E 00	7.68E 00	8.44E 00	9.27E 00
2.5	*	4.40E 00	4.78E 00	5.20E 00	5.66E 00	6.17E 00	6.73E 00	7.35E 00	8.04E 00	8.81E 00	9.66E 00
3.0	*	4.65E 00	5.04E 00	5.47E 00	5.94E 00	6.46E 00	7.04E 00	7.67E 00	8.38E 00	9.15E 00	1.00E 01
3.5	*	4.88E 00	5.29E 00	5.72E 00	6.20E 00	6.74E 00	7.33E 00	7.97E 00	8.69E 00	9.48E 00	1.04E 01
4.0	*	5.09E 00	5.50E 00	5.92E 00	6.45E 00	7.00E 00	7.60E 00	8.26E 00	8.99E 00	9.80E 00	1.07E 01
4.5	*	5.30E 00	5.72E 00	6.18E 00	6.69E 00	7.25E 00	7.86E 00	8.53E 00	9.27E 00	1.01E 01	1.10E 01
5.0	*	5.49E 00	5.92E 00	6.40E 00	6.91E 00	7.48E 00	8.11E 00	8.79E 00	9.55E 00	1.04E 01	1.13E 01
5.5	*	5.67E 00	6.12E 00	6.60E 00	7.13E 00	7.71E 00	8.34E 00	9.04E 00	9.81E 00	1.07E 01	1.16E 01
6.0	*	5.85E 00	6.30E 00	6.80E 00	7.34E 00	7.93E 00	8.57E 00	9.28E 00	1.01E 01	1.09E 01	1.19E 01
6.5	*	6.02E 00	6.48E 00	6.99E 00	7.54E 00	8.14E 00	8.79E 00	9.51E 00	1.03E 01	1.12E 01	1.21E 01
7.0	*	6.19E 00	6.66E 00	7.17E 00	7.73E 00	8.34E 00	9.01E 00	9.74E 00	1.05E 01	1.14E 01	1.24E 01
7.5	*	6.35E 00	6.83E 00	7.35E 00	7.92E 00	8.54E 00	9.22E 00	9.96E 00	1.08E 01	1.17E 01	1.26E 01
8.0	*	6.50E 00	6.99E 00	7.52E 00	8.10E 00	8.73E 00	9.42E 00	1.02E 01	1.10E 01	1.19E 01	1.29E 01
8.5	*	6.65E 00	7.15E 00	7.69E 00	8.27E 00	8.91E 00	9.61E 00	1.04E 01	1.12E 01	1.21E 01	1.31E 01
9.0	*	6.80E 00	7.30E 00	7.85E 00	8.44E 00	9.09E 00	9.80E 00	1.06E 01	1.14E 01	1.23E 01	1.34E 01
9.5	*	6.94E 00	7.45E 00	8.01E 00	8.61E 00	9.27E 00	9.99E 00	1.08E 01	1.16E 01	1.26E 01	1.36E 01
10.0	*	7.08E 00	7.60E 00	8.16E 00	8.77E 00	9.44E 00	1.02E 01	1.10E 01	1.18E 01	1.28E 01	1.38E 01
10.5	*	7.21E 00	7.74E 00	8.31E 00	8.93E 00	9.61E 00	1.03E 01	1.11E 01	1.20E 01	1.30E 01	1.40E 01
11.0	*	7.34E 00	7.88E 00	8.46E 00	9.09E 00	9.77E 00	1.05E 01	1.13E 01	1.22E 01	1.32E 01	1.42E 01
11.5	*	7.47E 00	8.02E 00	8.60E 00	9.24E 00	9.94E 00	1.07E 01	1.15E 01	1.24E 01	1.34E 01	1.44E 01
12.0	*	7.60E 00	8.15E 00	8.75E 00	9.39E 00	1.01E 01	1.09E 01	1.17E 01	1.26E 01	1.36E 01	1.46E 01
12.5	*	7.73E 00	8.28E 00	8.88E 00	9.54E 00	1.02E 01	1.10E 01	1.19E 01	1.28E 01	1.38E 01	1.49E 01
13.0	*	7.85E 00	8.41E 00	9.02E 00	9.68E 00	1.04E 01	1.12E 01	1.20E 01	1.29E 01	1.40E 01	1.50E 01
13.5	*	7.97E 00	8.54E 00	9.15E 00	9.82E 00	1.05E 01	1.13E 01	1.22E 01	1.31E 01	1.41E 01	1.52E 01
14.0	*	8.08E 00	8.66E 00	9.29E 00	9.96E 00	1.07E 01	1.15E 01	1.24E 01	1.33E 01	1.43E 01	1.54E 01
14.5	*	8.20E 00	8.78E 00	9.41E 00	1.01E 01	1.08E 01	1.16E 01	1.25E 01	1.35E 01	1.45E 01	1.56E 01
15.0	*	8.31E 00	8.90E 00	9.54E 00	1.02E 01	1.10E 01	1.18E 01	1.27E 01	1.36E 01	1.47E 01	1.58E 01
15.5	*	8.43E 00	9.02E 00	9.67E 00	1.04E 01	1.11E 01	1.19E 01	1.28E 01	1.38E 01	1.48E 01	1.60E 01
16.0	*	8.54E 00	9.14E 00	9.79E 00	1.05E 01	1.13E 01	1.21E 01	1.30E 01	1.40E 01	1.50E 01	1.62E 01
16.5	*	8.64E 00	9.25E 00	9.91E 00	1.06E 01	1.14E 01	1.22E 01	1.31E 01	1.41E 01	1.52E 01	1.63E 01
17.0	*	8.75E 00	9.37E 00	1.00E 01	1.07E 01	1.15E 01	1.24E 01	1.33E 01	1.43E 01	1.53E 01	1.65E 01

D TABLE NO. 10 CONTINUED.

17.5	*	8.86E 00	9.48E 00	1.01E 01	1.09E 01	1.17E 01	1.25E 01	1.34E 01	1.44E 01	1.55E 01	1.67E 01
18.0	*	8.96E 00	9.59E 00	1.03E 01	1.10E 01	1.18E 01	1.26E 01	1.36E 01	1.46E 01	1.57E 01	1.69E 01
18.5	*	9.06E 00	9.70E 00	1.04E 01	1.11E 01	1.19E 01	1.28E 01	1.37E 01	1.47E 01	1.58E 01	1.70E 01
19.0	*	9.16E 00	9.80E 00	1.05E 01	1.12E 01	1.20E 01	1.29E 01	1.39E 01	1.49E 01	1.60E 01	1.72E 01
19.5	*	9.26E 00	9.91E 00	1.06E 01	1.14E 01	1.22E 01	1.30E 01	1.40E 01	1.50E 01	1.61E 01	1.74E 01
20.0	*	9.36E 00	1.00E 01	1.07E 01	1.15E 01	1.23E 01	1.32E 01	1.41E 01	1.52E 01	1.63E 01	1.75E 01
20.5	*	9.46E 00	1.01E 01	1.08E 01	1.16E 01	1.24E 01	1.33E 01	1.43E 01	1.53E 01	1.65E 01	1.77E 01
21.0	*	9.56E 00	1.02E 01	1.09E 01	1.17E 01	1.25E 01	1.34E 01	1.44E 01	1.55E 01	1.66E 01	1.78E 01
21.5	*	9.65E 00	1.03E 01	1.10E 01	1.18E 01	1.27E 01	1.36E 01	1.45E 01	1.56E 01	1.67E 01	1.80E 01
22.0	*	9.75E 00	1.04E 01	1.11E 01	1.19E 01	1.28E 01	1.37E 01	1.47E 01	1.57E 01	1.69E 01	1.82E 01
22.5	*	9.84E 00	1.05E 01	1.12E 01	1.20E 01	1.29E 01	1.38E 01	1.48E 01	1.59E 01	1.70E 01	1.83E 01
23.0	*	9.93E 00	1.06E 01	1.14E 01	1.21E 01	1.30E 01	1.39E 01	1.49E 01	1.60E 01	1.72E 01	1.85E 01
23.5	*	1.00E 01	1.07E 01	1.15E 01	1.23E 01	1.31E 01	1.40E 01	1.51E 01	1.61E 01	1.73E 01	1.86E 01
24.0	*	1.01E 01	1.08E 01	1.16E 01	1.24E 01	1.32E 01	1.42E 01	1.52E 01	1.63E 01	1.75E 01	1.88E 01
24.5	*	1.02E 01	1.09E 01	1.17E 01	1.25E 01	1.33E 01	1.43E 01	1.53E 01	1.64E 01	1.76E 01	1.89E 01
25.0	*	1.03E 01	1.10E 01	1.18E 01	1.26E 01	1.34E 01	1.44E 01	1.54E 01	1.65E 01	1.77E 01	1.90E 01
25.5	*	1.04E 01	1.11E 01	1.19E 01	1.27E 01	1.36E 01	1.45E 01	1.56E 01	1.67E 01	1.79E 01	1.92E 01
26.0	*	1.05E 01	1.12E 01	1.19E 01	1.28E 01	1.37E 01	1.46E 01	1.57E 01	1.68E 01	1.80E 01	1.93E 01
26.5	*	1.06E 01	1.13E 01	1.20E 01	1.29E 01	1.38E 01	1.47E 01	1.58E 01	1.69E 01	1.81E 01	1.95E 01
27.0	*	1.06E 01	1.14E 01	1.21E 01	1.30E 01	1.39E 01	1.49E 01	1.59E 01	1.70E 01	1.83E 01	1.96E 01
27.5	*	1.07E 01	1.14E 01	1.22E 01	1.31E 01	1.40E 01	1.50E 01	1.60E 01	1.72E 01	1.84E 01	1.98E 01
28.0	*	1.08E 01	1.15E 01	1.23E 01	1.32E 01	1.41E 01	1.51E 01	1.61E 01	1.73E 01	1.85E 01	1.99E 01
28.5	*	1.09E 01	1.16E 01	1.24E 01	1.33E 01	1.42E 01	1.52E 01	1.63E 01	1.74E 01	1.87E 01	2.00E 01
29.0	*	1.10E 01	1.17E 01	1.25E 01	1.34E 01	1.43E 01	1.53E 01	1.64E 01	1.75E 01	1.88E 01	2.02E 01
29.5	*	1.11E 01	1.18E 01	1.26E 01	1.35E 01	1.44E 01	1.54E 01	1.65E 01	1.77E 01	1.89E 01	2.03E 01
30.0	*	1.11E 01	1.19E 01	1.27E 01	1.36E 01	1.45E 01	1.55E 01	1.66E 01	1.78E 01	1.91E 01	2.04E 01
30.5	*	1.12E 01	1.20E 01	1.28E 01	1.37E 01	1.46E 01	1.56E 01	1.67E 01	1.79E 01	1.92E 01	2.05E 01
31.0	*	1.13E 01	1.21E 01	1.29E 01	1.38E 01	1.47E 01	1.57E 01	1.68E 01	1.80E 01	1.93E 01	2.07E 01
31.5	*	1.14E 01	1.21E 01	1.30E 01	1.39E 01	1.48E 01	1.58E 01	1.69E 01	1.81E 01	1.94E 01	2.08E 01
32.0	*	1.14E 01	1.22E 01	1.30E 01	1.39E 01	1.49E 01	1.59E 01	1.70E 01	1.83E 01	1.96E 01	2.10E 01
32.5	*	1.15E 01	1.23E 01	1.31E 01	1.40E 01	1.50E 01	1.60E 01	1.72E 01	1.84E 01	1.97E 01	2.11E 01
33.0	*	1.16E 01	1.24E 01	1.32E 01	1.41E 01	1.51E 01	1.61E 01	1.73E 01	1.85E 01	1.98E 01	2.12E 01
33.5	*	1.17E 01	1.25E 01	1.33E 01	1.42E 01	1.52E 01	1.62E 01	1.74E 01	1.86E 01	1.99E 01	2.13E 01
34.0	*	1.18E 01	1.25E 01	1.34E 01	1.43E 01	1.53E 01	1.63E 01	1.75E 01	1.87E 01	2.00E 01	2.15E 01
34.5	*	1.18E 01	1.26E 01	1.35E 01	1.44E 01	1.54E 01	1.64E 01	1.76E 01	1.88E 01	2.02E 01	2.16E 01
35.0	*	1.19E 01	1.27E 01	1.36E 01	1.45E 01	1.55E 01	1.65E 01	1.77E 01	1.89E 01	2.03E 01	2.17E 01
35.5	*	1.20E 01	1.28E 01	1.36E 01	1.46E 01	1.56E 01	1.66E 01	1.78E 01	1.90E 01	2.04E 01	2.18E 01
36.0	*	1.21E 01	1.29E 01	1.37E 01	1.47E 01	1.57E 01	1.67E 01	1.79E 01	1.91E 01	2.05E 01	2.20E 01
36.5	*	1.21E 01	1.29E 01	1.38E 01	1.47E 01	1.57E 01	1.68E 01	1.80E 01	1.93E 01	2.06E 01	2.21E 01
37.0	*	1.22E 01	1.30E 01	1.39E 01	1.48E 01	1.58E 01	1.69E 01	1.81E 01	1.94E 01	2.07E 01	2.22E 01

***** D TABLE NO. 11 FOR CABINET TUNING *****

ALPHA VALUES FROM		D TABLE NO. 11 FOR CABINET TUNING									
ALPHA (ACROSS)		SQUARE INCHES PER INCH.									
50 1/16 IN		DIMENSION OF SQUARE PORT CROSS-SECTION IN INCHES.									
L INCHES (DOWN)		1.00E 01	1.12E 01	1.26E 01	1.41E 01	1.56E 01	1.70E 01	2.00E 01	2.24E 01	2.51E 01	2.82E 01
0.0	*	8.25E 00	9.26E 00	1.04E 01	1.17E 01	1.31E 01	1.47E 01	1.65E 01	1.85E 01	2.07E 01	2.33E 01
0.5	*	8.82E 00	9.83E 00	1.10E 01	1.22E 01	1.37E 01	1.53E 01	1.70E 01	1.91E 01	2.13E 01	2.38E 01
1.0	*	9.32E 00	1.03E 01	1.15E 01	1.28E 01	1.42E 01	1.58E 01	1.76E 01	1.96E 01	2.19E 01	2.44E 01
1.5	*	9.78E 00	1.08E 01	1.20E 01	1.33E 01	1.47E 01	1.63E 01	1.81E 01	2.01E 01	2.24E 01	2.49E 01
2.0	*	1.02E 01	1.13E 01	1.24E 01	1.37E 01	1.52E 01	1.68E 01	1.86E 01	2.06E 01	2.29E 01	2.55E 01
2.5	*	1.06E 01	1.17E 01	1.28E 01	1.41E 01	1.56E 01	1.72E 01	1.91E 01	2.11E 01	2.34E 01	2.60E 01
3.0	*	1.10E 01	1.21E 01	1.32E 01	1.46E 01	1.60E 01	1.77E 01	1.95E 01	2.16E 01	2.39E 01	2.64E 01
3.5	*	1.13E 01	1.24E 01	1.36E 01	1.50E 01	1.64E 01	1.81E 01	2.00E 01	2.20E 01	2.43E 01	2.69E 01
4.0	*	1.17E 01	1.28E 01	1.40E 01	1.53E 01	1.68E 01	1.85E 01	2.04E 01	2.25E 01	2.48E 01	2.74E 01
4.5	*	1.20E 01	1.31E 01	1.43E 01	1.57E 01	1.72E 01	1.89E 01	2.08E 01	2.29E 01	2.52E 01	2.78E 01
5.0	*	1.23E 01	1.34E 01	1.47E 01	1.61E 01	1.76E 01	1.93E 01	2.12E 01	2.33E 01	2.56E 01	2.82E 01
5.5	*	1.26E 01	1.37E 01	1.50E 01	1.64E 01	1.79E 01	1.96E 01	2.16E 01	2.37E 01	2.60E 01	2.87E 01
6.0	*	1.29E 01	1.40E 01	1.53E 01	1.67E 01	1.83E 01	2.00E 01	2.19E 01	2.41E 01	2.64E 01	2.91E 01
6.5	*	1.32E 01	1.43E 01	1.56E 01	1.70E 01	1.86E 01	2.04E 01	2.23E 01	2.44E 01	2.68E 01	2.95E 01
7.0	*	1.35E 01	1.46E 01	1.59E 01	1.74E 01	1.89E 01	2.07E 01	2.26E 01	2.48E 01	2.72E 01	2.99E 01
7.5	*	1.37E 01	1.49E 01	1.62E 01	1.77E 01	1.93E 01	2.10E 01	2.30E 01	2.51E 01	2.76E 01	3.02E 01
8.0	*	1.40E 01	1.52E 01	1.65E 01	1.79E 01	1.96E 01	2.13E 01	2.33E 01	2.55E 01	2.79E 01	3.06E 01
8.5	*	1.42E 01	1.54E 01	1.68E 01	1.82E 01	1.99E 01	2.17E 01	2.36E 01	2.58E 01	2.83E 01	3.10E 01
9.0	*	1.45E 01	1.57E 01	1.70E 01	1.85E 01	2.02E 01	2.20E 01	2.40E 01	2.62E 01	2.86E 01	3.13E 01
9.5	*	1.47E 01	1.59E 01	1.73E 01	1.88E 01	2.04E 01	2.23E 01	2.43E 01	2.65E 01	2.90E 01	3.17E 01
10.0	*	1.49E 01	1.62E 01	1.76E 01	1.91E 01	2.07E 01	2.26E 01	2.46E 01	2.68E 01	2.93E 01	3.20E 01
10.5	*	1.52E 01	1.64E 01	1.78E 01	1.93E 01	2.10E 01	2.28E 01	2.49E 01	2.71E 01	2.96E 01	3.24E 01
11.0	*	1.54E 01	1.67E 01	1.81E 01	1.96E 01	2.13E 01	2.31E 01	2.52E 01	2.74E 01	2.99E 01	3.27E 01
11.5	*	1.56E 01	1.69E 01	1.83E 01	1.98E 01	2.15E 01	2.34E 01	2.55E 01	2.77E 01	3.03E 01	3.31E 01
12.0	*	1.58E 01	1.71E 01	1.85E 01	2.01E 01	2.18E 01	2.37E 01	2.58E 01	2.80E 01	3.06E 01	3.34E 01
12.5	*	1.60E 01	1.73E 01	1.88E 01	2.03E 01	2.21E 01	2.40E 01	2.60E 01	2.83E 01	3.09E 01	3.37E 01
13.0	*	1.62E 01	1.76E 01	1.90E 01	2.06E 01	2.23E 01	2.42E 01	2.63E 01	2.86E 01	3.12E 01	3.40E 01
13.5	*	1.65E 01	1.78E 01	1.92E 01	2.08E 01	2.26E 01	2.45E 01	2.66E 01	2.89E 01	3.15E 01	3.43E 01
14.0	*	1.67E 01	1.80E 01	1.94E 01	2.10E 01	2.28E 01	2.47E 01	2.69E 01	2.92E 01	3.18E 01	3.46E 01
14.5	*	1.69E 01	1.82E 01	1.97E 01	2.13E 01	2.30E 01	2.50E 01	2.71E 01	2.95E 01	3.21E 01	3.49E 01
15.0	*	1.70E 01	1.84E 01	1.99E 01	2.15E 01	2.33E 01	2.52E 01	2.74E 01	2.98E 01	3.24E 01	3.52E 01
15.5	*	1.72E 01	1.86E 01	2.01E 01	2.17E 01	2.35E 01	2.55E 01	2.76E 01	3.00E 01	3.26E 01	3.55E 01
16.0	*	1.74E 01	1.88E 01	2.03E 01	2.19E 01	2.38E 01	2.57E 01	2.79E 01	3.03E 01	3.29E 01	3.58E 01
16.5	*	1.76E 01	1.90E 01	2.05E 01	2.22E 01	2.40E 01	2.60E 01	2.82E 01	3.06E 01	3.32E 01	3.61E 01
17.0	*	1.78E 01	1.92E 01	2.07E 01	2.24E 01	2.42E 01	2.62E 01	2.84E 01	3.08E 01	3.35E 01	3.64E 01

D TABLE NO. 11 CONTINUED.

17.5	*	1.80E 01	1.94E 01	2.09E 01	2.26E 01	2.44E 01	2.64E 01	2.86E 01	3.11E 01	3.37E 01	3.67E 01
18.0	*	1.82E 01	1.96E 01	2.11E 01	2.28E 01	2.46E 01	2.67E 01	2.89E 01	3.13E 01	3.40E 01	3.70E 01
18.5	*	1.83E 01	1.98E 01	2.13E 01	2.30E 01	2.49E 01	2.69E 01	2.91E 01	3.16E 01	3.43E 01	3.72E 01
19.0	*	1.85E 01	1.99E 01	2.15E 01	2.32E 01	2.51E 01	2.71E 01	2.94E 01	3.18E 01	3.45E 01	3.75E 01
19.5	*	1.87E 01	2.01E 01	2.17E 01	2.34E 01	2.53E 01	2.73E 01	2.96E 01	3.21E 01	3.48E 01	3.78E 01
20.0	*	1.89E 01	2.03E 01	2.19E 01	2.36E 01	2.55E 01	2.76E 01	2.98E 01	3.23E 01	3.51E 01	3.81E 01
20.5	*	1.90E 01	2.05E 01	2.21E 01	2.38E 01	2.57E 01	2.78E 01	3.01E 01	3.26E 01	3.53E 01	3.83E 01
21.0	*	1.92E 01	2.07E 01	2.23E 01	2.40E 01	2.59E 01	2.80E 01	3.03E 01	3.28E 01	3.56E 01	3.86E 01
21.5	*	1.94E 01	2.08E 01	2.24E 01	2.42E 01	2.61E 01	2.82E 01	3.05E 01	3.30E 01	3.58E 01	3.88E 01
22.0	*	1.95E 01	2.10E 01	2.26E 01	2.44E 01	2.63E 01	2.84E 01	3.07E 01	3.33E 01	3.61E 01	3.91E 01
22.5	*	1.97E 01	2.12E 01	2.28E 01	2.46E 01	2.65E 01	2.86E 01	3.10E 01	3.35E 01	3.63E 01	3.94E 01
23.0	*	1.98E 01	2.13E 01	2.30E 01	2.48E 01	2.67E 01	2.88E 01	3.12E 01	3.37E 01	3.65E 01	3.96E 01
23.5	*	2.00E 01	2.15E 01	2.32E 01	2.50E 01	2.69E 01	2.91E 01	3.14E 01	3.40E 01	3.68E 01	3.99E 01
24.0	*	2.02E 01	2.17E 01	2.33E 01	2.51E 01	2.71E 01	2.93E 01	3.16E 01	3.42E 01	3.70E 01	4.01E 01
24.5	*	2.03E 01	2.18E 01	2.35E 01	2.53E 01	2.73E 01	2.95E 01	3.18E 01	3.44E 01	3.72E 01	4.04E 01
25.0	*	2.05E 01	2.20E 01	2.37E 01	2.55E 01	2.75E 01	2.97E 01	3.20E 01	3.46E 01	3.75E 01	4.06E 01
25.5	*	2.06E 01	2.22E 01	2.39E 01	2.57E 01	2.77E 01	2.99E 01	3.22E 01	3.49E 01	3.77E 01	4.08E 01
26.0	*	2.08E 01	2.23E 01	2.40E 01	2.59E 01	2.79E 01	3.01E 01	3.24E 01	3.51E 01	3.79E 01	4.11E 01
26.5	*	2.09E 01	2.25E 01	2.42E 01	2.60E 01	2.80E 01	3.02E 01	3.27E 01	3.53E 01	3.82E 01	4.13E 01
27.0	*	2.11E 01	2.26E 01	2.43E 01	2.62E 01	2.82E 01	3.04E 01	3.29E 01	3.55E 01	3.84E 01	4.16E 01
27.5	*	2.12E 01	2.28E 01	2.45E 01	2.64E 01	2.84E 01	3.06E 01	3.31E 01	3.57E 01	3.86E 01	4.18E 01
28.0	*	2.14E 01	2.29E 01	2.47E 01	2.66E 01	2.86E 01	3.08E 01	3.33E 01	3.59E 01	3.88E 01	4.20E 01
28.5	*	2.15E 01	2.31E 01	2.48E 01	2.67E 01	2.88E 01	3.10E 01	3.35E 01	3.61E 01	3.91E 01	4.23E 01
29.0	*	2.16E 01	2.33E 01	2.50E 01	2.69E 01	2.90E 01	3.12E 01	3.37E 01	3.63E 01	3.93E 01	4.25E 01
29.5	*	2.18E 01	2.34E 01	2.52E 01	2.71E 01	2.91E 01	3.14E 01	3.38E 01	3.65E 01	3.95E 01	4.27E 01
30.0	*	2.19E 01	2.35E 01	2.53E 01	2.72E 01	2.93E 01	3.16E 01	3.40E 01	3.67E 01	3.97E 01	4.29E 01
30.5	*	2.21E 01	2.37E 01	2.55E 01	2.74E 01	2.95E 01	3.18E 01	3.42E 01	3.69E 01	3.99E 01	4.32E 01
31.0	*	2.22E 01	2.38E 01	2.56E 01	2.75E 01	2.96E 01	3.19E 01	3.44E 01	3.72E 01	4.01E 01	4.34E 01
31.5	*	2.23E 01	2.40E 01	2.58E 01	2.77E 01	2.98E 01	3.21E 01	3.46E 01	3.74E 01	4.03E 01	4.36E 01
32.0	*	2.25E 01	2.41E 01	2.59E 01	2.79E 01	3.00E 01	3.23E 01	3.48E 01	3.75E 01	4.05E 01	4.38E 01
32.5	*	2.26E 01	2.43E 01	2.61E 01	2.80E 01	3.02E 01	3.25E 01	3.50E 01	3.77E 01	4.08E 01	4.40E 01
33.0	*	2.28E 01	2.44E 01	2.62E 01	2.82E 01	3.03E 01	3.26E 01	3.52E 01	3.79E 01	4.10E 01	4.43E 01
33.5	*	2.29E 01	2.46E 01	2.64E 01	2.83E 01	3.05E 01	3.28E 01	3.54E 01	3.81E 01	4.12E 01	4.45E 01
34.0	*	2.30E 01	2.47E 01	2.65E 01	2.85E 01	3.07E 01	3.30E 01	3.55E 01	3.83E 01	4.14E 01	4.47E 01
34.5	*	2.32E 01	2.48E 01	2.67E 01	2.87E 01	3.08E 01	3.32E 01	3.57E 01	3.85E 01	4.16E 01	4.49E 01
35.0	*	2.33E 01	2.50E 01	2.68E 01	2.88E 01	3.10E 01	3.33E 01	3.59E 01	3.87E 01	4.18E 01	4.51E 01
35.5	*	2.34E 01	2.51E 01	2.70E 01	2.90E 01	3.11E 01	3.35E 01	3.61E 01	3.89E 01	4.20E 01	4.53E 01
36.0	*	2.35E 01	2.53E 01	2.71E 01	2.91E 01	3.13E 01	3.37E 01	3.63E 01	3.91E 01	4.22E 01	4.55E 01
36.5	*	2.37E 01	2.54E 01	2.72E 01	2.93E 01	3.15E 01	3.38E 01	3.64E 01	3.93E 01	4.24E 01	4.57E 01
37.0	*	2.38E 01	2.55E 01	2.74E 01	2.94E 01	3.16E 01	3.40E 01	3.66E 01	3.95E 01	4.26E 01	4.59E 01

***** D TABLE NO. 12 FOR CABINET TUNING *****

ALPHA VALUES FROM 3.16E 01 TO 8.91E 01 SQUARE INCHES PER INCH.

ALPHA (ACROSS) D=SIDE DIMENSION OF SQUARE PORT CROSS-SECTION IN INCHES.
 SQ IN/IN= 3.16E 01 3.98E 01 4.47E 01 5.01E 01 5.62E 01 6.31E 01 7.08E 01 7.94E 01 8.91E 01
 L INCHES (DOWN)

0.0	*	2.61E 01	2.93E 01	3.28E 01	3.68E 01	4.13E 01	4.64E 01	5.20E 01	5.84E 01	6.55E 01	7.35E 01
0.5	*	2.67E 01	2.99E 01	3.34E 01	3.74E 01	4.19E 01	4.70E 01	5.26E 01	5.90E 01	6.61E 01	7.41E 01
1.0	*	2.72E 01	3.04E 01	3.40E 01	3.80E 01	4.25E 01	4.76E 01	5.32E 01	5.96E 01	6.67E 01	7.47E 01
1.5	*	2.78E 01	3.10E 01	3.46E 01	3.86E 01	4.31E 01	4.81E 01	5.38E 01	6.02E 01	6.73E 01	7.53E 01
2.0	*	2.83E 01	3.15E 01	3.51E 01	3.91E 01	4.36E 01	4.87E 01	5.44E 01	6.07E 01	6.79E 01	7.59E 01
2.5	*	2.88E 01	3.20E 01	3.56E 01	3.97E 01	4.42E 01	4.92E 01	5.49E 01	6.13E 01	6.84E 01	7.64E 01
3.0	*	2.93E 01	3.25E 01	3.61E 01	4.02E 01	4.47E 01	4.98E 01	5.55E 01	6.18E 01	6.90E 01	7.70E 01
3.5	*	2.98E 01	3.30E 01	3.66E 01	4.07E 01	4.52E 01	5.03E 01	5.60E 01	6.24E 01	6.95E 01	7.75E 01
4.0	*	3.03E 01	3.35E 01	3.71E 01	4.12E 01	4.57E 01	5.08E 01	5.65E 01	6.29E 01	7.01E 01	7.81E 01
4.5	*	3.07E 01	3.40E 01	3.76E 01	4.17E 01	4.62E 01	5.13E 01	5.70E 01	6.34E 01	7.06E 01	7.86E 01
5.0	*	3.12E 01	3.44E 01	3.81E 01	4.21E 01	4.67E 01	5.18E 01	5.75E 01	6.39E 01	7.11E 01	7.92E 01
5.5	*	3.16E 01	3.49E 01	3.85E 01	4.25E 01	4.72E 01	5.23E 01	5.80E 01	6.44E 01	7.16E 01	7.97E 01
6.0	*	3.20E 01	3.53E 01	3.90E 01	4.31E 01	4.77E 01	5.28E 01	5.85E 01	6.49E 01	7.21E 01	8.02E 01
6.5	*	3.24E 01	3.57E 01	3.94E 01	4.35E 01	4.81E 01	5.33E 01	5.90E 01	6.54E 01	7.26E 01	8.07E 01
7.0	*	3.28E 01	3.61E 01	3.98E 01	4.40E 01	4.86E 01	5.37E 01	5.95E 01	6.59E 01	7.31E 01	8.12E 01
7.5	*	3.32E 01	3.65E 01	4.03E 01	4.44E 01	4.90E 01	5.42E 01	5.99E 01	6.64E 01	7.36E 01	8.17E 01
8.0	*	3.36E 01	3.70E 01	4.07E 01	4.48E 01	4.95E 01	5.46E 01	6.04E 01	6.69E 01	7.41E 01	8.22E 01
8.5	*	3.40E 01	3.73E 01	4.11E 01	4.52E 01	4.99E 01	5.51E 01	6.09E 01	6.73E 01	7.46E 01	8.27E 01
9.0	*	3.44E 01	3.77E 01	4.15E 01	4.57E 01	5.03E 01	5.55E 01	6.13E 01	6.78E 01	7.51E 01	8.32E 01
9.5	*	3.47E 01	3.81E 01	4.19E 01	4.61E 01	5.07E 01	5.59E 01	6.18E 01	6.83E 01	7.55E 01	8.36E 01
10.0	*	3.51E 01	3.85E 01	4.23E 01	4.65E 01	5.11E 01	5.64E 01	6.22E 01	6.87E 01	7.60E 01	8.41E 01
10.5	*	3.55E 01	3.89E 01	4.26E 01	4.69E 01	5.16E 01	5.69E 01	6.26E 01	6.91E 01	7.64E 01	8.46E 01
11.0	*	3.58E 01	3.92E 01	4.30E 01	4.72E 01	5.20E 01	5.72E 01	6.31E 01	6.96E 01	7.69E 01	8.50E 01
11.5	*	3.61E 01	3.96E 01	4.34E 01	4.76E 01	5.24E 01	5.76E 01	6.35E 01	7.00E 01	7.73E 01	8.55E 01
12.0	*	3.65E 01	3.99E 01	4.38E 01	4.80E 01	5.27E 01	5.80E 01	6.39E 01	7.05E 01	7.78E 01	8.60E 01
12.5	*	3.68E 01	4.03E 01	4.41E 01	4.84E 01	5.31E 01	5.84E 01	6.43E 01	7.09E 01	7.82E 01	8.64E 01
13.0	*	3.72E 01	4.06E 01	4.45E 01	4.88E 01	5.35E 01	5.88E 01	6.47E 01	7.13E 01	7.87E 01	8.69E 01
13.5	*	3.75E 01	4.10E 01	4.48E 01	4.91E 01	5.39E 01	5.92E 01	6.51E 01	7.17E 01	7.91E 01	8.73E 01
14.0	*	3.78E 01	4.13E 01	4.52E 01	4.95E 01	5.43E 01	5.96E 01	6.55E 01	7.21E 01	7.95E 01	8.77E 01
14.5	*	3.81E 01	4.16E 01	4.55E 01	4.98E 01	5.46E 01	6.00E 01	6.59E 01	7.25E 01	7.99E 01	8.82E 01
15.0	*	3.84E 01	4.20E 01	4.59E 01	5.02E 01	5.50E 01	6.04E 01	6.63E 01	7.30E 01	8.04E 01	8.86E 01
15.5	*	3.87E 01	4.23E 01	4.62E 01	5.05E 01	5.54E 01	6.07E 01	6.67E 01	7.34E 01	8.08E 01	8.90E 01
16.0	*	3.90E 01	4.26E 01	4.65E 01	5.09E 01	5.57E 01	6.11E 01	6.71E 01	7.38E 01	8.12E 01	8.95E 01
16.5	*	3.93E 01	4.29E 01	4.69E 01	5.12E 01	5.61E 01	6.15E 01	6.75E 01	7.42E 01	8.16E 01	8.99E 01
17.0	*	3.96E 01	4.32E 01	4.72E 01	5.16E 01	5.64E 01	6.18E 01	6.79E 01	7.45E 01	8.20E 01	9.03E 01

D TABLE NO. 12 CONTINUED.

17.5	*	3.99E 01	4.35E 01	4.75E 01	5.19E 01	5.68E 01	6.22E 01	6.82E 01	7.49E 01	8.24E 01	9.07E 01
18.0	*	4.02E 01	4.38E 01	4.78E 01	5.22E 01	5.71E 01	6.26E 01	6.86E 01	7.53E 01	8.28E 01	9.11E 01
18.5	*	4.05E 01	4.41E 01	4.81E 01	5.26E 01	5.75E 01	6.29E 01	6.90E 01	7.57E 01	8.32E 01	9.15E 01
19.0	*	4.08E 01	4.44E 01	4.85E 01	5.29E 01	5.78E 01	6.33E 01	6.93E 01	7.61E 01	8.36E 01	9.19E 01
19.5	*	4.11E 01	4.47E 01	4.88E 01	5.32E 01	5.81E 01	6.36E 01	6.97E 01	7.65E 01	8.40E 01	9.23E 01
20.0	*	4.14E 01	4.50E 01	4.91E 01	5.35E 01	5.85E 01	6.40E 01	7.01E 01	7.68E 01	8.44E 01	9.27E 01
20.5	*	4.17E 01	4.53E 01	4.94E 01	5.39E 01	5.88E 01	6.44E 01	7.04E 01	7.72E 01	8.47E 01	9.31E 01
21.0	*	4.19E 01	4.56E 01	4.97E 01	5.42E 01	5.91E 01	6.47E 01	7.08E 01	7.76E 01	8.51E 01	9.35E 01
21.5	*	4.22E 01	4.59E 01	5.00E 01	5.45E 01	5.95E 01	6.50E 01	7.11E 01	7.79E 01	8.55E 01	9.39E 01
22.0	*	4.25E 01	4.62E 01	5.03E 01	5.48E 01	5.98E 01	6.53E 01	7.15E 01	7.83E 01	8.59E 01	9.43E 01
22.5	*	4.27E 01	4.65E 01	5.06E 01	5.51E 01	6.01E 01	6.57E 01	7.18E 01	7.87E 01	8.62E 01	9.47E 01
23.0	*	4.30E 01	4.67E 01	5.08E 01	5.54E 01	6.04E 01	6.60E 01	7.22E 01	7.90E 01	8.66E 01	9.51E 01
23.5	*	4.33E 01	4.70E 01	5.11E 01	5.57E 01	6.07E 01	6.63E 01	7.25E 01	7.94E 01	8.70E 01	9.55E 01
24.0	*	4.35E 01	4.73E 01	5.14E 01	5.60E 01	6.10E 01	6.66E 01	7.28E 01	7.97E 01	8.73E 01	9.58E 01
24.5	*	4.38E 01	4.75E 01	5.17E 01	5.63E 01	6.14E 01	6.70E 01	7.32E 01	8.01E 01	8.77E 01	9.62E 01
25.0	*	4.40E 01	4.78E 01	5.20E 01	5.66E 01	6.17E 01	6.73E 01	7.35E 01	8.04E 01	8.81E 01	9.66E 01
25.5	*	4.43E 01	4.81E 01	5.23E 01	5.69E 01	6.20E 01	6.76E 01	7.38E 01	8.08E 01	8.84E 01	9.70E 01
26.0	*	4.45E 01	4.83E 01	5.25E 01	5.72E 01	6.23E 01	6.79E 01	7.42E 01	8.11E 01	8.88E 01	9.73E 01
26.5	*	4.48E 01	4.86E 01	5.28E 01	5.75E 01	6.26E 01	6.82E 01	7.45E 01	8.14E 01	8.91E 01	9.77E 01
27.0	*	4.50E 01	4.89E 01	5.31E 01	5.77E 01	6.29E 01	6.85E 01	7.48E 01	8.18E 01	8.95E 01	9.81E 01
27.5	*	4.53E 01	4.91E 01	5.34E 01	5.80E 01	6.32E 01	6.88E 01	7.51E 01	8.21E 01	8.98E 01	9.85E 01
28.0	*	4.55E 01	4.94E 01	5.36E 01	5.83E 01	6.35E 01	6.92E 01	7.55E 01	8.24E 01	9.02E 01	9.89E 01
28.5	*	4.58E 01	4.96E 01	5.39E 01	5.86E 01	6.37E 01	6.95E 01	7.58E 01	8.28E 01	9.05E 01	9.91E 01
29.0	*	4.60E 01	4.99E 01	5.42E 01	5.89E 01	6.40E 01	6.98E 01	7.61E 01	8.31E 01	9.09E 01	9.95E 01
29.5	*	4.63E 01	5.01E 01	5.44E 01	5.91E 01	6.43E 01	7.01E 01	7.64E 01	8.34E 01	9.12E 01	9.99E 01
30.0	*	4.65E 01	5.04E 01	5.47E 01	5.94E 01	6.46E 01	7.04E 01	7.67E 01	8.38E 01	9.16E 01	1.00E 02
30.5	*	4.67E 01	5.06E 01	5.49E 01	5.97E 01	6.49E 01	7.07E 01	7.70E 01	8.41E 01	9.19E 01	1.01E 02
31.0	*	4.70E 01	5.09E 01	5.52E 01	5.99E 01	6.52E 01	7.10E 01	7.73E 01	8.44E 01	9.22E 01	1.01E 02
31.5	*	4.72E 01	5.11E 01	5.55E 01	6.02E 01	6.55E 01	7.12E 01	7.76E 01	8.47E 01	9.26E 01	1.01E 02
32.0	*	4.74E 01	5.14E 01	5.57E 01	6.05E 01	6.57E 01	7.15E 01	7.79E 01	8.50E 01	9.29E 01	1.02E 02
32.5	*	4.77E 01	5.16E 01	5.60E 01	6.07E 01	6.60E 01	7.18E 01	7.83E 01	8.54E 01	9.32E 01	1.02E 02
33.0	*	4.79E 01	5.18E 01	5.62E 01	6.10E 01	6.63E 01	7.21E 01	7.86E 01	8.57E 01	9.35E 01	1.02E 02
33.5	*	4.81E 01	5.21E 01	5.65E 01	6.13E 01	6.66E 01	7.24E 01	7.89E 01	8.60E 01	9.39E 01	1.03E 02
34.0	*	4.83E 01	5.23E 01	5.67E 01	6.15E 01	6.68E 01	7.27E 01	7.92E 01	8.63E 01	9.42E 01	1.03E 02
34.5	*	4.86E 01	5.26E 01	5.70E 01	6.18E 01	6.71E 01	7.30E 01	7.94E 01	8.66E 01	9.45E 01	1.03E 02
35.0	*	4.88E 01	5.28E 01	5.72E 01	6.20E 01	6.74E 01	7.33E 01	7.97E 01	8.69E 01	9.48E 01	1.04E 02
35.5	*	4.90E 01	5.30E 01	5.74E 01	6.23E 01	6.76E 01	7.35E 01	8.00E 01	8.72E 01	9.52E 01	1.04E 02
36.0	*	4.92E 01	5.33E 01	5.77E 01	6.26E 01	6.79E 01	7.38E 01	8.03E 01	8.75E 01	9.55E 01	1.04E 02
36.5	*	4.94E 01	5.35E 01	5.79E 01	6.28E 01	6.82E 01	7.41E 01	8.06E 01	8.78E 01	9.58E 01	1.05E 02
37.0	*	4.97E 01	5.37E 01	5.82E 01	6.31E 01	6.84E 01	7.44E 01	8.09E 01	8.81E 01	9.61E 01	1.05E 02

***** D TABLE NO. 13 FOR CABINET TUNING *****

ALPHA VALUES FROM 1.10E 02 TO 2.82E 02 SQUARE INCHES PER INCH.
 ALPHA (ACROSS) [SIDE DIMENSION OF SQUARE PORT CROSS-SECTION IN INCHES.
 SQ IN/IN = 1.03E 02 1.12E 02 1.26E 02 1.41E 02 1.58E 02 1.78E 02 2.00F 02 2.24E 02 2.51E 02 2.82F 02
 L INCHES (DOWN)

0.0	*	8.25E 01	9.26E 01	1.04E 02	1.17E 02	1.31E 02	1.47E 02	1.65F 02	1.85E 02	2.07E 02	2.33E 02
0.5	*	8.31F 01	9.32E 01	1.04E 02	1.17E 02	1.31E 02	1.47E 02	1.65F 02	1.85E 02	2.08E 02	2.33F 02
1.0	*	8.37E 01	9.38F 01	1.05E 02	1.18E 02	1.32E 02	1.48E 02	1.66E 02	1.86E 02	2.08E 02	2.34F 02
1.5	*	8.43E 01	9.44F 01	1.06E 02	1.18E 02	1.33E 02	1.49E 02	1.66E 02	1.86E 02	2.09E 02	2.34E 02
2.0	*	8.49E 01	9.49C 01	1.06E 02	1.19E 02	1.33E 02	1.49E 02	1.67E 02	1.87E 02	2.10E 02	2.35E 02
2.5	*	8.54E 01	9.55F 01	1.07E 02	1.19E 02	1.34E 02	1.50E 02	1.68E 02	1.88E 02	2.10E 02	2.36E 02
3.0	*	8.60E 01	9.61E 01	1.07E 02	1.20E 02	1.34E 02	1.50E 02	1.68E 02	1.88E 02	2.11E 02	2.36E 02
3.5	*	8.65E 01	9.66F 01	1.08E 02	1.21E 02	1.35E 02	1.51E 02	1.69E 02	1.89E 02	2.11E 02	2.37E 02
4.0	*	8.71E 01	9.72F 01	1.09E 02	1.21E 02	1.35E 02	1.51E 02	1.69E 02	1.89E 02	2.12E 02	2.37E 02
4.5	*	8.76E 01	9.77C 01	1.09E 02	1.22E 02	1.36E 02	1.52E 02	1.70E 02	1.90E 02	2.12E 02	2.38E 02
5.0	*	8.82E 01	9.83E 01	1.10E 02	1.22E 02	1.37E 02	1.53E 02	1.70E 02	1.91E 02	2.13E 02	2.38E 02
5.5	*	8.87F 01	9.88C 01	1.10E 02	1.23E 02	1.37E 02	1.53E 02	1.71E 02	1.91E 02	2.14E 02	2.39E 02
6.0	*	8.92E 01	9.93F 01	1.11E 02	1.23E 02	1.38E 02	1.54E 02	1.72E 02	1.92E 02	2.14E 02	2.40E 02
6.5	*	8.97E 01	9.99F 01	1.11E 02	1.24E 02	1.38E 02	1.54E 02	1.72E 02	1.92E 02	2.15E 02	2.40E 02
7.0	*	9.03E 01	1.00E 02	1.12E 02	1.24E 02	1.39E 02	1.55E 02	1.73E 02	1.93E 02	2.15E 02	2.41E 02
7.5	*	9.08E 01	1.01E 02	1.12E 02	1.25E 02	1.39E 02	1.55E 02	1.73E 02	1.93E 02	2.16E 02	2.41E 02
8.0	*	9.13E 01	1.01E 02	1.13E 02	1.25E 02	1.40E 02	1.56E 02	1.74E 02	1.94E 02	2.17E 02	2.42E 02
8.5	*	9.18E 01	1.02E 02	1.13E 02	1.26E 02	1.40E 02	1.56E 02	1.74E 02	1.94E 02	2.17E 02	2.42E 02
9.0	*	9.23E 01	1.02E 02	1.14E 02	1.27E 02	1.41E 02	1.57E 02	1.75E 02	1.95E 02	2.18E 02	2.43E 02
9.5	*	9.27E 01	1.03E 02	1.14E 02	1.27E 02	1.41E 02	1.57E 02	1.75E 02	1.96E 02	2.18E 02	2.44E 02
10.0	*	9.32E 01	1.03E 02	1.15E 02	1.28E 02	1.42E 02	1.58E 02	1.76E 02	1.96E 02	2.19E 02	2.44E 02
10.5	*	9.37E 01	1.04E 02	1.15E 02	1.28E 02	1.42E 02	1.58E 02	1.76E 02	1.97E 02	2.19E 02	2.45E 02
11.0	*	9.42E 01	1.04E 02	1.16E 02	1.29E 02	1.43E 02	1.59E 02	1.77E 02	1.97E 02	2.20E 02	2.45E 02
11.5	*	9.46E 01	1.05E 02	1.16E 02	1.29E 02	1.43E 02	1.59E 02	1.78E 02	1.98E 02	2.20E 02	2.46E 02
12.0	*	9.51E 01	1.05E 02	1.17E 02	1.30E 02	1.44E 02	1.60E 02	1.78E 02	1.98E 02	2.21E 02	2.46E 02
12.5	*	9.56E 01	1.06E 02	1.17E 02	1.30E 02	1.44E 02	1.61E 02	1.79E 02	1.99E 02	2.21E 02	2.47E 02
13.0	*	9.60E 01	1.06E 02	1.18E 02	1.31E 02	1.45E 02	1.62E 02	1.79E 02	1.99E 02	2.22E 02	2.47E 02
13.5	*	9.65E 01	1.07E 02	1.18E 02	1.31E 02	1.45E 02	1.62E 02	1.80E 02	2.00E 02	2.22E 02	2.48E 02
14.0	*	9.69E 01	1.07E 02	1.19E 02	1.32E 02	1.46E 02	1.62E 02	1.80E 02	2.00E 02	2.23E 02	2.48E 02
14.5	*	9.74E 01	1.08E 02	1.19E 02	1.32E 02	1.46E 02	1.63E 02	1.81E 02	2.01E 02	2.24E 02	2.49E 02
15.0	*	9.78E 01	1.08E 02	1.20E 02	1.33E 02	1.47E 02	1.63E 02	1.81E 02	2.01E 02	2.24E 02	2.49E 02
15.5	*	9.83E 01	1.09E 02	1.20E 02	1.33E 02	1.47E 02	1.64E 02	1.82E 02	2.02E 02	2.25E 02	2.50E 02
16.0	*	9.87E 01	1.09E 02	1.21E 02	1.33E 02	1.48E 02	1.64E 02	1.82E 02	2.02E 02	2.25E 02	2.51E 02
16.5	*	9.91E 01	1.09E 02	1.21E 02	1.34E 02	1.48E 02	1.65E 02	1.83E 02	2.03E 02	2.26E 02	2.51E 02
17.0	*	9.96F 01	1.10E 02	1.21E 02	1.34E 02	1.49E 02	1.65E 02	1.83E 02	2.03E 02	2.26E 02	2.52E 02

D TABLE NO. 13 CONTINUED.

17.5	*	1.00F 02	1.10E 02	1.22E 02	1.35E 02	1.49E 02	1.66E 02	1.84E 02	2.04E 02	2.27E 02	2.52F 02
18.0	*	1.00E 02	1.11E 02	1.22E 02	1.35E 02	1.50E 02	1.66E 02	1.84E 02	2.04E 02	2.27E 02	2.53E 02
18.5	*	1.01E 02	1.11E 02	1.23E 02	1.36E 02	1.50E 02	1.66E 02	1.85E 02	2.05E 02	2.28E 02	2.53E 02
19.0	*	1.01E 02	1.12E 02	1.23E 02	1.36E 02	1.51E 02	1.67E 02	1.85E 02	2.05E 02	2.28E 02	2.54E 02
19.5	*	1.02E 02	1.12E 02	1.24E 02	1.37E 02	1.51E 02	1.67E 02	1.86E 02	2.06E 02	2.29E 02	2.54E 02
20.0	*	1.02E 02	1.13E 02	1.24E 02	1.37E 02	1.52E 02	1.68E 02	1.86E 02	2.06E 02	2.29E 02	2.55E 02
20.5	*	1.02E 02	1.13E 02	1.25E 02	1.38E 02	1.52E 02	1.68E 02	1.87E 02	2.07E 02	2.30E 02	2.55E 02
21.0	*	1.03E 02	1.13E 02	1.25E 02	1.38E 02	1.53E 02	1.69E 02	1.87E 02	2.07E 02	2.30E 02	2.56E 02
21.5	*	1.03E 02	1.14E 02	1.25E 02	1.39E 02	1.53E 02	1.69E 02	1.87E 02	2.08E 02	2.31E 02	2.56E 02
22.0	*	1.04E 02	1.14E 02	1.26E 02	1.39E 02	1.53E 02	1.70E 02	1.88E 02	2.08E 02	2.31E 02	2.57E 02
22.5	*	1.04E 02	1.15E 02	1.26E 02	1.39E 02	1.54E 02	1.70E 02	1.88E 02	2.09E 02	2.32E 02	2.57E 02
23.0	*	1.05E 02	1.15E 02	1.27E 02	1.40E 02	1.54E 02	1.71E 02	1.89E 02	2.09E 02	2.32E 02	2.58E 02
23.5	*	1.05E 02	1.15E 02	1.27E 02	1.40E 02	1.55E 02	1.71E 02	1.89E 02	2.10E 02	2.33E 02	2.58E 02
24.0	*	1.05E 02	1.16E 02	1.28E 02	1.41E 02	1.55E 02	1.72E 02	1.90E 02	2.10E 02	2.33E 02	2.59E 02
24.5	*	1.06E 02	1.16E 02	1.28E 02	1.41E 02	1.56E 02	1.72E 02	1.90E 02	2.11E 02	2.34E 02	2.59E 02
25.0	*	1.06E 02	1.17E 02	1.28E 02	1.41E 02	1.56E 02	1.72E 02	1.91E 02	2.11E 02	2.34E 02	2.60E 02
25.5	*	1.06E 02	1.17E 02	1.29E 02	1.42E 02	1.57E 02	1.73E 02	1.91E 02	2.12E 02	2.35E 02	2.60E 02
26.0	*	1.07E 02	1.17E 02	1.29E 02	1.42E 02	1.57E 02	1.73E 02	1.92E 02	2.12E 02	2.35E 02	2.61E 02
26.5	*	1.07E 02	1.18E 02	1.30E 02	1.43E 02	1.57E 02	1.74E 02	1.92E 02	2.13E 02	2.35E 02	2.61E 02
27.0	*	1.08E 02	1.18E 02	1.30E 02	1.43E 02	1.58E 02	1.74E 02	1.93E 02	2.13E 02	2.36E 02	2.62E 02
27.5	*	1.08E 02	1.19E 02	1.30E 02	1.44E 02	1.58E 02	1.75E 02	1.93E 02	2.14E 02	2.36E 02	2.62E 02
28.0	*	1.08E 02	1.19E 02	1.31E 02	1.44E 02	1.59E 02	1.75E 02	1.93E 02	2.14E 02	2.37E 02	2.63E 02
28.5	*	1.09E 02	1.19E 02	1.31E 02	1.44E 02	1.59E 02	1.76E 02	1.94E 02	2.14E 02	2.37E 02	2.63E 02
29.0	*	1.09E 02	1.20E 02	1.32E 02	1.45E 02	1.60E 02	1.76E 02	1.94E 02	2.15E 02	2.38E 02	2.64E 02
29.5	*	1.09E 02	1.20E 02	1.32E 02	1.45E 02	1.60E 02	1.76E 02	1.95E 02	2.15E 02	2.38E 02	2.64E 02
30.0	*	1.10E 02	1.21E 02	1.32E 02	1.46E 02	1.60E 02	1.77E 02	1.95E 02	2.16E 02	2.39E 02	2.64E 02
30.5	*	1.10E 02	1.21E 02	1.33E 02	1.46E 02	1.61E 02	1.77E 02	1.96E 02	2.16E 02	2.39E 02	2.65E 02
31.0	*	1.11E 02	1.21E 02	1.33E 02	1.46E 02	1.61E 02	1.78E 02	1.96E 02	2.17E 02	2.40E 02	2.65E 02
31.5	*	1.11E 02	1.22E 02	1.34E 02	1.47E 02	1.62E 02	1.78E 02	1.97E 02	2.17E 02	2.40E 02	2.66E 02
32.0	*	1.11E 02	1.22E 02	1.34E 02	1.47E 02	1.62E 02	1.79E 02	1.97E 02	2.18E 02	2.41E 02	2.66E 02
32.5	*	1.12E 02	1.22E 02	1.34E 02	1.48E 02	1.62E 02	1.79E 02	1.97E 02	2.18E 02	2.41E 02	2.67E 02
33.0	*	1.12E 02	1.23E 02	1.35E 02	1.48E 02	1.63E 02	1.79E 02	1.98E 02	2.19E 02	2.42E 02	2.67E 02
33.5	*	1.12E 02	1.23E 02	1.35E 02	1.48E 02	1.63E 02	1.80E 02	1.98E 02	2.19E 02	2.42E 02	2.68E 02
34.0	*	1.13E 02	1.23E 02	1.35E 02	1.49E 02	1.64E 02	1.80E 02	1.99E 02	2.19E 02	2.42E 02	2.68E 02
34.5	*	1.13E 02	1.24E 02	1.36E 02	1.49E 02	1.64E 02	1.81E 02	1.99E 02	2.20E 02	2.43E 02	2.69E 02
35.0	*	1.13E 02	1.24E 02	1.36E 02	1.50E 02	1.64E 02	1.81E 02	2.00E 02	2.20E 02	2.43E 02	2.69E 02
35.5	*	1.14E 02	1.25E 02	1.37E 02	1.50E 02	1.65E 02	1.81E 02	2.00E 02	2.21E 02	2.44E 02	2.70E 02
36.0	*	1.14E 02	1.25E 02	1.37E 02	1.50E 02	1.65E 02	1.82E 02	2.00E 02	2.21E 02	2.44E 02	2.70E 02
36.5	*	1.14E 02	1.25E 02	1.37E 02	1.51E 02	1.66E 02	1.82E 02	2.01E 02	2.22E 02	2.45E 02	2.71E 02
37.0	*	1.15E 02	1.26E 02	1.38E 02	1.51E 02	1.66E 02	1.83E 02	2.01E 02	2.22E 02	2.45E 02	2.71E 02

***** D TABLE NO. 14 FOR CABINET TUNING *****

ALPHA VALUES FROM 3.16E 02 TO 8.91E 02 SQUARE INCHES PER INCH.

ALPHA (ACROSS) DIMENSION OF SQUARE PORT CROSS-SECTION IN INCHES.

SO IN/IN= 3.16E 02 3.55E 02 3.98E 02 4.47E 02 5.01E 02 5.62E 02 6.31E 02 7.08E 02 7.99E 02 8.91E 02

L INCHES (DOWN)

0.0	*	2.61E 02	2.93E 02	3.28E 02	3.69E 02	4.13E 02	4.64E 02	5.20E 02	5.84E 02	6.55E 02	7.35E 02
0.5	*	2.61E 02	2.93E 02	3.29E 02	3.69E 02	4.14E 02	4.64E 02	5.21E 02	5.85E 02	6.56E 02	7.36E 02
1.0	*	2.62E 02	2.94E 02	3.30E 02	3.70E 02	4.15E 02	4.65E 02	5.22E 02	5.85E 02	6.56E 02	7.36E 02
1.5	*	2.63E 02	2.95E 02	3.30E 02	3.70E 02	4.15E 02	4.66E 02	5.22E 02	5.86E 02	6.57E 02	7.37E 02
2.0	*	2.63E 02	2.95E 02	3.31E 02	3.71E 02	4.16E 02	4.66E 02	5.23E 02	5.86E 02	6.58E 02	7.38E 02
2.5	*	2.64E 02	2.96E 02	3.31E 02	3.71E 02	4.16E 02	4.67E 02	5.24E 02	5.87E 02	6.58E 02	7.38E 02
3.0	*	2.64E 02	2.96E 02	3.32E 02	3.72E 02	4.17E 02	4.67E 02	5.24E 02	5.88E 02	6.59E 02	7.39E 02
3.5	*	2.65E 02	2.97E 02	3.33E 02	3.73E 02	4.18E 02	4.68E 02	5.25E 02	5.88E 02	6.59E 02	7.39E 02
4.0	*	2.66E 02	2.97E 02	3.33E 02	3.73E 02	4.18E 02	4.69E 02	5.25E 02	5.89E 02	6.60E 02	7.40E 02
4.5	*	2.66E 02	2.98E 02	3.34E 02	3.74E 02	4.19E 02	4.69E 02	5.25E 02	5.89E 02	6.61E 02	7.41E 02
5.0	*	2.67E 02	2.99E 02	3.34E 02	3.74E 02	4.19E 02	4.70E 02	5.26E 02	5.90E 02	6.61E 02	7.41E 02
5.5	*	2.67E 02	2.99E 02	3.35E 02	3.75E 02	4.20E 02	4.70E 02	5.27E 02	5.91E 02	6.62E 02	7.42E 02
6.0	*	2.68E 02	3.00E 02	3.36E 02	3.76E 02	4.21E 02	4.71E 02	5.28E 02	5.91E 02	6.62E 02	7.42E 02
6.5	*	2.69E 02	3.00E 02	3.36E 02	3.76E 02	4.21E 02	4.72E 02	5.28E 02	5.92E 02	6.63E 02	7.43E 02
7.0	*	2.69E 02	3.01E 02	3.37E 02	3.77E 02	4.22E 02	4.72E 02	5.29E 02	5.92E 02	6.64E 02	7.44E 02
7.5	*	2.70E 02	3.02E 02	3.37E 02	3.77E 02	4.22E 02	4.73E 02	5.29E 02	5.93E 02	6.64E 02	7.44E 02
8.0	*	2.70E 02	3.02E 02	3.38E 02	3.78E 02	4.23E 02	4.73E 02	5.30E 02	5.94E 02	6.65E 02	7.45E 02
8.5	*	2.71E 02	3.03E 02	3.38E 02	3.79E 02	4.24E 02	4.74E 02	5.31E 02	5.94E 02	6.65E 02	7.45E 02
9.0	*	2.72E 02	3.03E 02	3.39E 02	3.79E 02	4.24E 02	4.75E 02	5.31E 02	5.95E 02	6.66E 02	7.46E 02
9.5	*	2.72E 02	3.04E 02	3.40E 02	3.80E 02	4.25E 02	4.75E 02	5.32E 02	5.95E 02	6.67E 02	7.47E 02
10.0	*	2.72E 02	3.04E 02	3.40E 02	3.80E 02	4.25E 02	4.76E 02	5.32E 02	5.96E 02	6.67E 02	7.47E 02
10.5	*	2.73E 02	3.05E 02	3.41E 02	3.81E 02	4.26E 02	4.76E 02	5.33E 02	5.96E 02	6.68E 02	7.48E 02
11.0	*	2.74E 02	3.05E 02	3.41E 02	3.81E 02	4.26E 02	4.77E 02	5.34E 02	5.97E 02	6.68E 02	7.48E 02
11.5	*	2.74E 02	3.06E 02	3.42E 02	3.82E 02	4.27E 02	4.77E 02	5.34E 02	5.98E 02	6.69E 02	7.49E 02
12.0	*	2.75E 02	3.07E 02	3.42E 02	3.82E 02	4.28E 02	4.78E 02	5.35E 02	5.98E 02	6.69E 02	7.49E 02
12.5	*	2.75E 02	3.07E 02	3.43E 02	3.83E 02	4.28E 02	4.79E 02	5.35E 02	5.99E 02	6.70E 02	7.50E 02
13.0	*	2.76E 02	3.08E 02	3.43E 02	3.84E 02	4.29E 02	4.79E 02	5.36E 02	5.99E 02	6.71E 02	7.51E 02
13.5	*	2.76E 02	3.08E 02	3.44E 02	3.84E 02	4.29E 02	4.80E 02	5.36E 02	6.00E 02	6.71E 02	7.51E 02
14.0	*	2.77E 02	3.09E 02	3.45E 02	3.85E 02	4.30E 02	4.80E 02	5.37E 02	6.01E 02	6.72E 02	7.52E 02
14.5	*	2.77E 02	3.09E 02	3.45E 02	3.85E 02	4.30E 02	4.81E 02	5.38E 02	6.01E 02	6.72E 02	7.52E 02
15.0	*	2.78E 02	3.10E 02	3.46E 02	3.86E 02	4.31E 02	4.81E 02	5.38E 02	6.02E 02	6.73E 02	7.53E 02
15.5	*	2.78E 02	3.10E 02	3.46E 02	3.86E 02	4.31E 02	4.82E 02	5.39E 02	6.02E 02	6.74E 02	7.54E 02
16.0	*	2.79E 02	3.11E 02	3.47E 02	3.87E 02	4.32E 02	4.83E 02	5.39E 02	6.03E 02	6.74E 02	7.54E 02
16.5	*	2.80E 02	3.11E 02	3.47E 02	3.87E 02	4.33E 02	4.83E 02	5.40E 02	6.03E 02	6.75E 02	7.55E 02
17.0	*	2.80E 02	3.12E 02	3.48E 02	3.88E 02	4.33E 02	4.84E 02	5.40E 02	6.04E 02	6.75E 02	7.55E 02
D TABLE NO. 14 CONTINUED.											
17.5	*	2.81E 02	3.13E 02	3.48E 02	3.89E 02	4.34E 02	4.84E 02	5.41E 02	6.04E 02	6.76E 02	7.56E 02
18.0	*	2.81E 02	3.13E 02	3.49E 02	3.89E 02	4.34E 02	4.85E 02	5.41E 02	6.05E 02	6.76E 02	7.56E 02
18.5	*	2.82E 02	3.14E 02	3.49E 02	3.90E 02	4.35E 02	4.85E 02	5.42E 02	6.06E 02	6.77E 02	7.57E 02
19.0	*	2.82E 02	3.14E 02	3.50E 02	3.90E 02	4.35E 02	4.86E 02	5.43E 02	6.06E 02	6.78E 02	7.58E 02
19.5	*	2.83E 02	3.15E 02	3.51E 02	3.91E 02	4.36E 02	4.86E 02	5.43E 02	6.07E 02	6.78E 02	7.58E 02
20.0	*	2.83E 02	3.15E 02	3.51E 02	3.91E 02	4.36E 02	4.87E 02	5.44E 02	6.07E 02	6.79E 02	7.59E 02
20.5	*	2.84E 02	3.16E 02	3.52E 02	3.92E 02	4.37E 02	4.88E 02	5.44E 02	6.08E 02	6.79E 02	7.59E 02
21.0	*	2.84E 02	3.16E 02	3.52E 02	3.92E 02	4.37E 02	4.88E 02	5.45E 02	6.08E 02	6.80E 02	7.60E 02
21.5	*	2.85E 02	3.17E 02	3.53E 02	3.93E 02	4.38E 02	4.89E 02	5.45E 02	6.09E 02	6.80E 02	7.60E 02
22.0	*	2.85E 02	3.17E 02	3.53E 02	3.93E 02	4.39E 02	4.89E 02	5.46E 02	6.10E 02	6.81E 02	7.61E 02
22.5	*	2.86E 02	3.18E 02	3.54E 02	3.94E 02	4.39E 02	4.90E 02	5.46E 02	6.10E 02	6.81E 02	7.62E 02
23.0	*	2.86E 02	3.18E 02	3.54E 02	3.95E 02	4.40E 02	4.90E 02	5.47E 02	6.11E 02	6.82E 02	7.62E 02
23.5	*	2.87E 02	3.19E 02	3.55E 02	3.95E 02	4.40E 02	4.91E 02	5.48E 02	6.11E 02	6.83E 02	7.63E 02
24.0	*	2.87E 02	3.19E 02	3.55E 02	3.96E 02	4.41E 02	4.91E 02	5.48E 02	6.12E 02	6.83E 02	7.63E 02
24.5	*	2.88E 02	3.20E 02	3.56E 02	3.96E 02	4.41E 02	4.92E 02	5.49E 02	6.12E 02	6.84E 02	7.64E 02
25.0	*	2.88E 02	3.20E 02	3.56E 02	3.97E 02	4.42E 02	4.92E 02	5.49E 02	6.13E 02	6.84E 02	7.64E 02
25.5	*	2.89E 02	3.21E 02	3.57E 02	3.97E 02	4.42E 02	4.93E 02	5.50E 02	6.13E 02	6.85E 02	7.65E 02
26.0	*	2.89E 02	3.21E 02	3.57E 02	3.98E 02	4.43E 02	4.94E 02	5.50E 02	6.14E 02	6.85E 02	7.65E 02
26.5	*	2.90E 02	3.22E 02	3.58E 02	3.98E 02	4.43E 02	4.94E 02	5.51E 02	6.15E 02	6.86E 02	7.66E 02
27.0	*	2.90E 02	3.22E 02	3.58E 02	3.99E 02	4.44E 02	4.95E 02	5.51E 02	6.15E 02	6.87E 02	7.67E 02
27.5	*	2.91E 02	3.23E 02	3.59E 02	3.99E 02	4.44E 02	4.95E 02	5.52E 02	6.16E 02	6.87E 02	7.67E 02
28.0	*	2.91E 02	3.23E 02	3.59E 02	4.00E 02	4.45E 02	4.96E 02	5.52E 02	6.16E 02	6.88E 02	7.68E 02
28.5	*	2.92E 02	3.24E 02	3.60E 02	4.00E 02	4.46E 02	4.96E 02	5.53E 02	6.17E 02	6.88E 02	7.68E 02
29.0	*	2.92E 02	3.24E 02	3.60E 02	4.01E 02	4.46E 02	4.97E 02	5.54E 02	6.17E 02	6.89E 02	7.69E 02
29.5	*	2.93E 02	3.25E 02	3.61E 02	4.01E 02	4.47E 02	4.97E 02	5.54E 02	6.18E 02	6.89E 02	7.69E 02
30.0	*	2.93E 02	3.25E 02	3.61E 02	4.02E 02	4.47E 02	4.98E 02	5.55E 02	6.18E 02	6.90E 02	7.70E 02
30.5	*	2.94E 02	3.26E 02	3.62E 02	4.02E 02	4.48E 02	4.98E 02	5.55E 02	6.19E 02	6.90E 02	7.70E 02
31.0	*	2.94E 02	3.26E 02	3.62E 02	4.03E 02	4.48E 02	4.99E 02	5.56E 02	6.19E 02	6.91E 02	7.71E 02
31.5	*	2.95E 02	3.27E 02	3.63E 02	4.03E 02	4.49E 02	4.99E 02	5.56E 02	6.20E 02	6.91E 02	7.72E 02
32.0	*	2.95E 02	3.27E 02	3.63E 02	4.04E 02	4.49E 02	5.00E 02	5.57E 02	6.20E 02	6.92E 02	7.72E 02
32.5	*	2.96E 02	3.28E 02	3.64E 02	4.04E 02	4.50E 02	5.00E 02	5.57E 02	6.21E 02	6.93E 02	7.73E 02
33.0	*	2.96E 02	3.28E 02	3.64E 02	4.05E 02	4.50E 02	5.01E 02	5.58E 02	6.22E 02	6.93E 02	7.73E 02
33.5	*	2.97E 02	3.29E 02	3.65E 02	4.05E 02	4.51E 02	5.01E 02	5.58E 02	6.22E 02	6.94E 02	7.74E 02
34.0	*	2.97E 02	3.29E 02	3.65E 02	4.06E 02	4.51E 02	5.02E 02	5.59E 02	6.23E 02	6.94E 02	7.74E 02
34.5	*	2.98E 02	3.30E 02	3.66E 02	4.06E 02	4.52E 02	5.02E 02	5.59E 02	6.23E 02	6.95E 02	7.75E 02
35.0	*	2.98E 02	3.30E 02	3.66E 02	4.07E 02	4.52E 02	5.03E 02	5.60E 02	6.24E 02	6.95E 02	7.75E 02
35.5	*	2.98E 02	3.31E 02	3.67E 02	4.07E 02	4.53E 02	5.04E 02	5.60E 02	6.24E 02	6.96E 02	7.76E 02
36.0	*	2.99E 02	3.31E 02	3.67E 02	4.08E 02	4.53E 02	5.04E 02	5.61E 02	6.25E 02	6.96E 02	7.77E 02
36.5	*	2.99E 02	3.32E 02	3.68E 02	4.08E 02	4.54E 02	5.05E 02	5.62E 02	6.25E 02	6.97E 02	7.77E 02
37.0	*	3.00E 02	3.32E 02	3.68E 02	4.09E 02	4.54E 02	5.05E 02	5.62E 02	6.26E 02	6.97E 02	7.78E 02

