Thermic Sniffler
RATE-OF-CLIMB SENSOR

designed by: Walt Good, Don Clark, and Ben Givens

ACE R/C, Inc.
BOX 511 116 W. 19TH ST. HIGGINSVILLE, MO. 64037

OPERATING INSTRUCTIONS

I. INTRODUCTION

The THERMIC SNIFFLER is a highly sensitive rate-of-climb sensor developed especially for use in RC gliders. A variation of tone is sent to a monitor receiver on the ground, indicating the slightest up or down motion of the glider.

The airborne unit, the Thermic Sniffler Transmitter weighs 2 oz. and consists of a tough plastic case in which is mounted a sensitive thermistor bridge flow meter, an amplifier, a tone generator and a low power transmitter. A change in air pressure causes air to flow into or out of the container through the sensitive flow meter. The flow meter signal is amplified and converted to an audio tone which modulates the transmitter whose signal is received on a small monitor receiver on your belt. An "up" motion of the glider causes the tone to increase and a "down" motion makes the tone drop. Thus you "hear" every vertical motion of your glider, even more than your eyes will detect.

The Thermic Sniffler tells you whether the glider is in or out of a thermal, it does not tell you where the next thermal is! But as you can imagine, it's a great help in training your eye as to what is really happening.

II. TRANSMITTER INSTALLATION

The transmitter consists of a plastic case which houses the electronics and an Antenna/Battery Harness which plugs into the end of the plastic case. You will need to obtain a standard sized 9V Heavy Duty or Alkaline transistor battery.

The battery wires and connector that come on the Sniffler can usually be used as supplied. However, if you wish, you can lengthen the wires by splicing in additional wire. Be sure to maintain proper polarity! Keep the overall length of these wires as short as possible. A switch may be wired in if desired. The usual 9V battery weighs 1 oz. so it is suggested to locate it where is will help out the most with keeping the proper balance.

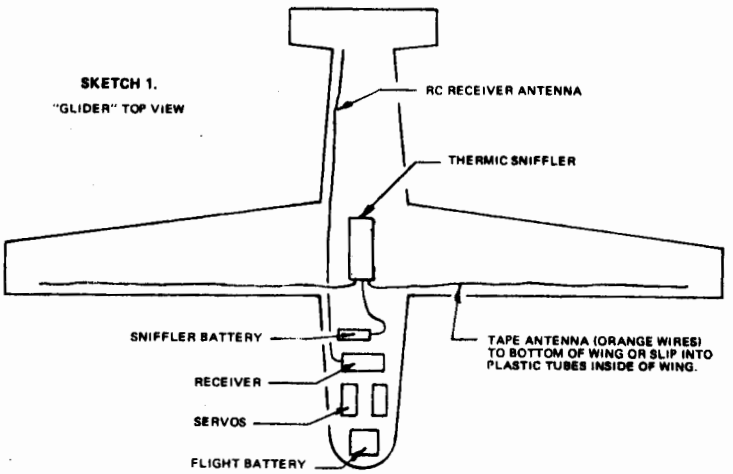
Our tests have shown a battery such as the Eveready Heavyduty No. 1222 will provide 15 hours or more of operation. Signs of a low battery are poor range and a change in the frequency of the tone.

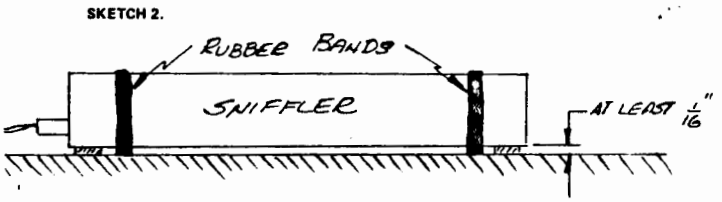
In order to get the best results from your Sniffler there are a few points about its location and installation that we recommend be followed. These are:

The Sniffler may be installed in either the fuselage or the canopy. Although either location can be used, the space in the fuselage under the wing is best. Plan on securing the sniffler and battery in place by means of rubber bands or wedged in foam rubber. You should also:

a. Locate the Sniffer and its wires at least 3/4" away from the RC receiver, wiring and servos.
b. Keep the Sniffler antenna at right angles to the RC receiver antenna.
c. The "airleak" for the Sniffler is a small hole thru a bolt in the end of the case. Keep it protected from wind blasts since it must pick up only the static pressure inside the fuse. On powered gliders, make sure that exhaust oil does not plug the airleak.
d. Although the Sniffler can be installed in any position, when mounting it with either of the wide sides down it is necessary to have a spacer at least 1/16" thick at each end under the case.

THERMIC SNIFFLER INSTALLATION





With the above points in mind and before proceeding with the final installation, it is suggested you make a check for proper operation of your RC equipment with the Sniffler in place and operating.

To make such a check, temporarily tape the Sniffler, battery, and antenna wires where you plan to locate them. Now with the Sniffler in operation, check your RC system for normal operation and range. Chances are that your RC system will not be affected in any way, in which case proceed to the final installation. In the event your RC system does not behave normally; i.e., servos chatter or range is poor, then try moving the Sniffler a bit further away from the receiver or rerouting the battery wires.

For the final installation, drill 2 holes 1/8" in diameter in the fuselage sides near the leading edge area of the wing and the rear canopy former if necessary to bring out the antenna wires. Location of the holes in the fuselage sides will be determined by the method you plan to use for mounting the antenna wires. These wires may be taped to the bottom surface of the wing or slipped into plastic tubes you install in the wing panels.

III. THE THERMIC SNIFFLER RECEIVER

This receiver has been designed specifically for the Thermic Sniffler with the objectives of providing a receiver that would have good range, a minimum of interference from your RC transmitter and adjacent Sniffler frequencies, low battery drain, easily changeable frequency, light weight, and small size.

Battery current is about 15 ma, the same as the transmitter. A good quality, Heavy Duty 9 volt battery would last at least 15 hours. The small, rechargeable replacement battery is not recommended due to its low capacity.

To put the receiver into operation you need to remove the back and install a 9 volt battery and insert the antenna through the grommet in the top of the case and screw it onto the stud mounted on the circuit board. Replace the back and plug the earphone into the front of the receiver.

Turn the receiver on with the combination switch and volume control and with the tranmitter operating, adjust the volume as desired.

The receiver is intended to be worn on your belt with the antenna trailing in back of you, away from the RC transmitter. As received, the receiver may be set up for wearing on either the right or the left side. If you prefer to wear it on the opposite side, the belt bracket can be changed; holes are provided to do so.

The receiver is built for earphone only. If you participate in cross country flying and want more volume, you can add a small amplifier-speaker such as the Radio Shack 200 mW unit (Cat. No. 277-1008). You can also use the light weight stereo phones with a sub-miniature jack.

IV. OPERATION

With the equipment installed, turn on the Thermic Sniffler Transmitter and Receiver. A 500 Hz tone should be heard. Now slowly raise the glider and note the tone increase. Lowering the glider will lower the tone. A rapid rise of 5 ft./sec. will send the tone to 2000 Hz and rapid lowering will drop the tone to zero. Hence, the range is about + or - 5 ft./sec. Since the ear will detect a change of a few Hz, the Thermic Sniffler will measure a rate-of-climb of a few inches per second! Note if you squeeze the tranmitter case or the fuselage near the transmitter, you will induce artificial variations in tone. When the glider is pulled upward by the winch or High-start, the tone will climb to a high pitch and then return to the normal tone as the model levels out and releases from the line. With the model trimmed for a smooth glide, the tone will be slightly lower than on the ground due to the sinking rate. Now push and pull on the stick to force a slow gallop. The tone will respond accordingly so that your ear and your eye will obtain the same information. This deliberate variation is known as a "stick thermal" but is only a momentary variation. You will have no trouble identifying a real thermal since it will sing for long periods when you know you haven't used the stick. If the tone becomes momentarily weak, orient the monitor antenna parallel to the wing to give the strongest signal. It is normal for the tone to weaken momentarily when the airborne antenna is pointed toward the receiver.

V. INTERFERENCE

Here are some of the interference effects you may notice. They are not serious, just annoying.

-Other Snifflers: Snifflers on adjacent frequencies to yours may be heard when they are close by and your glider is far away. The most common time for this to occur is when someone else is either launching or landing while you are still flying at some distance.

-RC transmitter buzz in the monitor: due to closeness of the Monitor to someone who is flying on one of the six meter frequencies. The remedy is to walk a few feet away and get out of range.

VI. TONE ADJUSTMENT

The Thermic Sniffler Transmitter is provided with an adjustment for the audio tone. You will find an adhesive dot on one end of the Sniffler. Remove this dot, insert a 1/8" diameter wood or plastic screwdriver in the hole and turn very slowly while listening to the tone from the receiver. Clockwise rotation gives you a lower tone. After the tone is set to your satisfaction, replace the dot with another or a small piece of tape.

VII. CHANGING FREQUENCY

Your Thermic Sniffler is crystal controlled on one of five permitted frequencies, 49.830, 49.845, 49.860, 49.875 and 49.890 mHz. These frequencies are compatable with all RC channels except the 50/53 mHz band.

If you wish to change your Sniffler frequency to one of the others, you will need a pair of crystals, one for the transmitter and one for the receiver; they are different and can't be interchanged. These crystals are available from Ace R/C.

To open the Transmitter case, it is necessary to pull off the tape which seals the two sections together. This gives you access for changing the crystal. Just pull out the crystal in the socket and replace it with the new one.

Put the case back together and replace the tape. The tape has to COMPLETELY seal the two halves together. It is best to slightly stretch the tape as you apply it around the corners. After the tape is in place, run your fingernail, or something like it, around the taped perimeter and carefully work it down without cutting through the tape. Pay particular attention to the area where the tape ends overlap. If there is the slightest leak, the Sniffler will not have the usual sensitivity. If you require additional tape, almost any thin vinyl tape will work; usually auto parts stores sell various trim tapes which come in 1/4" widths as well as different colors. The length required is 12 1/4"

The receiver frequency can be changed by removing the back, pulling out the crystal and installing the new one. if range with the new crystal is not as good as it was, you can probably improve it by tuning the IF cans (three small square metal cans on the receiver board.) This is easy to do. Remove the back, walk away from the operating transmitter a distance of about 100 yards and with a non-metallic tool, fine tune the yellow, white, and black IF cans by SLIGHTLY turning the slugs (less than 1/4 turn) in both directions to get the loudest tone. No other adjustments should be made.

VIII. USING THE SNIFFLER TO FIND A LOST GLIDER

No guarantee can be made that this will work due to the many variables involved but here is a tip to alert you to the possibility. Approach and search the general area where you believe the glider to be until the Sniffler is heard. When you hear the tone, swing the receiver in a horizontal plane and pick out the direction of the WEAKEST signal, collapsing the antenna if necessary. Once this direction is established, walk and search in that direction, continuing with the same procedure. It's the direction of the weakest signal because the antenna is the least efficient when its pointed at the transmitter.

10G200—Thermic Sniffler System	$149.95	12G20—Thermic Sniffler Receiver*	$59.95
11G20—Thermic Sniffler Transmitter*	99.95	20G20—Thermic Sniffler Xtal Set*	13.90
19G63—Thermic Sniffler Ant/Batt Hrns	5.00	SP001—Thermic Sniffler Earphone	1.50

*Specify Frequency

Prices are subject to change.

Ace R/C, Inc. 116 W. 19th St., Box 511, Higginsville, MO 64037

THE THERMAL SENSOR FOR RC GLIDERS

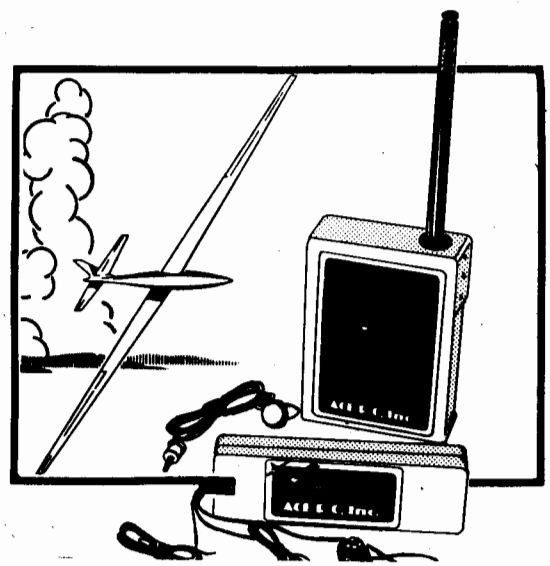
by Walt Good NSS 71-5

The thermal sensor for RC gliders has now been in use for over ten years so an update on the subject would be of interest to the readers of SAILPLANE.

Particularly, since license-free thermal sensors have recently become available there may be many RC glider flyers who would want to learn more about these devices. The earlier units required an amateur radio license or the assistance of a licensed amateur. This article describes what the sensor is, how it works and the possible uses.

First, the name 'thermal sensor' means that the device is really a rate-of-climb sensor. It detects whether the model is climbing when in the rising air current of a thermal. Of course, it detects sinking air as well!

Actually the sensor is similar to the electric variometer used in full scale sailplanes but greatly reduced in size and weight. One unit on the market is housed in a plastic tube four inches long by 1-5/16 inches in diameter and weighs two ounces. (See photograph.) The addition of the one ounce battery brings the total airborne weight to three ounces, which is a very small payload for most gliders. As a result it has no detrimental effect on the glider's performance.



The airborne sensor incorporates a tiny, low power radio transmitter which sends the rate-of-climb information to the pocket monitor receiver on the ground. The information is in the form of a variable audio tone which increases in pitch as the glider rises and drops in pitch when the glider sinks. Whenever the glider flies at constant altitude the tone returns to the basic tone of 500HZ, which is the same as it would have while resting on the ground. Therefore, the information is really a measure of vertical velocity and not altitude as might at first seem to be the case.

The sketch in Fig. 1 shows the overall system with the pilot controlling the normal RC controls while the airborne thermal sensor is sending the rate-of-climb information down the 49MHz link to the monitor at the pilot's waist.

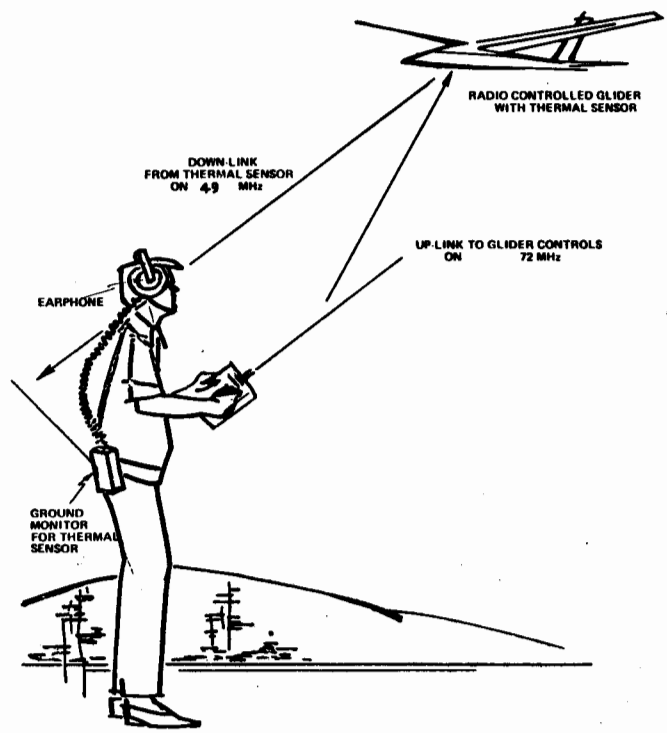


FIGURE 1. CONFIGURATION OF RC GLIDER AND THERMAL SENSOR

The pilot 'hears' the glider's vertical motion in the earphones. Normally he wears a small ear plug but artist Dick McNeil said the headset was easier to draw!

What principle of physics does the thermal sensor employ?

The change of air pressure with vertical height is the quantity measured by the sensor. It is not the temperature of the slightly warm rising air that is measured as one might think.

How is the change in pressure measured? The sketch in Fig. 2 shows the small plastic container which has only one small entry orifice to allow air to flow in or out. Any air flow is channeled through a flowmeter before entering the container volume.

If the container is at rest, no flow takes place. If the container is rising, the air from inside the container flows out through the orifice in order to equalize the pressures between the inside and outside air.

If the container is sinking, then air flows into the container because the heavier outside air must rush in to again equalize the pressure. Yes, the air appears as pretty heavy stuff if you have a sensitive flowmeter to measure it. Here we are talking about air flow rates of a few cubic millimeters per second (or a few cubic inches per hour)! The flowmeter uses a pair of tiny thermistor

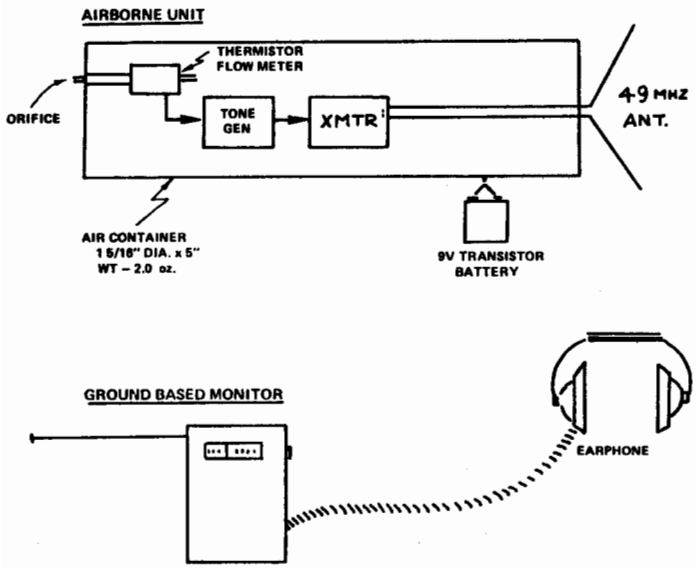


FIGURE 2. PRINCIPLE OF RATE-OF-CLIMB THERMAL SENSOR

beads of 0.010 inches in diameter as the sensing elements. In an electrical bridge circuit, the flow upsets the balance of the beads and creates a voltage which changes the frequency of the tone generator. Even though the thermistor is a device whose resistance varies as a function of temperature, the circuit arrangement using a pair of beads ends up measuring airflow rather than the temperature of the air.

The tone generator modulates the low power transmitter and sends the signal to the ground monitor.

As the end result the vertical velocity of the glider causes the sensor to provide variation in the tone signal. Going up causes an increase in tone. Going down causes a decrease in tone. Standing still holds the base tone at 500Hz. In a practical case the tone runs from 500 to 2000Hz for up motions and 500 to zero Hz for down motions. The tone will change for vertical rates as small as a few inches per second!

What kind of air probe is necessary?

The answer is none. Or, more accurately, it has been found that the inside of the fuselage of a typical glider is a good source of local static air pressure. Normal leakage through various holes in the body provides this result. Of course, a well-sealed body with a hole in the nose would not be good because its internal pressure in flight would be mostly a dynamic one, rather than static, and could confuse the sensor. Actually a ram probe has been fitted to a standard thermal sensor to provide a reading of forward velocity, but that's another story.

The combination of the sensor transmitter and the ground-based monitor determines the usable range of the system. The practical range of the license-free 49MHz system is several thousand feet. This distance is more than adequate since it is near the limit of visual contact, and courage, of most pilots! There are five spot frequencies in the 49MHz band so several gliders may use sensors at the same time.

Now let's talk about the many uses which the modelers have found for the thermal sensor. Of course, the primary use is detecting thermal lift so let's walk through a flight and see what the sensor does.

During launch on a winch the sensor tone leaps to a high pitch during the rapid ascent. Then the tone starts down as the plane approaches its peak. Experience with the sensor shows that many gliders are released from tow before the top altitude has been obtained. In other words, while the model appears to have gone over the top from a visual viewpoint, it is really still gaining a bit more altitude. You'll note that sensor users usually appear to release late for this reason. The result is extra altitude.

Sometimes several quick 'bumps' in the tone are heard during the launch. This means you have flown through the lift area during launch. The proper action is to release at once into the lift even if you're not at the high point of launch. The eyeball may see a little wing rocking at the same time but the sensor tone confirms the lift area and gives you the courage to jump off early.

If no lift was observed during launch the glider is released when the tone is back at the base value. Now you steer towards a known lift area or proceed upwind using the stick as little as possible. The purpose here is to listen for 'bumps' in the tone and look for wing wiggles at the same time. Since the sensor measures vertical motion caused by the elevator control as well as by thermal lift, it is best not to inadvertently produce 'stick thermals' and confuse the true lift pattern. It soon becomes automatic for the pilot to know when the sensor is reading true lift. Full scale sailplane variometers eliminate the 'stick thermal' effect by compensating devices, but this complication has not been necesary on RC gliders.

Most thermals have a rim of turbulence surrounding the core of the lift. Turbulence gives a few warning bumps in the tone to alert the pilot that lift is near. Almost immediately the tone starts upward indicating entry into the lift core. The glider should be circled quickly to stay in the lift. If a visual clue from the wing tilt was present, then circle the glider in the opposite direction to force it toward the center of the lift. Whether you are in the center can be determined by listening to the tone for several circles to see if one side of the circle has a lower tone. If it does, then slide the circle away from the low tone side until the tone is relatively steady indicating constant lift and proper centering.

Assuming you've drifted as far downwind as you dare but want to find another thermal, it's time to head up-wind as fast as possible. Again the sensor tone will help adjust the glide angle for the best high speed flight. In this case the proper tone is below the 500Hz base tone

but still above zero tone. Zero tone usually gives a modest, safe dive angle and is good for losing altitude safely.

Some pilots use the sensor right to touchdown because it clues them if abnormal sink or lift is in the approach zone.

Thus we've seen that the sensor is useful in all phases of a typical flight. Of course, if your thermal really squeals to a high tone then it's also obvious to the eyeball and the need for the sensor is less important. However, in marginal lift, the sensor is more senstive then most eyeballs and gives most of us a definite assist. Especially if we have grey hair and wear glasses!

Slope flying can be assisted by the sensor too, particularly when the lift is marginal. Finding the maximum paths of lift is made easier. The writer used the sensor during both the LSF 4 hour and 8 hour flights. The 4 hour flight was almost terminated at 3½ hours when the wind dropped below 4 mph. By listening to the sensor while flying at nose height it was possible to optimize the lift until the breeze picked up a few mph. On the 8 hour flight in a 25 mph wind on Lake Michigan the sensor served no purpose except to show a curious long cyclical pattern of mild lift and sink superimposed on the strong slope lift.

The League of Silent Flight tasks offer excellent opportunities to be helped by the use of the sensor, specifically the goal-and-return flights and the thermal flights which require multiple thermals and very high overhead flights. Flying over your head, even at low altitudes, is hard on the eyeball detector, but is easy for the thermal sensor.

The same is true for FAI World Record Trials and USA Record Trials. Ray Smith attained the FAI World Record for almost 5000 ft. of altitude using the sensor.

Another use of the sensor was related by Ken Bates from Michigan. He uses the sensor during the trimming phase of a new model. This gives him more accurate information on changes of CG and control trim positions than by the eyeball method.

We believe that the eyeball method of detecting lift improves when using a sensor because the information from the sensor is training the eyeball.

In contest flying the thermal sensor seems to help most in duration events beyond the three minute limit. However, it is noted there are still many consistent contest winners who don't use sensors.

Finally, there are several cases where the RC glider was lost down-wind and found by using the thermal sensor and monitor as a direction finder. Pointing the monitor antenna at the sensor provides a distinct null in the signal. Pointing to either side is much stronger. Thus by walking in the direction of the null the signal will get stronger when going towards the model and weaker going away. It doesn't take long to determine this. In the writer's case, the errant model was hanging half way up a tree and we walked directly under it without spotting it. Then the signal began to weaken. Upon reversing our course the model was spotted.

Now that the license-free thermal sensors are available there are no radio license restrictions with regard to their use in RC gliders.

The use of thermal sensors is legal in all AMA contests, in AMA Record Trials and in FAI World Record Trials. The only restriction against the use of sensors, that we know of, is in the FAI regulations for RC gliders in World Championship competition. This was apparently done because of the complications caused by the different radio frequencies available in the various countries.

Well, that's the current status of the thermal sensor which now has a decade of experience in RC gliders and has found a definite niche for itself by many modelers.

The source of the thermal sensor in the USA is listed below:

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Thermic Sniffler

RATE-OF-CLIMB SENSOR

FORMERLY MANUFACTURED BY SOARING PRODUCTS

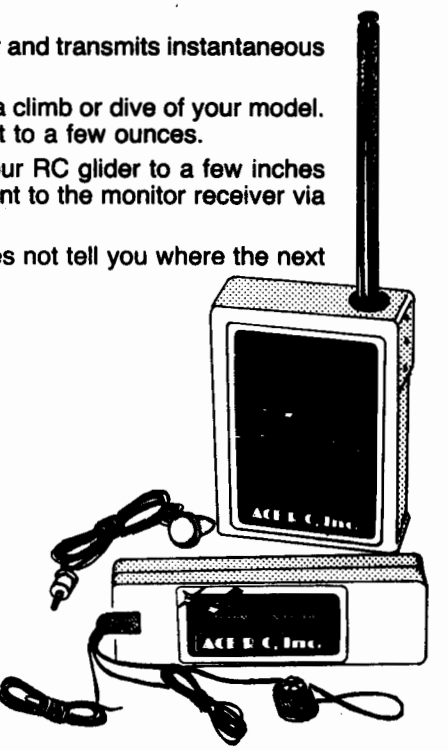
The "THERMIC SNIFFLER" is a small three ounce device which rides in your RC glider and transmits instantaneous rate-of-climb audio information to your ear via a monitor receiver at your side.

The THERMIC SNIFFLER uses the variation of the air pressure with altitude to detect a climb or dive of your model. It's really the same as the electric variometer from full-scale soaring, but reduced in weight to a few ounces.

The THERMIC SNIFFLER is so sensitive it can detect the up and down motion of your RC glider to a few inches per second. You can "hear" the tiniest thermal by the change in the audio tone which is sent to the monitor receiver via a radio link. A rising tone means "up" and a descending tone means "down".

The THERMIC SNIFFLER tells you whether your glider is in or out of a thermal; it does not tell you where the next thermal is! But you can imagine many of the possible uses listed below:

- Improving your flying skills especially in weak lift.
- Increasing your knowledge of thermal behavior.
- Exploiting the best lift areas for thermal and slope soaring.
- Control of dive angle for speed and safe fast descent.
- For LSF tasks such as thermal and goal flights.
- As a finder signal for lost model.
- And for just plain fun!



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12G20—Thermic Sniffler Receiver*	**59.95**
11G20—Thermic Sniffler Transmitter*	**99.95**
20G20—Thermic Sniffler Crystal Set*	**13.90**
19G63—Thermic Sniffler Antenna/Batt. Harness	**5.00**
SP001—Thermic Sniffler Earphone	**1.50**

THERMIC SNIFFLERS are in use around the world. Jack Hiner used a SNIFFLER to establish the World Altitude Record of 6400 feet, an AMA Undeclared Distance Record of 104 miles and a World Distance Record of 55 miles.

Manufacturing and testing techniques have been continually improved over the years to insure best performance and minimum temperature drift.

The THERMIC SNIFFLER operates in the 49 MHz Low Power Communication band and no license is required. It is recommended for use with 72 MHz R/C systems.

TECHNICAL SPECIFICATIONS

Size:	¾" x 1½" x 4¾"	Dimensions do not include antenna and battery wires.
Weight:	2 ounces	
Voltage:	9v @ 15 ma	Operates approximately 15 hours with a standard one ounce transistor battery (Heavy duty type).
Frequency:	49.830, 49.845, 49.860, 49.875, 49.890	SNIFFLER will be shipped with our choice of crystals unless other frequency is specified in order.
Adjustable Tone:	0 to 2000 Hz	Level flight is normally set at 500 Hz but is adjustable to your taste.
Monitor Receiver:	A ground based receiver is required. The SOARING PRODUCTS Monitor Receiver has been designed and matched to your SNIFFLER to give the best range with a minimum of spurious signals from RC transmitters. Receiver uses earphone only, no speaker.	

AVAILABLE AT YOUR DEALER OR DIRECT FROM ACE R/C. (Add $1 Handling)

MANUFACTURED IN THE U.S.A. BY:

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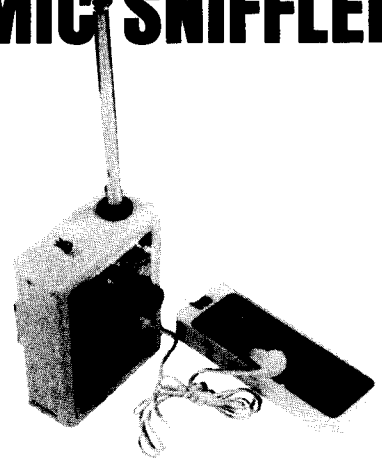
THERMIC SNIFFLER: HELPFUL or HARMFUL?



Now that I have your attention, let's talk about ~~Thermic Snifflers~~. They are a wonderful tool if you understand what they can and cannot do. Thermic Snifflers are used to confirm what your eyes see. The air and lift your plane flys in is seldom, if ever, ideal. The atmosphere is a very dynamic fluid, subject to wide variations caused by terrain and uneven heating. After the launch, the fun begins, unless it's one of those days where lift is everywhere. Lift at or below launch altitude is usually small in diameter. If you are lucky, an area of heated, unstable air looking for an excuse to bust loose is somewhere on the field. What to do?

Assuming your Sniffler is set up like mine...to go dead quiet in sink, start your search for lift by tacking laterally across your field of view upwind. If no lift is found after a max of two passes, head downwind. Again start the lift search in a tacking fashion across the face of the wind. Look for an area where the pitch of the Sniffler tone is about or slightly above the tone when the Sniffler is at rest. Make one or more wide, flat turns. If during the turn you hear several or quite a few short increases in pitch tone, remain circling. Each succeeding circle should see a slight increase in altitude. As the plane ascends in altitude, the duration and intensity of the pitch change should increase until you more or less hear a steady high pitch tone. Congratulations! You are now at the altitude where thermals are broader, more positive in their lift component, and relatively easy to core. By the way, the Sniffler will also announce the breakup of a thermal long before you can see it.

Some other ways of using a Sniffler combined with common sense and a little knowledge:

LAUNCHING

Launching: Most of us have a tendency to stay on the winch past the apex of the launch. With the proper use of the Sniffler, the launch apex is readily apparent. When the Sniffler stops screaming, either start the zoom, release, or stop pulling and float off the line.

FLYING

Flying: A Sniffler can make you a smoother flyer. How? Easy. Follow the rate of change (ascending/descending pitch tones) found when flying in a thermal with small up elevator inputs in response to a descending tone. Note: watch the flying speed; fly fast enough to fly smooth. The smoother you fly in a thermal, the more efficeint the glider is flying and the faster it will climb.

STANDING WAVE

Standing Wave: As you approach the apex of the standing wave, the tone ascends in pitch; past the apex, the tone descends. Try a circle and if it is a standing wave,, the tone will peak in one quadrant of the circle. Find the peak and stay in the lift band much the same way one slope soars; i.e., tacking "S" turns into the wind.

DYNAMIC SOARING

Dynamic Soaring: Dynamic soaring into a steady wind is almost like the whipping techniques we used with control line models but with a difference. The first step is to tack across the face of the wind and build up some speed. After speed has been attained, turn sharply into the wind and let the nose of the airplane come up. Use your eyes and Sniffler to tell you when the glider slows up and stops climbing. Do a sharp stall type downwind turn. Let the nose of the plane drop to pcik up airspeed. Repeat the turn into the wind. The path of the airplane will be elliptic in shape. If you do it right the plane will stay at the same altitude or gail altitude slightly with each turn. This technique is not the only dynamic soaring technique but it is the easiest to learn.

The Thermic Sniffler is also useful in trimming a glider:

BEST L/D

Best L/D: On a calm day, set in some down trim. Let the glider pick up some speed in a 3 to 4 degree shallow dive (Sniffler tone quiet or at a very low pitch). At some point about 5-8 seconds, the glider should get on the step and Sniffer tone restores to a rest or stable tone. Mark this position on the transmitter elevator trim. This is the setting to use while searching for lift or in stable air for max duration without thermal assistance.

BEST C/L

Best C/L: Again, on a calm day, fly the plane in a area where the tone is more or less stable (same pitch). Gradually feed in small amounts of up trim until the glider starts to porpose and the Sniffler tone becomes cyclic in up/down variations. Back off gradually on the up trim until the glider just stabilizes. Mark this trim setting as the best C/L. This setting is used in rising unstable air or after the plane has settled in a useable thermal.

Two more hints: Don't fly the tone, fly the plane. Second, have the tone turned down until it is just audible. Your eyes are still the best way to tell when the plane is in lift. The Sniffler is an aid, not a miracle.

Courtesy:

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