July, 1986 Volume 5, Number 7 $2.00

Premiere Issue of the New MT!

MONITORING TIMES

MT Merges With International Radio!

Now bringing you the full-spectrum utilities coverage of **MT** *plus the shortwave broadcasting thrust of* **IR**!

BBC

British Broadcasting's Margaret Howard

(Shown here with spy novelist, John LeCarré)

Gone, but not forgotten *(Story on Page 8)*

Scanning for News

How Great 'Spot News' Stories are Made
Page 10

Also:

- **Radio Canada Cancels North American Service**
  What you can do to get it back! Page 4
- **World Harvest Radio**
  The people & equipment that make it work.
  Page 12
- **Worldwide Utilities and Broadcasting Coverage!**

ASSOCIATION OF NORTH AMERICAN RADIO CLUBS
Richard T. Colgan, Executive Secretary
P.O., Box 180403 Austin, Texas 78718

May 5, 1986

Messrs. Bob Grove and Larry Miller
Monitoring Times
Brasstown, North Carolina

Dear Bob and Larry:

The staff and Member Clubs of the Association of North American Radio Clubs wish you success with the merger of International Radio and Monitoring Times.

We look forward to the continuation of the fine service that your publications have provided to radio hobbyists and listeners.

Best wishes,

Terry Colgan

NOW HEAR THIS

TEN-TEC'S NEW RX-325 SHORT WAVE RECEIVER

TEN-TEC, America's premier producer of high quality amateur radio equipment, now brings the ultimate in design to short wave listening.

With continuous frequency coverage from 100 kHz to 30 MHz the RX-325 receives short wave, medium wave, and long wave frequencies, and detects AM, SSB, and CW signals.

The latest advances in low-noise circuitry, quality ceramic filters, phase-locked loop technology and microprocessor controls insure high sensitivity and freedom from adjacent channel interference. The RF stage employs a low noise bi-polar amplifier for excellent sensitivity and a diode quad first mixer for improved dynamic range.

Although this new receiver is highly sophisticated, all controls are user-friendly. Favorite frequencies, such as BBC, VOA, WWV plus local AM stations, are easily stored in a 25 memory bank for recall at the touch of a button. Memories not only store the frequencies, but the modes and the tuning rates. The tuning knob allows you to change tuning speed automatically — in 100 Hz, 500 Hz, 1kHz or 5kHz steps.

The TEN-TEC RX-325 combines ultimate performance and ease of operation for a lifetime of listening pleasure.

Consider these features. We think you'll agree the RX-325 incorporates every worthwhile feature for maximum short wave listening pleasure.

- Keyboard or tuning knob frequency entry.
- 25 high capacity memories.
- Mode switches select AM, LSB (cw), or USB (cw).
- Blue vacuum fluorescent display.
- "S" Meter with SINPO S-scale.
- Built-in quartz digital clock with timer.
- Communications type noise blanker.
- RF attenuator.
- Programmable band scan and memory scan.
- Two built-in ceramic i-f filters.
- Hi and Lo impedence antenna terminals.
- Switchable AGC, built-in speaker.

Audio output is 2 watts at 10% distortion.
Striking high-tech appearance finished in black.
Durable, high quality epoxy-glass circuit boards.
Dimensions (HWD) 3¼" x 9½" x 7". Weight 5 lbs. 5 oz.
115 VAC adapter included, also 13.8 VDC capability.

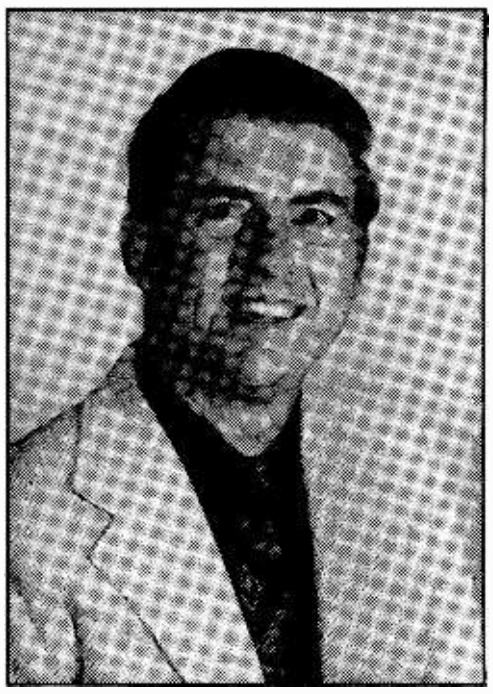
Introductory factory price $549.

See your TEN-TEC dealer or write

CIRCLE 68 ON READER SERVICE CARD

TEN-TEC, INC.
SEVIERVILLE, TENNESSEE 37862

From the Editors



Well, we've finally done it; after months of our frantic preparation, you are now reading the largest, most comprehensive and authoritative publication dedicated to monitoring the radio spectrum.

Over the last five years of its publication, *Monitoring Times* has emerged from an eight page fledgling to a sixty page world-class contender!

During those five formative years, *MT* earned respect for its objective reporting, authoritative equipment reviews and accurate information. It became "must reading," not only for hobbyists, but for government and military agencies as well. Top secret memos are often circulated through guarded buildings around the nation's capitol with references to *MT* and its contents.

But *MT* has always had a leaning toward utilities, since that is the area with which I have the most familiarity; we lacked the scope of broadcasting. Now, Larry Miller brings with him an enormous wealth of experience and expertise in that field as a result of his own years of intensive listening and his success in publishing *International Radio* (formerly *Shortwave Guide*), now incorporated into *MT*.

With a substantial increase in page count--from 40 to 60--*MT* clearly emerges as an enormous bargain for the listener, regardless of his particular interest. SWL or scanner enthusiast, DX'er or dedicated monitor, VLF "lowfer" or satellite chaser, the MT reader now has the best of all possible worlds at his fingertips.

Even with this impressive growth, we don't intend to remain static; three new IBM computers and a Hewlett-Packard Laser printer will improve our graphic image as well, allowing us to custom-print *MT* in the easiest to read format.

We know that subscribers to *International Radio* will be pleased to learn that none of their favorite columns will be compromised and that our computerized telecommunications system will insure the most timely articles.

And to our stalwart *MT* readers, thanks for staying with us through these formative years. I think you will agree--the wait has been worth it!

Bob Grove
Utilities Editor

Welcome to Our New Home

Welcome to the first edition of our new, joint publication, *Monitoring Times*. For the former subscribers to *International Radio*, *MT* will provide you with a whole new range of listening possibilities, along with, of course, many of your favorite shortwave columns.

As far as shortwave is concerned, we've taken a lot of your suggestions from the old *International Radio* and incorporated them into *Monitoring Times*. You find that we now have a team of four monitors for the English Broadcast frequency list -- two on the west coast, two on the east and within the next few months, we'll be adding a midwest monitor as well.

In *Monitoring Times*, as well, we encourage more participation from our readership. If you find a frequency that is not listed, jot it down on a pice of paper and throw it in the mail. We'll check it out and add it to the list. Likewise, in any of our work, we sincerely desire your comments. We won't be able to implement all of your suggestions, but we promise to consider each and select from them those which we feel best serve the needs of the hobby community. So don't be afraid to write.

Shortwave is a dynamic medium -- one that can change in hours (as recent reception conditions have shown) so we welcome help from our friends.

Concerning the new material that many subscribers to *IR* will now find in these 60-odd pages, don't be afraid to ask questions -- about any of the material that is new or unfamiliar to you. Everyone at *MT* is willing and able to assist you, no matter what your level of expertise. Write to them. In most cases, the addresses of regular reporters are included in their article and they'd welcome your letter.

For us, it's like moving into a new house -- a mixture of feelings, both of unfamiliarity and of excitement at the things to come. Hey! Maybe the sofa will look better over there. No, let's put it against that wall! Aw heck, who needs a sofa anyhow? We never sit down!

The point is that we're always interested in hearing your feedback and finding out how we might make *Monitoring Times* an even better publication. As we get settled into our "new house," we invite you to roam about, get settled in, and maybe ewven move a little of the furniture around yourself. After all, we want you to feel perfectly at home.

We look forward to serving you in the months and years to come with America's number one radio magazine, *Monitoring Times*!

I look forward to hearing from you as well. Don't hesitate to give us your suggestions and comments. Our address remains the same: P.O. Box 691, Thorndale, PA 19372. After all, we're here for you.

Join us as we continue to explore the world through its most dynamic medium -- radio.

73s,

Larry Miller
Broadcast Editor

A NOTE TO INTERNATIONAL RADIO SUBSCRIBERS

We have worked several weeks to insure that your remaining number of issues with *IR* has been shown on your *MT* label this month. We have also tried to eliminate any duplicate mailings. Please check the mailing label and let us know if there is an error or if you are receiving duplicate copies. Simply mail the label, giving us the proper information, to Monitoring Times, P.O. Box 98, Brasstown, NC 28902.

Please remember that the expiration date shown on your *INTERNATIONAL RADIO* label was for the month AFTER your subscription expired; i.e., if your last issue was to be May, the date shown on the label was June. *MONITORING TIMES* expiration dates are for the month your subscription expires; i.e., if your last issue is to be May, the date shown on the label would be 5/1/86, so it might book like you have been shorted one month, but you haven't.

Your cooperation and understanding in helping us make this monumental transition is much appreciated.

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Inside this Issue

RADIO CANADA INT'L TO CANCEL NORTH AMERICAN SERVICE

Radio Canada International will, this month or next, cancel their North American service. According to sources within the station, all weeknight transmissions directed to the United States will end with the exception of those on the weekends. The evening transmissions will reportedly be replaced with one in the morning.

Although other transmissions from Canada will probably be audible in the U.S., the loss of the U.S. service bodes ill not only for the listeners who enjoy RCI's excellent programming, but all of international radio as well. As one industry insider put it, "In these tough financial times, there are a number of countries that have been thinking about dropping their North American service, if not their entire international service. And if they see one of the leaders like Canada making the decision, it won't be long before we'll see a lot more bailing out."

You can make your voice heard. Send a letter to Radio Canada International's Director of Program Operations, Mr. Allan Familiant at P.O. Box 6000, Montreal, Canada H3C 3A8.

Another Woodpecker?
(Just what the world needs!)

First the Russian over-the-horizon backscatter radar system, then the U.S. system in Maine, now the British are coming. Marconi Radar Systems of Chelmsford, England, have developed an OTH radar system for the shortwave spectrum to detect coastal and ship intruders up to 200 miles away.

A full operational system, capable of computing data at 2 billion operations per second, is expected within two years.

KYOI Sold to Christian Science Monitor?

Unofficial reports have it that the owners of KYOI, the struggling shortwave station beaming rock and roll to Japan from the U.S. possession of Saipan, have reached an agreement of sale for the station. The buyers of KYOI have not been disclosed; however, an article in the May 30, 1986, issue of the Christian Science Monitor says that they were negotiatiating "for a second shortwave site in Saipan, in the Marianas Islands, for broadcast to the Far East." The Christian Science Monitor's first station is due to sign on the air from Oalon, Maine, on January 1, 1986. Additionally, the CSM says that a third transmitter may be situated in Texas for broadcast to Latin America.

Videocipher II Targeted by Codebreakers

Robert M. Richardson, secretary of the Digital Encryption Standard Users Group, claims so far to have turned down as many as 150 applicants offering to break M/A-Com's VideoCipher II satellite scrambling system used by HBO, Showtime and other programmers.

Richardson is quoted as saying that while the video is easy to crack with $10-$15 worth of parts, the audio is a real challenge. Only professional cryptanalysts are being invited to apply for the appointment.

HBO PIRATE CAPTURES SATELLITE

"Captain Midnight" seized HBO's uplink channel for four minutes on April 27, 1986, to protest scrambling and surcharges with the message: *"Goodevening HBO from Captain Midnight. $12.95? No way! (Showtime/The Movie Channel Beware!)."*

Although the perpetrator faces a fine of $10,000 and a year in jail if caught, officials are concerned about the vulnerability of satellites. Granting that it would take the equivalent of a ten meter dish and 2000 watts of power at 6000 MHz--no easy task--those officials admit that considerable damage could occur if the appropriate commands were attempted.

It is possible that taking command of a satellite could burn out a transponder, disable a guidance system and knock it out of proper orbit, and even interfere with or alter data being transferred from banks, telephone, corporations, and other business entities.

The FCC believes that there may be approximately 100 installations in the country capable of commanding the satellite and that the signal did not come from the west coast. North Texas is being strongly considered.

Radio Netherlands Drops 0130 Transmission

Because of poor propagation conditions, Radio Netherlands is dropping their 0130 UTC English transmission via the Flevo site effective the first of this month. In compensation, two frequencies are being added to the 0230 UTC broadcast via the Bonaire relay. That will now be heard on 6020, 6165, 9590 and 9895. In addition, the 0430 UTC transmission to the Middle East and East Africa is being moved earlier to 0400 UTC and shortened to 25 minutes.

Neu quits NDXE Global Radio; Sign-on Postponed Again

There has been another problem at *NDXE Global Radio*, the proposed grandiose-shortwave-stereo operation in Opelika, Alabama, run by Harry Dickson Norman. Herb Neu, formerly with Turner Broadcasting, has resigned as *NDXE* VP saying, "I smelled a skunk and I got out." Neu refused further comment and calls to Norman were not returned. Meanwhile, the station's latest sign-on date, July 4th, has been pushed back to the fall.

KENWOOD TO BUILD U.S. HEADQUARTERS

Kenwood U.S.A. Corporation, known for its popular amateur and SWL radio equipment, will open two U.S. headquarters facilities. Slated for early 1987 in Carson, California, the first facility will have over 200,000 square feet of office and warehouse space.

A second facility will be located in the International Trade Center in Mt. Olive, New Jersey.

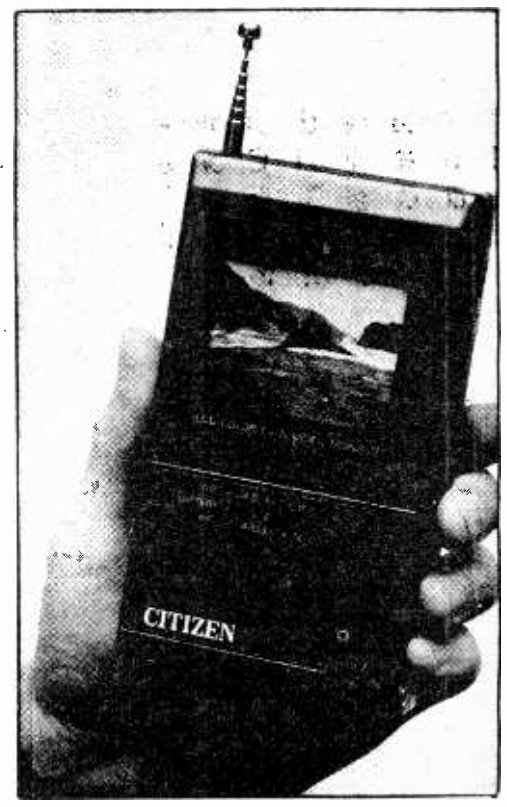
CES HOLDS FEW SURPRISES

Radio enthusiasts have little new equipment to look forward to over the next few months if the Consumer Electronics Show, held the first week in June in Chicago, was any indication.

While the general feeling at the show was positive, with an improved financial outlook on consumer electronics in general, shortwave and scanner advances obviously were of little concern to the major manufacturers. Regency did show their R1075, a 15-channel upgrade of their R1070, featuring priority and delay. An 8-channel model R806 crystal scanner was also announced.

Several themes became apparent by those in attendance:

* Camcorders are in, standalone videocameras are on their way out. But there does seem to be considerable debate stirring between proponents of VHS-C and 8 mm formats.
* Pocket TV sets are really revving up; Citizen Electronics introduced the industry's first under-$200 LCD pocket color TV (see photo).
* Three-Dee-Tee-Vee seems to be on the near horizon with Sharp's and Toshiba's high-capacity videodisk systems. Although staring at the double picture without glasses will give a viewer a headache, properly equipped with electro-optically-equipped glasses, a viewer gets a nice 3-D picture for under $500.
* Much digital TV technology was in full view, with advances showing in high density video diskettes, large screen TV's and "sparklies"-free satellite receivers.



Citizen introduced the industry's first under-$200 pocket color TV.

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GREAT SUMMERTIME BUYS!

NEW! SONY ICF-2010

IN STOCK AND ONLY **$299.95**

This is the perfect, state-of-the-art portable for listening. **It's a communications receiver that you can take with you!** It has digital readout, it can store 32 of your favorite frequencies in its memory and it even has a timer. Most important is its synchronous detector circuit. In plain talk, that means that you can tune to whatever side of a frequency has the least interference for cleaner, more enjoyable listening. Covers the shortwave bands from 1,620—29,999.9 kHz plus AM, FM, Longwave and the air band from 116—136 kHz.

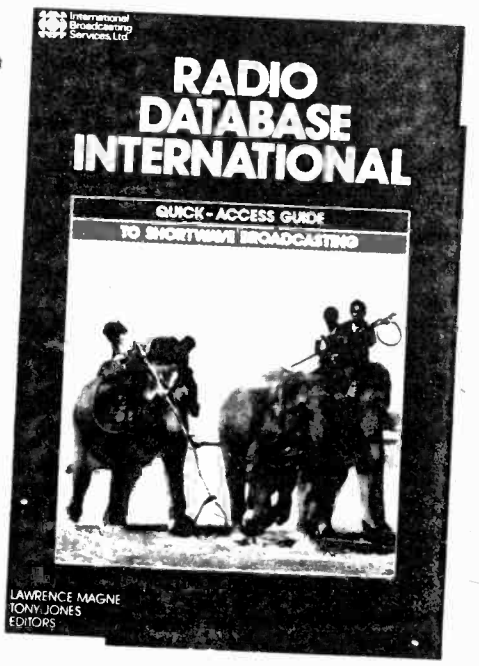
THE SW RADIO OF THE FUTURE
TOP RATED!

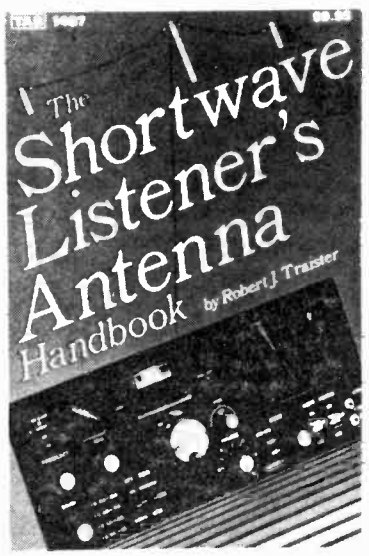
1987 RADIO DATABASE INTERNATIONAL

GET IT FIRST, FAST FROM RDI'S NO. 1 DEALER — MILLER PUBLISHING

Last year's Radio Database International was hailed around the world as the ultimate frequency guide to the shortwave bands. This year's book will be even better. Both the tropical band and international edition are combined into one super book! And in addition to the easy-to-use computer generated frequency-by-frequency listing, there'll be country-by-country listings, even more receiver reviews and plenty of articles of interest to the shortwave listener. The new 1987 Radio Database International ships late this summer and you can be among the first to have a copy by reserving one now through RDI's number one dealer, Miller Publishing. In fact, if you order now, you'll save $4.80 off the list price of last year's books. #M448. Just $12.90.

JUST $12.90 — SAVE $4.80!





The Shortwave Listener's Antenna Handbook

By Robert J. Traister

Even the most sophisticated receiver can only pick up hum-drum signals if the antenna isn't up to par. And a relatively inexpensive receiver can bring in some pretty impressive signals when the right antenna is in place. A complete, authoritative guide to shortwave listening antennas including how to design, build and install them. 204 pp. Just 10.95

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EWS WORLD RADIO NEWS WORI

FCC TO REINSTATE LICENSE FEES

President Reagan, on April 7, 1986, signed the "Consolidated Omnibus Budget Reconciliation Act of 1985" which, 360 days later, will allow the FCC to charge once again for licensing all services except private leisure users (like amateur radio).

License fees will range from $20 to $18,000 depending upon the service. Private land mobile services must pay $30 for new, renewed or modified licenses and manufacturers will be required to pay $100 to $6500 for equipment approval.

Norway to Test New Transmitters

According to Radio Norway International monitor Joe Hanlon, the first of three new 500 kw transmitters will begin testing in August from a site in Sveio. The first will go into regular operation in September and all are expected to use the regular Radio Norway frequencies and the normal broadcast times.

Phony Faith Healer "Bugs" His Followers

It started off like any other videotaping session for TV crusader Peter Popoff in San Francisco's Civic Auditorium. The evangelist was preparing to call out the names of the afflicted and their complaints prior to "laying hands" on them.

But this session was different. Unknown to Popoff and his wife who meets the faithful flock before the show begins, James ("the Amazing") Randi and his team of experts from CSIOP (The Committee for the Scientific Investigation of the Paranormal) were nearby with a receiver and a tape recorder.

Apparently Mrs. Popoff repeatedly cues the evangelist/showman on 39.17 MHz, for those MT readers who would like to "tune in" on the Sunday morning preacher when his entourage visits nearby.

Although initially denying the ploy, Popoff eventually admitted that he uses the gimmick, adding that he compares his services to a TV game show like "The Price is Right," and that the parishioners expect to hear their names and "Come on down!".

Popoff is presently seen on 51 television outlets nationwide, grossing an income of $550,000 per month, according to his business manager. There's more than one way to fleece a flock!

Flat Plate TVRO Antenna to Debut

Future Communications of Colorado Springs, Colorado, has announced their "PhaseCom" phased array antenna which measures about 5 feet square and is only 2 inches thick. Models for both C and Ku band are to be marketed.

With wholesale pricing between $21 and $1189, picture quality is claimed equal to that from a dish, yet the small antennas may be mounted on an outside wall or installed in a window.

The devices use "sputtering," a technology developed by NASA and the military, whereby atoms are dislodged from a glass surface by high energy particles to create the antenna imprint.

Police Radio Pirate Nabbed

A scanning buff with a programmable two-way VHF radio was arrested in Brevard County, Florida, after police observed him transmitting on a police frequency as he drove by the officers who were inspecting a vehicle.

Anthony Rossi, 25, of St. Petersburg, Florida, is suspected of using the radio on several Florida law enforcement frequencies across the state while traveling from St. Petersburg to Melbourne.

Upon his arrest, police found two radio transmitters, a book listing police frequencies, and a newspaper article on the previous interference in St. Petersburg. Rossie unsuccessfuly attempted to erase frequencies on his radio as he was being arrested.

Rossie, who is employed as a bouncer in a Cincinnati bar, is charged with unlawfully having a radio tuned to a police frequency (yes, it's on the books in Florida), transmitting on a police frequency, resisting arrest without violence, and tampering with evidence.

If convicted on all counts, Rossi could face over seven years in prison and a $7500 fine. No charges have yet been filed in St. Petersburg.

Guess Who's Coming to Dinner?

When Fred Waterer sent away for a QSL card from *Radio Free Surinam*, he probably wasn't even sure he'd get a QSL. But he did. And more. In fact, when Fred picked up the phone one evening, he found himself speaking transatlantic to a man from the Council for the Liberation of Surinam. "He asked me to monitor their broadcasts for several days (at 2240 UTC on 9940 kHz)," said Fred, "so they can determine whether or not they will expand their broadcast times and languages."

A week later, the man called back asking for the results. In a gross understatement, Fred says, "He was extremely keen to know how they were being received." Apparently.

Will the man from the Council for the Liberation of Surinam call you? Is this the beginning of a trend among international broadcasters? And if so, how far will it go? Who knows. But the next time you send in a reception report to *Radio Free Surinam*, better have the wife set another place at the dinner table just in case. *(ODXA via Larry Miller)*

Boeing to Build Secret Antenna Range

Morrow County, eastern Oregon, is the site of a proposed $10 million top-secret antenna range which would cover over 10,000 acres. Intended to test sensitive defense equipment by "bouncing signals off foreign objects and retrieving them on radar screens," the facility would employ 15 persons nine miles southwest of Boardman.

The parcel is part of 93,000 acres leased by Boeing from the state since 1963 and a small scale antenna range is already in operation there.

Bad Vlad

Radio Moscow commentator Vladimir Posner, touring the United States in preparation for a TV show, criticized his government for jamming the broadcasts of Radio Liberty and Radio Free Europe. While Posner stressed that his views were "a very personal evaluation," he said that the jamming serves to attract attention "to something that is not all that important." Meanwhile, Posner will continue to be heard regularly on Radio Moscow -- reporting from the Siberia bureau. *(via Alpert, NY)*

Radio Liberty Defector Returns Home

Oleg Tumanov was a 21-year-old seaman when he jumped ship off the coast of Libya 20 years ago. His last job ended last February when he disappeared from his job as editor of the Russian service of *Radio Liberty* in Munich.

Tumanov, appearing for the first time with a prepared statement from the Soviet Union, charged that *Radio Liberty* and *Radio Free Europe* are under the control of the CIA. Funded by the United States, the stations are jammed by the USSR. (Mel Pratt, Baltimore, MD)

"Great Commotion" over Columbian Clandestine

According to the Columbian newspaper *El Tiempo*, "Great commotion prevails in the middle Magdelena region following the appearance of an alleged clandestine station identifying itself as the "Voice of Freedom." The anti-communist station has announced itself as the voice of the peasants, says that it is located on "a Caribbean island" and can also be heard on shortwave. No reports have yet been received on the station.

DX Europe -- the Easy Way

Catch the latest European DX news by tuning in to HCJB's European DX Report, carried on the DX Party Line at 2130 UTC on the first Wednesday of every month. Noted DXer Rod Sanders hosts this feature.

MacDonalds Big on Radio Highland

Radio Highland, a BBC affiliate station serving north and northwest Scotland, claims more personnel with the surname "Mac" than anywhere else in the world.

When telephone receptionist Anne Cronie gets a caller requesting a MacDonald, she gives them a choice of Angus, Ian, James, Martin, Mary-Anne, and Morag! (David Alpert, NYC)

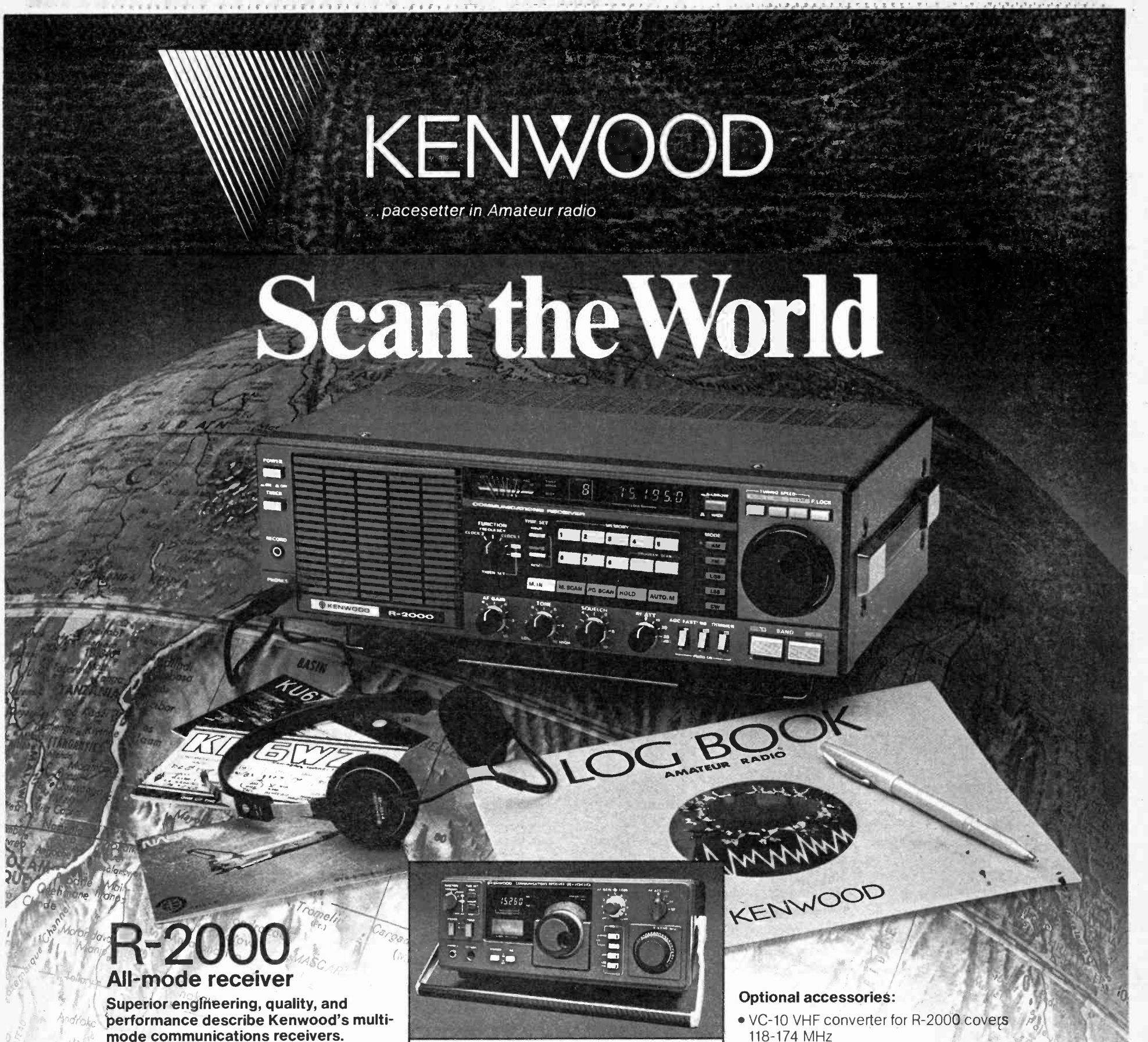
Quince de Septiembre funded by U.S. CIA

According to an article by George Zeller in the A*C*E bulletin, *Radio Quince de Septiembre* (15 of September), the long-running and easily heard voice of anti-Sandinista contra forces, is funded by the U.S. Central Intelligence Agency. The article cites sources as claiming that the station's transmitter is in Honduras. Radio Quince de Septiembre can be heard local evenings on variable 6265 kHz.

KENWOOD

...pacesetter in Amateur radio

Scan the World



R-2000
All-mode receiver

Superior engineering, quality, and performance describe Kenwood's multi-mode communications receivers.

These receivers boast the most often-needed features for the serious or casual shortwave broadcast listener. Listen in on overseas news, music, and commentary. "Listen up" on the VHF public service and Amateur radio frequencies, as well as aircraft and business band communications with the R-2000 and VC-10 option. Both receivers have a muting circuit so you can monitor your Amateur radio station's signal quality. Select the right receiver for your needs—the R-2000 or R-1000.

- Covers 150 kHz—30 MHz in 30 bands.
- All mode: USB, LSB, CW, AM, FM.
- Digital VFO's. 50-Hz, 500-Hz or 5-kHz steps. F. LOCK switch.
- Ten memories store frequency, band, and mode data. Each memory may be tuned as a VFO.
- Lithium batt. memory back-up.
- Memory scan.
- Programmable band scan.
- Fluorescent tube digital display of frequency (100 Hz resolution) or time.
- Dual 24-hour quartz clocks, with timer.
- Three built-in IF filters with NARROW/WIDE selector switch. (CW filter optional.)
- Squelch circuit, all mode, built-in.
- Noise blanker built-in.
- Large front mounted speaker.
- RF step attenuator. (0-10-20-30 dB.)
- AGC switch. (Slow-Fast.)
- "S" meter, with SINPO scale.
- High and low impedance antenna terminals.
- 100/120/220/240 VAC operation.
- RECORD output jack.
- Timer REMOTE output (not for AC power).
- Muting terminals.

R-1000 High performance receiver • 200 kHz-30 MHz in 30 bands • AM, CW, SSB • 3 IF filters • noise blanker • RF attenuator • S-meter • 120-240 VAC • muting terminals • built-in speaker • digital display/clock/timer

Optional accessories:

- VC-10 VHF converter for R-2000 covers 118-174 MHz
- YG-455C 500 Hz CW filter for R-2000
- HS-4 Headphones
- HS-5 Deluxe headphones
- HS-6 Lightweight headphones
- HS-7 Micro headphones
- DCK-1 DC cable kit for 13.8 VDC operation
- AL-2 Lightning and static arrester

Additional information on Kenwood all-band receivers is available from authorized dealers.

25th Anniversary

KENWOOD

TRIO-KENWOOD COMMUNICATIONS
1111 West Walnut Street
Compton, California 90220

Service manuals are available for all receivers and most accessories.
Specifications and prices subject to change without notice or obligation.

SHORTWAVE INTERVIEW

British Broadcasting's Margaret Howard

Gone, but not forgotten

Margaret Howard. For years she's been the "voice" of the BBC as host of the station's immensely popular *Letterbox* program. She's a woman who doesn't suffer fools gladly and her acerbic style has endeared her to millions of people who tuned in every week.

So popular -- and refreshing -- was this approach that Letterbox was listed in the Guiness Book of World Records as the program with the greatest number of listeners -- estimated at some 40 million.

In a decision that puzzled those same listeners and which Howard herself calls "extraordinary," the BBC recently cancelled *Letterbox*.

Hardly one to be held down for long, Ms. Howard discusses the cancellation of *Letterbox* as well as her career in broadcasting -- a career that's taken her around the world, from America to Africa and has placed her face to face with some of the most powerful people in the world.

Radio Canada International's Ian Mc farland spoke with Margaret Howard and the result is one very candid interview. But who would expect less from Margaret Howard?

MT: How long have you been in broadcasting. I won't be so rude as to ask you your age.

Howard: [Laughter] I've been in broadcasting all my life. I started at the BBC right out of school, first working in an office and then eventually I became an announcer on the staff.

As a staff announcer all I did was say "here is," "that was" and "those taking part were..." In those days, I, being a woman, was not allowed to read the news. Even though that was part of an announcer's duties, at the time I was an announcer, the news was read exclusively by men. So I resigned.

When I left the BBC, I went to America on a scholarship to the University of Indiana. There I taught undergraduates and did the master's course and I appeared on radio and television in Indiana -- WFIU and WTIU. And I finally got to read the news for the first time in America. It's kind of "have voice, will travel."

MT: So you don't really work for the BBC World Service?

Howard: I work mostly now with services other than the World Service, particularly now that *Letterbox* has folded.

MT: What kind of programs did you do when you were at the World Service?

Howard: I started off by being something of a [armed] Forces "sweetheart." I used to do a record request program for the armed services overseas. And I did a program for the merchant fleet called the *Merchant Navy Request Program* and I also did *Listener's Choice*. That was the beginning of it all.

MT: I guess during the war, you must have gotten the odd love letter from a very lonesome soldier...

Howard: I wasn't doing it during the war. I'm not <u>that</u> old. It was after the war. Quite a long time after the war.

MT: *Letterbox* is probably where you are best known. And it probably has the biggest audience of any mailbag program of any shortwave station anywhere.

Howard: There was an estimate figure that got it into the Guiness Book of World Records. It was thought to have had 40 million listeners.

MT: That is a lot of listeners.

Howard: Yes [laughter]. But I don't know how true the calculation was. But I think it was quite likely that there was a very large number, because after all, it went out four times to cover all the different regions of the world when they're awake. People obviously liked it.

MT: Even if you want to be conservative and cut that figure in half, 20 million is still a lot of listeners. Do you find yourself bent just a little bit odd thinking about talking to that number of people?

Howard: No. It's funny, isn't it? I'm not, for instance, a very good public speaker. And if I have to stand up and address a meeting or make an after-dinner speech, I die a thousand deaths. But somehow, sitting in front of a microphone is quite different because you're not talking to 40 million people in a crowd -- which would indeed be terrifying, wouldn't it.

Instead, it's very one-to-one. And that's what I like about broadcasting. It's very small-scale communication because its just into one pair of ears, really. Very intimate.

MT: Now that *Letterbox* has been cancelled, there are probably 40 million fairly disappointed listeners out there. What was the reasoning behind cancelling *Letterbox*?

Howard: There were a number of reasons. It was a very strange thing to do because the BBC prides itself in its accountability. And this was a way for the station to be directly accountable to the listener.

There was a feeling among certain people in the heirarchy that the program was a little dated in style. It was described as.. I can't think of the word...

MT: Direct. You seemed to enjoy exercising that old British love of "taking the mickey" out of people.

Howard: "Coy" was one of the words. The original host of the program didn't suffer fools gladly. And I personally have a rather acerbic style. And the listeners warmed to that style. I wasn't rude, exactly. But if anyone said something a bit silly, I would say so. I think the listeners actually liked that.

Nonetheless, it was thought that a new format was required. That was what was said at all the meetings. Of course as a freelance, I don't go to the meetings. The word comes down from the mountain... "We want a new format!"

So we tried a number of new formats. One was to have a number of journalists to listen to the output of the BBC World Service with me and we would have a quarter of an hour discussion about what we heard and what we thought about it. That didn't work at all.

MT: I can imagine that it wouldn't work. It's like film reviewers. They're not looking at a film as the average moviegoer. Surely, journalists see programs in a totally different way than the average listener.

Howard: And of course the whole set up was rather false because these journalists were London-based. They were not natural World Service listeners. They were not at home listening to the radio like my listeners to *Letterbox* were. They were listening to tapes that were sent to them by a BBC producer. And that's not the way you listen to a radio station, really.

So it was an artificial thing. We tried very hard to make it work, but it didn't. Then we thought maybe if we had less letters, and I took a few letters and did a long interview with somebody, the head of World Service drama, or whatever it might be. So we tried that for a while. But I don't think the listeners liked that. What they really liked was hearing their letters read out. And hearing me answer them. And that was deemed to be old fashioned.

And so, eventually after these various struggles and changes in format and whatnot, I was summoned to an office and was told that I was being taken off the air. And that was the end of *Letterbox*.

MT: It sounds like someone wanted to be innovative for innovation's sake and in the process destroyed a perfectly viable program.

Howard: It's very hard for me to comment on that because I'm very close to it. Maybe if I was a program controller, I would feel that it was time for a change. Personally, I found it to be an extraordinary decision because it's an odd feeling to be doing something that's deemed to be successful and then to be fired [laughter]. It's very peculiar. I mean what can you do? You can only do something as well as you can do it and the people who are listening like it. There isn't anything more I can do.

What else?

MT: You've also chaired the *It's Your World* international telephone talk show on the BBC World Service. It must have been terribly exciting to have so many world famous people as your guest.

Howard: Yes. Yes it was a marvelous experience. I think the most exciting was when I did [British Prime Minister] Mrs. [Margaret] Thatcher. It was the first time she had done a world-wide phone-in program... and it was first time I had done a Prime Minister [laughter]. To be live on the air for an hour with a dynamic person like that...

I must say, in the morning of the day I was doing it I felt extremely sick [laughter]. I walked to the studio.... Somehow I suppose it was like having a baby or something. There was no turning back. The whole process had started.

And she appears with an entourage of photographers and film camera-men and God knows what all. And then everyone went away and she and I had ten minutes together. We had a quick chat about what we were going to do and how we were going to do it. And suddenly we were on.

I heard the opening announcement saying "and now over to Margaret Howard" and I was away. And do you

know I wasn't nervous at all! It was quite extraordinary. And when we finished, I was on my knees and she said, um, 'Oh! It was much too short! We should have done two hours.'" [laughter]

I've also done the Foreign Secretary, the leader of the opposition, the leader of the liberals and the leader of the SDP. And I've also done a number of non-political people.

But the program I felt worked the best was a more recent one I did with the writer John Le Carre [see cover photograph].

MT: "The Spy that Came in Out of the Cold..."

Howard: He was terrific. And I got more calls in with him than with anybody else. He was very quick, very witty, very capable of supplying an anecdote and then stopping. One of the most difficult things in conducting an interview is stopping people. Once they've got the bit between their teeth they never stop talking. Especially people who are politicians. There were people on the phone in who I literally had to wrap across the knuckles with a ruler to stop them talking.

Overall, doing the telephone talk show was so nice because a lot of the people who rang in had been writing to *Letterbox* over the years. People I've known from their handwriting for a long time and suddenly, there they were. I shall never forget the very first phone-in I did with the managing director of [BBC] external broadcasting -- he has since died, that was Malcolm Muggeridge -- and we didn't really know if it was going to even work! It was the first time it had ever been attempted. And we felt, if the phones don't work, then all I'll do is interview you for an hour. And this is kind of what we had lined up.

When the first phone call came through -- and I can't remember who it was from -- the voice at the other end said, "Hello, Margaret!" And I thought, "My God! I don't believe this." There's as person on the other side of the world who knows me well enough to call me Margaret. Just like that. I was so touched I nearly broke into tears. It was such a moving moment. It was wonderful.

[Listeners wanting to register their complaint about the cancellation of "Letterbox" can write to the Director of Programs, BBC World Service, P.O. Box 76, Bush House Strand, London WC2B 4PH, England.]

Howard Return to DX Party Line Delayed

Clayton Howard, the popular and recently retired host of DX Party Line on HCJB, was scheduled to return to Ecuador to fill in for vacationing John Beck. Howard recently was diagnosed as having cancer and has been forced to delay his return to the station. Those who would like to drop Clayton a "get well" card should write to him at 20 Westlake Dr., Orange City, Florida 32763.

RESULTS OF MONITORING GAME

by Bert Huneault

Sincere thanks to MT readers who responded to my article by sending in their loggings of east coast Canadian CG stations on 2598 kHz.

Although the article was delayed until the May issue, four SWLs braved the high springtime atmospheric static levels and played the game: Greg Doerschler, Wethersfield, CT; Harold Levison, Philadelphia, PA; Don Patterson, Asheboro, NC; Daryll Symington, Holland, OH.

Interestingly, all four used ICOM receivers. The SWL with the QTH farthest from the Canadian stations was Don in North Carolina, yet he reported the strongest signals (Halifax, S9+20dB).

The most remote CG station (St. Anthony, at the northern tip of Newfoundland) produced S4-S9 readings at Don's QTH. All participants reported moderate to strong QRN.

Most loggings were very detailed and interesting, and all reports were much appreciated. My wife pulled the winner's name out of a hat: Harold Levison. Congratulations, Harold, your book is on the way!

PRESSTOP: WASHINGTON

SUBSTITUTE LISTENING LAW APPROVED

"Determining what is and what is not readily accessible to the public by fiat, without any regard to the physical accessibility of the signal, is the absurdity the courts have complained about since the original wiretap act was passed in 1968. It boggles the mind that Congress proposes to deal with the problem by enlarging it."...Robert Horvitz, Government Affairs Liaison, ANARC.

Editorial commentary
by Bob Grove

The notorious H.R.3378, entitled the "Communications Privacy Act of 1985," has been replaced by a new bill, H.R. 4952, following some late discussion between the Department of Justice and members of the House Judiciary Committee.

The new bill differs in several ways from H.R. 3378, perhaps most notably:

(1) Whereas H.R. 3378 defined "interception" in terms of acquisition of the transmission itself and not merely the contents, H.R. 4952 addresses the "acquisition of contents of a transmission";
(2) All marine and aeronautical communications may be monitored without divulgence as already stipulated in the 1934 Communications Act.

As observed by Robert Horvitz, Government Affairs Liaison for ANARC (Association of North American Radio Clubs), "The new bill protects the information, not the radiation."

After minimal discussion by the House Judiciary Committee on Tuesday, June 10, 1986, H.R. 4952 was accepted with no dissenting votes.

As previously reported in *MT*, the Department of Justice continues to state that they will not enforce the new bill except in cases of "egregious violation"; that is, recreational monitoring will, in all probability, continue in all of its aspects without fear of criminal sanction.

Heavily lobbied for by the cellular telephone industry to legitimize their claim that cellular telephones have a reasonable expectation of privacy, and supported by major vested interests including IBM, AT&T, MCI, Motorola, GE, GTE, Bell Telephone, ABC, NBC, and CBS, the bill will now move to the full House of Representatives for approval. A companion bill before the Senate must be approved before the legislation can be signed by the President into law.

Rep. Mike DeWine (R-OH) previously proposed two amendments which would protect the casual scanner interception of a cellular telephone call noting, "If a scanner stops at a cellular phone channel (a scanner listener) could be imprisoned for six months...even if he did not disclose the information."

DeWine, attempting to reason with the subcommittee went on, referring to the Justice Department's statement that they would not enforce the new law: "It's basically bad public policy to create a law that everyone knows will not be enforced...It brings about a disrespect for the law...It weakens anybody's faith in the criminal justice system. We are not talking about difficult enforcement. What we are talking about is an impossibility unless we are willing to violate people's Constitutional rights and go into their own homes."

He continued, "The bill creates the illusion of protection; the facts are that it will no more protect (cellular) the day after we pass this bill than the day before."

Sadly, DeWine's valiant effort at adding rationale and perspective to the ill-conceived proposal went unheeded by the other members and the bill was adopted unanimously.

If passed, the new law would protect (*prohibit the monitoring of*):

Cellular telephone conversations;
Remote broadcast pickup and remote services;
FM subcarrier services (SCA);
Private fixed microwave links;
Any encrypted transmission;
Conventional land mobile radiotelephones
Private satellite videoconferencing.

Specifically excluded from protection (*monitoring allowed*) would be:

> "...any station for use of the general public, or that relates to ships, aircraft, vehicles, or persons in distress; any governmental, law enforcement, civil defense, or public safety communications system, including police and fire, readily accessible to the general public."

These stations would include amateur radio including autopatch, CB, GMRS, law enforcement, government, and dispatch operations.

Uncertainty still exists as to the intended protection of satellite dish reception (currently under study by the House Telecommunications Subcommittee).

Criminal penalties for unauthorized interception range up to a year in jail and a $10,000 fine. Civil remedies (suits) may also be granted separately.

If approved, scanner owners will not be able to tune in remote broadcast stations around 26, 153, 161, 450, and 455 MHz or car telephones near 152, 158 and 454 MHz.

Interestingly, the Federal Communications Commission finally made a stand, stating that "...we do not support criminal prosecution of those who incidentally intercept (radiotelephone) communications."

The letter, signed by FCC General Counsel Jack Smith, was in response to the Department of Justice's request that the Commission review the DOJ position paper concerning the pending legislation.

The FCC concluded their comments by the statement: "In short, because radio, unlike wire, telephone communications can be so easily intercepted, we propose that the...Act not prohibit interception of the radio portion of telephone communications where the interception is neither divulged nor used for the benefit of the interceptor or another not entitled thereto."

The position was based on the longstanding section 605 (and newly revised section 705) of the 1934 Communications Act.

It is difficult to understand how a body of representatives of the American people could conceivably endorse such a preposterous piece of legislation; nevertheless, they have...overwhelmingly.

No longer may the airwaves be considered public domain; even though they intrude uninvited into our homes, we are unable to consider their presence commonly shared. The accidental tuning in of a cellular conversation by a TV set (done routinely) constitutes a serious crime.

This remarkable artifact of PAC lobbying would be laughable if it were not so insidious. If you are as outraged at this arbitrary curtailment of your basic freedom as we are, alert your legislators--in no uncertain terms--as to your concern. A sample letter is printed below. If you are not sure who your representatives are, contact your local library or newspaper, or consult the January issue of *Monitoring Times*.

We would like to commend the representatives of ANARC (Association of North American Radio Clubs) for their tireless efforts at bringing reason to the floor of the House subcommittee; the officers of RCMA (Radio Communications Monitoring Association) for their excellent June 1986 coverage of the issue; Fred Maia, W5YI (*Dits and Bits...The W5YI Report*) for his incisive reporting of the evolution of the bill; and the other individuals and organizations who have brought the House Bill issue to their constituents. ■

WRITE NOW!

A sample letter for you to copy is printed below:

The Honorable [ ]
U.S. House of Representatives
Washington, D.C. 20515

Dear Representative [ ]:

I am writing with regard to H.R. 4952: the Electronic Communications Privacy act of 1986.

Despite the bill's good intentions, passage of H.R. 4952 will not materially reduce the vulnerability of radio communications to unauthorized interception. Congress cannot rewrite the laws of physics. Even the sponsors of the bill acknowledge that key parts of it are unenforceable.

If I can tune in a signal in my own home, that is because that signal is intruding into my home. To make me a criminal for detecting this intrusion is as unfair as it is absurd.

Because H.R. 4952 declares certain radio signals to be not "readily accessible to the general public" even though they actually are, every citizen would be exposed to criminal liabilities for receiving these "inaccessible" signals. For example, cellular phone calls can be picked up by ordinary unmodified television sets on channels 80-83. If this bill becomes law, I would risk six months in jail and a fine of up to $500 for willfully tuning my TV to the top of the dial!

I urge you to amend H.R. 4952 so that radio signals which are in fact readily accessible to the public continue to be protected under the Communications Act of 1934. This is the only reasonable policy to follow when the method of transmission itself makes a communication receivable by anyone.

Sincerely,

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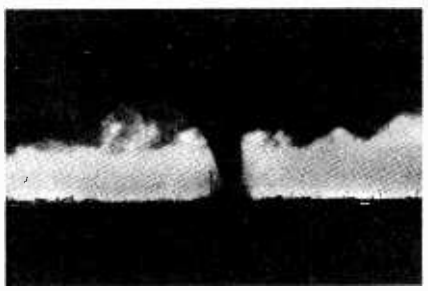

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Model HX 2000

Model HX 1200

800 MHz

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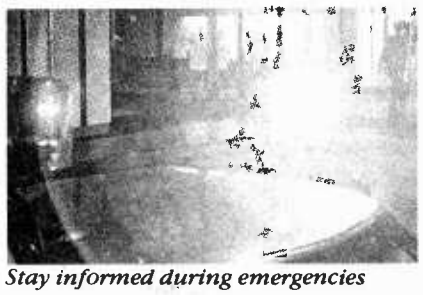

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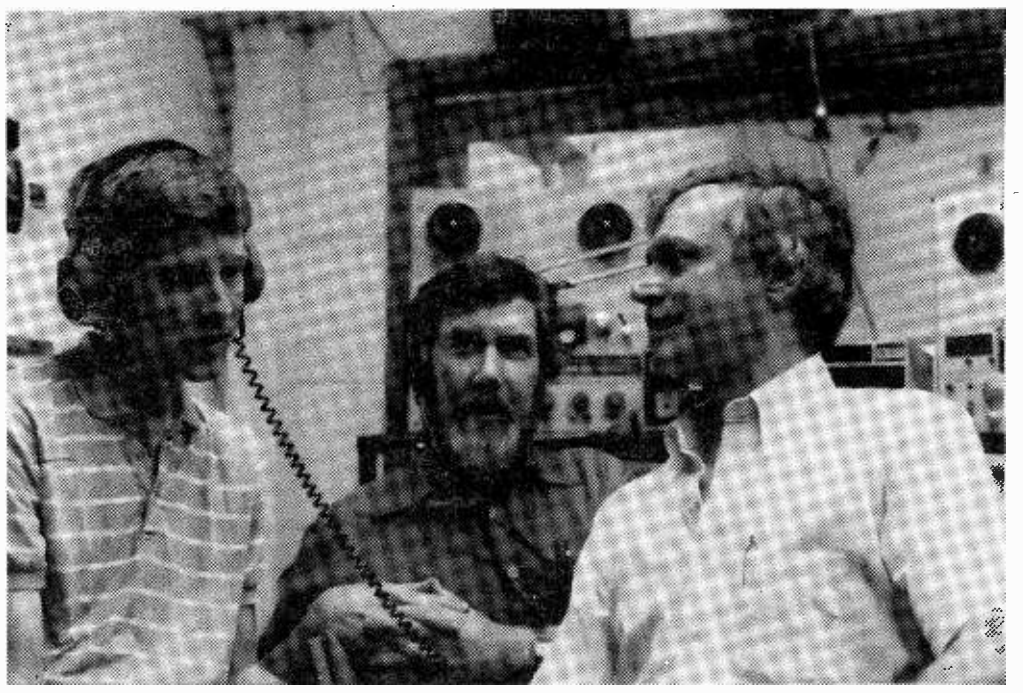
RADIO CANADA -- AND YOU -- ARE ON THE AIR!

by Bill Lenrow



Larry Miller, Ian McFarland and Larry Magne discuss an upcoming program in the studios of Radio Canada International. Shortwave Listeners Digest is certainly one of the most popular programs among SWL's and with good reason.

If you've already heard the new *Shortwave Listener's Digest Forum* program on Radio Canada International, you know why it's so popular -- and unusual. Once each month, on the last weekend of the month, people from all around the globe gather in one spot to discuss their hobby. Regular co-hosts Larry Miller and Larry Magne make the trip by train and car but most come by telephone, never leaving the comfort of their favorite armchair. And that's what makes the program unique. *Forum* is the world's only shortwave hobby telephone talk show.

The program begins to take form weeks, or even months in advance of its airing with a spate of telephone calls between the show's principals, Miller, Magne and Mc Farland. A topic is determined, jobs assigned and everyone goes to work. If the discussion is on, say, jamming, Magne (who happens to be an expert on the subject himself) might be assigned the task of rounding up experts on the topic. Miller does the background research and Mc Farland arranges to studio time, technicians and begins to rough out the 22 or so minutes the program runs.

Everyone meets in Montreal the weekend before the show airs, Magne and Miller taking the long train ride from Philadelphia to Montreal. Arriving Friday night, there is a brief pre-pre-production meeting (actually an excuse to shoot the breeze over some fine Chateau Larose-Trintaudon wine). Early the next morning, the group reassembles at Radio Canada International's studios downtown. A conference room is reserved and after the RCI coffee wagon makes its final stop on the 4th floor, everyone settles in for the pre-production meeting. This time there is no wine. This is when the hard work begins.

This month the topic is "What bugs you about shortwave radio?" It's a topic that, given Miller's tendency to set the Guinness Book of World Records for non-stop talking every time he opens his mouth on any shortwave-related subject, really needs no second or third host. Larry would do just fine on his own on this one, thank you. An odd person, that Larry Miller. You're not likely to get much out of him if you're talking about anything else. But mention the word shortwave and he's as animated as a frog on stilts.

There is a struggle in the conference room. And co-hosts Mc Farland and Magne manage to subdue Miller with a strategically placed rag. Quiet returns.

"I'll start off with the regular open" says Ian as he takes control of the discussion. "And then I'll ask you two what your pet peeves are." Magne says yes; Miller, rag still firmly implanted in his mouth, nods his agreement. What choice does he have?

"I talked to Don Jensen earlier this week," says Magne "and I think Don will be calling in." Everyone is impressed with the quality and number of calls coming in to the show. But no one is ready for the response on Sunday morning.

Arriving at the studio just before 10:00 AM in order to accommodate calls from overseas listeners in other time zones, the three are surprised by a technician who tells them, "You've already gotten a mess of calls -- one from New Zealand, one from Bangladesh, two from Europe, several from Canada and, God, I don't know how many from the States." It's going to be a great show.

The biggest problem in putting together a show like *Forum* is determining who shall make it on the air and who shan't. Many times its a tough choice, made tougher by the fact that the show runs only 22 or so minutes a month.

At exactly ten, the tape begins to roll. The first caller is on the line. It's Andy Reid from the Ontario DX Association. And Andy has a gripe about the lack of organization on the shortwave bands. "There are many examples," he says, "of stations broadcasting on top of one another" and goes on to cite some. This touches off a mild discussion. There's no argument here. Anyone who has ever listener to shortwave knows the bands are more crowded than a 32 ounce can of anchovies.

The next call is in fact Don Jensen. Don is a shortwave listener of more years than he'd be willing to admit. And he begins to talk about some of the extraordinary programs he's heard. "I listened to the station in Biafra during that ugly little civil war" he says, "and as it became apparent that its days were limited, the station began to play, very softly, old Negro spirituals." Softer and softer it went until finally, the station -- and the country was gone. Everyone in the studio nods silently in agreement and everyone has examples of momentous occasions they have witnessed through their receivers. There was the torment of Radio Prague as Soviet tanks brought an end to the *Free Spring* in Czechoslovakia, including the account of the invasion presented by Radio Prague announcers looking out the station's windows. And then silence.

And that seems to get everyone going. Suddenly, the topic has changed from "What's your gripe about shortwave?" to "Isn't shortwave great!" The calls are coming in faster than can be handled and undoubtedly many are left holding the phone. But in a matter of what seems like seconds, 20 minutes has gone by. And Ian Mc Farland, regretfully, steps in to wrap up the show with his traditional close: "73s, 88s to the ladies and good listening." Another *Shortwave Listener's Digest Forum* program is in the can. Listeners will be able to hear the results on UTC June 28th (Saturday) at 2030 on 7139,9555, 11945, 15325, 17820 and 17875 kHz, and again that same day at 2130 UTC on 11945, 15150 and 17820 kHz. Additional transmissions of *Forum* can be heard on Sunday June 29 at 2300 UTC on 9755, 11710 and on Monday, June 30 at 0300, 5960, 9755 kHz. Remember, all times are UTC.

Those attending the 1986 ANARC Convention in Montreal will have a special opportunity to participate in the *Forum*. During the convention, Radio Canada International will record a live version of the program.

Then it's back to the phones in August for another edition of the *Shortwave Listener's Digest Forum* on Radio Canada International.

Vatican Radio Gets Testy

Vatican Radio has initiated a test transmission to North America in English at 0310 UTC on 6150 kHz, says WRTVH staffer Andy Sennitt. Andy also reports that the station has installed two new 250 kW transmitters and is working on a second rotatable antenna.

Coming next month: *Monitoring Times's Larry Miller interviews the host of HCJB's popular "Saludos Amigos" program, Ken MacHarg. The program, less than a year old, has already been compared to Radio Netherland's perennially top-rate "Happy Station." Is Ken MacHarg the next Tom Meyer?*

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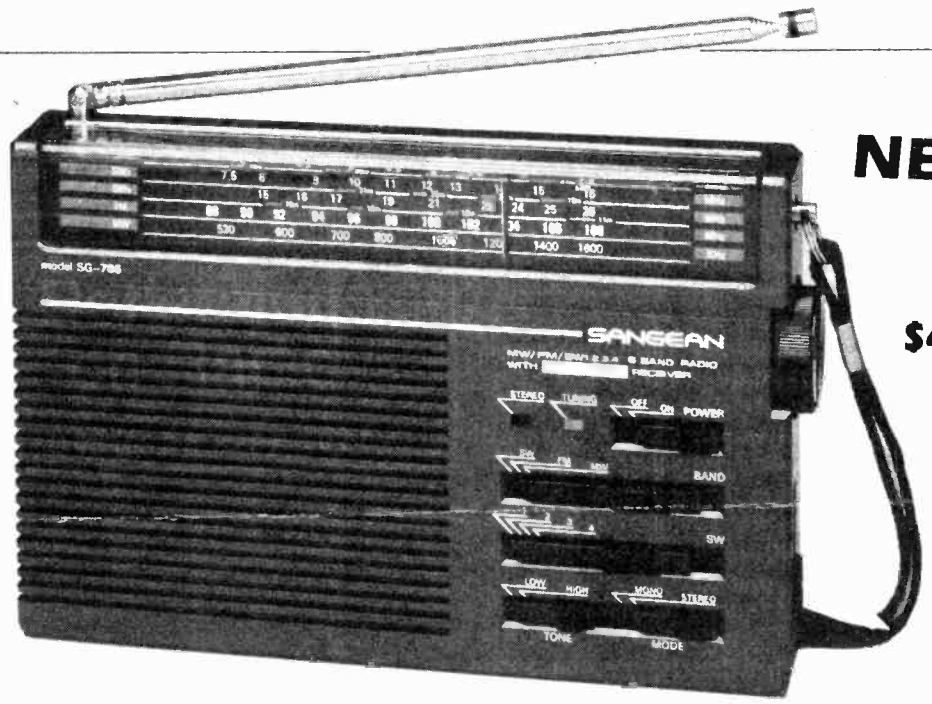

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HOW GREAT NEWS STORIES ARE MADE

Scanner monitoring and the press

by Steve Douglass

It was a cold November night, one of those nights in west Texas when the freezing wind cuts through you like a sharp knife. I remember clearly the wind howling above the house and wondering if my scanner antennas would hold up to the strain. I locked down the police scanner on the main local fire channel, turned up the volume and turned in for the night.

At about 4 am I was awakened by the startling mix of sirens and voices breaking the squelch on the scanner. "We need at least two more companies here, Chief; this thing is fully involved!" the scanner blared. Two more companies--this fire has to be a doozie! The dispatcher announced the address as he sent out more equipment; the fire was just eight blocks away from me!

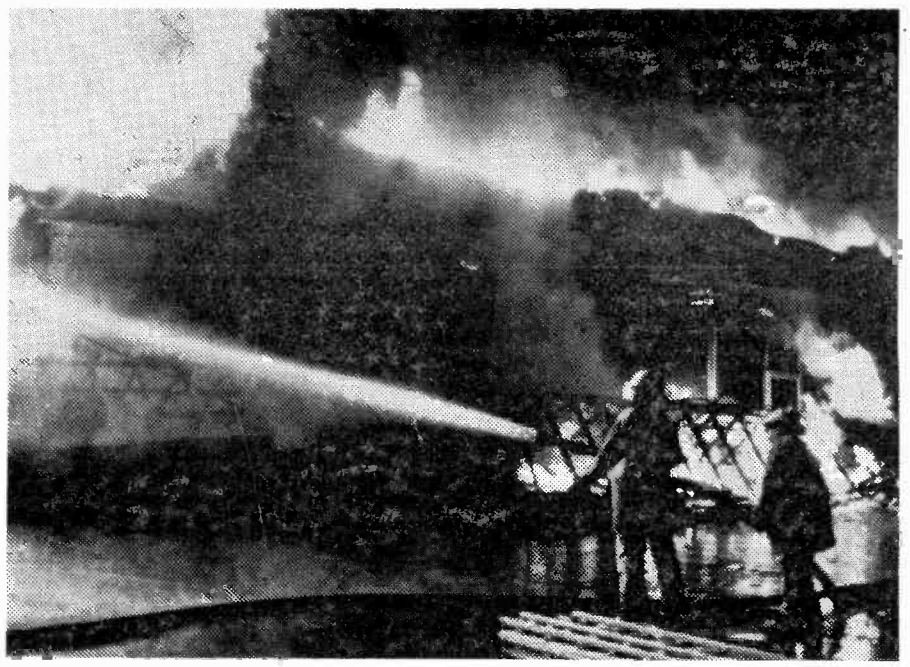
I jumped out of bed into my clothes, grabbed my cameras, and darted out the door. I could see thick smoke and the glow of an immense fire on the horizon--the South Georgia shopping center was ablaze!

I pulled up just as the other fire units were arriving. As I stepped out into the cold air I could hear small explosions coming from inside stores that were blazing. I moved closer but a blast of hot air from the fire pushed me back. Flames were leaping into the sky above the shopping center; the whole area was lit with a ghastly orange glow from the inferno.

Shielding my face from the heat with my cameras I quickly clicked off several shots of two firemen battling the fire. I framed a fire fighter using his walkie talkie against a backdrop of fire and snapped the shutter. The fierce winds quickly whipped the flames through the shopping center, engulfing the whole complex and making the blaze a firestorm that could not be stopped.

The wind-whipped fire burned through walls and into the dry cleaners. Cleaning solvents ignited, and strange blue-green flames erupted into the air. I was startled to hear yelping sounds. Surely, no one was inside this inferno. Then I saw the source of the anquished cry. The fire had reached the pet shop! Those poor animals inside were trapped in their cages with no chance for rescue. I decided to head into the paper with my film.

That was the first fire I had covered as a professional press photographer. Although the blaze was a tragedy to those involved, it had netted me a front page color photo of the firemen battling the blaze.



South Georgia shopping center goes up in flames. Investigators confiscated, then returned these pictures for their investigation, later ruled arson. First front page photo by Steve Douglass.

Since then my scanners have been an essential tool. The photo department at the Amarillo Globe news where I work uses two scanners and a portable tunable monitor to keep in touch with the goings-on in town.

The photo department also has two wirephoto FAX transmitters, one for AP and the other for UPI. Whenever a fast breaking story yields a strong news photo of regional interest, we send it over the wirephoto network by telephone to Dallas or Chicago.

The nespaper receives color laserphotos via satellite and black and white by landline. There are also three IBM teletype computers for AP news and a weather wire machine for the latest weather reports.

The city desk uses a 50 channel scanner to keep abreast of the latest breaking stories and there is usually someone within ear shot of the scanner 24 hours a day. The police beat reporters carry hand held programmable scanners and the reporters and photographers both carry pocket pagers to dispatch them to spot news events. The paper formerly used two-way radios for the staff but found pagers less expensive to maintain and just as reliable.

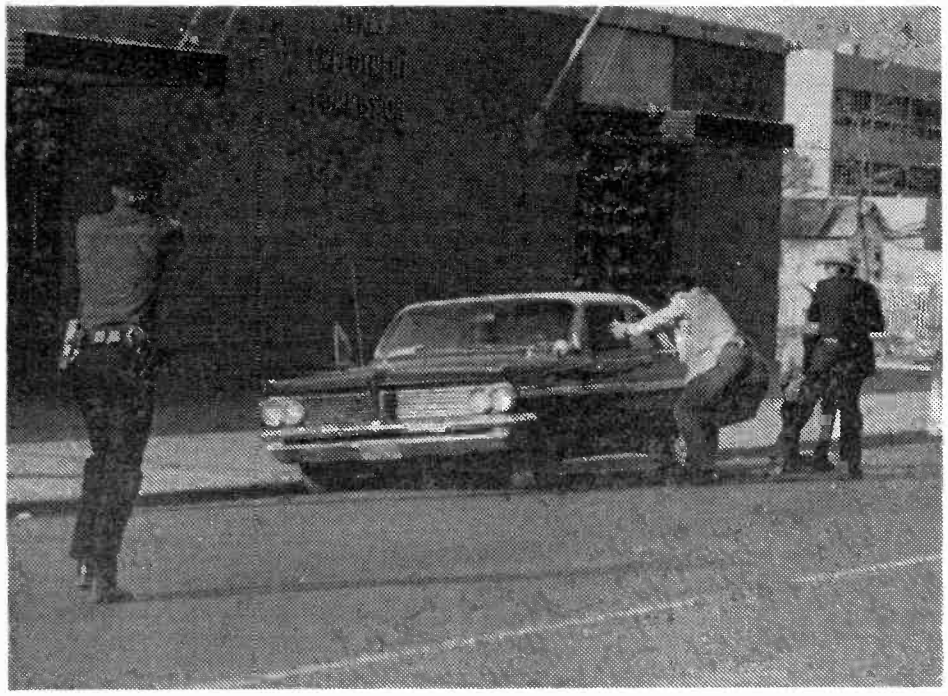
When something is heard of importance on the scanner a reporter usually calls the service involved--police, fire, etc.--to confirm a location. The police beat reporter then heads out and a photographer is either paged or sent from the paper.

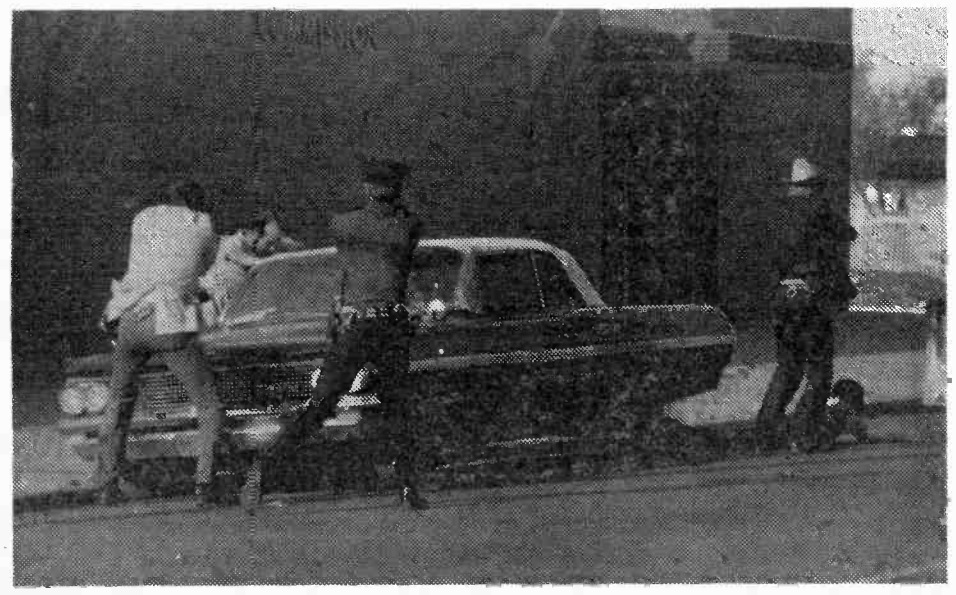
Sometimes someone will call the paper with a news tip and the paper will respond. The Globe News has a policy of paying $5-$10 to persons who call with tips which lead to stories. Many papers and stations around the country have this policy.

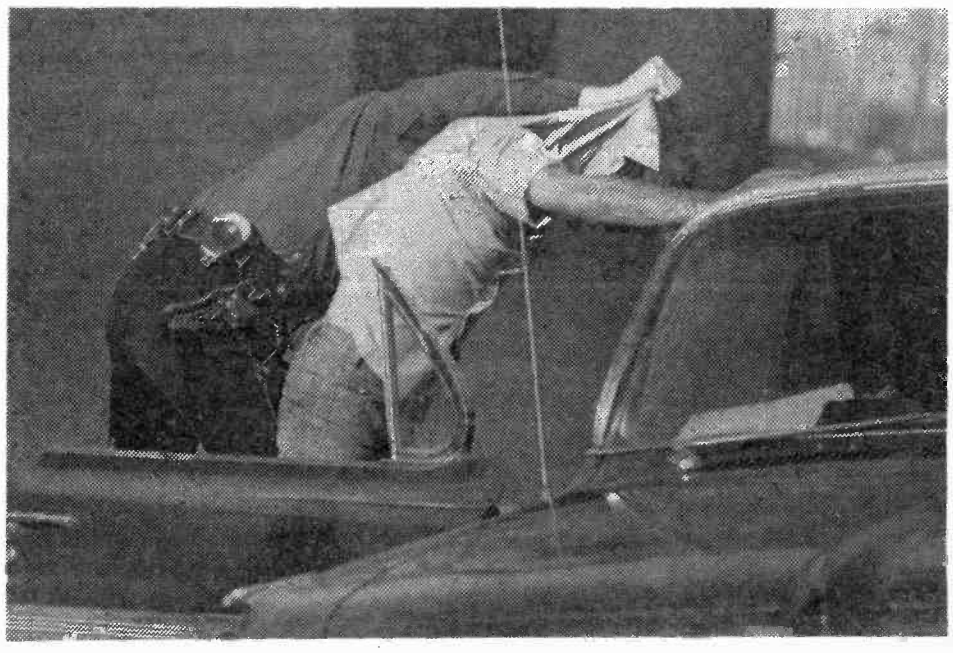
Rushing to a scoop that one hears on his scanner can be rewarding and also a bit dangerous, especially if one arrives before the police do. When Henry Bargas, a photographer for the Globe News, worked for a paper is Odessa he heard a call on his scanner about a man shooting at people in the street only a couple blocks from the paper. He rushed out to the scene and found the assailant before the police did. The man aimed his gun at the photographer and Henry dived for cover!

The police converged on the scene, got out of their vehicles, drew their weapons, and aimed at the armed man, all with poor Henry between the police and the man with the gun! The armed man surrendered when he saw he was surrounded.

The weapon turned out to be a starter pistol, and the man had been







Odessa, Texas, shooting alerted photographer Henry Bargas who took these exciting action photos (Courtesy Amarillo Globe Times)

firing blanks at people and cars! When the police finally arrived and arrested the suspect Henry got some great pictures.

NOTE TO NEWS TIPPERS

When calling in news tips, don't call in every minor wreck, fire, etc.; Ask yourself, "Is this newsworthy?" Make sure you talk to the right person. Don't give a great news tip to the janitor. Your best bet is to talk to an editor of to the city desk.

Make sure you know where the news tip is--the address, service involved, whatever. Don't just call and say, "There's a wreck somewhere in town." ■

TOP 10 LIST OF SERVICES THAT MEDIA MONITOR FOR NEWS STORIES:

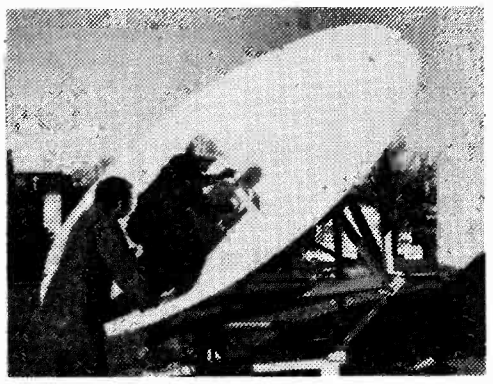
1. POLICE
2. FIRE
3. AMBULANCE
4. EMERG RESCUE CREWS
5. SHERIFF DEPTS.
6. SPEC POLICE OPS,SWAT, DETECTIVES NARCOTICS
7. HIGHWAY PATROL
8. AIRCRAFT EMERGENCY SERVICES
9. SEVERE STORM SPOTTERS
10. CIVIL DEFENSE

FREQUENCIES

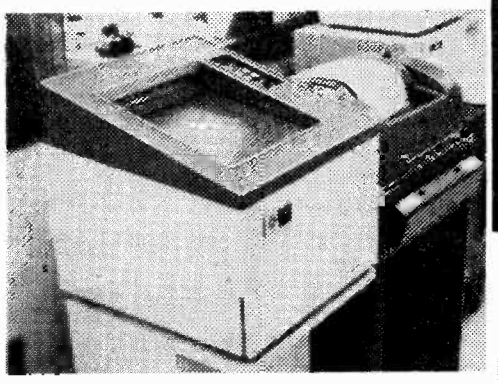
Set your search mode on your programmable scanner between these frequencies to find the media two way channels in your area.

25.870 - 26.470	Remote pick-up broadcast
152.870 - 152.990	Remote pick-up broadcast
161.640 - 161.670	Remote pick-up broadcast
166.250	Press relay
170.150	Press relay
173.225 - 173.375	Remote pick-up broadcast
450.050 - 450.950	Remote pick-up broadcast
452.975 - 453.000	Remote pick-up broadcast
455.050 - 455.950	Press relay

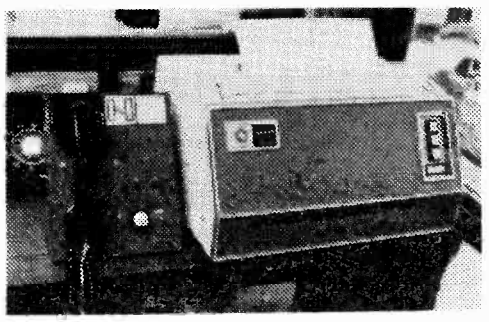
Concerned fireman administers first aid. An excellent photo by Henry Ortega.



AP technicians install news satellite dish at Globe News (photo by Steve Douglass)

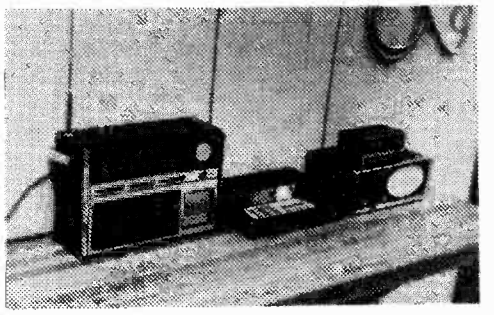


AP wirephoto receiver and weather teletype at the Globe News (photo by Steve Douglass)



Left:

AP laser photo transmitter in Amarillo Globe News photo dept. The phone is for talking to AP before transmitting (photo by Steve Douglass)



Monitoring setup in the photo lab of Amarillo Globe News (photo by Steve Douglass)

TUNING THE SOVIET SSR'S

SSR? Is that some kind of new Soviet radar system? A satellite? Aircraft? Ship? No, it's more down to earth but no less challenging than those others might be. SSR refers to "Soviet Socialist Republic" -- those said-to-be autonomous republics which cluster around the western and southern borders of Russia and were incorporated into the Soviet Union beginning in 1939.

There are over a dozen of these republics and all but one -- Moldavia -- are represented on the short wave broadcasting bands. All you have to do is find them!

Hearing Radio Moscow is one of the easiest tricks any SWL performs to amaze and impress visitors to the shack. But, beyond Moscow, out in the hinterlands, things become much more difficult and confusing.

Short wave broadcast listeners who confine their approach to merely tuning around the bands to hear what they can hear on a catch-as-catch-can basis will soon find that this method will prove to be wholly inadequate when it comes to trying to log the SSRs. Tuning for these requires time, study and analysis, careful and persistant tuning and oft times a sharp ear.

Picking up broadcasts from the Soviet Union's secondary capitals is a good test of the SWBC DX'ers patience and persistence!

A few of these republics have their own English language broadcasts to North America and can be easily heard. But there's a trip-wire here because such North American services are almost invariably beamed over the facilities of Radio Moscow. So what you hear comes from one of the dozens of Soviet transmitter sites, very likely not one in the republic to which you think you are listening. It becomes, as somebody once said, a game of "Russian radio roulette."

We have put together some suggestions for what appear to be the best opportunities to log the SSRs direct and have also provided current data on where and when to hear the various North American services from the republics even though, in the strictest sense, they are not "countable."

Information was taken from the 1985 edition of *Radio Data Base International* as well as Roger Legge's excellent *USSR High Frequency Broadcast Newsletter* ($3 per year in North America, $4 overseas, from Box 232, McLean, VA 22101.) What we list here does not represent all of the possibilities for each republic but what appear to be the most likely chances for reception in the current arrangement of things.

ARMENIAN SSR

Radio Yerevan is aired over Radio Moscow sites to North America daily at 0330 to 0400 UTC in Armenian (English for the last five minutes) and is currently on 11.790, 13.605 and 15.180 MHz. It is rarely heard, even in this service designed to be received in North America. For Yerevan direct, try 4.990 where a 50 kilowatt transmitter operates from 0100 to 2000 UTC.

AZERBAIJAN SSR

Radio Baku's domestic service programs are on 50 kilowatt transmitters from 0100 to 2100 on 4.785 and 4.947.5 and can occasionally be found during the early evenings or early mornings.

BYELORUSSIAN SSR

Minsk operates continuously on 7.210 with a domestic service running 15 kilowatts. But there are other Soviet sites using this frequency most of the time as well. Several sites and services also occupy 9.795 along with Minsk, though Minsk would appear to be in the clear from 1800 to 2100. Minsk is also on 11.995 with a 50 kW domestic service operating from 0100 to 2100.

ESTONIAN SSR

Talinin uses 5.925 with 50 kilowatts to various targets between 0700 and 2100. But Tashkent is also here from 2300 to 1800, so 2100-2300 looks to be the best opportunity.

GEORGIAN SSR

Tbilisi, from Stalin's home republic, uses 4.930 from 0045-2100 with 50 kW. Although Ashkhabad is also here it should be more likely heard in the mornings with Tbilisi showing in the evening, even though both are rare occurrences. Try Tbilisi also on 5.040 from 0100-2000.

KAZAKH SSR

Alma Ata occasionally pops through on 4.545 during its 2300 to 1830 schedule. Somewhat better possibilities are 5.035 operating almost 24 hours (2330-2200 with some brief breaks) and 5.260 between 2300 and 1700.

KIRGHIZ SSR

Frunze is one of the toughest of the Soviet logs. It's listed on 4.810 between 2300 and 1800, but there are other Soviets operating here too, to say nothing of the QRM caused by non-Soviet stations. Another frequency is 4.050 but Yuzhno Sakhalinsk operates co-channel here. The latter is off from 1300 to 1800 so Frunze might be possible sometimes around sunrise.

LATVIA

Riga uses 5.935 24 hours per day with programs in various languages to different target areas. But so does Kenga. Both are 50 kW but Kenga is in Asia so take the propagational differences into consideration.

LITHUANIAN SSR

Radio Vilnius is carried via Radio Moscow facilities from 2300 to 2330 and 0100 to 0130 on 7.400 and 9.530. It seems there is no short wave broadcast transmitter at Vilnius itself so for direct reception look for Kanaus on 6.100 from 1700 to 2200 (there are two Asian sites here as well) or 9.710 carrying domestic services between 0500 and 1530.

TADZHIK SSR

Dushanbe occasionally shows from the fall through spring seasons on 4.635 around 0100. It is scheduled here from 2300 to 1830. Also try 2300 to 1230 on 4.975.

TURKMEN SSR

Ashkhabad is on 4.825 from 2330 to 2100 and free in our evenings. There is co-channel occupancy by other Soviet sites at other hours. Also try 4.895 from 1500 through to 1400, although Tyumen is here, too, though with less power.

UKRAINE SSR

Radio Kiev, via Radio Moscow facilities, is currently on from 2200 to 2300 on 7.205, 9.530 and 9.800; 0030 to 0100 on 7.400, 9.530 and 9.800 and 0300 to 0330 on 7.175 and 9.800. For Kiev direct try 4.940. It's one hour short of an around-the-clock schedule, 0200 to 0100 with 50 kW.

UZBECK SSR

Tashkent has English for Asia at 1200 to 1230, often heard in the U.S. on 5.945, 5.985, 9.600 or 11.785. Eleven of those are Radio Moscow facilities, however. For broadcasts direct try 4.850 at appropriate open band times. It's on from 2300 to 1830.

Although the upper band frequencies tend to be switched around with the seasonal schedule changes, the lower frequency usage has remained quite consistent over the past decade or so. The DX'er has at least <u>that</u> going for him!

QSL's

QSL'ing the republics isn't much easier than hearing them. Normally there is less trouble getting replies for the North American services of the various republics. QSLs for direct broadcasts not aimed at U.S. listeners are more difficult. The best advice is simply to keep trying.

Many DX'ers have confirmed all of the Soviet republics so there's no question that it can be done. Addresses of the various stations can be found in the *WRTH* or in Gerry Dexter's *World Broadcast Station Address Book*, published by Gilfer.

Don't expect to log them all in a few sittings. It will probably take several months of tuning, perhaps even a couple of years. Arm yourself with information, plot out your best shots and be prepared for a long haul. ■

Coming in August

Summertime is traditionally thought of as DXing's "off Season," But if you're like Harold Sellers, you make the best of the warm weather, pack up some radio gear and head out into the country for a DXpedition with some friends and a few hundred cows.

Tune in on the Air Shows! Ever watch the graceful maneuvers of the Blue Angels or the daring aerobatics of the Thunderbirds and wish you could listen in on their split-second communications? Next month *MT* presents a list of the hottest frequencies to monitor!

A good shortwave radio for $35.00? Terry Staudt says that they can and are being found every day--at your neighborhood flea market. Staudt gives advice on what to look for and how to make it perform when you get it.

All this and much more in the August issue of *Monitoring Times*!

WORLDWIDE PAGING SERVICE?

Geostar Corporation is working with the French space agency to launch a worldwide paging satellite aboard an Ariane rocket. The service is officially acknowledged by the ITU (International Telecommunications Union) and the FCC who refers to the system formally as the "Radiodetermination Satellite Service."

Three satellites would send the receive signals from land-based beacons; the relative spacing between the satellites and the transmitting beacon would allow the resolution and fix of a single user on the ground.

A prototype system is already in use for finding ships and small boats lost at sea. The manufacturer hopes to expand the system, making it usable for public safety officers to quickly locate emergency transmissions as well as routine transportation navigation. (David Alpert, NYC)

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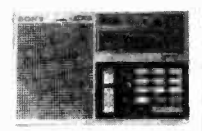

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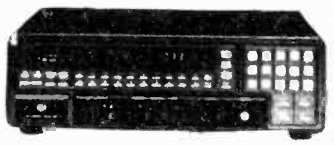

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MT WORLDWIDE SCANNING with Norm Schrein

Great Britain

Wherever you travel (excluding eastern block countries) try to take along a hand held scanner to determine which frequencies are active.

This month we are going to look at some frequencies to monitor in Great Britain. Two of the least known groups of frequencies in Great Britain are the amateur two meter and 70 cm repeaters. The call signs of all amateur repeaters in the UK consist of the prefix GB3 followed by two unique letters (e.g. GB3 SC). In addition the repeaters are assigned a channel number as follows:

Ch	Rptr Input	Rptr Output
R-0	145.000	145.600
R-1	145.025	145.025
R-2	145.050	145.650
R-3	145.075	145.675
R-4	145.100	145.700
R-5	145.125	145.725
R-6	145.150	145.750
R-7	145.175	145.775
RB-0	434.600	433.000
RB-2	434.650	433.050
RB-4	434.700	433.100
RB-6	434.750	433.150
RB-10	434.850	433.250
RB-11	434.875	433.275
RB-12	434.900	433.300
RB-13	434.925	433.325
RB-14	434.950	433.350
RB-15	434.975	433.375

Likewise, simplex frequencies are assigned channel numbers as follows:

S-8	145.200	
S-9	145.225	
S-10	145.250	
S-11	145.275	
S-12	145.300	
S-13	145.325	
S-14	145.350	
S-15	145.375	
S-16	145.400	
S-17	145.425	
S-18	145.450	
S-19	145.475	
S-20	145.500	
S-21	145.525	
S-22	145.550	
S-23	145.575	
SU-8	433.200	Used by Raynet
SU-16	422.400	
SU-17	433.425	
SU-18	433.450	
SU-19	433.475	
SU-20	433.500	Calling Chan

Our list of two meter repeaters appears above.

How about the coverage of these amateur repeaters? A quick call to a Tandy store in the London metro area told me that the North London two meter repeater on 145.775 has a coverage of approximately 30 miles. There is an amateur 10 meter beacon noted on 28.215 MHz call sign GB3 SX which is located in Crowborough.

The Tandy clerk indicated that most police frequencies can be located between 147.200 and 147.500 MHFz; The local police frequency from Edmonton is 147.300 MHz (simplex). Bath police transmissions have been noted on 146.050, 146.350 and 146.440 MHz. Scotland Yard can be found between 147.250 and 147.400 MHz.

What about the legality of using a scanner in Great Britain? The Tandy store clerk told me that there was no problem in owning or using a scanner in Great Britain, however there is some question on the legality of monitoring of police frequencies; so if you are going to listen to the police, it might be wise to do that from your hotel room!

Don't forget to scan aeronautical frequencies when you are awaiting your ride home. Until next time -- Good Monitoring. ■

Output	Call	Location
145.725	GB3 AE	Barnoldswich, N. Yorks
145.750	GB3 AM	Longbridge, S. Birmingham
145.700	GB3 AR	Caernarfon, Gwynedd
145.625	GB3AY	Ayr, Scotland
145.750	GB3 BC	Newport, Gwent
145.725	GB3 BM	Central Birmingham
145.750	GB3 BP	Horsham, W. Sussex
145.700	GB3 BT	Berwisk-upon-Tweed
145.650	GB3 BX	North Birmingham
145.600	GB3 CF	Leicester
145/750	GB3 CS	Motherwell, Scotland
145.725	GB3 DA	Danbury, Essex
145.600	GB3 EL	Havering, E. London
145.775	GB3 ES	Hastings, E. Sussex
145.700	GB3 EV	Appleby, Cumbria
145.600	GB3 FF	Burntisland, Fife
145.775	GB3 FR	Boston, Lincs
145.775	GB3 GN	Aberdeen, Scotland
145.625	GB3 HG	Northallerton, N. Yorks
145.700	GB3 HH	Buxton, Derbyshire
145.700	GB3 HI	Isle of Mull, Scotland
145.650	GB3 HS	Kingston upon Hull, Humberside
145.700	GB3 KN	Maidstone, Kent
145.625	GB3 KS	Dover, Kent
145.625	GB3 LD	Ulverston, Lake District
145.725	GB3 LM	Lincoln
145.600	GB3 LY	Limavady, Co. Londonderry
145.600	GB3 MB	North Manchester
145.675	GB3 MH	Malvern Hills
145.650	GB3 MN	Stockport, Cheshire
145.750	GB3 MP	Moel-Y-parc, Clwyd
145.675	GB3 NA	Barnsley, S. Yorks
145.625	GB3 NB	Tacolneston, Norfolk
145.725	GB3 NC	St. Austell, Cornwall
145.725	GB3 NI	Belfast, N. Ireland
145.775	GB3 NL	Enfield, N. London
145.750	GB3 PI	Royston, Herts
145.675	GB3 PO	Martlesham Heath, Suffolk
145.675	GB3 PR	Perth, Scotland
145.675	GB3 PW	Newtown, Powys
145.675	GB3 RD	Reading, Berks
145.775	GB3 RF	Burnley, Lancs
145.650	GB3 SB	Duns, Berwickshire
145.625	GB3 SC	Bournemouth, Dorset
145.625	GB3 SI	St. Ives, Cornwall
145.650	GB3 SL	Crystal Palace, S. London
145.725	GB3 SN	Alton, Hampshire
145.675	GB3 SR	Brighton, Sussex
145.600	GB3 SS	Elgin, Scotland
145.650	GB3 TR	Torquay, Devon
145.725	GB3 TW	Tyne and Wear
145.750	GB3 TY	Hexham, Northumberland
145.700	GB3 VA	Aylesbury, Bucks
145.625	GB3 VT	Stoke on Trent
145.700	GB3 WD	West Devon
145.650	GB3 WH	Swindon, Wilts
145.625	GB3 WL	Hillingdon, W. London
145.600	GB3 WR	Wells, Somerset
145.775	GB3 WT	West Tyrone, N. Ireland
145.775	GB3 WW	Carmel, Dyfed
145.775	GB3 YJ	Leamington Spa
433.350	GB3 AB	Aberdeen
433.050	GB3 AV	Aylesbury, Bucks
433.250	GB3 AW	Newbury, Berks
433.100	GB3 BD	Bedford
433.275	GB3 BK	Upper Basildon, Berks
433.000	GB3 BN	Bracknell, Berks
433.150	GB3 BR	Brighton
433.250	GB3 BS	Bristol
433.350	GB3 CB	Central Birmingham
433.350	GB3 CE	Wivenhoe, Colchester
433.050	GB3 CH	Liskeard, Cornwall
433.050	GB3 CI	Corby, Northamts
433.000	GB3 CK	Ashford, Kent
433.150	GB# CR	Mold,Clwyd
433.150	GB3 CW	Newton, Powys
433.000	GB3 DT	Wimborne, Dorset
433.250	GB3 DY	Wirksworth, Derby
433.350	GB3 ED	Edinburgh, Scotland
433.050	GB3 EK	Margate, Kent
433.250	GB3ER	Danbury, Essex
433.000	GB3 EX	Exeter, Devon
433.050	GB3 FC	Clyde Coast,Lancs
433.150	GB3 FE	Fife, Scotland
433.325	GB3GF	Guildford, Surrey
433.350	GB3 GL	Glasgow, Scotland
433.150	GB3 HC	Hereford
433.350	GB3HE	Hastings, Sussex
433.275	GB3 HN	Hitchin, Herts
433.350	GB3 HO	Horsham, Sussex
433.350	GB3 HR	Bushey Heath, Herts
433.250	GB3 HU	Hull, Humberside
433.325	GB3 HW	Gidea Park, Essex
433.100	GB3 IH	Ipswich, Suffolk
433.100	GB3KL	Kings Lynn,Norfolk
433.325	GB3 LC	Louth, Lincs
433.100	GB3 LE	Leicester
433.100	GB3 LH	Shrewsbury
433.250	GB3 LI	Liverpool
433.250	GB3 LL	Colwyn Bay
433.050	GB3 LS	Lincoln
433.250	GB3 LT	Luton, Beds
433.050	GB3 LV	Enfield, N. London
433.150	GB3 LW	Central London
433.100	GB3 MA	Central Manchester
433.150	GB3 ME	Rugby, Warwicks
433.000	GB3 MK	Milton Keynes, Bucks
433.250	GB3 ML	Blackhill, C. Scotland
433.350	GB3 MR	Stockport, Cheshire
433.000	GB3 MS	Malvern, Worcs
433.250	GB3 MW	Leamington Spa
433.350	GB3 NH	Northampton
433.100	GB3 NK	Wrotham, Kent
433.150	GB3 NM	Nottingham
433.050	GB3 NN	Bacton, Norfolk
433.000	GB3 NR	Norwich
433.250	GB3 NS	Banstead, Surrey
433.000	GB3 NT	Newcastle upon Tyne
433.050	GB3 NX	Crawley, N. Sussex
433.000	GB3 NY	Scarborough, N. Yorks
433.100	GB3 OH	Stirling, Scotland
433.100	GB3OX	Oxford
433.250	GB3 PB	Peterborough
433.000	GB3 PF	Blackburn, Lancs
433.050	GB3 PH	Portsmouth
433.300	GB3 PT	Bakway, Herts
433.350	GB3 PY	Cambridge
433.350	GB3 SD	Weymouth, Dorset
433.275	GB3 SH	Honiton, Devon
433.150	GB3 SK	Folkestone, Kent
433.000	GB3 SO	Boston, Lincs
433.100	GB3 SP	Pembroke, Dyfed
433.050	GB3 ST	Stoke on Trent
433.000	GB3 SV	Bishops Stortford, Herts
433.150	GB3 SY	Barnsley, S. Yorks
433.350	GB3 TS	Middlesborough
433.100	GB3 UB	Bath
433.000	GB3 US	Sheffield
433.350	GB3 WF	Otley, Yorks
433.150	GB3 WG	Port Talbot, Wales
433.000	GB3 WN	Wolverhampton
433.250	GB3 WY	Bradford, W. Yorks
433.275	GB3 ZI	Stafford

Great Britain Scanner Ranges
(from Tandy Pro 30 ad):
144-148 MHz - Ham*
108-136 MHz - AM Aircraft
138-144 MHz - VHF High
148-174 MHz - VHF High
380-450 MHz - UHF Low
470-512 MHz - UHF High
**(Although the store clerk told me the two meter ham band ends at 146.000 MHz)*

Radio and the Races

One of the favorite targets of scanner listeners is automobile racing. We would like to thank Larry Williams of Radio Research for this interesting and informative contribution.

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==========================
    NASCAR FREQUENCIES
==========================
464.500 ROAD CHANNEL USED
        FOR RACE / SCORING
464.775 DAYTONA HQ & RACE.
        TALLADEGA SPEEDWAY
464.900 ROAD CHANNEL USED
        FOR RACE / SCORING
465.687 TRACK JUDGES
==========================
 MISC OPERATIONS CHANNELS
==========================
151.625=<=WALKIE TALKIE CH
154.515 <
154.540 <---- SHORT TRACKS
154.570=<ALL OF THESE FREQ
154.600=<SHOULD BE CHECKED
464.500=<AT ALL TRACKS FOR
464.550=<RACE OPERATIONS
469.500=<
469.550=<
==========================
   WINSTON CUP DIVISION
==========================
461.050 #17 PANCHO CARTER
461.450 #98 RON BOUCHARD
461.700 # 6 TREVOR BOYS
461.875 #44 TERRY LABONTE
462.650 ESPN TV
463.187 #14 AJ FOYT
463.462 # 7 KYLE PETTY
463.500 #26 JOE RUTTMAN
463.700 #28 CALE YRBOROUGH
463.775 #21 DAVID PEARSON
463.825 #88 BUDDY BAKER
463.900 #27 RUSTY WALLACE
464.450 #55 BENNY PARSONS
464.475 #66 PHIL PARSONS
464.525 #33 HARRY GANTT
464.537 #   "TOMMY"
464.600 #47 MRGAN SHEPHERD
464.800 #43 RICHARD PETTY
--------------------------
467.112 ?   "RONNIE"
467.250 ESPN TV
467.325 ESPN TV
467.775 #73 PHIL BARKDOLL
469.012 ?   "DALE OR DELL"
469.125 #8  BOBBY HILLEN

==========================
   8 5 0  MHZ   B A N D
==========================
853.4875   #9 BILL ELLIOTT
--------------------------
A FEW TEAMS HAVE MOVED TO
THE NEW 850 MHZ BAND.
NEIL BONNET/DARRELL WHO ?
TIM RICHMOND/GEOFF BODINE
--------------------------

==========================
       S E A R C H
==========================
SEARCH FROM 460.650
       TO 465.000
SEARCH FROM 465.650
       TO 470.000
--------------------------
SEARCH FROM 806.000<INPUT>
       TO 810.000
SEARCH FROM 851.000<OUT>
       TO 855.000
==========================
    MEDIA  FREQUENCIES
==========================
SEARCH FROM 161.640-161.76
SEARCH FROM 173.2 TO 173.4
SEARCH FROM 450.0 TO 451.0
SEARCH FROM 455.0 TO 456.0
SEARCH FROM 457.5 TO 457.6
==========================
      RADIO RESEARCH
       10 ELF LANE
     GREENVILLE. SC
         29611
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Monitoring EXPO

Recently, a Canadian reader forwarded an excellent list of active frequencies in use at EXPO, Vancouver, British Columbia. We appreciate his sharing of this information and invite other monitors to send additional lists for EXPO and other interesting communications as well.

156.42	Expo Site-Expo Ferries (Marine Ch#68)	447.2125	Expo Site-TV Crews Maint.
156.800	Expo Site-Ferries (Marine Ch#16)	447.662	Expo Site-Roming Mobile Robot (Expo Ernie)
410.2875	Vancouver-Skytrain	449.287	Expo Site-Maintenance
427.3875	TV Crews	449.337	Expo Site-Guards, Gates, Grounds (Delta, Echo)
427.6875	Expo Site-Fire Crews	449.362	Expo Site-?
427.7375	TV Crews	449.487	Expo Site-Production Logistics Personal
428.250	ExpoSite-Expo Security, Vancouver Police	449.537	Expo Site-?
433.1875	Expo Site-Maintenance	449.587	Expo Site-Monorail, Maintenance
439.9875	Media		
442.662	Expo Site-Roaming Mobile Robot (Expo Ernie)		

Liberty Weekend=Spectacular Monitoring

This Fourth of July celebration, centering on the Statue of Liberty and Governors Island in New York Harbor, should offer unusually good scanner monitoring fare because of the participation of so many diverse agencies.

Some 33 naval vessels representing 23 countries will be poised in the harbor as the carrier John F. Kennedy fires a 21-gun salute to be taken by the battleship Iowa and its reviewing party aboard.

Besides searching for military and federal government operations during this festive period, take a listen to some of the following frequencies for heavy use by law enforcement and news reporting services on or near New York Harbor:

34.79 Statue of Liberty
40.39 Governors Is. Security (USCG)
151.295 Urban Park Rangers

NY Harbor Police
154.800
156.850

U.S. Coast Guard
156.600
156.700
157.050
157.100
157.150
157.175

NY Transit Police
160.305/.695

Fire Island National Seashore
166.900

NY Port Authority
453.400 Police
453.800 Tunnels & Bridges
150.995 Lincoln Tunnel & buses
151.115 Bus terminal

U.S. Park Service
418.300

State Island Ferry
156.950 Police
158.730 Security

State Island Rescue
155.295/.280

NYPD Special Events
470.8375/.8625/.6875

News Media

AP	35.90	
ABC	450.5875	Network
	450.4125	Special events
	152.870	Remote
CBS	450.0875	Reporters
	450.350	Network pool
	153.290	Remote
NBC	161.670	Assignment desk
	153.050	Remote
WINS	450.450	Reporters
WNYC	161.760	
WOR	450.4875	

450.800 Goodyear Blimp
452.975 Action Movie News
462.700 State News Service
173.375 Newsday
453.000 Time
173.225/.275 NY Times
173.325 NY Daily News

HURRICANE MONITORING

During tropical hurricane season, June through November of each year, a number of high-frequency single-sideband services are activated to provide emergency communications.

MT reader Jim Dantin provides the following list of frequencies which become quite active as these storms threaten coastal areas.

3.9350	HAM Hurricane network
3.9400	"
7.2470	"
7.2680	"
14.320	"
14.3250	"
21.3250	"
2.1820	Maritime (Hurricanes)
2.2060	"
2.5980	"
4.1250	"
5.5620	NOAA Hurricane hunters
6.6730	"
8.8760	"
13.3540	"
4.4550	Petroleum platform svcs.
4.5500	"
4.6345	"
4.6375	"
7.5520	"
8.0700	"
2.6700	US Coast Guard
3.1230	"
5.3200	"
5.6960	"
8.9840	"

NUCLEAR TEST SITE

Sequestered away deep in the Nevada desert, the Nuclear Test Site is the home of underground atomic explosions, a proving ground for nuclear armaments.

As with any complex military installation, radio communications provides the heartbeat of this facility. The following list of active scanner frequencies was provided by Todd Shideler of Las Vegas. All frequencies are in megahertz.

36.33	EOD/Weather/EPA radiation checks
122.800	UNICOM, Desert Rock Airport
167.825	Security
167.875	Control
167.925	Fire Department
173.5125	Nuclear test preparation/ countdown
173.6125	"
173.7125	"
401.800	Paging
407.350	Construction
408.025	Construction

We appreciate Todd's contribution and encourage other readers who have similar confirmed lists of interesting monitoring to send in their listings.

MT WORLD WATCH

Tom Williamson

Greetings to all readers of the new Monitoring Times! I'm Tom Williamson and every month I'll be working to keep you in touch -- and in tune -- with the world of shortwave listening and DXing.

It's July already and with the hot weather comes the normal summer-time problem of heavy thunderstorm static (QRN) and difficult tropical band reception (be sure to read Paul Swearingen's article, including some valuable safety tips, in this issue). The good news is that the high-frequency channels have cheered up a bit even though low sunspot numbers still limit reliable reception to around 17 MHz.

Still, there's plenty of good listening to be found from Latin America. Rather unappreciated by the Anglo-Saxon races is the huge and varied world of music in Spanish America -- to say nothing of Brazil with its African and Portuguese inheritance.

With just a little thought and listening, it's easy to distinguish between the two major forms of music from this part of the world: traditional folk and the more modern dance music.

The best known Latin folk music comes from the mountain regions of South America and is simply referred to as "Andean" music. It often sounds kind of sad and is easily identifiable because of its haunting, slow rhythms. Sometimes it is accompanied by vocal groups. A variation on Andean music comes from Peru which is called "village dance" and is often referred to as the "huayno." Some reporters have been known to refer to "huayno" singing as yipping!

Actually, the best source of Andean music is not a difficult catch at all. In fact, it comes from the powerhouse evangelical station HCJB in Quito, Ecuador. Four times each week you can hear traditional Andean music on the program, "Musica del Ecuador." The fifteen minute program can be heard on UTC Tuesdays at 0230 and and 0515 and again on Saturdays at 0115 and 0545 UTC.

Once you've learned to recognize this type of music, take your radio on a trip through South America. Other Ecuadorian stations are good sources of such music as is the nation of Peru. In the early mornings -- around 1000 UTC -- you'll hear many beautiful programs of Andean music. One that has a good listenership in North America is *Buenos Dias Peru* from *Radio Los Andes* in Huamachuco. Their 5030 kHz frequency in the 60 meter tropical band is well heard after 0950 UTC despite the station's modest power.

But shortwave provides more than just the traditional music. Modern dance music has swept the South American continent. "Musica romantica" is slow ballads, usually with solo vocalists and always full of deep emotion. The rhythms include the "son," the "bolero" and others from virtually every country in South America.

The faster-tempoed music is collectively called "musica tropical" and originates from the coastal and Caribbean regions of the continent. It is truly music for movement and if you don't find yourself at least tapping you fingers, it's a good sign that you're dead.

The most frequent rhythm you'll hear on the shortwave bands is the the ubiquitous "cumbia" and the "merengue." The latter originated in the Dominican Republic and Haiti and stations from those countries are a good source of this type of music. Although *Radio Clarin* in the Dominican Republic isn't what it used to be in terms of a high quality signal, try its 11700 kHz outlet. *Radio Discovery*, also from the Dominican Republic, is a good source of this music albeit even harder to hear than Radio Clarin. Try for Radio Discovery anywhere from 0100 to 0400 UTC on a varying frequency of 6245 kHz and again from 1800 to 2000 on 15045 kHz. You may be rewarded for your efforts with a program with host Rudy Espinal.

By contrast, the "cumbia," which originated in Columbia, has captured the imagination of the entire Latin World. It can be heard almost nightly from stations in Venezuela and Columbia in the 60 meter bands. Try the famous *Ecos del Torbes* on 4980 kHz. The truth is that even if you can't find *Ecos del Torbes* -- and it is a pretty easy catch -- turn on the shortwave radio any Saturday night and you'll find the dial throbbing with *Sabado bailable* (literally, Saturday dancing).

So the next time you're at home -- all dressed up with no place to go -- on a Saturday night, make a date with your radio to go *Sabado bailable* in Peru. Then take a swing through Ecuador and into the Andes. As always, there's a whole world out there. It's only as far away as your short wave radio. ■

RADIO ACTIVITY

Send your loggings to Radioactivity c/o Tom Williamson, 506-270 Waterloo Avenue, Guelph, Ontario, Canada. All loggings should include frequency, time heard in UTC, station name, location, language signal strength and some details of the program(s) you heard. This month we also feature some loggings from the club bulletins of ASWLC, FRENDX, ODXA and SPEEDX.

(Frequency, Station, time, frequency, language, program details, contributor.)

ALGERIA: RTVA [1945 UTC on 17745 kHz in French] Arabic-style music with lady announcer in French. At 2000 UTC into English program of International service and news in English. Good. (Tom Williamson-ON)

ANGOLA: Radio Nacional [2300 UTC on 11955 kHz in Portuguese] Wide selection of easy listening music from around the world with male announcer. Interference from VOA and HCJB. Poor. (Larry Miller, PA)

AUSTRALIA: VLQ9, Brisbane [0600 UTC on 9660 kHz in English] Domestic service broadcasting local help wanted ads. (Gunner Daneels, WA)

AUSTRIA: Radio Austria International [0220 UTC on 9770 kHz in German] Music by Strauss, German station announcement, followed by news bulletin. Good signal.

BANGLADESH: Radio Bangladesh [1533 UTC on 4894 kHz in English] Man with British accent reading national and world news plus sports. Woman with economic report. (Dale Park-HI/ASWLC)

BENIN: La Voz de la Revolution [0540 UTC on 4870 kHz in French] Hilife music with male DJ. ID. Ute QRM. (David Sharp, FL/SPEEDX)

BOTSWANA: Radio Botswana [0445 UTC on 7255 kHz in vernculars and English] Afro rock ar 0450, ID with clear mention of "Gaborone" at 0500 UTC. Fair to good but // 4820 and 3356 were both poor. (Dave Clark-ON/ODXA)

BRAZIL: Radio Ribeirao Preto [t0312 UTC on 3205 kHz in Portuguese] Blend of English and Portuguese vocals, soft-spoken announcements. (Richard D'Angelo, PA/FRENDX)

BRITAIN: BBC Cyprus Relay [2130 UTC on 6030 kHz in English] "English by Radio" program with "English Anyway No. 61." Poor. (Dave Alpert-NY)

BURKINA FASO: Radio Burkina [2351 UTC on 4815 kHz in French] Hilife music with male DJ. (Ruth Hesch, NY)

CANADA: Radio Canada International [2005 UTC on 11945 kHz in English] News from Radio Canada International. Excellent signal.

CHINA: Radio Beijing [2019 UTC on 11945 kHz in Chinese/Russian] Chinese music, announcements by lady in Russian. Good signal overriding RCI. (Dave Alpert-NY) [0200 UTC on 11745 kHz in English] Transmission via Radio France International with news and commentary. Good.

CLANDESTINE: La Voz del CID [0046 UTC on 7390 kHz in Spanish] Selections from an album of organ music with IDs as "Esta es Radio Camilo Cienfuegos, de la cadena radial de Cuba independiente y democratica" and interval signal. (Mike Csorbay-ON/ODXA)

CUBA: Radio Havana Cuba [0100 UTC on 9740 kHz in English] News, comments and Cuban rhythms. Good signal.

ECUADOR: HCJB [1705 UTC on 15160 kHz in Spanish] Broadcast of ministry of Education through facilities of HCJB (this is NOT a Voice of the Andes production). Commentaries, news, legends of Ecuador, national music, program entitled "Hoy Dia" -- very interesting! Even if you don't speak Spanish, its worth listening to the music. Fair. (Tom Williamson, ON)

ECUADOR: Radio Quito [0200 UTC on 4920 kHz in Spanish] News bulletins, ads, IDs as "Radio Quito." Also known as "La Voz de la Capital." Good.

EGYPT: Radio Cairo [2015 on 12050 kHz in Arabic] Non-stop Eastern-style music (no vocals]. Fair signal.

GABON: Africa Numero UN [2020 UTC on 15475 kHz in French and English] French news and political commentaries read by man. Sports update on World Cup soccer then rock music with English announcements: "Here we are again! Africa Number One!" Into program entitled "Special melee." Excellent. (Tom Williamson-ON)

GERMANY, WEST: Deutsche Welle [sign on of "Asian Service of the Voice of Germany" then comprehensive coverage of Asian news.

GERMANY, WEST: Sudwestfunk [0112 UTC on 7265 in German] Pop and rock music to 0200 then into news in German. Dance music program ar 0210 UTC. (Harold Sellers-ON/ODXA)

HONDURAS: HRPC [0230 UTC on 3250 kHz in Spanish] Religious talk by man. IDs as "Radio Luz y Vida." Local program produced in Guatemala. Fair.

ICELAND: Icelandic State Broadcasting Service [1215 UTC on 13797 kHz in Icelandic] News (?) from 1215 to 1245 UTC. ID at bottom of hour. (Rufus Jordon-PA/FRENDX)

INDIA: All India Radio [2146 UTC on 11620 kHz in English] Talk on banks and agriculture, music, "Newsreel." Fair. (George Neff-OH/SPEEDX)

INDONESIA: RRI Bengkulu [1438 UTC on 3265 kHz in Indonesian] Lady announcer with lite Indonesian pop music. (Owsley-CA/ASWLC)

INDONESIA: RRI Temate [1433 UTC on 3345 kHz in Indonesian] Male announcer with lite female Indonesian vocal music. (Owsley-CA/ASWLC)

IRAN: Voice of Islamic Republic of Iran [2010 UTC on 15085 kHz in ?Farsi] Male announcer with ?news or news comments in local language. Poor reception due to bubble jammer. (Tom Williamson-ON)

IRAQ: Radio Baghdad [2130 UTC on 7170 kHz in English] Comments about Iran. (Mike Willen-NJ/ASWLC)

IRELAND: Radio Dublin International [0150 UTC on 6909.9 in English] Pop and rock music with female announcer at 0200, ID at 0201 then back into music. First time audible for quite some time. (Dave Clark-ON/ODXA)

ISRAEL: Kol Israel [2000 UTC on 11605 kHz in English] News in English with detailed commentary on the Middle East. Good signal strength.

ISRAEL: Reshet Bet [2215 UTC on 9388 kHz in Hebrew] Musical program. Interference from RTTY. (Dave Alpert-NY)

ITALY: RAI [1902 UTC on 17780 kHz in Central European language] "Bird Call" interval signal, closing announcement by lady in either Polish or Czech.

RADIO ACTIVITY

KOREA, SOUTH: Radio Korea [0230 UTC on 15575 kHz in English] Program "From Us to You" followed by "Koreans Today." (Andrew Gordon-CT).

KUWAIT: Radio Kuwait [1915 UTC on 11675 kHz in English] Rock and roll music. (Mike Willen-NJ/ASWLC)

LUXEMBOURG: Radio Luxembourg [0024 UTC on 6090 in English] Pop music and easy-going male DJ. ID heard at 0036 for "Radio Luxembourg." Good signal but only fair overall due to heavy splatter from adjacent signals. (Tom Manley-ON/ODXA)

MEXICO: Radio Mexico International [0030 UTC on 15430 kHz in Spanish] "Musical de Mexico" program. (Gary Pate-MD/FRENDX)

NETHERLAND ANTILLES: TWR Bonaire [1245 UTC on 11815 kHz in English] Religious program "Glad Tidings", then message from TWR President Paul Freed. Good signal quality.

NEW CALEDONIA: Radio Noumea [1018 UTC on 7170 kHz in French] Rock and roll music. (Parker-OH/ASWLC)

MONACO: TWR [0625 kHz on 7015 kHz in English] Sign on then "Back to the Bible" program followed by "midweek", frequency announced as "7.1 megahertz."(Dave Alpert-NY)

NICARAGUA: Voice of Nicaragua [0555 UTC on 6015 kHz in English] Man and woman with international news, news headlines, 0559 ID, "thanks for listening to the int'l SW dept. of the Voice of Nicaragua" and invitation to tune in tomorrow. Good. (Dave Alpert-NY)

PAKISTAN: Radio Pakistan [1703 UTC on 9465 kHz in English] Man reading news. (Gerald Arrington-CA/ASWLC)

PERU: Radio Eco Iquitos [0245 UTC on 5010 kHz in Spanish] Latin romantic songs, ads for stores in Iquitos, station ID by man. Fair.

PERU: Radio Melodia [0240 UTC on 6260 kHz in Spanish] Excited non-stop soccer commentary between local team and another. Male announcer and occasional ads. Fair.

PERU: Radio Satellite [0237 UTC on 6724 kHz in Spanish] Latin ballads played by male announcer. Poor signal.

SPAIN: Spanish Foreign Radio [2007 UTC on 9690 kHz in English] Talk about Transylvanians, ID at 2015, operetta music. (Dave Alpert, NY)

SRI LANKA: Sri Lanka Broadcasting Corporation [1114 UTC on 15120 kHz in English and Arabic] News in English, musical program in English and Arabic. (Mike Keenan-Korea/ASWLC)

SWAZILAND: TWR [0256 UTC on 7295 kHz in unidentified language] Interval signal then ID at 0259 "This is Trans World Radio Swaziland," lady annnouncer in unidentified language, hymns.

SWEDEN: Radio Sweden International [2300 UTC on 9695 kHz in English] Talk about nuclear power plants. (Stanley-AZ/ASWLC)

SYRIA: Radio Damascus [2040 UTC on 9670 kHz in English] Program of music with man singing Arabic songs. (Bingham-MA/ASWLC)

TAHITI: Radio Tahiti [0330 UTC on 15170 kHz in French/?Tahitian] American songs such as "I've Been to Paradise," announcements in French, at 0330 UTC news in presumed local dialect, some "Hawaiian" type music. Parallel 11826 kHz. Good. (Andrew Gordon-CT) [0130 UTC on 11815 kHz in French] with female DJ playing disco, // 15171 kHz (Larry Miller-PA) [Watch for Dave Rosenthal's article on Radio Tahiti in the September issue of MT]

TURKEY: Voice of Turkey [2340 UTC on 9560 kHz in English] Turkish music. (Mike Willen-NJ/ASWLC)

UNIDENTIFIED [2140 UTC on 10000 kHz ?Arabic] Male announcer and some music, possibly Arabic language, mention of "Jamahiriya" ... to past 2200 UTC. (Dave Alpert, NY)

VIETNAM: Voice of Vietnam [1207 UTC on 11750 kHz in Chinese] Lady announcer with mentions of Hanoi and world news. QRM from Singapore on same frequency. (Owsley-CA/ASWLC)

U.S.A.: AFRTS (feeder) [0200 UTC on 6300 kHz in English] Station ID followed a Canadian hockey game, then network news followed by ID as AFRTS by lady at 0205 UTC. (Andrew Gordon, CT)

U.S.A.: KGEI [0130 UTC on 15280 kHz in Spanish] "Voice of Frienship" broadcast. (Andy Gordon-CT)

U.S.A.: WRNO Worldwide [2130 UTC on 11705 kHz in English] Religious program "Four Square Gospel Tidings" with appeal for donations to address in Saskatchewan, Canada. Excellent signal.

U.S.A.: WYFR [1857 UTC on 21525 kHz in French] Ending broadcast (presumably to Canada) with station identification. Fairly Good. (Tom Williamson-ON)

U.S.S.R.: Radio Moscow [2030 UTC on 11860 kHz in English] World Service news read by man. Good signal.

U.S.S.R.: Radiostantsiya Rodina [1710 UTC on 13755 kHz in Russian] Talk and commentary by man with ID as "Radiostantsiya Rodina."

VATICAN: Vatican Radio [0050 UTC on 9605 kHz in English] Roundtable discussion in Rome about miracles. (Mike Willen-NJ/ASWLC)

VENEZUELA: Radio Tachira [0245 UTC on 4830 UTC in Spanish] ID and time check, romantic and lively Latin pops. (Peter Dillon-DC/FRENDX)

This month's contributors: Dave Alpert, Richard D'Angelo, Peter Dillon, Andrew Gordon, Ruth Hesch, Rufus Jordan, Larry Miller, George Neff, David Sharp, Mike Willen, Tom Williamson. and several others who are members of the following clubs: ASWLC, FRENDX, ODXA and SPEEDX. Our special thanks to the clubs.

Voyager and the VLA

NASA's Voyager 2 interplanetary probe is expected to rendezvous with the planet Neptune on August 24, 1989, some 2.7 billion miles from Earth; at this distance radio signals, traveling at the speed of light, will take four hours ten minutes to span the gap.

To accommodate the call, NASA will spend $5.5 million over the next three years to replace the receivers used in conjunction with the VLA (very large array) radiotelescope installation near Socorro, New Mexico.

The 27 dish antennas, each 82 feet in diameter, are arranged in a "Y" pattern and will be used in conjunction with the sophisticated Goldstone Deep Space Communications Complex near Death Valley, California.

Scientists are quite optimistic about the future acquisition of imaging from Neptune, speculating that the pictures should be at least as good as those returned from Uranus in January and February of this year, partially because of the updated equipment and partially because the flyby will be only 2186 miles from the planet's surface. Voyager was 48,440 miles from Uranus when it sent photos back the first of the year.

SIGNALS FROM SPACE

by

Larry Van Horn

160 Lester Drive

Orange Park, FL 32073

Larry Van Horn
160 Lester Drive
Orange Park, FL 32073

This month I received a very interesting letter from George Hunt in Michigan who passed on his experiences with setting up a GOES weather satellite receiving station. George's homebrew/surplus experiences characterize a lot of what is needed to experiment in the higher satellite frequencies. Without further ado, here are George's comments.

"To monitor the GOES satellite, I bought a two meter dish from a surplus electronics firm in Mt. View, California, a couple of years ago. I constructed a feedhorn from a coffee can. I fiddled around for quite a while with an RF converter that tuned around 1.7 GHz, out of a TRC-29. The TRC-29 had a 30 MHz IF that was unsuccessful even using a pre-amp.

"Later I tried using a Polarad FIM (Field Intensity Meter) that tuned the proper band segment without success. Finally, I bought a RHG Electronics Labs FMRW 1700 FM receiver at a swap meet. It works well (at least down to the 30 MHz IF into a 30 MHz FM receiver). The output goes into a Westrex RJ-4 FAX receiver.

"The GOES bird sends out a 240 scans/min signal; my recorder runs at 120 scans/min, so I get two pictures side by side. The system works well if no more than 10' of RG-213 coax is used between the horn and receiver. If more coax is used, a preamp must be used at the feedhorn, otherwise the signal is completely absorbed in the coax."

George further describes the setup he uses for the polar orbiting satellites: "I use a Defense Electronic Industries TMR-6 telemetry receiver with a crystal controlled TMH-A6A tuning unit. I bought crystals to receive the NOAA birds from International Crystal. The price was reasonable and the service was prompt.

"The satellite signals are picked up by a circularly polarized Lindenblad antenna I bought surplus from the FAA. The video from the DEI receiver goes into the RF-4 recorder also. The pictures received are pretty good.

"I have monitored the space shuttle on their UHF-AM signals using a R-278 surplus receiver and a UHF discone antenna (more FAA stuff). I've only picked up snatches of conversation."

I appreciate George's comments on monitoring the weather

THE MT FAMILY OF WRITERS

Larry Van Horn

Larry Van Horn was born in San Antonio, Texas, on January 14, 1952. Larry entered the service (U.S. Navy) in 1971.

After completing Navy Basic Electricity and Electronics school at Great Lakes, Illinois, he attended Sonar "A" school at Key West, Florida. Following school, he was assigned to the USS Josephus Daniels (DLG-27) homeported at Norfolk, Virginia. Upon completing that tour of duty, he was transferred back to Key West for advanced electronics training.

Larry's next sea tour was aboard the USS Robert E. Peary (FF-1073) stationed at Pearl Harbor, Hawaii. During his stay aboard the Peary, Larry became an amateur radio operator, active in the amateur radio satellite program. While at Pearl, Larry served as Secretary/Treasurer for the Pearl Harbor Subase Amateur Radio Club and editor of the club newspaper. He was also active in Navy MARS.

His next sea duty assignment was aboard the USS Reasoner (FF-1063) homeported at Long Beach and San Diego, California.

With sea duty behind him, Larry was transferred to shore duty at NAS Memphis, Tennessee, where he served as a patrolman in the base security department. During this period he helped reactivate the base amateur radio club (W4ODR) and served as its President.

Following shore duty, Larry returned to school at Memphis, attending Aviation Avionics "A" school and the Navy's toughest advanced electronics school, AVIC7, from which he graduated with honors.

Upon leaving Memphis, he was assigned to Fighter Sqadron 201 based at NAS Dallas, Texas. During his tour at Dallas, Larry was further assigned to the NAS Dallas Public Affairs Office as the station's staff journalist, editor of the base newspaper "Sky Ranger," and media relations specialist.

While in Dallas, Larry worked part-time for Dallas' local CBS affiliate, KDFW-TV channel 4, and the largest local daily newspaper, the *Dallas Times Herald*. During the 1984 Republican National Convention, Larry worked full time as an assignment editor on the city desk of the *Dallas Times Herald*.

While stationed at NAS Dallas, Larry was awarded the coveted Chief of Naval Information Merit Award for journalism excellence and was rated as one of the top four journalists in the Navy in 1984. He also received many other awards and letters of commendation for his work at NAS Dallas during his tour.

Larry is currently assigned to NAS Cecil Field, Florida.

Larry has been a member of the National Radio Club (NRC) and election committee chairman of the International Radio Club of America (IRCA). He is currently a member in good standing of the Radio Communications Monitoring Association (RCMA), World FM-TV DX Association (WTFDA), North American Shortwave Association (NASWA), the Society to Preserve the Engrossing Enjoyment of DXing (SPEEDX), United States Space Education Association (USSEA), and the Radio Amateur Satellite Corporation (AMSAT).

Please turn to p.37

Signals from Space, cont'd

birds and hope that it has been of use to other MT readers. George would also like to trade manuals and information on surplus equipment that might be used for satellite monitoring. George can be reached at Rosenbalm Aviation, Box 834, Willow Run Airport, Ypsilanti, Michigan 48198.

• According to John Biro, the Russians have announced, via Radio Moscow, that the crew aboard the MIR space station have finished the first phase of their mission and are preparing to move to the Salyut 7 space station. If this move is made, the Soyuz T-15 crew will probably recover the French space dust experiment on the exterior of the Salyut 7/Cosmos 1686 complex and return to earth.

MT readers should watch for a shift to the Salyut 7 frequency 142.415 MHz for voice comms. Another long-duration crew is expected aboard MIR soon so the 143.625 MHFz voice and RTTY frequency will remain active.

Expect to hear very soon that the next Soviet crew aboard MIR will launch an ISKRA satellite. These satellites have been known to carry amateur transponders aboard for communications (15 meters uplink and 10 meters downlink). I hope to include more information from John in next month's *MT*.

• The USFL will use the RCA SATCOM K-2 to distribute football games nationwide beginning with the 1986 Fall season. KU-band dish owners are invited to report transponder usage to this column on the KU of games broadcast for the USFL.

• Are you interested in getting the latest space information and orbital parameters? Does satellite monitoring interest you? Do you own a computer and modem?

I am working with the Sysop of a local BBS to get a sub-board dedicated to nothing but Space Communications for *MT* readers and provide better access to the *Signals from Space* editor.

If you are interested in using such a system, I need to hear from you; if there is enough interest, I'll be passing on details shortly. Drop me a postcard care of the column address in the masthead with your comments.

• I just received my copy of the *new second edition* of Communications Satellites. I must say that Bob, Judy and the gang, in Brasstown have outdone themselves! The book layout, printing and quality is the finest I have seen from Grove Enterprises.

To all who provided material, support, frequencies, and satellite information, I wish to thank each and every one of you. Communications Satellites could not be possible without the assistance of the many *MT* readers who have given me your comments and support over the last few years.

I know that all of you will find that the new larger edition with its 255 pages will help keep you informed on space communication developments.

• This will be a relatively short column this month due to my approaching departure for my annual pilgrimage to the deserts of Fallon, Nevada, and two weeks of operating with Navy Carrier Air Wing Twenty. I'll be dragging a couple of scanners with me and if I get any off time hope to compile some UHF aircraft scanner frequencies for this column next month.

Also next month, the latest from John Biro on the Russians and their new space station MIR. Be sure to send your correspondence concerning satellite frequencies, satellite hints and tips, and military aircraft frequencies to the address in the masthead. If you desire a personal reply, please enclose an SASE.

James R. Hay
141 St. John's Blvd.
Pointe Claire, P.Q.
Canada, H9S 4Z2

Now that summer is returning, the winter's ice has departed from the Great Lakes and many readers are heading back to their summer cottages, it seems a good time to have a look at the activity which can be heard on the Great Lakes. All frequencies are in megahertz.

GREAT LAKES VHF MONITORING

156.275	ch.65	KSF 914	Amoco Oil - Chicago
		WHG 854	Waukegan Port District, Waukegan, MI
156.300	ch.6	VDX 36	Sarnia Traffic
		This channel is designated for intership communications relating to safety. A few coast stations are equipped with this channel where it is used only for safety related matters.	
156.350	ch.7	WHF 847	Dunbar and Sullivan - Chicago
		WHF 767	Manitowoc Yacht Club - Manitowoc, WI
		WHG 854	Waukegan Port District - Waukegan
156.400	ch.8	KSC 779	Great Lakes Dredging - Chicago
		This channel in	Canada is a secondary intership safety channel in Canada.
156.425	ch.68	KUZ 445	Algoma Marine - Algoma, WI
		KQU 367	Chicago Yacht Club
		KVY 744	Harbor Lite Yacht Club - Racine, WI
		KQU 367	Chicago Yacht Club
		KVY 744	Harbor Lite Yacht Club - Racine, WI
		WQX 603	Harbor Tender Co. - Chicago
		WHF 767	Manitowoc Yacht Club - Manitowoc, WI
		WQX 618	Middle Coast Marine - Port Washington, WI
		WXZ 504	Racine Yacht Club
		WHU 311	Stop n Dock Marina - Two Rivers, WI
		WRV 396	Syntec Inc. - Port Washington, WI
		KIZ 603	Tate Electronics - Brookfield, WI
		KZN 514	University of Wisconsin - Green Bay, WI
		KFQ 810	Waukegan Flotilla 3 - Waukegan, MI
		WQZ 420	Wilmette Harbor Association, Wilmette, MI
156.450	ch.9	KUZ 445	Algoma Marine - Algoma, WI
		WHD 774	Al's Enterprises - Chicago
		KXS 263	Bay Electronics - Sturgeon Bay, WI
		KVR 486	Bay Shipbuilding - Sturgeon Bay, WI
		WQB 414	Chicago Park District
		WDT 551	Chicago Sportfishing
		KQU 367	Chicago Yacht Club
		WHH 322	City of Chicago
		WHD 510	Fifth St. Yacht Club - Racine, WI
		KEB 310	Flybridge Yacht Club - Chicago
		KFB 681	Green Bay Yachting Club
		WQX 603	Harbor Tender Co. - Chicago
		KVL 875	Kenosha Yacht Club - Kenosha, WI
		KWS 585	Milwaukee Yacht Club
		WHF 754	North American Towing - Chicago
		KVR 500	Pace Communications - Waukegan, MI
		CJQ 717	Royal Canadian Yacht Club - Toronto
		KYI 921	South Shore Yacht Club - Milwaukee, WI
		WQZ 381	Sturgeon Bay Yacht Haven
		WRV 396	Syntec Inc. - Port Washington, WI
		KIZ 603	Tate Electronics - Brookfield, WI
		KBK 365	University of Wisconsin, Milwaukee, WI
		WHU 414	Villa Marine - Kenosha, WI
		WHG 854	Waukegan Port District - Waukegan, MI
		WQZ 420	Wilmette Harbor Association - Wilmette, MI
156.475	ch.69	WHU 381	Yacht Yard Inc. - Chicago
156.500	ch.10	WHD 774	Al's Enterprises, Chicago
		KSF 914	Amoco Oil - Chicago
		KSF 720	Burlington Northern RR - Allouez, WI
		WQB 542	Calmet Fishing Market - Chicago
		KFT 312	City of Milwaukee, WI
		WRD 754	DiSanto Brothers Marine - Chicago
		KAQ 384	Falcon Marine - Waukegan, MI
		KPB 612	Federal Marine Terminals - Chicago
		KAQ 384	Falcon Marine - Waukegan, MI
		KPB 612	Federal Marine Terminals - Chicago
		KSA 278	Great Lakes Towing - Chicago
		WHU 343	Great Lakes Towing - West Allis, WI
		KLG 358	Seaway Service - Chicago
		WXZ 253	Selvick Marine Towing - Sturgeon Bay, WI
		-- --	J.W. Wescott Co. - Detroit, MI
156.525	ch.70	This channel is used by pleasure cratt.	
156.550	ch.11	WHD 787	Bluebird Fishing Charter - Chicago
		VDK 35	Sarnia Traffic
		VDK 31	Seaway Iroquois
		VDX 70	Seaway Newcastle - St. Catherines Ont.
		VDX 72	Seaway Newcastle - Port Hope, Ont.
		VDX 68	Seaway Long Point - Port Colborne
		XJT 30	Seaway Long Point
		KLG 358	Seaway Services - Chicago
156.600	Ch.12	XLI 46	Burlington Canal Bridge
		KSF 720	Burlington Northern RR - Allouez, WI
		WQB 414	Chicago Park District
		KYH 549	City of Chicago
		WHF 745	City of Chicago
		WHF 746	City of Chicago
		WHF 747	City of Chicago
		WHG 612	City of Chicago
		WQZ 355	City of Chicago
		WXY 930	City of Chicago
		WKY 931	City of Chicago
		KFT 312	City of Milwaukee, WI
		KZN 488	City of Milwaukee, WI
		KPB 612	Federal Marine Terminals - Chicago
		WHD 510	Fifth St. Yacht Club - Racine, WI
		KSA 278	Great Lakes Towing - Chicago
		WHU 343	Great Lakes Towing - West Allis, WI
		-- --	Hamilton Harbour Commissioners
		VDX 30	Lakehead Harbour Commission - Thunder Bay, Ont.
		WXZ 504	Racine Yacht Club
		VDX 35	Sarnia Traffic
		VDX 23	Sault Ste. Marie Canal Lock
		KEF	Seaway Eisenhower - Massena, NY
		KLG 358	Seaway Services - Chicago
		XJF 495	Toronto Harbour Commissioners
		WQZ 420	Wilmette Harbor Association - Wilmette, MI
156.625	ch.72	This channel is used by pleasure craft.	
156.650	ch.13	WQB 542	Calmet Fishing Market - Chicago
		KYH 549	City of Chicago
		WHG 612	City of Chicago
		WXY 930	City of Chicago
		WXY 931	City of Chicago
		KZN 488	City of Milwaukee, WI
		WAG	Seaway Clayton
		WAG	Seaway Sodus
		This channel is also used for bridge to bridge communications.	
156.675	ch.73	WHF 802	Central Dispatch Inc. - Chicago
		WHF 754	North American Towing - Chicago
156.700	ch.14	XLI 46	Burlington Canal Bridge
		VDX 30	Lakehead Harbour Commissioners, Thunder Bay, Ont.
		VDX 23	Sault Ste. Marie Canal Lock, Ont.
		KLG 358	Seaway Services - Chicago
		VDX 22	Seaway Welland
		XJF 495	Toronto Harbour Commissioners
		KGA 287	Wendella Sightseeing - Chicago
156.800	ch.16	This is the Distress and Calling channel which is used by all ship stations, and many coast stations as well.	
156.850	ch.17	KIL 927	Algonac Marine Operator, MI
		KIL 925	Alpena Marine Operator, MI
		KIL 924	Benton Harbor Marine Operator, MI
		KQU 440	Cleveland Marine Operator, OH
		KVY 602	Copper Harbor Marine Operator
		KVY 601	Duluth Marine Operator, MN
		KVY 603	Grand Marais Marine Operator, MI
		KIL 926	Harbor Beach Marine Operator, MI
		WDT 522	Lake County - Fox Lake, MI
		KIL 922	Lorain Gateway Operator, OH
		WMI	Lorain Marine Operator, OH
		KIL 928	Opagon Marine Operator
		KIL 923	Pickford Marine Operator
161.775	ch.83B	VDQ 3	Cardinal CG Radio - Cornwall
		VDQ 2	Cardinal CG Radio - Kingston
		VBE 2	Sarnia CG Radio - Leamington
		VBE 3	Sarnia CG Radio - Kincardine
		VBB	Sault Ste. Marie
		VBG 2	Toronto CG Radio - Oakville
		VBC 2	Wiarton CG Radio - Leamington
		XMJ 362	Wiarton CG Radio - Kilarney
		This frequency is used in the same manner as ch.21B	

All of the frequencies below are used for public correspondence.

161.800	ch.24	VDQ	Cardinal CG Radio
		VBG	Toronto CG Radio
		VBC	Wiarton CG Radio
161.825	ch.84	KIL 925	Alpena Marine Operator, MI
		KVY 601	Duluth Marine Operator, MN
		KVY 603	Grand Marais Marine Operator, MI
		KTD 564	Waukegan Marine Operator, MI
161.875	ch.85	VDQ	Cardinal CG Radio
		KVY 605	Port Washington Marine Operator
		VBE	Sarnia CG Radio
		VBC	Wiarton CG Radio
161.900	ch.26	VDQ	Cardinal CG Radio
		WAY 200	Chicago Marine Operator
		VBA	Thunder Bay CG Radio
		VBG	Toronto CG Radio
		VBC	Wiarton CG Radio
161.925	ch.86	KIL 927	Algonac Marine Operator, MI
		KIL 924	Benton Harbor Marine Operator, MI
		KIL 922	Lorain Gateway Operator, OH
		KIL 923	Pickford Marine Operator
		KIL 929	Ripley Marine Operator
161.950	ch.27	VDQ	Cardinal CG Radio
		WAY 200	Chicago Marine Operator
		VBE	Sarnia CG Radio
		VBG	Toronto CG Radio
161.975	ch.87	KQU 440	Cleveland Marine Operator, OH
		KVY 602	Copper Harbor Marine Operator, MI
		KIL 926	Harbor Beach Marine Operator, MI
		KVY 604	Sturgeon Bay Marine Operator, WI
162.000	ch.28	WBL	Buffalo Radio, NY
162.025	ch.88	VBE	Sarnia CG Radio
		VBG	Toronto CG Radio
		KVY 605	Port Washington Marine Operator
		KIL 929	Ripley Marine Operator
		KVY 604	Sturgeon Bay Marine Operator
156.900	ch.18	KIY 712	Associated Fishing - Milwaukee, WI
		WHU 343	Great Lakes Towing - West Allis, WI
		WQX 618	Middle Coast Marine - Port Washington, WI
		KLG 358	Seaway Services - Chicago
		This channel is for commercial users.	
156.950	ch.19	WHZ 312	Great Lakes Electronics - Two Rivers, WI
		KMD 255	Mercury Sightseeing - Chicago
		KLG 358	Seaway Services - Chicago
		This channel is also used by the Canadian Coast Guard	
157.025	ch.80	WQB 414	Chicago Park District
		WXZ 223	Salmon Stop - Waukegan, MI
		KGA 287	Wendella Sightseeing - Chicago
157.050	ch.21	This channel is used by the U.S. Coast Guard	
157.100	ch.22	VDQ	Cardinal Coast Guard Radio
		WDT 522	Lake County - Fox Lake, MI
		KEF	Seaway Eisenhower - Massena, NY
		—	USCG Buffalo, NY
		NOG	USCG Sault Ste. Marie
157.150	ch.23	This channel is used by the U.S. Coast Guard	
157.175	ch.83	--	Prescott CG Base
		VDQ	Cardinal CG Radio
		--	Rockport Rescue Base, Ont.
		VBG	Toronto CG Radio
		KEF	Seaway Eisenhower - Massena, NY
		--	St. Lawrence Seaway Maintenance Base - Massena, NY
161.600	ch.20	KBK 365	University of Wisconsin, Milwaukee, WI
161.650	ch.21B	VDQ	Cardinal Coast Guard Radio
		VBE	Sarnia Coast Guard Radio
		VBF	Sarnio CG Radio - Port Burwell
		VBB 3	Sault Ste. Marie CG Radio - Bald Head
		VBB 2	Sault Ste. Marie CG Radio - Silver Water
		VBA	Thunder Bay CG Radio
		VBA 2	Thunder Bay CG Radio - Schreiber
		VBG	Toronto CG Radio
		VBG 3	Toronto CG Radio - Cobourg
		VBG 4	Toronto CG Radio - Orillia
		VBC 5	Wiarton CG Radio - Pointe au Baril
		VBC 3	Wiarton CG Radio - Tobermory
		This frequency is used for continuous broadcasts of weather and notices to shipping.	

This listing is by no means complete, and readers who know of errors or omissions are invited to let me know. Your comments and correspondence are always welcome. Good listening until next time.

Radio Beijing Knocks on its Own Back Door with English Service to China

by Wu Xiaoyong
Radio Beijing staff

The sound was terrifying. As the clock struck midnight, millions of firecrackers and fireworks literally drowned Beijing in a sea of explosions and lights.

Any first-time tourist in China might think that a major war was going on in the Chinese capital. But Patrick Shangala knew better. Since he arrived in Beijing from Zambia in 1984, he has learned hundreds of Chinese characters and many Chinese customs. He knew that people were simply welcoming in the Chinese new year.

It was the Spring Festival Eve, and it was a good time for Shangala to celebrate, too. He had been doing well in his courses at the Northern China University of Communication and he was in the middle of the winter vacation.

Shangala looked out the window at the fireworks for a while. What a dazzling sight! His radio was on. The dial was pointed to 1251 AM and a familiar voice could be distinctively heard amidst the sound of firecrackers. "...Tonight, we're broadcasting live from the main studios of the China Central Television Station. It's the first time we covered such a television show live and we hope our English explanation helped you enjoy the performances..."

That was Radio Beijing's new Capital Service. The station was providing live English-language coverage of a national television extravaganza, a popular program watched by millions of Chinese families on Spring Festival Eve. For the first time, though, Shangala could really enjoy the show, too. As the cross talks, short plays and songs rolled on, Shangala laughed out loud with his Chinese classmates. He no longer felt left out when the comedians on TV made jokes.

While Shangala was enjoying the show, several Radio Beijing staff members spent the last few hours of the year of the ox in quite a different way. On a narrow balcony overlooking China Central Television's main studio, four Radio Beijing reporters racked their brains to find just the right English words to translate the performances. The heat from the studio lights was almost unbearable and sweat quickly soaked through the foam of their headsets. But they went on without missing a beat, commenting and joking as the show continued.

"Coming up next is a cross-talk. Well, I have to admit we never saw this in the rehearsals. But I will translate as much as I can." Anchorman Xiaoyong was a bit nervous. But years of experience in the profession helped him calm down. Suddenly, his Canadian co-announcer, Doug Kirkaldy, uttered a hearty laugh. So the jokes of the cross-talk comedians did get through to non-Chinese speaking listeners like Doug. What a relief!

"And here is a telephone message we just received," anchorwoman Dang Bing said in a cheerful voice. "It's from Patrick Shangala of Zambia. He called up to say thanks to Radio Beijing for giving him the chance to enjoy the Spring Festival Eve together with the millions of Chinese. Thank you, Mr. Shangala, and we wish you greater success in the new year -- the year of the tiger."

1986 is the year of the tiger, according to the Chinese lunar calendar. It is a year represented by this forceful, vigorous and brave from listeners. Some of the more popular ones are *Beijing Report*, animal. As the tiger roars his way through the months, Radio Beijing intends to make its voice heard by English-speaking listeners in several more Chinese cities. In fact, the Spring Festival Eve special program was broadcast live by several provincial stations as well as in four major cities.

Since the inauguration of its Capital Service in 1984, Radio Beijing, the international service of Chinese radio, has quickly discovered a huge and potentially important audience -- English- speaking people living *in* China. And unlike its international broadcasts, English programs broadcast on medium wave right in town often evoke immediate response

Cultural Interchange, *Learning Chinese Sentence by Sentence* and *This and That*, a program the provides public service information such as restaurant guidance, shopping tips and directories for tourists. The program was designed for foreigners living in or visiting China, but actually most of the listeners are Chinese who are either learning English or simply wanting to find an alternative to the Chinese-language radio programs.

The operation opened a whole world of new horizons for the station. Disc jockey, talk shows and phone-in programs are still only in the planning stages, but the potential of expanding Radio Beijing's domestic service is enormous.

A national English-language network in China? Why not! It may take some time. But listeners like Shangala are waiting, and the people at Radio Beijing are working hard to satisfy their needs.

The Chinese Telegraphic Code

by Don deNeuf,
WA1SPM

While most languages could be adapted with reasonable facility to the dot-dash combinations of the Morse code, the memorization of some 6,000 Chinese picture symbols was virtually impossible.

Each Chinese character was assigned a four-number figure for transmission purposes (see cut). Although it often took Chinese businessmen 20 minutes to prepare a ten-word message, it did at least permit telegraphic communication in their language.

3105	5003	5000	4844	4794	4754	4721	4593	4477	4471
5722 虫	1133 夫	0022 中	2441 斡	4909 縠	4754	4721	7153 隸	3927 甘	3928 甚
5022	1140 夾	0670 史	1631 幹	4474 縠	6560 縠	0549 匏	7153 隸	5283 舊	0048 也
7230 青	1134 夬	0684 吏	8281 姘	4301	4760	4724	4643	4420	0013 世
5153 胃	1135 央	3947 申	4849	1435 尬	7451 罄	1733 彀	0533 媿	0354 共	1574 巷
5126 肅	1138 夷	2576 曳	2832 榦	1434 尷	4762	6049 彀	4662	0366 其	3918 甍
5023	5010	0025 串	4892	4834	5170 胡	4734	0776 哿	2806 楚	4472
2609 本	2521 畫	6508 車	3653 楠	6376 赦	4764	6377 赧	4672	7806 黃	7599 鬱
5043	3973 畫	5124 聿	4972	4841	0858 嘏	7734 彀	2586 揭	4430	0506 劫
1146 奏	5872 盞	0057 事	1425 尠	0051 乾	4774	4744	4690	4391 禁	4473
5044	5013	5002	5000	4842	0506 叔	1032 報	4161 相	4524	5417 茲

明密碼電報書

五四

Signal Propagation and the Ionosphere

How those short wave signals travel around the globe

by Bert Huneault

Part I

As you tune across the HF spectrum, the loudspeaker of your receiver comes alive: "GANDER, THIS IS AIR CANADA 870. POSITION 50 NORTH 30 WEST AT 0135 FLIGHT LEVEL 350...". A slight twist of the dial and "SKYKING, SKYKING, DO NOT ANSWER. NOVEMBER QUEBEC ZULU TIME FOUR ZERO. AUTHENTICATION, PAPA WHISKEY. OILCLOTH OUT." A little further down the dial you hear a Spanish female sending five-figure groups: "CINCO UNO NUEVE CUATRO OCHO...".

On other dial settings the world is at your fingertips: "THIS IS LODNON CALLING IN THE NORTH AMERICAN SERVICE OF THE BBC..."; "THIS IS VOA: THE VOICE OF AMERICA." You hear HCJB's *DX Party Line* program from Quito, Ecuador... RADIO MOSCOW... RADIO NEDERLAND... THE VOICE OF NICARAGUA... RADIO BEIJING... RADIO AUSTRALIA... and countless others.

How is all this possible? How do HF (high frequency--"short wave") signals travel across hundreds or even thousands of miles to your listening post?...Enter the fascinating world of shortwave radio propagation.

The Ionosphere

The ionosphere is that part of the upper atmosphere in which free ions (electrically charged molecules) and electrons exist in sufficient quantities to affect the propagation (signal path) of radio waves. During daylight hours, incoming solar radiation (ultraviolet and x-rays) causes oxygen and nitrogen atoms in the outer atmosphere to break up into free electrons and ions. This process is called ionization; hence the name, "ionosphere."

These electrified particles tend to be concentrated in bands or layers at various heights above the earth. Radio waves are electromagnetic in nature and may be manipulated by outside magnetic and electric forces, such as the ionosphere. They are often bent and reflected, returning to earth over long distances.

At night the ionosphere is cut off from the sun's direct radiation and the charged particles tend to recombine again to form neutral atoms, thus robbing the upper atmosphere of some of its reflective characteristic.

Because the intensity of the solar radiation changes drastically with time and geographic location, shortwave reception conditions vary widely with the time of day, the seasons of the year and the cyclic changes in solar activity which span a period of about eleven years (the "sunspot cycle"). Even meteors

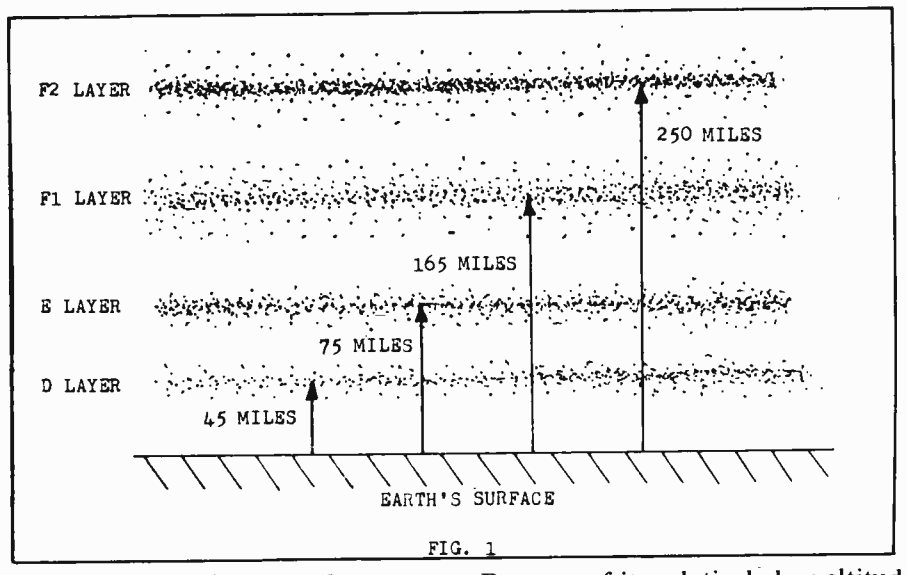

FIG. 1

entering the earth's atmosphere can cause ionization of the air, momentarily affecting shortwave propagation.

Because the density of the atmosphere changes at different altitudes, ionization tends to be concentrated in four distinct layers: at heights of approximately 45 miles (D layer); 75 miles (E layer); 165 miles (F_1 layer); and 250 miles (F_2 layer) above the earth. These heights are approximate and they change from day to night and season to season.

These layers are not sharply defined; each is a fairly thick layer consisting of a region of intense ionization sandwiched between regions of moderate to weak ionization above and below. For example, the band of intense ionization in the F_2 layer is approximately 40 miles thick (see figure 1).

The D Layer

The D layer, being the lowest, is not as intensely ionized as the others. It reaches maximum intensity at about noon, local time, when the sun is highest in the sky, and virtually disappears shortly after sunset when recombinations between electrons and ions occur rapidly because atoms are fairly closely spaced at this low altitude.

For all practical purposes, the D layer does not reflect or bend high-frequency radio waves; instead, the electromagnetic waves are partly absorbed as they pass through this region. The lower the frequency of the HF signal, the more severe the absorption. Thus, the D layer is a nuisance layer for MF (medium frequency: 300-3000 kHz) and the lower range of HF (3000-30,000 kHz) signals

The E Layer

Located only 30 miles or so above the D layer, the E layer is also mostly a daytime phenomenon; however, the instensity of ionization in the E layer is much greater than in the D region. HF signals can therefore be reflected back to earth by the E layer during daylight hours, but recombinations take place after sunset and the E layer practically disappears at night.

Because of its relatively low altitude, the E layer generally results in short-skip propagation, up to approximately 1000 miles.

The F Layers

By far the most important region of the ionosphere for long-distance HF propagation is the F region. Comprised two distinct layers during the day (F_1 and F_2). The F_1 layer actually disappears at night while the highly charged F_2 layer remains ionized around the clock because the recombination rate is slow in this rarefied region of the upper atmosphere.

The height of the F_2 layer varies between 150 and 250 miles on the dark side of the earth, supporting DX (distant) radio communications throughout the night.

Antenna Propagation

As electromagnetic waves escape from a transmitting antenna, they travel outward (propagate) in various directions. Based on their angle of radiation, the waves can be classified into ground waves, direct waves and sky waves (see figure 2).

Ground Waves

Ground waves tend to hug the surface and follow the curvature of the earth. They are subject to absorption by the ground, the amount of which depends upon the nature of the surface (land or water) as well as the frequency of the radio waves.

In general, the lower the frequency the less the absorption, so that while HF ground waves can hardly "get out of town," VLF (very low frequency: 30-300 kHz) and ELF (extremely low frequency: 30-300 Hz) ground waves can be used for long distance communications. As a matter of fact, high-power ELF waves can be used for worldwide naval communications with submerged submarines!

Direct Waves

Direct wave propagation involves waves traveling from transmitting antenna to receiving via a direct path in space, without contacting the ground. Examples include microwave relay towers in TV and telephone networks; the VHF and UHF waves linking TV and FM transmitters to home receiving antennas; and the VHF/UHF waves used by aircraft for communications with control towers and flight service stations.

Direct wave coverage is limited to "line-of-sight" distances; therefore, the higher the antenna, the longer the idstance over which reception is possible. The approximate VHF line-of-sight distance (in miles) may be calculated by multiplying the square root of the antenna height (in feet) by a factor of 1.4. For example, the distance from a 900-foot TV tower to the horizon is about 30 x 1.4 = 42 miles.

But we shall confine our discussion to short wave signal propagation. Let's move on.

Sky waves: The big hop

Shortwave listeners depend upon the sky wave mode of propagation. The sky wave component of electromagnetic waves emitted by a transmitting antenna travels upwards towards the ionosphere; there, depending upon the density of ionization, the frequency (or wavelength) of the waves, and the angle that they make with the ionosphere, the radio waves may: be bent or reflected back to earth, thus providing useful communications; penetrate right through the ionosphere and be lost in space; or be completely absorbed by the ionosphere, rendering sky wave communications impossible.

Therein lies the somewhat "iffy"--though largely predictable and highly interesting--nature of long distance HF radio communications. Next month we conclude this two part series on signal propagation. ■

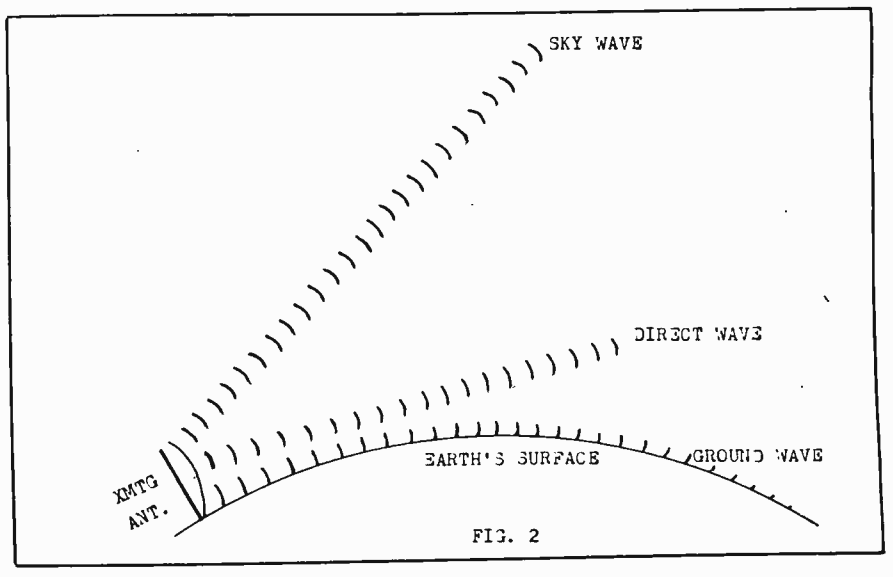

FIG. 2

frequency SECTION

0100 UTC [9:00 PM EST/6:00 PM PDT]

0100-0115		All India Radio.....	6035, 9595	7215
0100-0115		Vatican Radio.....	11845	
0100-0120		RAI, Italy.....	9575,	11800
0100-0125		BRT, Belgium.....	9830	
0100-0125		Kol Israel.....	5885, 9435	7410
0100-0130	T-S	Radio Budapest, Hungary.....	6025, 9520, 11910,	6110 9835 12000
0100-0130		Radio Canada International..	5960, 9535, 11940	9755 11845
0100-0130		Radio France International.	15350	
0100-0130		Radio Japan General Service.	7140, 15235,	9675 17810
0100-0130		Radio Vientiane, Laos.....	7112v	
0100-0145		Radio New Zealand Int'l....	15150	
0100-0145		WYFR, Florida.....	6065, 11855	9680
0100-0150		Deutsche Welle, West Germany	6040, 6145, 11785	6085 9565
0100-0200		ABC, Perth, Australia.....	15425	
0100-0200		Armed Forces Radio and TV...	6030, 15330, 21570	11790 17765
0100-0200		BBC, England.....	5975, 6120, 7325, 9915, 12095	6006 6175 9515 11750
0100-0200		CBC Northern Quebec Srvc....	9625	
0100-0200		CFCX, Montreal, Canada.....	6005	
0100-0200		CFRX, Toronto, Canada.....	6070	
0100-0200		CFVP, Calgary, Canada.....	6030	
0100-0200		CHNX, Halifax, Canada.....	6130	
0100-0200		CKFX, Vancouver, Canada.....	6080	
0100-0200		FEBC, Manila, Philippines..	15315,	21475
0100-0200		HCJB, Ecuador.....	9870, 15155	11910
0100-0200		KCBI, Texas.....	11910	
0100-0200	TEN	KVOH, California.....	11930	
0100-0200		KYOI, Saipan.....	15405	
0100-0200		Radio Australia.....	15160, 15320, 17715, 17795	15240 15395 17750
0100-0200		Radio Belize.....	3285	
0100-0200	(M)	Radio Cultural, Guatemala...	5955	
0100-0200	TES	R. Discovery, Dominican Rep.	6245v	
0100-0200	(T-A)	Radio Budapest, Hungary.....	6110, 12000	9835
0100-0200v		Radio Dublin International..	6910	
0100-0200		Radio Havana Cuba.....	6100, 9740	6190
0100-0200		Radio Moscow.....	7115, 7400, 9765, 12030, 12060, 15415, 15515, 17850	7175 9600 9865 12050 13665 15425 17590
0100-0200		Radio Moscow World Service..	7130, 11720	7315
0100-0200		Radio Prague, Czechoslovakia	5930, 9540,	7345 11990
0100-0200		Radio Thailand.....	9655,	11905
0100-0200		RAE, Argentina.....	9690,	11710
0100-0200		SBC Radio 1, Singapore.....	11940	
0100-0200		Spanish Foreign Radio, Spain	6055,	9630
0100-0200		Sri Lanka Broadcasting Corp.	6005, 15425	9720
0100-0200		Voice of America.....	5995, 9455, 9775, 11680, 15205,	6130 9650 11580 11740 15375
0100-0200		Voice of Indonesia.....	9680,	11790
0100-0200v		Voice of Nicaragua.....	6015v	
0100-0200		WINB, Pennsylvania.....	15145	
0100-0200		WHRI, Indiana.....	9745	
0100-0200		WRNO Worldwide.....	7355	
0115-0200		Radio Berlin International..	6080,	9730
0130-0140		Voice of Greece.....	7430, 9420	9395
0130-0200		Radio Austria International.	9770	
0130-0200		Radio Tirana Albania.....	7120,	9760
0145-0200		Radio Berlin International..	6125,	6165
0145-0200		Radio Korea.....	6480,	7275

0200 UTC [10:00 PM EST/7:00 PM PST]

0200-0215		Radio Berlin International..	7125,	9560
0200-0215		Vatican Radio.....	6145, 9650	7125
0200-0225		Kol Israel.....	9435	
0200-0225		Radio Netherland.....	6020,	9895
0200-0225		Radio Veritas, Philippines.	15195	
0200-0230		BBC, England.....	5975, 6120, 7325,	6005 6175 9410
0200-0230		Burma Broadcasting Corp.....	7185	
0200-0230		Radio Austria International.	6155	
0200-0230	(T-A)	Radio Budapest, Hungary.....	6025, 9520,	6110 12000
0200-0230	(M-F)	Radio Canada International..	5960,	9755
0200-0230		Radio Kiev, Ukrainian SSR...	7175, 9435	13605
0200-0230		Radio Korea World.....	7275,	11810
0200-0230		SLBC, Sri Lanka.....	9720,	15425
0200-0230		Swiss Radio International...	6135, 9885, 12035	9725 11925
0200-0230		WINB, Pennsylvania.....	15145	
0200-0250		Deutsche Welle, W. Germany..	5995, 7285, 9690,	6035 9650 11945
0200-0256		Radio RSA, South Africa.....	5980, 9615	6010
0200-0300		Armed Forces Radio and TV...	6030, 17765,	11790 21570
0200-0300	(S)	CBC Northern Quebec Service.	6195	
0200-0300		GBC, Guyana.....	5950	
0200-0300		HCJB, Ecuador.....	6230	9870
0200-0300		KCBI, Texas.....	11910	
0200-0300	TEN	KVOH, California.....	11930	
0200-0300		KYOI, Saipan.....	15405	
0200-0300		Radio Australia.....	15180, 15395, 17750, 17795,	15240 17715
0200-0300		Radio Beijing, PR China.....	6015,	9635
0200-0300		Radio Belize.....	3285	
0200-0300		Radio Bras, Brazil.....	11745	
0200-0300		Radio Bucharest, Romania....	5990, 9510, 11810,	6155 9570 11940
0200-0300		Radio Cairo, Egypt.....	9475,	9675
0200-0300	(T-A)	Radio Canada International..	5960,	9755
0200-0300	TES	R. Discovery, Dominican Rep.	6245v	
0200-0300		Radio Cairo, Egypt.....	9475,	9675
0200-0300	(T-S)	Radio Dublin International..	6910	
0200-0300		Radio Havana Cuba.....	6100, 9740	6140
0200-0300		Radio Japan.....	11870, 15195	15420
0200-0300		Radio Korea, South.....	11810	
0200-0300		Radio Moscow.....	7115, 9765, 12030, 12060, 15415, 17590, 17825, 17860,	9600 11845 12050 15265 15425 17730 17850 17880
0200-0300		Radio Nacional do Brasil...	11745	
0200-0300		Radio Polonia, Poland.....	6095, 7145, 9525,	6135 7270 11815
0200-0300		Radio RSA, South Africa.....	5980, 9615	6010
0200-0300		Radio Thailand.....	9655,	11905
0200-0300		SBC Radio 1, Singapore.....	11940	
0200-0300		Sri Lanka Broadcasting Corp.	6005, 15425	9720
0200-0300		Voice of America.....	5985, 6010, 6130, 9575, 11675, 11680, 15375,	5995 6085 9455 9775 11740 15205 15420
0200-0300		Voice of Asia, Taiwan.....	7285	
0200-0300		Voice of Free China, Taiwan.	5985,	9680
0200-0300		WHRI, Indiana.....	9745	
0200-0300		WINB, Pennsylvania.....	15145	
0200-0300	(M)	World Music Radio.....	6910	
0200-0300		WRNO Worldwide.....	7355	
0200-0300		WYFR, Florida.....	11805	
0215-0220		Radio Nepal.....	5005	
0230-0300		BBC, England.....	5975, 6120, 9515, 9915	6005 6175 9590
0230-0300		CBC Northern Quebec Service.	6195	
0230-0300		Radio Netherland.....	6165,	9590
0230-0245		Radio Pakistan.....	7315, 15115	11740
0230-0300		Radio Sweden International..	9695, 17840	SSB
0230-0300		Radio Tirana Albania.....	7120,	9760
0230-0300		SLBC, Sri Lanka.....	9720	
0230-0300	(S,M)	WINB, Pennsylvania.....	15145	
0240-0250		All India Radio.....	6110, 9610	9545
0252-0300		Radio Yerevan, Armenian SSR	11790, 13605	11875

0300 UTC [11:00 PM EST/8:00 PM PDT]

0300-0310		CBC Northern Quebec Service.	6195,	9625
0300-0315		Radio Berlin International..	6080,	9730
0300-0315		Radio Budapest, Hungary.....	6025, 9520,	6110 9835
0300-0325		Radio Netherland.....	6165,	9590
0300-0330		BBC, England.....	5975, 6120, 7160,	6005 6175 7185
0300-0330		Radio Cairo, Egypt.....	9475,	9675
0300-0330		Radio Canada International..	5960,	9755
0300-0330		Radio Japan General Service	17810, 17845	17835
0300-0330		Radio Kiev, Ukrainian SSR...	7165	
0300-0330	(T-A)	Radio Portugal.....	9565	
0300-0330	(S,M)	WINB, Pennsylvania.....	15145	
0300-0350		Deutsche Welle, West Germany	6010, 9565, 9735	9545 9640
0300-0350		Radio Berlin International..	9560	
0300-0350		Voice of Turkey.....	9560	
0300-0400		Armed Forces Radio and TV...	6030, 11790, 17765	11730 12060
0300-0400		CFCX, Montreal, Canada.....	6005	
0300-0400		CFRX, Toronto, Canada.....	6070	
0300-0400		CFVP, Calgary, Canada.....	6030	
0300-0400		CHNX, Halifax, Canada.....	6130	
0300-0400		CKFX, Vancouver, Canada.....	6080	
0300-0400		HCJB, Ecuador.....	6230, 11910	9870
0300-0400		KCBI, Texas.....	9852.5	
0300-0400	TEN	KVOH, California.....	15190	
0300-0400		KYOI, Saipan.....	4820	
0300-0400	(M)	La Voz Evangelica, Honduras.	15160, 15320, 17715, 17795,	15240 15395 17750 11750
0300-0400		Radio Australia.....	9565, 9640, 11750,	11860 11970
0300-0400		Radio Baghdad, Iraq.....	3285	
0300-0400		Radio Beijing, China.....	5955	
0300-0400		Radio Belize.....	6910	
0300-0400	(T-S)	Radio Cultural, Guatemala...	7355	
0300-0400	(T-S)	Radio Dublin International..	6065, 9740	6100
0300-0400		Radio Earth.....	6910	
0300-0400	(M)	Radio Havana Cuba.....	7400, 9600, 9765, 11770, 11790, 12050, 13605, 15265, 15415, 15540,	9755 9685 9865 11775 12030 12065 13665 15320 15425 15515
0300-0400		World Music Radio.....	15150	
0300-0400		Radio Moscow, U.S.S.R.....	6095, 7270, 9630, 11990	6135 9525 9740
0300-0400		Radio New Zealand Int'l....	9585	
0300-0400		Radio Polonia, Poland.....	7115, 11765	9595
0300-0400		Radio Prague, Czechoslovakia	5930, 9630, 11990	7345 9740
0300-0400		Radio RSA, South Africa.....	9560, 6005, 15425	11905 9720
0300-0400		Radio Sofia, Bulgaria.....	5055	
0300-0400		Radio Thailand.....	9535	
0300-0400		SLBC, Sri Lanka.....	5995, 9575, 11680, 15205,	6130 9775 15205 15375
0300-0400		TIFC, Costa Rica.....	9680, 5985, 9770	11745 6065
0300-0400		Trans World Radio, Bonaire..	6150	
0300-0400		Voice of America.....	7135, 9790, 11680, 15375,	9535 9800 11745 15420
0300-0400		Voice of Free China, Taiwan.	4820	
0300-0400	(M)	WHRI, Indiana.....	7355	
0300-0400		WRNO Worldwide.....	6185	
0305-0400	(S)	Radio Austria International.	5945, 9770	6055
0310-0330		Vatican Radio.....	6150	
0315-0330		Radio France International..	7135, 9790, 11680,	9535 9800 11745
0330-0400	(M)	CBC Northern Quebec Service.	6195	
0330-0400		BBC, England.....	5975, 9410, 11680,	6175 11745
0330-0400		Radio Austria International.	9770	
0330-0400		Radio Havana Cuba.....	6090, 6140, 11680,	6100 9740 11745
0330-0400		Radio Sweden International.	11705	
0330-0400		Radio Tanzania.....	5985	
0330-0400		Radio Tirana Albania.....	6200,	7300
0330-0400		UAE Radio, Dubai.....	9640,	11940
0335-0340		All India Radio.....	3905, 9545, 11830,	4860 9610 11895
0340-0400		Voice of Greece.....	7430,	9420
0345-0400		Radio France International..	6055, 7135, 9550, 97901	6175 9535 9800
0345-0400		Radio New Zealand Int'l.....	9620, 11705	9645

0400 UTC [10:00 AM EST/9:00 PM PDT]

0400-0410		Voice of Kenya.....	6090	
0400-0415		Kol Israel.....	9009, 11605,	9435 11700
0400-0415		Radio Cultural, Guatemala...	3300	
0400-0426		Radio RSA, South Africa.....	7270	

frequency SECTION

0400-0430		BBC, England.....	5975, 6175 12095, 15420
0400-0430		Radio Bucharest, Romania....	5990, 9510 9570, 11810 11940
0400-0430	M	Radio Norway International..	9730, 11870
0400-0430		Swiss Radio International...	6135, 9725 9885, 12035
0400-0430		TWR Bonaire.....	9535
0400-0430	(S,M)	Trans World Radio, Bonaire..	4835, 7295
0400-0500		ABC, Perth, Australia.....	15425
0400-0500		Armed Forces Radio and TV...	6030, 12060 11790, 17765
0400-0500		Capital Radio, South Africa.	3930
0400-0500		CBC Northern Quebec Service.	6195
0400-0500		CFCX, Montreal, Canada.....	6005
0400-0500		CFRX, Toronto, Canada.....	6070
0400-0500		CFVP, Calgary, Canada.....	6030
0400-0500		CHNX, Halifax, Canada.....	6130
0400-0500		CKFX, Vancouver, Canada.....	6080
0400-0500		HCJB, Ecuador.....	6230, 9870
0400-0500	TEN	KVOH, California.....	9852.5
0400-0500		Radio Australia.....	15160, 15240 15320, 15395 17715, 17795
0400-0500		Radio Beijing.....	15280
0400-0500		Radio Belize.....	3285
0400-0500	(T-S)	Radio Dublin International..	6910
0400-0500		Radio Havana Cuba.....	6090, 6100 6140, 9740
0400-0500		Radio Japan.....	11705
0400-0500		Radio Moscow.....	7155, 9500 11770, 12030
0400-0500		Radio Moscow World Service.	11700, 11950 13605, 13665 15265, 15470 15515, 15540 15470, 15415
0400-0500		RAE, Argentina.....	9690, 11710
0400-0500		VLW 15, Lyndhurst,Australia	15230
0400-0500		VLW 15, Waneroom, Australia	15425
0400-0500		Voice of America.....	5995, 7170 7200, 9575 9670, 11925 15205
0400-0500		WHRI, Indiana.....	7355
0400-0500v	(M)	World Music Radio.....	6910
0400-0500		WRNO Worldwide.....	6185
0415-0430		Radio France International..	6055, 6175 7135, 9535 9550, 9790 9800
0425-0450		RAI, Italy.....	5980
0430-0445		Radio France International..	6055, 7135 9535, 9550 9790
0430-0455		Radio Tirana Albania.....	7300, 9480
0430-0500		BBC, England.....	5975 9510
0430-0500		Deutsche Welle, W. Germany..	7150, 7225 9565, 9765
0430-0500		Radio Austria International.	6155
0430-0500		Radio Netherlands.....	9895, 11720
0445-0500		Radio France International..	6055, 6175 7135, 9535 9550, 9790 9800

0500 UTC **[1:00 AM EDST/10:00 PM PDT]**

0500-0505		Radio Belize.....	3285
0500-0510		Radio Lesotho.....	4800
0500-0515		Deutsche Welle.....	5960, 6065 6120, 6130 7150, 7225 9565, 9700 9765
0500-0515		Kol Israel.....	7410, 9009 9435, 9860 11960, 21710
0500-0515		Vatican Radio.....	11725, 15190
0500-0525		Radio Netherland.....	9895, 11720
0500-0530		Captial Radio, S. Africa....	3930
0500-0530		Radio Berlin International..	9500, 11960
0500-0530		Radio Canada Int'l.....	11840
0500-0530	(M)	Radio Norway International.	15180, 15165
0500-0530	(S,M)	Trans World Radio, Bonaire..	9535
0500-0545		Radio Havana Cuba.....	5970, 6090 6100, 9740
0500-0550		Deutsche Welle.....	5960, 6120 6130 9700
0500-0600		ABC, Melbourne, Australia..	15330
0500-0600		ABC, Perth, Australia.....	15425
0500-0600		Armed Forces Radio and TV...	6030, 11790 15330, 17765
0500-0600		BBC, London.....	5975, 6005 6175, 7105 7160, 9410 9510, 9600 9825, 12095
0500-0600		CBC Northern Quebec Service.	9625
0500-0600		CFCX, Montreal, Canada.....	6005
0500-0600		CFRX, Toronto, Canada.....	6070
0500-0600		CFVP, Calgary, Canada.....	6030
0500-0600		CHNX, Halifax, Canada.....	6130
0500-0600		CKFX, Vancouver, Canada.....	6080
0500-0600		HCJB, Quito, Ecuador.....	6230, 9870 11910
0500-0600	TEN	KVOH, California.....	9852.5
0500-0600		KYOI, Saipan.....	15190
0500-0600		Radio Australia.....	15160, 15240 15320, 15395 17715, 17795
0500-0600		Radio Beijing, China.....	9565
0500-0600		Radio Canada International..	6140
0500-0600v		Radio Dublin International..	6910
0500-0600		Radio Japan General Service.	9735, 15235 17810
0500-0600		Radio Korea World News Svc..	7275
0500-0600		Radio Moscow.....	9535, 9580 9685, 9755 9765, 9775 9865, 11670 11705, 11770 11790, 11950 12010, 12030 12050, 12210 13605, 13680 15210, 15140 15155, 15265 15320, 15415 15470, 15540 17590, 17730 17835, 17850 17860, 17880
0500-0600	S	Radio Zambia.....	11880
0500-0600		SBC Radio 1, Singapore.....	11940
0500-0600		Soloman Islands Bcasting Co	5020
0500-0600		Spanish Foreign Radio.....	9630
0500-0600		VLW 15, Lyndhurst,Australia	15230
0500-0600		VLW 15, Waneroo, Australia.	15425
0500-0600		Voice of America.....	5995, 6035 7170, 7200 9575, 9670 11925, 15205
0500-0600		Voice of Nicaragua.....	6015
0500-0600		WHRI, Indiana.....	7400
0500-0600v	(M)	World Music Radio.....	6910
0500-0600		WRNO Worldwide.....	6185
0530-0600		Radio Cameroon.....	4850
0530-0600		Radio Netherland.....	6165, 9715
0530-0600		UAE Radio, Dubai.....	15435, 17775 17830, 21700

0600 UTC **[2:00 AM EDST/11:00 PM PDT]**

0600-0605		Radio Ghana.....	4915
0600-0610		Voice of Kenya.....	6090
0600-0625		Radio Netherland.....	6165, 9715
0600-0630		AWR, Italy.....	6215
0600-0630		Deutsche Welle.....	7290, 9625 9700
0600-0700		Armed Forces Radio and TV...	6030, 15330 17765
0600-0700		BBC, London.....	5975, 6175 7150, 9510 9600, 9825 9915, 12095 15360
0600-0700		CFCX, Montreal, Canada.....	6005
0600-0700		CFRX, Toronto, Canada.....	6070
0600-0700		CFVP, Calgary, Canada.....	6030
0600-0700		CKFX, Vancouver, Canada.....	6080
0600-0700		CHNX, Halifax, Canada.....	6130
0600-0700		GBC, Accra, Ghana.....	3366
0600-0700		HCJB, Quito, Ecuador.....	6230, 9870 11910
0600-0700		King of Hope, Lebanon.....	6280
0600-0700	TEN	KVOH, California.....	6005
0600-0700		KYOI, Saipan.....	15190
0600-0700		Radio Australia.....	15160, 15240 15315, 17715 17750
0600-0700		Radio Havana Cuba.....	9525
0600-0700		Radio Moscow.....	9635, 9580 9755, 11770 11950, 13605 13615, 13680 15210, 17590 17730, 17860 17835, 17850 17880
0600-0700		Radio Pyongyang, N. Korea..	13650, 13680
0600-0700		SBC Radio 1, Singapore.....	11940
0600-0700		Soloman Islands Bcasting Co.	5020
0600-0700		VLQ 9, Brisbane, Australia..	9660
0600-0700		VLW 15, Lyndhurst,Australia	15230
0600-0700		VLW 15, Waneroo, Australia.	15425
0600-0700		Voice of America.....	3990, 5995 6080, 6095 6125, 9530 9550, 9670
0600-0700		Voice of Asia, Taiwan.....	7285
0600-0700		Voice of Malaysia.....	6175, 9750 15295
0600-0700		WHRI, Indiana.....	9620
0600-0700	(S)	World Music Radio.....	6910
0600-0700	(S)	WRNO Worldwide.....	6185
0600-0700		WYFR, Okeechobee, Florida...	6065, 6185 7355, 7365 9455
0615-0630	(M-F)	Radio Canada International..	6140, 7155 9740, 9760 11775, 11840
			15235
0615-0630	(M-A)	Vatican Radio.....	15190, 17730
0625-0700		TWR, Monaco.....	7105
0630-0655		Radio Netherland.....	9895, 11930
0630-0700		Radio New Zealand Int'l....	11780
0630-0700		Radio Polonia.....	6135, 7270 9675
0630-0700		Radio RSA, South Africa.....	5980, 7270 9585, 11900
0630-0700		Radio Sofia, Bulgaria.....	9700
0630-0700		Radio Tirana.....	7080, 9500
0630-0700		Swiss Radio International...	3985, 6165 9535, 9870 12030, 15430
0645-0700	(M-F)	HCJB, Quito, Ecuador.....	6205
0645-0700		Radio Bucharest, Romania...	11940, 15250 15335, 17790 17805, 21665

0700 UTC **[3:00 AM EDST/12:00 AM PDT]**

0700-0712		Radio Bucharest, Romania...	11940, 15250 15335, 17790 17805, 21665
0700-0725		Radio Tirana Albania.....	9500, 11985
0700-0730		Burma Broadcasting Corp.....	9730
0700-0730		BBC, London.....	5975, 6175 7150, 9510 15360
0700-0730	(A,S)	TWR, Bonaire.....	9535
0700-0730v		Radio Zambia.....	11880v
0700-0735		TWR Swaziland.....	6070
0700-0745		Radio New Zealand Int'l....	11780, 15150
0700-0745		WYFR, Florida.....	6065, 7355 7400, 9455 9852.5
0700-0750		Radio Pyongyang.....	11930, 13750 15340
0700-0800		Armed Forces Radio and TV..	15400
0700-0800		CFCX, Montreal, Canada.....	6005
0700-0800		CFRX, Toronto, Canada.....	6070
0700-0800		CFVP, Calgary, Canada.....	6030
0700-0800		CHNX, Halifax, Canada.....	6130
0700-0800		CKFX, Vancouver, Canada.....	6080
0700-0800	(A,S)	ELWA, Liberia.....	11830
0700-0800		FEBC, Manila.....	11850, 15350
0700-0800		GBC, Accra, Ghana.....	3366
0700-0800		HCJB.....	6130, 9745 9860, 9845
0700-0800		King of Hope, Lebanon.....	6280
0700-0800	TEN	KVOH, California.....	6005
0700-0800		KNLS, Anchor Point, Alaska..	9555
0700-0800		KYOI, Saipan.....	15190
0700-0800		NBC, Papua New Guinea.....	4890
0700-0800		Radio Australia.....	15395, 17715 17750
0700-0800	(S)	Radio Earth (via Milano)....	7295
0700-0800		Radio Havana Cuba.....	9525
0700-0800		Radio Japan General Service.	9735, 11955 15235, 17810 17855
0700-0800		Radio Kuwait.....	9560
0700-0800		Radio Moscow.....	7290, 17590 17880
0700-0800		Radio Thailand.....	9655, 11905
0700-0800		SBC Radio 1, Singapore.....	5010, 11940
0700-0800		Soloman Islands Bcasting Svc	5020
0700-0800		VLM4 Brisbane, Australia....	4920
0700-0800		Voice of America.....	5995, 6035 6080, 6125 9550, 9670 11840
0700-0800		Voice of Free China.....	5985
0700-0800		Voice of Malaysia.....	6175, 9750 15295
0700-0800		Voice of Nigeria.....	15120, 15185 17800
0700-0800		WHRI, Indiana.....	9620
0700-0800	(S)	World Music Radio.....	6910
0700-0800	(S)	WRNO Worldwide.....	6185
0715-0730	(M-A)	Vatican Radio.....	11725, 15190
0715-0800	(S)	FEBA Radio, Seychelles.....	15120, 17780
0725-0800		TWR Monte Carlo.....	7105
0730-07357		All India Radio.....	5990, 6010 6020, 6050 7110, 7250 9610, 11730 11850, 11935
0730-0800		BBC, London.....	9410, 9510 12095, 15070
0730-0800		KTWR, Guam.....	11735, 15115
0730-0800		Radio Finland.....	6120, 11755 15265
0730-0800		Radio Netherlands.....	9630, 9715
0730-0800		Radio Prague.....	11855, 17840 21705

0800 UTC **[4:00 AM EST/1:00 AM PST]**

0800-0805		GBC, Accra, Ghana.....	3366
0800-0825		Radio Netherlands.....	9630, 9715
0800-0825		Voice of Malaysia.....	6175, 9750 15295
0800-0830		Radio Bangladesh.....	11645, 12035
0800-0830		HCJB, Quito, Ecuador.....	6130, 9745 9845, 9860
0800-0830		Voice of Nigeria.....	7255, 15185

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0800-0845	(S)	FEBA, Seychelles.....	15120, 17795	0847-0852	(A)	R. Pacific Ocean, Vladivost.	9500, 9620	0915-1000		BBC, London.....	9410, 9655
0800-0855	(M-F)	BRT, Belgium.....	9880, 15515				9635, 9795				12095, 15070
0800-0900		AFAN, Antarctica.....	6012				9810, 11710				15400, 17705
0800-0900		AFRTS Far East Network.....	11750				11815, 11910				21660
0800-0900		BBC, London.....	9410, 9510				12010, 15260	0930-1000		Radio Australia.....	9580, 9655
			12095, 15070				15295, 17765				
0800-0900		CFCX, Montreal, Canada.....	6005				17815, 17850	**1000 UTC**		**[6:00 AM EDT/3:00 AM PDT]**	
0800-0900		CFRX, Toronto, Canada.....	6070								
0800-0900		CFVP, Calgary, Canada.....	6030					1000-1010		Voice of Kenya.....	9665
0800-0900		CHNX, Halifax, Canada.....	6130	**0900 UTC**		**[5:00 AM EDT/2:00 AM PDT]**		1000-1030		Deutsche Welle, W. Germany..	7225, 9735
0800-0900		CKFX, Vancouver, Canada.....	6080								17765, 21600
0800-0900		FEBC, Manila.....	11890, 21475	0900-0905		Africa Number One, Gabon....	7200, 15200	1000-1030		Kol Israel.....	11700, 13725
0800-0900	(S,A)	GBC, Accra, Ghana.....	3366	0900-0915		BBC, London.....	9510, 12095				15640, 15650
0800-0900		HCJB, Quito, Ecuador.....	6130, 9745				11750, 15070				17565, 17685
0800-0900		King of Hope, Lebanon.....	6280	0900-0915	(S)	Radio Austria International.	6000, 6155				17815
0800-0900		KNLS, Anchor Point, Alaska.	11860				11915	1000-1030		Radio Australia.....	9580, 9655
0800-0900		KTWR, Guam.....	11735	0900-0925		Radio Netherlands.....	17575, 21485				9770
0800-0900		KYOI, Saipan.....	15190	0900-0930		Radio Australia.....	6060, 9580	1000-1030	(S)	Radio Norway International..	9590, 15175
0800-0900		Radio Australia.....	9580, 15395				9670				15185, 15230
			17715, 17750	0900-0930		Radio Korea.....	7275	1000-1030		Swiss Radio Int'l.....	9560, 11745
0800-0900		Radio Earth (via Milan).....	7295	0900-0950		Radio Pyongyang N. Korea....	9765, 11830				11905, 15570
0800-0900		Radio Korea World News Svc..	7275				13650	1000-1030		Voice of Vietnam.....	9840, 12035
0800-0900		Radio Kuwait.....	9750	0900-1000	(S)	Adventist World Radio.....	9670	1000-1100		AFRTS.....	6030, 6125
0800-0900	(S)	Radio Prague.....	6055, 9505	0900-1000		AFRTS.....	6030, 9530				9530, 9590
			11990				9590				9700, 11805
0800-0900		Radio Pyongyang, N. Korea..	11830, 13680	0900-1000		Deutsche Welle.....	11945, 15160	1000-1100		All India Radio.....	11705, 11810
0800-0900		RTE Portugal.....	9670				15185, 15205				15320, 15335
0800-0900		SBC Radio 1, Singapore.....	5010, 11940				15320, 17780				17387, 17875
0800-0900		TWR Monte Carlo.....	7105				17800, 21560	1000-1100		BBC, London.....	6195, 9410
0800-0900		Voice of Indonesia.....	11790, 15150	0900-1000		FEBC, Manila.....	11890, 21475				9740, 9760
0800-0900		WHRI, Indiana.....	7355	0900-1000		HCJB, Quito, Ecuador.....	6130, 9745				11750, 12095
0800-0900	(S)	WRNO Worldwide.....	6185				11925				15070, 15280
0830-0900		Radio Austria Int'l.....	6000, 6155	0900-1000		King of Hope, Lebanon.....	6280				21660
			11915, 15410	0900-0100		KNLS, Anchor Point, Alaska.	11850	1000-1100		B.S. Kingdom Saudi Arabia..	11855v
0830-0900		Radio Beijing.....	9700, 11755	0900-1000		KTWR, Guam.....	11840	1000-1100		CFCX, Montreal, Canada.....	6005
			15440	0900-1000		Radio Afghanistan.....	4450, 6085	1000-1100		CFRX, Toronto, Canada.....	6070
0830-0900		Radio Prague,Czechoslovakia	11855, 17840				17655	1000-1100		CFVP, Calgary, Canada.....	6030
			21705	0900-1000		Radio Japan.....	9675, 11875	1000-1100		CHNX, Halifax, Canada.....	6130
0830-0840		All India Radio.....	5960, 5970				11955, 15235	1000-1100		CKFX, Vancouver, Canada.....	6080
			5990, 6010				17810	1000-1100		FEN, Japan.....	3910, 6155
			6020, 6050	0900-1000		Radio Moscow.....	9795, 13645	1000-1100		HCJB, Quito, Ecuador.....	6130, 11925
			6100, 7110				13655, 13680	1000-1100		KNLS, Alaska.....	11930
			7125	0900-1000		Radio New Zealand Int'l.....	9600, 11780	1000-1100		Radio Dubai, UAE.....	17775
0830-0855	(M-A)	Radio Netherlands.....	9715	0900-1000		Radio Tanzania.....	9685v	1000-1100		Radio Honaire, Soloman Ils..	5020
0830-0900		HCJB, Quito, Ecuador.....	6130, 9745	0900-1000	(S)	Radio Prague.....	6055, 9505	1000-1100		Radio Moscow.....	9600, 9795
			11925				11990				13645, 13665
0830-0900		Radio Netherlands.....	17575, 21485	0900-1000		SBC Radio 1, Singapore.....	5010, 11940				13680, 13705
0830-0900		Swiss Radio International...	9560, 11745	0900-1000		Voice of Nigeria.....	7255, 15120				15110, 15140
			11905, 15570				15185, 17800				15155, 15225
0840-0900		Radio Australia.....	6045, 6060	0900-1000		WHRI, Indiana.....	7355				15265, 15490
			9580, 15395	0900-1000	(S)	WRNO Worldwide.....	6185				17625, 17645
			17715, 17750	0910-0930	(A)	BRT, Belgium.....	9880, 15515				17665, 17775

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1000-1100		Radio New Zealand Int'l.....	9600, 11780	1200-1225
1000-1100	(S)	Radio Prague.....	6055, 9505 11990	1200-1225
1000-1100		SBC Radio 1, Singapore.....	5052, 11940	
1000-1100		Voice of Nigeria.....	7255, 15120	
1000-1100		WHRI, Indiana.....	7355	1200-1225
1000-1100	(S)	WRNO Worldwide.....	6185	1200-1230
1005-1010		Radio Pakistan.....	15605, 17660	
1030-1040		Voice of Asia, Taiwan.....	5980	1200-1230
1030-1100		Radio Austria International.	9625, 12025	1200-1230
1030-1100		Radio Budapest Hungary.....	9835, 11910	
			15160, 15220	1200-1235
			17710, 21665	1200-1242
1030-1100		Radio Netherland.....	6020, 9650	1200-1250
1030-1000		Radio New Zealand.....	6100, 9620	1200-1300
1030-1100		Sri Lanka Broadcasting Corp	11835, 15120 17850	1200-1300
1030-1100		UAE Radio, Dubai.....	17775, 17865	
			21605, 21700	1200-1300
1040-1050		Vatican Radio.....	6250, 9645 11740	
1040-1050		Voice of Greece.....	15630, 17565	
1045-1000		Radio Nepal.....	5005, 9590	1200-1300
1050-1100	(M-F)	Radio Budapest Hungary.....	9585, 9835	1200-1300
			11910, 15160	1200-1300
			17710	1200-1300
				1200-1300
1100 UTC		**[7:00 AM EDT/4:00 AM PDT]**		1200-1300
				1200-1300
1100-1115		Radio Pakistan.....	15605, 17660	1200-1300
1100-1125		Radio Netherland.....	6020, 9650	1200-1300
1100-1130		Kol Israel.....	11605, 15560, 15643	1200-1300
1100-1130		Radio Australia.....	5995, 6080	1200-1300
			7215, 9580	
			9710, 9770	
1100-1130		Radio Finland.....	11945, 15400	
1100-1200		Radio Japan General Service.	9675, 11815	1200-1300
1100-1130		Radio Sweden Int'l.....	9630, 15115	
1100-1130		Sri Lanka Broadcasting Corp	11835, 15120 17850	1200-1300 1200-1300
1100-1130		Swiss Radio International..	11795, 15570	
			15585, 17830	1200-1300
1100-1130		Voice of America.....	6110, 9760	1200-1300
			15160, 15210	1200-1300
			15425	1200-1300
1100-1130		Voice of Vietnam.....	9840, 12035	1200-1300 (S)
1100-1156		Radio RSA, South Africa....	11900, 15220	1200-1300
			17780	1210-1300
1100-1200		4VEH, Haiti.....	4930	1215-1300
1100-1200		ABC, Brisbane, Australia....	4920	1215-1245
1100-1200		ABC, Perth, Australia.....	9610	1215-1300
1100-1200		AFRTS.....	6030, 9590 9700, 11805 15430	1230-1235
1100-1200		BBC, London.....	5965, 6195	
			9410, 9510	1230-1300
			9740, 11750	
			11775, 12095	1230-1300
			15070, 15280	1230-1300
1100-1200		B.S. Kingdom Saudi Arabia..	11855v	
1100-1200		CFCX, Montreal, Canada.....	6005	1230-1300
1100-1200		CFRX, Toronto, Canada.....	6070	1230-1300
1100-1200		CFVP, Calgary, Canada.....	6030	1230-1300
1100-1200		CHNX, Halifax, Canada.....	6130	
1100-1200		CKFX, Vancouver, Canada.....	6080	1230-1300
1100-1200		Radio Beijing.....	9535	1230-1300
1100-1200		Radio Korea.....	7275, 15575	1235-1245
1100-1200		Radio Moscow.....	9600, 9795	
			11675, 13665	1255-1300 (M-A)
			13680, 13705	1255-1330 (A-S)
			15135, 15150	
			15475, 15550	**1300 UTC**
1100-1200		Radio New Zealand.....	6100, 9600	
1100-1200		Radio Pyongyang, N. Korea...	9750, 9977	1300-1325
1100-1200		SBC Radio 1, Singapore.....	5052, 11940	
1100-1200		Trans World Radio Bonaire..	11815	1300-1330
1100-1200		Voice of Asia, Taiwan.....	5980, 7445	
1100-1200		Voice of Nigeria.....	7255, 15120	
1100-1200		WHRI, Indiana.....	5995	
1100-1200	(S)	WRNO Worldwide.....	6185	
1115-1130		Vatican Radio.....	17840, 21485	1300-1330
1115-1200		Voice of Islamic Rep. Iran.	15084	1300-1330
1130-1200		Radio Australia.....	5995, 6060,	1300-1330
			6080, 7215	1300-1330
			9580, 9645	1300-1330 (S)
			9710, 9770	
			11800	1300-1337 (A-S)
1130-1200		Radio Netherland.....	5955, 9715	1300-1355 (A-S)
			15560, 17575	1330-1355 (S)
			17605, 21480	1300-1400
1130-1200		Radio Thailand.....	9655, 11905	1300-1400
1130-1200		TWR Bonaire.....	11815	
1150-1200	(M-F)	Radio Budapest Hungary.....	6025, 9585	1300-1400
			9835, 11910	1300-1400
			15160, 17710	1300-1400
				1300-1400
1200 UTC		**[8:00 AM EDT/5:00 AM PDT]**		1300-1400
				1300-1400
1200-1215		Radio New Zealand.....	6100, 9620	1300-1400
1200-1215	(M-A)	Vatican Radio.....	15190, 17840	1300-1400
			17865, 21485	1300-1400
1200-1215		Voice of Islamic Rep. Iran.	15084	
1200-1215	(S)	Vatican Radio.....	17840, 21485	1300-1400
1200-1215		Voice of People of Kampuchea	9693, 11938	1300-1400
1200-1215		Radio Finland.....	11945, 15400	

		Radio Bucharest; Romania....	9530, 11740 15345	1300-1400
		Radio Netherland.....	5955, 9715	
			15560, 17575	1300-1400
			17605, 21480	1300-1400
		Radio Polonia.....	6095, 7285	
		Radio Tashkent.....	7325, 9600	
			9715, 15460	
		Radio Ulan Bator, Mongolia..	9615, 12015	
		Swiss Radio International...	6165, 9535	1300-1400
			12030	1300-1400
		Radio Ulan Bator Mongolia..	12015	1300-1400
		Trans World Radio Bonaire..	11815	
		Radio Pyongyang, N. Korea...	9550	1300-1400
		4VEH, Haiti.....	4930	1300-1400
		AFRTS.....	6030, 9700	1300-1400 (S)
			15330, 15430	1330-1400
			21670	1330-1400
		BBC, London.....	5965, 6195	1330-1400
			9740, 11750	
			12095, 12095	1330-1400
			15070	1330-1400
		B.S. Kingdom Saudi Arabia..	11855v	
		CBC Northern Quebec Service.	6065, 9625	1300-1400
		CFCX, Montreal, Canada.....	6005	
		CFRX, Toronto, Canada.....	6070	1330-1400
		CFVP, Calgary, Canada.....	6030	
		CHNX, Halifax, Canada.....	6130	1330-1400
		CKFX, Vancouver, Canada.....	6080	1330-1400
		GBC, Accra, Ghana.....	7295	1330-1400
		HCJB, Quito, Ecuador.....	11740, 15115	1337-1400 (A)
			17890	1345-1400
		KYOI, Saipan.....	11900	
		Radio Australia.....	5995, 6045	
			6060, 6080	**1400 UTC**
			7205, 9580	
			9770	1400-1415
		Radio Beijing.....	9535, 9640	1400-1415
			9820	
		Radio Korea World News Svc..	7275	1400-1430
		Radio Moscow.....	9600, 9795	
			11675	
		Radio Tanzania.....	9685	
		RAE, Argentina.....	15345	1400-1430
		SBC Radio 1, Singapore.....	5010, 11940	1400-1430
		WHRI, Indiana.....	5995	
		WRNO Worldwide.....	9715	1400-1430 (S)
		WYFR, Louisiana.....	5985, 11875	
		Voice of Nigeria.....	7255, 15120	1400-1430
		Radio Cairo.....	17675	1400-1430
		Radio Japan Regional Serv..	11875, 15235	1400-1430
		Radio Berlin International.	21465, 21540	1400-1500
		All India Radio.....	3905, 4800	
			4920, 7280	1400-1500
			9565, 9615	1400-1500
			11620, 15245	
		Radio Austria International.	6000, 6155	1400-1500
			11915, 11955	1400-1500
		Radio Bangladesh.....	15525	1400-1500
		Radio Polonia.....	9525, 9675	1400-1500
			11840, 15120	1400-1500
		Radio Sweden Int'l.....	9565, 11940	1400-1500
		Radio Tirana.....	9555, 11960	1400-1500
		Sri Lanka Broadcasting Corp.	6075, 9720	1400-1500
			15425	1400-1500
		Voice of Turkey.....	15255	1400-1500
		WYFR, Florida.....	9680	1400-1500 (S)
		Voice of Greece.....	11645, 15405	1400-1500
			17565	
		Radio Ulan Bator Mongolia...	7235, 15305	1400-1500
		TWR, Bonaire.....	11815	
		[9:00 AM EDT/6:00 AM PDT]		
		Radio Canada International.	11955, 11855	
			15440, 17820	
		BBC, London.....	5965, 6195	1400-1500
			9410, 9510	
			9750, 11705	1400-1500
			11775, 12095	1400-1500
			15070, 17790	
		Radio Australia.....	7205, 9580	1400-1500
		Radio Bucharest, Romania....	9690, 11940	1400-1500 (S)
		Radio Finland.....	15400, 17800	1400-1500
		Radio Korea.....	6135	1415-1430
		Radio Norway International.	6040, 15245	1415-1500 (S,A)
			15310, 17770	1415-1500
		TWR, Bonaire.....	11815	
		BRT, Belgium.....	15590, 17590	1430-1445
		Radio Finland.....	11945, 15400	
		4VEH, Haiti.....	4930	1430-1500
		AFRTS.....	9700, 15330	
			15430	
		B.S. Kingdom Saudi Arabia..	11855v	
		CBC Northern Quebec Service	11720	1430-1500 (M-A)
		CFCX, Montreal, Canada.....	6005	
		CFRX, Toronto, Canada.....	6070	
		CFVP, Calgary, Canada.....	6030	1430-1500
		CHNX, Halifax, Canada.....	6130	1430-1500
		CKFX, Vancouver, Canada.....	6080	
		FEBC, Manila.....	11850	
		GBC, Accra, Ghana.....	7295	1430-1500
		HCJB, Quito, Ecuador.....	11740, 15115	1445-1500
			17890	
		KTWR, Guam.....	9870	
		Radio Australia.....	5995, 6060	
			7205, 9580	

			9770,
		Radio Beijing.....	9550, 9730
			11660, 11755
		Radio Canada International.	11955, 17820
		Radio Moscow.....	9580, 9655
			9705, 9755
			11675, 13615
			15490, 17625
			17645
		Radio RSA, South Africa....	15220, 21535
		SBC Radio 1, Singapore.....	5010, 11940
		Sri Lanka Broadcasting Corp.	6075, 9720
			15425
		Voice of Nigeria.....	7255, 15120
		WHRI, Indiana.....	11790
		WRNO Worldwide.....	9715
		All India Radio.....	11810, 15335
		Laotian National Radio.....	7123v
		BBC, London.....	9740, 11750
			12095, 15070
		Radio Korea World News Svc.	15575
		Radio Tashkent.....	7325, 9715
			15460
		Swiss Radio International..	15570, 15585
			17785, 17830
		U.A.E. Radio.....	11955, 17775
			21605, 21695
		Voice of Vietnam.....	10040, 15010v
		Radio Austria International	11935
		WYFR, Florida.....	15055
		TWR, Bonaire.....	11815
		Vatican Radio.....	7250, 9645
			11740
		[10:00 AM EDT/7:000 PDT]	
		GBC, Accra, Ghana.....	7295
		U.A.E. Radio, Dubai.....	11955, 17775
			21605, 21695
		Radio Australia.....	5995, 6035
			6045, 6060
			6080, 9580
			9710
		Radio Finland.....	15400, 17800
		Radio Japan General Service.	5990, 7140
			9695, 11815
		Radio Norway International.	15245, 15300
			15310
		Radio Polonia.....	6095, 7285
		Radio Sweden International.	11705, 21570
		Radio Tirana.....	9500, 11985
		ARFTS.....	9700, 11805
			15330, 15430
		All India Radio.....	11810, 15335
		BBC, London.....	11750, 12095
			15070, 21660
		CBC Northern Quebec Service.	9625, 11720
		CFCX, Montreal, Canada.....	6005
		CFRX, Toronto, Canada.....	6070
		CFVP, Calgary, Canada.....	6030
		CHNX, Halifax, Canada.....	6130
		CKFX, Vancouver, Canada.....	6080
		FEBC, Manila.....	9670
		HCJB, Quito, Ecuador.....	15115, 17890
		KVOH, California.....	11940
		Radio Beijing.....	11600, 15165
		Radio Canada International.	11955, 17820
		Radio Korea, South.....	9570, 9750
			15575
		Radio Moscow.....	9655, 11710
			11840, 11850
			12005, 12030
			15100, 15125
			15150, 15330
			15455, 15475
			17700, 17875
		Radio RSA, South Africa.....	9585, 15220
			21535
		SBC Radio 1, Singapore.....	5010, 11940
		Sri Lanka Broadcasting Corp.	6075, 9720
			15425
		WHRI, Indianapolis.....	11790
		WRNO Worldwide.....	11965
		Voice of Nigeria.....	7255, 15120
		KTWR, Guam.....	9820
		GBC, Accra, Ghana.....	7295
		Radio Berlin Int'l.....	11795, 15445
			17700
		Vatican Radio.....	11865, 15115
			17845,
		Radio Australia.....	5995, 6045
			6060, 6035
			6080, 7205
			9580, 9710
		Radio Budapest Hungary.....	9835, 11910
			15160, 15220
			17710, 21665
		Radio Korea World News Svc..	7275, 11805
		Radio Netherland.....	5955, 11735
			13770, 15560
			17575
		Radio Yugoslavia.....	9620, 15240
		Radio Ulan Bator, Mongolia..	9615, 12015

frequency SECTION

1500 UTC **[11:00 AM EDT/8:00 AM PDT]**

1500-1520		Radio Ulan Bator Mongolia...	9615, 12015			
1500-1530		HCJB, Quito, Ecuador.....	11740, 15115			
			17890			
1500-1530		Radio Austria International.	6000, 6155	1600-1700		
			12015, 15420	1600-1700		
1500-1530		Radio Bucharest.....	11940, 15250	1600-1700		
			15335	1600-1700		
1500-1530		Radio Netherland.....	5955, 11735	1600-1700		
			13770, 15560			
			17575			
1500-1530		Radio Veritas, Philippines..	9570			
1500-1530		TWR, Guam.....	9870			
1500-1530		Voice of Nigeria.....	7255, 11770	1600-1700		
1500-1556		Radio RSA, South Africa.....	7270, 15220	1600-1700		
			17780	1600-1700		
1500-1600		AFRTS.....	9700, 15330	1600-1700		
			15430			
1500-1600		BBC, London.....	6195, 9410	1610-1620	(M-F)	
			9760, 11750	1610-1645		
			12095, 15070	1630-1700		
			21660	1630-1700		
1500-1600		CBC Northern Quebec Service.	9625, 11720	1630-1700		
1500-1600		CFCX, Montreal, Canada.....	6005			
1500-1600		CFRX, Toronto, Canada.....	6070	1630-1700		
1500-1600		CFVP, Calgary, Canada.....	6030	1630-1700		
1500-1600		CKFX, Vancouver, Canada.....	6080			
1500-1600		CHNX, Halifax, Canada.....	6130			
1500-1600		FEBC, Manila.....	9670	1630-1700		
1500-1600	TEN	KVOH, California.....	11940	1630-1700		
1500-1600		Radio Australia.....	5995, 6060	1645-1700		
			6080, 6035	1645-1700		
			7205, 9580			
1500-1600		Radio Japan General Service.	5990, 11815			
			15310			
1500-1600		Radio Moscow.....	5900, 5050			
			5980, 6020	1700-1710		
			6050, 9580	1700-1715		
			9655, 11840			
			11850, 11860	1700-1720		
			12055, 13680	1700-1730		
			13705, 15100			
			15125, 15150	1700-1730		
			15330			
1500-1600		RTM, Sarawak, Malaysia.....	4950	1700-1730		
1500-1600		SBC Radio 1, Singapore.....	5052, 11940	1700-1730	(S)	
1500-1600		Sri Lanka Broadcasting Corp.	6075, 9720			
			15425	1700-1730		
1500-1600		Voice of Indonesia.....	11790, 15150	1700-1730		
1500-1600		V. Revolutionary Ethiopia..	9560			
1500-16000		WHRI, Indiana.....	15105	1700-1800		
1500-1600		WRNO Worldwide.....	11965	1700-1800		
1530-1545		Radio Bangladesh.....	7195			
1530-1600	(M-A)	Radio Budapest Hungary.....	9835, 11910	1700-1800		
			15160, 15220	1700-1800		
			17710, 21665	1700-1800		
1530-1600		Voice of Nigeria.....	7255, 11770	1700-1800		
1530-1600		Radio Yugoslavia.....	9620, 15240	1700-1800		
1540-1550		Voice of Greece.....	11645, 15630	1700-1800	(S)	
			17565	1700-1800		
1545-1600		Vatican Radio.....	11810, 15120	1700-1800	TEN	
			17730	1700-1800		
				1700-1800		
				1700-1800		
				1700-1800		

1600 UTC **[12:00 PM EDT/9:00 AM PDT]**

1600-1605		SBC Radio 1, Singapore.....	11940			
1600-1615		Radio Pakistan.....	9645, 11675			
			11735, 11925			
			15515, 15595			
			17660			
1600-1630		Radio Budapest Hungary.....	7220, 9585	1700-1800		
			9835, 11910			
			12000	1700-1800		
1600-1630	(S)	Radio Norway International..	9510, 11925			
			17840	1700-1800		
1600-1630		Radio Polonia.....	6135, 9540	1700-1800		
1600-1630	(M-F)	Radio Portugal.....	15105, 15330	1700-1800		
1600-1630		Radio Sweden Int'l.....	15110	1700-1800		
1600-1630		Voice of Vietnam.....	10040, 15010	1700-1800		
1600-1645		TWR, Swaziland.....	3200			
1600-1645		UAE Radio, Dubai.....	9550, 11955			
			15300, 15320	1700-1800		
1600-1700		AFRTS.....	9700, 11805	1700-1800		
			15330, 15430	1700-1800		
1600-1700		BBC, London.....	7105, 9740	1700-1800	TEST	
			9515, 12095	1700-1800		
			15070, 15260	1700-1800		
1600-1700		B.S. Kingdom Saudi Arabia..	11855v			
1600-1700	(A)	CBC Northern Quebec Service.	9625, 11720	1730-1800		
1600-1700		CFCX, Montreal, Canada.....	6005	1730-1800		
1600-1700		CHNX, Halifax, Canada.....	6130			
1600-1700		CFRX, Toronto, Canada.....	6070	1730-1800		
1600-1700		CFVP, Calgary, Canada.....	6030	1730-1800		
1600-1700		CKFX, Vancouver, Canada.....	6080			
1600-1700	TEN	KVOH, California.....	11940			
1600-1700		KYOI, Saipan.....	9665			
1600-1700		Radio Australia.....	6035, 6060	1730-1800		
			6080, 9550	1730-1800		
			9580, 15320			
1600-1700		Radio Beijing.....	9570, 11600	1745-1800		
1600-1700		Radio Canada International.	11955, 17820			
1600-1700		Radio France International..	6175, 11705,			
			17620, 17795	1730-1800		
1600-1700		Radio Jordan.....	9560			
1600-1700		Radio Korea.....	5975, 9870			
			11810			
		Radio Malawi.....	3380, 5995			
		Radio Moscow.....	5920, 6020			
			9640, 9580			
			9655, 9755			
			11840, 15535			
		Radio Riyadh, Saudi Arabia..	9720v			
		Radio Tanzania.....	6105			
		Radio Zambia.....	9505			
		UAE Radio.....	9550, 15320			
		Voice of America.....	6110, 11920			
			15205, 15410			
			15445, 15580			
			15600, 17785			
			17800, 17870			
		Voice of Nigeria.....	7255, 11770			
		WHRI, Indiana.....	15105			
		WRNO Worldwide.....	11965			
		WYFR, Florida.....	11830, 11875			
			17845			
		Radio Botswana.....	4820, 7255			
		Radio Belem.....	3205			
		KNLS, Alaska.....	11965			
		ELWA, Liberia.....	11830			
		Radio Nacional Angola.....	7245, 9535			
			11955			
		Radio Netherland.....	6020, 9515			
		R. Peace and Progress USSR.	11690, 11755			
			11865, 12045			
			13660, 15140			
		Radio Polonia.....	7125, 9525			
		Voice of Africa, Egypt.....	15255			
		Radio Pakistan.....	6230, 9465			
		WYFR, Florida.....	15566, 17640			
			21525			

1700 UTC **[1:00 PM EDT/10:00 AM PDT]**

		Voice of Lebanon.....	6548			
		Kol Israel.....	9920, 11585			
			13745			
		Radio Netherland.....	6020, 9515			
		BBC, England.....	9740, 15070			
			15260			
		Radio Australia.....	6035, 6060			
			7205			
			5990, 11815			
		Radio Japan.....	5990, 11815			
		Radio Norway International..	9655, 11925			
			15310			
		Radio Portugal.....	15250			
		Swiss Radio International...	3985, 6165			
			9535			
		4VEH, Haiti.....	4930			
		AFRTS.....	9700, 15330			
			15345, 15430			
		CFCX, Montreal, Canada.....	6005			
		CFRX, Toronto, Canada.....	6070			
		CFVP, Calgary, Canada.....	6030			
		CHNX, Halifax, Canada.....	6130			
		CKFX, Vancouver, Canada.....	6080			
		KCBI, Texas.....	11735			
		KNLS, Alaska.....	11965			
		KVOH, California.....	17775			
		KYOI, Saipan.....	9665			
		Radio Beijing.....	9570, 11600			
		Radio Korea, South.....	5975, 15575			
		Radio Moscow.....	5920, 6020			
			9580, 9605			
			9640, 9705			
			9755, 9885			
			11865, 12030			
			15500			
		Radio Nacional Angola.....	7245, 9535			
			11955			
		Radio Pyonyang, N. Korea....	7105, 7305			
			9977, 11665			
		Radio Riyadh, Saudi Arabia..	9720v			
		Radio Tanzania.....	6105			
		Radio Zambia.....	9505			
		Voice of Africa, Egypt.....	15255			
		Voice of America.....	6110,			
			15410, 15445			
			15580, 15600			
		Voice of Nigeria.....	11770			
		WHRI, Indiana.....	15105			
		WINB, Pennsylvania.....	15295			
		WMLK, Pennsylvania.....	15110			
		WRNO Worldwide.....	11965			
		WYFR, Florida.....	9535, 11830			
			11875			
		Radio Australia.....	6035, 9580			
		Radio Bucharest, Romania....	7145, 9640			
			9690, 11830			
		Radio Polonia.....	6135, 9540			
		Radio Prague, Czechoslovakia	5930, 7345			
			9605, 11990			
			13605, 15110			
			17705, 21505			
		Radio Surinam.....	17755			
		Spanish Foreign Radio.....	6020, 7275			
			9765			
		BBC, London.....	9410, 11745			
			12095, 15070			
			15400			
		Radio Sofia, Bulgaria.....	11735, 11840			
			15310			

1800 UTC **[2:00 PM EDT/11:00 AM PDT]**

			9640, 9580	1800-1810		Voice of Kenya.....
			9655, 9755	1800-1815		Radio Cameroon.....
			11840, 15535			
			9720v			
			6105	1800-1830		AWR, Italy.....
			9505	1800-1830		Radio Canada International.
			9550, 15320	1800-1830		Radio Japan.....
			6110, 11920	1800-1830		Radio Kiev.....
			15205, 15410			
			15445, 15580	1800-1830		Radio Mozambique.....
			15600, 17785	1800-1830	(M-F)	Radio Portugal.....
			17800, 17870	1800-1830		TWR, Monte Carlo.....
			7255, 11770	1800-1900		Voice of Africa, Egypt.....
			15105	1800-1830		Voice of Vietnam.....
			11965	1800-1900		Deutsche Welle.....
			11830, 11875			
			17845	1800-1850		Radio Nacional do Brasil...
			4820, 7255	1800-1855	(M-A)	BRT Brussels, Belgium.....
			3205	1800-1900		4VEH, Haiti.....
			11965	1800-1900		AFRTS.....
			11830			
			7245, 9535	1800-1900		All India Radio.....
			11955	1800-1900		BBC, London.....
			6020, 9515			
			11690, 11755	1800-1900		CFCX, Montreal, Canada.....
			11865, 12045	1800-1900		CFRX, Toronto, Canada.....
			13660, 15140	1800-1900		CFVP, Calgary, Canada.....
			7125, 9525	1800-1900		CKFX, Vancouver, Canada.....
			15255	1800-1900		CKZU, Vancouver.....
			6230, 9465	1800-1900		KNLS, Alaska.....
			15566, 17640	1800-1900	TEN	KVOH, California.....
			21525	1800-1900		KYOI, Saipan.....
				1800-1900		Radio Australia.....
			9920, 11585	1800-1900	(A,S)	Radio Canada International.
			13745	1800-1900	TEST	R. Discovery, Dominican Rep
			6020, 9515	1800-1800v		Radio Jamahiriya, Libya....
			9740, 15070	1800-1900		Radio Korea.....
			15260	1800-1900		Radio Kuwait.....
			6035, 6060	1830-1900		Radio New Zealand Int'l....
			7205	1800-1900		Radio Moscow.....
			5990, 11815			
			9655, 11925			
			15310			
			15250	1800-1900		Radio Riyadh, Saudi Arabia..
			3985, 6165	1800-1900		Radio Tanzania.....
			9535	1800-1900		Radio Zambia.....
			4930	1800-1900		RAE, Argentina.....
			9700, 15330	1800-1900		TWR, Swaziland.....
			15345, 15430	1800-1900		Voice of America.....
			6005			
			6070	1800-1900		Voice of Nigeria.....
			6030			
			6130	1800-1900		WHRI, Indiana.....
			6080	1800-1900		WINB, Pennsylvania.....
			11735	1800-1900		WRNO Worldwide.....
			11965	1800-1900		WYFR, Florida.....
			17775	1805-1830	(A,S)	Radio Austria International.
			9665	1814-1817		Radio Suriname Int'l.....
			9570, 11600	1815-1900		Radio Bangladesh.....
			5975, 15575	1815-1900		Radio Berlin International..
			5920, 6020	1830-1855		Radio Finland.....
			9580, 9605			
			9640, 9705	1830-1900		Radio Netherlands.....
			9755, 9885			
			11865, 12030	1830-1900		Radio Polonia.....
			15500			
			7245, 9535			
			11955			
			7105, 7305	1830-19000		Radio Sweden International..
			9977, 11665			
			9720v	1830-1900		Radio Sofia, Bulgaria.....
			6105			
			9505	1830-1900		Radio Sweden Int'l.....
			15255	1830-1900		Radio Tirana.....
			6110,	1830-1900		Swiss Radio International...
			15410, 15445	1830-1900		Radio Netherlands.....
			15580, 15600			
			11770	1830-1900		Spanish Foreign Radio.....
			15105	1830-1900		Radio Abidjan, Ivory Coast.
			15295	1830-1900		Radio Havana Cuba.....
			15110	1830-1900		Radio New Zealand.....
			11965	1840-1900		Voice of Greece.....
			9535, 11830			
			11875	1845-1900		All India Radio.....
			6035, 9580			
			7145, 9640			
			9690, 11830			
			6135, 9540	1900-1905		Vatican Radio.....
			5930, 7345			
			9605, 11990	1900-1915		Radio Bangladesh.....
			13605, 15110	1900-1925		Radio Netherland.....
			17705, 21505			
			17755	1900-1925		Radio Prague, Czechoslovakia
			6020, 7275	1900-1930		Kol Israel.....
			9765			
			9410, 11745			
			12095, 15070			
			15400			
			11735, 11840	1900-1930		KNLS, Alaska.....
			15310	1900-1930		Radio Afghanistan.....

			6135
			4750, 4795
			4850, 5010
			9745
			6205
			15260, 17820
			7250, 9675
			7175, 7330
			9560, 9710
			3340, 9620
			15250
			11965
			15255
			10040, 15010v
			7285, 9700
			9735, 11785
			15155
			5910, 15510
			4930
			15330, 15345
			15430, 17765
			11940, 15280
			7325, 9410
			12095, 15070
			6005
			6070
			6030
			6080
			6160
			11965
			17775
			9665
			5995, 6045
			6060, 6035
			6080, 7215
			9580
			15260, 17820
			15045
			15450v
			5975, 15575
			11675
			11780, 15150
			9575, 9580
			9640, 11860
			11865, 12070
			12050, 12030
			9720v
			6105
			9505
			15435
			9550
			15445, 15580
			15410, 17800
			11770, 15120
			17800
			15105
			15400
			15420
			9535, 11875
			5945, 6000
			17755
			6240, 7505
			6080, 6115
			6120, 9655
			11755
			6020, 9540
			17605, 21685
			5995, 6135
			7125, 7285
			9525, 9675
			11840
			6065, 11835
			15240
			6070, 9700
			11720
			6065, 15240
			7065, 9480
			9885, 11955
			6020, 9540
			17605, 21685
			11840, 15375
			11940
			11795
			11780, 15150
			11645, 12105
			15630
			7412, 11620

1900 UTC **[3:00 PM EDT/12:00 PM PDT]**

1900-1905		Vatican Radio.....	6190, 6250
			7250, 9645
1900-1915		Radio Bangladesh.....	9855, 11555
1900-1925		Radio Netherland.....	6020, 9540
			17605, 21685
1900-1925		Radio Prague, Czechoslovakia	5930, 7345
1900-1930		Kol Israel.....	9009, 9440/
			9435, 11655/
			11700, 12027.5
			15425, 17685
			17815
1900-1930		KNLS, Alaska.....	7355
1900-1930		Radio Afghanistan.....	5900, 6020
			7160, 9665

frequency SECTION

1900-1930	(M-F)	Radio Canada International..	5995, 7285	2000-2100		CFRX, Toronto, Canada.....	6070
			15325, 17875	2000-2100		CFVP, Calgary, Canada.....	6030
			21695	2000-2100		CHNX, Halifax, Canada.....	6130
1900-1930		Radio Japan.....	9505	2000-2100		CKFX, Vancouver, Canada.....	6080
1900-1930		Radio Kiev, Ukrainian SSR...	7230, 6010	2000-2100	(M-F)	KCBI, Texas.....	11735
			6090, 6165	2000-2100		King of Hope, Lebanon.....	6280
1900-1930	(S)	Radio Norway Int'l.....	11865, 15310	2000-2100	TEN	KVOH, California.....	17775
1900-1930		Voice of Vietnam.....	10040, 15010v	2000-2100		KYOI, Saipan.....	9670
1900-2000		4VEH, Haiti.....	4930	2000-2100		Radio Kuwait.....	11675
1900-2000		AFRTS.....	15330, 15345	2000-2100		Radio Moscow.....	12030, 12050
			15430, 17765				13665, 13785
1900-2000		All India Radio.....	7150, 9665				15425
			11620, 11845	2000-2100		R. Nacional, Equator Guinea	15106v
			15265	2000-2100		Radio New Zealand.....	11780, 15150
1900-2000		BBC, London.....	7325, 9410	2000-2100		Radio Pyongyang, N. Korea...	6575, 7105
			12095, 15070				9345, 9977
1900-2000		B.S. Kingdom Saudi Arabia..	11855v	2000-2100		Radio Zambia.....	9505
1900-2000		CFCX, Montreal, Canada.....	6005	2000-2100		Voice of America.....	15410, 15445
1900-2000		CFRX, Toronto, Canada.....	6070				15580, 17785
1900-2000		CFVP, Calgary, Canada.....	6030				17870
1900-2000		CKFX, Vancouver, Canada.....	6080	2000-2100		Voice of Turkey.....	7215
1900-2000		CKZU, Vancouver, Canada.....	6160	2000-2100		WHRI, Indiana.....	15310
1900-2000		HCJB, Ecuador.....	15220, 15270	2000-2100	(S,A)	WINB, Red Lion, Penna.....	15185
			17790	2000-2100		WRNO Worldwide.....	15420
1900-2000		KCBI, Texas.....	11735	2000-2100		WYFR, Okeechobee, Florida..	11830, 11875
1900-2000		KVOH, California.....	17775				15170
1900-2000		Radio Australia.....	5995, 6045	2005-2100		Radio Damascus Syria.....	7455, 12085
			6060, 6035	2010-2100		Radio Havana Cuba.....	17885
			6080, 7215	2015-2100		ELWA, Liberia.....	11830
			9580	2015-2045		RAI, Italy.....	7235, 9575
1900-2000		Radio Beijing.....	9860, 11500				11800
1900-2000	(A,S)	Radio Canada International..	7130, 9555	2030-2100		Falkland Islands Bcast Svc..	2380 / 3958
			11945, 15325	2030-2100		IBRA Radio.....	6110
			17875	2030-2100		Radio Australia.....	6035, 6045
1900-2000	TEST	R. Discovery, Dominican Rep	15045				6080, 7215
1900-2000		Radio Kuwait.....	11675				9580, 9620
1900-2000		Radio Moscow.....	9580, 12030	2030-2100		Radio Beijing.....	6955, 7480
			12050, 12070				9440, 9895
			13665, 15480	2030-2100		Radio Canada International.	15325
			15500	2030-2100		Radio Netherland.....	9540, 9715
1900-2000		Radio New Zealand Int'l....	11780, 15150				9895, 11740
1900-2000		Voice of America.....	15410, 15580	2030-2100		Radio Polonia.....	6095, 7285
			17800	2030-2100	(M-F)	Radio Portugal.....	9740, 11790
1900-2000		Voice of Nigeria.....	7255, 11770	2030-2100		Radio Sofia, Bulgaria.....	9700
1900-2000		V. Revolution.....	9595	2030-2100		Radio Tirana, Albania.....	7065
1900-2000		WHRI, Indiana.....	15105	2030-2100		Voice of Africa (Cairo)....	15375
1900-2000		WRNO Worldwide.....	15420	2030-2100		Voice of Nigeria.....	11770
1900-2000		WYFR.....	11830, 11875	2030-2100		Voice of Vietnam.....	10040, 12020
			15170, 15566				15010v
1910-1920		Radio Botswana.....	3355, 4820	2045-2100		All India Radio.....	7160, 9550
1920-1930	M-A	Voice of Greece.....	7430, 9395				9665, 9910
			9420				11620, 11870
1930-2000		Radio Beijing, China.....	9440, 11515	2045-2100		Vatican Radio.....	9625, 11700
			11905				11760, 15120
1930-2000		Radio Bucharest, Romania....	7145, 9690				
			9750, 11940	**2100 UTC**		**[5:00 PM EDT/2:00 PM PDT]**	
1930-2000		Radio Finland.....	6120, 11755				
1930-2000		Radio Tirana Albania.....	7075, 9500	2100-2105		Radio Damascus Syria.....	7455, 12085
1930-2000		Voice of Islamic Rep. Iran..	9022, 11930	2100-2115		Radio New Zealand Int'l....	11780, 15150
1940-2000		Radio Ulan Bator Mongolia...	9575, 15305	2100-2220		ELWA, Liberia.....	11830
1950-2000		Vatican Radio.....	6190, 7250	2100-2125	(S-F)	CBC Northern Quebec Service.	9625, 11720
			9645	2100-2125		Radio Beijing.....	9440
				2100-2125		Radio Netherland.....	9540, 9715
2000 UTC		**[4:00 PM EDT/1:00 PM PDT]**					9895, 11740
				2100-2130		ELWA, Liberia.....	11830
2000-2005		Radio Ghana.....	4915	2100-2130		Radio Finland.....	6120, 11755
2000-2005		Radio Ulan Bator Mongolia...	9575, 15305	2100-2130		Radio Australia.....	6080, 9580
2000-2010		Vatican Radio.....	6190, 7250				9620, 15160
			9645				15395, 17795
2000-2010		Voice of Kenya.....	4808	2100-2130		Radio Bucharest, Romania....	6055, 7145
2000-2015	(M-F)	Radio Cotonou, Benin.....	4870				7195, 9690
2000-2015		Radio Togo, Lome.....	3220, 5047	2100-2130		Radio Japan General Service.	7140, 9675
2000-2025		Radio Beijing, China.....	9440, 11515				11815
			11905	2100-2130		Radio Sweden International.	11845, 11955
2000-2025		Radio Bucharest, Romania....	7145, 9690	2100-2140		Radio Havana Cuba.....	17885
			9750, 11940	2100-2150		Deutsche Welle, West Germany	6010, 7130
2000-2025	(M-H)	Radio Polonia.....	7125, 7145				9675, 9765
			9525, 9695				11815
2000-2030		Radio Australia.....	6060, 6035	2100-2150		Radio Pyongyang, N. Korea...	6575, 9360
			6045, 6080				11660
			7215, 9580	2100-2155		BRT, Brussels, Belgium.....	5895, 11980
			9620	2100-2156		Radio RSA, South Africa.....	7270, 9585
2000-2030		Radio Algiers, Algeria.....	9640, 9685				11900
			15160, 15215	2100-2200		AFRTS.....	11805, 15330
			17745				15345, 15365
2000-2030		Radio Budapest Hungary.....	6025, 7220				15430, 17765
			9585, 9835	2100-2200		All India Radio.....	7412, 9665
			11910, 12000				9910, 11620
2000-2030	(M-F)	Radio Canada International..	7130, 9555	2100-2200		BBC, London.....	6175, 7325
			11945, 15325				9410, 12095
			17820, 17875				15070, 15260
2000-2030	(S)	Radio Norway International..	6015, 11865	2100-2200		CFCX, Montreal, Canada.....	6005
			15310	2100-2200		CFRX, Toronto, Canada.....	6070
2000-2030		Radio Polonia.....	7125, 7145	2100-2200		CFVP, Calgary, Canada.....	6030
			9525, 9675	2100-2200		CHNX, Halifax, Canada.....	6130
2000-2030		Radio Prague, Czechoslovakia	5930, 7345	2100-2200		CKFX, Vancouver, Canada.....	6080
2000-2030		Voice of Islamic Rep. Iran..	9022, 11930	2100-2200		Falkland Islands Bcast Svc..	2380 / 3958
2000-2030		Voice of Nigeria.....	7255, 11770	2100-2200		KCBI, Texas.....	11735
2000-2045		All India Radio.....	7160, 9665	2100-2200		King of Hope, Lebanon.....	6280
			9755, 9910	2100-2200	TEN	KVOH, California.....	17775
			11620, 11865	2100-2200		KYOI, Saipan.....	9670
2000-2100		AFRTS.....	11805, 15330	2100-2200		Radio Baghdad, Iraq.....	7170
			15345, 15430	2100-2200	(M-F)	Radio Canada International.	11960, 15325
			17765	2100-2200v		Radio Jamahiriya, Libya.....	6155/ 11815
2000-2100		BBC, London.....	6175, 9410	2100-2200		Radio Moscow.....	5915, 5980
			11675, 12095				6020, 7290
			15070, 15260				7310, 9840
2000-2100	(S)	CBC Northern Quebec Service.	9625, 11720	2100-2200	(M-A)	Radio Nacional Angola.....	9535, 7245
2000-2100		CFCX, Montreal, Canada.....	6005				

2100-2200		R. Nacional, Equat. Guinea.	15106v
2100-2200	(F,A)	Radio Zambia.....	9505
2100-2200		RTL, Luxembourg.....	6090
2100-2200		Voice of Africa (Cairo)....	15375
2100-2200		Voice of America.....	9760, 11760
			15445, 15580
2100-2200		Voice of Free China, Taiwan.	9510, 9765
			11860, 15540
			17845
2100-2200		Voice of Nigeria.....	15120
2100-2200		Voice of Turkey.....	7215
2100-2200		WHRI, Indiana.....	9770
2100-2200		WRNO Worldwide.....	11705
2100-2200		WYFR, Okeechobee, Florida..	11830, 11875
			15055
2105-2200		Radio Damascus, Syria.....	9950, 12085
2115-2145		Radio Cairo.....	9805
2115-2200		Radio Yugoslavia.....	6100, 7240
			9620
2130-2200	(T,F)	BBC Falklands Service.....	9915, 11820
			12040, 15390
2130-2200	(S-F)	CBC Northern Quebec Service.	9625, 11720
2130-2200		HCJB, Quito, Ecuador.....	15270, 17790
2130-2200		KGEI, San Francisco, CA....	15280
2130-2200		Kol Israel.....	9009, 9435
			9815, 9860
			11960, 12080
			13725
2130-2200		Radio Austria International.	5945, 6000
			9670
2130-2200		Radio Australia.....	15160, 15395
			17795
2130-2200		Radio Canada International.	11945, 15150
			17820
2130-2200		Radio Prague.....	6055
2130-2200		Radio sofia, Bulgaria.....	11720, 15330
2130-2200		Radio Vilnius, Lithuania....	6100
2130-2200		Swiss Radio International...	6190, 9885
2200 UTC		**[6:00 PM EDT/3:00 PM PDT]**	
2200-2205		Radio Damascus, Syria.....	9950, 12085
2200-2207		Voice of America.....	11740, 15160
			17730, 17775
2200-2210		Radio Sierra Leone.....	5980
2200-2225		Radio Tirana Albania.....	7065, 9480
2200-2225		Radio Yugoslavia.....	6100, 9670
2200-2225		RAI, Italy.....	9710, 11800
			15330
2200-2230		All India Radio.....	7160, 9550
			9665, 9910
			11620, 11870
2200-2230	(S-F)	CBC Northern Quebec Service.	9625, 11720
2200-2230		Radio Canada International..	5960, 9755
2200-2230	(S)	Radio Norway International..	9605, 11930
2200-2230		Radio Vilnius, Lithuania SSR	7165, 7400
			9800, 11750
			11860, 15100
2200-2245		Radio Cairo, Egypt.....	9805
2200-2245		WINB, Red Lion, Penna.....	15185
2200-2250		Radio Jamahiriya, Libya.....	6155
2200-2250		Voice of Turkey.....	7215, 9535
			9560, 17725
2200-2300		AFRTS.....	11790, 15330
			15345, 17765
			21570
2200-2300		BBC, London.....	5975, 6175
			7325, 9590
			9515, 9915
			12095, 15070
2200-2300		CFCX, Montreal, Canada.....	6005
2200-2300		CFRX, Toronto, Canada.....	6070
2200-2300		CFVP, Calgary, Canada.....	6030
2200-2300		CHNX, Halifax, Canada.....	6130
2200-2300		CKFX, Vancouver, Canada.....	6080
2200-2300		CKZU, Vancouver.....	6160
2200-2300		Falkland Islands Bcast Svc..	2380 / 3958
2200-2300	TEN	KVOH, California.....	15250
2200-2300		KYOI, Saipan.....	15405
2200-2300		Radio Australia.....	15160, 15240
			15320, 15395
			17795
2200-2300	(M-F)	Radio Canada International..	6170, 7230
			11945, 15325
2200-2300		Radio Havana Cuba.....	11705
2200-2300		Radio Korea.....	6480, 7550
2200-2300		Radio Moscow.....	7390, 9490
			9610, 9720
			9820, 9880
			11950, 12030
			12060, 15425
			15478 LSB
2200-2300		Spanish Foreign Radio.....	5960, 6020
			7105
2200-2300		Voice of America.....	15185, 15290
			15415, 15580
			17740, 17820
2200-2300		Voice of Free China, Taiwan.	9955, 15440
			17845
2200-2300		WHRI, Indiana.....	9770
2200-2300		WRNO Worldwide.....	9852.5
2200-2300		WYFR, Okeechobee, Florida..	11830, 11855
			15055, 17750
			21525
2205-2230		Vatican Radio.....	6015, 9615
			11830
2215-2230		Radio Yugoslavia.....	6100, 7240
			9620

frequency

2230-2300	(S)	CBC Northern Quebec Service.	9625, 11720
2230-2300		Kol Israel.....	7410, 9435
			9815, 9860
			11960, 12025
2230-2300		Radio Mediterran, Malta.....	6110
2230-2300	(S)	Radio Nacional Angola.....	7245, 9535
2230-2300		Radio Polonia.....	5995, 6135
			7125, 7270
2230-2300		Swiss Radio International...	6190
2245-2300		All India Radio.....	6035, 7215
			9595, 9912
			11765
2300 UTC		**[7:00 PM EDT/4:00 PM PDT]**	
2300-2330		BBC, London.....	5975, 6005
			6120, 6175
			7325, 9590
			9915, 12095
			15070, 15435
2300-2330		Kol Israel.....	7410, 9435
			9860
2300-2345		Radio Berlin Int'l.....	6080, 9730
2300-2330		Radio Canada International..	9755, 11710
2300-0000		Radio Japan General Service.	7140, 9645
			9675, 11815
			15235
2300-2330		Radio Sweden International..	9695, 11705
2300-2345		WYFR, Okeeechobee, Florida.	15400
2300-2350		Voice of Turkey.....	6105, 7215
			9560, 9730
2300-0000		4VEH, Haiti.....	4930
2300-0000		AFRTS.....	11790, 15330
			15345, 17765
			21570
2300-0000	(A)	CBC Northern Quebec Service.	9625, 11720
2300-0000		CFCX, Montreal, Canada.....	6005
2300-0000		CFRX, Toronto, Canada.....	6070
2300-0000		CFVP, Calgary, Canada.....	6030
2300-0000		CHNX, Halifax, Canada.....	6130
2300-0000		CKFX, Vancouver, Canada.....	6080
2300-0000		CKZU, Vancouver.....	6160
2300-0000		Falkland Islands Bcast Svc..	2380 / 3958
2300-0000		FEBC, Manila.....	15320
2300-0000	TEN	KVOH, California.....	15250
2300-0000		KYOI, Saipan.....	15405
2300-0000		Radio Australia.....	15160, 15240
			15320, 15395
			17725, 17795
2300-0000		Radio Japan.....	7140, 9645
			9675, 11815
			15235
2300-0000		Radio Kiev, Ukrain, USSR....	9665, 9685
			9800, 11790
			11875, 13605
2300-0000		Radio Korea, South.....	15575
2300-0000		Radio Moscow.....	7175, 7400
			9610, 9720
			9765, 9865
			12030, 12050
			12060, 13665
			15425, 17850
			15478 LSB
2300-0000		Radio Prague, Czechoslovakia	6055, 9630
2300-0000		Radio Pyongyang, N. Korea..	11735, 13650
2300-0000		Radio Sofia Bulgaria.....	11720, 15330
2300-0000		Radio Thailand.....	9650, 11905
2300-0000		RTL, Luxembourg.....	6090
2300-0000		Voice of America.....	9640, 11740
			15160, 15185
			15290, 17730
			17740
2300-0000		WHRI, Indiana.....	11775
2300-0000		WRNO Worldwide.....	9852.5
2300-0000		WYFR, Florida.....	6300, 7485
			11830, 11855
2330-0000		BBC, London.....	5975, 6120
			6175, 7325
			9590, 9915
			12095
2330-0000	(S-F)	Radio Canada International..	5960, 9755
2330-0000		Voice of Vietnam.....	9840, 12035
2335-2345		Voice of Greece.....	9395, 11645
2345-0000		Radio Berlin Int'l.....	6080, 9730
2345-0000		Radio Korea, South.....	7275

WIRELESS COMPUTER TERMINALS LOOM ON THE HORIZON

Motorola has proposed to the FCC the shared use of a block of frequencies now utilized by weather satellites and government communications for wireless computer terminals. The 100 milliwatt signals would carry about 500 feet, but terminals using the same frequency would need a separation of about 2000 feet to escape possible interference.

Obviously, such a system would be vulnerable to snooping by appropriately-equipped hackers, but encryption is intended.

ELECTRONIC PRIVACY ACT OF 1986

Extracted from the COMSEC Letter by James A. Ross

This astounding law, among other things, would make it a crime to listen to what has been broadcast by radio on certain frequencies. The law cannot be enforced.

Those who wish to listen will be able to listen with essentially zero chance of being detected in their "criminal" activity, and no chance of being punished for engaging in their "criminal" activity. What then will the law accomplish?

1. It will serve to diminish respect for all laws. Every unenforced law tends to diminish respect for all laws.

2. It will offer cellular communication sellers an opportunity to take advantage of folks by allowing them to assure their customers that their broadcast conversations cannot be overheard because "there's a law against it".

3. It will mean that it will be possible for a person to be accused of committing a crime if he operates a radio:

a. without being aware that listening to what has been broadcast on certain frequencies is a "no-no", or

b. operates a radio that does not accurately display the frequency tuned to, or

c. operates a radio that has poor selectivity, or

d. operates a radio that has poor image rejection, or

e. does anything that allows him to hear what has been broadcast on the specified frequencies (e.g., uses a spectrum analyzer or crystal set or a TV on Channel 80 - 83, etc.).

(Of course, defenders of the bill will point out that there are words in it relating to the "intent" of the listener, but how does one prove a lack of "intent"?)

4. To those with any understanding of radio communication, propagation, etc. it will make the legislators who voted for it look very silly.

Yes, I agree that something should be done to modernize the laws. Yes, we are entitled to protection from wholesale eavesdropping by eager investigators. Yes, law enforcement organizations with cause should be able to eavesdrop on suspects. But making the mere listening to what has been broadcast into a crime is ludicrous. In fact, from here it looks like the beneficiaries of the proposed new law are the salesmen for cellular phones, and some very smart (but devious) law enforcement types who will be able to snoop legally without fear of violating the law because they built in some beautiful gaping loopholes.

GE REVEALS 'WOODPECKER' SPECS

For many years, the Russian military has besieged the short wave bands with the jolting "rat-a-tat" of its over-the-horizon backscatter radar intrusion detection system. Now, the U.S. has plans of its own to assault the airwaves with a similar barrage from within our own borders.

A recent leaflet circulated by General Electric, prime contractor for the U.S. system, outlines the purpose of the equipment to be installed at three domestic sites:

"The purpose of O-T-H radar is to detect bombers that fly at low altitude, supersonic speeds at distances that can't be seen by existing coastal warning radars. O-T-H radar extends the range of our coastal radar to provide the North American Air Defense Command (NORAD) with adequate warning time needed to respond to approaching enemy aircraft.

"The OTH-B radar can detect low flying aircraft at ranges up to ten times greater than conventional microwave radars. This unique radar operates in a frequency range where its radar energy reflects off of the ionosphere (or multiple bounces) to see around the earth's curvature. In this way, bombers can be tracked out to 1,800 miles from our coastline.

"One OTH-B radar can provide the same low altitude coverage as 1,000 conventional microwave radars. Each radar provides all altitude surveillance from 500-1800 miles over a 60° sector. Computers automatically detect, track and identify targets to the radar system operator. Operating frequency is from 5 to 28 MHz."

NSA Picks Contractors

The super-secret electronic eaves-dropping agency, the National Security Agency of Ft. Meade, Maryland, has chosen 11 defense contractors to build its standardized cryptographic equipment.

The list names Rockwell-Collins, AT&T, GTE, Harris, Honeywell, Hughes, IBM, INTEL, Motorola, RCA, and XEROX. In conjunction with NSA, these select 11 will form a joint government/industry team called the "Development Center for Embedded COMSEC Products" (COMSEC is an acronym for communications security).

MAKING WAVES

AM DXing with Paul Swearingen

Summertime QRN (static) is the bane of broadcast band, longwave, and tropical band DXers. A strong storm even 500 miles away can overpower weak signals, and a close lightning storm can be hazardous to you equipment as well as to your health. Many Dxers turn to the FM and TV bands in midsummer, giving up on the AM band in frustration. But selective listening techniques can make your summer DX sessions even more productive than during the relatively QRN-free winter months.

Let's take a few safety precautions first. If you use an external antenna, get into the habit of unhooking it from your equipment at the end of each session and grounding it, preferably to a true earth ground, not just to a water pipe which could transmit a lightning strike throughout the house. Keep the ground wire away from electronic equipment, including the telephone; lightning doe not always follow the man-made path laid out for it, as anyone who has witnessed ball lightning can testify. And remember, if you can see lightning in even a distant storm, it's time to ground your antenna. Powerful static charges can build quickly in the presence of a near-by storm. I've watched them crackle up and down the supposedly well-insulated guy wires of radio station antennas even though the nearest lightning strikes were miles away.

You'll probably find that to gather signals, a loop antenna (many are commercially available at a modest cost from the advertisers in *Monitoring Times*) will give you the best results in the summer. The directional properties of the loop may help null out some of the static, unless you are surrounded by thunderstorms. Check the nation-wide forecasts to find out where the largest (and noisiest) storms will prevail. For example, if you live near Kansas City, and if a cold front is moving through Arkansas, you could expect to orient your loop antenna so as to null static from the southeast and enhance reception from the northeast and southwest.

During my years of DXing in southeast Kansas, I found that reception of regional stations from the Gulf states was actually better in the summertine than during the winter. Indeed, when I was still a kid DXing on a five-tube table radio, most of my DXing took place in the warm months. Can you imagine my excitement while listening to faint reports from KGBC-1540 Galveston, Texas in September, 1961, as hurricane Carla came ashore?

If you have trouble logging the Pacific Northwest, you may find that now's the best time to DX at sunset. For example, KOMO-1000 will not change from a non-directional pattern to a directional one until after 9:00 pm CDT in July, whereas in December the change will occur at 6:15 CST. The differences in inclination of the earth's axis in relationship to the angle of the sun's rays at two times causes the difference in pattern changes.

If you're not too old to enjoy getting up at 3 am to DX, you may find that most static-generating storms have just about spent their energy by this time. Oftentimes, the airwaves are almost eerily quiet after a storm system passes through your area during the previous evening. Plan to DX the northern latitudes, as northern U.S. stations will change to the due south in southern states.

Also interesting is the theory that loggings from deep in South America are more likely in summer than winter. July to Buenos Aires, for example, is as January to Los Angeles and the lack of wintertime QRN, sunrise/sunet patterns, and sea-path propagation could all combine to enhance southern hemisphere DX.

Virtually anytime of the year, you'll find plenty of good listening on the AM bands. In fact, AM DXing can be -- no matter what the season -- the most challenging, most interesting, and most fun DX hobby. So, ladies and gentlemen... start your radios.

Paul Swearingen has been a broadcast band DXer for thirty years, straying only occasionally into the other bands. A firm believer in "DXing smart," he feels that patience is the most important attribute and planning the best technique of a successful DXer. Hardware, he says, "is secondary."

Reflections on Radio

by Hank Bennett

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by Hank Bennett

Some of our readers will be able to transcribe the above heading as, "QRX not QRT." In ham radio talk, QRX generally means "stand-by," while QRT means closing down. Such is the case here. More on this later.

* * *

A good friend, Tom Pailloz, WDX4PHL, writes to inform me that he is writing a pen-pal column for a club to which he belongs. He is instrumental in helping foreign friends to obtain copies of the World Radio-TV Handbook, the Radio Amateur Radio Callbook and other publications as well as my own WDX registrations and DX Awards. He would welcome old copies of just about anything pertaining to radio and he can be reached at Two Wheaton Center, Apartment 1102, Wheaton, Illinois 60187-4972.

* * *

Back in the January 1986 issue, I ran an article entitled "When the Sap Runs Down the Trees." An article subsequently appearing in "Sweden Calling DX'ers" entitled, "Radio and Trees," informs us that a few months ago reports came in of Indian experiments in using trees as radio antennae.

Now there are indications that radio waves can adversely affect trees. A West German radiation physicist says radio waves can kill forests. Researcher H. Hommel says that needles, leaves and branches can function as antennae. The radiation stresses the trees so that they die.

Apparently the worst effect is during wintertime and at night. To the trees, microwaves resemble sunlight, and the trees think it's a summer day which can be catastrophic in the middle of a northern European winter.

* * *

There. That's the easy part of this column. Now comes the tough part.

As many of you know, I've been writing monthly columns for many years, since May 5, 1948, to be exact when I started a shortwave column with the Newark News Radio Club.

Since that time I have turned in at least one column a month and sometimes two or three columns each month, such as during 1955-1970 when I was also writing for *Popular Electronics* and later when I wrote for *Radio Today*. Since 1948 I have neither missed a month nor a deadline. That's a lot of columns, people!

But there comes a time when you run out of stuff to talk about. Most of my writing career has been in more active columns, columns devoted to what was actually being heard on the air and written by the people that sent me monthly reports.

Writing a column of the type that I've been writing may often require many hours of research and this has generally been available to me in the past; presently, however, my time is becoming less and less available because I want to be able to spend more time with my family and less time doing research.

If you haven't gotten the drift of my story thus far, I'll spell it out clearly; I'm going to take a break from monthly columns. As the title indicates, I'm going on standby for a while, but not giving up entirely. What I hope to be able to do is to contribute on an occasional basis without having to keep constantly checking the calendar for deadline dates.

One thing that will continue indefinitely and with full steam ahead is the WDX Monitor Registration Program with certificates of identification and certificates for DX Awards. This program has helped and encouraged thousands of people to join in our hobby and to gain a radio-type identification of their own. My dear, patient wife has helped me with WDX through the years and we'll be continuing this program as long as we're able.

If I were able to list everyone who has helped me through the years, there wouldn't be enough pages available. I guess the most important people who have been with me in my writing career, outside of a multitude of editors, is my own family and it is to them that I owe many tons of loving thanks.

Like I said, this is QRX - not QRT. I will be back.

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The Complete DX'er by W9KNI covers all aspects of the DX'ers life both in and out of the pile-ups: listening, the chase, capture and quest for elusive QSL cards. **#0283 $10 US, $11 elsewhere**

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GIL: Collection of cartoons from QST .. **#0364 $5**
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The Satellite Experimenter's Handbook by Martin Davidoff, K2UBC. Packed with information on amateur satellites and how to communicate through them. 208 pages, copyright 1985
#0046 $10 US, $11 elsewhere
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Understanding Amateur Radio
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RSGB VHF/UHF Manual ..... **#R630 $17.50**
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SUMMERTIME READING

"The Compleat SWL"

When do you go on vacation this year? Plan on spending any time at the beach? Need some good reading to take with you?

We at monitoring Times have taken the liberty of compiling your summer "international radio" reading list for you. It's a list that is designed to give you a well-rounded, historically valid look at virtually all aspects of international radio.

Not all of the reading is going to be like plowing through a marvel comic book. While the list is not meant to be all-inclusive or "exhaustive," there are a number of very heavy academic citations included, all without a doubt, contributing to your knowledge of the field and perhaps even building character and making you a better person.

We've tried to stay away from the purely hobby-related topics (like how to choose a receiver, get QSL cards, etc.) in an effort to provide a more well-rounded view of the industry as a whole, leaning particularly toward the area of politics. 'Cause after all, that's what international radio is all about, really.

If you complete all of the books, articles and citations listed below, there's a good chance you'll know just about everything there is to know about international radio. Send in $12,000 and we'll toss in a genuine International Radio diploma from the Bob Grove school of auto repair.

All citations are available from you local library or through inter-library loan. So get crackin'. There'll be a test on this material in the fall!

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Cont'd next page

The Utility DX'ers Library

The hoopla that often accompanies advertising efforts designed to attract more people into the monitoring hobby is all too often just that - hoopla. The current generation of shortwave receivers and accessories which can decode CW, RTTY and FAX transmissions may be modern miracles of technology; but the fact remains that, no matter how fancy and amazing the equipment is, the user isn't going to hear very much if he or she doesn't know what he or she is doing.

Tuning in a specific RTTY service or finding Coast Guard transmissions when you want them isn't something that just happens. You can know your equipment inside and out, you can "play" it with all the mastery of a concert violinist, but if you don't know where to find what you are looking for you might as well be blindfolded and have cotton stuffed in your ears to boot.

Being an expert driver and owning a Mercedes isn't in itself going to get you from Tacoma, Washington to Baton Rouge, Louisiana; a road map or some sort of directions are required.

The same is true with successful monitoring and nowhere is it more applicable than in the world of utility monitoring. There are hundreds of services using thousands of channels in the high frequency spectrum. Your chance of finding a particular station, country or service strictly on your own are about equal to those of an unprotected snowball surviving in the Sahara.

The utility monitor lives on information. It is the stuff of success. He needs aids to chart a path through this astounding maze of signals and services active at any hour of the day or night on the shortwave frequencies.

Monitoring Times and *Popular Communications* and clubs such as SPEEDX and the Association of DX Reporters which provide coverage of utilities through lists of loggings and/or background articles are invaluable aids. They provide the background information and current information about what's being heard. It goes without saying that the serious utility monitor will have a subscription to *MT*, *Pop Com* and at least one club which provides utility coverage.

Good as they are, however, these publications can only provide a small slice of the pie at any one time. Since the field is so large and so changeable, there is no one source that will give you the whole pie. A complete worldwide listing of all utility stations has never been compiled and probably never will be.

But there are some very good volumes which do provide bigger slices of the utility pie, books that the serious ute hunter should consider for his reference library. Here's a listing of books which would make excellent additions to your library.

The Guide to Utility Stations by Jorge Klingenfuss, is a huge listing containing some 15,000 frequencies with European emphasis, all or most of which are the result of the author's own monitoring efforts. The current fourth edition also contains the previously separate Guide to RTTY Stations, as well as call sign listings and rules of the International Telecommunications Union. Over 400 pages and priced at $19.95.

The Shortwave Directory by Bob Grove contains some 6,000 station listings with North American, covering everything from embassies to Interpol, military, RTTY, and FAX. This book is especially useful since the listings are categorized by station type or agency so if you want to listen to Coast Guard frequencies you don't have the near-impossible task of sorting through everything else to pull out what you want. 184 pages, priced at $12.95.

The Confidential Frequency List, by O.P. Ferrell. The sixth edition of this book is the last edition in which the late Perry Ferrell was involved. Over the years it has become something of a standard reference work for utility station listings. The Slim Jim early editions have grown to today's version of over 300 pages which include aeronautical, CW, coastal, fixed, embassy, military, facsilime, Volmet and time stations, as well as stations transmitting in RTTY. Presented in straight ahead by-frequency listings. The introduction contains much of value to the beginning ute DX'er as well as chapters on RTTY and the Cyrillic alphabet. Rumor says that a new, 7th edition is in preparation. Published by Gilfer Shortwave and priced at $13.95.

The SPEEDX Reference Guide to the Utilities, published by the SPEEDX club is another fine guide. It has been released in sections covering basic information about utility monitoring, Morse code, single letter higher frequency beacons, commercial, aeronautical, Coast Guard, and so on.

The book is shipped three-hole punched for insertion into your own 6"x9" binder. 237 pages, priced at $11.75 in the U.S. Available from SPEEDX, 7738, East Hampton St., Tucson, AZ 85715-4212.

Those with wallets in good health should consider the FCC Master Frequency File which contains nearly two million listings of frequencies ranging from 1 hertz to 100 gigahertz--in other words, the

Cont'd next page

Utility DX'ers Library, cont'd

entire radio frequency spectrum. These are, of course, U.S.-licensed stations only, with listings arranged by frequency, by state and by city.

The file comes on microfiche cards (over 800 of them!) and costs $150. Also available on fiche is the Government Master File ($25.00) and the FAA Master File (1984) at $12.95--all three sold by Grove Enterprises.

DX'ers who are into radioteletype have a number of titles in their area of special interest available from Universal Shortwave. The classic World Press Service Frequencies by Thomas Harrington both explains RTTY monitoring and lists press agencies transmitting in English by both frequency and time. It's priced at $8.95. RTTY Press Broadcasts by Time and Frequency by Michiel Schaay covers press transmissions in all languages and costs $12.95. RTTY Today by Dave Ingram, while containing only a smattering of actual station listings, is an excellent introduction into the world of RTTY for both ham and SWL. Priced at $8.95. Klingenfuss offers the List of Special RTTY and CW Alphabets and Codes at $12.95, to help you understand what you are receiving.

DX'ers who like to search out communications on military frequencies may want the three volume set entitled U.S. Military Radio Communications by Michiel Schaay. Each volume is priced at $12.95.

FAX fans will want a copy of Balneger and Schaay's Shortwave Facsimile Frequency Guide, which provides frequencies and discusses the equipment needed to copy FAX transmissions. It's priced at $14.95.

Other specialized listings include Schaay's Embassy Radio Communications Handbook at $8.95 (most of the listings in this one are for RTTY, CW and TOR transmissions) and the Air and Metro Code Manual by Klingenfuss, which explains how to decode weather information received over RTTY. The tag on this one is $15.95. Speaking of weather broadcasts, we mustn't forget Bert Huneault's Worldwide Weather Broadcasts. The amount of information in this slim 23 pager makes it a steal at $4.95.

For a general introduction into the utility world, try the SWL's Manual of Non-Broadcast Stations by Harry L. Helms. A TAB book, priced at $12.95.

Prices are, of course, subject to change and do not include shipping costs. Most, if not all, of the books mentioned above are available from Universal, EEB or one of the other SW specialty houses.

Depending upon your degree and are of interest you should probably have several, if not all, of these books in your library. But no book is worth very much unless it is put to use, so study the text of those you purchase and become familiar with the areas they cover.

You don't have to buy them all in one fell swoop. Build your library slowly if necessary. You'll find these books will greatly increase your utility station loggings and the enjoyment you gain from monitoring this endlessly fascinating area. ■

Larry Van Horn, cont'd from p.23

For his work in amateur satellites, Larry was awarded the OSCAR 20th anniversary certificate in 1981.

Navy medals that have been awarded to him include: the Navy's Enlisted Aviation Warfare Specialist Wings, Navy Achievement Medal (for journalism excellence), Navy Good Conduct Award (two awards), Navy Battle Efficiency "E" (two awards), Sea Service Deployment Ribbon (two awards), and the Navy Sharpshooter Pistol (three awards).

Larry is an avid TV-FM Dx'er, VHF-UHF experimenter/DX'er and HF utility monitor buff. His station is equipped for all modes from 550 kHz to 1.3 GHz including RTTY. Larry holds amateur radio callsign N5FPW and has held amateur callsigns WH6INU, KH6INU and KA5PAE since becoming a ham in 1974.

His major thrust in the monitoring hobby has been a project he has worked on for over twenty years, the study and monitoring of the Soviet space program.

Larry has been editing the RCMA "Space Communications" column since May of 1982 and has been a part of the *Monitoring Times* editorial team, editing "Signals from Space," since January 1984. His book Communications Satellites has enjoyed good reviews. Larry has made several appearances on local TV/radio stations and has had several articles written about his Soviet space studies published in Dallas area newspapers.

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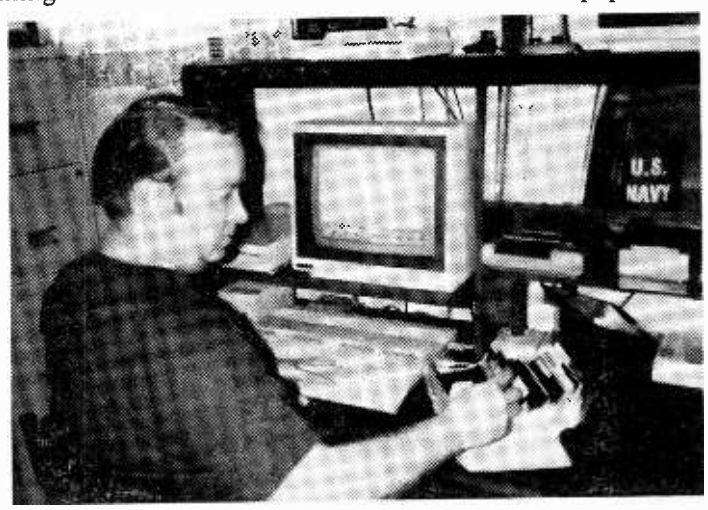

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SPEECH INVERSION CHIP AIDS SCRAMBLING

Although recognized as the lowest level of electronic encryption, speech inversion is commonly found on the airwaves, especially by small municipalities' police departments.

Speech inversion is the only form of scrambling which can be broken by consumer descramblers such as the Capri decoder sold by Grove Enterprises.

A British company, consumer Microcircuits Ltd of Witham, UK, has announced a variable split-band frequency inversion integrated circuit, the model FX204, allowing the designer to scramble speech transmissions with switched-capacitor filters. For further security, 32 different codes may be employed allowing rolling-code inversion, much more difficult to break.

The inexpensive chip is compatible with 5 volt CMOS circuitry, making it suitable for use in battery operated equipment, and comes packaged in a 24-pin DIP configuration.

--READER FEEDBACK--
THE KIND OF "INTERFERENCE" WE LIKE!

THE 1986 ANARC CONVENTION

by Henry Jewlette

Go Habs Go! To many, Montreal is the home of the great hockey dynasty. Impressing even the Russians, it was the first to win the Stanley cup 5 years in a row. And the city was thrown into a frenzy.

To others, it the home of sizzling brochettes, served in the innumerable neighborhood restaurants. It is a multi-cultural city, home of four world renowned universities -- two English and two French. It is extraordinarily clean and safe subways. The Montreal Symphony Orchestra. Fine breweries overflowing with home-made suds. And this year, Montreal adds to its repetiore the 21st annual ANARC convention.

While the ANARC convention probably will not have the same effect on the city as a home-team Stanley Cup victory, it nonetheless opens its doors and offers its gracious hospitality to the shortwave community this month from July 18 through the 20th.

This year's convention will probably be the largest in history. Hosted by Radio Canada International, it already boasts a line-up of more broadcasters, clubs, distributors and manufacturers than any other. Among the familiar names expected to appear are Radio Netherland's Jonathan Marks (be sure and ask him for an autographed photo), Mike and Suzanne Poulos of Radio Earth, Rudy Espinal of Radio Clarin, David Monson, formerly of the Belgian BRT, Swiss Radio's Bob Zanotti, John Beck and Ken MacHarg (MacHarg carries autographed glossies as well) of HCJB, the charming Wolfgang Pleines of Deutsche Welle and -- convention maitre 'd -- Ian McFarland, himself hardly an unknown on shortwave radio. And, of course, many of your favorite columnists from *Monitoring Times* will be in attendance to answer your questions and drink your beer.

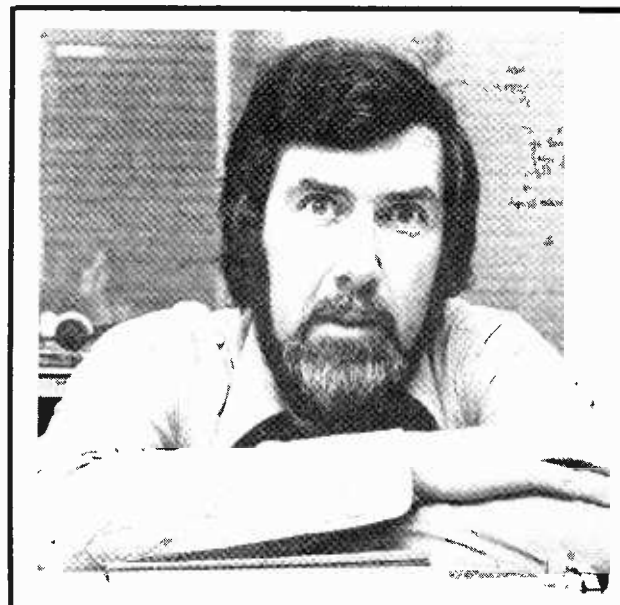
If you're like most shortwave listeners, chances are you don't have a lot of like-minded people in your neighborhood. Shortwave listeners are used to receiving blank stares or long talks about "ham" radio from people when they attempt to share their enthusiasm for their hobby. And that's what makes an ANARC convention so wonderful. It's a place where everybody talks the same language! DX is definitely spoken here!

This year, the agenda for the conference features a "live" taped recordings for a number of international broadcast programs including Radio Canada International's *Shortwave Listener's Digest Forum*, HCJB's *Saludos Amigos*, and Radio Earth's *The World*, to mention a few. There will also be continuous film shows on shortwave and related communications topics, equipment displays, discussions and seminars as well as a number of events that have become traditions over these 21 conventions: the wine and cheese reception, the ANARC auction, the World Radio TV Handbook quiz and the International Broadcaster's Forum -- your chance to put your favorite broadcaster on the hot seat.

If you have not already registered to atttend this gala event, there is still time. Walk-in registrations are accepted (you may have difficulty finding accommodations at the convention hotel but others will undoubtedly be available and the banquet may be booked up) but virtually all other activities will be open to you. (Traveler's note: if you plan to drive into Montreal, check with your automobile insurance company about getting a Quebec insurance card before driving into the province.)

ANARC 86 will be held on Montreal July 18 through 20 at the Holiday Inn, Place Dupuis.

So if the following list of activities isn't enough to make your DX taste buds absolutely stand up and cheer, then it's just possible that you're in the wrong hobby. For those interested in finding out more information, write P.O. Box 6000, Montreal, Canada H3C 3A8 or simply drop by the convention. Everyone will be happy to see you!



Ian McFarland, host of ANARCON '86.

La Tourelle - The Home of RCI

21st Annual ANARC Convention

Montreal, Canada - July 18 - 20, 1986
Sponsored by Radio Canada International

* * *

Provisional Convention Program

Friday, July 18, 1986

0830 hrs.	Convention registration opens
1000-1700 hrs.	Continuous film show - SW & communications related films
1100-1730 hrs.	Equipment, SW station & ANARC club displays
1130-1530 hrs.	Introduction to radio monitoring -- seminars
1300-1430 hrs.	ANARC Executive Council Meeting
1300-1430 hrs.	Recording of RCI Listener's Corner Mailbag program
1500-1800 hrs.	Bus tour of Montreal (extra charge)
1900-2130 hrs.	Wine & cheese reception - official convention open

Saturday, July 19, 1986

0830-1430 hrs.	Convention registration desk opens
0900-1700 hrs.	Equipment, SW station & ANARC club displays open
0900-1045 hrs.	Frequency management seminar & open forum
0930-1700 hrs.	Continuous film show - SW & communications related topics
1115-1215 hrs.	Seminar on SW jamming & the ANARC "Woodpecker" project
1330-1430 hrs.	Introduction to radio monitoring seminar
1315-1415 hrs.	Seminar on WARC 84-87, intercessional activities, and preview of WARC 87
1415-1515 hrs.	Seminar on the results of the ITU Region II MW conference
1530-1700 hrs.	Recording of SW Listener's Digest - Forum
1800-1900 hrs.	Cocktail party
1900-	ANARC awards banquet with special guest of honor, Arthur Cushen, wellknown SW monitor and broadcaster from New Zealand Following the banquet: the ANARC auction will be held

Sunday, July 20, 1986

1000-1100 hrs.	Audio/visual presentation by Jonathan Marks of Radio Netherlands "Media Network" program "The Explosive Growth of Computer Bulletin Boards for SWLS" "Some of the Problems Facing Newcomers to SWLing"
1100-1200 hrs.	World Radio TV Handbook quiz with Andy Sennitt
1300-1500 hrs.	International broadcasters forum
1500-	Official closing of the 1986 ANARC convention
1900 hrs.	Montreal Harbor Sunset Cruise (extra charge)

CHECK YOUR EXPIRATION DATE: Renew Today!

MT COLUMNISTS ARE AT YOUR SERVICE--WRITE THEM WITH YOUR IDEAS

Clever Reader Creates His Own QSL Cards

Want to increase the chances of having a verification returned from your listening quarry? Try computer-generating your own QSL like Milan Seifert of Ft. Belvoir, Virginia, does.

Milan customizes a report from on his Commodore 128 using the Print Shop program (for art) and Easyscript word processor (for text). He recommends that listeners enclose return postage with the forms as a courtesy.

Nifty idea, Milan!

TROUBLE LOOMS OVER AM STEREO

It looked pretty cut and dry. The Motorola AM broadcast stereo system seemed to win the foray hands down. But on March 14, 1986, Kahn Communications of Garden City, New York, filed a complaint with the Federal Communications Commission charging that the Motorola system fails to comply with the Commissions Part 73.44 and 73.128 Rules and Regulations.

Kahn stands to win big if the protest is taken seriously since the only other contestant in the new technology was Harris, but their type acceptance was revoked in August, 1983.

Kahn's complaint stems from an alleged test run by an unidentified broadcast station which showed spurious emissions from the Motorola chip were greater than allowed by FCC regulations.

Kahn requests that the FCC run tests of its own and then, upon finding validation of the charge, reject the Motorola device.

New Chip

In a related item, Tokyo Sanyo has announced a one-chip demodulator that can switch among the Motorola, Kahn and Magnavox AM stereo systems, providing such functions as discrimination, automatic switching and demodulation.

The LA1910 IC corrects for distortion, requires a low input level (92 dB/u) and offers a high output level (360 mV at 50% modulation). Packaging is a standard DIP-30s. (Contributed by Christopher Kissel, Islip Terrace, NY)

THE HIGH COST OF JAMMING

Jamming of incoming radio signals by Soviet countries is a daily--and expensive--occurrence on the international scene. It is estimated that the Soviet Union spends approximately $1 billion dollars annually to support its 15,000 technicians manning 2,000 jamming stations. (Contributed by Frederick Chesson, Waterbury, CT)

BE A FRIEND
TELL A FRIEND ABOUT
MONITORING TIMES

QSL

UNITED STATES COAST GUARD
OMEGA STATION
LA MOURE, NORTH DAKOTA

THIS CONFIRMS YOUR RECEPTION OF COAST GUARD
OMEGA STATION LAMOURE AT 1500 Z,
13 SEPTEMBER 1985.
FREQUENCY 13.1 KHZ.
TRANSMITTER MODEL AN/FRT-88
ANTENNA TYPE 120' UNGROUNDED.
ELECTRONIC TECH.
~~RADIOMAN~~-IN-CHARGE ETC FORT

U.S.C.G. OMEGA STA.
LAMOURE
N.D.

QSL

UNITED STATES AIR FORCE
COMMUNICATION STATION
MCDILL AFB, FL

THIS CONFIRMS YOUR RECEPTION OF AIR FORCE
COMMUNICATION STATION Lark 21 AT 2320 Z,
11 September 19 85.
FREQUENCY 11179 KHZ.
TRANSMITTER MODEL ----
ANTENNA TYPE ----.
RADIOMAN-IN-CHARGE J.M. MCAULIFFE, MSgt, USAF
Superintendent, Radio Operations

**Under current regulation, I cannot release any equipment information; I can only verify the reception report.

Station Profile

WHRI: WORLD HARVEST RADIO INTERNATIONAL

The Birth of World Harvest Radio:

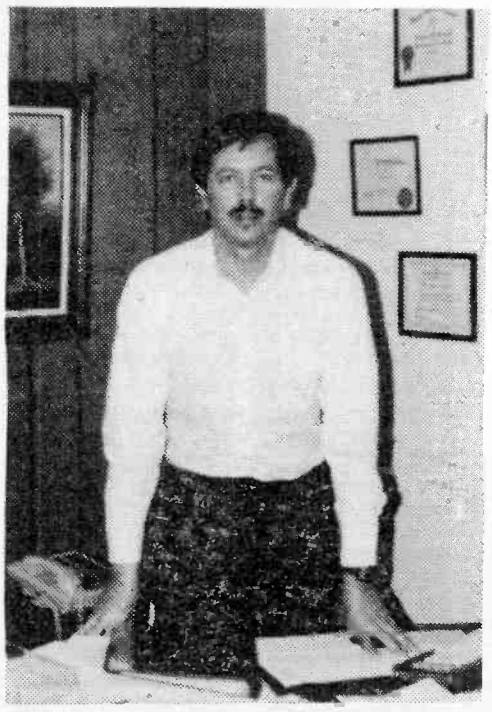
Doug Garlinger's Dream Come True

Donald Dickerson with Larry Miller

The next voice you hear may be that of Dr. Lester Sumrall -- if you happen to tune across the newest broadcaster to enter the international radio arena. WHRI, World Harvest Radio International, the new shortwave outlet of LeSea Broadcasting Company, began regular transmissions in late December, 1985. WHRI is LeSea's first venture into shortwave although they have operated a network of religious radio and TV stations for several years. Dr. Sumrall, the company's founder, began his career in radio in the late 1960s when he aired a 30 minute program on a local radio station in South Bend, Indiana.

With the success of his program and continued support from his listeners and church, Dr. Sumrall purchased a local radio station in South Bend, Indiana, called WURD in 1968. That year, the station -- not one of radio's great success stories -- received its new owner, a new set of call letters (WHME) and a bold, new future. The LeSea Broadcasting Company was born.

Television was the first expansion LeSea was to undertake and in 1972, WHMB, TV 40, signed on the air in Indianapolis. Six years later, LeSea added a another television station, this time to its facility in South Bend. This was followed by Direct Satellite Broadcasting with a hook up to Spacenet 1. [The Spacenet transponder operates on C band with the uplink frequency of 5.9 to 6.4 GHz and a downlink frequency of 3.7 to 4.2 GHz.] Within a span of only 20 years, Lester Sumrall had gone from broadcasting a local thirty minute radio program, to the stars.



WHRI's designer and builder Doug Garlinger

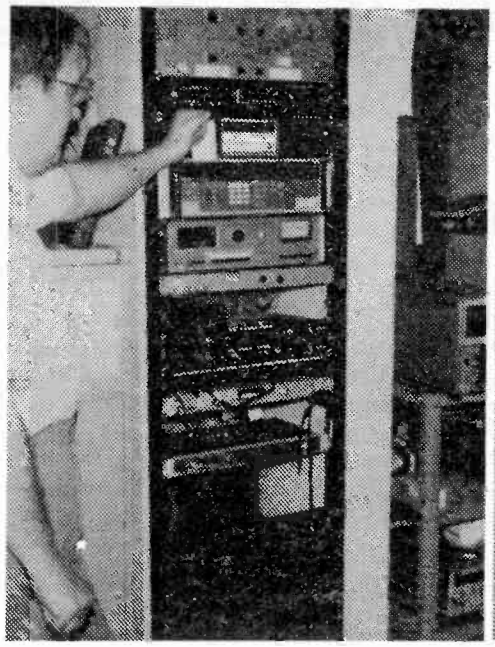
While Dr. Sumrall was pursuing his interests in Christian Broadcasting, the man destined to play a key role in the development, planning and design of WHRI as their chief engineer was busy collecting QSL cards from international shortwave broadcast stations.

Doug Garlinger, head of LeSea's engineering department, began his career in radio at the age of 11 as an active shortwave listener. By the time he was thirteen, he was an accomplished DXer and a licensed radio operator with the call sign WA9TQX. He knew that broadcasting was for him from the start.

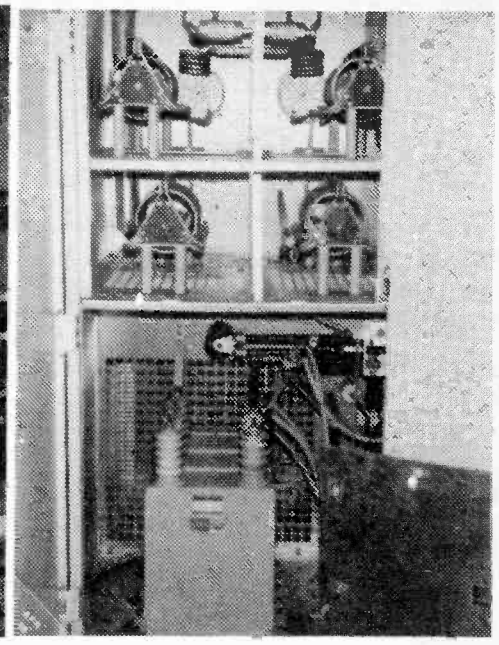
Dr. Sumrall, too, was well aware of the potential of shortwave as a medium for his message. But it was not until recently that the U.S. Federal Communications Commission began to grant new licenses for new stations. Once they did, the stage was set for the development of WHRI.

Without a doubt, LeSea's Chief Engineering position is a demanding and challenging one but it must offer some moments of leisure as was the case when Doug Garlinger decided to bring his QSL collection cards to work one day. Perhaps it was to fill those few free moments with fond memories of late winter nights spent in front of the receiver tuning in SBC, Radio Moscow, or 4VEH for the first time.

Doug's reminiscing was interrupted on that particular morning by station general manager Pete Sumrall. Doug feels it was nothing less than providence which brought Peter into his office on the same day that he had his QSL cards spread out all over his desk. After discussing some routine business, Pete asked about all those colorful cards, prompting him to mention Dr. Sumrall's interest in shortwave broadcasting. As you can imagine, that bit of information was rather exciting to an old salt SWL like Doug. A quick call to Dr. Sumrall, several informal meetings and a rough outline later and it was determined that a feasibility study was in order.



WHRI Engineer and Station Manager Larry Fawbush.



Top cabinet contains the tuning circuit; lower, filter capacitor for plate circuit.

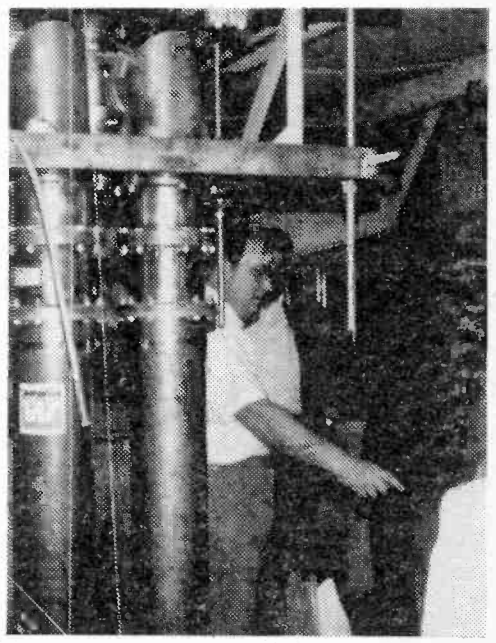
With the completed study in hand, the Engineering Department was given the go-ahead to draw up plans for the transmitter and other equipment that would be needed. A suitable 27 acre tract of land was purchased just east of the Noblesville studios of WHMB TV and a construction permit was received from the Federal Communications Commission in May, 1985. With a projected budget of 1.2 million dollars, construction was begun on the transmitter building and the equipment was ordered.

WHRI Today

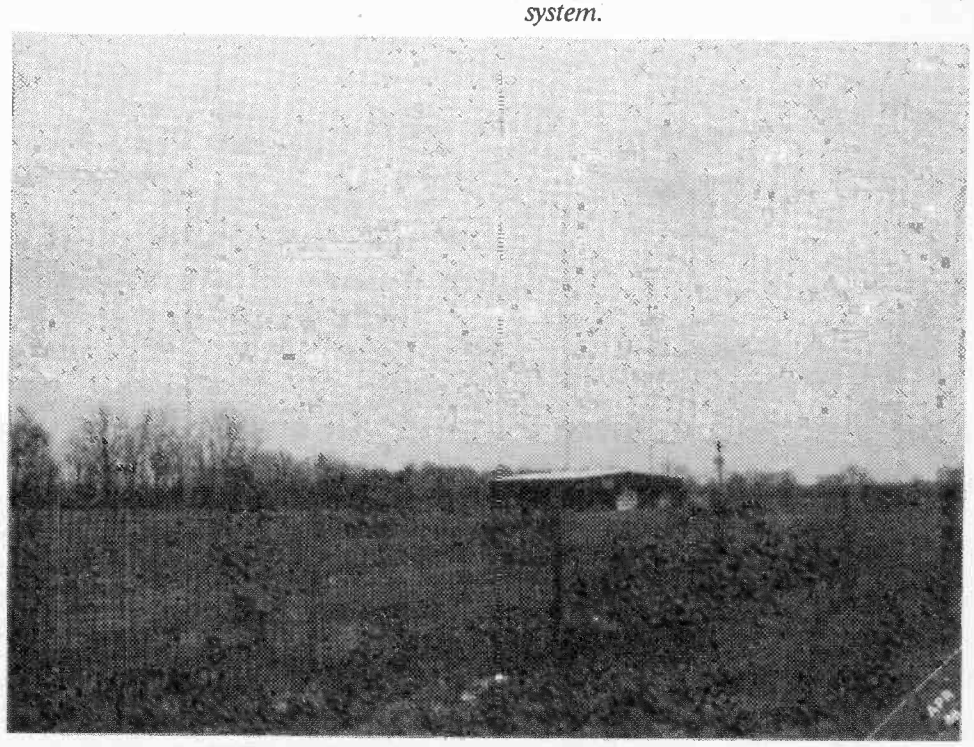
Today, the station uses one Harris SW-100A 100 kilowatt transmitter. It's in operation 24 hours a day, pumping out an effective radiated power of over 4 million watts into two antennas, one centered on a direct line to Buenos Aires, Argentina and a second targeted to the Middle East. You can see the antennas, surrounded by a bright red 5-foot snow fence, just north of Highway 283 East -- as you pass through Noblesville, Indiana.

In the beginning, World Harvest Radio's programs have been in English but LeSea plans to eventually expand to 14 languages. Among their first priorities are Spanish and Russian broadcasts, as Dr. Sumrall feels a special concern for the Soviet people.

How does World Harvest Radio differ from other religious broadcasters? According to Dr. Sumrall, there are two areas. One of the goals of the station is diversity in programming, both in terms of content and theological perspective.



Larry Fawbush at the antenna switching system.



WHRI's rural setting in North Central Indiana.

While station founder Dr. Lester Sumrall has his own program, *Lester Sumrall Teaches* daily at 1900 UTC, the station also carries a wide range of other religious programs including what is probably the most widely known in the industry, *Back to the Bible*, daily at 0600 UTC. *Back to the Bible* is a conservative, traditional Bible teaching program with host Warren Wiersbe. Another in a similar mold is *In Touch* with Dr. Charles Stanley, President of the Southern Baptist Convention, heard daily at 0630 UTC.

But WHRI programming is not limited to the religious. Last month, the station carried live the Indy 500 car race from Indianapolis, Indiana. And, in the summer of 1987, the station hopes to transmit the Pan Am Games live from that same city. "Carrying those programs are a natural" says station Operations Manager Craig Wallin, "because they are right in our backyard. If all goes well," he continues, "we could end up branching out into other similar programs in the future."

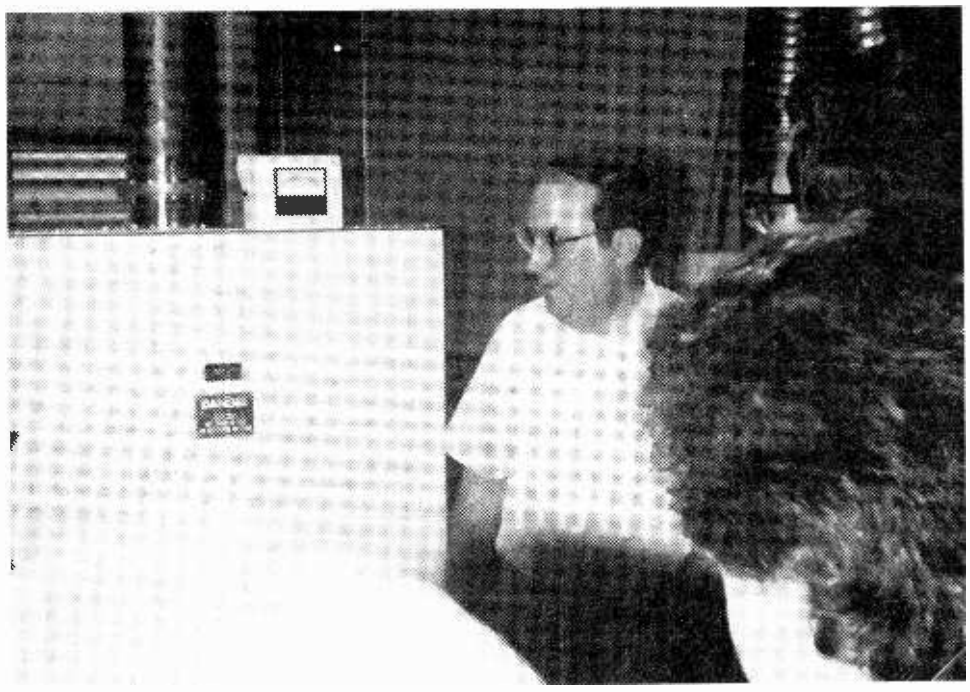
Indeed, hearing such events over WHRI should come as no surprise as the station currently carries the independent, non-religious programs of Radio Earth every night except Sunday at 0300 UTC on 7355 kHz!

The second area where the station hopes to excel is in its professionalism. To that end it employs a dedicated staff and gives them top-of-the-line equipment to work with.

In fact, for a station only six months old, World Harvest Radio radio has already made its mark. It's shown the world that it knows how to do shortwave right. ■

WHRI Schedule

Time	Frequency	Target
0000-0100	11770 kHz	South America
0100-0300	9690 kHz	South America
0300-0600	7355 kHz	South America
0600-0800	9620 kHz	Europe
0800-1100	7355 kHz	Europe
1100-1300	5995 kHz	Europe
1300-1500	11790 kHz	South America
1500-1700	15105 kHz	South America
1700-1800	15105 kHz	Europe
1800-2100	15310 kHz	Europe
2100-2300	9770 kHz	Europe



The dummy load antenna for WHRI is large enough to fill a room. It stands 5' tall 5' wide and 12' long.

Members of the "Five-Seven Group" touring WHRI. Including MT's own Jean Baker.

Mystery of Glenn Miller Solved

One of the personal tragedies Americans shared during the second world war was the loss of popular band director Glenn Miller. His music promised a return to beauty in a particularly brutal time. But somewhere over the English Channel, the plane carrying Miller went down.

Now, more than 40 years after the unaccountable incident, it appears that the mystery is solved.

An RAF Lancaster bomber, returning from an aborted mission to the Siegen, Germany, railyards, was routinely ordered to jettison its bombs into the English channel to avoid the possibility of explosion upon landing with armed bombs.

The Navigator aboard the Lancaster remembered seeing a Norseman D-64 fall into the sea, accidentally struck by one or more of the falling bombs. Miller was aboard that aircraft.

The story remained untold for four decades because no debriefing was required following an aborted mission. The loss of a civilian aircraft went unrecorded until recently when the navigator, watching a rerun of "The Glenn Miller Story," realized the ironic tie-in with his early mission.

Overcoming the Odds - Electronically

Apparently, some industrious electronics whizzes have figured out a way to beat the odds at Las Vegas and Atlantic City gambling casinos. With modern electronic control of some games, patrons with concealed computerized cheating devices are reportedly making the odds considerably in their favor.

Now, a New York company claims to have perfected a countermeasures system which can be worn under the clothes of security personnel. Small antenna wires are run down sleeves and pantlegs with the main unit attached to a belt or housed in a pocket.

The manufacturer claims that the system is capable of detecting either communication line noise or data line noise generated by the cheating devices.

Priced at $22,000, the system should be attractive to casino operators.

THE OUTER LIMITS

Scott McClellan
P.O. Box 982
Battle Creek, MI 49016

Welcome to the Outer Limits. As you may have guessed from the name of the column, we'll be looking at anything out of the ordinary that's heard on the shortwave broadcast bands, focusing mainly on clandestine and pirate broadcasters.

Pirate Plans

WBRI, "Progressive Free Radio for North America" sends word that they are planning to operate with 10 kilowatts in the 39 meter band, starting July 4th. The message arrived on a printed QSL card, signed by "Robyn Generator." I think that Robyn is suffering from a case of wishful thinking regarding the station's output level, but it might pay to giver a listen to the 7350-7500 kHz range on July 4th.

A station with even bigger plans is *Radio Clandestine*. We'll have more details next month, but a phone call received here from R. F. Burns revealed some exciting news. I'll just say that we may be hearing much more from *Radio Clandestine* in 1987, and you have a chance to be a big part of it!

FM Pirate Closed by FCC

Herbert Gesell of Amityville, New York, sends along two newspaper clippings from "Newsday" dated April 30 and May 2. *WQNR*, located in Selden, Long Island, was closed down by the FCC on April 28th for unlicensed broadcasting. They had been operating on 87.9 MHz in the FM band after operating as a legal, carrier-current station on 640 kHz AM for nearly two years. Gesell hopes to one day convert *WQNR* into a commercial station but for now it will make do with its carrier-current operation and the memory of a $750.00 fine.

Out of the Ether

David Cutter in Louisiana was pleased to find *KFAT* on 7435 kHz from 0250 to 0431 UTC. David says that the signal strength was so good that at first he wasn't aware that he was listening to a pirate station. After listening to "The Redneck National Anthem" and a commercial for neutron bombs, he heard the station identify as "*KFAT*, The Fat One." Mace Twigg heard the same broadcast in Minnesota, but with only a fair signal. *KFAT* can be reached via P.O. Box 5074, Hilo, Hawaii 96720.

Mace Twigg also added the *Secret Mountain Laboratory* to his ever-growing logbook. *SML* was heard on 7426 kHz from 0202 to 0317 UTC. The signal suffered from heavy interference but he was still able to enjoy a program of country, blues, bluegrass, and jazz music. *Secret Mountain Laboratory* is another station that can be reached via the Hilo, Hawaii address.

Peter W. D. Wright in Virginia heard *WPBR*, Pig Boy Radio on 7438 kHz lower sideband at 0230 UTC. He reports a "strong and clear" signal. The format was an interview wherein "Zelma wit" talked to "The Soldier" and "Messenger" about avoiding the FCC. Peter remarks, "It was a fascinating discussion" and I'm sure it was. *WPBR* always has something interesting to say! The mailing address for WPBR is P.O. Box 982, Battle Creek, Michigan 49016.

Juan Palmer in Kansas heard what is apparently a pirate new to the shortwave bands. *TNFM* was heard broadcasting on 7437 from 0417 to 0526 UTC. It seemed to be a rebroadcast of an FM pirate since the announcer gave only the FM frequency, 100.0 MHz, and seemed unfamiliar with shortwave. The played top-40 and older rock music, such as "Stairway to Heaven." The address was given as P.O. Box 1345, Salt Springs, B.C. V0S 1E0, Canada.

Clandestine Reports

The clandestine *La Voz de U.N.O. was* logged on 5040 kHz from 0232 to 0307 UTC. Reception was, according to John Santosuosso, poor to fair with much interference. An English program started at 0300 with commentary on the Sandinista's human right's record and a plea that the Contras not be forgotten.

Dr. Santosuosso also heard the *"black" or "phoney" Radio Venceremos* on 6555 kHz at 0201 UTC. Several IDs were given as "Radio Venceremos" by a man and woman but they were much more laid back than the "real" *Venceremos* announcers. At 0230, the real *Venceremos* was found on 6565 kHz and was monitored until 0255. The "black" *Venceremos* went off at 0205 UTC but returned the next night on its usual frequency of 6555 kHz from 0125 until 0129 sign off.

As you can see, the shortwave bands are filled with the unusual -- and we're just beginning to scratch the surface. Let us know what you hear -- pirates, clandestines, "spy" numbers stations, whatever. Anything unusual you hear in broadcast bands is fair game in this column. Send your loggings and comments to me at the address above. I'll be looking forward to hearing from you this month!

INTRIGUE

Don Schimmel
516 Kingsley Road, SW
Vienna, VA 22180

A note from Herb Balfour in Canada reported he had verified four receptions of his experimental beacon on CW (5 WPM) signing OHH on 190.4 kHz. Individuals reporting reception were Les Rayburn, Kittery, Massachusetts; Joe Saloka, Chardon, Ohio; Bob Sethman, Pennsylvania; and Carl Lundren, Colts Neck, New Jersey.

A couple of years ago, Bob Rankin had a query about a book titled Spanish for Border Patrol Officers. At the time it was evidently not available from the Government Printing Office. However, I now note in the latest GPO listing, Foreign Languages SB-082, that the publication is again available.

Practical Spanish Grammar for Border Patrol Officers - Contains basic elements of Spanish grammar, specialized vocabulary, and practice dialogues designed for use by border patrol officers, including a basic Spanish-English and English-Spanish dictionary. 1972: 225 pp; ill. revised ed. 1983-repr. The catalog number is S/N 027-002-00114-1 and the price is $7.00.

Several readers have inquired regarding the mixed letter/number message sent in by M.L Gibson of Renton, Washington. The message was printed in the February 1986 issue of MT. The traffic is another example of what is called "cut numbers." Such characters are an abbreviated form of the Morse code numbers.

There are many of these cut number systems in use and this particular one appears to be the following:

1 2 3 4 5 6 7 8 9 0
A U V 4 E 6 B D N T

The single appearance of the letter G in the text is believed to have been a garbled character, perhaps a sloppy letter D. For those interested in reading more about cut number systems, see the April 1984 MT or the "Best of MT 1984" book which carried a reprint of the cut number article.

Bob Harris of Manchaug, Massachusetts, brought to our attention some rather strange transmissions. Here is what he heard: HQ8 (mobile) calling HQ9 for a radio check with both stations right on top of WWV 10 MHz signal. One operator told the other "Read you Lima-Charlie with a little static."

The stations indicated a QSY to 3 MHz but they were unheard on that frequency. It would appear that someone strayed from their authorized frequency to end up on the WWV frequency.

The second activity intercepted by Bob was a three station net on 2020 kHz (approximately) at 0100Z. No callsigns were given and,from the converesation, Bob believed what he heard was hams operating out of band.

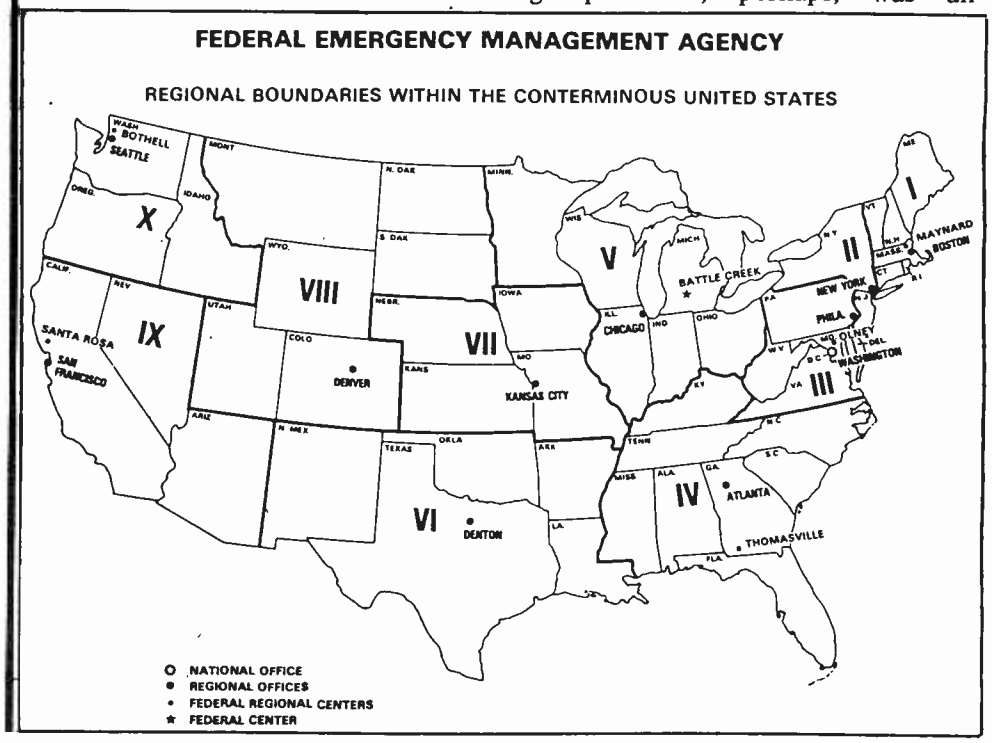
The Utility Intrigue monitoring position also produced some odd intercepts. The first one was on 5455 kHz on 29 April at 0037Z. The transmission was RTTY 50-425 and was another instance of nothing but continuous RY's.

More and more of this type are being observed. The stations will run for long periods of time sending only RY's until shutdown. A detailed study of the various transmissions would have to be undertaken before it could be concluded that they are the same transmitter operating at different times and on different frequencies.

The next intercept was automatic CW on 5440 kHz on 29 April at 0041Z. I did not hear any callsigns and the message was 5L groups with a pause at the end of every ten groups of text. I stayed with the message for over ten minutes and it still had not been completed, so it was obvious the group count was in the hundreds.

Short messages of 4F groups were seen on 6578 kHz on 29 April at 2244Z. Only one station was heard sending CW traffic like this:
DXV 7447 5201 6.68 6009 BT

There was no pause after the BT (-...-); instead, another message was immediately sent with each short message being preceded by a 3L group which, perhaps, was an



INTRIGUE

addressee indicator.

Initially the numbers were sent full except for zero which was cut as letter T, however, after a number ofthe messages had been transmitted, the operator suddenly switched to cutting additional numbers with the system in use being the following:

1 2 3 4 5 6 7 8 9 0
A U 3 4 5 6 7 D N T

The format of the traffic reminded me of the activity I had previously reported in the June and December 1985 issues of *MT*. One noticeable difference was that the most recent transmissions were made by a better transmitter than noted in the past. This one was not chirpy but, instead, a clean sounding tone.

Although I heard only one station whereas, in the past, there were many stations operating on (or near) the same frequency, I feel that this latest intercept does tie in with the activity observed in 1985.

Jerry Rappel of Davenport, Iowa, has sent in a question about one of the FEMA stations: This station is one of the VIP relocation installations and is in an underground shelter in Mount Weather, Berryville, Virginia.

This is in the Blue Ridge Mountains and off of Route 601 between Paris and Bluemont, Virginia. Other FEMA locations are shown on the illustration.

Jerry, I do not know if FEMA stations will acknowledge reception reports. Additional information on the Federal Emergency Management Agency (FEMA) can be found in the Grove Shortwave Directory.

Last month, Greg Wilson sent in an informative report on an unidentified activity he had copied on 13455 kHz. The details were carried in this column. Now, another report on this activity has been published, and this most recent rundown appeared in the June issue of *POPCOM* magazine.

The procedures and callsign structure outlined in the article authored by William Orr certainly correspond to those noted in the other observations as reported in the December 1984 *MT*, May 1985 *MT* and November *POPCOM*. As time goes on, perhaps more details will come to light regarding these transmissions.

I was able to visit the Dayton HAMVENTION on 26/27 April and it was a grand show. Although I am not a ham, the show is also of interest to SWLs as evidenced by the large audience present for the joint presentation given by Fred Osterman, Chuck Gysi and Bob Grove.

Many aspects of monitoring were covered by these three gentlemen including utilities, scanners and RTTY monitoring as well as general information on the hobby. It was an excellent two-hour session and numerous questions were presented and answered during the formal presentations as well as after the session.

I found many interesting exhibit booths and, of course, walking through the flea market section was particularly enjoyable. One piece of equipment really caused me to drool--it was the new INFO TECH M-6000 demodulator. This unit provides many capabilites beyond those available in the M-600 model.

I am trying to figure out some way of purchasing one of these M-6000's without causing my better half to explode! All in all, the visit was a pleasant and informative one. ■

APRIL 1986 LOGGINGS

4330	210424	CW.CQ DE FF12 FFL3 FFL4 (St.Lys,Fr.)
4354	210422	CW/LGB TLX (Rogaland, Norway)
4415	210419	USB/EE/YL Talking to ?? (unheard) re various real estate properties
4472	210417	USB/3 OM commenting re reception of unidentified TV transmission
4782	282338	CW/XA DE WGY912 (FEMA) 5L Grps
6386	210432	CW/CQ DE HKS (Buenaventura, Colombia)
6407	210431	CW/DE GKS (Portishead, England)
6410	290018	CW/DE SVF (Athens, Greece)
6445	290023	CW/No Calls/Long msg detailing cargo loads for barges on Mississippi River
6522	290026	USB/2 OM conversing re various river barges
6923	290033	CW/No Calls/5L Groups, Spec Charac AA OE OT IM
8463	251518	CW/CQ DE NMN (COMMSTA Portsmouth, VA)
8470	251521	CW/CQ DE NMR (COMMSTA San Juan, PR)
9118	251527	CW/DE WGY912 (FEMA Stn at Mt. Weather, VA) 5L Grps, msg repeated many times
10472	251934	MCW/No Calls/Appears to be machine sent continuous V's
12220	282326	RTTY 75-425/UN News items in English
12248	282331	RTTY 50-425/Press in Spanish
13508	251500	RTTY 75-850/Coded WX, 5F Grps
13535	291711	RTTY 50-425/Y7A54-59 (Berlin, GDR) RYs
13616	291527	CW/SQDO DE SPH (Polish ship from Stn at Gdynia, Poland)/Polish PT msgs
14616	251504	RTTY 50-425/Press in German
14670	291705	MCW-VOICE/CHU (National Research Council of Canada, Ottawa, Ontario) Time Sigs, Anncmt in English & French
16346	291701	RTTY 50-425/TASS Press items in English
16593	282110	USB/2 OM conversing in Greek
18026	251512	CW/DE CLP5 (Cuban Emb. in Algeria) Trying to establish comms with unid. station (possibly CLP1, Havana, Cuba)
18540	282110	RTTY 75-425/USIA Press items in English
18232	251710	AM/YS-SS with 5F Grps
18784	251714	RTTY 50-425/Press in English (Poss FRANPRESSE)

The Contemporary Zepp-Fed Antenna:
A Nostalgic Trip into the Past

We've all heard of "Zepp-feed," the "Zeppelin-antenna," or the plain old "Zepp." This system with its strange-sounding name has been around for a very long time, and some old-timers (even a few "new-timers") will swear that there is no finer all-band antenna anywhere than a Zepp with tuned feeders.

Touting the very low signal attenuation of its open-wire feed line, they point out that the antenna's general coverage response is good, even with the less-than-optimum SWR generally found in all-band antenna systems.

Since the experts are never in perfect agreement on anything, we find alternate points of view such as: "...the Zepp feed...has deep roots in the history of radio and an honored place in most of the standard textbooks. It is a pity therefore that in its recognized form it `does not work'."(1)

It is not my intention to enter the debate as to the merits of the Zepp system, but with so much attention having been given to this skywire, it might be fun to take a look and see just what the famous "Zeppelin" has been up to over the years.

The basic Zepp is a horizontal half-wave antenna, end-fed with a two-wire open transmission line as shown in figure one. For simplicity's sake, we won't include later variations such as the double-Zepp and the extended double-Zepp in our present discussion. It will be obvious to the reader, however, that the historical facts given below are also relevant to these Zepp-descendants.

The ARRL Antenna Handbook gives some interesting comment on the Zepp antenna: "In the early days of short-wave communication an antenna consisting of a half-wave dipole, end-fed through a 1/4-wavelength transmission line, was developed as a trailing

antenna for Zeppelin airships. In its use by amateurs, over the years, it has become popularly known as the `Zeppelin´ or `Zepp´ antenna. The term is now applied to practically any resonant antenna fed at the end by a two wire transmission line."(3)

So, the mystery of the strange-sounding name for this antenna begins to clear. In the early days of air travel, even before the Wright brothers flew their first airplane in 1903, lighter-than-air ships called "dirigibles" (literally: "directable" balloons) were taking people aloft on air-trips. As they developed, they were soon making long, lonely flights across the mighty oceans and even to the far reaches of the polar regions.

Around 1900 the German general and inventor, Count Ferdinand von Zeppelin, developed the famous type of dirigible which bears his name: the Zeppelin. Dunlap, a well-known historian of radio writes, "The Zeppelin dirigibles...made dramatic use of radio." He goes on to quote Leo Freund, a Zeppelin´s radioman, "`Picture yourself in an airship for three days sailing over the ocean, and the navigator unable to make use of his sextant to determine the position, not being able to see the stars, sun or moon. It would be dangerous to make a trip of this length without radio apparatus.´"(4)

One would certainly want an efficient and dependable antenna for such a trip. He´d also definitely want the antenna, with its possible sparks or corona discharge, as far away as possible from the ship´s explosive hydrogen inflatant! Let´s see how well our Zepp antenna of today might do in filling such requirements.

Looking at the antenna in figure one, it is difficult to see how it could be adapted to an airship. We would need masts mounted on top of the dirigible to hoist the antenna into position a full quarter-wavelength above the airship containing the transmitter. Actually, the problem is only apparent, because there has been an important change in the Zeppelin-antenna since the early days: it has been turned upside-down!

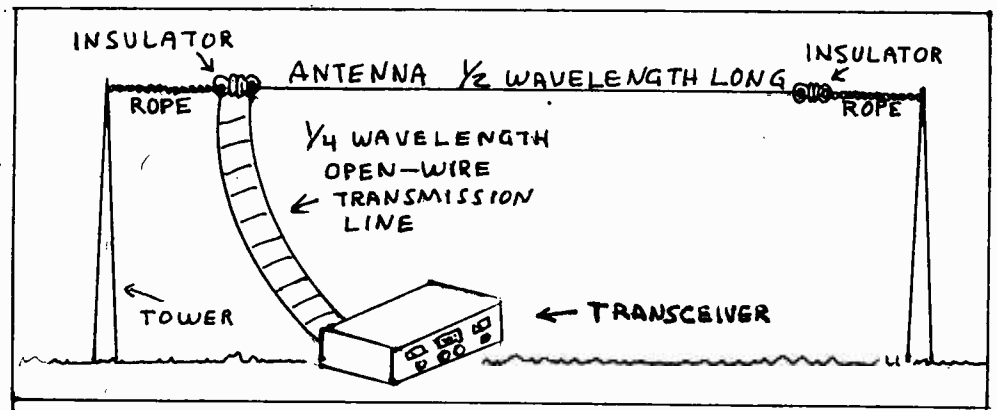


Figure 1. A Zeppelin antenna.

In the early years of this century, H. Beggerow patented the original Zeppelin antenna system as a feedline and antenna hanging beneath the airship(5) (fig. 2a). This configuration allowed utilizing the metal framework of the Zeppelin as an artificial ground or counterpoise and, "...not only gave a very long and efficient aerial, but also ensured that all high-tension wires were kept away from the neighborhood of the gas-bag so preventing danger from accidental sparking."(5).

In this reference, Legget´s description of the antenna leaves some doubt as to its actual construction; however, Zenneck and Seelig discuss Beggerow´s invention in greater detail than did Leggett, giving the electrical wiring schematic shown in fig. 2b (6). They give the same wavelength-dimensions for the transmission line and antenna as those found in the ARRL Antenna Handbook cited above.

Sterling´s well-known Radio Manual, (7) reports that the June 1925 QST names Beggerow as responsible for the idea of the Zeppelin antenna. There seems little doubt that figure 2 shows the genuine early "Zepp" antenna.

We still have a problem, however: The radiating element in the original Zeppelin antenna shown in figure two is vertical and we all know that Zepps are horizontally-oriented antennas. J.M. Haerle, WB5IIR, outlined a solution to the problem: "...the bottom of the feedline was stabilized with an aerodynamically-designed weight, heavy enough to hold the feedline mostly vertical, with the wire antenna itself trailing behind the fairly slow-moving aircraft in a horizontal position."(8)

As Haerle didn´t give a reference for his report, it is hard to verify whether his solution is a report of known fact or the passing-on of a good hunch. Although he may very well be correct, in all of the pictures which I have been able to find of Zeppelins trailing antennas, the antenna is flowing out in an arc rather than as Haerle suggested.

None of the antennas which I found pictured were identified as "Zepp" antennas, however; in fact, their types were not indicated at all. Whether Haerle´s idea as cited above is correct or whether the Zepp-antenna just swung out in a graceful arc as the dirigible began to pick up speed, one can visualize the resultant changing signal polarization from vertical to somewhat more horizontal at the higher speeds. This surely must have produced some interesting effects on the signal´s propagation!

In searching through much literature on both antennas and on dirigibles, I have been unable to locate even one actual photograph of anything which appeared to be a Zeppelin antenna attached to an airship. Quite possibly this is due to the fact that small lines, such as mooring halyards or antenna lines, just do not show up well in photographs made on the large scale necessary to capture a whole airship on film. Also, most photos of airships show them when they are about to land or take-off: times when the antenna is likely to be safely reeled back into the radio cabin, rather than extended!

Well, there you have it: a bit of nostalgia from yesterday bringing us right up to the contemporary Zepp-fed antenna. Maybe we didn´t cover much basic design information but, nevertheless, the next time you hear a radio operator transmit: "The antenna here is a Zepp," it may hold just a bit more meaning for you. ■

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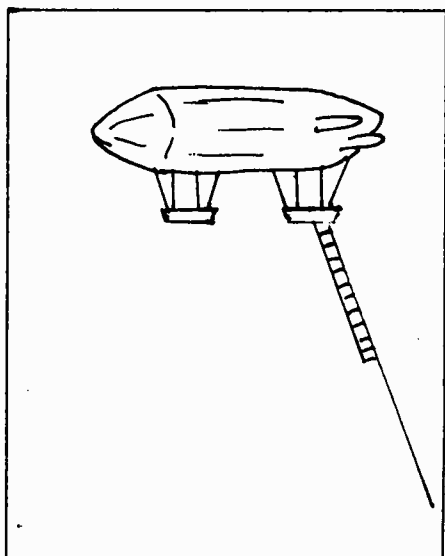

Figure 2a. Drawing of Beggerow's early airship antenna. (after Leggett)

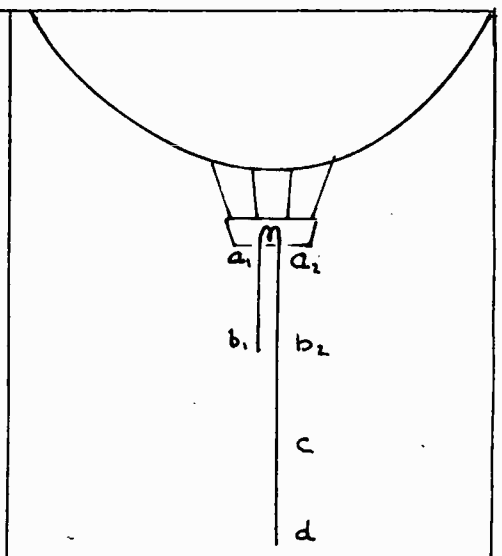

Figure 2b. Drawing of early Beggerow airship-antenna with its wiring diagram. (after Zenneck and Seelig)

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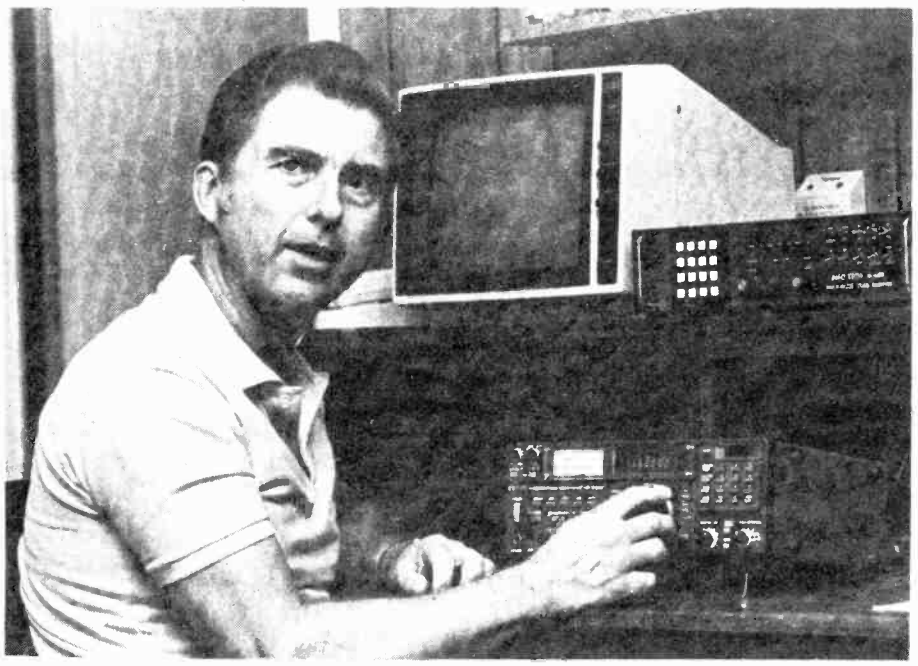

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ANTENNA TALK

ANTENNA RECIPROCITY:
ARE THERE EXCEPTIONS TO THIS RULE?

W. Clem Small, KR6A

Most commercial radio operators, hams, SWLs, and monitoring buffs are at least somewhat familiar with the general concept of antenna reciprocity. Sometimes called the Rayliegh-Carson theorem(1), it is generally interpreted to mean that a given antenna will perform identically in terms of radiation pattern, feedpoint impedance and gain whether it is used for transmitting or receiving. Thus, when we come up with an antenna design which seems to perform well in receiving, we believe that that antenna will perform just as well when functioning as a transmitting antenna (and vice versa).

Antenna engineers tell us that reciprocity holds for all antennas, from VLF to microwave systems. For instance, Balanis says: "The radiation pattern is a very important antenna characteristic. Although it is most convenient and practical to measure the pattern in the receiving mode, it is identical to that of the transmitting mode because of reciprocity"(2). But is reciprocity always found in practical operating practice? Well, take a look at the following considerations and then decide.

The Masked Robber

Several years ago I moved to a new neighborhood and, of course, set up a ham station at the new QTH. I did my best to set up as much of an antenna farm as one can manage on a city lot. High frequency skywires there included a half-wave dipole on 40 meters, a multi-band trapped vertical with radials on the roof and a two-element cubical quad beam. I thought that this station would really work some DX for me.

I did work some DX, but pitifully little compared to my expectations. Frequently, I would call "CQ" repeatedly with very little or no results. Interestingly enough, though, a local ham would occasionally break in and tell me that stations were answering my calls, and ask "why wasn't I answering them?"

Well, that was a surprise! What was going on? I checked my receiver against other receivers, and it seemed to be about as sensitive as the rest, so it wasn't that my rig was unable to respond to weak signals. I checked my antennas for matching to the transmission lines and the matching of the lines to the rig; all seemed OK there, too.

It seemed to me that I had a situation that defied the principle of antenna reciprocity: I could transmit signals that reached other antennas nicely, but could not pick up signals returned from those same antennas! And, on top of that, it just didn't seem fair when other hams in town could hear calls intended for me, but I couldn't hear the calls myself!

The solution to the mystery was revealed one day when a local ham told me that he was glad he didn't live in my section of town, as it was such a noisy location. His proof was the fact that, as he rotated his HF beam, the noise level in his receiver went up noticeably when it was pointed in my direction!

For some reason there was a higher than normal constant background RF noise level in my area. To me, living there, it sounded normal. It was like the background noise you could hear at any QTH, but somewhat stronger. Since it never disappeared, I had no idea that there was a few dB of extra noise on the HF bands at all times: I thought it was the normal noise present at any station.

Since I've moved from that QTH and experienced some quiet band conditions, I know the difference. But then I didn't realize that the noise was a bit high, and I blamed my antennas.

Culprit in the Sky

Now we'll take a different sort of situation where one might start to question the validity of the concept of reciprocity. Let's say that one radio operator (Joe) calls CQ; a second operator (Jane) in a different state hears the call and decides to respond. Let's say that Jane's station is not located in a direction of maximum gain for Joe's antenna, so we may ask "is Joe likely to hear her call?"

Yes, very likely, according to reciprocity: If Joe's antenna can radiate energy to Jane's antenna, then his antenna should receive energy which Jane's antenna radiates in his direction equally well. And practice generally bears out theory well here.

But what if Jane's antenna, like many antennas, has a fair amount of directivity in its vertical radiation pattern? Although she might receive Joe as he transmitted (fig. 1a), if the ionosphere has shifted a bit as she answers him, her signals may go right over his station (fig. 1b) due to the shift. Jane, unaware that the shifty ionosphere has outfoxed the law of reciprocity, will not know that Joe's failure to respond was due to a failure to receive her signals.

The above example is the sort of situation Leutz and Gable were discussing in the first book ever written exclusively about short wave phenomena, when they said "Vertical directivity greater than this (about 10^{o} to 15^{o}) can be secured, but results in a ray so sharply directed that its operation is erratic, due to sudden changes in the height of the Heaviside Layer" (parentheses added,3).

More recently, Glanzer, speaking on antenna reciprocity, has written a variation on the same theme: "In long distance transmissions the observed behavior may sometimes be at variance with this rule (reciprocity) because the waves may not take exactly the same paths through the ionosphere when going in opposite directions. Therefore an incoming wave may not arrive at the antenna from the same angle as that wave which is transmitted from it.

"Thus, the two waves may be utilizing different parts of the directive pattern with some departure from complete reciprocity" (parentheses added,4). The medium through which radio waves travel may, by its fickle nature at times, functionally seem to repeal the stable law of reciprocity. Nevertheless, as Glanzer indicates, it is the ionosphere which fails us, not reciprocity.

The Beverage Antenna

Taking yet another point of view now, I have heard the reciprocity theorem questioned by reference to the operation of the Beverage antenna. There is something of an old wive's tale (should we say "old ham's tale?") that the Beverage is a receiving antenna which can't really be used for transmitting. If that's the case, then we obviously don't have reciprocity in this antenna.

The problem with the "old ham's tale" is that it is not true. Beverage antennas can and have been used for transmitting. There have even been arrays of this antenna specifically designed for transmitting purposes(5).

Ordinary single-wire Beverages do have a very low gain when used for transmitting and, by reciprocity considerations, we would expect the same low gain for receiving--which is just what we get(5).

But don't get me wrong, the Beverage is a fine antenna which can really "dig 'em out of the noise"; however, it does that by its fantastic signal to noise ratio, not by high gain. Due to its extreme directivity, the Beverage rejects not only off-heading, unwanted-signal interference, but also rejects off-heading noise.

The signal you get, low-level though it may be, competes with much less noise and other interference than when a less directive antenna is used. Therefore, the Beverage only seems to be a high-gain antenna on receiving, it is the excellent S/N ratio that makes it seem that way! Transmitting or receiving, the Beverage is a low gain antenna: reciprocity holds for this antenna as for any other.

SUMMARY. So, although "Observed behavior may sometimes be at variance with the rule," the rule is a good one. Antenna reciprocity is a valid concept, but it is sometimes necessary to look at the overall situation to understand the "observed behavior."

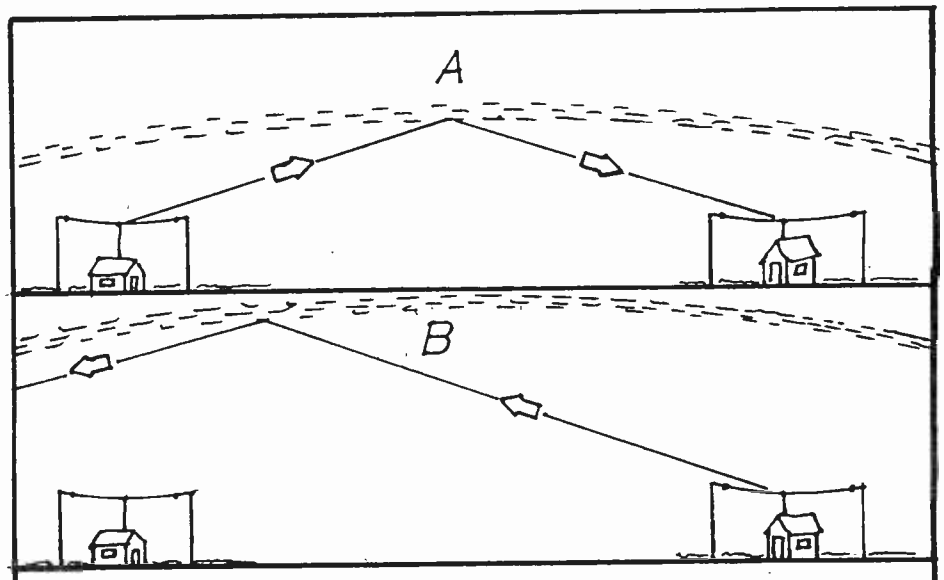

Fig. 1. Although signals from Joe's QTH reach Jane's antenna well in A, the ionosphere shifts as Jane answers Joe's call (B). Consequently Joe's antenna does not receive Jane's signals. Nothing is drawn to scale in this figure

RADIO RIDDLES

Last Month's Radio Riddle: "For coaxial cables, what does the RG, as in RG-59/U, stand for?" Did you get this one? The clue given was the function of the cable, and that function is to guide radio waves. "RG" stands for "radio guide." Makes sense, doesn't it?

Last Month's Connundrum: "When is a transmission line like a transformer?" Well, believe it or not, sections of transmission line can be used to "transform" the impedance of devices, such as antennas, as effectively as can transformers. For instance, a quarter-wave length of transmission line can be used to transform a high impedance antenna feedpoint to a low-impedance value, and vice-versa. The use of such matching sections is covered in most good texts on antennas.

This Month's Radio Riddle: What communications concept do the initials LUHF represent? This is more likely to be known by commercial shortwave radio operators, SWLs and hams than by scanner buffs. The UHF does not stand for ultra-high-frequency, and the L does not indicate inductance.

Answer next month. In the meantime, why not drop me a note telling what antenna related topics you'd most like to see covered in this column? 'Til then, 73. ■

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GETTING STARTED

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Kunkletown, PA 18058

THE TOOLS OF THE TRADE

My mail bag has been loaded with questions about antennas.

If you have been following Clem Small's "Antenna Talk" column, you have some ideas as to what kind of antenna will serve your purpose. Rather than advise as to a specific type of antenna, I am going to take a nuts and bolts approach to the subject and tell you how to find the materials needed to construct an antenna inexpensively. At the same time we will take a look at some of the tools required, not only to build antennas but of general use around the shack.

The Pocket Knife

Perhaps one of the most useful tools you can own is a good pocket knife; get an electricians knife--one with a screwdriver blade. You will use your knife to strip wire and cable, clean wire and terminals prior to soldering, and that screwdriver blade is always in your pocket when you need it.

Pliers

Several types of pliers are good to have, the most useful of which will be a slip joint at least six inches long; eight inches would be a better choice. This tool will handle tough jobs like wrapping heavy antenna wire or breaking loose a rusted nut as well as perform well on some of the more delicate jobs.

The second type of pliers to go in the tool kit is the long nose. I like a six-inch length which will take care of delicate jobs such as bending leads on components or snaking a part in a tight spot. Be careful, though, not to use your long nose to tighten nuts or bend heavy material; this kind of use will cause the jaws to spring and the pliers will be useless.

Wire Cutters

A diagonal cutter, used for cutting wire, comes in a wide variety of sizes from four inch for trimming light gauge wire to husky ten inchers for cutting heavy wire and small cable. If you opt for a pair of six inch diagonal cutters ("dikes") you will handle most of the cutting shores around the shack. Don't use the diagonal cutters on screws or bolts or you will ruin them.

Some kind of wire stripper belongs in the tool box. I use Miller strippers, a pliers-like tool with sharp blades instead of jaws. The blades have a notch in the center whose size is determined by how far the handles are closed. There is a stop on the handle so the blades can be set to accommodate wire from 28 up to 10 gauge.

To use the tool, insert the wire into the notch, close the handles and pull on the long end of the wire. There are many other strippers on the market and most of them work well; the choice is yours.

Screwdrivers

We are going to need some screwdrivers in the kit. I suggest the following as a minimum: Numbers 0, 1 and 2 in Phillips (cross-slotted) tip and 1/8, 1/4 and 3/8 inch wide tips in the slotted type. Six inch handles are recommended. Add various screwdrivers to the kit as you go along; I have a wide variety including a full set of right angle drivers in my kit.

VOM

Our next tool is a VOM (volt-ohm-milliameter). This handy little gadget will measure voltage, resistance and current. It will tell you if a circuit is shorted or open. A usable VOM should not cost more than 15 or 20 dollars and I have seen them advertised recently for $9.95.

You won't need the extreme accuracy the more expensive units provide unless you intend to do some serious servicing inside your set. The VOM I use most of the time cost $3.95 about 20 years ago and it is still going strong.

Information on how to use your meter is usually included with the instruction manual. One of the best, most thorough and easy to understand books I have seen on the use of this tool can be purchased from your local Radio Shack; the title of the book is Using Your VOM.

Soldering Iron

If you can buy only one iron buy one of at least 100 watts capacity; the main difference between a soldering iron and a soldering gun is that an iron will take several minutes to heat up whereas a gun will heat in a few seconds. If you can purchase only one, then get an iron. The iron is a bit more rugged and less costly to maintain than a gun.

The reason I suggest the 100 watt or larger iron is because frequently the beginner wants to solder around connections and antenna wires and this kind of service requires a lot of heat. My own general service soldering tool is a 275/325 watt gun.

If you are going to build equipment then a smaller iron will be required. I use a 47 watt soldering pencil for working on PCB's (printed circuit boards). An iron this size will be satisfactory for most repair work inside a radio. The pencil type of iron is very easy to manage in a tight spot because it is small and held like a pencil. Most pencil irons have screw-in elements that vary in power from 25 to 70 watts, and a variety of tips is available for the pencil, making it ideal for a wide range of work.

Solder

Proper soldering requires a little time to learn; so if you have never soldered before, do some practicing on scrap wire before tackling the real thing. Here are some hints that will help you over some of the rough spots.

1) NEVER use acid core solder on electronic equipment! In fact, do not even use a soldering iron that you suspect may have been used with acid core solder or past. The acid fumes infiltrate copper and eat it away in a very short time. Use only rosin core solder for your radio work (60/40 tin/lead is best).

2) Clean all dirt and corrosion from the wires or components to be soldered. Use a knife, wire brush, file, or sandpaper to obtain a shiny, clean surface.

3) Clean the tip of your iron frequently; use a wet sponge or rag to wipe the residue from the tip of the hot iron.

4) Heat the joint thoroughly--the solder should melt on the material being heated, not on the tip of the iron. If the solder will not flow, apply rosin soldering paste (flux) to the joint and try again.

5) Tin all components to be soldered. Tinning is the process of applying a small amount of soldering to the component before attaching it. Stranded wires should be twisted neatly together and a small dab of solder applied. Tinning will help transfer heat quickly and evenly.

Unless a wire is going to be used in a high stress application such as an antenna, don't wrap the wire fully around a terminal. If soldering is properly done, you can simply lay a wire against a terminal without wrapping.

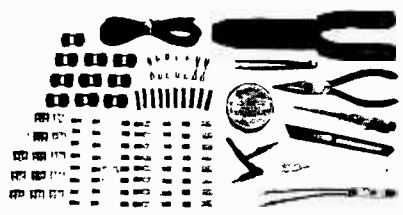
It is advisable to make a 1/4 to 1/2 turn wrap most of the time to insure full contact. This way the joint may be reheated and the wire removed later if necessary for repair.

Be neat, don't gob solder on a connection, and use only enough solder to cover the joint.

Inspect your work, the joint should be bright and shiny. If the joint has a frosty appearance, it is a cold joint and must be redone! The most frequent causes of cold joints are moving the joint while it is cooling, not using enough heat, and blowing on the connection to cool it faster.

Learning to solder takes time and practice; if possible, get someone who knows what a good solder joint looks like to inspect your work and advise you.

Now that you have the tools, we'll move on next month to the nuts and bolts of building your own inexpensive antenna. Keep those letters and cards coming; I like hearing from you. 73 - Ike ■



An array of wire cutters, pliers, screw drivers, etc. will make your project easier and more enjoyable.

Soldering iron or gun? It depends on your project and your pocketbook.

HEARING HOLLYWOOD

Motion picture companies have frequent need for radio communication while filming a movie. Since many film companies go "on location," they commonly use itinerant channels as well as those provided for motion picture production.

Next time a motion picture company comes near your location for shooting a film, try tuning in the following channels on your scanner; chances are, you'll hear some action!

ITINERANT

151.490	464.500
151.625	464.550
154.570	467.750
154.600	467.775
158.400	467.800
451.800	467.825
457.525	467.850
457.550	467.875
457.575	467.900
457.600	467.925

MOTION PICTURES

152.870	153.020
152.900	173.225
152.930	173.275
152.960	173.325
152.990	173.375

LIBYAN CRYPT BROKEN EASILY

Ray Cline, former deputy director of the CIA, claims that U.S. forces had descrambled Libyan encrypted transmissions and flashed them to the U.S. fleet and other government agencies within seconds after their transmission.

Although Libya uses sophisticated equipment made by Crypto ofSwitzerland, similar equipment is made by Harris (Melbourne, FL), ITT (New York), Litton Industries (Beverly Hills, CA), Collins-Rockwell (Pittsburgh, PA), RACAL (Britain), and Plessey (Britain).

It is now apparent that the U.S. Sixth Fleet was probably on an electronics intelligence gathering mission when it maneuvered off the shores of Tripoli. On-board equipment allowed data acquisition, descrambling and jamming as well.

The garbled transmissions were received by the ships and retransmitted, unaltered, via satellite either to NSA (National Security Agency) in Ft. Meade, Maryland, or to GCHQ in Cheltenham, England. It was in Britain during World War II where the famed Enigma machine was reconstructed to break the code used by Nazi field officers. *(Harold Sellers, Toronto, ONT)*

MT TUNE IN with Ed Noll

LONGWAVE BEACONING AND THE LOWFERS

(Conclusion of a two-part article)

by Ed Noll

After a month of longwave listening you may be quite surprised as to just how well you are reading the slow beacon code signals. I'm certain the first week was the most difficult. If you have put off that initial effort, go back to last month's issue. Do the same if you have missed the introductory coverage of longwave beacon chasing.

Those of you who have followed through and made up your 350-400 kHz log are no doubt on the way to becoming adept longwavers. My loggings are listed in the table. Careful attention to the small frequency segment has uncovered some new ones for me.

Perhaps you have been doing some listening on other parts of the band, too. Many of you will have discovered beacons that also transmit voice weather information on a scheduled basis such as GKQ on 379 kHz, the 400 watter of Newark, NJ. You may have discovered one or more very local stations that deliver blockbuster signals to your receiver like Naval air station NXX (383) does for me just a few miles from here.

A very strong signal can block good reception on as many as ten channels on each side of its frequency since channel separation is only 1 kHz or less on this band and heterodyning is a big problem. Now you know why the avid longwaver invests in filters and traps to increase the number of usable channels!

There are loop antennas that permit listeners to null troublesome locals and even some of the stronger signals that come from some distance away. I have problems with JF (373) at Kennedy Airport as well as RD (356) in Reading and AB (400) in Allentown on adjacent channels. Certainly, the troubles are not on the order of those from NXX.

A favorite frequency spectrum of mine extends between 285-325 kHz. Many continuous marine beacons as well as those who time-share one frequency operate over this range. Many channels contain no or few high-powered stations and distant low-power stations can be sorted out because of the few stations assigned to other radio services.

In this southeastern Pennsylvania location it is possible to pick up many of the beacons, light stations and even buoys that operate along the Atlantic seaboard. When the band is quiet and propagation conditions are good you can search out the long-distance beacons. But all of this is patter for another tune-in-story.

The Lowfers

Another interesting segment of the longwave spectrum falls between 160-190 kHz (1750 meter band) and is occupied by a special breed of low frequency experimenters named "lowfers." This band is open to all and no license is required. However, power is limited to a meager one watt and a total antenna length of 50 feet. A good receiver and antenna system are essential. Back-up filters, traps and special loops can be of additional help.

Here in the Northeast and Mid-Atlantic states you can judge if you have any hope of picking up a lowfer signal when you can tune in radio beacon and weather station TUK (194), operating with 4000 watts from Nantucket, MA. If the received signal from TUK is good you may have a possibility of hearing a lowfer if you tune lower into the 160-190 range.

Lowfer stations are spread across the country with the greater numbers along the eastern and western coastlines. If you are within 20 miles or so of a lowfer station you have a much better chance of hearing the signal; however, lowfer radio beacons have been heard over distances well in excess of 500 miles and two-way links have been made between radio beacon owners almost as far.

As your code speed picks up begin to tune between 415-525 kHz for coast and ship radiotelegraphy contacts. Recall that 500 kHz is the international calling and distress frequency.

It is a slow process to build up receiving speed--at first when you try to copy a faster speed you miss more than you are able to set down. However, you must persist. The excellent sending ("fist") of marine operators can help you improve your code-copying capability.

The 350-400 kHz log table was compiled over a period of several days while this two-part article was written. Results are a bit unusual because propagation definitely favored signals from the north. Two antennas were used. Canadian stations were abundant.

Almost every 1 kHz slot has a beacon log, some two or three. On occasion some deep background listening permitted the reception of three beacons simultaneously. There are several unidentified beacons. Ken Stryker's Aero/Marine Guide is essential for the longwavers (See last month's column). It is of tremedous help in making ID's.

These two columns just scratch the surface of longwave activity. You may wish to add this facet of radio listening to your medium wave DXing. Who knows, you may become a transmitting lowfer one of these days! ■

350-400 KHZ LOG

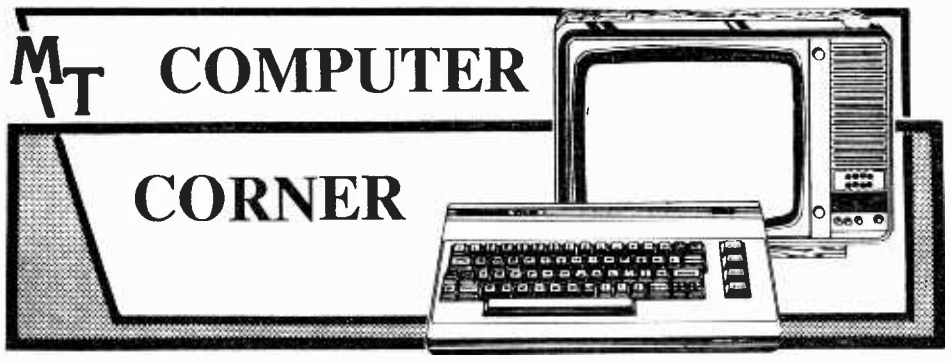
kHz	ID	Location
350	DF	Deer Lake,Nfld
	L	Raleigh, NC
	LI	Fredericton, NB
351	YKQ	Fort Rupert, Que
352	DKO	Fort Devens, MA
353	FME	Ft. Meade, MD
	MG	Montgomery, NY
	QG	Windsor, Ont
354	MKS	Moncks Corner, SC
356	HEU	Schnectady, NY
	MBV	South Hill, VA
	RD	Reading, PA
359	2I	Connell, NB
	MS	(Unid.)
360	LYS	Lyndon, NY
	PN	Port Menier, Que
	RW	Camp Springs, MD
362	AK	Akron, OH
	OX	Oxford, CT
	SB	Sudbury, Ont
	SC	Sherbrooke, Que
363	RNB	Millville, NJ
364	SG	Springdale, Nfld
366	HMX	(Unid.)
367	FVX	Farmville, VA
368	L	Toronto, Ontario
369	TT	Trenton, NJ
371	FND	Baltimore, MD
372	CQD	Erie, PA
373	JF	New York, NY
374	SA	Sable Island, NS
375	ELM	Elmira, NY
	PJS	Newport, VA
378	RJ	Roberval, Quebec
379	CM	Channel Head, Nfld
	GKQ	Newark, NJ
382	BHU	Latrobe, PA
	XU	London, Ontario
385	NA	Natashquan, Ont
	UR	New York, NY
386	D8	Dolbeau, Que
388	BD	Windsor Locks, CT
	NXX	Willow Grove, PA
390	JT	Stephenville, Nfld
391	DDP	San Juan, PR
392	CLY	Worcester, MA
	ML	Charlevoix, Que
	MM	Morristown, NJ
394	YB	North Bay, Ont
395	GBR	Great Barrington, MA
396	NEL	Lakehurst, NJ
	OBO	(Unid.-Bolivia?)
	PLB	(Unid.)
397	J	St. John, NB
	RR	(Unid.)
398	IRA	Rutland, VT
399	YZ	(Unid.)
400	AB	Allentown, PA
	FO	Westhampton Bch, NY
	PO	(Unid.)

USAF Installing New Network

Project GWEN (Ground Wave Emergency Network) is proceeding well, if the new 300 foot tower at Fayetteville, Arkansas, is any indication. Serving Little Rock Air Force Base and Blytheville Air Force Base, the new GWEN installation is but one link in a massive network under construction by the U.S. Air Force.

The purpose of GWEN is to "provide the United States strategic forces with the ability to maintain critical long-range command and control communications ability, despite atmospheric disturbances" which would occur after a nuclear war, according to a spokesman at Little Rock AFB.

Hanscom AFB at Bedford, Massachusetts, received the prototype installation as part of nine stations installed in 1983 for passing emergency and wartime messages. An additional 57 stations are slated to be operational by the end of this year as part of an eventual 240-260 stations in the total network. *(Dave Montgomery KA5SKU, Little Rock, AR)*



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SEEING SECRETS

Last month we touched lightly on some of the methods of recovering data from various computer media after some disaster overtook it. This month I would like to take you on a brief sojourn into another corner of the computer world, a corner shared with other professions and one as old as recorded history.

I refer to the cloak and dagger world of espionage and the subject of discussion is secret codes, more specifically the encoding and decoding of information to keep the information away from prying eyes.

Secret codes have been around for a long time. Some "secret" codes are secret only because the language used has passed into oblivion. Such a code would be the famous "Code of Hammurabi," which was an ancient script that was particularly difficult to break.

The difficulty arose not because the document was written in code, but because it was written in an ancient and unknown language. Once it was deciphered it provided the key to many other documents written in the same ancient language.

The Good...

History has it that Hannibal (famous for crossing the Alps with elephants) depended on a secret code which he used to send battle plans through enemy lines. Closer to home, during World War II, the Germans had a sophisticated code machine named Enigma and, during the course of the war, the allied forces obtained one of these code machines. They "cracked" the coding scheme and often had copies of orders before the German field commanders did!

It is recorded that German plans for an attack on a small English town were decoded; the allies were forced to keep silent about the impending all-out attack, and the town was subsequently slaughtered. This was done for fear that the German High Command would know that the allies had broken Enigma if the town were evacuated.

The Bad...

I am sure most of you have seen the newspaper headlines of the industrial spies being caught, or the XYZ company suffering large financial losses due to the theft of trade secrets. These are some of the incentives for the development of an unbreakble code, and conversely the desire to be able to break these codes.

The computer has brought the unique ability to store tremendous amounts of data; more important, it has brought a way to categorize all this data and track an individual through every financial or business transaction.

All those records on all the individuals on one computer was too big a temptation, so enter the white collar criminal with a new weapon--the computer. The most opportune hole in the computer was the remote dial-in ability popular through the sixties. The trick was to dial into a mainframe and, if not copy the data, scramble or erase it or, in the case of a banking institution, tranfer money from one account to another where it could be withdrawn easily.

Many other schemes were perpetrated from within the system. Tales abound of the programmer writing an additional code for the bank's computer to round off every financial transaction, but take the accumulating odd cents and credit it to another account.

Imagine the distress the bank-manager feels when he fires a programmer only to discover, thirty days after the programmer leaves, that all the deposit records have been erased. The programmer merely programmed a date-checking routine that erased a given set of files if the programmer weren't around to reset the routine every twenty-nine days.

Many protective schemes were developed to encode information in such a way that people who shouldn't see such information couldn't make anything of the files even if they had access to them.

And the Ugly

Some time ago ANSI (American National Standards Institue) got into the computer act and started writing and adopting standards for the computer industry. Interestingly enough, the standard display interface driver for the IBM PC is named ANSI.SYS.

An encryption standard surfaced based on a technique developed by IBM. Written for mainframe computers, the data encryption algorithm was adopted as a national standard (ANSI X3.92-1981). In the VM 370 environment, the program is known as CIPHER.

Later the federal government got into the act and called it DES - Data Encryptation Standard. The DES standard is good - good enough, in fact, that any software utilizing the DES algorithm cannot be exported to a foreign company without permission of the State Department. The standard is also good enough to take a huge computer considerable time to break file encoded with the DES standard.

The big hooker in any encryption scheme is the personal aspect - the disgruntled employee giving away the password,the opposition "getting the goods" on someone with access to unencrypted information, etc.

The theory behind the DES algorithm is too deep to go into here, but the fact that the DOD and other federal agencies make use of it says something for its performance. I feel that the biggest reason the State Department watches where this thing goes is that if the Banana Republic of Nutti happens towind up with a copy, the CIA's job of tracking the rebels just got harder if all the radio transmissions are DES encoded!

COMMODORE CONTROL FOR THE FRG-9600

Computer control of modern receivers offers considerable flexibility, expanding many capabilities within the receiver itself that would otherwise be unavailable.

George Wood has come up with a simple program to interconnect a Commodore 64 home computer with the Yaesu FRG-9600 VHF/UHF scanning receiver. No additional hardware is needed other than a shielded cable and a six-pin DIN plug.

Only two wires are actually used; pin "M" on the C64 user port is connected to pin 3 on the DIN plug, and the cable shield is used to connect pin "A" on the user port to pin 1 on the DIN connector.

To select the interface, type in, save and run the following program.

We would like to thank George Wood and Radio Sweden International for this program which is enclosed in their new *DXers GUIDE TO COMPUTING*.

```
1 REM ****************************************
2 REM *** TEST PROGRAM FOR FRG-9600 ****
3 REM ********** BY KJELL STROM **********
4 REM *** WITH HELP FROM JIM GRUBBS ***
5 REM ******** AND GEORGE WOOD *********
6 REM ****************************************
10 OPEN1,2,0,CHR$(128):POKE665,208:POKE666,0
15 REM 4800 BD, 2 STOP BITS, NO PARITY
20 POKE53280,S:POKE53281,6:PRINT "■"
25 PRINTTAB(10)"FRG-9600 CAT CONTROL":PRINT:PRINT
30 PRINT" SELECT COMMAND ( 0 - 7 )":PRINT
40 PRINT"  (0).....FREQUENCY SET"
50 PRINT"  (1).....FM-WIDE"
60 PRINT"  (2).....FM-NARROW"
70 PRINT"  (3).....AM-WIDE"
80 PRINT"  (4).....AM-NARROW"
90 PRINT"  (5).....USB"
100 PRINT"  (6).....LSB"
110 PRINT"  (7).....END"
120 PRINT
130 INPUT"COMMAND";A:IFA>7 GOTO 20
140 PRINT:IF A-7 THEN CLOSE 1:END
150 IF A=0 THEN NO=10:GOTO1000
160 IF A=1 THEN NO=23
170 IF A=2 THEN NO=22
180 IF A=3 THEN NO=21
190 IF A=4 THEN NO=20
200 IF A=5 THEN NO=17
210 IF A=6 THEN NO=16
220 GOTO 2000
1000 REM FREQUENCY SET
1010 PRINT"ENTER FREQUENCY (MHZ)"
1020 PRINT"  FREQ. RANGE 60.0-905.0 MHZ":PRINT
1030 INPUT FR
1040 IF FR<60.0 OR FR>905.0 THEN PRINT"OUT OF RANGE":GOTO1020
1050 FR=FR*10000
1060 M1=INT(FR/100000)
1070 M2=INT(FR/1000)-M1*100
1080 M3=INT(FR/10)-M1*10000-M2*100
1090 L1=M1*100000:L2=M2*1000:L3=M3*10
1100 M4=FR-L1-L2-L3:M4=INT(M4+.5)*10
1110 N1=INT(M1/10)*16+M1-INT(M1/10)*10
1120 N2=INT(M2/10)*16+M2-INT(M2/10)*10
1130 N3=INT(M3/10)*16+M3-INT(M3/10)*10
1140 N4=INT(M4/10)*16+M4-INT(M4/10)*10
2000 REM SEND 5BYTES TO FRG-9600
2010 PRINT#1,CHR$(N0)+CHR$(N1)+CHR$(N2)+CHR$(N3)+CHR$(N4)
2020 GOTO20
```

The Challenge

As a closing note, anyone who is a glutton for punishment or who thinks code breaking is a fascinating exercise is invited to mail a standard IBM style PC diskette along with return postage. I will send you five files as follows:

a) One file consisting of the first line of a nursery rhyme, encoded via DES;
b) A second file containing the clear text of the encoded file and the key used to encode it;
c) A third file consisting of a different line, encoded;
d) A fourth file containing the key used to encode file three;
e) And lastly, a file containing one line, encoded, with no key furnished.

Your ultimate goal is to use the first four files to break the fifth file. I haven't decided on what the prize is for the first right answer, but I'll think of something long before anyone comes up with a winner!

Unfortunately, the offer is limited to those of you with access to an IBM or IBM compatible computer, or one that can read the IBM diskette format.

So, until next month, \$%%%**@!

MT WHAT'S NEW?

SOFTWARE BOOKS EQUIPMENT ACCESSORIES CHARTS RECEIVERS

MARITIME RADIO HANDBOOK, Second edition, by Michiel Schaay (180 pages, 5-3/4" x 8", paperbound; Price to be announced. Available from Universal Shortwave, 1280 Aida Drive, Reynoldsburg, OH 43068)

Probably the only comprehensive directory of the world's coastal marine radio stations, Schaay's new release is cross-referenced by location, time of regular broadcasts and time by country. Data provided include call sign, frequency, mode of operation, and types of traffic handled.

This is part one of a two-volume series and contains listings from 4-26 MHz; the next edition, now in preparation, will list 1.6-4 MHz.

This is an easy-to-use handbook which will fill in the gaps of many short wave utilities publications. Its format of cross-referincing makes it of value to anyone interested in monitoring the coastal maritime services.

MIDWEST FEDERAL FREQUENCY DIRECTORY by Scan America (79 pages, 5-1/4" x 8-1/4", paperbound; $8 postpaid from Scan America, 430 Garner Drive, Suffield, OH 44260)

Not to be confused with the Grove Federal Frequency Directory (now out of print), Scan America's directory covers seven states surrounding (and including) Ohio, with frequency coverage of the standard scanner ranges (low and high VHF and UHF, 27-460 MHz) including the 225-400 MHz military aircraft band.

For the scanner buff who enjoys monitoring federal agencies, this concentrated listing, cross-referenced by frequency, call letters and agency, provides information on all major federal users of the VHF/UHF spectrum.

Introductory text discusses several aspects of monitoring and sources for additional data. Even if you are not located in one of the nine states surrounding and including Ohio, federal government listings are often common throughout the United States and the listings provide an excellent guide as to where to hunt for federal government activity in your area.

THE ENEMY IS LISTENING by Aileen Clayton (4" x 7" pocket paperback; $3.95 from Ballantine Books #30250)

During World War II, the Y Service was set up in England to intercept enemy radio communications. Aileen Clayton was the German interpretor. Her story reflects the patriotic dedication of a group of women assembled from all walks of life to piece together these parts of the axis puzzle.

LANGUAGE LAB by Gerry L. Dexter; Spanish Edition (55 pages, 8-1/2" x 11", spiral bound; $12.95 plus $1 shipping from Tiare Publications, P.O. Box 493 Dept. MT, Lake Geneva, WI 53147)

If you are serious about QSL'ing foreign stations, Dexter's new book is the penultimate guide. Certainly, Spanish language stations are plentiful on the shortwave bands, and this collection of letter openings and closings, requests, descriptions of programs, and other valuable native-language expressions and colloquialisms will prove of enormous value to the inveterate DXer.

All Spanish language phrases are translated into English and the book is organized for easy reference by topic.

THE BLACK BOX SOLUTION (49 pages, 8-1/2" x 11", spiral bound; $49.95 from The Black Box Solution, 4014 Central Avenue Dept. MT, Hot Springs, AR 71913)

If you have cable TV and are contemplating installing a M/A-COM VideoCipher II descrambler to see your favorite movie channel, you should be aware of a growing sea of entrepreneurs who are intent upon breaking the code and providing low-cost competitive decoders.

Probably leading the band at this writing is The Black Box Solution, a combination instruction manual/parts kit house who has broken the video, but is still working on the audio.

The audio problem is staggering: VideoCipher removes the audio subcarrier as well as both vertical and horizontal synchronization pulses. The audio, in two channels, is recoded 30 times per second!

Black Box Solution's manual assumes a fair level of technical sophistication among its readers and starts right out with block diagrams and circuit descriptions.

While Black Box suggests that the total parts cost should be about $90 (compared with the $350 cost of the commercial equivalent), they do caution that the device may be illegal once built and that the manual is intended for "educational purposes." This is like selling electronic bugs as "wireless babysitters" and fireworks for frightening away pests!

In any case, The Black Box Solution is a consumate analysis of the most-commonly-encountered TV scrambling.

NEW HAMPSHIRE SCANNER GUIDE by Robert Coburn (191 pages, 8-1/2" x 11", paperbound; $14.95 plus $2.05 shipping from NH Scanner Guide, P.O. Box 712 Dept. MT, Londonderry, NH 03053)

Crossreferenced by frequency and community, Coburn's new scanner guide lists just about anything monitorable on a conventional scanner in the state of New Hampshire.

Ski patrols, public safety and emergency, mobile phones, aircraft, boats, weather, conservation, ham, news agencies,and many other services are listed.

FM ATLAS AND STATION DIRECTORY by Bruce F. Elving (164 pages, 5-1/2" x 8-1/2", paperbound; $8.95 from FM atlas, Dept MT, Adolph, MN 55701-0024)

Are you an FM broadcaster DX'er? If so, this latest (10th edition) from Bruce Elving is the ultimate guide to monitoring the 88-108 MHz FM broadcast band.

The first dozen pages serve as an introductory chronology to FM broadcasting, including a comparison with AM radio, insights into piracy, terms perculiar to this service, recent rulings by the FCC into new channels, and so on.

State-by-state listings--including maps--show the locations of FM stations in the U.S., Canada and Mexico; a cross-reference section does the same alphabetically and by frequency.

THE DXers GUIDE TO COMPUTING by George Wood; Edition 3.0 (34 pages, 5-3/4" x 8-1/4", papgerbound; $3 from Radio Sweden International, S-105 10 Stockholm, Sweden)

Perhaps the best description of this little guide would be that it is a sourcebook on computer software, bulletin boards and publications related to the radio listening hobby.

Brief descriptions of the programs available to the listener as well as comments by the author concerning his recommendations pepper the pamphlet. An excellent synopsis on what's available; well worth the $3 for its orientation.

HAM PAC 5

(Hobby disc for Commodore 64; $18.50 from Gardner Electronics, P.O. Box 387 Dept MT, Chillicothe, OH 45601)

A couple of months ago we reviewed Ham Pac 5, providing details of all the utilities on the disk. Now, Gardner has updated some of the programs, making them available as HAM PAC 5. HAM PAC 4 owners may send their disks in to Gardner for update for $4.

Titles on the disk include: MORSE 64 (for practice; adjustable weight, speed, etc.), MORSE TEACHER (for the beginner), HAM 64 (several simple circuit and antenna design programs), DRAW BABY 1 and 2 (basic graphics), SNAIL COPY/BAM COPY (disk copying utility), and LOOKER: LOOKER (Disk sector editor for 1540 drive).

RADIO FREQUENCY SPECTRUM CHART

by Robert Rover

Intended for the scanner and shortwave listener, this wall size (16" x 20" standard for framing) poster shows the major classifications of users of the radio spectrum from 300 kilohertz through 3000 megahertz.

Printed on heavy glossy paper in seven distinct colors (plus black printing), the chart shows shortwave broadcasting, amateur, standard broadcast, television, maritime mobile, government/research, and commercial/business.

Subcategories of fixed location, mobile, radionavigation, aeronautical, radio astronomy, and space research/ operations are included as well. An additional continuous spectrum chart shows all ranges of electromagnetic radiation from sound through gamma rays.

The chart is colorful, attractive and accurate--an excellent addition to the wall of any listener's shack. It comes rolled in a mailing tube for $4.50 plus $1.50 shipping and handling from Rover Printers, 2135-F Columbia, Dept MT, San Diego, CA 92101.

"CHIP CHECKER" from Microcraft

Microcraft Corporation announced CHIP CHECKER, a full-mode TTL in-circuit tester with the capability of detecting and displaying IC errors during actual operating conditions--automatically.

CHIP CHECKER model TTL-1 is designed to test 14, 16, 18, and 20 pin TTL ICs including low power Schottky TTL. This includes logic gates, flip flops, buffers, and interface elements. Newer and older logic families may also be tested.

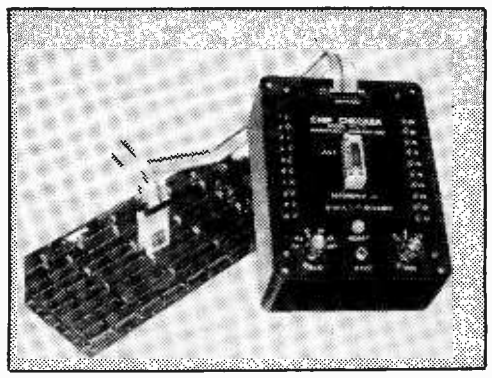
Some specialized ICs or those dependent on external resistors or capacitors such as the monostable 74121 cannot be tested; however, tri-state, bi-directional and open collector ICs in most cases can be tested.

Chip Checker requires no additional test equipment. Two front panel mounted switches are available for selecting the VCC and GND pins on the IC under test. Lighted LEDs indicate differences or errors between the IC under test and the reference IC.

Chip Checker automatically determines the inputs, outputs and logic levels of a known reference IC and carefully compares the outputs to those of the IC under test. Differences between the outputs of the two ICs cause one or more LEDs to light indicating possible errors.

Stuck logic states and improper operation are easily detected. Intermittent errors occurring over several minutes or even hours can be detected by using the dynamic latching mode.

Chip Checker comes complete with power supply, test clips and manual. Price is $299.95 from Microcraft Corporation, P.O. Box 513 Dept MT, Thiensville, WI 53092 (414) 241-8144.



RADIO WEST ANNOUNCES ESKAB DISTRIBUTORSHIP; RX-33 RECEIVER

ESKAB Elektronik A-B was born out of the ESKA company which was taken over by its creditors who subsequently sold off the rights to its unusual $3,000 RX99PL receiver. The new company, ESKAB, retained the RX12, twelve-channel, cyystal controlled shortwave receiver, and the RX12PL, a synchronous detector version of the same radio.

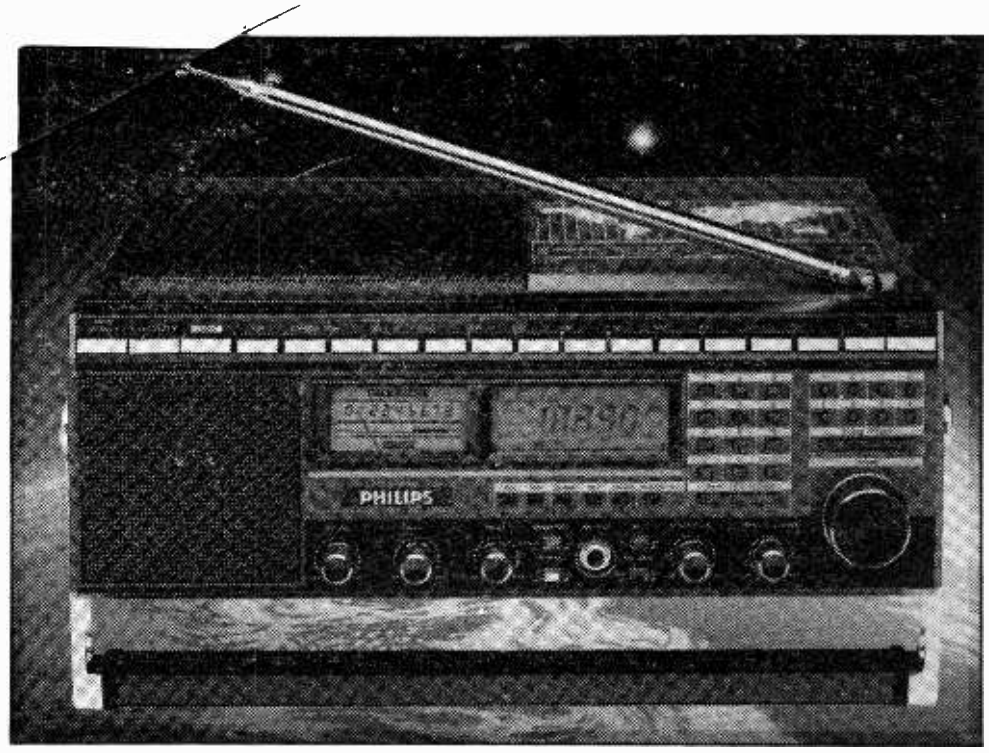
Radio West of Escondido, California, a master distributor for ESKAB, announces that the company has added a receiver to its lineup, the RX-33. The RX-33 is, according to Radio West, a "considerably modified version of the Sangean ATS-803 and is in fact built by Sangean to ESKAB specs. The RX-33 is a general coverage 150-29.999 kHz receiver with keypad and manual tuning, manual RF gain, two selectivities, and internal/external antenna options.

Receiver Review:

THE PHILIPS/MAGNAVOX D2999: Turning Lead into Gold

RDI Rating of Overall SWL/DX Performance: **

The D2999. Bow, wow, wow. The "D" stood for "Dog."



by Larry Magne

When we first tested the $400.00 Philips/Magnavox D2999 in the autumn of 1985, we were aghast. False signals, generated by poor circuitry within the receiver, ran rampant across the shortwave dial, making a mockery of the frequency display. To say that the D2999 made shortwave listening unpleasant was a gross understatement. It was one of the worst sets we had ever tested.

When reports concerning these highly negative findings filtered back to Philips'management, the company, to its credit, decided to recall the entire lot. Consumers who had already purchased units were given the option of having their sets upgraded, at no cost, for improved performance.

Multiband Field Portable

The Philips/Magnavox D2999 is a "field portable." That is, it is fully self-contained, yet too large and heavy for convenient travel. As befits a device intended for use worldwide, it operates not only off batteries (6 x "D"/UM1/R20 for the main power, 3 x "AA"/UM3/R6 for the microprocessor) and 12V dc, but also 120/240V ac mains current. Power line hum was reduced by placing the entire ac/dc power supply inboard.

The D2999's coverage includes longwave, mediumwave AM and shortwave continuously to 30 MHz. This also encompasses the 1600-1705 kHz AM band extension that could go into effect in North America as early as 1990.

Controls Well Thought Out

The cabinet and controls of the D2999 suggest that some detailed and creative thought went into making the receiver user-friendly. With a few exceptions, even the smallest detail has been attended to carefully.

RDI Scale of Overall SWL/DX Performance:

***** Superb
**** Excellent
*** Very Good
** Good
* Fairly Good

Larry Magne's receiver reviews are conducted independently of Monitoring Times. The views expressed herein are not necessarily those of the staff and management.

Its synthesized tuning arrangement -- which tunes and reads out to the nearest kHz -- is very complete. There's a foolproof keypad to select any desired frequency with a minimum of button-pushing. Added to this are a scanner of sorts and 16 memory channels in which to store your favorite frequencies.

There's even a real tuning knob -- a variable-rate knob, at that. When you give it a good flick, it shifts into overdrive and zooms off, like Popeye with a canful of spinach. Most variable-rate tuning circuits tend to be "fussy", going from one speed to another just when you don't want them to. But the D2999's is as good as we've seen, shifting into "high gear" only when you give the knob a healthy "let's get moving" spin. As if this weren't enough, the knob assembly has detents that produce one "click" per one kHz (10 kHz on FM) tuned at normal speed. This provides a tuning aid to the visually impaired as well as enhanced "feel" for bandscanning.

The top of the set has a handy row of buttons to allow you to get right to whichever meter band you'd like to scan. Next to each button is a red light-emitting diode (LED) which glows if you're tuned to that band. If you're between bands, two LED's light up -- one for each of the bands astraddle where you're tuned.

In all, the D2999 makes it very easy to move about the shortwave spectrum. The only niggling complaints, aside from the pedestrian scanner software, are, first, that the keypad and channel numbers are small and not well contrasted against the background of the front panel. Second, although most of the front-panel labeling is excellent, some of it is really strange. For example, the keypad labeled "preselection" has nothing to do with preselection. Instead, it contains the programmable-channel memory buttons. And the RF gain control is labeled "AM Gain Control".

The D2999 incorporates an analog meter for battery and signal strength, along with a clock/timer that operates in either 24 or 12 hour format but, alas, does not display seconds. For $400, though, you shouldn't find, as you do with the D2999 and a distressingly large number of other models, that the clock shares the front-panel display with the frequency readout. This means you can see the time or frequency -- but not both -- at the same time. Dumb, but not crippling.

The D2999's liquid-crystal display and signal/battery strength meter are illuminated -- a plus for nocturnal listening -- and the long, beefy carrying handle also works as an effective "tilt leg" to prop the set to a pleasant angle once it's laid down. The rugged, lengthy (160 cm/63") telescopic antenna swivels in discrete increments a full 360 degrees -- a plus, especially for optimum FM reception. Indeed, this is as worthy a built-in antenna as we've come across in some time.

Front-End Selectivity Improved

Front-end selectivity -- the curse of the original version -- is considerably improved in the cleaned-up D2999. Nevertheless, it remains substandard for a model in its price class. When a good external antenna is attached, vestigial false shortwave signals can still be found in the higher reaches of the shortwave spectrum, such as the 13, 16 and 19 meter bands. Within the 11 meter band, even AM signals appear. The set's attenuator alleviates this, but reduces signal strength so profoundly that the best solution often is to switch from an external to the internal antenna instead.

Excellent Sensitivity

Sensitivity -- even with only the built-in telescopic antenna -- is excellent. Dynamic range is at least average for a set in this class, allowing outdoor antennas to be used in many parts of the world. However, in Europe overloading may occur with an outdoor antenna under certain conditions, e.g. the 49 meter band at night.

Reasonable Selectivity

There are two bandwidths. The wide is too wide for most shortwave listening situations but it does allow for pleasant listening to local stations and to the occasional shortwave broadcast clear of interference. The narrower width works well under the more typically congested conditions on the shortwave bands, but is rather wide for both ECSS/SSB reception and conventional reception when there is substantial adjacent interference. Both should have been slightly narrower.

Mediocre BFO Performancer

The beat-frequency oscillator (BFO), which is needed to listen to one sideband of a signal at a time, performs in a substandard and peculiar manner. To begin with, it does not switch automatically to discrete lower sideband (LSB) and upper sideband (USB) settings. This is because of the synthesizer's coarse 1 kHz resolution, which makes either a BFO or RIT fine tuning control necessary.

To activate the BFO, a button must be pushed and a fine-tuning potentiometer adjusted manually to the proper setting for LSB or USB reception -- something that's a throwback to the dark ages of receiver design. When the BFO finally does comes on, it causes the signal strength meter to rise to near midpoint, even if no signal is present. After that, it takes a couple of seconds to settle down, at which point is becomes relatively stable except for occasional spasms. Finally, the local carrier injection level is simply too great. *It overwhelms the signal, much as did early BFO's before product detectors came into use decades ago.*

For these and other reasons, the D2999 -- even the improved version -- is just not acceptable for ECSS reception. For this, you need either a first-rate communications receiver or Sony's innovative ICF-2010/ICF-2001D portable.

Fortunately, the D2999's low-distortion circuitry makes the absence of ECSS less noticeable than it would be on many other models. *You can even detune slightly without a significant rise in distortion, just as you can on the Sony ICF-6800W.*

Digitrex Pocket Counter

An inexpensive frequency counter is a handy gadget for any home electronics experimenter to have around the bench, and the PFC-500 from Digitrex is a good example.

About the size of a pack of cigarettes--truly pocket-sized--the pocket counter features four LED digits which can be switched between 100 kHz and 1 kHz resolution for an equivalent of 6 digit readout.

Total frequency response is 1-500 MHz with an average sensitivity of 20 millivolts over approximately 10-200 MHz. An extendable whip provides coupling to a nearby transmitter to obtain a reading. With a 1-watt two-meter transceiver, we were able to get a steady reading from approximately six feet away.

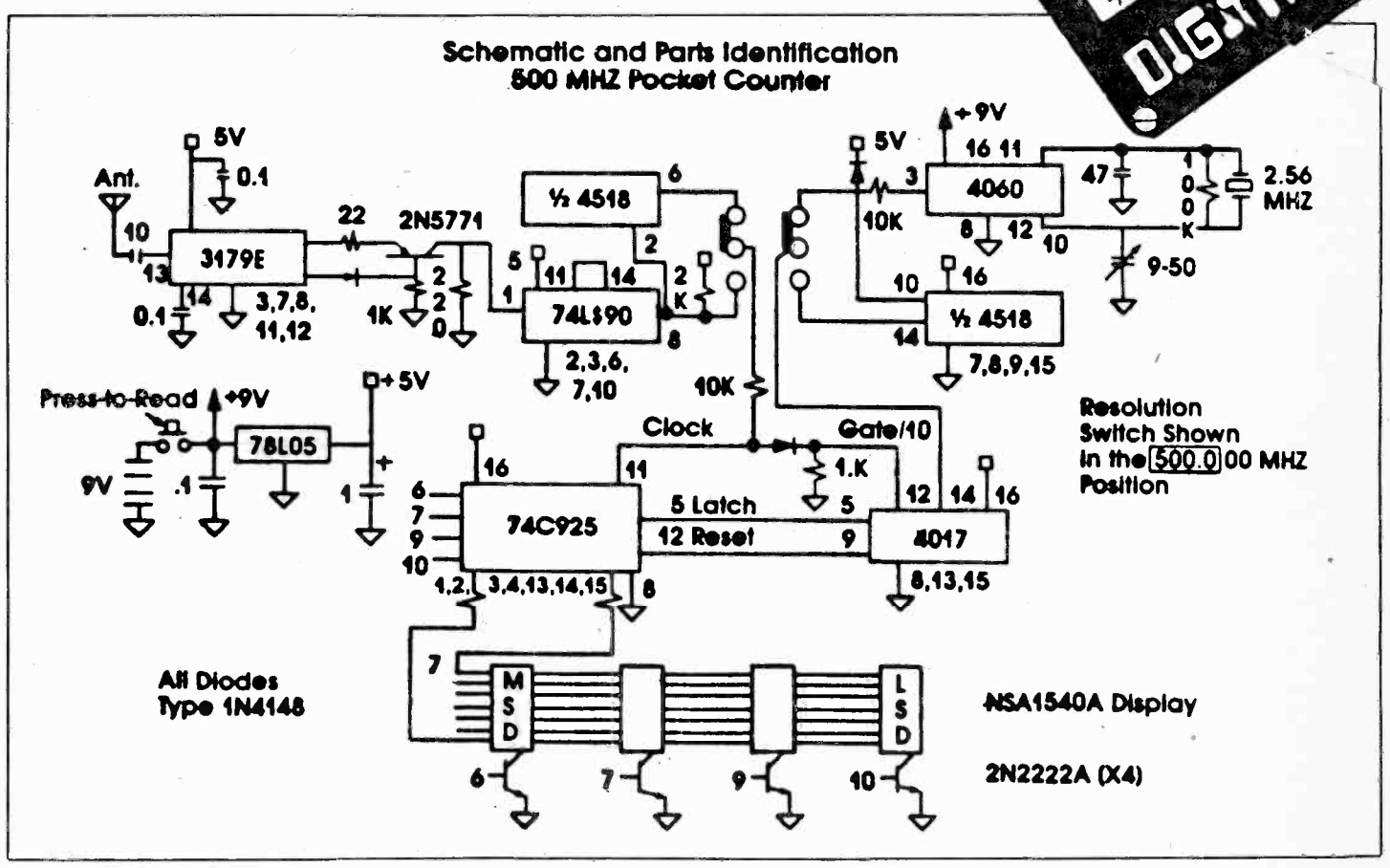
Accuracy of the 2.56 MHz time base is within 1 part per million, equivalent to 500 Hz at 500 MHz (1 Hz per MHz) settable by a front-panel-accessible trimmer capacitor. Temperature range for this accuracy is 10-40 degrees Centigrade.

If additional resolution (to 100 Hz) is desirable, a simple modification procedure is explained in the literature, requiring cutting of the circuit foil and rerouting the signal paths to the divider chip.

The circuit is extremely straightforward and a schematic is included with the counter (see attached figure). Power is provided by an internal nine volt battery (not supplied); alkaline is recommended since current requirements are quite high (near 100 mA).

Operation couldn't be simpler: Simply press the sidebutton and read the display. Since there is no warmup time and instant readout, intermittent operation would suggest a battery life of many weeks to months.

The PFC-500 costs $49.95 plus $2 shipping and is available from Digitrex, 1005 Bloomer, Dept. MT, Rochester, MI 48063.



Philips/Magnavox 2999, cont'd

Commendable Audio Quality

The best thing about the D2999 is its audio quality -- it is unusally good for a shortwave radio. The separate bass/treble controls have been well engineered to allow the listener to shape the audio frequency response to suit the varied demands of high-fidelity FM, on one hand, and the reduced-bandwidth response of longwave, mediumwave AM and shortwave, on the other. Two speakers, fed by a relatively powerful monaural amplifier, are provided -- one atop the cabinet, the other (switchable) in front -- to disperse the sound as appropriate throughout the listening area. Although there is a trace of hiss, it's quite minor and far less objectionable than that found on the Sony ICF-2010/ICF-2001D.

In all, the D2999's audio quality is on a par with that of the excellent Sony ICF-6800W. This is no small consideration, and allows listening to major broadcasters to be unusually pleasant.

Revised D2999 Provides Enjoyable Listening

Overall, the cleaned-up version of the D2999 is not only an improvement over the original attempt, but is actually a worthy receiver in its own right. With synchronous ECSS, improved BFO operation and design, narrower bandwidths, and better front-end selectivity in the higher bands, this set would outdistance other models in its price class. Even as is, the D2999 -- even though obviously not a prime choice for DXing -- is a serious alternative for shortwave listeners who don't care for the exotic operating requirements of the innovative Sony ICF-2010/ICF-2001D portable, but who are loathe to spend up to $600 for a pleasant-sounding Sony ICF-6800W field portable.

For those who listen mainly to the major shortwave broadcasters, the Philips/Magnavox D2999 is straightforward to operate and provides aurally pleasant results.

As of presstime some 100+ samples of the original D2999 still had not been tracked down. These units continue to be eligible for a no-cost upgrade at any time. But how can you tell a lead D2999 from a gold D2999? Look for a yellow or green dot on the receiver's cabinet, box or both. Alternatively, the model designation -- found in the main battery compartment -- will have a slash or stroke...for example, D2999/01.

DOLLAR/YEN CLASH HIKES RADIO PRICES

Still reeling from a price hike on the newly-released R7000 receiver, ICOM officials have notified dealers that another increase is on the way. The pattern is echoed by Regency and other manufacturers as well.

Americans aren't the only consumers inpacted by the deflated value of the dollar in the rising power of the Japanese yen. Even Hong Kong electronics businesses, largely dependent upon Japanese components, are being hurt by the inflationary costs of parts.

To make matters worse, a recent *New York Times* report states that the policy-making Interim Committee of the International Monetary Fund has told Japan that it must allow the yen to escalate even higher in order to "achieve a more stable international economic order."

Treasury Secretary James A. Baker, 3rd, said, "The Japanese are the biggest beneficiaries of the oil-price collapse, and therefore it would be surprising if there were not some further appreciation (of the yen)."

Computerizing the Embassies

The days of diplomatic couriers and cables may be numbered. The U.S. State Department has authorized 131 million dollars to link 250 worldwide missions with Washington.

While most of these outposts already have teleprinters, the system is slow and antiquated; the desktop computer would definitely beef things up at Foggy Bottom.

Diplomatic telegrams have been increasing at a rate of 100,000 per year since 1980, up to an astounding 1.8 million this year along. Since many of these messages would merely flash on the screen, there would be less likelihood of printed messages wandering where they shouldn't.

As an additional security measure, the hardwired computer system will employ specially secured lines, employ encrypted techniques and will be accessible to limited key personnel with passwords. (Contributed by Ruth Hesch, White Plains, NY.)

MT HAM RADIO

We would like to thank the American Radio Relay League for excerpts from their ARRL Letter which appear here.

Hands Across America

On May 25, according to *Westlink*, over five million citizens, coordinated by over 3500 radio amateurs, held hands for 15 minutes to promote public awareness of the homeless and to raise funds on their behalf.

Radio amateurs were assigned to each mile of the route and provided primary communications for the event. Hams on the line reported the status of the line back to their state command posts. The state command posts were in constant contact with the east and west coast control stations.

The west coast control station, W6RO, located in the berthed Queen Mary ocean liner, was headed by Tim Loewenstein, WAØIVW. The east coast control station was headed by ARRL Vice-director Steve Mendelsohn, WA2DHF. State command posts were linked to each other and the east and west coast command posts through a teleconferencing network put together by Lou Appel, KØIUQ.

FCC CONSIDERS VOICE OPS FOR NOVICES

It has been over 20 years since novice-class hams were allowed voice operations; now, with amateur radio suffering a decline (there are 10,000 fewer novices now than just two years ago and 2/3 of all novices drop out of amateur radio without upgrading), commercial radio services are pounding on the FCC's door for ham frequencies.

Novices should be ready for frequencies in the ten meter band from 28.1-28.5 MHz (digital and voice) and all of the 1.25 meter band (220-225 MHz) for voice.

JARL Code Practice

The Japan Amateur Radio League (JARL), using its station JA1RLI, has started to transmit regularly bulletins of interest and relevant information to its memboers. This station transmits CW practice on 7030 MHz (∓5 kHz). SWL reports are solicited.

OSCAR 10 SIGNALS LOST

After nearly three years of on-orbit performance, A0-10 has suffered a serious, if not fatal, malfunction. The central computer or Integrated Housekeeping Unit (IHU)--the computer that runs the whole satellite--experienced a major malfunction on May 17.

A0-10 users began to notice some odd symptoms: The telemetry mode did not switch from PSK to RTTY or CW. Moreover, the Mode B transponder was locked on during a perigee passage.

Analysis of the fault is proceeding with experts from around the world considering the symptoms. Most are convinced the error is in the IHU memory and was caused by solar or cosmic radiation. The 16k memory chips are susceptible to the debilitating effects of exposure to radiation. The effects are cumulative so an overall degradation of the memory is suspected.

Karl Meinzer, DJ4ZC, President of AMSAT DL, a prime mover in the Phase 3 Project, says the current problem is survivable and there is a reasonable chance many functions can be restored. But he hastens to add the current fault is the harbinger of a new class of problems AMSAT will be seeing more often.

Antenna Zoning Restrictions

ARRL HQ has put together a "PRB-1" package which consists of a copy of PRB-1, model antenna ordinances, general information about Amateur Radio, names and addresses of local ARRL volunteer counsels and other information useful in the battle against unduly restrictive antenna ordinances. For a copy, send $3.00 (for postage) to HQ requesting the PRB-1 package: ARRL, Newington, CT 06111.

Amateur License Renewal

If you have a license good for a five year term, its grace period, should you fail to renew, if five years. After two years of the grace period has elapsed, you will lose your callsign and will be assigned a new one.

The new 10-year term licenses which have been issued since January 1984 have a two-year grace period. To renew an amateur license, use FCC Form 610, which is available from FCC or ARRL HQ. There is **no** fee for renewing an amateur license.

MT EXPERIMENTER'S WORKSHOP

A Challenge to the Experimenter:

BUILD A STORMSCOPE

by Tom van Kuiken

Most of us with weather satellite reception capabilities have probably thought how nice it would be to see what's inside the clouds we look at. Radar could be an answer. The problem is the complexities of the system and the great cost of magnetron tubes.

Some years ago a system was developed by Paul Ryan, an electrical engineer, to display sferics (lightning). The unit is called the (RYAN) STORMSCOPE and is meant to help aircraft in storm avoidance. I understand that a few units have also been purchased by large factories to avoid costly assembly line shutdowns during severe weather warnings.

In simple terms the Storm Scope displays lightning discharges on a CRT screen in the form of dots, thus giving azimuth and ranging, somewhat similar to a radar screen. The oldest dots are kept on the screen until the memory is saturated, and replaced by newer ones. They are also erased after about five minutes during periods of weaker electrical activity.

The Stormscope is well covered by patents, but we can look at a few of the principles involved. With the falling prices of today's home computers, maybe one of our ambitious readers could develop a sferics* detection and ranging device!

WX-10 Display

In the commercial Stormscope a single flat-pack antenna (mounted on an airplane) is used for reception. Azimuth information is acquired by using the same principle as an ADF (automatic direction finder). Range comes from an analysis of intensity of the discharge as well as the time it takes to peak and decay. The stormscope pays particular attention to the frequencies around 50 kHz, although other devices have chosen different frequencies.

In construction of a sferics detection device it should be noted that lightning will often arc for miles through a thunderstorm complex. To avoid errors you must measure the first few microseconds of the return stroke. Directional errors are thus reduced, since at this point the stroke is nearly straight and vertical without branches.

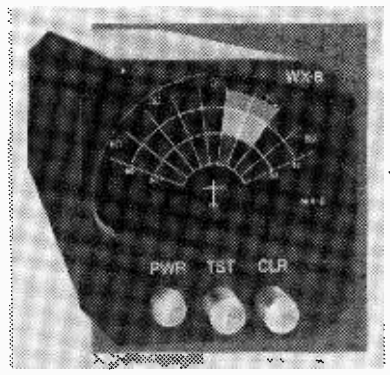
Broadband measurements of the lightning magnetic fields out to 200 km show the return stroke waveforms have a peak rise time of from one to five microseconds. A gated device would allow you to capture the part of the stroke that is of interest. The intensity of the radiation field decreases as the square of the distance from the discharge. Measurement of peak field intensity should allow you to get a general location of the strike.

Back in the early 70's the government also experimented with electromagnetic devices for tornado detection. While there was a good correlation between intense lightning and tornadoes they did not have a sferic signature of their own. Severe storms simply produce a lot of bad weather.

The device used by the government was not for direction finding; it used a one-meter monopole antenna connected to a receiver tuned to 3.16 MHz with a 10% bandwidth. They had two distance thresholds. Levels of 5 V/m were equal to a 30 km distance and 2 V/m for 20 km.

Quite simply, this project should be constructed with a direction-finding device and a system to measure the lightning intensity. The intensity must then be assigned a value that corresponds to a distance. In the Stormscope the accuracy is within 10% over a 200 mile distance. ■

* *Atmospheric radio noise*



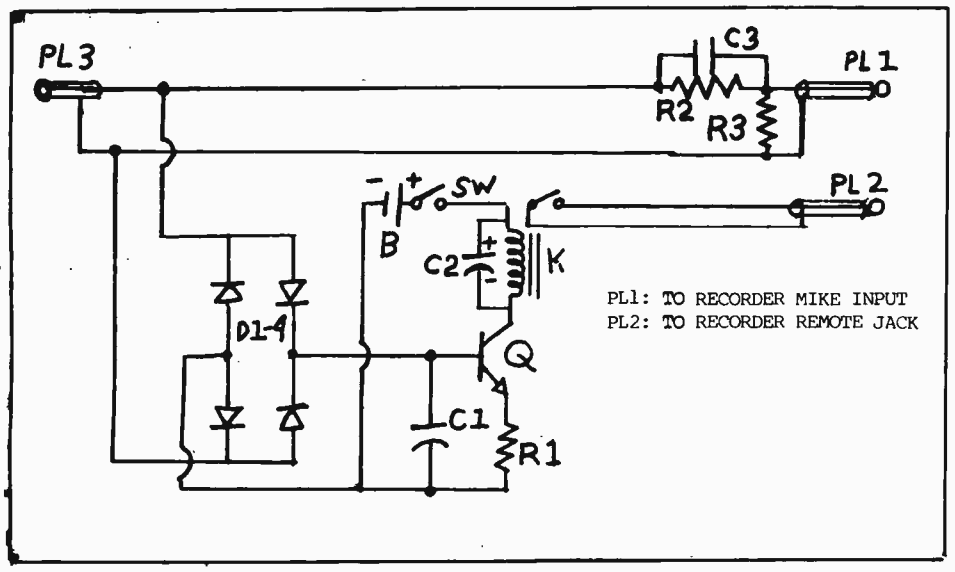
BUILD THIS RECORDER ACTIVATOR FOR YOUR SCANNER

Whether you enjoy monitoring short wave or VHF/UHF, this recorder activator project sent in by Howard Carver can provide a permanent record of your intercepts when used with an inexpensive tape recorder.

Connected to the external speaker jack of your receiver, the activator samples the audio level and when the squelch is broken or programming is being heard through the speaker, the audio is rectified by the four diodes, sent to a switching transistor and trips a relay which turns on the recorder.

After the audio disappears or squelch drops out, the relay also drops out, shutting off the recorder. The delay time before the relay drops out may be set by selecting the appropriate capacitance for C2; the lower the capacitance, the more immediate the dropout.

Parts values are definitely not critical and a number of substitutes may be made to suit your needs. For those without a stock of experimenter's parts, Howard has included a cross reference by Radio Shack stock number.



VOX Operated Recorder Activator

Parts List

B1	9V Battery
S1	SPST on-off switch
C1	1000μf 16V electrolytic (Radio Shack 272-958)
C2	1000μf 16V - other values can be used for different relay dropout delays
K1	9-12 VDC coil (Radio Shack 275-004) $2.99
Q1	2N2222 (Radio Shack 275-1617; 15 for $1.98)
R1	15Ω 1/2W resistor (Radio Shack 271-003)
PC Board	(Radio Shack 276-024)
D1-D4	Any handy diodes like IN4001-IN4007 or IN4148/IN914 can be used for the bridge or an encapsulated bridge such as Radio Shack 276-1151 can be used
R2	10KΩ ½W (Radio Shack 271-034)
R3	10Ω ½W (Radio Shack 271-001)
C3	Optional if needed to beef up the higher frequencies .01-.05uf 16V
PL1	1/8" mini phone plug (Radio Shack 274-287)
PL2	3/32" submini phone plug (Radio Shack 274-289)
PL3	Chosen to plug into receiver speaker jack; usually like PL1

AN EASY AUDIO NOTCH FILTER

by Chris Williams

If you've been listening to the shortwave bands for any length of time, you are aware of how crowded they are. QRM (adjacent signal interference) is one of the first problems shortwave listeners become aware of and accustomed to.

Often, the QRM manifests itself as signal overlap. This is the situation where more than one signal gets through a receiver's front end, even though the interfering signal's frequency is well removed from where the receiver is set.

In these instances, additional selectivity will solve the problem by sharpening the skirts of the receiver's bandwidth and attenuating the interfering signal strength so that it no longer overwhelms the tuned circuits. This additional selectivity can be achieved using such techniques as higher Q circuits, preselectors, or a tuned antenna.

QRM sometimes appears in a different form, however; it may occur as a constant-pitched tone somewhere within the bandwidth of a receiver. In ham radio, this is usually just another CW station operating at a frequency near the one tuned in. In shortwave broadcasting, it is usually a heterodyne resulting from a strong station close in frequency to where the receiver is tuned, but not within its bandwidth.

Let's deal with the shortwave broadcast situation first. If the tone is in the middle of the AM pass-band of the receiver, additional selectivity cannot help. AM signals, including those from SW broadcast stations, are about 6 kilohertz wide. The bandwidth of typical HF receivers in the AM mode are designed with that in mind.

Narrowing selectivity further in an attempt to remove an interfering tone might remove that tone, but it would also make the voices of the broadcasters from the station of interest muddy and unintelligible.

Similarly, additional selectivity will be of no use to you in ham radio CW work if the signals are so close together in frequency that separating them requires filters of such high Q that their sharpness results in "ringing."

There are also cases in CW work where you don't want to remove a signal by traditional high-pass, low-pass or band-pass filtering. Perhaps you are listening to a CW net operation where everyone is not exactly "zero beat" (on frequency). Should you try to use one of the three filter types just mentioned to solve this problem, you would most likely remove many of the desired signals in addition to the single offending tone.

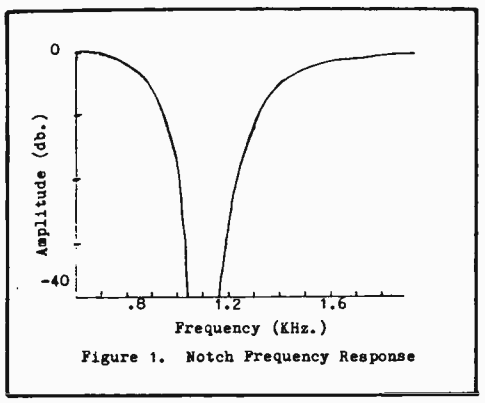


Figure 1. Notch Frequency Response

The Cure

In both these examples the cure is a notch filter, so named because of the shape of its response curve on a graph (see figure 1). Here you see how a narrow frequency range is attenuated deeply by a notch filter.

In CW, the other signals are left alone and can be copied without the distracting tone, and in voice, the remaining, unattenuated frequencies contain sufficient information that there is no loss of intelligibility.

How to Create a Notch

The traditional way of creating a notch is shown in figure 2. Here, a low-pass and high-pass filter are connected in series to create the desired frequency response. This works fine, but it requires separate cut-off frequencies for the two separate filters.

By controlling these frequencies individually, the notch's width could vary from too wide to too narrow, depending on how the user has adjusted it. It would be both time-consuming and difficult to get the adjustment perfect each time you wish to remove a tone.

Figure 3 is a much easier notch circuit to use. The method used is a bit more subtle than that just described. Here, an active bandpass audio filter is shown with a minor, yet significant, modification: R4 is a balancing potentiometer which, when adjusted properly, feeds equal amounts of input and output signal from the bandpass filter to the additional amplification provided by U1b.

The feedback creates a notch because of phase inversion. Since the bandpass center frequency is inverted in phase and then mixed with the non-inverted input, we get a cancellation of that frequency. This is a simple, elegant way of creating what turns out to be a deep, easily adjustable notch.

The next stage with U1b is simply an amplifier with a gain of about 10 which ensures there is enough audio signal to drive the headphones.

Using the notch is quite easy. R2 is the frequency determining component. Set R4 all the way to the output side of the bandpass filter and tune $2 to peak the offending tone. Then adjust R4 until that tone attenuates. That's all there is to it.

The component values chosen for the circuit are designed to optimize the notch for frequencies in the range of 800 to 1500 Hz. Attenuation will still be possible outside this range, but will not be as deep.

The circuit operates nicely from a 9V battery and, since the current drain is low, battery life should be quite long. The notch filter connects between the 8-ohm headphone output of your receiver and the headphones themselves. Adjust the receiver audio gain to provide comfortable volume without distortion.

D1 and D2 are diodes which provide protection from excessive drive. They are wired back-to-back so that when they are biased beyond their PN junction's threshold voltage, they conduct. This prevents either negative- or positive-going peaks of the input signal from exceeding the permissible input voltage to U1a.

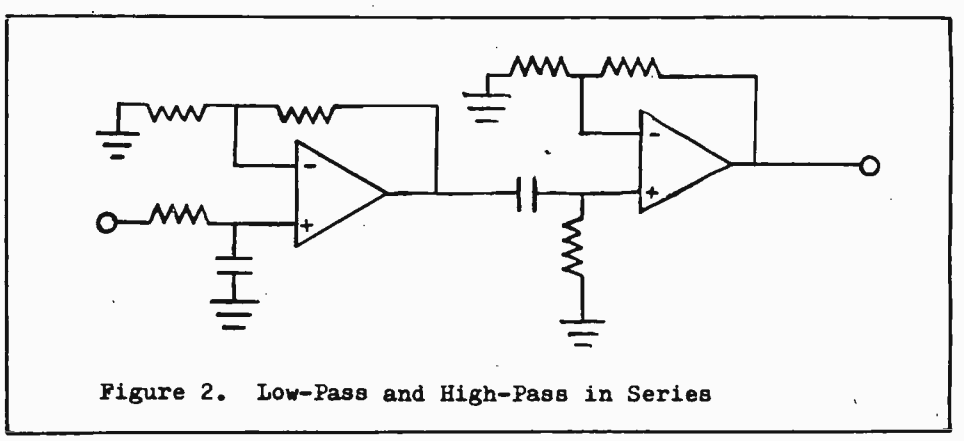


Figure 2. Low-Pass and High-Pass in Series

Notch filter, cont'd

Dick Smith Electronics
1-800-332-5373

Circuit Specialists
1-800-528-1417

One Last Note

If a strong, offending tone is present then the signal is probably influencing the receiver's AGC so as to desensitize the front end. With the receiver's overall gain decreased, a desired signal may be too weak to hear. The notch can attenuate the offending tone, but it can't bring back the weak signal.

When the signals are of similar strength, however, you should find it handy to have a notch available■

The parts required to construct the circuit in figure 3 are available from:

More information on bandpass filters and notch filters can be found in the ARRL's *Radio Amateur's Handbook*, which is available from Grove Enterprises and other MT advertisers.

Parts List:

C1,C2 - 0.1 uf
R1 - 3.6K ohms
R2 - 1K ohm potentiometer
R3 - 15K ohms
R4 - 20K ohm potentiometer
R5 - 1K ohms
R6 - 10K ohms
D1,D2 - 1N34A
U1 - LM324 Quad Op-Amp

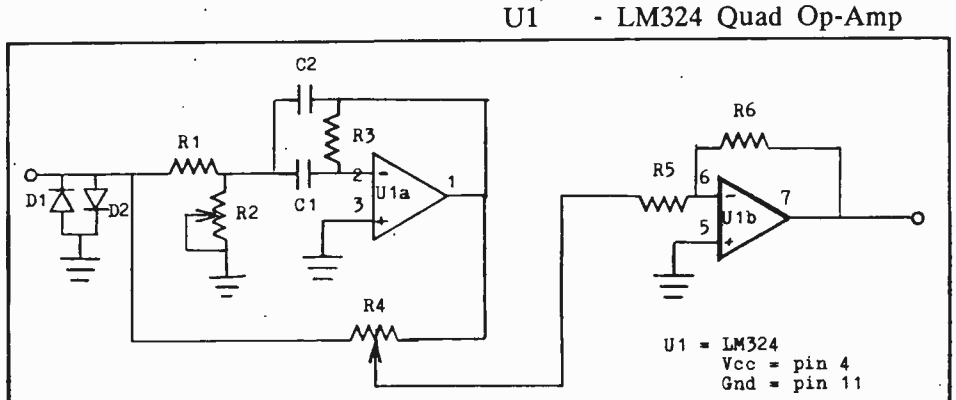


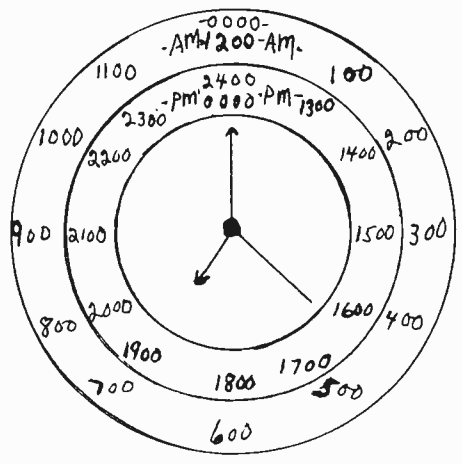
Figure 3. A Simple Notch Filter

HELPFUL HINTS

BUILD YOUR OWN 24 HOUR CLOCK--The Easy Way

by Ken Hand WB2EUF

A Combination 12 and 24 Hour Clock Face



If you have wished to own a 24 hour clock but just haven't gotten around to buying one, try this simple way to make a new dial face for a standard clock. To read hour time start at the top center (0000 am) and then read clockwise around the outer ring to 1200 hours; then drop to the inner ring (marked pm) and continue reading clockwise to 2400 hours.

The idea is good for battery operated clocks as well as electric. These clocks are easily found at yard sales, flea markets, thrift stores, and second hand stores at very low cost. The converted clock still tells 12 hour local time as well as 24 hour time, and, if appropriately lettered, UTC as well.

Reader "Jump Starts" Regency Keypad

Larry Williams of Radio Research found a way to bypass a defective keyboard section in his D-series Regency programmable scanner. Undaunted by the task, he decided to make a chart of other keypad connections to the multiconnector as shown.

We appreciate Larry's contribution and invite other readers to share their helpful hints with fellow radio hobbyists through the pages of *MT*.

Keyboard does not have to be removed to jump pins. Count pins from left.

REGENCY KEYBOARD JUMP START

PAD # "D SERIES"	J U M P
1-Lo	7 to 4
2-Uo	7 to 6
3	7 to 8
4	5 to 4
5	5 to 6
6	5 to 8
7	3 to 4
8	3 to 6
9	3 to 8
0	1 to 4
./DELAY	1 to 6
ENTER/SPEED	1 to 8
PROGRAM srch	2 to 7
SEARCH	2 to 5
SCAN	2 to 3
MANUAL	2 to 1

Faster Scan/Search on the MX7000:
Part III

In two previous issues of *MT* we shared reader suggestions on speeding up the sluggish scan and search rates of the popular Regency MX7000 scanner, otherwise an excellent radio.

A letter just received from Larry Wiland of Youngstown, Ohio, praises the original discoverer, Dave Cook, for his fix and offers some interesting observations and improvements. We extract the following from his letter:

The actual modification is rather easy, but working quarters are CROWDED in there!...it is necessary to SLIGHTLY bend over the small green capacitor (attached to the solder pad) to be able to get the drop of solder on it needed to fasten the newresistor here.

Don't use too much heat; if you accidentally melt the solder on the existing resistor, you will then HAVE TO remove the LCD display from the PC board to re-fasten everything.

I tried several resistors in the 27K-39K range, and got the same results as Mr. Cook stated; overly-fast searching which skips frequencies past the third decimal point (kHz); a scanning rate which misses distant stations; and memory loss within a minute of cutting power.

Here is the final result (tried-and-true) that I have found by experimenting with Mr. Cook's modification...A 56K-ohm resistor does the best job; it makes the scanner scan and search as quickly as other Regencies, retaining the speeds without skipping signals.

The memory is now retained for at least 8-10 hours following loss of power, and the annoying, loud beep is comfortably reduced.

Will the same modification work on the MX5000? Perhaps some inveterate experimenter would let us know. And how about the addition of a continuous tuning knob and an S-meter?

Scanners as Signal Generators

by Rene Borde

After reading your HX-1000/1200 Sig/Gen article, I thought that you might be interested in how I am using the BC-210, BC-101, SC-200 and BC-220 scanners as signal generators. By using the 210 for the low end and the SX-200 for all ranges. I'm able to cover 19.2-773, 118.7-190.7 and 390.7-524.7 MHz in the signal generator mode. The only two gaps are 77.3-118.7 and 190.7 and 390.7 MHz

BC101, BC210, BC220RC & SX-200 AS SIGNAL GENERATORS.

TEST FREQUENCY RANGE	PROGRAMMED BC101 RANGE	PROGRAMMED BC210 RANGE	PROGRAMMED BC220RC RANGE	PROGRAMMED SX-200 RANGE
19.2 - 29.2	(A) 30.0 - 50.0	(C) 30.0 - 50.0		
26.7 - 48.695				(F) 26.0 - 57.995
40.8 - 60.5			(D) 30.0 - 49.7	
47.3 - 77.3				(G) 58.0 - 88.0
*77.3 - 118.7				
118.7 - 190.7				(F) 108.0 - 180.0
122.2 - 159.2			(E) 138.0 - 170.0	
128.8 - 146.8			(D) 118.0 - 136.0	
135.2 - 163.2	(A) 146.0 - 174.0	(C) 146.0 - 174.0		
*190.7 - 390.7				
390.7 - 524.7				(F) 380.0 - 514.0
405.2 - 501.2		(C) 416.0 - 512.0		
416.8 - 479.2			(D) 406.0 - 490.0	
426.8 - 522.8	(B) 416.0 - 512.0			

* TEST FREQUENCIES NOT AVAILABLE WITHIN THESE RANGES.

(A) BC101: PROGRAM 10.8 MHz HIGHER THAN DESIRED TEST FREQUENCY.
EXAMPLE - PROGRAMMED 49.96 MHz = 29.16 MHz TEST FREQUENCY.

(B) BC101: PROGRAM 10.8 MHz LOWER THAN DESIRED TEST FREQUENCY.
EXAMPLE - PROGRAMMED 472.1625 MHz = 483.9625 MHz TEST FREQUENCY.

(C) BC210: PROGRAM 10.8 MHz HIGHER THAN DESIRED TEST FREQUENCY.
EXAMPLE - PROGRAMMED 40.8 MHz = 30.0 MHz TEST FREQUENCY.

(D) BC220RC: PROGRAM 10.8 MHz LOWER THAN DESIRED TEST FREQUENCY.
EXAMPLE - PROGRAMMED 32.02 MHz = 43.82 MHz TEST FREQUENCY.

(E) BC220RC: PROGRAM 10.8 MHz HIGHER THAN DESIRED TEST FREQUENCY.
EXAMPLE - PROGRAMMED 166.265 MHz = 155.565 MHz TEST FREQUENCY.

(F) SX-200: PROGRAM 10.7 MHz LOWER THAN DESIRED TEST FREQUENCY.
EXAMPLE - PROGRAMMED 32.8 MHz = 22.5 MHz TEST FREQUENCY.

(G) SX-200: PROGRAM 10.7 MHz HIGHER THAN DESIRED TEST FREQUENCY.
EXAMPLE - PROGRAMMED 82.84 MHz = 72.14 MHz TEST FREQUENCY.

Drug Smugglers Using Electronics

DEA (Drug Enforcement Administration) officials recently revealed how electronics are being used to benefit illegal drug trafficking nationwide. DEA's "Operation Southern Comfort" in 1983 homed in on the Gambino Mafia family in Georgia and Florida, and found that gang members had hired a retired New York detective to perform an "electronic sweep" of their homes on a weekly basis to find bugs.

Since federal agents had applied for, and had been granted, permission to use electronic surveillance on a residence in Ft. Lauderdale, the countermeasures seriously compromised their intelligence gathering. One bug was uncovered, necessitating the purchase of more sophisticated surveillance gear which ultimately led to at least one arrest.

Not all scanner monitors have been passive in their hobby. One listener in Chicago who is known to have mob connections hindered ongoing investigations by monitoring DEA frequencies and alerting the subjects that they were targets.

In Detroit in 1984, DEA agents broke in and arrested several suspects while they were monitoring that agency's traffic on a Bearcat 210 scanner.

Dopers Use High Tech

Florida investigators are continuing to probe into an alleged drug smuggler ring which use digital data transmissions over telephone lines for speed and security. Ostensibly, radio is also used with the digital device for conducting narcotics transactions. (Contributed by Robert Johnston, Seattle, WA)

New Programs from Finland

Radio Finland is now carrying programs produced for the station by the Nordic Communications Corporation. The NCC productions will comprise most editions of "Weekend Fare." some editions of the "Weekend Focus" broadcasts and a weekly Finnish Notebook, broadcast for North America on Friday mornings in all editions of Northern Report (1100, 1200, 1300, 1400 UTC). Listener correspondence concerning the NCC broadcasts can be addressed to P.O. Box 10, SF-00241, Helsinki, Finland. The station can also be dialed direct to the international audience service between 1000 and 1200 UTC at 011-3580-401-3534.

MT

TECHNICAL TOPICS

Q. *On April 28 at 7:05 pm near 5250 kHz I heard a woman's voice giving out a series of numbers like "327-12; 539-88", etc. I would love to QSL! (M.J. Hatten, Huntington, WV)*

A. What you heard was one of the mysterious "spy numbers" stations which populate the short wave spectrum. They send encrypted messages this way to operatives in foreign countries. Messages are generated from intelligence agencies and transmitted from the U.S. from transmitters at Remington, Virginia, among others. Havana is another source as is Nauen, East Germany. I doubt that they will QSL!

♦ ♦ ♦ ♦ ♦

Q. *What is that equipment shown next to you in the picture on the editorial page? (Mike Day, Dayton, OH)*

A. Although we are switching photos in the new *MT*, the equipment that you have seen next to me over the last few months is part of our test bench gear. It includes (left to right) our Tektronix Tektronix 547 spectrum analyzer/-oscilloscope with a Dumont 'scope above it; the balance of the bench is composed of varous signal generators. All the equipment pictured is for sale (see the Grove used equipment list) as we upgrade for servicing in our repair department.

♦ ♦ ♦ ♦ ♦

Q. *My Capri voice descrambler worked great on our local police department until they switched to digital. Is there another descrambler for such a system? (Roy Williams, La Mesa, CA)*

A. Unfortunately for scanner buffs, the only system for which any descramblers are made is voice inversion. Systems like rolling code, frequency hopping and digital have no simple cure, and none is anticipated in the near future.

Mailbag

Shortwave

I wanted to mention something that we hadn't said since the early days of International Radio magazine. That is that we're always interested in examining articles from readers for possible publication in MT. As far as the shortwave section is concerned, they should be non-technical in nature but can range from station profiles to tips on things to tune in and how to tune them in better. All in all, we find that our readers are some of the most creative and well-informed in the world so don't hesitate to drop us a line if you have an idea for a possible article. Our address is Broadcast Editor, P.O. Box 691, Thorndale, PA 19372.

Steve Forest of Cincinnati, Ohio, writes in with some "various and sundries" as he calls them.

He's been hearing Libya in Arabic coming in crystal clear on 15415 kHz between 1200 and 1300 UTC. Steve recruited a professor who listened to the broadcasts to translate them. Steve says that at one point the professor told him 'I don't want to hear any more!'

Steve also says that Radio Cairo's signal is stronger than it has been in some time at 0200 UTC on 9475 kHz in parallel with 9675.

Finally, he closes with the comment, "With all due respect, who cares about RAI Italy. Honestly, if the announcers care about programming, they'd quit the station. Their phrasing makes Radio Tirana Albania sound like a Communist Top 40 rocker... which scores high Marx for format.. and playing all the Engels."

Totally ignoring those atrocious puns, RAI has always been the laughing stock of shortwave. Their short, nearly incoherent English broadcasts contribute litte more than frequency congestion, and their announcers are truly one of a kind. I've heard them yawn on the air and one time after reading the standard announcement encouraging people to write in to the station the lady commented, in her perpetually bored way, "Yes. Write in... But please. Not too often." So there!

One thing I always wondered about was why RAI, in their alleged music segments, seemed to start songs in the middle and more often times than not, abruptly end them whether they were over or not.

Now comes the answer. The music segments on RAI are simply picked up from another RAI network. When the news is over on shortwave, they simply turn on the other network. When it's time to sign off shortwave, they simply turn off the network. Some operation, eh? The sad thing is that their program booklet shows a really wide range of programs on Italian culture. Apparently though, it's in the Italian service only.

Bill Barnes, who says he's been picking up a copy of IR each month at a local electronics hobby store would like to know the whereabouts of two of his favorite columnists: Terry Staudt and Scott McClellan.

Both columnists will be making the transition from IR to Monitoring Times. Scott will have his monthly column -- although it's name has been changed from "Sounds from the Underground" to "The Outer Limits." And Terry Staudt, who developed a large and loyal following for his combination of folksy writing about the technical side of shortwave, will also remain with us, albeit on an every-other-month basis. Oh, and by the way, there's a hint of some really exciting pirate news in Scott's first column for MT. If you're a pirate fan, keep an eye on "The Outer Limits" for more information. I'd tell you what it is but I've been sworn to secrecy until August!

I'd like to take a moment to thank everyone who wrote to us, expressing their interest and encouragement in the merger of IR and MT. There have been times when we wondered if we had been wasting our time publishing a shortwave magazine, but these letters -- many truly moving -- showed us that our work was not only appreciated but enjoyed. And that, my friends, made it all worthwhile. Thanks again to all.

Steve Gaines of Perryville, Ohio, writes in to ask if the picture we published on page two of the April issue of International Radio was really that of Glenn Hauser. The answer is yes.

We'd be interested in any reports on the new international service of Radio Ivoirienne from the Ivory Coast. That new facility is operating between 1100-1200 and 1700-1800 UTC on 15350 kHz. Also announced have been 6015, 7215, 9620 and 11920 in parallel.

Mailbag...

Utilities

PRIVACY ACT AND MILITARY SECRETS

I want to commend you for your rapid and, I hope, effective work against the abomination known as the Communications Privacy Act of 1985. I've testified in federal court as an expert on the old law and I can tell you that it's bad, very bad; but the new one is even worse. (The old one is so badly written that most folks--including the Congress's own Office of Technology Assessment--rely on lay interpretations of its meaning rather than the words of the law itself.) I expect to be quoting both you and Don Schimmel on this in a future issue of my COMSEC LETTER.

On the negative side, I have to chastise you for repeating that CCS story about bugged worry beads. I'll believe it when I test the bugged beads.

Last but not least, you printed without comment a letter by Abe Lewkowicz in which he stated that revealing military communications to the public is a felony. Do you suppose you could find that law for me? I'd like to read up on it.

Keep up the good work. MT performs a valuable service and I always recommend it to my seminar participants.

James A. Ross
Ross Engineering
Adamstown, MD

(Revealing the contents of any private transmission not intended for general consumption is unlawful as stipulated by section 605 [and later 705] of the 1934 Communications Act. It may be treated as a misdemeanor or, in the case of malicious use of the information [such as to blackmail or alert criminals], may result in a fine and imprisonment.)

✦ ✦

Do you have an uneasy feeling that these vicious drug-smugglers are subscribers to Monitoring Times? I do.

I have thought, for a long time, that the Russian Embassy and the UN KGB spy cadre had several subscriptions, and cackled gleefully as they sent each issue back to Moscow.

How do you rationalize these deadly possibilities?

Robert E. Johnston
Seattle, WA

(I'm sure that vicious drug smugglers, Russian spies, the KGB, CIA,and even some perverts subscribe to MT. Nonetheless, we don't feel that a rationale is necessary. Nothing we have ever published in MT has compromised national security. I would imagine that the new Russian listening post atop a hill overlooking the Capitol learns more in a day of monitoring than an entire library of "The Best of MT" could provide...Bob)

FEEDBACK ON MT

OK Bob, here's my $12.00 for a year of *Monitoring Times*. I hope that the incorporation of the *International Radio* section does in no way diminish your fine UTILITY coverage, and the fascinating in-depth stories you have covered.

My only reason for never subscribing before may seem trivial to you, but here is my two cents: I simply do not care for the newspaper format! It is too hard to read, it comes apart and is less permanent than a nice stapled magazine:.. Could you not reduce the page size, and staple the publication? A magazine-sized monthly publication would be far more desirable, and I for one would pay a little more for a magazine sized publication! Presently I take Tom Kneitel's *PopCom*, and really enjoy it, but that one mag is just not enough. I wonder if anyone else has mentioned a desire for a magazine rather than a newspaper format? I know the cost would be a little higher, but those of us who like to keep the publications, and also who (like myself) are nearsighted would find such a change worthwhile.

Gary Bourgois
Marquette, MI

✦ ✦

I have subscribed to *MT* for about a year now and feel I must tell you why I will continue to do so in the future. I own a shortwave radio, a scanner, a C-64 computer, and a RTTY/CW interface. Every issue of *MT* gives me something new to listen for, or something to build, or something to buy. Your publication has renewed my interest in listening to my radios.

One of the first items I ordered was a shortwave program database by Ronald Pokatiloff as reported on page 24 of the September 1985 issue of *MT*. I don't usually buy software for my computer without reading reviews or trying it out first. For $15 I gambled and struck gold. Having the program schedules of over 25 shortwave stations and the frequencies of over 40 stations at my fingertips has opened up a whole new world of listening for me.

I have also purchased a scanner directory, built two new antennas, and participated in the Armed Forces Day radio exercise. I just received my two certificates in the mail.

I believe you have an excellent publication and would urge you to be very careful about making any changes. I look forward to every issue.

Ray Simonson
4510 SE Powell Valley
Gresham, OR 97030

(Thank you for the kind comments. We expect the only changes in MT to be a growth in size and comprehensiveness. As in the past, we will remain responsive to our readers' interests and requests. We value all of you and look forward to your continued comments--and criticisms...Bob)

EXPO '86 A SUCCESS

Having just recently returned from vacation to Expo 86, which is being held in Vancouver, British Columbia, Canada, now until October 13, I would like to say to all readers of *Monitoring Times* that if they have a chance to attend this event, please do; they won't be disappointed.

With more than 80 participants made up of over 40 nations, several states, provinces, territories and corporations, you will definitely capture a feel of the various cultures and lifestyles of the countries all together on one site.

The theme of Expo 86 is "World in Motion - World in Touch," which showcases the technology and history of transportation and communication of the various countries.

After seeing the many exhibits displayed, on the above theme, I believe that your readers, like myself, will want to pursue more time to listen to their shortwave receivers just to learn more about these foreign nations that have all come together for this World Exposition.

Barry Green
Glendive, Montana

(See list of Expo frequencies on page 19)

GULL ISLAND LOCATED

Ed Noll, on page 32 May 1986 *MT*, states he could not locate Little Gull Island; it is located to the east of Great Gull Island off the extreme end of the north fork of Long Island.

It's a Coast Guard controlled light house with access by permission only.

In 1981 the Radio Central Amateur Radio Club, using call of WA2UEC, obtained permission from the USCG to operate a mini expedition on the island.

Walter Lindgren
East Quogue, NY

SWL CONTESTS

Are there any contests that SWL's can enter similar to those available for hams which offer certificates? I think it would be interesting and would add something to *MT*. (Mike Day, Dayton,OH)

(While many of the clubs offer occasional contests, your point is well taken. MT is seriously considering contests and awards for utilities and broadcasting alike. We'll keep you advised!)

STOCK EXCHANGE

NOTE: Monitoring Times assumes no responsibility for misrepresented merchandise.

PERSONAL–SUBSCRIBER RATES: $.10 per word; NON-SUBSCRIBERS RATES: $.25 per word. All ads must be paid in advance. All merchandise must be non-commercial and radio-related. Ads for Stock Exchange must be received 45 days prior to the publication date.

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JOIN a radio listening club. Complete information on major North American clubs and sample newsletter $1.00. Association of North American Radio Clubs, P.O. Box 462, Northfield, MN 55057.

OSBORNE 1 COMPUTER, three disk drives with 1.5Mb total capacity, 64K ram, CP/M operating system, twelve-inch amber monitor, 1200/300 baud modem, all manuals and cables. Software includes Wordstar, Supercalc, Pearl, and many utilities. System works great, just add printer. Over $4000.00 invested (including upgrades) in the last three years, selling for $1200.00. Call John Praytor at 305/234-4617, 735 Camelia Lane, Vero Beach, FL 32963.

INFO-TECH M-200F RTTY/CW decoder, with manual, $200.00. INFO-TECH M-600 multi-mode RTTY/ ASCII/CW decoder with WMO selcals, $400.00. SANYO 9-inch green monitor, $50.00. Includes UPS. John Praytor, 735 Camelia Lane, Vero Beach, FL 32963 305/234-4617.

BEARCAT 210 scanner $85, HEATHKIT HD3030 terminal interface for $100. RTTY, Morse, like new. 302/738-5794, Gary Linwood, 6 Newbrook Rd., Newark, NE 19711.

BEARCAT 100XL - brand new, $195.00; BEARCAT 100 - Excellent condition, 8 months old, all accessories and original box included - $145.00; $300.00 takes them both. Tony Coiro, 66 Caryl Ave #3E, Yonkers, NY 10705. 914/964-9274 after 6 p.m. EST.

WANTED - RF generator for VHF/UHF with cal. output. Prefer Xistor unit. T. McLaughlin, P.O. Box 411, Mango, FL 34262

TRADE: MOTOROLA Pageboy II voice pager and charger with receive frequency of 158.775. Trade for any pager near frequency of 152.24. Will also trade for pocket scanner or what have you. Andrew Karvel, 372 St.Peter, #330, St. Paul, MN 55102, (612)292-9703.

WANTED: REGENCY M-400 "Touch" no acc., box, papers, etc. needed, cosmetics not important, but must be exc. working condition. Box 1239, Charleston, S.C. 29402 (803)723-5061.

BEARCAT 210-XL Programmable, Exc. condition $160.00 free shipping (803)723-5061.

For Sale: LAFAYETTE Tunable scanner (30 to 50 and 152-174 MHz bands) $30.00 postpaid. Bill Smith, RFD 238W3, Locust Street, Uxbridge, Mass. 01516.

Readers interested in forming an informal SWL/DX organization in the PHILADELPHIA area please contact: Alan Lees, 424 School House Lane, Devon, PA 19333.

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Information Please

Monitoring Times will print at no charge (as space permits) announcements and questions of a non-commercial service nature.

Can anyone identify the scanner produced in the early 1970's that had multicolored channel lights on the front? (Dennis Ruda, 42 Harryl Drive, Johnson City, NY 13790)

* * * * *

Clandestine broadcasting in Central America: Want bibliographic references and similar leads to be used in writing book on history of modern Central America. Will pay costs for copies, etc. In CA from September 1986 and could exchange info. David McCreery, History Dept., Georgia State U., Atlanta, GA 30303.

CLEARANCE SALE!

SIGNAL AMP - VHF/UHF antenna booster. Customer Harry McCabe says: *"You were right! Using a paper clip (!) for an antenna (and the Signal Amp) I heard the NOAA weather station 75 miles away loud and clear!"* While we don't recommend you use a paper clip for your antenna, the Signal Amp can make a difference in weak signal scanner reception.

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