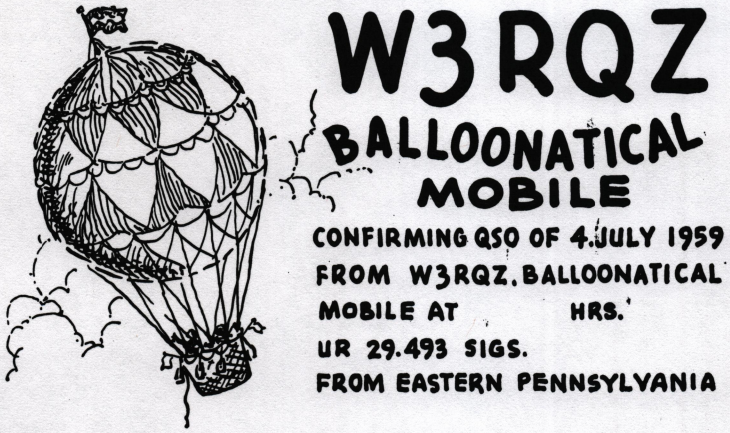

Balloon Mobile

BY ROBERT G. THOMAS,* W3QZO

In recent years the Balloon Club of America has revived the almost-forgotten sport of free-flight balloon ascension, whereby several venturous souls ride aloft beneath a large gas-filled balloon, drifting wherever they are taken by the wind. Because of the uncertain nature of the flight path, the balloonists have enlisted the assistance of the Phil-Mont Mobile Radio Club, whose members follow the balloon overland in their mobile units, and report its position for relay to the Federal Aeronautics Administration and to other members of the balloon club, who follow with a trailer to gather up the gas bag paraphernalia when it comes down. This activity has been coordinated between the two clubs by W3UMK, and in appreciation for his efforts, and the cooperation of Phil-Mont, the balloonists offered to let Dick bring along a rig and make an ascension with them. Well, Dick doesn't mind flying as long as he can keep one foot on the ground so he deferred, but another Phil-Mont member, W3JIL, does a lot of private flying and gladly accepted when the offer was made to him.

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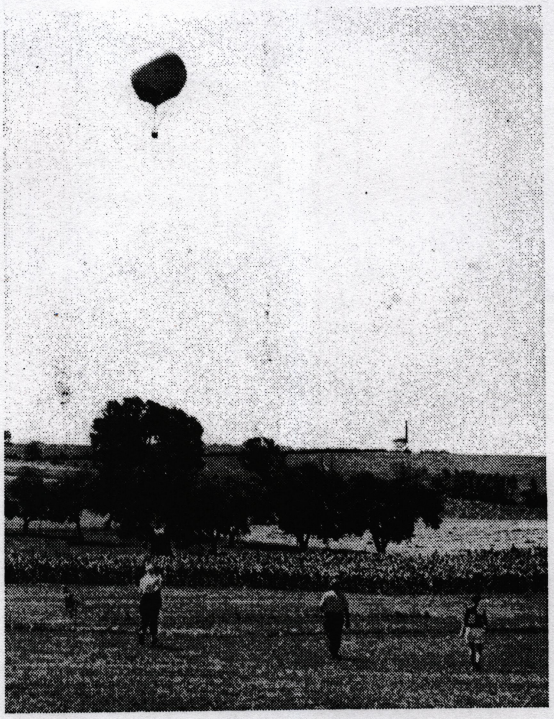
This is W3JIL in the gondola basket beneath the balloon, checking out the 10-meter portable prior to the ascension. During flight, the handset was wrapped in a handkerchief to minimize the danger of sparks setting off an explosion of the cooking gas which was used to inflate the balloon. The large rope at the right is a drag line used for stopping movement of the balloon as it nears the ground on descent. Ballast bags are at the left.

The date was set for July Fourth at the Valley Forge Airport. W3QQH offered the use of his ten-meter walkie-talkie for the rig to be taken on the flight.

Since a balloon can hardly be classed as a common conveyance for the average ham, it might be well to take time here for a short description of the contraption. The main body of the balloon used locally is a rubberized fabric sphere about fifty-four feet in diameter. As can be seen in the photographs, it is surrounded by a rope net, from which is suspended a wicker basket large enough to hold four or five people. The balloon is filled with ordinary cooking gas — the kind that explodes, that is — so needless to say, extreme precautions were taken to eliminate sparks from the walkie-talkie! Sand ballast is thrown over when it is desired to go up, and gas is released for coming down. As a safety measure, transmissions were not made during ascents, since stray gas envelops the passenger area during this maneuver.

W3JIL wrapped some wire around the outside of the basket for a half-wave dipole in case the whip mounted on the walkie-talkie was inadequate. It turned out during the flight that this was the case, and Al extended his range tremendously by using the horizontal dipole, even though the ground stations were vertically polarized.

Dawn on the Fourth broke calm and clear, and found W3JIL already at work installing the rig while his fellow "Balloonatics," as they are known locally, busied themselves untangling ropes, inflating the balloon, filling bags with ballast and checking weather reports for some hint of the direction the wind would carry them. Preparations were completed at 0900. At 0930 Al and his three companions clambered into the



The "welcoming party" scurries out to meet the descending balloon. The rig could not be operated at this time because so much gas was being released. However, previous contact between the balloon and the ground party had provided the necessary liaison for having the ground crew be at the proper site for the landing activities.

basket, and the ground crew guided the balloon out to the center of the field for the ascension. At 0945 the balloon was released and Al, operating under the club call, W3RQZ, was on his way.

The silvery balloon was an inspiring sight as it silently rose from the earth, drifting slowly toward the west. The balloon club chase car and trailer got underway immediately, followed by W3QZO and YL in one radio-equipped car, and W3UMK/m in another. It has been found extremely helpful to have a "navigator" in the mobile units to keep an eye on the balloon and plot a corresponding course using available roads, while the driver operates the rig and watches where he is going. Contact was first established with W3RQZ/balloon by W3QZO/m at 1005 when the balloon had leveled off at an altitude of 2000 feet. This was followed by contacts with W3UMK/m, W3WUN, W3ZPP, K3DJE/m, K3GNM and W3DSG. The signal from the balloon was not very strong, however, and stations more than twenty degrees from directly beneath it had difficulty reading Al. Later during the flight he changed over from the whip to the horizontal dipole and worked W3QV, about twenty miles distant, with good reports both ways.

By this time the wind had shifted somewhat, changing the flight path to a northeasterly direction. We decided to head due north on one main road, then turn to the west on another main road to avoid the necessity of going through the city of Phoenixville, where traffic and tall buildings might have caused us to lose sight of the balloon. It soon became apparent, however, that this route was not close enough to the flight path, so we back-tracked and took a chance on passing through the city. Once on the other side of the city it was an easy matter to track the balloon overland by following whatever country road seemed to go in the most desirable direction. We would occasionally get ahead of the balloon and wait for it to drift overhead. At one time when they were directly above us, Al mentioned via the ten-meter link that since they were drifting with the wind, it was perfectly quiet, and they could hear children playing and dogs barking. I asked Al to stand by, then sent "hi" on the car horn. He read it perfectly from a 2300-foot altitude! As we passed through small towns we could see the excitement of the residents as they stopped their work to watch the balloon pass overhead. Later we learned that two motorists became so engrossed watching the unusual spectacle that they didn't see each other and had a collision; as previously mentioned, it pays to have a navigator in the mobile so the driver can drive.

About forty-five minutes after they had taken off, Al reported that they were looking for a suitable field in which to land. We located the balloon chase crew on a nearby road and signalled them to pull over so they could talk directly to the occupants of the balloon to discuss flight and landing details.

Safety considerations made it necessary for Al to sign off from W3RQZ/balloon before descent was made. The balloon, looming larger and larger as it raced toward its shadow back on earth, finally settled down in a field about twelve miles "as the balloon flies" from the starting point. Thus ended one of our most unusual and exciting activities in the mobile phase of amateur radio. An activity combining all the best features of a pleasant ride in the country, a sports car rallye, and a "hidden" transmitter hunt in which you never lost sight of the transmitter! QST

Strays

One hundred and fifty hams, each with the handle "Doc," crowded into the top floor suite of K2SVD at one time or another during the six-day American Medical Association convention in June. Hooky-playing physician hams were lined up twenty deep at times for cracks at the rig K2SVD brought to Atlantic City, N. J. The set-up resulted in an excellent public relations piece in the medical news magazine *Scope Weekly* and, we bet, a resolve by approximately 149 M.D.s to bring their own rigs next year.

New Life for CODAN

A Modernized Receiver Squelch Circuit

BY ROBERT G. THOMAS,* W3QZO

THE Philadelphia mobile calling frequency of 29.493 Mc. is monitored nearly twenty-four hours a day as one phase in the activities of the Phil-Mont Mobile Radio Club. For this service, most stations employ broad-band crystal-controlled receivers and, in many instances, remote operating positions in various parts of the house. Mobile calls can thus be answered immediately, regardless of what part of his home the fixed-station operator happens to be in at the time. These remote positions generally consist of a loud-speaker with attenuating pad, transmit-receive switch, and a microphone. They may be located in such places as the workshop, garage, dining area, and living room. One of the fellows has gone so far as to install a remote position at

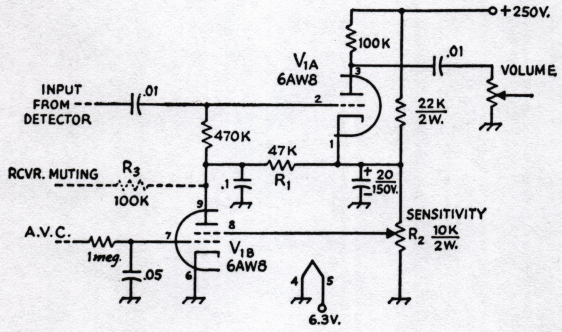


Fig. 1 — Schematic diagram of the Codan receiver squelch. Capacitances are in μf. The volume control shown at the upper right is the volume control ahead of the normal receiver output tube.

If desired, the receiver can be muted during transmit periods by grounding the left-hand side of R_3.

his back porch so he can "yak" and water the petunias at the same time!

Needless to say, the little woman would never tolerate remote rig controls scattered throughout her happy home if they all issued a monotonous stream of background noise. Most of them will reluctantly admit, however, that they like the normal chatter on the "party line" calling channel that we use, and only object to the intersignal noise. Even in cases where net receivers are operated normally (with a single speaker located right at the receiver) background noise soon promotes a "tin ear" and a tendency to turn the audio gain down, with the possibility of missing weak signals from calling stations.

The obvious solution is to incorporate a squelch system in the receiver, to eliminate audio output whenever signals are not being received. A variety of methods for accomplishing this are in use locally, including simple amplifier/relay combinations, a popular combined limiter and squelch,

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• Codan is a useful operating adjunct to any fixed-tuned or communications receiver. In this article the author describes a simple and effective circuit that can be used in new gear or installed in existing equipment in place of the first audio stage. (In case you have forgotten, or never knew, "Codan" is the code designation for "carrier-operated device, anti-noise").

and the Codan circuit.[1] After reviewing each circuit and testing them under actual operating conditions for several weeks, it was concluded that the Codan arrangement offered considerable advantage over the others in performance, cost and space requirements. In addition, several improvements are possible that greatly enhance the attractiveness of the Codan squelch for fixed station use.

Operation of the circuit can be easily understood by referring to the schematic diagram, Fig. 1. V_{1B} operates as an electronic switch to turn an audio amplifier, V_{1A}, on and off. When signals are not being received, a.v.c. potential is near zero and V_{1B} conducts, drawing its plate current through the 47K plate load resistor, R_1. The voltage drop across R_1 is sufficient to cut off V_{1A}, preventing unwanted background noise from reaching the audio output stage. When a signal is received, negative a.v.c. voltage developed by the detector cuts off V_{1B}, and plate current no longer flows through R_1. V_{1A} will then conduct and amplify the detector audio output. The precise level at which the squelch opens is determined by the setting of the sensitivity control,

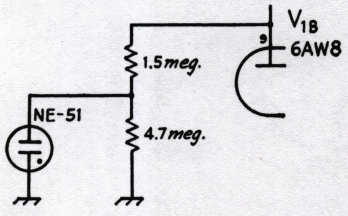

Fig. 2 — An optional addition to the squelch circuit that will furnish visual indication when a signal is received.

R_2, a 10K potentiometer in the screen circuit of V_{1B}. At one extreme in the setting of R_2, the screen voltage is quite high, necessitating a rather strong signal to develop sufficient a.v.c. to cut off V_{1B} and open the squelch. The other extreme exists with the screen grounded through the

[1] Ives, "Codan Elimination of Intersignal Noise," *QST*, October, 1952.

potentiometer, which cuts off V_{1B} and opens the squelch continuously, regardless of the absence of an incoming signal. Optimum setting is a point between these two extremes such that the squelch does not quite open on random low-level a.v.c. fluctations resulting from noise rectification while no signals are being received. With this adjustment, a signal one S unit above the noise will open the squelch and permit normal reception.

Recent advances in tube design have made available the 6AW-A, a miniature dual section type which will replace both the 6J5 and 6SJ7 used in the original circuit. The triode section of the 6AW-A has a high amplification factor and, as used here, provides an audio gain in excess of 50. This is more than enough amplification to drive the output stage with the low amplitude signal developed by the detector. The pentode section has the sharpest cut-off characteristic of any pentode available, and is therefore well suited for service here, where it must be turned on and off by small changes in a.v.c. generated by weak signals. Of course, the space occupied by a single 6AW-A is significantly less than that required by its two octal counterparts, resulting in an important advantage when compactness is a consideration.

The squelch circuit at W3QZO is built into a crystal-controlled monitor receiver. However, several possibilities exist for adding the squelch to an existing commercial receiver if desired. The simplest means is to construct the circuit in a small aluminum utility box that can be mounted on the back of the receiver or housed within the cabinet. Most receivers incorporate an accessory socket, and a compact plug-in squelch unit would be easy to add, especially since many accessory sockets already have a.v.c. and audio connections for n.f.m. adaptors. In areas where the noise level varies over wide limits during the day, readjustment of the sensitivity control will occasionally be necessary so that the squelch will react properly to weak signals but still prevent noise from breaking through. In such cases it is advisable to mount the sensitivity control where it is accessible. Of course, this is not a problem when the Codan is incorporated in a new equipment design. When the squelch is added to an existing commercial receiver, the sensitivity control may be accommodated on the front panel without drilling additional holes merely by converting an existing control to a dual concentric type that handles its original function in addition to squelch sensitivity. As an alternative, the sensitivity control can be mounted out of the way and set up so the maximum noise encountered will not open the squelch. The squelch will react normally to strong signals, and a conveniently located switch may be used to open the pentode cathode return and disable the squelch when it is desired to receive weak signals without disturbing the preset sensitivity adjustment. The latter procedure is most applicable in CD equipment where inexperienced operators might otherwise misadjust a variable control.

No special precautions need be taken in the construction of the Codan circuit other than avoiding excessive lead length and high temperature locations. It is preferable to use a high quality two-watt composition potentiometer for the sensitivity control, but if cost is an important factor, a wire-wound unit can be employed with a minor sacrifice in smoothness of operation. While the sensitivity control has sufficient range for nearly all cases, some receivers have such a high internal noise level on the higher frequency bands that they develop appreciable a.v.c. voltage even when not tuned to a signal. Because of this, it may not be possible for the squelch to cut off and eliminate noise in the output. The receiver limitation can be accommodated in the squelch circuit by putting a resistor of about 2K to 10K in the ground return of the sensitivity control, thus raising the screen voltage and requiring higher values of a.v.c. to open the squelch. The squelch will then function properly, but the fundamental problem of an inherently noisy receiver will still exist. Although the Codan circuit eliminates receiver noise and moderate amounts of impulse noise during intervals when signals are not being received, it is not intended to suppress impulse noise, and hence it must be supplemented by a conventional noise limiter at locations where interference of this type is bothersome.

One other point dealing with installation should be noted: Be sure that the a.v.c. voltage used to actuate the squelch not the delayed type, because if a.v.c. is used, the squelch will not operate properly on weak signals.

An effective means of muting the receiver during transmitting periods can be had by adding a 100K resistor, R_3, at the plate of the pentode, as shown in Fig. 1. The free end of the resistor is grounded through auxiliary contacts on the change-over relay, causing the triode section to cut off when transmitting. This completely silences the receiver with none of the contact arcing and thumps from the loudspeaker that generally accompany the method where receiver plate voltage is switched off.

Although not actually incorporated in the author's receiver, the novel visual signal indicator shown in Fig. 2 may be of interest to others. The NE-51 glow lamp conducts whenever a signal is being received, and is extinguished during no-signal conditions. The 6AW-A pentode plate voltage is used to provide an appropriate potential to the indicator dividing network. A visual indication of this type will help avoid missing a calling station if the volume control is unknowingly turned down, or if room noise is high.

Several of the local gang have used the modified Codan squelch described here with excellent results in various types of receivers. The small effort expended in its construction is more than repaid by a new operating convenience and the elimination of listening fatigue caused by incessant background noise.