DD 1 INSTRUCTION BOOKLET

CONTENTS PAGE

DISCUSSION OF DIVERSITY ACTION

The advantages to be gained from diversity reception with the model DD1 can best be appreciated by a general understanding of diversity action.

Before describing this new receiver in detail, it might be well to briefly review the principles of diversity reception with its benefits as compared to the best single-receiver methods.

The principle improvement is, of course, in the reduction of fading. Fading is the result of several waves from the same transmitter arriving at the receiver over different paths. The signal delivered at the output of the receiver is the resultant of the several waves which arrive

over paths differing in direction and length. Additionally, these waves upon reaching the receiver are of varying amplitude and phase.

Fortunately for our solution to the problem of fading, a signal does not fade identically in two antenna locations at the same instant - even when the two antennas are spaced a relatively small distance apart, or when they are near to each other and in different planes of polarization. What is happening is that the phase angle between waves arriving over varying paths is continuously rotating. When the amplitude is the same in two waves and the signs are opposite, a condition of cancellation, or zero signal, takes place. (We have all experienced the condition of a signal taking a rapid and vicious dive into the noise level).

Diversity reception takes advantage of this vulnerable spot in fading's armor.

The basic idea is to pick up the signal waves on two different antennas and then combine the signals in a common receiver circuit. While it would be convenient to couple these various antennas to our receiver the result would not be the correct answer, With signals of various phase differences arriving over separate antennas it would still be possible to have complete cancellation of the input to the receiver if the signals on each of the antennas were of equal amplitude but directly out of phase. Because of this condition it is impossible to obtain diversity action through the use of several antennas on one receiver.

The only place where combining the signals should take place is in the output of the final detector where we have the rectified envelope of the signal to work with, The final detector outputs of the two receiver sections are tied together across the common load of the 6J5 audio amplifier. Combining the signals after rectification results in audio output which will be the average of the two signals. By virtue of the common A.V.C, the receiver with the greater signal input takes control of the gain of both receivers and supplies practically the total output. The gain of the other receiver, at that instant of time, is so reduced that the noise it would otherwise contribute is made negligible. The resultant signal-to-noise ratio is that of the particular receiver in control at that instant and results in a considerably higher average signal-to-noise ratio than can be obtained with the single receiver method of reception.

In addition, selective fading, or that phenomena which occurs when the carrier fades and the side bands remain at their original level with attendant distortion, is

greatly minimized. The reason for this is clear when we understand that the receiver in control at any instant is the one which is delivering the greatest signal to the amplifier.

The Hallicrafters Dual Diversity receiver, model DD1 differs from the usual commercial installation in that instead of using separately tuned receivers with individual high frequency oscillators, a common oscillator is used which feeds the first detectors of each of the two receivers. This eliminates the expensive precautions taken in the multi-receiver system to keep the high-frequency hetrodyne oscillator of one receiver from feeding into the other antenna or input circuits. Additionally, with separate oscillators it is practically impossible to obtain perfect synchronism for any length of time.

In addition to reducing fading, diversity reception also reduces heterodyne interference in the reception of telephone signals. This may be considered as a species of phase selectivity peculiar to the diversity system, irrespective of its frequency selectivity characteristics. When the audio frequency outputs representing the envelopes of two modulated signals are combined in the audio Load circuit, they will add arithmetically. However, beat frequency heterodyne products from an interfering carrier will add up vectorally. Hence, with the dual diversity system the interference to signal ratio will, at worst, be the same as with a single receiver when the heterodyne outputs of the two detectors are in-phase aiding and of equal amplitudes. Under all conditions, the beat-note products will have a tendency to cancel each other. The combined beat-note output may be reduced to zero when the separate beat-note products are of equal amplitude and opposite phase, Since the relative phase of the interfering heterodyne outputs of the two detectors depends on the radio-frequency phase relationship at the inputs of the receiver, and since this relationship is likely to shift continually, the average heterodyne interference is considerably reduced.

The Hallicrafters Model DD1 Diversity system of reception does four important things:

1. Elimination or great reduction of fading in high frequency reception,

2. An average increase in signal strength better than that obtainable with any single receiver,

3. Greatly improved signal to noise ratio.

4. Reduction of heterodyne beat-note interference to a marked degree.

The Model DD1 overcomes so many handicaps attendant with normal methods of high frequency reception as to represent a receiving system without a parallel.

ANTENNA RECOMMENDATIONS

As previously mentioned, diversity action depends on the fact that a radio signal will not fade in two antenna locations at the same instant. Antenna systems used commercially for diversity reception are spaced by thousands of feet. While such an arrangement affords the ultimate in antenna design, practically such an installation represents an impossible installation problem for the normal user of the DD1 receiving system. Additionally, practice has shown that satisfactory diversity action is afforded by having the two antennas separated only a quarter to a half-

wave length apart. Suffice to say, regardless of the type of antenna system you should choose to use, diversity action will be better when the two antennas are separated by as great a distance as possible.

At this point it might be well to bear in mind that no one aerial, regardless of type, will work at peak efficiency throughout the tuning range of the DD1 receiver. The most practical antenna system for general coverage reception will be that consisting of two inverted "L" antennas approximately 100 feet long overall, Fig. 1A. Running these two wires at right angles to one another will give very satisfactory pick-up in a location where the noise level is fairly low.

Considering the fact that the antenna input impedance of the model DD1 and the average terminating impedance of the single wire type of antenna, at high frequencies, is approximately 400 ohms, a good match Is effected.

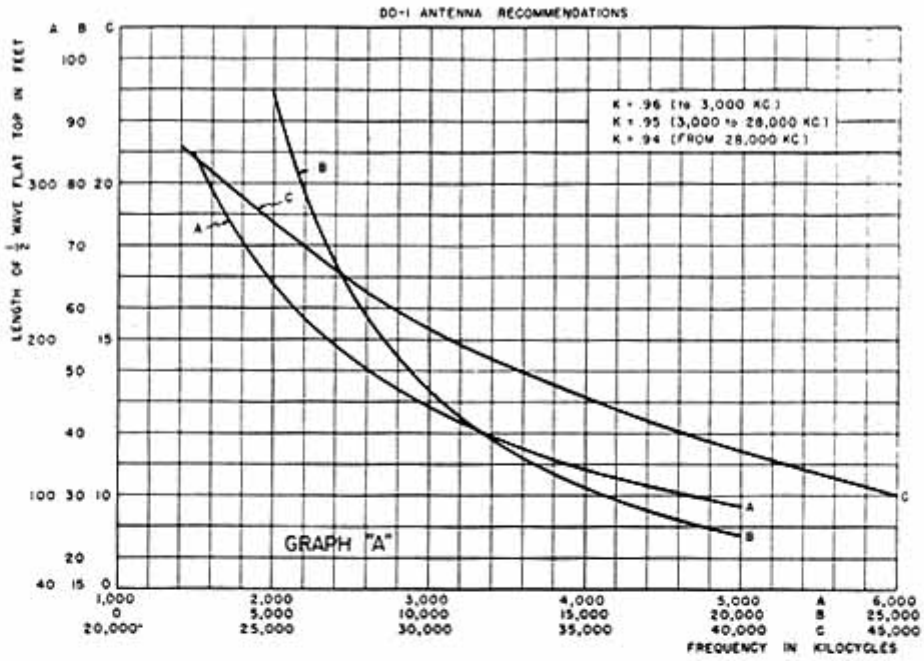
NOTE - When using this type of antenna the jumper should remain connected between A2 and G, or ground.

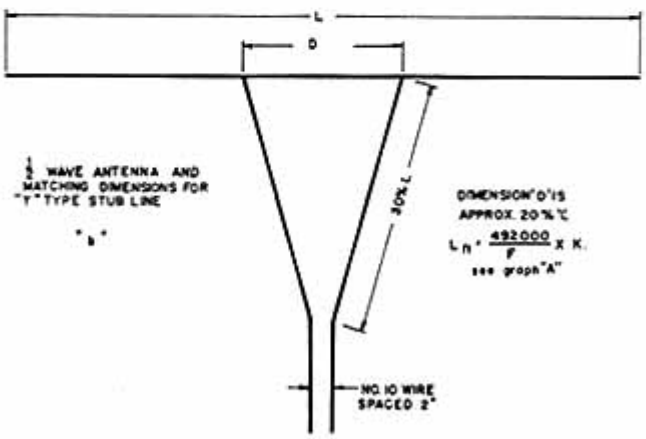
Where reception on the short wave broadcast channels is most desired, two of the commercially available "all wave doublets' erected at right angles to one another and spaced as far apart as possible will provide excellent diversity reception on these frequencies. However, it might be well to point out at this time that in no case should the twisted pair transmission Line as supplied with this all wave type of antenna be connected directly to the diversity. Only through the use of the matching transformer supplied with these kits can a satisfactory match between the 72 ohm impedance of the twisted pair and the 400 ohm input of the receiver be attained. A serious mismatch with a resultant loss of sensitivity and poor reception will occur if a direct connection is made. If you should wish to give preference to any one frequency your logical choice would be an aerial cut one half wave length long and coupled to the diversity by means of the "P" matching stub and the 440 ohm open wire line. A 440 ohm line is conveniently constructed using #10 wire separated by 2" glazed porcelain spacers. The length of the half wave flat top and dimension for the "Y" matching stub may be determined by referring to graph "A" and Fig. 1 B respectively.

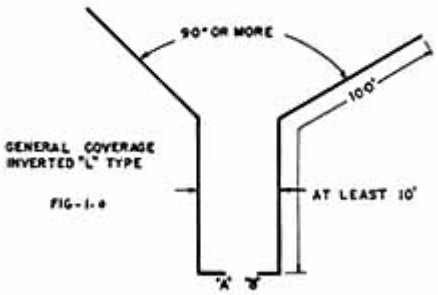
In view of the numerous types of antennas that can be constructed these suggestions cover only the most practical and easily erected systems. All three types have demonstrated their worth over a period of years. It is to your advantage to erect as efficient an antenna system as possible in order to enjoy the capabilities of the DD1 receiving system to the fullest extent,

NOTE 1 The antenna lead-ins should be kept as far apart as possible when entering the receiving position and should not be allowed to parallel one another unless separated by at least 10 feet.

NOTE 2 Unlike the average receiver, the DD1 requires a good ground connection. If a low resistance external ground is an impossibility a cold water pipe is advised. unless a good ground is used objectionable interference may result.


DO-1 ANTENNA RECOMMENDATIONS
LENGTH OF ½ WAVE FLAT TOP IN FEET
K = .96 (to 3,000 KC.)
K = .95 (3,000 to 28,000 KC.)
K = .94 (FROM 28,000 KC.)
GRAPH "A"
FREQUENCY IN KILOCYCLES


L
D
½ WAVE ANTENNA AND MATCHING DIMENSIONS FOR "T" TYPE STUB LINE
"b"
.10% L
DIMENSION "D" IS APPROX. 20% "L"
see graph "A"
NO. 10 WIRE SPACED 2"


90° OR MORE
100'
GENERAL COVERAGE INVERTED "L" TYPE
FIG-1-a
AT LEAST 10'
"A"
"B"

OPERATING SUGGESTION

(General)

The receiver has reached you in a sturdily constructed container. The packing case was designed to give maximum protection to the instrument while in transit. If the case bears visible evidence of having been damaged in shipment it is suggested that you get in touch with the carrier at once.
The power amplifier and power supply are packed separately. The cables which will connect these units to the receiver are packed in the same container. The A. C. cord to connect the receiver, and indirectly the audio amplifier and power supply, to the A. C, line is packed with the receiver.
If the Diversity meters have been purchased that unit will be in its own container complete with the connecting cable.

Check all the units to be sure that nothing is missing.
If you plan on having the audio amplifier and power supply at each end of the receiver, the power supply should be put at the right and the audio amplifier at the left when looking at the receiver from the front. When you are locating the Hallicrafters PM 12C speaker and case it Is inadvisable to place it on top of the receiver cabinet proper. The speaker wires should be connected to the 5000 ohm terminals on the rear of the power amplifier. The other two terminals on the power amplifier are of 500 ohm impedance.

It is assumed, before going into the suggested operating procedure, that you have installed two antennas and have brought their lead-ins, or transmission lines, into the room at a point at which you intend to operate the receiver. If conveniently possible it is recommended that the amount of lead-in from the window or lead-in insulators to the receiver be kept reasonably short.

Connect the audio amplifier and powers supply to the receiver. It is impossible to connect them incorrectly because of the different types of sockets on each unit. The cable for the power pack has an 8 prong plug and the one for the amplifier a 5 prong plug. Both an 8 and a 5 prong socket will be found on the back of the receiver into which each of these plugs will fit.

The seven prong socket takes the connecting cable for the Diversity Action meters, should they have been purchased with the receiver. The Diversity Action meters can be placed in any position, so that they can be conveniently viewed by the operator.

The A.C. cord packed with the receiver plugs into the recessed male receptacle in the back or the chassis. When this cord is connected to the power mains you have also automatically connected the audio amplifier and power supply, The top button in the vertical row of band switch buttons in the center of the receiver turns all three units "On" and "Off", It will be noticed that the receiver is "off" when this button is pushed in. In order to turn the receiver on all that is necessary to do is to push the button covering the particular range of frequencies to which you wish to listen. When anyone of the 6 band switch buttons are operated the "AC off" button will automatically release and connect power to the receiver, audio amplifier, and power supply.

FREQUENCY COVERAGE

The Hallicrafters Model DD1 Receiving System tunes from 545 KC to 46 mc. This frequency range is covered by 6 bands. They are as follows:

1 - 540 KC to 1500 KC
2 - 1.5 MC to 4.2 MC
3 - 4 MC to 10 MC
4 - 10 MC to 20 MC
5 - 20 MC to 36 MC
6 - 34 MC to 46 MC

When switching from one band to another, pressing the button that is identified by the frequency marking on its front will switch all seven coils for that range, There are a total of 42 coils in the coil and switch section. For protection and isolation a metal cover is firmly held in place over the mechanism by screws Which are threaded Into the coil partitions.

TUBE FUNCTIONS

The tube functions will be treated for only one receiver section inasmuch as the R, F. amplifiers, 1st detectors, I. F, amplifiers and 2nd detectors are similar in both receiver "A" and "B".

The R. F. amplifier consists of two stages in which the high-gain #1851 type tubes are used, This tube represents the latest advancement in tube design and provides substantially increased gain on the higher frequencies.

The first detector-mixer is a 6L7. The injector grid of this tube is extremely well shielded which adapts it for the first detector - mixer function.

The high-frequency oscillator is a 6K6 tube, The output of this tube is coupled to the injector grids of the 6L7 first detector tubes in both receiver sections. In commercial practice, where separate receivers are used for diversity reception, the most objectionable fault is the leakage experienced with the high frequency oscillator of one receiver feeding into the input circuit of the other. Expensive shielding precautions found necessary with separate oscillators are obviated by the use of the 6K6 oscillator which is common to both first detector circuits in the DD1 receiver. The choice of the tube is dictated by the fact that the parallel injector grids of the two 6L7 tubes represent a capacitive load which, if applied to full output of the oscillator, seriously limits the tuning range. As a result the 6K6 tube, in providing greater signal output, allows the load represented by the two first detector tubes to be tied into the oscillator at the cathode tap. Coupling the high frequency oscillator output at that point enables the tuning range to be extended, Additionally, a higher degree of oscillator frequency stability is afforded. In conjunction with its performance in filling the above requirements the greater conversion factor at higher frequencies recommends the 6K6 as a tube ideally suited for its purpose in the DD1 receiver.

The first stage of 455 K.C. I.F. amplification uses a 6K7 tube. A 6L7 follows in cascade as the second stage. The 6L7 was chosen as the second I.F. amplifying tube

because of it having an injector grid into which can be fed the output of the 6J5 Heterotone oscillator. The Heterotone oscillator modulates the signal flowing in the I.F. amplifier. The electron stream in the 6L7 is already modulated by the signal in the normal operation of the tube. When the voltage at the heterotone frequency is applied to the injector grid, the electron stream is further modulated at this frequency. The product of these two modulating voltages appears in the plate circuit of the 6L7 with the result that the signal delivered to the 6H6 diode tube has a modulation envelope at the heterodyne frequency. After rectification the CAW carrier disappears and the modulation frequency appears as an audible note in the output of the 6H6 tube.

The output of the 6H6 second detector is then coupled to the grid of the 6J5 audio frequency amplifier tube which is mounted in the receiver chassis. The output of this tube is transformer coupled through a 500 ohm line to the audio amplifier which is in its separate cabinet complete with power supply.

AUDIO AMPLIFIER

The audio amplifier consists of one 6J5 driving two 2A3's in push-pull, A 5Z3 rectifier supplies voltages for these three tubes. Having a separate power supply for the audio section is advisable, A separate input filter is provided so that the hum level of the amplifier is 50 DB below full output. The output transformer on the audio amplifier has both 500 and 5000 ohm output terminals. By referring to the fidelity curve you will see the excellent frequency response to be expected from this amplifier.

POWER SUPPLY

The power supply unit for the DD1 receiver delivers 250 volts at 110 milliamperes. A 5Z3 tube is used as the rectifier.

A single section filter of conservatively rated components adequately filters the direct current supplied to the tubes in the receiver. The unit is similar in appearance to the audio amplifier. Channel type of construction with flame-welded joints is employed which contribute to the mechanical rigidly of the unit.

OPERATION OF CONTROLS

As mentioned previously, the frequency to which you wish to listen is selected by pushing the band switch button covering that range. When that range is in the circuit the coverage dial, which is the large calibrated dial to the left and controlled by the knob below it and to its left, is turned until the frequency appears under the edge of the transparent plate mounted in front of the dial. The calibration of the main dial will be accurate only when the band-spread dial, which is the right hand large dial, is set at minimum capacity or "O". This dial is rotated by the handwheel below and to its right, When using the band-spread control the coverage dial should be set to read higher in frequency than that on which the desired station or group of stations transmits. Adding capacity by turning the bands spread control from its minimum capacity position will allow you to resonate on

the wanted frequency. The band-spread control will be of great help in tuning in short-wave stations by virtue of the fact that they can be more accurately resonated due to the capacity change with this control being but a small fraction of the change experienced should the coverage control be used and moved through the same number of degrees. Directly below each of the large dials will be seen an aperture through which is visible an indirectly lighted vernier dial, Using the markings on this 100 division dial in conjunction with those appearing on the larger dials will allow the receiver to be accurately re-set to a known frequency once it has been tuned in and logged. It takes 25 revolutions of the hand wheels to complete the 333 degree are of the large dials.

In order to become familiar with the operation of the receiver it is recommended that No. 1 band covering the standard broadcast frequencies be used at first, The operation and functions of the other controls as follows:

To the right of the hand wheel which controls the coverage dial is the head-phone jack. Inasmuch as no direct current flows in the head-phone circuit crystal type head-phones can be used. For most satisfactory operation high impedance type headphones are recommended, On the same plane as the fone jack and to the left of the band-spread hand-wheel is the ANL or automatic noise limiter "on" and "off" switch. This switch controls the 6H6 noise limiter tube which operates in the input circuit of the audio frequency amplifier. The limiter in no way affects the signal being received but when surges of static, ignition or other types of interference of a pulsating nature are picked up, the limiter cuts off the peaks of interference to the level of the signal. because of the interference peaks being of so short a period of duration, the signal will predominate. The ANL will be of benefit in minimizing noises so objectionable to high-frequency reception.

The left hand control on the upper panel to the left of the main tuning control is the stand-by switch. This switch removes plate voltage from the tubes in the receiver when placed either in the up, or down position. In the down position the switch locks in place and must be moved back to the neutral or "on" position manually. The "up" position of the switch is for momentary stand-by. The switch does not lock in this position, returning to center as soon as your hand is removed.

The meter on this panel is the average carrier intensity meter which is calibrated in "S" units, this meter indicates the output of both receiver sections. It will be interesting to note that the variation in signal strength, as viewed on this meter, will be minute in comparison with the wide variation in carrier intensity shown on the Diversity Action meters.

The first step in adjusting this Meter is to remove the antenna from each receiver. Turn the Master gain control on full. Leave the A & B balance gain control in the center or upright position. Raising the lid of the receiver will disclose a knurled shaft protruding through the R.F, chassis near the 6J7 meter amplifying tube. With the above conditions taken care of turn the knurled shaft until the average carrier intensity meter reads "0".

To the right of this meter is the Heterotone - Heterodyne Switch. In the center or neutral position neither oscillator is operating. In the up position of this switch the Heterotone oscillator is connected. In "tube functions" attention was drawn to the coupling; of the Heterotone audio frequency modulator to the 6L7 2nd I. F.

stage. It is recommended that the heterotone be used for the copying of code signals when it is desired to use the receiver in the dual position. The Heterotone gives either 500 or 1000 cycle output. The "Hi-Low" switch in back of the panel near the Heterotone oscillator tube will allow the choice of either of those two modulating frequencies.

In the down position of this switch, the Heterodyne oscillator is connected in the circuit. The pitch of the beat note can be varied by the knob marked "Pitch Control" mounted on the lower left panel. The Heterodyne oscillator can be used with the receiver operating in the DUAL position but little is to be gained. This is explainable by the reason that when the Heterodyne, or B.F.O., oscillator is operating the receiver has no A.V.C. In view of that, no diversity action is possible. As a result when the BFO is used it is recommended that either receiver "A" or "B" be used.

The controls on the lower left hand panel looking from left to right are: The Pitch control, Tone control and Infinite Adjacent-channel Rejection control. The Pitch control, when the Heterodyne switch is in the Heterodyne position, will enable you to vary the frequency, or pitch, of the beat note.

The operation of the Tone control Is easily recognized by referring to the Fidelity curves appearing later in this manual.

The upper right hand panel incorporates the I. F. gain switch, Balance meter and Dual switch.

The I.F. amplifier gain switch in neutral, or center position, gives normal I. F. amplifier gain to the 6H6 second detector. In the +10 DB position the switch shorts out a portion of the cathode resistor in both the 6K7, 6L7 tubes.

In the -10 DB position the cathode bias resistor in the I. F. stages is increased in value. In many instances it is advisable to operate the receiver with the I.F. gain switch in the -10 DB position, This suggestion is explained by the fact that, due to the A.,V.C. action of the receiver, reducing the I. F. gain automatically increases the R. F. gain, As we all know the greater the R. F. gain before the first detector the more favorable will be the signal to noise ratio.

The "circuit balance" meter registers the balance of gain that exists between Receivers A and B, This meter and its associated controls will be treated later in greater detail.

The Dual switch to the right of the circuit balance meter is in the plate circuit of both Receiver A and B. When in the center position plate voltage is applied to each receiver and dual-diversity reception is possible. then moved to receiver "A" position, plate voltage is removed from receiver "B" so that it does not contribute any signal to the audio load after its second detector. In the "B" position receiver "A" is out of the circuit.

The first two controls on the lower right hand panel, the Master, and A and B balance RF gain controls, are adjusted in conjunction with the Dual switch. Let us examine what the A and B balance R. F. gain controls accomplish.

The A and B balance control consists, as Indicated by the schematic, of two controls on one shaft. In order to obtain most satisfactory diversity reception it has been determined that the gain of each receiver section should be relatively the same.

Where the signal input to the two receivers is unequal as shown by a lower average reading on either A or B diversity meter it will be necessary to reduce the gain on the side getting the greater signal. This is accomplished by turning the "A or B balance" control until the average indications on the diversity meters are the. same.

While electrical balance is no longer obtained the performance of the receivers in dual will be more satisfactory because the effective gain of each receiver will then be equal. The Master R. F. gain control simultaneously raises or lowers the gain of both receivers and is connected in series to ground with the Balance R. F. gain controls described above.

The audio gain control adjusts the output of both receivers to the grid of the 6J5 audio frequency amplifier tube mounted in the receiver proper. The output of this tube is transformer coupled to the fone jack, the 500 ohm terminal strip mounted on the rear of the receiver cabinet and the input transformer mounted in the audio amplifier cabinet. When headphones are used, the fone plug will disconnect the audio amplifier and any load appearing across the 500 ohm terminals.

The Diversity Action Meters show the incoming signal intensity for each of the receivers. It will be interesting to watch these meters as they show the fading of signals on each receiver. With the receiver operating in Dual position notice how seldom the Average carrier intensity meter shows a deep fade while the Diversity Action meters will alternately register fading of a serious value.

Moving the Dual switch from Dual to either Receiver "A" or "B" will effectively demonstrate how handicapped you would be if you were relying on only one receiver. The Diversity Action meters, with the receiver operating in Dual, will dramatically show the benefits of Diversity Reception.

These meters are adjusted similarly to the average carrier intensity meter described before. Disconnect both antennas. Set the Master R. F. gain control for maximum; adjust "A and B R. balance control until each receiver is in balance electrically as indicated when the pointer on the meter reads "O". Now adjust the control in back of each meter until each one reads "0". Upon re-connecting the antennas operate the receiver in the usual manner.

REJECTER THEORY AND OPERATION

The Infinite Adjacent channel Rejecter enables the operator of the Model DD1 Receiver to cope with Interference more capably than ever before. The Frequency at which rejection occurs is indicated by the position of the pointer in reference to the calibrated scale. This control varies the amount of bucking capacitive coupling between the coils in the I.F. transformers from 3 KC to 18 KC. Rejection is accomplished by so arranging the Inductive and capacitive coupling in the I. F. transformers so that they will cancel each other at the undesired or interfering frequency. When this is done the signal to which you wish to Listen is in no way affected and is allowed to pass with negligible attenuation.

Both of the I. F. rejection units are ganged to reject at Identical frequencies. The rejection slots (refer to the progressive drawings of rejection on the next page) are always equidistant from the I. F. frequency of 455 KC and appear on both sides of the signal carrier.

Proper operation of the rejection control will not only enable the operator to attenuate the unwanted signal by 50 DB but also allows him to increase the "'nose" selectivity of the receiver.

The Hallicrafters Model DD1 receiver complete with audio amplifier and power supply draws 210 watts at 117 volts 60 cycle current;

GUARANTEE

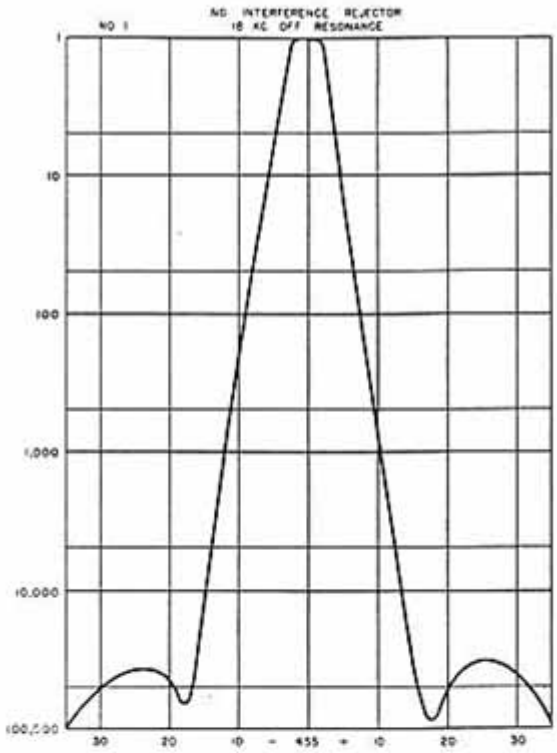
This receiver is guaranteed to be free from any defect in workmanship and material that may develop within a period of ninety (90) days from date of purchase, under the terms of the standard guarantee, as designated by the Radio Manufacturers Association, Any part or parts that prove defective within this period will be replaced without charge when subjected to examination at our factory, providing such defect, in our opinion, is due to faulty material or workmanship, and not caused by tampering, abuse or normal wear. All such adjustments to be made FOB the factory.

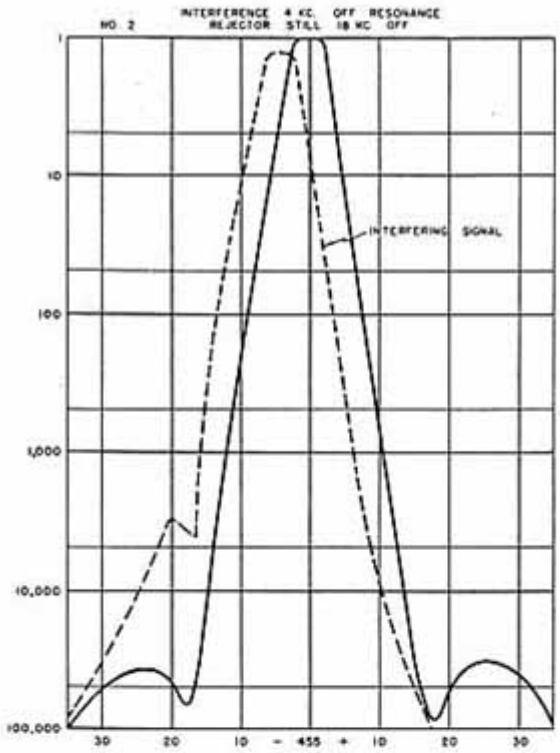
Should this receiver require any adjustments, your dealer or distributor has complete technical service information, or the factory will be glad to assist you in any problem direct.

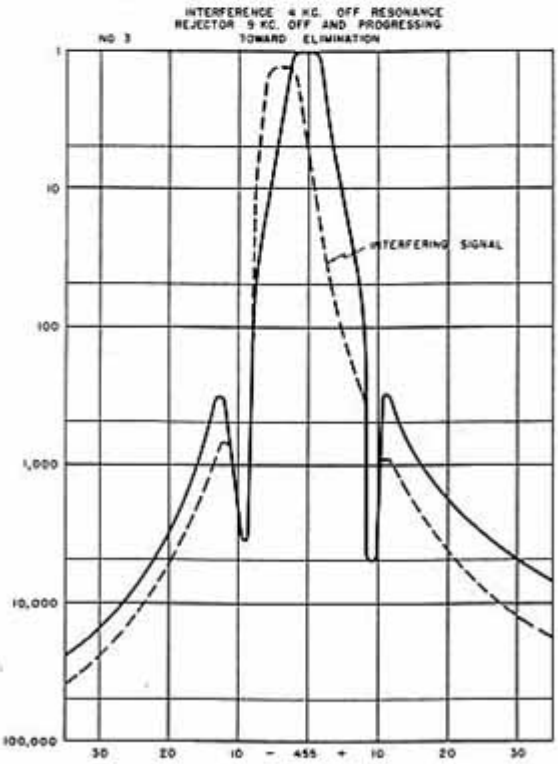
Should it be necessary to return any part or parts to the factory, a "'Return Material Permit'" must be obtained in advance by first writing the Adjustment Department, who will issue due authorization under the terms of the guarantee.

The Haillicrafters, Inc., reserve the right to make changes in design or add improvements to instruments manufactured by them, without incurring any obligation to install the same in any instrument previously purchased.

All Hallicrafters receivers are built under patents of Radio Corporation of American and Hazeltine Corporation.


NO INTERFERENCE REJECTOR
NO 1
18 KC OFF RESONANCE
1
10
100
1,000
10,000
100,000
30 20 10 - 455 + 10 20 30


INTERFERENCE 4 KC. OFF RESONANCE
NO 2
REJECTOR STILL 18 KC OFF
INTERFERING SIGNAL
1
10
100
1,000
10,000
100,000
30 20 10 - 455 + 10 20 30


INTERFERENCE 4 KC. OFF RESONANCE
REJECTOR 9 KC. OFF AND PROGRESSING
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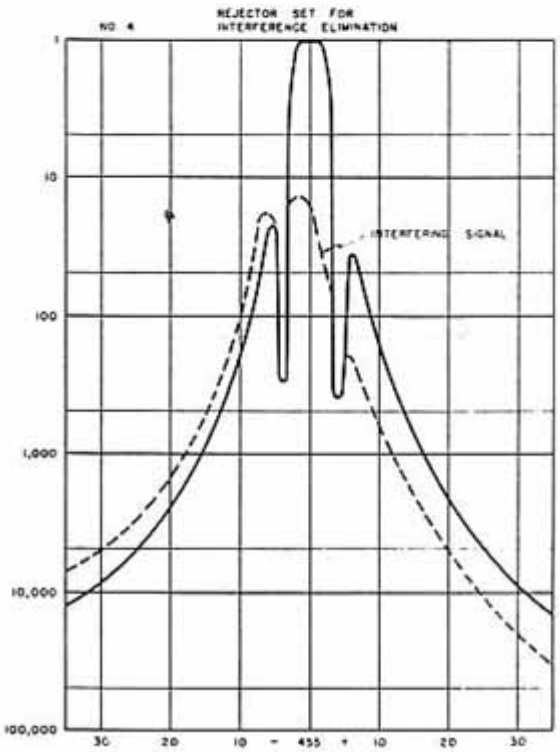
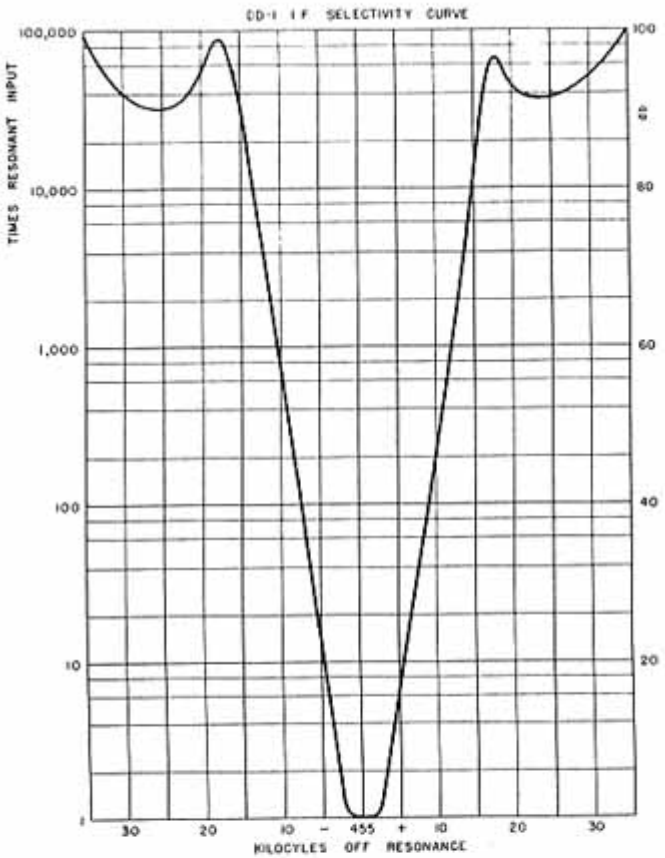
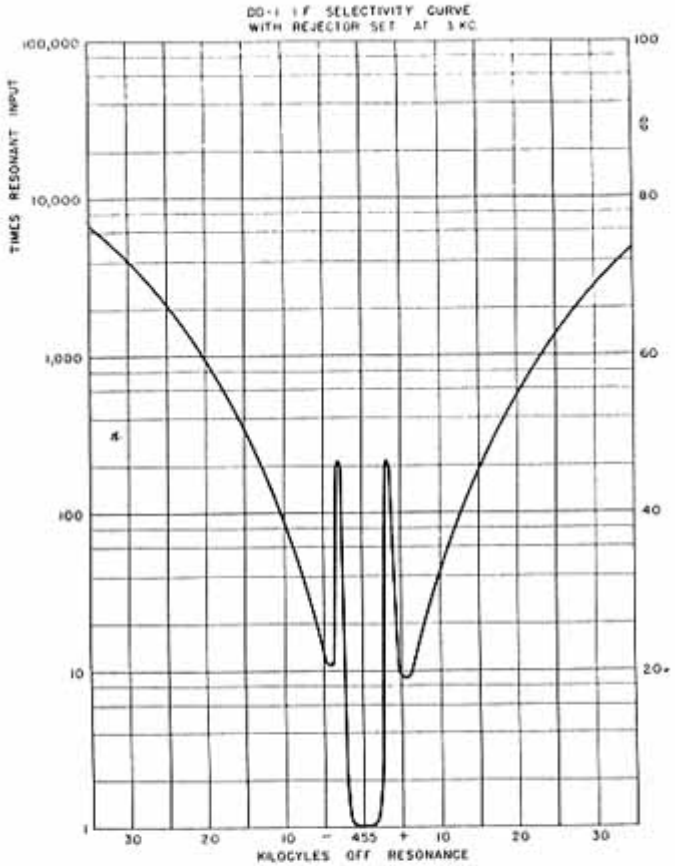
NO 3
INTERFERING SIGNAL
1
10
100
1,000
10,000
100,000
30 20 10 - 455 + 10 20 30


REJECTOR SET FOR
INTERFERENCE ELIMINATION
NO 4
INTERFERING SIGNAL
1
10
100
1,000
10,000
100,000
30 20 10 - 455 + 10 20 30


DD-1 I F SELECTIVITY CURVE
TIMES RESONANT INPUT
100,000
10,000
1,000
100
10
1
100
80
60
40
20
30
20
10
455
10
20
30
KILOCYLES OFF RESONANCE


DD-1 I F SELECTIVITY CURVE
WITH REJECTOR SET AT 1 KC
TIMES RESONANT INPUT
100,000
10,000
1,000
100
10
1
100
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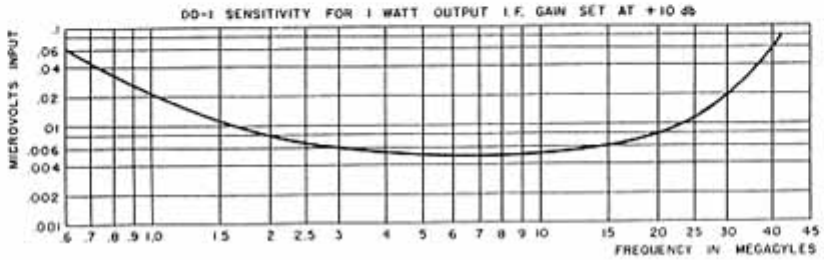
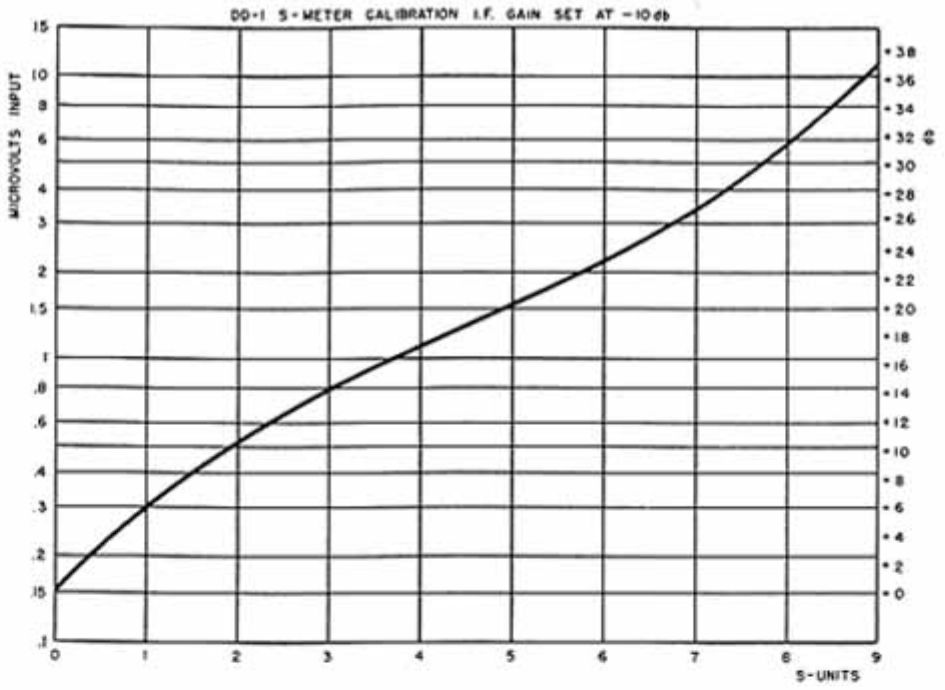
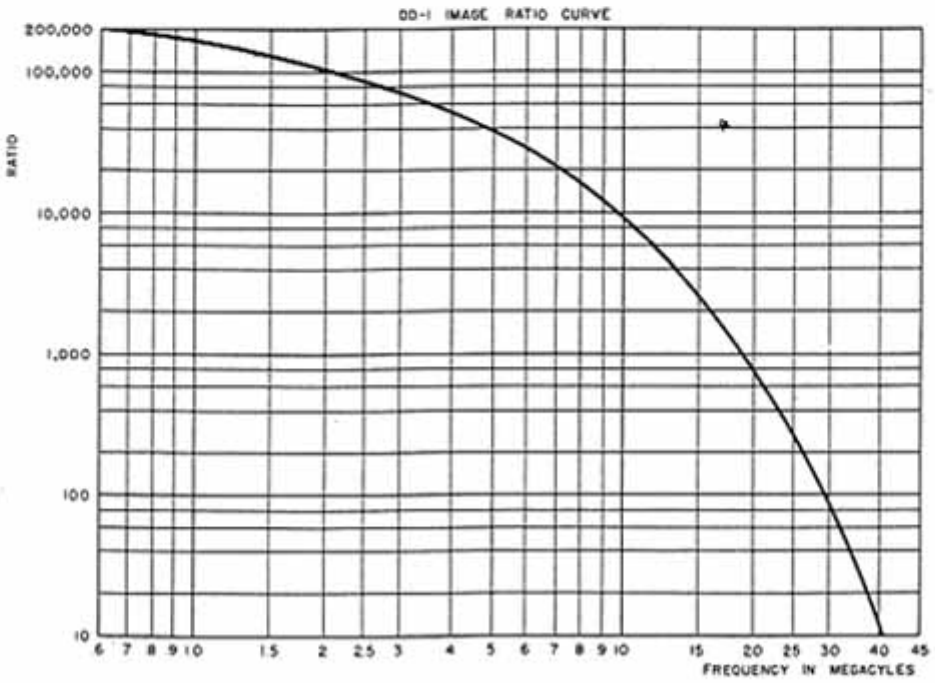
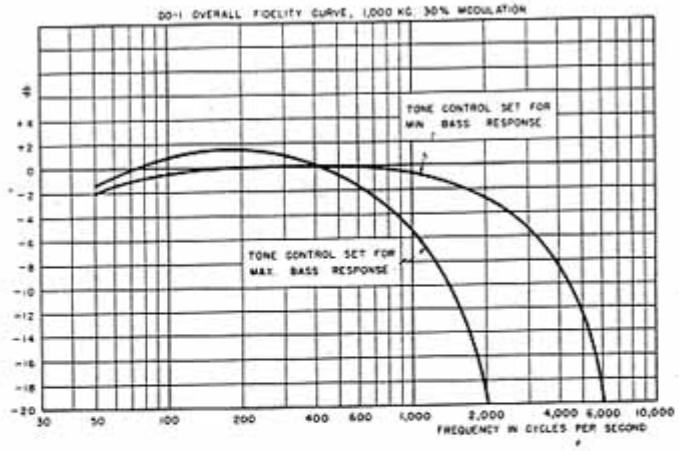
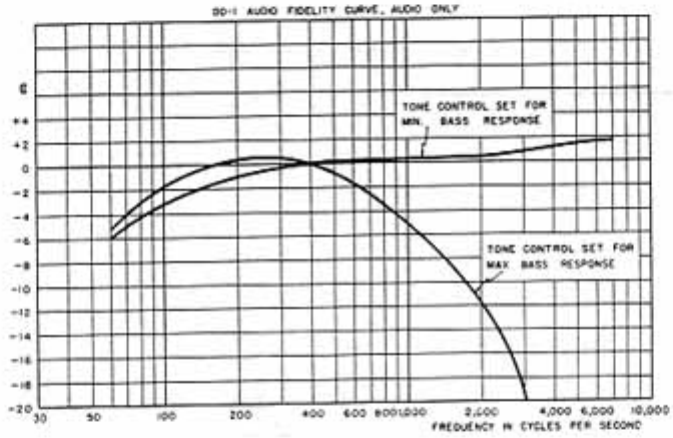
60
40
20
30
20
10
455
10
20
30
KILOCYLES OFF RESONANCE

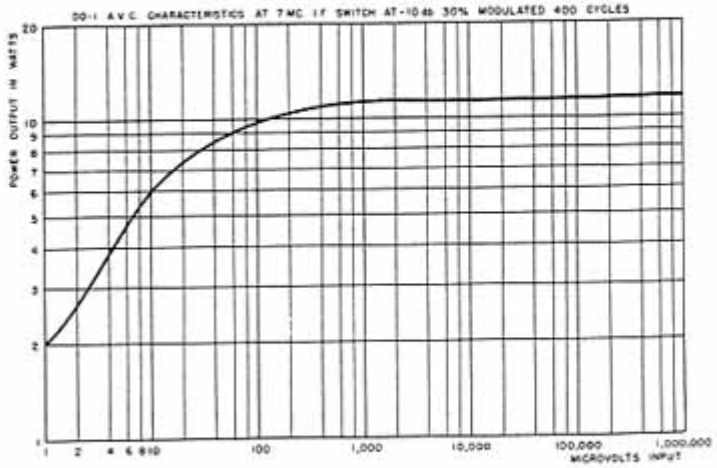

DD-1 SENSITIVITY FOR 1 WATT OUTPUT I.F. GAIN SET AT +10 db
MICROVOLTS INPUT
.1
.06
.04
.02
.01
.006
.004
.002
.001
.6
.7
.8
.9
1.0
1.5
2
2.5
3
4
5
6
7
8
9
10
15
20
25
30
40
45
FREQUENCY IN MEGACYLES


DD-1 S-METER CALIBRATION I.F. GAIN SET AT -10 db
MICROVOLTS INPUT
15
10
8
6
4
3
2
1.5
1
.8
.6
.4
.3
.2
.15
.1
+38
+36
+34
+32
+30
+28
+26
+24
+22
+20
+18
+16
+14
+12
+10
+8
+6
+4
+2
+0
db
0 1 2 3 4 5 6 7 8 9
S-UNITS


DD-1 IMAGE RATIO CURVE
RATIO
200,000
100,000
10,000
1,000
100
10
6 7 8 9 10 15 2 25 3 4 5 6 7 8 9 10 15 20 25 30 40 45
FREQUENCY IN MEGACYLES


DO-1 OVERALL FIDELITY CURVE, 1,000 KC. 30% MODULATION
db
+4
+2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
TONE CONTROL SET FOR MIN. BASS RESPONSE
TONE CONTROL SET FOR MAX. BASS RESPONSE
30
50
100
200
400
600
1,000
2,000
4,000
6,000
10,000
FREQUENCY IN CYCLES PER SECOND


DO-1 AUDIO FIDELITY CURVE, AUDIO ONLY
db
+4
+2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
TONE CONTROL SET FOR MIN. BASS RESPONSE
TONE CONTROL SET FOR MAX BASS RESPONSE
30
50
100
200
400
600
800
1,000
2,000
4,000
6,000
10,000
FREQUENCY IN CYCLES PER SECOND


DO-1 A.V.C. CHARACTERISTICS AT 7 MC. I.F. SWITCH AT -10 db 30% MODULATED 400 CYCLES
POWER OUTPUT IN WATTS
20
10
9
8
7
6
5
4
3
2
1
1
2
4
6
8
10
100
1,000
10,000
100,000
1,000,000
MICROVOLTS INPUT