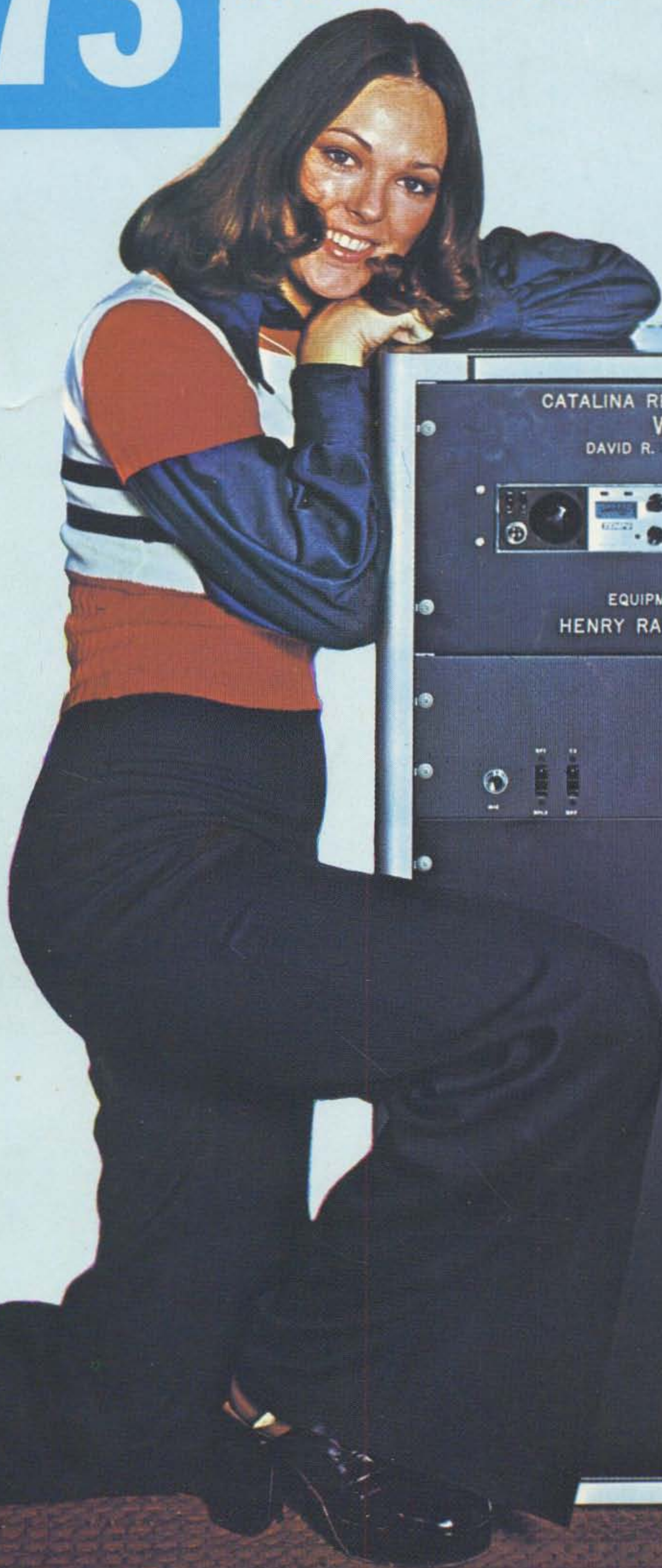


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magazine
for radio amateurs

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April 1974



CATALINA REPEATER ASSOCIATION
WR6AAA
DAVID R. CORSIGLIA - TRUSTEE

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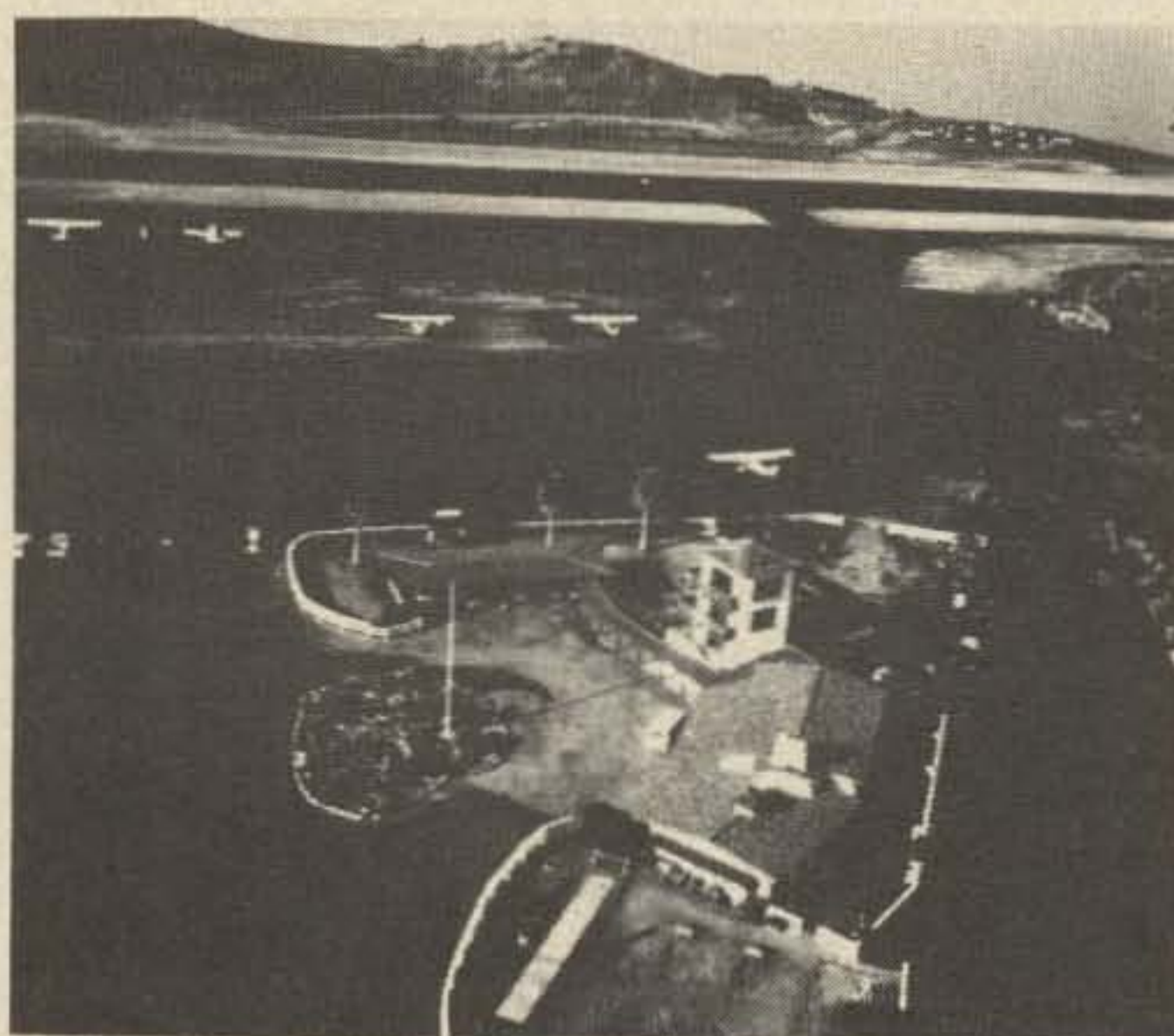
FIRST U.S. LICENSED REMOTE-CONTROLLED REPEATER

On 27 April, 1973, the country's first licensed remotely controlled repeater came on the air with a 10-watt voice from Catalina Island, and more than 200 Southern California and Mexican amateurs tried out its 13,000 square mile coverage.

Located on an island, the new WR6 AAA repeater had several obstacles to overcome before it was ready for service. First, the island of Catalina is privately owned by the Wrigley (chewing gum) family, which meant designing an installation under some conditional constraints of the lease. Then, there is the problem of transportation. Everything going to or from the island must be transported either by boat or by aircraft. In fact, it was this aspect of private flying that actually sparked the creation of the "AAA" repeater.

Catalina Island is not heavily populated; only about 1500 full-time residents share the 18-mile-long by 7-mile-wide island with some wild goats, numerous wild boar, and a herd of buffalo. The island is located 26 miles off the Southern California Coast, giving it a view of the mainland north to Santa Barbara, south to San Diego and Mexico, and inland to the San Bernardino Mountains.

The island itself is mountainous, with the terrain covered by thick chaparral growth and some scrub oak. Private pilots are keenly



Catalina Island's "Airport in the Sky"

aware of the topographic elevation of the island's "airport in the sky." Catalina Airport is 1,560 feet above sea level. There is a unique thrill finding yourself at 2,000 feet altitude over the water when you have left the runway just seconds before. It is this unusual airport location that brought private pilots to the service of amateur radio.

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The idea of a repeater on Catalina started more than two years ago when Dave Corsiglia WA6TWF, working as a flight instructor, would occasionally visit the airport in the sky with student pilots. On several of these trips, he found that he was able to work San Diego as well as the greater Los Angeles area with a 2-watt hand-held from the base of the control tower. He decided to pursue the idea of an airport-located repeater, and obtained a lease from the Catalina Island Company with the help of Ms. Debby Klapper, a student pilot and friend of the airport manager.

Next came the task of gathering financial support. Several clubs in the Los Angeles area were contacted, but all were skeptical. One club's "engineer" even said that he knew it would never work because he had tried to install a repeater for the Government in the 1950's and had failed because of the local temperature inversion. Strangely enough, instead of a hindrance, this weather phenomenon of the temperature inversion layer has so far seemed to be a great help to propagation.

Undaunted by the skeptics, Dave continued his efforts and formed the Catalina

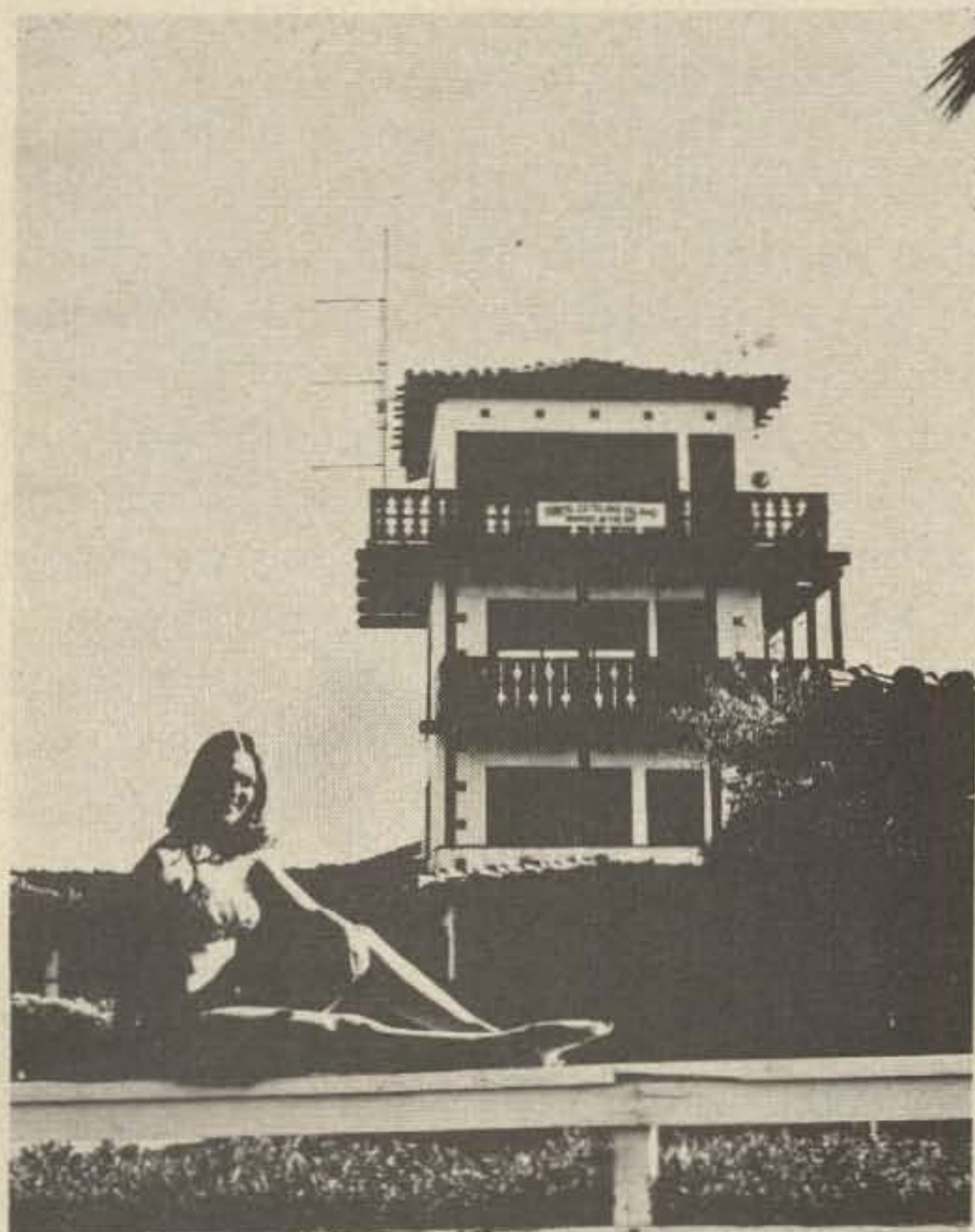


Catalina Island Repeater Club with equipment by Henry Radio.

Island Repeater Club. However, they were still unable to raise sufficient financial support until Sam Niles W6CXW, volunteered to talk to his employer, Ted Henry of Henry Radio. Ted agreed to sponsor the repeater.

The next step was to apply for the repeater station license and to design the system. I had some limited experience with FCC applications, so this is where I got into the program. Being a private pilot too, this also added to the transportation availability out to the island. Working together with Sam Ferraro W3VGU, of the FCC's Washington Office, we were able to obtain our station license, complete to the gain antenna and the radio remote control. Special thanks to Sam for his patience in this aspect.

The design of the system required careful consideration for reliability; an island 26 miles off the coast is not exactly handy for service calls. For this reason, plus the history of successful operation of the Standard repeater, WR6AAC WA6ZZE, an all solid-state design was selected. The system would consist of a Standard Radio model RPT-1, several Tempo Commercial Line transceivers for control, a TPL 80-watt power amplifier with a fan (installed later), a Cushcraft colinear antenna, and a Phelps-Dodge 506-509 duplexer. The control tone circuitry was custom designed. After final assembly and test, the repeater and duplexer were fine-tuned by Roland Souci WA6EGZ, who designed the repeater for Standard.



Catalina Airport Control Tower.

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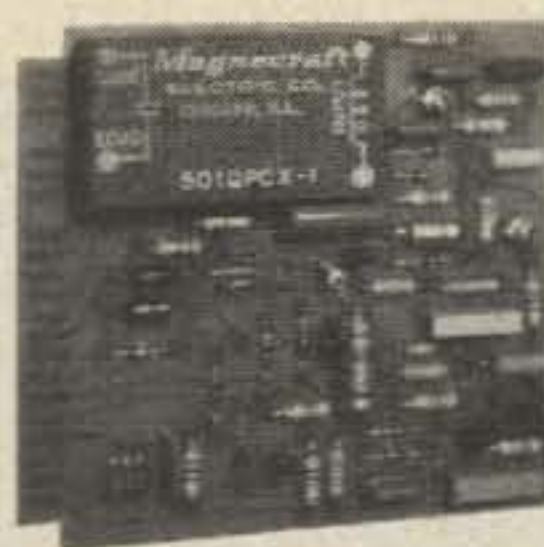
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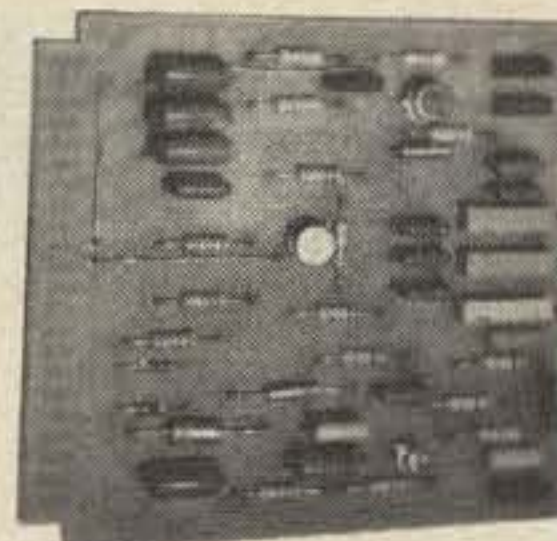
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After a week of checkout operation from Orange, California, the 4-foot pack plus accessories was ready to move out to the island to the top of the Catalina Airport control tower. Dave Corsiglia WA6TWF, Bob Swenson W6HIL, Rick Moore WB6FXF, Sam Niles W6CXW, and I loaded up two aircraft on the morning of 27 April and waited for the fog to clear at Catalina. At about 10:30, the island cleared just long enough for us to land, and then it closed in again.

Paul White WA6NUA, Assistant Manager of the Airport, was on hand to help us haul the equipment to the top of the tower by way of a rope line over the side. Then we connected the power. This was when we discovered another constraint — a minor clause in the lease agreement which said that the total antenna height should not exceed five feet because it would conflict with the aesthetics of the building. It should be pointed out here that the Catalina Airport is indeed a beautiful piece of architecture in the traditional Southern California old-Spanish-mansion style, which blends nicely with its environment. A not-beautiful antenna would certainly disrupt the aesthetics.

The remote control link antenna posed no problem. This 11-element beam antenna was installed inside the building, on the ceiling. The main antenna, however, would be another design challenge.

Our return trip was a real lesson in instrument flying and zero-zero takeoff. With the white line on the runway barely visible, we pushed our way through the fog and within 30 seconds were over the water, back in the sunshine...but still worrying about how to design an aesthetically pleasing antenna that would still perform well when mounted to the side of the control tower.

George Campbell W6FXZ, an antenna engineer and a new 2m FM enthusiast, was contacted and he agreed to take on the antenna design task. His first design consisted of two 2-element, end-fire, colinear arrays, fed 90° to provide a cardioid pattern. This antenna was installed and produced satisfactory results.

George soon discovered that this first design did not cover San Diego as well as he had hoped, so he designed and built a

second antenna for the repeater system. As shown in the photographs, the antenna is about 13 feet long overall, consisting of two 3-element, colinear arrays spaced at 135° , and driven 45° out of phase to produce a modified cardioid pattern shaped (appropriately for Southern California) much like the ears on a Mickey Mouse hat.

The second array design proved to work much better. The antenna develops 7.5 dB gain $\pm 45^\circ$ off center and approximately 5.5 dB at center. Total 3 dB beamwidth is 180° . The dipoles used to construct the antenna were taken from the original Cushcraft hardware.

With satisfactory operation of the antenna established, a TPL power amplifier was installed to bring the ERP up to the allowed 100 watts. Operation of the system has been outstanding; only one service call has been required in eight months of operation. Planned later additions to the repeater system include a battery backup for emergency operation.

Remote control and monitoring of the repeater is accomplished from five control points in the Orange County, California area on a shared-time basis. Each day is broken into four time segments. Bill Davis WB6YHP, handles service from 6AM until noon, when Rick Moore WB6FXF, covers until 6PM, then Bob Swenson W6HIL, operates until midnight, when my call letters K6BIG, are behind the control until 6AM. Dave Corsiglia WA6TWF, acts as backup in the event of equipment failure or operator commitments.

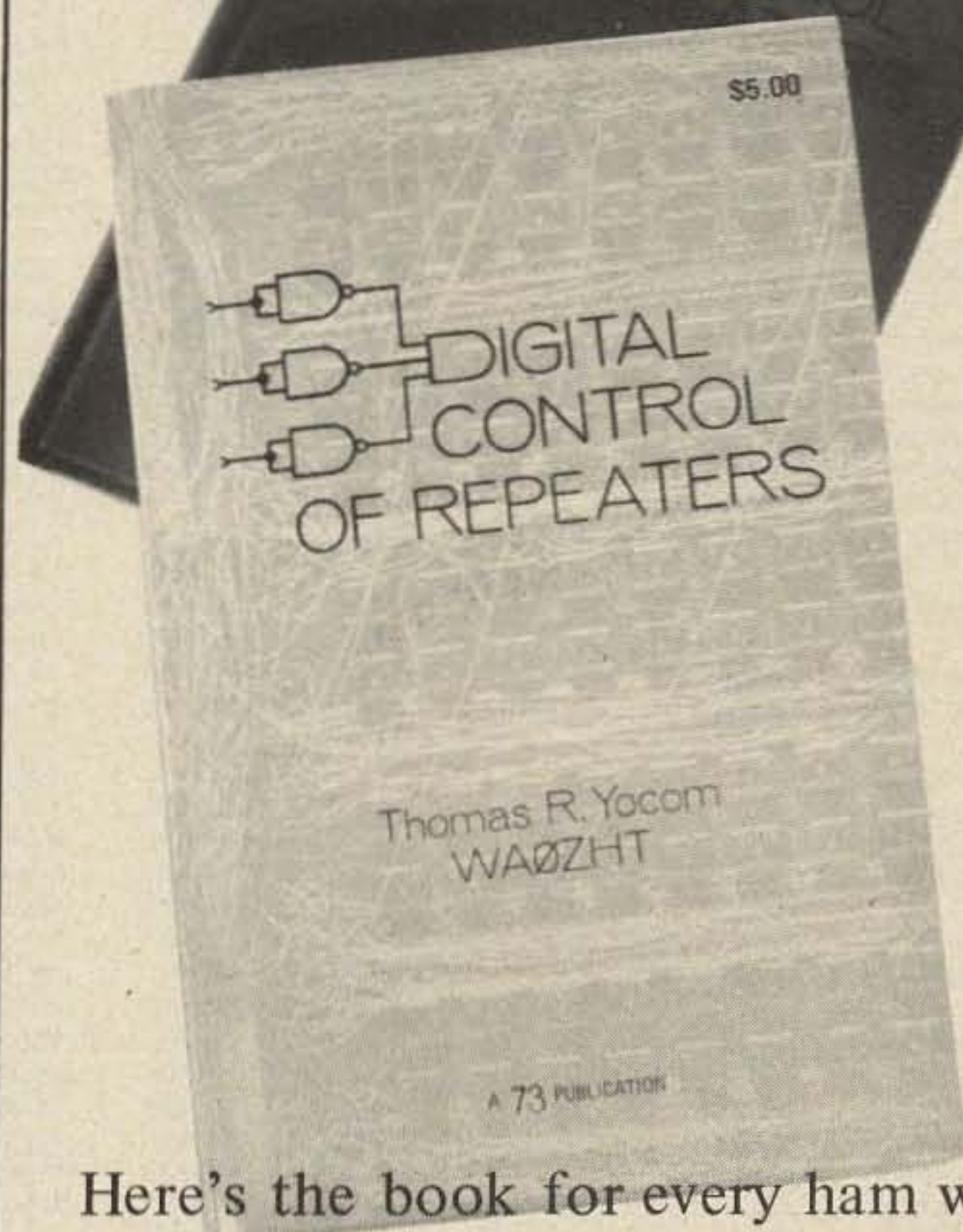
Operation of the WR6AAA repeater system has proven to be a real help to Southern California amateur operators. More than 600 different calls have been logged to date and the repeater's record of continually improved performance attests to its fine operation.

We wish to thank everyone who has graciously supplied their time to the "AAA" project, particularly the people involved with the antenna installation, and to Jerry Vanderville (the new Catalina Airport Manager) for his patience and understanding, and especially to Henry Radio for their support of the program.

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