



MONITORING TIMES

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WHO'S ON FIRST?

A Look At The Radio Spectrum

by
Patrick O'Connor
Plain Road
Hinsdale, NH 03451

PART I: LONG WAVE 0-500 kHz

As a person enters the hobby of DX'ing he often tunes his receiver at random, stopping to listen to whatever interests him. As time passes he soon realizes that he must become organized, learning where and when to tune for what he wants to listen to. Here, for the beginner as well as the more experienced DX'er looking for new challenges, is the first part in a series that will look at the radio spectrum from the bottom to the top, showing where various signals are located.

The long-wave range--sometimes referred to as "radio's basement"--occupies the first 500 kilohertz (kHz) of the spectrum. Basic allocations are:

- kHz:**
- 0- 25 Naval communications; time signals; "OMEGA" navigational system
 - 100 Navigational signals (LORAN-C)
 - 155-281 Broadcasting in Europe, Asia & Africa
 - 160-190 USAF "GWEN" system; 1750 meter license-free experimental band
 - 160-200 Coastal & ship stations

- 200-285 Morse code nondirectional beacons (NDB's) for air navigation
- 285-325 Coastal & ship stations
- 300-400 NDB's, some with FAA weather reports
- 325-415 Morse code NDB's
- 400-500 Ship-to-ship & ship-to-shore CW/RTTY signals
- 500 International calling & distress frequency (CW)

Now we'll take a closer look at the types of stations on this band.

BROADCAST:

155 to 281 kHz is used for AM(amplitude modulation) broadcasting in Europe, Asia and parts of Africa. Unlike conventional broadcast stations that use power outputs measured in thousands of watts (kilowatts), long-wave stations are very high powered, often running in the millions of watts (megawatts)--two megawatts is not uncommon. On occasion, these stations may be heard in the U.S.

UTILITY:

Many types of utility (non-broadcast) transmissions are heard on this band. The U.S. Navy uses the lowest part of the band to transmit messages to submerged submarines. Project ELF in Michigan transmits extremely slow-speed Morse code (taking up to five minutes to send one letter) on a frequency of 76 Hz (that isn't a misprint; they

do, indeed, use 76 hertz!). Also used for Naval communications are 14.1, 14.7, 18.6, and 24 kHz.

Time signals are transmitted on 16 kHz from England, 25 kHz in the USSR, 60 kHz in the U.S. and England, and several other frequencies including 75, 182, 412.5, 418, and 482 kHz.

The segment from 160-190 kHz is used by the Air Force for its Ground Wave Emergency Network (GWEN). It is also available to experimenters as a no-license band. There are severe restrictions in this service: ALL other services have priority; only Morse code (CW) is allowed; power output cannot exceed one watt; and the antenna, including feedline, must not exceed 15 feet in length.

From 200-285 kHz and from 300-415 kHz are found low-powered Morse code beacons used for close-in navigation to airports. These beacons transmit their continuous calls so slowly that even if you don't know the code, you can read off the letters as they are transmitted.

Most beacons in the U.S. just transmit their calls (between one and three letters), whereas Canadian beacons follow their letters with a long dash. Also, any beacon with the first letter "Y" or including a number is probably Canadian.

Between roughly 300 and 400 kHz are many beacon stations that transmit Federal Aviation Administration (FAA) weather reports by voice along with the Morse code identification. Morse-code-only beacons run powers of around 25-50

watts; the FAA weather stations usually have a power of 400-1000 watts.

The segments 160-200 kHz, 285-325 kHz and 400-500 kHz are used for ship-to-shore CW communications; it is in these segments that you are likely to hear "markers" from shore stations which allow other stations to tune into the correct frequency. The frequency 500 kHz is reserved for calling and distress use only; this is the most likely frequency to hear an SOS from a ship in trouble.

TUNING IN

There are certain advantages to DX'ing long wave: Since most signal propagation is by ground-wave, fading (QSB) is either non-existent or very slow (but deep); and there are hundreds of aerobeacons to listen for.

But there are also disadvantages: The band is extremely noisy with lots of atmospheric static making it hard at times to pull the low powered beacons out of the noise. Information on stations can be extremely hard to find at a reasonable price. One excellent publication that fits anyone's budget is the Beacon Guide and updates from Ken Stryker (6350 N. Hoyne St., Chicago, IL 60659). Send an SASE for further information.

What equipment will you need? First, a good, sensitive receiver with a BFO is a must. A long antenna is needed--the longer the better--and a good ground is recommended.

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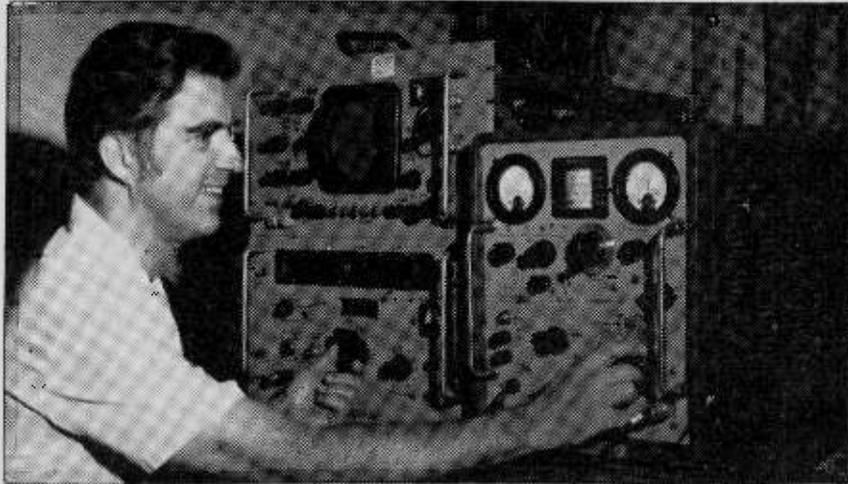
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Bob Grove.....Editor
 Judy Grove.....Publisher &
 Advertising Manager
 Rachel Thomas.....Production
 Mitzi McCoy.....Distribution
 Joan Fuller.....Subscription
 Services

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FROM THE EDITOR



Hamfests and Conventions

Summertime automatically sparks a glimmer in the eyes of many ham operators and other communications enthusiasts alike; it's the season for hamfests -- amateur radio conventions, flea markets and informational forums.

Whether you are licensed or not, hamfests are fun places to visit and can save you money if you are looking for equipment. The price competition can be fierce, especially at the larger gatherings where vendors frequently use the large crowds to turn over excess inventory to increase their cash flow.

The world's largest hamfest is the Dayton Hamvention, held this year (as it is every year) at the Hara Arena in Dayton, Ohio. Here, tens of thousands of inspired hobbyists and sellers alike convene the last weekend in April to match wits and swap prices.

Approximately 16 acres of flea market is an awesome spectacle, with row upon row of card tables and car trunks loaded with junk, good equipment and everything in between.

ANARC

As just about every SWL quickly learns, there is a wide array of clubs from which to choose the particular facet of your listening interest. To help coordinate their activities, an umbrella organization called the Association of North American Radio Clubs (ANARC) provides a variety of publi-

cations and services.

This summer (July 19-21) ANARC will hold its international convention at the Red Carpet Hotel in Milwaukee. Details will be found elsewhere in Monitoring Times this month and next.

ELECTRONICS MARKET SLUMP

It is no secret that consumer electronics is feeling severe repercussions from a sluggish economy. Many dealers are selling products barely above cost just to keep their cash flow moving, clearing out excess inventory.

While no one seems able to pinpoint the cause of the void in buying, there are many theories including oversaturation by the home video and computer industries.

With just so many consumer dollars to go around, those marketers with the best sales pitches attract the largest volume of customers. Very large corporations have been involved in a number of takeovers, multiplying their effectiveness in advertising. The little guy is hurting.

Additionally, the low prices of off-shore manufactured merchandise have discouraged domestic manufacture; Americans are simply not price-competitive in the Japanese electronic marketplace. Further discouraging the American dealer is the low markup necessary for him to be competitive with mail order



Viewpoint

For one who expounds the virtues of un-biased journalism, (Margolis) evidently does not practice what he preaches. First he states that he doesn't care and it doesn't matter why Demmitt is imprisoned. Two paragraphs later he slams Ron Coogan for not using good journalistic procedure and consulting the public record to bring John's crime to light.

This harangue became the central theme throughout his letter. Mr. Margolis' preoccupation with why John is a guest of the state is not the topic and casts a bias of its own on his motives for writing and his understanding of the situation that John is trying to oppose.

Honoring John and his lawyer's wishes not to publicize the details of John's crime pending further judicial actions speaks very highly of Ron's ethics as a journalistic reporter. I suggest that if Mr. Margolis is so incensed about not knowing why John is imprisoned, that he research the public record like the journalist that he aspires to be.

REMEMBER!

"S.A.S.E."

We at Monitoring Times constantly receive letters from readers which begin, "Please send me everything you have on..."

As much as we would like to help, we are not a public library service. Letters received with a Self-Addressed Stamped Envelope will be answered.

And as always, my telephone line is open for prepaid calls weekdays 1-5 pm Eastern (704-837-2216)..Bob

Inmates in the Pennsylvania correctional facilities are allowed a clock radio. Why not a SW receiver, too? Listening to SW sure beats Dan Rather and the 6 o'clock news (speaking of biased). I have to sympathize with John and his fear of being culturally deprived by relying on AM radio and TV for news and comments.

I personally think that most of us would not only be culturally deprived but demented if we had to rely on TV for enlightenment. Face it, CNN and PBS notwithstanding, the thousands of hours of TV programming per month are devoted to trash and violence. Just what a bunch of inmates need to watch while in prison, hours of megaviolence. Think about it.

As for the authorities that were never identified by Ron, they are a bunch of

specialists who work extremely close to the margin.

It would be nice to offer sage wisdom to reassure the venerable American electronics industry of quick recovery and economic turnaround; unfortunately, none appears to be on the horizon.



Judy, Bill and Bob Grove after a long day at the booth!



The Dayton Hamvention is renowned for its gigantic fleamarket.

FORUM

JOHN DEMMITT REPLIES

In all fairness to Monitoring Times and Ronald Coogan who wrote the article entitled, "Request Denied: The John Demmitt Case," I must take exception to the remarks made in the first two letters which appeared in the May "Viewpoint" column.

To Robert Margolis, I would like to remind you that Ronald Coogan simply wrote an article telling of one inmate's attempts to convince the prison authorities that shortwave receivers do not pose a threat to the security of the institution, but instead can provide a rehabilitative tool in education, culture, religion and entertainment.

The author did not list my crime, the name of the college I graduated from nor my brand of toothpaste because it simply was not germane to the subject he was writing about.

Perhaps you, in dwelling over an issue that wasn't relevant, missed the issue that some inmates in the United States are censored from listening to international radio stations because some authorities believe radios receive police calls.

I am very sorry if you feel that it is wrong for me to speak up when I see an injustice. I am just thankful that our founding fathers of America did not feel the way you do or we would still be under the rule of England.

It was most unfair of you to imply that in the event I was able to listen to shortwave, that I would listen to Radio Moscow. I personally prefer such stations as the BBC, D.W., RCI, R. Nederland, TWR, etc. I hope you are not alarmed if our tastes in programming are in agreement.

The assertion made by Mr. Margolis suggesting that I can hear and understand all the world news and events by listening to a

five-minute radio and a 30-minute TV newscast filled with commercials is not very astute as any serious short-wave listener knows. When there is a world situation in progress, what better way is there to understand what is happening than by tuning to the countries responsible, listening to their views expressed in their news and commentaries?

As for the person who did not want his name used and claims he has a letter from my warden saying that I am not in jail, I wish that was true! A great many people in the shortwave community will confirm that there is, indeed, a John Demmitt and will tell you my QTH.

To both gentlemen I would like to make one last remark. Although I do not agree with what you had to say, I do respect your right to say what is on your mind and I admire Bob Grove for printing your views in spite of the fact that he knew some of your statements were not true. He allowed you the freedom to express yourselves. All I'm asking for is the freedom to be able to listen to international broadcasting stations. I don't feel my mind should be imprisoned as well as my body.

From the many supportive letters that have been arriving, I am happy to say that most of the MT readers agree with me. I am very thankful for your support and wish to take this time to thank all of the MT readers who have been sending these letters of support to the Pennsylvania officials and myself as well.

For those wishing to know more, including the above mentioned gentlemen, I am including my address so you will be able to write me directly. I will respond to all letters.

Sincerely,
John H. Demmitt
Box A K0848
Bellefonte, PA 16823

VIEWPOINT cont'd

faceless bureaucrats who control the state Department of Corrections. They try to thwart and evade the issue by using absurd and stupid excuses as to how an inmate could use this evil black box (SW receiver) to escape.

Only by forcing the issue of an inmate being able to have a SW receiver will the problem be

resolved. After all, isn't that the basis of our democracy? If we don't like a law or statute, do we not have the right to campaign to have it repealed or modified?

I stand firmly behind John's cause to obtain and use a SW receiver in prison. I have even written several letters to lawmakers on his behalf. I urge anyone interested in helping John over-

turn the ruling regarding SW receivers to contact Ron Coogan for the names and addresses of legislators in Pennsylvania (and other states for that matter) and write, write, write.

I feel that Ron did an outstanding job of presenting the facts on a very emotionally charged subject. Keep up the good work.

Rich Arland,
WPE7BYR/K7YHA

>>>><<<<

*In regards to the VHF spectrum, perhaps we all ought to petition the FCC to CEASE issuing any NEW VHF television licenses, and require that by, say, 1994, all VHF licenses be terminated, and all stations to re-locate to UHF. As you pointed out, wasting 6 MHz on the likes of Family Feud seems weird. This will then free up all of the present allocations for land mobile, fixed point to point, marine and aviation requirements (not to mention some more amateur assignments!). Since most of the television stations now on VHF are using old equipment, there should be little problem with the cry of "What will we do with our transmitter?". Probably the most significant problem will be the need to change stationery and logos!

*Hank Bennett missed the bus on his May article. Under NO circumstances should we encourage quasi-pirate stations. There is a provision in Part 15 of the Communications Act that allows for low power (100 mW) transmitters, provided they (a) do not cause interference to any licensed operation, and (b) use an antenna and feedline totaling no more than 50 feet. While this will not get you into every house in the U.S.A., it is LEGAL. The programming can be up to you.

*A little note for you intrigue folks; ever listen REAL CLOSE to the Standard Time Frequencies, such as 10.0000 or 15.0000 MHz? Ever hear a SSB Conversation under the time ticks? That is a good place to look for SHORT RANGE comms of those wishing to remain unknown. Give it a listen.

(Name withheld by request)

>>>><<<<

In Vol.4-No.3, Michael Schaay has a nice article. However, one point in particular I must clarify for him. The symbols he appends to OBS+? SVC+? and so on are superfluous. He should explain that in SITOR operations the "+?" transfers keyboard (sending) control between stations. Sure, it prints out +? but it shouldn't go unexplained.

When the +? sequence is detected in a SITOR message circuit it disables the previous sender's keyboard and enables the other keyboard. This sure keeps both from sending at once!

"Old Sparky" Bill Edwards
REO U.S. Merchant Marine

>>>><<<<

Being an amateur photographer, I've been taking pics of TVs for a few years (wherever the Navy or vacation happened to send me), and the best condensed booklet I've found was (is?) put out by Eastman Kodak Co., 343 State Street, Rochester, NY 14650 and is titled "Photographing Television Images."

In the late '70s/early '80s, the price was 75¢ so would be best to send a card/ltr to check on availability/price. The booklet covers taking pics of B&W and color screens by both 35mm and instamatic-type cameras, so would be of use to most persons w/a camera. The pubs cat number was "AC-10," but may have changed.

Hope this info helps fellow DXers.

Mike Hardester,
Modesto, CA

>>>><<<<

A comment on the April '85 issue: I'm very glad to see a column on aircraft monitoring. Aviation seems to have frequently been the forgotten step-child of monitoring and I'm glad to see it given the coverage I feel it deserves. I'm an active pilot who keeps a scanner on in the shack when not flying. The first column was interesting and I look forward to continued good reading.

John Knight, K5HGX
Dallas, TX

>>>><<<<

In the April article "Plane Talk" the author gave sound advice saying not to rush out and buy an expensive aircraft band receiver. I live close to the world's busiest airport (O'Hare) and have monitored the aircraft frequencies on and off for years. It is my opinion that with the possible exception of listening to beacons, no band could be more boring.

Aircraft communications are dull, terse instructions about changing altitude, OK to use a certain runway, clear to land and take off, a little brief weather info, flight identification numbers, etc. No excitement, no humor, no idea where the plane is coming from or going. In a word, nothing to hold a monitor's interest.

Ken Greenberg
Skokie, IL



WHO'S ON FIRST? cont'd

Nighttime is the best time to listen. On occasion, daytime listening may bring in nearby beacons normally inaudible at night. The best time to listen for European and African broadcasters is around your local sunset; try for Asian/Pacific stations near your local sunrise.

Beacons may be heard all night; it is quite possible to log upwards of 100 as the night progresses. Long wave is a colder-weather band; summer thunderstorms produce loads of static, rendering the band almost useless.

VERIFYING YOUR CATCH

Most broadcasters will verify a good, accurate report. You might have some problems making up a good report, as almost all LW broadcasts are in the native languages of the countries where the transmitter is located. To even up matters, most stations will accept reports written in English.

Most government-operated stations don't require reply postage, but those that are privately-owned (like Monaco on 218 kHz) do; for these include either mint stamps of that country, or 2-3 International Reply Coupons (IRC's).

Most coastal and beacon stations will also verify, but you should include a prepared form card (PFC) with your report, including date/ time/ frequency of reception, and leaving space for the station to add power and antenna type, and the signature of the person verifying the report. ALWAYS include return postage with reports to coastal and beacon stations!

When you report to a utility station, you may report the call(s) of the station involved, but NEVER report the contents of the message! THIS IS A VIOLATION OF FEDERAL LAW and may land you in really serious trouble! You can listen to your heart's content, but don't repeat what you have heard. Instead, report either on the "marker" transmission, or just note the calls of the stations involved and the times of transmissions.

Addresses can be tough to come by. Most U.S. aero-beacons can be reached by addressing your report to FAA Communications Manager, c/o the airport involved. Weather stations usually announce their locations ("This is Elmira Radio" from Elmira, NY, for example). Broadcaster addresses can be

found in the World Radio-TV Handbook. Other utility addresses are very hard to acquire unless you are willing to shell out the big bucks required for ITU (International Telecommunications Union) publications; but even these are sometimes inaccurate or incomplete!

Several radio clubs with utility coverage have some listings of LW stations heard. Some also carry on occasion addresses of utility stations. There is a club exclusively for LW DX'ers - the Longwave Club of America (45 Wildflower Rd., Levittown, PA 19057), which publishes a monthly bulletin call "The Lowdown." For a sample copy and membership information, send \$1 to the address above.

Long wave may not be the easiest band to DX, but for those who seek unusual or low-power listening targets, this is the band to try. Give it a shot if you have the equipment--it can be fun!

IT'S HAMFEST TIME!

by Ed Soomre

It's that time of the year again--the ham radio and electronic flea markets. This is where you can find every type of electronic device, old and new. And if you think it's for hams only, you're in for a surprise!

These flea markets, sponsored by amateur radio clubs and associations, are for anyone interested in electronics including the SWL and scanner enthusiast. Most charge a small fee to get in or a rental fee for an area or table to sell equipment.

You don't need to be a ham to buy or sell, and it's a great place to look for a scanner, HF receiver, home computer, antenna, CB radio, antique radios and parts, and other items. Don't let the fact that you are not a ham stop you--I never did.

As a listener, you will probably be looking for scanners and HF receivers; you can get a really good deal on them, especially if you are not looking for the latest models available. The choice of equipment available goes from 1950 era receivers to the latest synthesized digital display

New VOA Transmitter Poses A Real Hazard To Health

A recent item appearing in Newsweek has raised more than a few eyebrows. It seems that the new \$150 million dollar VOA transmitter to be constructed in Israel could put out signals strong enough to detonate the electronic fuses of bombs and other explosives at nearby ammunition dumps!

A search is now underway for a relocation site, possibly in the Negev Desert, sparsely populated and quite remote from the troublesome dumps.

units. You will, of course, find ham transceivers there, too, obviously at a greater price than receivers. But stick with the general coverage HF receiver; many hams will not sell HF transceivers to someone without a ham license anyway.

For the VHF/UHF listeners there are scanners (synthesized and crystal), tunable receivers, multi and single position crystal receivers, and many commercial two-way radios (some converted to ham radio bands, others not).

Stick with the scanner and crystal receiver type radios. The commercial two-way equipment is excellent for receiving, but in many cases requires modification and maintenance by qualified technical experts. And remember, the older it is the more difficult it will be to locate replacement parts.

Many accessories for HF and VHF/UHF monitoring are available at a bargain such as preamplifiers, filters, converters, and CW/RTTY readers to name a few. Don't forget about antennas, too. Antennas and parts are available at great prices, a fraction of the cost of new ones.

One nice thing about the listening hobby is that you can use ham radio antennas and commercial two-way radio antennas for high performance monitoring; just be sure it works on the frequencies and bands you want to listen to.

Prices are always negotiable, so bargain a bit about the cost. Many sellers enjoy haggling and will usually come to an agreeable price. If they list prices on the equipment, it is usually the highest price they want. While you can usually check out a piece of equipment by looking at it, you should try it out whenever possible before buying

it.

Most ham radio flea markets have some AC power available nearby to test equipment. So if you are interested, don't hesitate to ask to hear the unit and operate the controls.

Most hams are getting rid of equipment to make room (and money) for newer items in their stations. They will usually tell you of any problems with the equipment and will adjust the price to compensate for it. In my experience, most hams are honest and not out to swindle the buyer. Many will provide a guarantee (I always do), so if you don't like the equipment when you try it out at home, you can return it (within a few days) for a refund.

A FEW TIPS:

- * Take a friend with you who knows about the hobby, too. It's great to have someone to help you check out equipment, bargain and talk to.
- * When arriving at the ham radio flea market, walk around making a fast sweep of the entire area. Look specifically for items you need. Then walk around again, looking at equipment in more detail.
- * Let the seller know you are interested in a piece of equipment. Many times I have gone back to look at equipment again. If you stay to the end of the day--and the equipment is still unsold--you can often get a good deal while the seller is packing up.
- * Physically check over the equipment carefully. Be sure it is complete. Try it out if possible.
- * Don't let the seller talk you into anything you don't need (this does not happen too often.)
- * Negotiate about the price; it's your money. Some hams will not take personal checks, so try to have cash with you. You can often bargain better with cash.
- * Ask for the seller's name, address, and telephone number so you can contact him if you have problems with the equipment.
- * Check around and under tables; many items are placed there because of space limitations.
- * Most of all, have a good time!!

SWLing THE HAM BANDS: 1.8 to 29.7 MHz

by Mike Kerschner N3IK
RD 1 Box 181 A
Kunkletown, PA 18058

In more than 30 years as a radio amateur I have received fewer than a dozen SWL cards from listeners in the U.S.A, but have received hundreds from SWL's overseas. A few years ago I began to question every SWL I could find as to why they did not listen to the ham bands. I received four major answers--they are:

1. Hams don't QSL
2. I can't copy code.
3. Too much QRM (interference) on the ham bands
4. Hams are not interesting to listen to.

I will respond to the above answers, then I will tell you what to expect from each of the high frequency ham bands.

"Hams don't QSL"

Some hams, like some SWBC stations, don't QSL, but the majority do. Remember: a QSL will cost at least 35 cents to send and many amateurs are on a fixed budget and there are some amateurs who don't care about SWL reports or, for that matter, about receiving QSL cards from the stations they work. But the large majority of hams want to encourage the SWL and will send a card.

There are some methods you can use to increase your chance of getting a response from an amateur station and I will discuss this later.

"I can't copy code"

OK, don't listen to the code portion of the ham bands. About 65% of all amateur HF activity is on SSB, AM, RTTY and SSTY. Most SWLs tune the phone portions of the band, but with home computers and an interface many listeners can monitor the RRTY and code portions as well.

"There is too much QRM on the ham bands"

There are a lot of stations on the ham bands but, on the average, you should be able to copy about 85% of what you hear without any trouble. If your receiver lacks selectivity the addition of a simple audio filter may work wonders when it comes to separating stations.

"Hams are not interesting to listen to"

This one blew me away, so I spent some time tuning

the bands as an average SWL would. I must say there is a lot of "your sig is--" "rig is--" "thanks and 73" going on and they are boring to most folks (including me), but there are many, many interesting contacts taking place.

For instance the guy who just built a hang glider and flew it for the first time that day--or the family that just came back from ice fishing with a bucket of perch (which the XYL was cleaning). There are the traffic nets where messages are passed and weather nets as well as the usual DX activities.

Now let's take a close look at the high frequency amateur bands and see what can be expected from each one and how the listener can get the most enjoyment from them.

160 Meters (1800-2000 kHz)

"Top Band" as 160 is frequently called is the lowest licensable ham band; it is in the medium frequency portion of the radio spectrum. Being located just above the standard broadcast band, it behaves much the same way with reliable daytime ranges of 50 to 100 miles widening to several hundred or a thousand miles at night.

From autumn till late spring it is possible to work halfway around the earth under favorable conditions. We are at the low end of the present sunspot cycle and DX conditions on 160 will be excellent for several years.

Amateurs are allowed to use phone or CW (continuous wave--Morse code) anywhere in the 160 meter band (and other bands as well). There are several gentlemen's agreements in effect on 160 to avoid problems arising from phone and CW signals trying to occupy the same frequencies. From 1800 to 1820 you will normally find CW operation; phone operation usually commences above 1835 with the segment from 1820 to 1835 reserved for DX stations to call in.

Normal contacts on 160 tend to be chatty and relaxed; a casual listener might think all the operators know one another on a personal basis (many do). Two contests each year turn 160 into something of a madhouse, but they are good times to log that rare state or DX station.

INVENTORY SALE!

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ALL SALES FINAL --CHECK OR MONEY ORDER ONLY! NO CHARGES
See Grove catalog for full description of products.

MOBILE SCANNER ANTENNA

Reg. \$29
NOW \$22 - free UPS
Order ANT6

A superior wide-coverage scanner antenna features rugged magnetic mount for reliable anchoring without drilling holes, yet easily removable for security. UHF element is a 3.5 dB gain collinear for maximum distance.

FREQUENCY COVERAGE -
25-54, 118-174, 406-512 MHz.
VSWR better than 1.5:1 at all
midbands IMPEDANCE 50ohms
(nom.). LENGTH 38" heavy-duty
stainless. CABLE 17' RG-58/U
with Motorola plug. MOUNT
Heavy duty 6-pole magnet with
no-scratch vinyl pad

Mount anywhere--roof top, trunk lid, fender cowl for outstanding mobile reception.



Profusely illustrated--transmitters, receivers, test equipment, antennas and transmission lines, the radio spectrum and listening techniques. Charts of CW and RTTY "Q" and "Z" signals and prosigns, sources of materials and even a glossary of common terms. 344 pages. Order BOK 16 Reg. \$14.95 \$11.95, free bookrate shipping.

FCC FREQUENCY MASTER FILE (1984)

(a few broken sets available - no more than 7 cards missing on FCH 11-17; FCH10 has some states AL-IA missing)

| Stock # | Frequency | Reg. Price | Sale | Broken Set |
|---------|--------------|------------|--------|------------|
| FCH10 | State Index | \$15 | \$10 | \$5 |
| FCH11 | 1 HZ-30MHz | \$10 | \$3.50 | |
| FCH12 | 30-150.8MHz | \$15 | \$5 | \$4 |
| FCH13 | 150.8-216MHz | \$35 | \$30 | \$15 |
| FCH14 | 450-806MHz | \$50 | out | \$25 |
| FCH15 | 806-960MHz | \$35 | \$10 | |
| FCH16 | 960MHz & up | \$50 | \$20 | \$15 |
| FCH17 | 1HZ-100GHz | \$150 | \$75 | \$50 |

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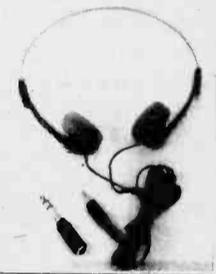
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WHO'S ON FIRST? cont'd

Most activity takes place during the cooler months of the year because summertime brings high static levels and decreasing DX. 160 is a night owl band with enjoyable QSOs (contacts) going on into the wee hours.

80 Meters (3500-4000 kHz)

Expect to hear signals to 200 miles in daylight and 1500 at night. Presently conditions on 80 are excellent for DX and hearing all continents on a single weekend of listening is not impossible. 80 is a very popular band for traffic handling networks and "rag chew" type QSOs.

80 meters is subdivided into CW, RTTY, SSTV and

phone segments. There are also gentlemen's agreements on 80 for low power (QRP) operation. 3500 to 3750 kHz is exclusively CW and RTTY; 3700 to 3750 is set aside for slow speed Novice use (an excellent place to practice your code). Low power operation can be found at 3560 kHz and 3690 kHz. If you hear a low power station and send a report you are almost certain to receive a QSL.

Most DX CW activity is found between 3500 and 3535, while phone (including DX) can be found from 3750 to 4000 (often referred to as 75 meters). Slow Scan TV will also be heard from 3750 to 4000 as well as a smattering of AM.

There are many nets operating on 80. Some of

them handle traffic; others are for operators looking for new states and countries, counties or rag chew nets as well as civil defense and emergency communications. This is another night time band and QRM can become a problem at times due to the extreme popularity of 80 meters. Summer static is also a problem on 80 but not as severe as on 160.

40 Meters (7000-7300 kHz)

This band is a transition area between local and DX coverage. Normal daytime range will be over 300 miles and frequently overseas stations can be heard during daylight hours, but DX is more likely heard beginning just after sunset to shortly after sunrise.

Summer static is not as bad on 40 as it is on the lower bands, but still affects band usage at times. 40 is very popular and many amateurs work this band exclusively. Signals propagate over long distances and the antennas are short enough to erect on the average lot.

One problem with 40 meters is SWBC (short wave broadcast) QRM since the band is shared with broadcast stations (outside the U.S.A.) and 7080 to 7125 can be a hassle at times. 40 meters is also divided into segments: from 7000 to 7300 CW is allowed; phone occupies 7075 to 7300 with SSTV permitted from 7150 to 7300 and RTTY from 7000 to 7150; Novice operation is permitted from 7075 to 7125, and QRP operation will be found on 7040 and 7090. From 7000 to 7040 you will find most CW DX stations: look for phone DX from 7050 to 7150.

You will find some regional networks on 40 with the popular mobile nets being active on this band; you will hear mobile stations from coast to coast and county hunters as well. 40 is generally not as chatty a type of band as the lower frequencies but some rag chewing does go on.

This is a fairly difficult band for the beginner to tune; it is quite crowded at night with stations moving around a lot trying to get away from broadcast QRM.

30 Meters (10100-10150 kHz)

This is the newest ham band, created by WARC (the World Administrative Radio Conference in Geneva) in 1979. Due to the narrow band only CW and RTTY modes are ALLOWED: the IARU (International Amateur Radio Union) has decided that no contacts on this band will be allowed for award credit and contests will not be permitted on 30 meters.

This is a rag chewer's band because you will not have a wolf pack chasing the DX station as is customary on the other bands. Range of 500 miles is common during daylight.

20 Meters (14000-14350 kHz)

The King of the DX bands, 20 meters, is almost always open to some part of the world, although recent decline in sunspot activity does shut down 20 some evenings. This band is a DXers dream; antennas need not be large and long distance can be worked with modest power.

During a DX contest it is easy from hams to work all continents and 100

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WHO'S ON FIRST? cont'd

countries or more in a single weekend. Competition can be rough with many stations trying to work the same DX station. Contacts on this band are normally brief, although it is possible to spend an enjoyable half hour or more chatting with a station thousands of miles distant.

CW is normally found from 14000 to 14100 and RTTY from 14090 to 14150. DX phone is found from 14100 to 14350 with most DX concentrating in the area of 14100 to 14200. SSTV is between 14150 to 14350.

Low power operation on this band may be found at 14060 CW and 14185 phone. CW will be at 15 wpm or higher, so here is where the code readers come in handy!

15 Meters (21000-21450 kHz)

This daytime DX band closes down at night. Under present sunspot conditions the band is seldom open for DX more than one or two days a week, and then only to South America and sometimes in early afternoons for a short time to Europe.

CW is normally found from 21000 to 21200; phone is from 21200 to 21450, with the DX portion runs from 21150 to 21450. At 21100 to 21200 is the 15 meter Novice CW band with most stations sending at speeds of 5 to 15 wpm. This is a good spot to nail down some CW DX stations!

Low power CW operation may be heard on 21060 and QRP SSB on 21185.

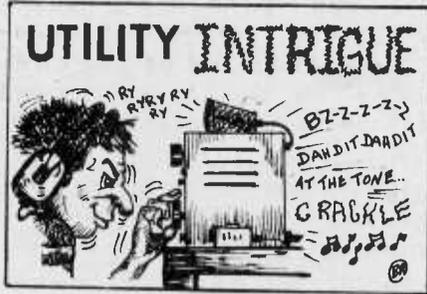
10 Meters (28000-29700 kHz)

Bordering on the VHF portion of the radio spectrum, 10 meters is affected by both HF and VHF type propagation modes. When the sunspots smile on us old ten meters comes to life and a converted CB rig at five watts will work halfway around the world on a whip.

Normally, 10 meters is a daylight band and is not too active at present. A national NBFM (narrow band frequency modulation) calling frequency of 29.6 MHz and many beacons (see next month's conclusion) make this band easy to check on.

Activity is mostly heard from 28000 to 28300 and a Novice CW band extends from 28100 to 28200. DX phone is from 28300 to 29700, with 29000 to 29700 often used for NBFM.

Want to hear a spacecraft? You can on ten meters. Listen between 29300 and 29500 and sooner or later you will hear hams talking to each other via



by
Don Schimmel
516 Kingsley Rd SW
Vienna, VA 22180

MT reader Richard Baumgart recently informed me of an activity he observed on 6513 kHz USB--a repeating loop tape in Spanish which, at one time, carried an announcement of LPL Argentina. I have looked for this station on numerous occasions but have not heard anything to date.

In looking through my various identification publications, I do find that LPL30, General Pacheco Radio, Argentina, has a listing for 6512.6 kHz, so this might be the same activity as that heard by reader Baumgart.

I have added another KENWOOD R-2000 receiver to the UTILITY INTRIGUE monitoring position. I find the R-2000 convenient with its frequency memory feature which facilitates periodic checking of interesting frequencies.

I also installed additional antenna tuner/preamp units to enable me to have a greater variety of antenna/receiver combinations available. Some modification of my equipment layout has been made so as to enhance the operating efficiency.

Included has been the

the USSR's RS satellites. These spacecraft were designed for amateur radio communications and experimentation.

Beacons send ID and vital information about the spacecraft to earth; you can hear these beacons on 29330, 29340, 29410, 29450, 29460 and 29500. The beacon will alert you as to when the satellite is within range; you can then tune through the passband of the transponder and hear amateurs all over the globe communicating through the satellite.

These guys want to hear from you and most are only too happy to send a QSL to anyone reporting their signal. The ARRL can provide full info as to when the satellites can be heard; check QST magazine or write ARRL for info.

NEXT MONTH: Getting the QSL and monitoring the amateur beacons

incorporation of a console RTTY printer; I can now obtain hard copy of RTTY transmissions in addition to the video monitor read-out. This permits me to be listening to another type signal at the same time I am obtaining copy of a RTTY signal.

Having the hard copy available for later study has made it possible to make a number of identifications I otherwise probably would have missed with just the screen print-out.

I must sympathize with MT reader Suarez (VIEWPOINT April 1985). It is unfortunate, but nevertheless true, that there are many languages with numerous words having a variety of meanings and not all of the specialized definitions are to be found in a general type dictionary.

I do not know when the word INTERCEPTS (meaning material or items copied during a monitoring period) was first used in that manner. I suspect, however, it, as well as the other forms INTERCEPT, INTERCEPTED, INTERCEPTING and INTERCEPTION, all date back to the early 1940s and possibly back to the WW I period or even before. I do know that the terms have been in use in the U.S. military services for a long time.

Radio Havana has been

noted with frequent testing with ITT New York so this may mean that some additional commercial links are going to be brought into use. A recent test took place on 16135.8 kHz 24 March at 1502Z. The transmission was RTTY at 50 baud.

Unusual looking groups were found on 22307.7 kHz 6 March at 1953Z. The mode was CW and the message resembled the classic dictionary type code, for example: AAA, 8/1, AAA, 6/3, AAA, 8/80, AAA, etc. Although I have searched for this activity frequently, I have not relocated it.

For several weeks now I have been following the RTTY activity on 10021, 10031 and 10041 kHz. The transmissions have been copied during two periods (although there may be other skeds as well) 1400Z and 2300Z. Callsigns are LFL combinations and per the Spanish PT messages it would appear that this is a Peruvian naval network. A CW link on 6856 kHz which was noted at 0300Z seems to be related to the same organization.

Here is a strange network I have not yet been able to identify. The CW (possibly some voice) stations operate in the 11310-11360 kHz range and have been heard at various intervals during 1800-2100Z. The transmitters for the most

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UTILITY INTRIGUE cont'd

part have a raspy tonal quality and tend to drift somewhat.

Operator chatter is in broken English and the traffic consists of 4F groups. Callsigns/addressee indicators are of the LLL type and, in view of the quantity of these, there must be quite a few stations within the network.

Lengthy RTTY testing was noticed on 13529 kHz on 21 March at 1811 Z when RBK-75/RWZ-72/RWW-73 callsigns were observed with an RY tape. I have continued to check for this Soviet transmission but have not come across this testing again.

RTTY Arabic text was copied on 18263.4 kHz on 24

March at 1417Z. A sample of such traffic is presented for identification purposes: TXCIKU VMT? OMYT, DAC! OYKC; VCJTR VFWO-----VNYT VYFNX; BAMETNQ etc., etc. In Arabic printer traffic many words commence with letters V, T or B. Another clue is the word endings of ! and ?.

M-600A OPERATING HINT

I have discovered one drawback to the INFO TECH M-600 demodulator. On strong signals you can obtain good copy at any one of the shift settings, thus you can be misled into thinking the shift is something other than what it really is. I plan to overcome this through use of a tuning scope. The M-600 is still a great demodulator!

| LOGGED APRIL 1985 | | |
|-------------------|--------|---|
| KHZ | DTOI | MODE/IDENTIFICATION/COMMENTS |
| 4304.5 | 040408 | CW/DE CTV-CTU4-28/MONSANTO NAVAL RADIO, PORTUGAL. |
| 4780 | 130126 | CW/NO CALLS/5L GRPS, 6 GRPS IN MSG |
| 5458.9 | 040344 | RTTY 75-850/PRESS IN ENGLISH |
| 6097 | 041426 | CW/NO CALLS/GRPS OF 5 CHARACS, LTRS A-Z PLUS MW(SPANISH NYEH) & FIGS 2,3,8. |
| 6281.7 | 071216 | CW/NO CALLS/5L GRPS, BAD SPACING |
| 6292.5 | 071220 | CW/NO CALLS/COAST GUARD TFC |
| 6325.7 | 071228 | CW/DE WNU32(SLIDELL, LA) |
| 6491 | 092219 | CW/DE VCS(CANADIAN COAST GUARD, HALIFAX) |
| 6515 | 061309 | CW/KCU DE AUL/5L GRPS |
| 6603.8 | 061300 | VOICE USB/GANDER RDO/WX IN ENGLISH |
| 6856.7 | 040302 | CW/PBW DE GCO(POSS PERUVIAN NAVY) PT SPANISH MSGS, SEE 10021.1 KHZ ENTRY. |
| 8129.2 | 041716 | RTTY 75-850/CODED WX |
| 10021.1 | 041420 | RTTY 50-170/CS ARE LFL COMBINATIONS/ BASED ON PT SPANISH MSGS THIS ACTIVITY IS PERUVIAN NAVY. |
| 10031.2 | 022346 | RTTY 50-170/LFL CALLS/POSS PERU NAVY. |
| 10044.4 | 032334 | RTTY 75-850/DE BZQ67 (CHINESE ALLOC) |
| 10046.5 | 032350 | CW/NO CALLS/5L GRPS |
| 10051 | 022352 | VOICE USB/WX IN ENGLISH |
| 10324.8 | 061254 | CW/NO CALLS/5L GRPS, SPEC CHARAC AA IM OE OT. |
| 10405.7 | 040328 | RTTY 50-170/DE 6VU(DAKAR, SENEGAL) RY'S |
| 10878.4 | 031759 | RTTY 50-850/PRENSA LATINA(CUBAN NEWS SVC) PRESS IN ENGLISH. |
| 12948.2 | 031151 | CW/DE WKM(UNIDEN US STN) |
| 12952.4 | 021716 | CW/DE WMH (BALTIMORE, MD) CALL TAPE |
| 13175.3 | 021931 | VOICE USB/CONVERSATION IN SPANISH |
| 13216 | 081954 | CW/EM DE ØA(? FROM ?)THIS ACTIVITY HAS BEEN HRD FREQUENTLY IN PAST ON MANY FREQS. |
| 13289 | 071205 | CW/V V V CQ 51 5 AAA 464 (??)UNIDEN. |
| 13365.5 | 040005 | RTTY 50-850/DE 5YD (NAIROBI, KENYA) RY'S |
| 13369.7 | 031153 | RTTY 75-850/DE NBA (US NAVY BALBOA, CZ) |
| 13371.7 | 020016 | VOICE USB/CONVERSATION IN PORTUGUESE. |
| 13374.8 | 061251 | VOICE USB/STN IN BERLIN, GDR/XMSN FOR FREQ ADJUSTMENT PURPOSES. |
| 13388.6 | 071259 | RTTY 50-425/EMBACUBA FROM HAVANA(CUBAN EMBASSY GUYANA) |
| 13399 | 041218 | RTTY 50-850/POSS BULGARIAN PRESS SVC, PRESS ITEMS IN ENGLISH. |
| 13401.5 | 032108 | RTTY 50-170/NO CALLS/TFC APPEARS BE ARGENTINE BANKING RELATED. SPANISH PT, QUOTES ON CURRENCIES OF THE WORLD. |
| 13403.9 | 131337 | RTTY 50-170/UJY-2 DE CLN-78 (KALININGRAD USSR FROM HAVANA CUBA) RY'S. |
| 13420 | 111714 | CW/DE CUA48-69 CUI22-24 (LISBON, PORTGL) |
| 13423 | 111725 | CW/NO CALLS/5F GRPS, SLOW, BAD ECHO. |
| 13529.2 | 051904 | RTTY 50-425/CODED WX |
| 13623.1 | 021747 | RTTY 75-850/CODED WX |
| 13631.1 | 020009 | RTTY 50-170/KB DE BN (??) 5L GRPS |
| 13893.9 | 081950 | RTTY 50-425/PRENSA LATINA (CUBAN NEWS SVC) PRESS ITEMS IN ENGLISH. |
| 13966.8 | 022116 | CW/NO CALLS/PORTUGUESE PT MSGS |

| KHZ | DTOI | MODE/IDENTIFICATION/COMMENTS |
|---------|--------|---|
| 13996.9 | 031912 | RTTY 50-850/APPEARS BE FRENCH LANGUAGE PRESS ITEMS. |
| 14418.9 | 072122 | RTTY 50-170/NO CALLS/5F GRPS, SHIFT TO CW FOR REPEATING MISSED GROUPS. |
| 14428.4 | 030007 | VOICE AM/SPANISH FEMALE, 5F GRPS, DOWN WITH FINALE, FINALE. VERY BAD AUDIO. |
| 14449.7 | 072142 | VOICE USB/CONVERSATION IN SPANISH |
| 14458.7 | 041215 | RTTY 50-850/APPEARS BE PRESS ITEMS IN GERMAN LANGUAGE. |
| 14496.6 | 030001 | RTTY 50-850/UNIDEN STN SENDS LAPAZ RY'S (APPARENTLY IS BOLIVIAN STN) |
| 14568.4 | 071239 | FSK CW/QRA Y7A58 Y7A76 (BERLIN, GDR) |
| 14618 | 041409 | RTTY 50-850/PRESS ITEMS IN GERMAN LANG. |
| 14851.6 | 081917 | RTTY 75-850/CODED WX |
| 14886 | 120125 | CW/NO CALLS/5L GRPS, 6 GRPS TO MSG. |
| 14926.9 | 081930 | RTTY 50-425/PRENSA LATINA (CUBAN NEWS SVC) PRESS ITEMS IN ENGLISH. |
| 15823.6 | 081938 | CW/QRA DE WFI77 WFK50 WFL35 WFK39 WFN23 (ASSOCIATED PRESS STNS NEW YORK) |
| 16192.7 | 081943 | RTTY 75-425/DE NBA (BALBOA, PANAMA) RY'S |
| 16201.5 | 071239 | CW/NO CALLS/5L GRPS, 6 GRPS TO MSG |
| 16395.4 | 041407 | RTTY 50-850/PRESS ITEMS IN FRENCH |
| 17165 | 021918 | CW/NO CALLS/SPANISH PT MSGS, PER MSG HEADING APPEARS BE CUBAN COMMERCIAL NET. |
| 17336.1 | 061242 | VOICE USB/CONVERSATION IN GERMAN |
| 18142 | 031804 | UNUSUAL TONES/NO CALLS |
| 18419.3 | 122114 | RTTY 50-425/BUENOS AIRES COMMUNICATING WITH TANJUG (JUGOSLAVIAN NEWS AGENCY) |
| 22318 | 021845 | CW/CQ DE FFL9 FFS9 (ST LYS, FRANCE) |
| 22330 | 021843 | CW/CQ DE D3E50-62-71-81 (LUANDA, ANGOLA) |
| 23768.8 | 011844 | RTTY 75-850/PRESS ITEMS IN ENGLISH |

SCANNING

VHF SKIP REPORT

by Chuck Robertson

(PART II IN A SERIES)

Welcome to Monitoring Times' VHF Skip column! I'm Chuck Robertson, author of the new Low Band Skip Directory from Grove Enterprises, and I'll be discussing long distance radio propagation reports for frequencies above 29.70 MHz.

Contributions and questions should be sent to:

Chuck Robertson
Route 2, Box 850
Greal Springs, IL 62922

It's summer, so let's review some of the types of propagation responsible for summertime skip.

THE SPORADIC-E MYSTERY

Sporadic-E (E_s) skip is one of the most commonly encountered, yet least understood, forms of propagation for the 29.70 to 75 MHz band.

Some say solar flares and related solar activity account for E_s skip; others point to the weather and high altitude winds. And yet others speculate that auroral and geomagnetic activity (radio storms) are

the formative mechanisms of E_s. They may all be right!

First, let's look at what we know empirically* of sporadic-E propagation characteristics. These are the day-to-day and month-to-month patterns which any North American monitor should perceive from first hand experience at receiving E_s skip.

Sporadic-E may occur any time of the year, day or night, with morning and evening hours often bringing the best chances for skip. Summer is the peak season for E_s, with June usually having the largest number of openings.

A second, but shorter, peak occurs in winter, with December the most active month. March is usually the least active month of the year.

Little is known about E_s patterns in the southern hemisphere, but it stands to reason that they would be reversed, just as the seasons are.

Skip distances range from around 250 to 1300 miles for a single hop, to over 2500 miles for multiple hops.

The ionization responsible for E_s skip is located in patches or "clouds" at about the same height as the E-layer of the ionosphere, approximately 60 miles above the earth.

However, sporadic-E ionization is significantly different from E-layer ionization.

* (by observation)

SCANNING cont'd

emissions.

zation which reflects short-wave frequencies. Sporadic-E ionization primarily reflects higher frequencies, with the 20 to 100 MHz area receiving the greatest benefit.

Even higher frequencies than that can be reflected, but only very poorly. It would take exceptionally intense E_s ionization to have an MUF (Maximum Usable Frequency) of 160 MHz.

The formative mechanisms of E_s clouds, and even the source of the ionization itself, remains a mystery that has not been satisfactorily answered.

My own experience leads me to suspect there is a tie-in with both solar and weather conditions. Unlike F₂ skip which is solar related, and unlike tropospheric skip (Tropo) which is weather related, E_s skip appears to be a unique and complicated interplay of several natural phenomena.

The weather map shown below is a good example of the tie-in surface weather has with the production of E_s skip. Air movements at higher altitudes are often directly related to surface weather, and it is these high altitude winds which can produce wind shear.

When two air masses at different altitudes, and moving in opposite directions, come into contact, the molecules between the two air masses can become ionized. This ionization is then collected by the earth's magnetic field into dense "clouds" at E-layer height. These are the sporadic-E clouds.

E_s Skip Received on the Morning of August 9, 1984

- 29.76 Quebec Ministry of Public Works. French.
- 30.06 Ferry, U.S. Government. Location probably Washington, D.C. or New York
- 30.48 (Repeater) Ontario Ministry of Community and Social Services
- 30.54 Trucking, Canada
- 36.69 Taxi, U.S. Gov't. Base located at McNair AFB, Washington, D.C. 60 watts, narrow band FM

- 38.10 Ft. Drum, Watertown, NY. Mobiles on range were heard.
- 38.30 Wheeler AFB SAC operations, Waipahu, Hawaii. Aircraft communications originating from inside the contiguous U.S.
- 46.62 to 46.88 in 20 kHz steps: This band is used by the Ontario Ministry of Natural Resources. French language was heard on some channels. Here are the frequencies active on the 9th: 46.62, 46.64, 46.68, 46.72, 46.76, 46.78, 46.82, 46.84, 46.86
- 47.52 "KNES 812" Mauritawes Brothers Oil Service, Crisfield, Maryland
- 47.00 to 50.00 in 10 kHz steps: This general frequency segment is used for hydroelectric operations in some areas of Canada, mainly Quebec and Ontario. Wire stringing, maintenance, and power plant operations are heard. French and English languages used. Here are the channels active on the 9th: 48.07, 49.25, 49.60, 49.61, 49.62, 49.64, 49.66, 49.67, 49.68, 49.77, 49.78, 49.79, 49.83, 49.84, 49.88
- 49.90 Canadian Forces (military) French language. The frequency 49.90 is allocated Canada-wide to the military. On this day U.S. military range control comms were also logged on 49.90 MHz. All were wide band FM.

Other sources of ionization which may enhance these E_s clouds are ultraviolet radiation from the daytime sun and aurora, produced by solar flares.

Solar ultraviolet radiation accounts for most of the ionization in all layers of the ionosphere; this may be the reason most E_s occurs during the daytime.

During solar flares large amounts of ultraviolet radiation are released, but only for a few minutes. This bombardment of ultraviolet radiation could have had an

effect on the production or enhancement of sporadic-E ionization.

Traveling at the speed of light, the ultraviolet radiation produced by a solar flare takes about eight minutes to reach the earth; 18 to 36 hours later the slower-moving charged particles emitted by the flare reach the earth's magnetic fields and are funneled to the magnetic poles. This results in the ionization of molecules in the E-layer which produces aurora.

Much of the E_s produced during the winter months is thought to be due to auroral ionization.

The effects of such an avalanche of charged particles from a flare usually lasts one to three days or longer. Geomagnetic intensities also increase at this time, and may facilitate the collection and compression of ionization into E_s clouds.

The May 1985 Monitoring Times article, "VHF Low Band Skip Report" (page 11) documents F₂ skip logged around noon on the 5th and 6th of 1985. In the evening hours, E_s skip was received from areas where heavy weather was occurring!

The skip may have been due to the effects of a coronal hole near the

central meridian of the sun. Large numbers of charged particles were emitted which resulted in a measurable increase in geomagnetic intensities, as recorded by the National Geophysical Data Center in Boulder, Colorado.

Since there was very little skip monitored in February 1985, it seems more than a coincidence that this F₂ and E_s combination occurred two days in a row.

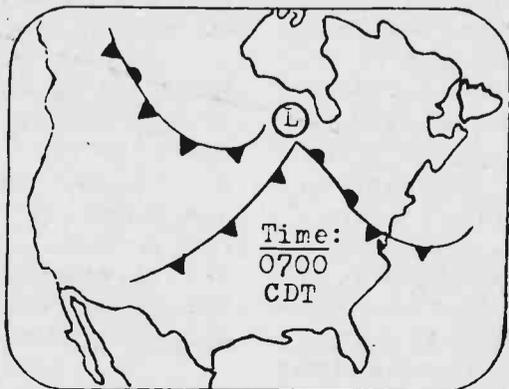
There may be other explanations--sporadic-E remains a mystery!

TROPOSPHERIC SKIP

"Tropo" is another type of propagation common during summer. It's associated with temperature inversion layers and the trailing edges of high pressure areas. Skip distances may exceed 2500 miles, although 100 to 1500 miles is more common. In spring, summer and fall, almost daily tropo can be heard at 100 to 400 miles distances.

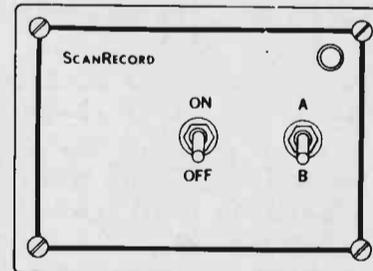
Tropo favors VHF-high and UHF frequencies well over 1 GHz! Unfortunately frequencies below 50 MHz will usually not travel more than 300 miles via tropo.

NEXT MONTH we'll observe the 38.00 to 38.25 MHz radio astronomy band. There's more there than meets the eye!



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by James R. Hay

This month we return to have a look at the Great Lakes. For those interested in beacons or who have never tried them, below is a listing of the various maritime beacons operating on the Great Lakes. For those who have general coverage receivers which cover the range of 285 to 315 kHz and who have never tried it, you might be surprised at what is there and at the distance over which you can hear beacons.

First here is a listing of the continuously operating beacons; they may be heard year round with the exception of those marked with an asterisk.

| LOCATION | FREQ(kHz) | ID |
|-----------------------|-----------|----|
| Grose Cap, ON | 286 | A |
| Goderich, ON | 286 | GD |
| *La Pointe, WI | 288 | V |
| Gibraltar Point, ON | 290 | TZ |
| *Thunder Bay, ON | 325 | P |
| Tibbets Pt., NY | 293 | Q |
| Detroit River, MI | 290 | M |
| Fairport Harbour, ON | 318 | FP |
| Round Is. Passage, MI | 322 | RD |
| Alpena, MI | 320 | AL |
| Presque Isle, MI | 322 | PX |
| Sodus, NY | 314 | SZ |
| Huron, OH | 323 | HR |
| Superior Entry, WI | 316 | SN |
| Silver Bay, MN | 304 | SB |
| Taconite, MN | 320 | TH |
| Toledo, OH | 320 | TJ |
| South Buffalo, NY | 322 | B |
| Buffalo, NY | 286 | BL |

The identification comes in the form of Morse code characters as listed above, usually sent three times followed by a long dash, but may be sent many more times (for 48 seconds) followed by a brief silence and long dash. This characteristic holds true also for the sequenced beacons listed below.

Sequenced radiobeacons are a method of conserving frequencies. Up to six beacons operate in the same general area, on the same frequency, but sequenced so that each operates only for one minute during a specified sequence. Thus, during six minutes each beacon will have operated for one minute without interference. On the Great Lakes there are 44 such beacons as follows:

| LOCATION | FREQ (kHz) | SEQUENCE | IDENTIFICATION |
|----------------------|------------|----------|----------------|
| Whitefish Point, MI | 292 | 1 | O (---.) |
| Caribou Is., ON | 292 | 2 | A |
| Marquette, MI | 292 | 3 | W |
| Slate Is., ON | 292 | 4 | b |
| Michipicoten Is., ON | 292 | 5 | Q |
| Michipicoten, ON | 292 | 6 | R |
| Cleveland, OH | 294 | 1 | C |
| Long Point, ON | 294 | 2 & 5 | L |
| Port Colbourne, ON | 294 | 3 & 6 | Z |
| Erie, PA | 294 | 4 | Y |
| Devils Is., WI | 296 | 2 | O |
| Two Harbors, MN | 296 | 3 | P |
| Duluth, MN | 296 | 5 | O (---.) |
| Keweenaw, MI | 296 | 6 | A (---.) |
| Owen Sound, ON | 298 | 1 | X |
| Collingwood, ON | 298 | 2 | C |
| Hope Is., ON | 298 | 3 | F |
| Snug Harbour, ON | 298 | 4 | R |
| Gereaux Is., ON | 298 | 5 | J |
| Killarney, ON | 298 | 6 | K |
| Burlington, ON | 302 | 2 & 5 | R |
| Detour, MI | 302 | 1 & 4 | CH |
| Pof Reef, MI | 302 | 2 | W |
| Lansing, MI | 302 | 5 | Z |
| Grays Reef, MI | 302 | 6 | X |
| Main Duck Is., ON | 306 | 2 | Y |
| Point Petre, ON | 306 | 3 | P |
| Oswego, NY | 306 | 4 | W |
| Rochester, NY | 306 | 5 | M |
| Sandusky, OH | 306 | 2 | X |
| Southeast Shoal, ON | 306 | 3 | H |
| Ashtabula, OH | 306 | 6 | G |
| Keweenaw, MI | 312 | 1 | C |
| Angus Is., ON | 312 | 2 | F |
| Rock of Ages, MI | 312 | 3 | Z |
| Manitou, MI | 312 | 4 | M |
| Passage Is., MI | 312 | 5 | X |
| Eagle Harbor, MI | 312 | 6 | J |
| Cove Island, ON | 312 | 1 & 4 | D |
| Harbor Beach, MI | 312 | 2 | U |
| Thunder Bay, MI | 312 | 3 | K |
| Great Duck Is., ON | 312 | 5 | B |
| Fort Gratiot, MI | 312 | 6 | P |

The sequence number refers to the order in the local sequence in which each beacon operates.

In addition to the continuously operating and sequential beacons there are four beacons which are occasionally used for the purpose of calibrating direction finding equipment. These calibration beacons are identified by the Morse code identification, "T." They are operated on request through the local Coast Guard Radio Station.

The beacons at Burlington, Ont., Port Colbourne, Ont., and Port Weller, Ont., all operate on 312 kHz; that at Collingwood, Ont., operates on 316 kHz.

Some former beacons on Lake Michigan have been deleted by the U.S. Coast Guard to reduce the number of stations and cut costs. Any information on this would be appreciated and will be shared with other readers in a future column.

As usual your correspondence is welcome. Address all letters regarding this column to: James R. Hay, 141 St. John's Blvd., Pointe Claire, P.Q., Canada H9S 4Z2.

Good listening until next month.

"PLANE TALK"

by Jean Baker

213 West Troy Ave
Apt C
Indianapolis, IN 46225

In this month's column we will look at the frequency allocations of the VHF Aeronautical Communications Band and discuss the various types of transmissions which can be monitored.

- (MHz)
- 118.000-121.400
Air Traffic Control
 - 121.500 (243.0 UHF)
This is the aeronautical emergency guard frequency. It is utilized by both voice and ELT (Emergency Locator Transmitter) tones.
 - 121.600-121.925
Flight Service Station (FSS). These provide services for general aviation (non-commercial). Also used by flight watch, voice facilities at selected VORs (NAVAIDS), UNICOMs, MULTICOMs, heli-

- copter control/communications, etc.
- 123.100
Search and rescue communications
- 123.125-123.425
Flight test
- 123.450
This freq. is unofficially used by airline pilots for air-to-air chit-chat. It can be extremely interesting to monitor--especially late at night when pilots tend to get very informal and let their hair down!
- 123.475-123.690
Flight test, flight service stations, etc.
- 123.675-128.825
Air Traffic Control (ATC)*
- 128.850-132.000
This portion of the VHF aero band is one of the most fascinating of all to monitor; it is utilized by aeronautical enroute/airline company transmissions. These concern operations, phone patches, enroute messages to and from dispatchers and aircraft, etc. Some of these transmissions are concerned with occurrences that are quite commonplace, such as estimated times of arrival of various flights, delays and their reasons, etc.; others - well, they can range from the downright funny to the absolutely frightening.

I monitored a conversation between the captain of an airliner (a "heavy" DC-10) and his dispatcher. All of the bluerooms (bathrooms) had plumbing problems aboard the plane, and the pilot said that he was going to have to make an unscheduled stop to have them dumped and repaired - otherwise, he "Was gonna have a total mutiny by all of his passengers, and/or be condemned by the health authorities of the city of his destination, cause by that time the plane would be a stinkin' mess!"

On the serious side, I heard a pilot tell company operations that he had a passenger who was so spaced out on drugs that he was going ape (the passenger, not the pilot), and they were going to have to make an emergency request to put down at the nearest airport to off-lead the passenger! all in all, there's never a dull moment on these freqs.

- 132.025-135.975
Air Traffic Control*

I have placed an asterisk* beside the words "Air Traffic Control" in each area of the VHF aero band where they have an allocation.

PLANE TALK cont'd

tion. This simply means that these frequencies are utilized by both Air Route Traffic Control Centers (ARTCC), to use their full designation, and Air Traffic Control Towers: Approach/Departure Control, Ground Control, Clearance Control, ATIS (Automated Terminal Information Service) recordings which update semi-hourly giving weather, runway, frequency, and other information (including altimeter settings) for approaching and departing aircraft.

Now that you have an idea of what you can hear on the VHF aero band, let's discuss a few other related subjects:

Please don't let the news and entertainment(?) media color your image of air traffic controllers, pilots and other folk who work in the airline transport industry (and private aviation). Unlike their stereotyped image, as a group air traffic controllers are not all tranquilizer-popping, neurotic, wild-eyed maniacs who will strike at the drop of a hat. Nor are pilots all conceited

Greek-god look-alikes. And flight attendants are not giggly/hysterical round-heeled women, nor are their male counterparts all effeminate as they are so often portrayed in the movies, novels, TV shows, etc. These people do not fit those images as a group any more than do employees within other industries.

The reader response to the first column was really terrific; thanks to all of you who responded so encouragingly. Please bear in mind that I'd like to hear from anyone who would like to comment about the contents of "Plane Talk"--both good and bad comments are welcome. Reader feedback will make this column as interesting and as informative as possible.

In the next installment, we will talk about monitoring the HF aeronautical bands; how to get started, what you will hear, how to get QSLs (yes, it can be done!), and other related topics.

Until then, 73s and out -

Jean Baker,
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SIGNALS FROM SPACE

by Larry Van Horn

●As I write this column of Signals from Space, Gayle, Loyd and I are now in sunny Florida. Over the last several months, time has been at a premium and I have gotten behind on correspondence. Those of you awaiting a reply please be patient. Between getting the manuscript for Communications Satellites ready and Uncle Sam moving us, I have put all correspondence on hold.

Now that we are here and settled, I will take care of the backlog and resume normal correspondence with all. Those individuals desiring a reply from the author be sure to include an SASE. My new address is Signals from Space, c/o Larry Van Horn, 160 Lester Drive, Orange Park, Florida 32073.

●A new distribution service for regional or specialized radio networks using single-channel-per-

carrier (SCPC) distribution over SATCOM I-R is now operational. This service will provide 7.5 and 15 kHz signals as well as access into RCA Americom's digital audio transmission service (DATS).

SCPC Radio Service is designed to grow with programmers' requirements using an existing network of receive-only antennas located throughout the country. At very low cost and with protected service, special music, sports, seasonal, regional, or state networks can access affiliates simply by directing their uplink antenna at SATCOM I-R.

"SCPC Service will provide a long-needed means of consolidation of these networks on one satellite, SATCOM I-R," says Harold W. Rice, RCA Americom's VP, Video/Audio Services. "The advantage to the programmers is virtually unlimited

growth opportunity for the network because virtually all of the nation's radio-station antennas are, or can be, directed to one satellite.

The advantage for listeners is new SCPC channels to search out. TVRO-equipped monitors listening to new SCPC channels on SATCOM I-R are encouraged to drop Signals from Space a note and let us know what special services you are hearing.

●The information on the new Russian amateur radio satellites is starting to creep out of the Soviet Union. Latest information on RS-9, due to be launched later this year, indicates that at least one beacon will be on 29.402 MHz. The satellite's transponder will be a Mode-A-type uplink 145.860 to 145.900 MHz, downlink 29.360 to 29.400 MHz. It also appears that RS-9 will carry an automatic robot of similar design to those on RS-5 through RS-9.

According to Amateur Satellite Report NO. 98/99, RS-9 and 10 are in Kaluga, 200 km southwest of Moscow undergoing tests. G3IOR obtained the following frequency information on RS-10 from UA3CR.

Mode A
145.960-146.000 MHz uplink
29.460- 29.500 MHz downlink

Beacon
29.457 or 29.503 MHz, 250 mW or 1 watt

Mode K
21.260-21.300 MHz uplink
29.460-29.500 MHz downlink

A third (unnamed mode) transponder may also be included. Its frequencies were specified as follows:

21.260- 21.300 MHz uplink
145.960-146.000 MHz downlink

Beacon 145.957 MHz

Yes, folks, the Russians are going to use the 15 meter amateur band for uplinks to the 10 and 2 meter bands. This should bring the 10 and 15 meter bands alive during this period of low sunspot activity.

At present, both RS-9 and RS-10 are to be orbited from a single launcher; however, builders and organizers are thought to be seeking separate launches for each, hopefully placing them into 2,000 km polar orbits.

These satellites should offer the SWL as well as HF equipped hams the oppor-

SIGNALS FROM SPACE cont'd

tunity to enjoy satellite communications without much expense.

●As of this writing I still do not have any details to offer you on monitoring Tony England, W0ORE's Ham-in-Space mission. I have heard that 10 meter SSTV gear might be carried onboard as well as the HT that Owen Garriott carried. There was some talk about a two-to-ten-meter repeater but this is not confirmed. Interested readers are urged to monitor WIAW and AMSAT nets for the latest information.

●This month's mailbag is full. A lot of listeners are starting to listen to military aircraft and satellites and some of this information has finally caught up with me.

Rich Kramer in Pennsylvania recently dropped me a note with a question. He asked if the downlinks from the milsats are variable with regard to the uplinks being used. For example, if the downlink for channel number 4 is 260.500 and uplink is 360.300 and a ground station transmits on 300.315, will the downlink come down as 260.515?

Well, Rich, the system you described would indicate a linear transponder and milsat wideband channels act as repeaters throughout the whole bandpass in a linear fashion. So, yes, 260.515 is a valid frequency. The way I understand it, the channel numbers used on the wideband portion of the milsats are for reference only and do not represent discrete frequency transponders.

The reason Rich asked the question is that he heard Brandywine communicating with SAM 26000 on the LES 9 bird indicating they could use any frequency from 2 to 400 MHz for their uplink. I find that statement very misleading and would invite other MT readers to comment.

A friend recently sent me an update on current Fleetsatcom/Leasat activity. This material is referenced to the milsat section of my new book, *Communications Satellites* (available from Grove Enterprises).

From the eastern U.S. Fleetsatcom, plans A,B,C are now being heard. For a while Leasat plan "Whiskey" was up and running but now only some fleet relay channels are available; they 250.350 fleet broadcast channel is down.

It appears that Leasat "Whiskey" bandplan has

replaced Fleetsatcom "Charlie" for fleet broadcasts. Other listeners are urged to send their notes during this transition period between Fleetsatcom and Leasat satellites.

●Len Merkoske in Canada has managed to catch another Russian Ocean Radar Recon satellite on HF. Len monitored Cosmos 1579 several months ago on 19.544 MHz as the nuclear reactor was being raised to a safe height. Len now has monitored Cosmos 1607 launched October 31, 1984 from Tyuratam. These satellites are kept in 89-90 minutes orbital periods until end of mission when the reactor sections are hoisted into 109 minute orbital periods.

Len caught the transmissions over a 2 day period February 1-2, 1985. It appeared as though towards the later periods of Len's monitoring, the on board power supply (batteries) failed and no more signals have been received from 1607.

●H. Lillibridge in Bay Shore, NY, has sent me some interesting mil aircraft frequencies from his area. He uses an SX400, MX5000, BC300.

The following frequencies are used by Navy P3's on surveillance and Air Force reserves on maneuvers from McGuire, Andrews, and Langley AFB.

Base callsign: "Huntress";
Planes "Dragnet"

| | | | |
|-------|-------|-------|-------|
| 364.2 | 228.7 | 318.7 | 282.5 |
| 258.0 | 236.6 | 321.2 | 233.6 |
| 292.3 | 261.8 | 218.4 | 360.6 |
| 357.2 | 291.2 | 239.4 | 262.2 |
| 218.0 | 327.2 | 378.4 | 252.0 |

Base callsign: "Giant Killer"

| | | | |
|-------|-------|-------|-------|
| 255.0 | 292.8 | 266.5 | 249.8 |
| 288.0 | 252.6 | 305.0 | 310.1 |
| 233.7 | 251.6 | 312.3 | 350.0 |
| 338.1 | 239.2 | 308.0 | |

Base callsign: "Foot Rope"

| | | | |
|-------|-------|-------|-------|
| 269.3 | 259.4 | 301.6 | 283.8 |
| 314.2 | 275.9 | 238.7 | |

Base Callsign: "King Cole"

| | | | |
|-------|-----|-------|--|
| 363.9 | and | 321.2 | |
|-------|-----|-------|--|

Some of the tanker aircraft callsigns he has monitored include Dusty, Shake, Robe, Durk, Cutty, King, Chintz, Minor, Reel, Mine, Pro.

Fighter aircraft monitored on these frequencies have used the following callsigns: Aces, Wade, Brave, Smash, Hex, A.K., Cosmos Rival, 100 Lima and Snake.

He also sent along a list of VHF ATC frequencies which I will pass on to Jean Baker, MT's Plane Talk editor. Welcome to the

family, Jean.

●I would like to receive your listings of satellite and mil aircraft (225-400 MHz) UHF..Remember, VHF aircraft material should go to Jean.

SATELLITE DISHES AND GAIN

by John Wilson W4UVV (6413 Bull Run Rd., Prince George, VA 23875)

(ED.NOTE: John Wilson, author of a previous MT feature on satellite FM-SCPC monitoring, has contributed for fellow listeners this excellent reference list. Thanks, John, for sharing this useful set of data.)

C BAND TVRO ANTENNA SIZE AND GAIN

With the vast proliferation of various antenna sizes available for TVRO installations today, it can be confusing as to the actual antenna diameter that is shown in some advertising. Most manufacturers list their antenna sizes in feet, but some use meters.

When determining the size of an antenna, it is advantageous also to know the theoretical gain of a given antenna; gain is an important factor in the TVRO configuration relating directly to the expected transponder signal strength to be delivered to the Low Noise Amplifier (LNA).

The cross reference table of commonly used antenna sizes/gains table shown at Figure 1 will provide a handy reference for use in various TVRO applications.

| 3,700-4,200 MHz (C BAND) | | |
|--------------------------|-------------|------------|
| Antenna Size | Approximate | |
| Feet | Meters | Gain (dB)* |
| 4 | 1.2 | 31.0 |
| 5 | 1.5 | 34.0 |
| 6 | 1.8 | 35.0 |
| 7 | 2.1 | 36.0 |
| 8 | 2.5 | 37.5 |
| 9 | 2.8 | 38.5 |
| 10 | 3.0 | 39.5 |
| 11 | 3.4 | 40.5 |
| 12 | 3.7 | 41.0 |
| 13 | 4.0 | 42.0 |
| 14 | 4.3 | 42.5 |
| 15 | 4.6 | 43.0 |
| 16 | 4.9 | 43.5 |
| 17 | 5.3 | 44.0 |
| 18 | 5.6 | 44.5 |
| 19c | 5.9 | 45.0 |
| 20 | 6.1 | 45.5 |
| 23 | 7.0 | 47.0 |
| 26 | 8.0 | 48.0 |
| 29 | 9.0 | 50.0 |
| 33 | 10.0 | 51.5 |
| 36 | 11.0 | 52.0 |

* = 55% rated efficiency @ 4,000 MHz with greater than 30 degree look angle.

HAM TELECONFERENCE NETWORK

The North American Teleconference Radio Network, a system of interlinking two meter repeaters, will present another nationwide "program" of interest to radio hobbyists.

The topic will be developments in the amateur radio space program, including the basics and how to get involved in the hamsats. The net will begin on the evening of June 14th (0100 UTC June 15th) and will be heard over 235 amateur repeaters across the country.

For further information send an SASE to Tim Loewenstein WA0IVW, Box 1231, Kearney, NE 68847-1231, or listen in on various repeaters in your area for activity.

A representative list of some 180 participating amateur repeaters was presented in the June '84 issue of MT; others have been added since.

SATELLITE SWLing: Monitoring FM-SCPC

by John Wilson W4UVV

Welcome to the world of satellite short-wave listening--really short waves--microwaves. This article will discuss briefly three popular methods of FM-Single Channel Per Carrier (SCPC) reception which is rapidly becoming an increasingly popular, cost effective and efficient method of satellite audio and data transmission.

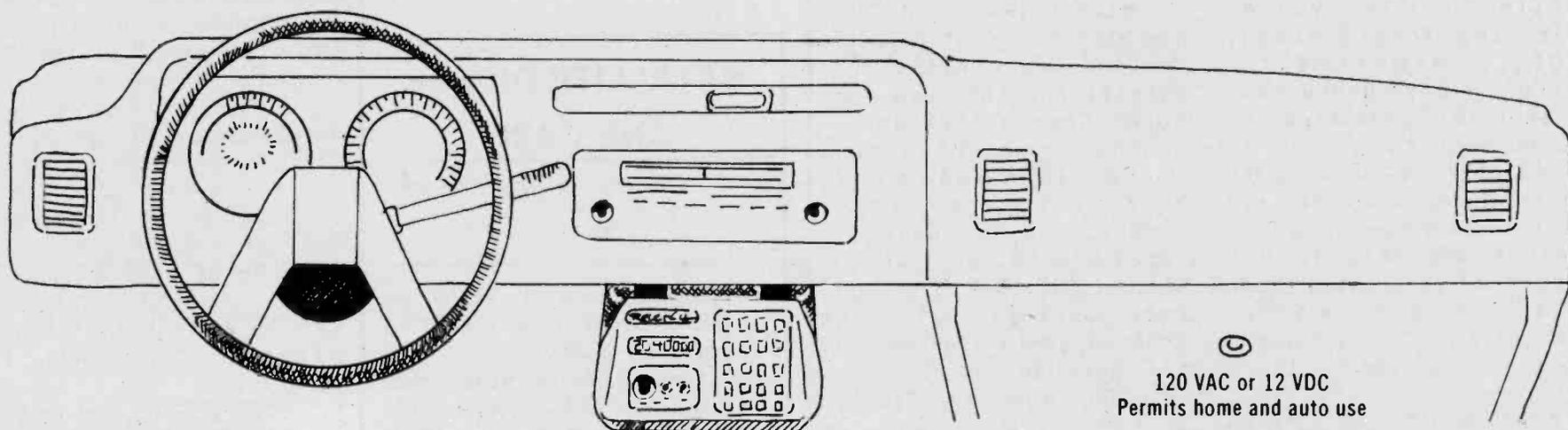
A LITTLE HISTORY

For over 40 years radio and TV networks had been technically "tied" to the AT&T terrestrial-microwave point-to-point relay or "hard-wired" for distribution of their network programs. This method was a very expensive way to transmit programming services. With the advent of improved technology in the mid '70s, the satellite alternative was available, technically feasible, cost effective, and afforded other advantages as well.

One of these other advantages was that the uplink (transmit site) could be almost anyplace geographically within the downlink's (receive site) "footprint" signal and vice versa. In other words, if a

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This recent addition to the Regency line of high performance scanners offers 30 channel memory, 0.5uV sensitivity, sharp 15 kHz selectivity and an FM frequency range that won't quit: 26.5-64.5, 117.7-193.8 and 309.3-538 MHz (wider than specified by Regency)! Other features: search, scan, delay, priority, lighted LCD display, top-mounted squelch and volume controls and BNC antenna connector.

Order SCN-7 **Only \$244** (includes UPS)



Regency HX-2000

Finally a hand-held programmable with the 800 MHz band! This feature-packed new entry sports 20 channels of memory, each individually selectable for AM and FM mode. Continuous frequency ranges include: 118.0-174.995, 406.0-525.9875, and 800.0-999.975 MHz, AM or FM. Selectivity is a sharp 15 kHz (-6 dB) on FM. Scan and search speed is a fast 15 channels per second. An LCD display provides accurate readout as well as status indication of control functions.

VHF-FM sensitivity is 0.4 microvolts. Unit measures 3"W x 6.9"H x 1½"D. Two screw-in flexible antennas (800 MHz and VHF/UHF, rechargeable batteries and plug-in wall unit included).

Order SCN-9 **Only \$409** (Includes UPS)

Mobile Scanner Antenna

This 38" heavy-duty stainless steel antenna offers wide coverage and a rugged magnetic mount for reliable anchoring without drilling holes—yet it is easily removable for security.

UHF element is a 3.5 dB gain collinear for maximum distance. Covers frequencies of 25-54, 118-174 and 406-512 MHz. VSWR: better than 1.5:1 at all midbands. Impedance is 50 ohms (nominal). Comes with 17' RG-58/U cable with Motorola plug.

Mount it anywhere—roof top, trunk lid, fender cowl—for outstanding mobile reception.

Tested personally by Bob Grove. He says: "The best mobile scanner antenna I have ever used."

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LET'S TUNE IN

radio station, music service, news service, or whatever, primarily in the 48 contiguous states, could access the desired satellite transponder, its physical location was not a prime technical consideration. The uplink site did not have to be in New York, Chicago, or Denver; it just as easily could be in Bristol, Tennessee, Show Low, Nevada, or Anaconda, Montana.

Additionally, each uplinker had its own assigned frequency within the transponder so interference such as found on HF was non-existent. As far as the FM-SCPC listener was concerned the signal either was there or not, and weak or strong, depending upon the carrier-to-noise relationship of the receive system.

There was no atmospheric signal fading (only occasional minor signal absorption) or phase-distortion-type reception problems commonly experienced in the lower portions of the RF spectrum.

A final big advantage was that because of the different FM-SCPC downlink-carrier-to-noise/signal-to-noise performance requirements, smaller-aperture parabolic antennas could be used with good results. We were now talking about using 4 and 6 foot antennas for threshold-plus reception. For an AM or FM radio station located in a congested area where antenna roof mounting formerly was not possible due to elevation look angle problems or building structure unsuitability, this was a significant advantage.

For transponder usage efficiency purposes, FM-SCPC signals are usually transmitted on dedicated FM-SCPC transponders. Two of the more popular SCPC satellites are Westar III transponders 1, 3 & 7 and Westar IV transponders 1, 2, 3 & 4. Satellite hopping through the arc on other non-video and common carrier transponders will disclose other transmissions.

Some Intelsats and the Russian Gorizont 7 satellite also have FM-SCPC. You may wish to keep your own reception log since there currently is no "TV Guide" listing of what's up there; however, at least two industry publications have recently begun listing programming services on an occasional basis for some satellites.

The present popularity of FM-SCPC reception today is similar to RTTY (radio-teletype) reception after WW II. Little was known about RTTY by the average SWLer and reception required specialized equipment and the users were relatively small in number. Today RTTY abounds as a popular SWL interest.

As with RTTY, FM-SCPC reception requires a special signal demodulation process for proper reception. FM-SCPC signals differ from the 5.5-8.0 MHz subcarrier audio "piggybacked" signals heard on video transponders: Each FM-SCPC signal is a "stand-alone" carrier typically 60 kHz wide.

When tuning your present satellite TVRO receiver across an FM-SCPC transponder, you will probably see and hear only "white noise" or a slight darkening of the video; you would not know these signals were there.

There are three popular methods of receiving FM-SCPC transmissions; all require at least a four-foot antenna (preferably six-foot or larger on the coasts) and a 100⁰K LNA (low noise amplifier) correctly installed and aimed at the desired satellite with the proper polarization set for the transponder to be searched.

- The first method (see figure 1) involves the use of a TVRO down-converter and a VHF-TV (Ch.2-6) converter interfaced with an AM radio set at approximately 1400 kHz. The TVRO separately-powered down-converter's IF output at 70 MHz is connected to the input of the VHF-TV converter which, in turn, is fed to the AM radio. Tuning from channel 2 to 6 on the converter corresponds to the 40 MHz bandwidth of the transponder being searched.

Separating the received signals may be a problem; signal-to-noise ratio may be

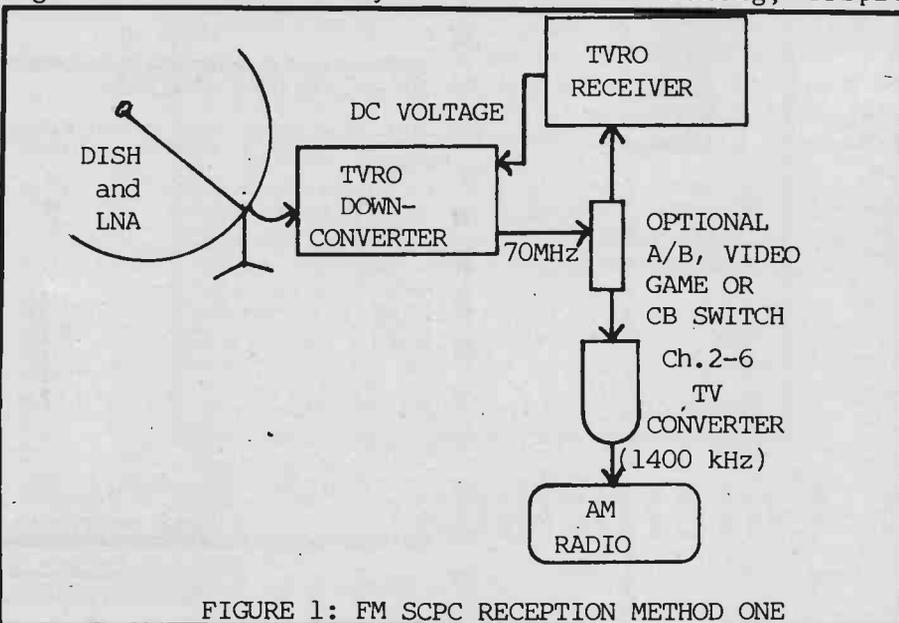


FIGURE 1: FM SCPC RECEPTION METHOD ONE

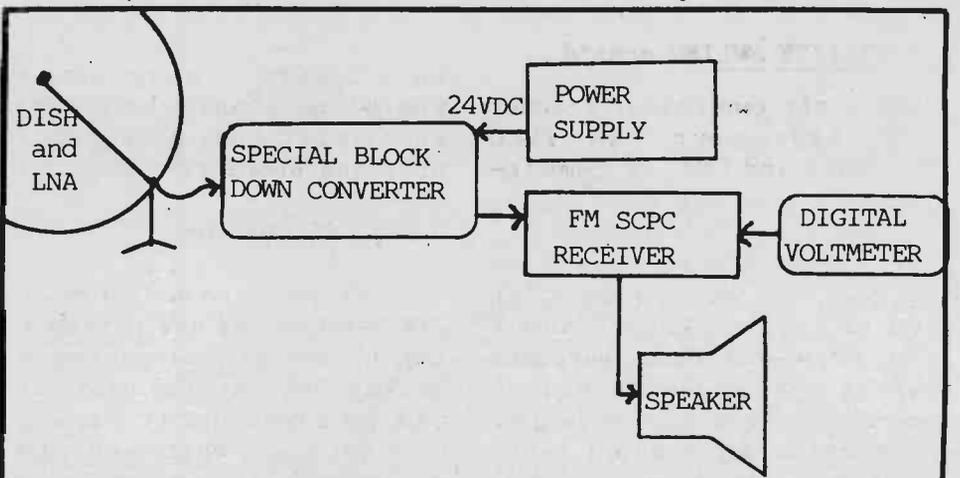


FIGURE 2: FM SCPC RECEPTION METHOD TWO

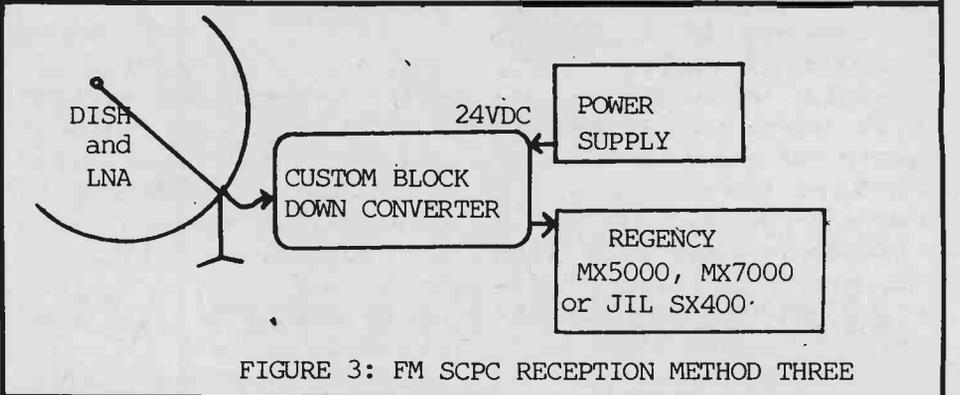


FIGURE 3: FM SCPC RECEPTION METHOD THREE

poor because the converter's frequency bandpass is about 150 kHz wide and the FM-SCPC signals are only 60 kHz wide (or less) so some noise will also be passed. This receive method assumes that you TVRO down-converter is separately powered and can lock onto the FM-SCPC signals.

I tried this first approach and had no success because my TVRO receiver/down-converter was designed to lock onto 4.5 MHz video transmissions, not these narrow-bandwidth transmissions. At least 90% of TVRO receiver/down-converters probably cannot lock onto these transmissions although this method has been proven to work with certain receiver configurations such as Scientific Atlanta.

- My FM-SCPC receive system is the second method (see figure 2). The system is not cheap, costing approximately the same as a small-dish TVRO system. A special purpose FM-SCPC receiver designed for 60 kHz reception is used offering continuous tuning, triple

conversion, good sensitivity, and selectivity. With a 100⁰K LNA and a six-foot antenna my reception is noise-free plus for over 90% of my monitoring. Of course, a larger antenna will improve any weaker signals such as some found on Westar IV.

The block down-converter is a special component interface to the receiver, powered separately from a 24VDC supply. Jacks are provided for 300 and 8 ohm audio output or you may connect the converter to a general coverage receiver such as the ICOM R-71A or NRD-515 which will tune to 10 kHz as partial interface for Frequency Division Multiplex (FDM) reception of UPI RTTY news (or to an FDM demodulator for reception of other "hidden" RTTY transmissions).

A digital voltmeter connected to the tuning control provides a rough frequency cross-reference when tuning a particular transponder. Slight variances in readings will occur with remote mounting of the downconverter due to thermal drift of the local oscillator.

- The third method of reception requires the use of a customized block down-converter and a Regency MX-5000, MX-7000 or JIL-400 scanner (see figure 3). A typical TVRO "off the shelf" block down-converter will not work (or, at best, will not work properly) and interfacing with any other scanner would yield inadequate tuning range. The cost for this method, if you

SATELLITE SWLING cont'd

presently own either scanner and have your own TVRO antenna and LNA, is comparable to the cost of a general coverage HF receiver.

Method three has been proven to work well with detailed frequency readout for cross-reference purposes using the scanner's search mode. Again, slight variances in readout will occur if the down-converter is remotely mounted.

For those readers who like challenges such as deciphering HF "numbers," new intrigue awaits you. For example, on one video carrier where one normally would not expect to find an FM-SCPC transmission, I recently received a tone/audio tape loop with the cryptic message: "Stations, the primary circuit will be magenta and secondary cyan." Other types of transmissions can be found

on FM-SCPC transponders including stand-alone FDM, subcarrier FDM, subcarrier SSB, and subcarrier FAX.

A WORD OF CAUTION

If you presently have a TVRO system and are attempting to use existing components, be careful not to damage anything. If you are not sure of what you are doing seek competent technical help.

THE MENU

The following list represents recent typical FM-SCPC programming found on just one satellite--Westar III. Some programming is occasional or seasonal such as football, baseball and basketball. Network and state news are usually on the hour or half hour and music services usually offer 24 hour programming.

| TRANSPONDER 1 | | |
|----------------------------|----------------------|---|
| Approximate Frequency(MHz) | DC Digital Voltmeter | Service |
| 3720.5 | 15.3 | Tick-Tock Carrier/Sports Line-Nationwide call-in talk program |
| 3723.5 | 17.6 | Carrier/Wall St. Journal Rpt./Dow Jones Talk Phone (LSB 19.9 kHz subcarrier) |
| 3724.3 | 18.3 | Radio 650-WSM Nashville, TN-Country music format |
| 3724.5 | 18.5 | Tone Carrier/AP News(FAX +10 kHz subcarrier and AP News LSB 20 kHz subcarrier) |
| 3725.2 | 19.1 | Unidentified Carrier |
| 3726.8 | 20.2 | Unidentified Carrier |
| 3727.5 | 21.1 | UPI Radio News (English & Spanish/FDM 50 state UPI RTTY (LSB 11.4 kHz [east Coast] subcarrier and LSB 15.4 kHz [west coast] subcarrier) |
| 3727.6 | 21.4 | WPAT-Patterson, NJ-good music format |

| TRANSPONDER 3 | | |
|----------------------------|----------------------|--|
| Approximate Frequency(MHz) | DC Digital Voltmeter | Service |
| 3742.6 | 1.5 | Transworld Radio (Left Channel Stereo)-Colorado Springs, CO-Current and past popular hits-commercial free |
| 3743.0 | 1.8 | Transworld Radio (Right Channel Stereo)-Colorado Springs, CO-Current and past popular hits-commercial free/ LSB 17.5 kHz RTTY-Unidentified |
| 3739.8 | 3.0 | San Francisco Giants Baseball Network |
| 3739.9 | 3.1 | Chicago Cubs Baseball Network |
| 3740.0 | 3.2 | Tone Pulse Carrier-Unident. |
| 3740.2 | 3.3 | Detroit Tigers Baseball Radio Network |
| 3740.4 | 3.4 | Milwaukee Brewers Radio Netwk |
| 3742.0 | 4.0 | Carrier/Michigan Farm Radio Network/ Spartan Baseball Network |
| 3742.8 | 4.2 | Tick-Tock Carrier/ RKO News/ Florida Network News/ Florida Sports Network |
| 3743.5 | 4.4 | KKJO-Los Angeles, CA-Jazz music format/ Motor Racing Network |
| 3744.9 | 4.7 | Unidentified Carrier |

| | | |
|--------|------|---|
| 3747.0 | 5.4 | Unidentified commercial free good music programming |
| 3747.2 | 5.5 | Unidentified commercial free popular music programming |
| 3748.2 | 5.8 | Minnesota Twins Baseball Network |
| 3750.4 | 6.8 | Unidentified Sports News |
| 3751.2 | 7.5 | Carrier/ ABC Radio Sports/ Oklahoma News Network/ ABC News |
| 3751.8 | 8.2 | Tick-Tock Carrier/RKO News |
| 3752.4 | 8.4 | FM100-Columbus, OH- country music format |
| 3752.6 | 8.7 | Carrier/ABC Contemporary News |
| 3752.7 | 9.2 | KAKZ News/Kansas Agriculture Network |
| 3752.8 | 9.4 | Tone Carrier/ Oklahoma News Network/ WYNY-NY-good music format |
| 3752.9 | 9.5 | Unidentified popular music |
| 3753.4 | 9.8 | Carrier/ Kansas Information Network |
| 3755.4 | 10.5 | Kansas Information Network |
| 3755.6 | 10.6 | Carrier/Southern States Network News |
| 3755.7 | 11.0 | Unidentified Carrier |
| 3757.9 | 12.4 | Carrier/Texas State Network-English and Spanish News |
| 3761.3 | 15.0 | Carrier/ ABC Dimension Network/ Missouri Network News/ Sports (LSB 15.9 kHz subcarrier) |
| 3761.8 | 15.6 | Carrier/ ABC News |
| 3761.9 | 15.7 | Carrier/ UPI Radio News/ Midwest Information Network |
| 3762.1 | 15.9 | Carrier/ ABC Direction Network/ North Carolina News Network (Total Radio) |
| 3762.2 | 16.0 | Carrier/Kansas Information Network/ ABC News/ Missouri Network Sports |

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REGENCY (216) 376-2402

REGENCY MX-5000
20ch, covers 25-550 mhz CONTINUOUS COVERAGE, AM/FM/WFM Modes, Scan, Delay, Priority, Search UP/DOWN, LCD Display, Dual Speeds, Lockout, Display Light, AC/DC, MUCH MORE!!!
\$374.50

KENWOOD R-2000
100 khz-30 mhz, 10 Memorys, Store Frequency & Mode as it scans/searches. Covers AM/FM/USB/LSB/CW. Digital Readout. 3 speed band scanning & tuning, electronic band switching, MUCH MORE!!!
\$459.50

WE PRE-TEST

REGENCY HX-1000
30ch, covers 28-59, 118-180, 350-515 mhz (FM). Scan, Search, Delay, Priority, LCD Display, ONE WATT AUDIO!! W/Charger, Ni-Cads, Antenna, Earphone, Case, Belt Clip.
\$239.50

ICOM ICR-71A
100 khz-30 mhz, has 32 programmable memorys, covers AM/USB/LSB/CW/RTTY, Manual or Keyboard Frequency Entry, PBT, Pre-Amp, Scans, 2.3ssb Filter, 3 tuning speeds, AGC, Notch Filter, OPTIONAL REMOTE CONTROL, MORE!!!
\$639.50

REGENCY HX-2000
20ch, covers 118-136, 144-174, 406-512, 800-950 mhz. Has Scan, Search, Priority, LCD Display, Delay, Selectable AM/FM Modes, AC/DC, W/Charger, Ni-Cads, Antenna, Case, Belt Clip. IN STOCK!
\$359.50

SHORTWAVE RADIO

- ICOM ICR-71A 100 khz to 30 mhz, Digital, 32 Memorys. **639.50**
- SONY-2010 AM/FM/Aircraft/Shortwave/Memorys. **279.50**
- KENWOOD R-2000 150 khz-30 mhz, Digital, 10 Memorys. **459.50**
- R-1000 200 khz-30 mhz, Digital Receiver. **399.50**
- R-600 150 khz-30 mhz, Digital Receiver. **329.50**
- YAESU FRG-8800 150 khz-30 mhz, Dig/Memorys. **549.50**
- BEARCAT DX-1000 10 khz-30 mhz, Dig/Memorys. **479.50**
- PANASONIC RFB-300 1.6-30 mhz, AM/USB/LSB/CW Digital. **214.50**
- RFB-600 1.6-30 mhz, All Mode, Digital, Memorys. **449.50**
- RF-3100 31 bands, 1.6-30 mhz, Digital. **266.50**
- SONY 2002 AM/FM/SW, Digital, Memorys, Scans. **219.50**
- SONY AN-1 Shortwave Active Indoor Antenna. **79.50**
- RADIO TAP CW/RTTY Decoder Vic 20/Comm 64. **139.50**
- MFJ-959 Antenna Tuner, Pre-Amp, Dual Outlets. **89.50**
- MFJ-1040 Pre-Selector, Pre-Amp, Dual Outlets. **99.50**
- *SPECIAL* 12Volt 20Amp Power Supply/FTR/REG. **119.50**
- *SPECIAL* 12Volt 7Amp Power Supply/FTR/REG. **59.50**
- ***FREE UPS SHIPPING & INSURANCE TO 48 STATES***
- COMPLETE 25 PAGE PICTURE CATALOG WITH SPECS 1.00

SCANNERS

- REGENCY HX-1000 30ch, Prog.28-60,118-180,350-515(FM). **239.50**
- HX-2000 20ch, Prog.118-174,406-520,800-999 mhz **369.50**
- MX-7000 20ch, Prog.25-550 & 800-1300 mhz. **449.50**
- MX-5000 20ch, Prog.25-550 mhz Straight Thru. **374.50**
- MX-4000 20ch, Prog.30-59,118-174,406-525,800-999 mhz **419.50**
- MX-3000 30ch, Prog.30-50,138-174,406-512 mhz **219.50**
- Z-60 60ch, 30 50,88-108,118 174,406-512 mhz. **274.50**
- Z-30 30ch, Prog.30-50,144-174,406-512 mhz. **179.50**
- Z-10 10ch, Prog.30-50,144 174,406-512 mhz. **159.50**
- D-310 30ch, Prog.30 50,140-174,406-512 mhz. **149.50**
- D-810 50ch, 30 50,88-108,118-174,406-512 mhz **235.50**
- BEARCAT BC-100 16ch, Prog.30-50,138-174,406-512 mhz. **239.50**
- BC-201 16ch, 30-50,118-136,138-174,406-512 mhz. **199.50**
- BC-210 18ch, Prog.30-50,144-174,421-512 mhz. **224.50**
- BC-250 50ch, Prog.30-50,144-174,420-512 mhz. **249.50**
- BC-260 16ch, Prog.30-50,138-174,406-512 mhz. **259.50**
- BC-300 50ch, 30-50,118-136,144-174,421-512 mhz. **359.50**
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NEW ARRIVALS

YAESU FRG-9600

With continuous frequency coverage from 60 to 905 MHz and 100 channels of memory, this hot new Yaesu scanner should generate considerable interest in the VHF/UHF monitoring market.

Detection modes include AM, narrowband FM, wideband FM, and even a product detector for SSB/CW listening. Seven tuning/scanning rates may be selected between 100 Hz and 100 kHz, and frequency selection is by both keypad entry and a tuning dial.

Operated from 12 VDC for mobile installation, an optional AC adaptor is



available.

The receiver is a triple conversion super-heterodyne, offering 3 dB bandwidth selectivities of 180 kHz (FM wide), 15 kHz (FM narrow), 6 kHz (AM wide), and 2.4 kHz (AM narrow and SSB). Average sensitivity is 1.0 microvolt for 12 dB SINAD.

Signal strengths are

SATELLITE SWLING cont'd

| | | |
|--------|------|--|
| 3762.9 | 16.4 | Carrier/ ABC Dimension Network/ Cyclone Baseball Network |
| 3763.6 | 16.9 | Tick-Tock Carrier/ RKO News/ ABC Dimension Network |
| 3764.0 | 17.2 | Tick-Tock Carrier/ RKO News/ Louisiana Network |
| 3765.2 | 17.8 | Carrier/ Mississippi News Network/ RKO News/ Capital Sports Network (North Carolina) |
| 3765.4 | 18.0 | Unidentified popular music format |
| 3767.4 | 19.0 | Carrier/ North Carolina News Network |
| 3767.5 | 19.2 | Carrier/ UPI Radio News |
| 3767.7 | 19.6 | Virginia News Network/ UPI Radio News |
| 3771.4 | 21.8 | Tick-Tock Carrier/ Arkansas Radio Network |
| 3781.9 | 22.2 | Carrier/ Arkansas Radio Network/ RKO News |
| 3872.5 | 22.6 | Unidentified Religious Music Format |
| 3373.6 | 23.6 | Unidentified Carrier |
| 3374.0 | 23.9 | TalkNet/ WTMJ Milwaukee, WI |
| 3374.1 | 24.0 | Unidentified Carrier |
| 3775.0 | 24.6 | Carrier/ Oklahoma Sports Network |
| 3775.4 | 24.9 | Z100-Portland, OR/ Blazer SportsTalk/ Brownfield Agricultural Network |
| 3775.8 | 25.1 | TalkNet/ FM100-Columbus, OH- Popular music format |
| 3770.0 | 25.7 | KMPC-Los Angeles, CA- '40s and '50s music format |

TRANSPONDER 7

| Approximate Frequency(MHz) | DC Digital Voltmeter | Service |
|----------------------------|----------------------|---|
| 3832.0 | 2.0 | Bible Broadcasting Network (left channel stereo)- Religious format |
| 3832.5 | 2.2 | Bible Broadcasting Network (right channel stereo)- Religious format |
| 3841.0 | 14.6 | Unidentified FDM |

A list of FM-SCPC equipment sources is available from the author. Send an SASE to: John Wilson (W4UVV), 6413 Bull Hill Road, Prince George, VA 23875.

(ED.NOTE: This article is intended only to increase the public awareness of non-video services carried via satellites. Neither the publisher nor the author condone misuse of any information by any individual, firm, or other entities, and assume no liability for such.)

BEHIND THE DIALS

indicated on a two-color graphic display; a 24-hour clock-timer is included as is a recorder output with automatic on/off switching. Additional jacks provide CPU access for band selection, FM wide multiplex, AF and RF muting, and other control functions.

A Yaesu CAT interface allows interconnection with most home computers for virtually unlimited control functions including custom memory bank access, automatic tuning and scanning. List price is expected to be \$599.

Monitoring Times will present an in-depth review of the new scanner in a future issue.

RUMORS FROM ICOM

With the Yaesu FRG-9600 attracting attention from VHF/UHF listeners, it wouldn't be at all surprising if we learned of a major competitive introduction from ICOM. MT will present full details of this specu-

AND FROM BEARCAT

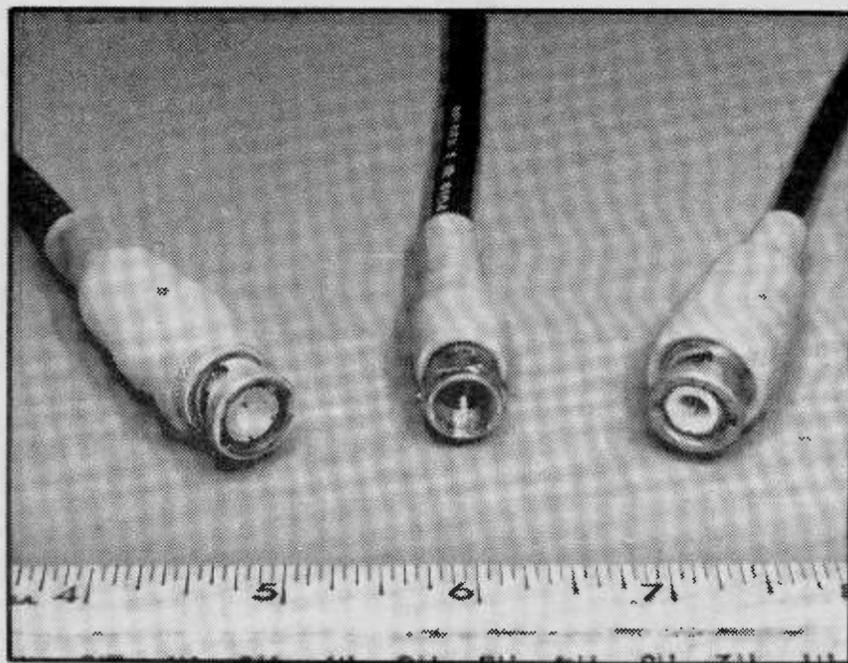
Rumor has it that Uniden, new owner of the Bearcat scanner brand, will be releasing four new programmable models before the end of the year. It is expected that these will be several models under development before Uniden's acquisition of the company's assets two years ago.

MT will present complete details when they become available.

KILOTECH WEATHER BOOTS

An alternative to sticky, messy sealants is now offered by Kilo-Tec (P.O. Box 1001, Dept. MT, Oak View, CA 93022). Useful for RG-58, 59 and 8X, the vinyl boots resist moisture and solar breakdown.

A kit of six boots, your choice, is \$8.95 post-paid. Be sure to specify your cable and connector.



1985 Schedule For The Thunderbirds, Golden Knights and Blue Angels

TB = USAF Thunderbirds
GK = Army Golden Knights
BA = Navy Blue Angels

| JUNE | | | JULY | | |
|-------|------------------|-------|-------|---------------------|-------|
| 1-2 | Flint, MI | BA,GK | 4 | Memphis, TN | TB |
| 1-2 | Greenville, SC | TB | 4 | Grand Rapids, MI | GK |
| 2 | Val d'OR, Quebec | GK | 4-6 | St. Louis, MO | GK |
| 8 | Harrisburg, PA | TB | 5-6 | Cheektowaga, NY | GK |
| 8-9 | Harrisburg, PA | GK | 6 | Little Rock, AR | TB |
| 9 | Myrtle Beach, SC | TB | 6-7 | Moffett Field, CA | BA |
| 12 | Moody AFB, GA | TB | 7 | Offutt AFB, NE | TB |
| 15 | Eglin AFB, FL | TB | 11 | Plattsburgh AFB, NY | GK |
| 15 | Ft. Dix, NJ | GK | 13-14 | Niagara Falls, NY | BA |
| 15 | Lowville, NY | GK | 13-14 | Chicago, IL | TB,GK |
| 15-16 | Meridian MS | BA | 13-14 | Des Moines, IA | GK |
| 16 | Dothan, AL | TB | 20-21 | Dayton, OH | BA,GK |
| 22 | Scott AFB, IL | TB | 20-21 | Kingsley Field, OR | TB |
| 22-23 | Denver, CO | BA,GK | 20-21 | Muskegon, MI | GK |
| 22-23 | Milwaukee, WI | GK | 23-28 | Sioux City, IA | GK |
| 23 | England AFB, LA | TB | 24 | Warren AFB, WY | TB |
| 29 | McChord AFB, WA | TB | 26-27 | Baton Rouge, LA | GK |
| 29-30 | Redding, CA | BA | 27 | Pensacola Beach, FL | BA |
| 29-30 | Erie, PA | GK | 27 | Ionia, MI | TB |
| 30 | Pasco, WA | TB | 28 | Grand Forks, ND | TB |

BEHIND THE DIALS

Klockit World Time Clock

An inquiry from a reader a couple of months back sparked a reply from another reader--the first was looking for a clock that showed times for various listening target areas around the globe, and the second provided a source: KLOCKIT, Highway H-North, P.O. Box 629, Dept. MT, Lake Geneva, WI 53147 (phone 414-248-1150).

We ordered the World Time Desk Set pictured herein to sample the clock and were quite pleased with the accuracy of the quartz movement which has not shown loss or gain of even one

second in nearly a week of observation.

The gold finish pen and pencil desk set may be purchased separately as a kit, with the 7" x 9" sloped wood base requiring final finishing and staining.

The 5" diameter clock movement is powered by a single size C cell and features the names of dozens of representative worldwide cities with matching times for those zones.

Clock movement alone, \$14.95; plans and hardware, \$10.95; complete kits, \$42.95.



NEXT MONTH: A review of the complete J.I.L.C. SX-400 wide range receiving system.

THUNDERBIRDS cont'd

AUGUST

| | | |
|-------|-------------------------|-------|
| 2-4 | Brooklyn, NY | GK |
| 3 | Whidbey Is., WA | BA |
| 3 | Emendorf AFB, AK | TB |
| 4 | Weattle, WA | BA |
| 4 | Eielson AFB, AK | TB |
| 10 | Carswell AFB, TX | TB |
| 10-11 | Richards-Gebaur AFB, MO | BA,GK |
| 11 | Bergstrom AFB, TX | TB |
| 14 | Syracuse, NY | TB |
| 17 | Hanscom, MA | TB,GK |
| 17-18 | Miramar, CA | BA |
| 17-18 | Des Moines, IA | GK |
| 18 | McGuire AFB, NJ | TB,GK |
| 19-22 | Gray, TN | GK |
| 24 | Dyess AFB, TX | TB,GK |
| 24-25 | Peoria, IL | BA |
| 25 | Reese AFB, TX | TB,GK |
| 28 | Grissom AFB, IN | TB |
| 31 | Toronto, Canada | BA |
| 31 | Cleveland, OH | TB,GK |

SEPTEMBER

| | | |
|-------|-----------------------|-------|
| 7 | Hill AFB, UT | TB |
| 7-8 | Salinas, CA | BA,GK |
| 7-8 | Springfield, IL | GK |
| 8 | Kalispell, MT | TB |
| 11 | Mountain Home AFB, ID | TB |
| 11-13 | Reno, NV | BA |
| 12-15 | Reno, NV | GK |
| 13 | Keokuk, IA | GK |
| 14 | Fairchild AFB, WA | TB |
| 15 | Castle AFB, CA | TB |
| 15 | Waterloo, IA | GK |
| 21 | Virginia Beach, VA | BA |
| 21-22 | Rickenbacker ANGB, OH | TB |
| 21-22 | Topeka, KS | GK |
| 21-22 | Reading, PA | GK |
| 22 | Oceana, VA | BA |
| 28 | Casper, WY | TB |
| 28-29 | Kissimmee, FL | GK |
| 28-29 | Pueblo, CO | GK |
| 29 | Pueblo, CO | TB |

OCTOBER

| | | |
|-------|-------------------|-------|
| 5 | Iowa City, IA | GK |
| 5-6 | Kirtland AFB, NM | BA,GK |
| 11-12 | San Francisco, CA | BA |
| 12 | Shaw AFB, SC | GK |
| 12 | Ypsilanti, MI | GK |
| 17 | Kaneohe Bay, HI | BA |
| 19 | Waikiki Beach, HI | BA |
| 19-20 | South Bend, IN | GK |
| 20 | Barbers Point, HI | BA |

| | | |
|-------|-------------------|-------|
| 20 | McConnell AFB, KS | TB,GK |
| 26 | Altus AFB, OK | TB,GK |
| 26-27 | Point Mugu, CA | BA |
| 27 | Holloman AFB, NM | TB,GK |

NOVEMBER

| | | |
|-------|-------------------|-------|
| 2 | March AFB, CA | TB,GK |
| 2-3 | Opa Locka, FL | BA,GK |
| 3 | Edwards AFB, CA | TB,GK |
| 5-8 | Los Angeles, CA | GK |
| 9 | Fort Huachuca, AZ | TB |
| 9-10 | Lake Charles, LA | BA,GK |
| 9-10 | Glendale, CA | GK |
| 10 | Norton AFB, CA | TB |
| 12-14 | Houston, TX | GK |
| 16-17 | Pensacola, FL | BA |
| 23-24 | Chandler, AZ | GK |

DECEMBER

| | | |
|---|------------------|----|
| 7 | Philadelphia, PA | GK |
|---|------------------|----|

MONITOR THESE SPACE SHUTTLE NETWORKS

It's as predictable as the spring rains--every time the Space Shuttle is launched, MT telephones light up with calls from listeners eager to tune in on shuttle voice frequencies.

During the days of Project Gemini, the HF band was resplendent with single sideband traffic related to the space shots; even the capsule itself has HF capability on board, frequently reported on 15.016 Hz USB.

But the days of simple reception of space related activities are over; S-band (2.3 GHz) communication is primary, while some UHF support can be heard.

Still, tracking stations around the globe utilize HF for some voice and data links, and UHF is used for limited shuttle-to-ground communications.

The most commonly reported frequencies are listed below, along with typical uses where applicable.

HF Freq. kHz (USB)

| | |
|----------|-------------------------------|
| 3187 | |
| 4704 | |
| 5718 | |
| 5810 | Cape Radio; nighttime primary |
| 6896 | Cape Radio to Antigua |
| 7525 | Booster recovery vessels |
| 7765 | " |
| 9043 | |
| 10780 | Cape Radio; daytime primary |
| 14455 | Down range vessels |
| 20189(±) | Cape Radio to Ascension |

UHF Freq. MHz (AM)

| | |
|-------|-----------------------------|
| 259.7 | Shuttle to ground secondary |
| 296.8 | Shuttle to ground primary |

AMATEUR REBROADCAST NETWORKS

| | |
|-----------|---------------|
| Freq. kHz | |
| 3850 | (LSB) Houston |
| 3860 | (LSB) Goddard |
| 7185 | (LSB) Goddard |
| 7230 | (LSB) Houston |
| 14280 | (USB) Houston |
| 14295 | (USB) Goddard |

Direct shuttle transmissions (UHF) are not receivable north of the southernmost states during equatorial missions, but when the shuttle craft is in a polar orbit, these transmissions may be received for hundreds of miles with a simple antenna and appropriate scanner.

Here at MT headquarters, we received UHF signals from 500 miles distance during an EVA (extravehicular activity--"space walk"), one of the times when the UHF system is activated.

And even if you aren't successful in receiving space-related communications, you may dial up NASA's astronaut voice loop direct for \$.50 per minute at 900-410-6272.

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Converts out-of-band signals to vhf or uhf scanner bands. Cables provided. Simply plug into scanner.



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400-420 MHz Federal Government & FBI
240-270 MHz Navy/Air Force Satellites
135-144 MHz Weather Satellites
72-76 MHz Industrial & Radio Control

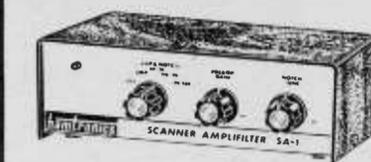
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Get clearer distant reception using ACT-1 POWER ANTENNA instead of scanner's built-in whip. This compact 21 - inch antenna has integral preamplifier, gives up to 15 dB gain (30 times as strong), plus all the advantages of a high antenna away from noise pickup. Often outperforms much larger indoor antennas! Easy to install on any vertical surface indoors or out. No mast required. Covers all bands: 30 - 900 MHz. Complete with 50 ft. cable, ready to plug into scanner.

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Mills, Sticks and Penmanship

by D.K. deNeuf, WAISPM

Before the typewriter came into use in the early 1900s, telegraph operators copied messages in longhand. Virtually all operators used a style called "telegraphic script." They were taught very early in their training that it was mandatory they produce handwriting which was 100% legible to anyone.

In railroad dispatching misinterpreted orders could mean disaster. In business and market messages a mistake could involve large sums of money. A sample of "telegraphic script" is shown in Figure I.

The average Morse sending operators transmitted at probably 20 to 25 words per minute, with handwriting receivers just managing to keep up with them. When the typewriter was introduced it gained widespread popularity in the telegraph field; now, sending operators couldn't send fast enough to keep receivers really busy. The introduction of the semi-automatic key, or "bug," not only made the sending operator's job easier, but it speeded up traffic movement.

In press telegraphy the "Phillips Code," a set of some 3,000 abbreviations for words and phrases, helped to speed up news movement still further: "APC" stood for "appreciate"; "XXN" for cross-examination; "POTUS" for "President of the U.S."; "POX" for "police"; etc., which the receiving operator spelled out in full, of course, with his fingers often kept very busy!

Operators almost invariably referred to a typewriter as a "mill." If for some reason they had to write with a pencil or pen they'd say they were having to copy "with a stick."

Somewhere along the way in wireless transmission there appeared instructions for "copying messages at field stations with pencil and paper" and the title read "GOVERNMENT PRESCRIBED PRINTING" (See Fig. II). I've never found out what government entity devised this - if indeed it was a government source.

THE WESTERN UNION TELEGRAPH COMPANY.

Receiver's No. _____ Time Filed 10 am Check 3 paid
 SEND the following message subject to the terms on back hereof, which are hereby agreed to.
 New York July 29 -02
 John Brown
 Chicago, Ill.
 Come home immediately
 Mother

GOVERNMENT PRESCRIBED PRINTING

(FOR COPYING MESSAGES AT FIELD STATIONS WITH PENCIL AND PAPER)



ARROWS INDICATE DIRECTION OF STROKE

"Natural Radio"

by W. Clem Small, KR6A

Today's emphasis on natural herb remedies, natural approaches to health, natural foods, natural flavors, and other such things which need no artificial additives or changes to be useful, indicates a healthy respect for the bountiful blessings with which providence has provided us. It seems to me that it is "high-time" that someone pointed out that "natural radio" is among the natural things which we may enjoy.

Natural radio needs no artificial source of power such as a battery for its operation. It has been around in various forms since before the time of Heinrich Hertz, the accepted discoverer of electromagnetic radiation (radio waves). Not only has it "been around," it has produced some remarkable and useful contributions to the ongoing history of radio communication. And thereby, as the saying goes, hangs a tale.

● One of the most interesting examples of a natural approach to radio was that of Mahlon Loomis, a dentist who, around 1865, developed his "aerial telegraph."¹ The

emphasis on naturalness contained in some phrases in his original 1872 U.S. patent is interesting. He wrote: "The nature of my invention...utilizing natural electricity...without aid of wire or artificial batteries..."

You see, Loomis developed his system on the premise that the upper atmosphere was a "static sea" charged with electricity. This natural sea of electricity could be utilized by raising a tall tower on a mountaintop and making a connection between that static sea and the earth. Then, by making waves of electrical disturbance in the static sea, "wireless" communication would be possible with another such tower on a different mountaintop far away.

In fact, Loomis was able to communicate between mountaintops by using, instead of towers, kites covered with copper gauze and tethered by a copper string. This kite-string aerial was earthed--grounded--by placing its lower end in a pool of water on the mountaintop. His detector was a galvanometer connected in series with the receiving kite-aerial, and his transmitter was the other kite-aerial which had a switch or key in series with it.

This system probably actually emitted electromagnetic waves as the switch sparked upon being opened. On the other hand, his galvanometer was not a detector of electromagnetic waves, so he fell short of inventing a radio system; his was more likely a conduction (through the atmosphere and earth) wireless system as he claimed, rather than a true radio system. He did, however, communicate over distances up to 14 miles, demonstrating a natural means of "wireless" communication using no batteries or generators, only the energy extracted from the atmosphere!

● Later, Maurice Child actually operated a spark-

gap wireless station on atmospheric electricity by utilizing the electrical charge given to his 180 foot tall antenna by a hail storm.² He was able to communicate across a distance of three miles with this system, and estimated from the length of the spark which he produced that he could have communicated over a distance of 100 miles had he had the opportunity at that time.

Child's system actually produced electromagnetic radiation, but was not one upon which you could depend to be operational at any convenient moment. On the other hand, it certainly did suggest an alternative technique which might bear further study in the natural "wireless" tradition commenced by Loomis in 1865.

● Another line of research on natural radio began with Benjamin Franklin flying his famous kite in an electrical storm. His work led to the development of lightning rods which are a means of providing a low-resistance ground return circuit for electrical energy which otherwise may strike as a destructive lightning bolt.

Oliver Lodge, an Englishman who followed Franklin in the study of lightning, came very close to discovering wireless or radio waves prior to Hertz. For his lightning-inspired studies, he used practically the same sort of apparatus as Hertz had used to demonstrate wireless waves, lacking only an antenna.

Hertz, in his now classic Electric Waves,³ wrote of Lodge: "...there can scarcely be any doubt that if I had not anticipated him he would have also succeeded in observing waves in air, and thus in proving the propagation with time of electric force." Thus, Lodge, studying a natural form of radio-wave generation (lightning bolts), was just a step away from being the person to give electromagnetic wave communication to the world. Obviously, natural radio has been important since the beginning of radio and even before.

● In case you haven't yet realized it, lightning bolts are actually nature's own version of the old-time spark-gap wireless transmitter. They send electromagnetic waves far and wide--just listen to an AM broadcast radio station during a thunderstorm if you think that claim might be incor-

RADIO NOSTALGIA cont'd

rect! Thus, we may correctly call lightning bolts "natural radio transmitters."

Popov (or Popoff if you prefer), the Russian radio pioneer, was inspired by the work of Lodge to study electric waves. He reported the use of these natural radio waves in 1895.⁴ Popov set up a radio receiving station consisting of a vertical antenna, coherer detector with bell indicator, and ground. With this he monitored distant lightning bolts by the radio waves they emitted. Although he used artificial power (a battery) to power his bell, he received radio waves generated in a totally natural manner, and thus is a pioneer of natural radio. But surprisingly, Popov was preceded in this work much earlier by a man who used a totally natural method of radio reception of these natural radio waves.

Joseph Henry in 1842 connected the metal roof of his home to the ground through a coil of wire, thus creating the world's first vertical receiving antenna system. In this coil he placed an iron needle and found that lightning bolts up to 20 miles away would magnetize the needle!⁵ Both Henry and Popov thus developed systems which could warn of approaching storms without the need of a weatherman or radio newscaster at an "unnatural radio station," as an intermediary: the work of each of these pioneers gives an excellent example of natural radio.

In the early days of this century, many boys, and probably a few pre-women's-lib girls, set up weather monitors similar to Popov's in their attics to detect approaching storms. Why don't they do that yet today? The system still works the way it did for Popov! Even now, some manufacturers make a modern "high-tech" version of Popov's weather detector which is said to be effective in warning of approaching storms useful even in today's world of satellite-based radio weather reports.

● You may be aware that many of the early forms of wireless or radio detectors were right at home in a natural radio station. Crystal detectors and electrolytic detectors functioned on only the power of the incoming wave, requiring no artificial battery for their use. Some circuits called for a bias battery, but most did not. The coherer could

be tapped (an essential action if it was to function) by natural energy supplied by your hand as you wound up a clockwork motor for its tapper.

Most coherers, however, seem to have been tapped by an electric battery-operated (thus "non-natural") vibrator. Marconi's famous magnetic detector had a spring-wound motor to drive it using the natural energy of hand and arm muscles to wind it up.

Right up until the days of the Fleming valve and audion (early vacuum tubes) most radio receivers were natural radio receivers. Of course it is perfectly feasible to use these old-time detectors today, depending on the application. For local AM broadcast and even strong long- and short-wave AM reception, the old crystal detector receiver or "crystal set" is fun to build and use.

Figure one below shows the wiring diagram of an old-time wireless receiver which used a crystal detector.⁶ This natural radio will work as well today for you as it did for the old timers who used it as their communication receiver in commercial, military and even amateur wireless applications in days long gone by.

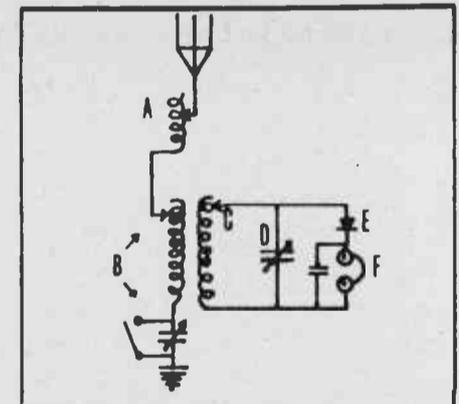


Figure 1. A natural radio receiver.
This was an "all-band" communications receiver of yesteryear. It was used for receiving from very long to moderately-short wavelengths back in the 1920's and earlier. This receiver is actually a rather sophisticated design for those days, complete with antenna loading coil (a), antenna tuner (b), band changing switch (c), tuning capacitor (d), crystal detector (e), and headphones (f).

● While we're on this theme of natural radio, let's not overlook the natural antenna and natural ground systems available. Back in 1904, Major General George Owen Squier reported that a living tree could be used as an antenna for the reception of radio signals.⁷ With a natural antenna we might want to use a natural ground, and Dr. Lee deForest has shown us one.

During some research he was pursuing in 1903, deForest was making reception tests in a remote location and needed a ground connection for his portable receiver. Not having a prepared ground rod handy, he merely peeled the bark off a nearby bush and used

the connection to earth formed through the moist interior of the plant and its roots.⁸ DeForest's account of the incident indicates that the bush worked fine!

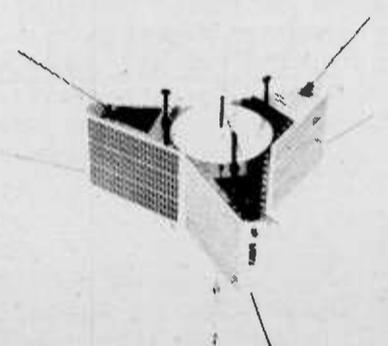
So, you can see that natural radio is not just a clever phrase, it is a reality that has shown some interesting accomplishments in radio's past. So far as we know, it is possible that its full potential has not yet been realized. When I think of the work already done in this area, I can't help wondering what would happen if some curious-minded inventor, amateur, engineer, or physicist seriously applied himself to the investigation of the atmospheric electricity idea as conceived by Loomis and furthered by Child. Who knows? There may be a Nobel prize waiting for the creative mind that closes in on that goal!





AMSAT

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OSCAR

Do you know that *amateurs* have launched over a dozen satellites into earth orbit? Some of these spacecraft have achieved orbits over 20,000 miles high! Signals from these satellites can be received using relatively small antennas and a preamplifier and/or converter connected to your present shortwave receiver. If you are a licensed Radio Amateur with at least a Technician Class license, you can communicate through most of these satellites to obtain reliable international ssb, cw, RTTY or SSTV communications. Special bulletins and other informational messages are available on satellite beacons. Informal conferences regarding space activities are conducted on these satellites and on various shortwave frequencies.

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 - Fly my name on the next OSCAR satellite and send me the special personalized certificate attesting to my support of the Amateur Space Program \$15 minimum donation please.
- Enclosed please find my check Please charge my VISA/MC account.

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City _____ State _____ Zip _____
AMSAT Membership No _____ Special interest(s) _____
For VISA/MC Card No _____ Exp date _____
Bank No. (MC only) _____ Signature _____

*Although an Amateur Radio license is required for two-way communications via OSCAR satellites, you do not have to hold such a license to be a full voting member of the AMSAT team.

1995

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Listener's log

Logging 170 Meters

by Craig Healy
66 Cove Street
Pawtucket, RI 02861

Loggings and information for the 1600-1800 kHz range. All times are GMT.

(ED.NOTE: The frequency range 1600-1800 kHz, just above the standard AM broadcast band, is a reservoir of fascinating noises. Cordless telephone bases, navigational beacons, fishing buoys, maritime stations, Travelers Information Service, and

many other users, registered and unregistered, populate this tiny portion of the radio spectrum.

One of the delights about the monitoring hobby is that no matter how esoteric the quarry may be, someone out there is listening to it. Craig Healy is one of those intrepid individuals and his loggings, compiled from contributions by other listeners, are reprinted from time to time in MT).

| Freq | Location/ Time/Date/Call-ID | (Credit) |
|------|--|----------|
| 1605 | NEW HAMPSHIRE Conway 2227 5/1 White Mt. National Forest | TIS (RF) |
| 1610 | ANGUILLA The Valley 0156-0230 2/10 Caribbean beacon | (JG) |
| 1610 | GUATEMALA Rabinal 0610 1/26 RAB | (DW) |
| 1614 | 0218 11/6 KA83348 | (RF) |
| 1614 | 0103 11/25 0447 | (RF) |
| 1615 | 0220 11/6 KA84028 | (RF) |
| 1618 | 0504,0508 2/4 KA83771 | (CH) |
| 1619 | 0607 1/26 UBT | (DW) |
| 1621 | 0512 2/4 KA83774 | (CH) |
| 1623 | 0225 12/10 KA83776 | (RF) |
| 1623 | 0146 11/5 KA8377 | (RF) |
| 1624 | 1/28 Random dots/dashes | (MH) |
| 1628 | 0205 1/23 HSN | (DW) |
| 1630 | 1/28 "Pinging" sounds | (MH) |
| 1630 | 0247-0248 2/10 Unid station | (JG) |
| 1630 | 0222 11/6 KA83326 | (RF) |
| 1632 | 0201 11/17 KA83785 | (RF) |
| 1633 | 0243 11/6 KA83786 | (RF) |
| 1633 | 0218 11/5 P446 | (RF) |
| 1633 | 0240 11/6 0285 | (RF) |
| 1633 | 2238 11/13 M472 | (RF) |
| 1633 | 0240 11/13 D445 | (RF) |
| 1634 | 0245 12/2 L313 | (RF) |
| 1634 | 0243 12/2 R110 | (RF) |
| 1634 | 0240 11/16 0221 | (RF) |
| 1634 | 2230 11/13 V382 | (RF) |

| | | |
|------|--------------------------------|------|
| 1634 | 0238 11/13 K290 | (RF) |
| 1634 | 2207 11/10 F59 | (RF) |
| 1634 | 2210 11/10 I384 | (RF) |
| 1634 | 0239 10/22 KA80051 | (RF) |
| 1634 | 2215 11/10 B445 | (RF) |
| 1635 | 0521 2/4 L313 and dash | (CH) |
| 1635 | 2209 11/10 R447 | (RF) |
| 1635 | 2219 11/10 0183 | (RF) |
| 1635 | 2137 12/19 L447 | (RF) |
| 1635 | 2137 12/19 W182 | (RF) |
| 1635 | 2137 12/19 L373 | (RF) |
| 1635 | 0214 12/29 B444 | (RF) |
| 1635 | 0214 12/29 F383 | (RF) |
| 1636 | 0234 11/5 KA81192 | (RF) |
| 1636 | 0231 11/5 KA81184 | (RF) |
| 1636 | 0101 11/25 J314 | (RF) |
| 1636 | 2218 11/10 V441 | (RF) |
| 1636 | 2221 11/10 R258 | (RF) |
| 1636 | 2223 11/10 W182 | (RF) |
| 1636 | 0220 12/10 C311 | (RF) |
| 1636 | 0115 1/14 A449 | (RF) |
| 1637 | 0252 11/6 KA81194 | (RF) |
| 1637 | 2229 12/15 U446 | (RF) |
| 1637 | 2148 11/10 F288 | (RF) |
| 1637 | 2148 11/10 L373 | (RF) |
| 1637 | 2148 11/10 U449 | (RF) |
| 1637 | 2149 11/10 Z442 | (RF) |
| 1637 | 2150 11/10 F287 | (RF) |
| 1637 | 2151 11/10 N443 | (RF) |
| 1637 | 2154 11/10 0181 | (RF) |
| 1637 | 2155 11/10 G447 | (RF) |
| 1637 | 2233 11/13 E284 | (RF) |
| 1638 | 0251 11/6 KA81185 | (RF) |
| 1638 | 0253 11/6 KA83333 | (RF) |
| 1638 | 0153 11/25 S340 | (RF) |
| 1638 | 2241 11/13 I448 | (RF) |
| 1638 | 2241 11/13 L446 | (RF) |
| 1638 | 2240 11/13 0290 | (RF) |
| 1638 | 0305 11/6 V311 | (RF) |
| 1638 | 2206 11/10 I55 | (RF) |
| 1639 | 0304 11/6 KA83334 | (RF) |
| 1641 | 2158 11/10 P372 | (RF) |
| 1641 | 2159 11/10 U450 | (RF) |
| 1641 | 0229 11/6 KA83794 | (RF) |
| 1641 | 0223 12/2 0384 | (RF) |
| 1641 | 0236 12/2 Q450 | (RF) |
| 1641 | 0247 11/16 0448 | (RF) |
| 1641 | 0248 11/16 Z190 | (RF) |
| 1641 | 0112 1/14 N322 | (RF) |
| 1641 | 0113 1/14 0450 | (RF) |
| 1642 | 0513,0517 1/31 H386 | (CH) |
| 1642 | 0515,0519 1/31 0384 | (CH) |
| 1642 | 0520 1/31 R372 | (CH) |
| 1642 | 0142 11/5 NV43 | (RF) |
| 1642 | 0145 11/13 L450 | (RF) |
| 1642 | 2230 11/10 R280 | (RF) |
| 1642 | 2232 11/10 S190 | (RF) |
| 1642 | 2233 11/10 0316 | (RF) |
| 1642 | 2237 11/10 D57 | (RF) |
| 1642 | 0123 11/20 J451 | (RF) |
| 1642 | 0039 12/5 U448 | (RF) |
| 1642 | 0039 12/5 A432 | (RF) |
| 1642 | 0055 12/16 N56 | (RF) |
| 1642 | 0227 11/6 H374 | (RF) |
| 1642 | 0153 11/5 B383 | (RF) |
| 1643 | 0151 11/5 C321 | (RF) |
| 1643 | 2203 11/10 Q17 | (RF) |
| 1643 | 2204 11/10 0442 | (RF) |
| 1644 | 0500,0504 1/31 KA83797 | (CH) |
| 1645 | 1/28 "Pinging" | (MH) |
| 1648 | 1/28 Geiger counter-like sound | (MH) |
| 1648 | 0209 11/5 KA83343 | (RF) |
| 1648 | 0207 11/5 KA81193 | (RF) |
| 1648 | 0203 11/5 KA83800 | (RF) |
| 1649 | 0218 12/10 KA81164 | (RF) |
| 1650 | 2214 11/10 I373 | (RF) |
| 1650 | 0116 11/20 E448 | (RF) |
| 1650 | 0117 11/20 D448 | (RF) |
| 1650 | 0117 11/20 S441 | (RF) |
| 1650 | 0118 11/20 R447 | (RF) |
| 1650 | 0120 11/20 M185 | (RF) |
| 1650 | 2229 12/15 I186 | (RF) |
| 1650 | 2231 12/15 B381 | (RF) |
| 1650 | 2232 12/15 X448 | (RF) |
| 1650 | 0044 11/18 I320 | (RF) |
| 1652 | 2228 12/15 C187 | (RF) |

| | | | | |
|--------|------------------|-----------|------------------------------------|------|
| 1653 | 0212 | 12/6 | P446 | (RF) |
| 1662 | | 1/28 | KA84075 | (MH) |
| 1665 | ECUADOR | | Lago Agrio | |
| | | 0646 | 1/26 LAG | (DW) |
| 1679 | 0208 | 11/17 | I2 | (RF) |
| 1680 | 1/28 | | "Pinging" | (MH) |
| 1685 | COLOMBIA | | Mercaderes | |
| | | 1056 | 1/7 MER. Also 1055 1/21 | (AP) |
| 1685 | COLOMBIA | | Mercaderes | |
| | | 0600 | 1/26 MER | (DW) |
| 1700 | | 1/28 | "Pinging" | (MH) |
| 1714 | 0900 | 1/26 | Cubic Argo | (JC) |
| 1716 | 0900 | 1/26 | ET or Cubic Argo | (JC) |
| 1740 | | 1/28 | Loran-A type sound | (MH) |
| 1746 | 0900 | 1/26 | Decca HiFix | (JC) |
| 1746 | | 1/28 | Modulated pulses 1 tone/sec | (MH) |
| 1747 | 0900 | 1/26 | Decca HiFix | (JC) |
| 1748 | 0900 | 1/26 | Decca HiFix | (JC) |
| 1760 | | 1/28 | Random modulated pulses | (MH) |
| 1764.8 | 0900 | 1/26 | Cubic Argo | (JC) |
| 1768 | | 1/28 | Random modulated pulses | (MH) |
| 1771 | 0900 | 1/26 | Cubic Argo | (JC) |
| 1613 | GUATEMALA | | Rabinal | |
| | | 0931 | 1/25 RAB | (SN) |
| 1616 | 2300 | 2/23 | KA83348 | (TW) |
| 1619.5 | 0934 | 1/25 | UBT | (SN) |
| 1622 | NEW YORK | | Yonkers | |
| | | 0215 | 3/4 KPF-941 | (JD) |
| 1629 | 0459 | 1/24 | KA81126 | (SN) |
| 1632 | PAPUA NEW GUINEA | | | |
| | | 1927 | 3/4 OKT? | (ET) |
| 1632 | 2050 | 2/22 | BRNJ | (TW) |
| 1632 | 2009 | 2/23 | BRN | (TW) |
| 1632 | 2113 | 2/24 | RRP | (TW) |
| 1633 | 0442 | 1/24 | HSN | (SN) |
| 1635 | 0246 | 3/12 | R372 | (JR) |
| 1635 | 0247 | 3/12 | 4110 | (JR) |
| 1637 | 0245 | 3/12 | S446 | (JR) |
| 1647 | 0330 | 1/31 | KA83901 | (SN) |
| 1651 | 0929 | 1/25 | KA83M | (SN) |
| | | | Also w/dash 0450 1/24 | (SN) |
| 1684 | COLOMBIA | | Mercaderes | |
| | | 0936 | 1/25 MER | (SN) |
| 1689 | PAPUA NEW GUINEA | | Mount Hagen | |
| | | 1929 | 3/4 MH | (ET) |
| 1689.8 | 0926 | 1/25 | E396 | (SN) |
| 1703 | 0323 | 1/31 | KA83756 | (SN) |
| 1725 | 1980 | 2/23 | Carrier pulsing | (TW) |
| 1769 | 2022 | 3/4 | 2AAV | (ET) |
| 1784 | 1941 | 3/4 | 2AAW and dash | (ET) |
| 1610 | WASHINGTON | | Port Townsend | |
| | | 0003 | 3/24 TIS station; Also Olympia, WA | |
| | | | TIS (Call KNHC- or KNEZ-262) | (BP) |
| 1613 | GUATEMALA | | Rabinal | |
| | | 0736 | 3/3 RAB | (RR) |
| 1620 | 0728 | 3/3 | KA83316 | (RR) |
| 1621 | 0725 | 3/3 | UBT | (RR) |
| 1622 | NEW YORK | | Yonkers | |
| | | 0010-0021 | 3/14 KPF-941 | (RR) |
| 1670 | 1233 | 3/24 | Unidentified Japanese | |
| | | | Marine WX BC stations? | (BP) |
| 1675 | 1239 | 3/24 | Unid SSB (Japanese?) | (BP) |
| 1685 | COLOMBIA | | Mercaderes | |
| | | 0743 | 3/3 MER | (RR) |
| 1700 | TAIWAN | | | |
| | | 1315 | 3/24 Keelung Fisheries | |
| | | | station? Female, Chinese. | (BP) |
| 1700 | 1353 | 3/24 | KQSV, unid code | (BP) |

Credits:

| | |
|-----------------|-------------------|
| Jack Cowart, | Jacksonville, FL |
| John Demmitt, | Bellefonte, PA |
| Russ Foss, | Hiram, ME |
| Joey Garcia, | Key West, FL |
| Mike Hardester, | Modesto, CA |
| Sam Neal, | Cleveland, TX |
| Art Peterson, | Richmond, CA |
| Bruce Portzer, | Kalaloch, WA |
| John Ramsey, | W. Hartford, CT |
| Robert Ross, | London, ON |
| Eric Thew, | Western Australia |
| Daryl Waggoner, | Harrison, AR |
| Thomas White, | Arlington, VA |

The FCC has stopped taking applications for broadcast station remote pickup stations on 1606, 1622, and 1646 kHz. This is in preparation for the deletion of the service in this part of the band, due to the coming expansion to 1700.

Rob Gerardi sends a few beacons in the 160m ham band. Might be handy as propagation pointers:

- 1805 OA36 Peru
- 1830 DHJ Germany
- 1831 OSN Belgium
- 1834TL31 Central African Republic
- 1834 NITON RADIO France(USB)
- 1837 ZA01 Albania
- 1837 0712 Faeroe Islands
- 1865.5 MPG England
- 1870 JD18 Japan

Geir Stokkeland of Norway sent a nice letter and

lists some Norwegian stations:

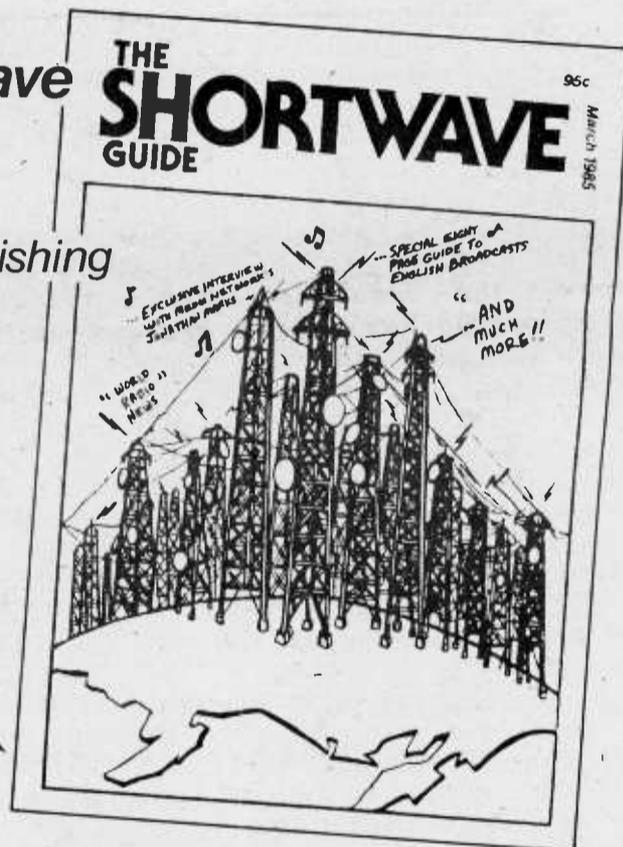
- 1722 LGA Alesund
- 1722 LGI Hammerfest
- 1722 ... Jan Mayen
- 1729 LGV Vardo
- 1736 and 1694
- LGS Svalbard (Spitsbergen)
- 1758 ... Bear Island

Geoff Halligey mentions in his "European Newsletter" column in LWCA's "LOWDOWN" that Rogaland Radio (LGB) Norway uses both 1644 and 1646 kHz. These are TOR (teletype) channels and are paired with 3148 and 3147 kHz respectively. These channels are used for communications with Norway's North Sea oil fields and will not be published for general marine use.

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CLUB CORNER

Paul Swearingen
P.O. Box 4812
Panorama City, CA 91412

It's been interesting watching new regional DX clubs spring up to join the ranks of the established clubs ... one has to feel that in spite of the current (or is it passing?) computer craze which probably siphoned away many potential younger listeners from the DX hobby, more and more

people of all ages are becoming DX'ers.

The bulletins I receive from the various clubs reveal hundreds of hours of volunteer manpower going into club work, and I have to believe that we're seeing only the beginning of a new wave of enthusiasm for the

CLUB CORNER cont'd

hobby, in spite of the occasional "moaner and groaner" who insists that listening conditions have deteriorated so much that he just can't DX any more.

With FCC deregulation, many changes are taking place in the broadcast band; some stations are unable to meet the competition and are going silent, but far more are vying for open channels in the former clear channels. New short-wave stations are taking to the air in the U.S. Best of all, good inexpensive portable receivers (such as the Sony ICF-2002, the Sharp FV 610, the Toshiba RP-F11 and the venerable Panasonic RF-2200, to name only a few) make it possible for almost anyone to be able to afford to become an SWL.

I firmly believe that we are seeing only the beginning of things to come; although we may not see the same degree of participation in SWL'ing in this country as happened in Japan ten years ago (complete with clubs in schools and various magazines devoted to SWL'ing) we'll continue to see new clubs come into being and the older clubs rejuvenating to meet the "competition." And I'd appreciate receiving info from club officers as things happen! Thanks to those of you who have been forwarding bulletins from the new clubs, too, by the way.

Chuck Boehnke of Los Gatos, California, brings up an interesting problem which I'm sure will draw a solution from one (or more) MT readers. He notes that it's difficult to determine exchange rates when one is attempting to join a club in another country, and that the International Money Orders available from the USPS are "clumsy and difficult to arrange."

He continues, "What we need is some kind of a clearing house or some such method where people could join foreign clubs easily, including working out a method of payment. There are many good clubs outside the USA and there must be some way for us DX'ers to join them without so much hassle and difficulty."

My banks charges me a whopping rate for converting currency, too, Chuck, and although IRC's are fine for ordering sample copies from clubs, I don't think that they would be thrilled to receive a basket full of IRC's for a year's subscription! Perhaps ANARC, EDXC and SPARC could come up with

some kind of cooperative effort aimed at exchanging international memberships.

I don't have a ready solution, Chuck, but let's hear from some of our readers with their suggestions. Sounds like a good topic for discussion at the ANARC meeting this July, too. Thanks for the idea, Chuck.

DX'ers in the Denver area seem to be getting together about every two weeks, according to a newsletter (entitled "Colorado DX Get-Togethers") published by Rob Harrington. I hosted a get-together March 31 ... and although I thoroughly enjoyed the experience, I'm not sure I could plan get-togethers more than once or twice a year ... but I applaud the enthusiasm of the Coloradans!

The Great Circle Short-wave Society has taken on a unique and historical project. Years ago, the now-defunct Popular Electronics magazine started a registration program for SWL's, issuing 40,000 calls worldwide to listeners. Some records have been lost, and the GCSS is attempting to list as many WPE call holders (including those converted to WDX prefixes under Hank Bennett's current program) in a directory.

If you hold a call or know of others who do, send them to GCSS WPE Directory, Attn: Vern A. Weiss WPE9GHF/WA9VVK, Box 874, Kankakee, IL 60901. If known, please include the date on your registration certificate.

Great Circle also plans to offer exact reproductions of the original shortwave monitor registration certificates. Information about this or the GCSS awards program, the weekly SWL net conducted on ham radio by Larry Wheeler WPE9AVS/K9ZCH, and many other features of special interest to short-wave enthusiasts are published regularly in the club's newsletter which can be yours for a 22-cent stamp sent to the same address.

Make plans now to attend one or more radio club conventions this summer! Remember, to get the best rates if you're flying you may have to make reservations 30 days in advance.

ANARC may well be sponsoring the conventional that will make Milwaukee famous, July 19-21. Send two 22-cent stamps or three IRC's to ANARCON '85, P.O. Box 24, Cambridge, WI 53523-0024 for information on registration, reservations, and programs. The National Radio Club is host sponsor;

their own convention will be August 30-September 2 in Rhode Island. Send an SASE to the same address for registration information.

Southern California Area DX'ers will get it together Saturday, June 15, 10-4, at the Village View School Auditorium, 5361 Sisson Drive (east of Bolsa Chica), Huntington Beach, CA. Bill Pasternak WA6ITF of the "Westlink Report" will be guest speaker. Send a #10 SASE to SCADS, 3809 Rose Ave., Long Beach, CA 90807-4334 for further information.

Due to uncooperative gathering place management, the International Radio Club of America had to change both the location and date of its convention. It will now be held August 23-25 in Portland, Oregon. Send an SASE to convention host Bill Block (9307 S.E. Clay, Portland, OR 97216) for an update.

August 2-4 will find Worldwide TV/FM DX Association members in New Orleans for their convention. An SASE to WTFDA, P.O. Box 514, Buffalo, NY 14205-0514 will get you details.

I like the first issue of Enjoying Radio, David Newkirk's new publication. The focus of the publication is on receiving equipment (although not confined to it) and the articles are

literate, frascible, authoritative, specific, and thoroughly enjoyable.

While not a club bulletin, ER is not meant to be profit-making venture, either, and Mr. Newkirk (who will continue his mthly column in "Review of International Broadcasting") is actively soliciting articles to be included in ER. Send \$1.75 for a sample copy or, better yet, send \$19.50 for a year's sub as I did; it's worth it.

I'll remind you again that the AMRAD Newsletter (published by the Amateur Radio Research and Development Corporation) is available for those of you who are interested in computer technology. A one-year membership in AMRAD is only \$15 (\$5 for full-time students); send an SASE to William P. Pala WB4NFB, 5829 Parakeet Drive, Burke, VA 22015 for details. They also pay an honorarium for original material published in the bulletin. Members of AMRAD seem to be at the forefront of computer technology development, and they'd be more than happy to have others join them in their endeavors.

That's about it for this month; don't forget that my deadline for the August column is June 10. 73.



RADIO EQUIPMENT REVIEW edited by Ronald Pokatiloff (bimonthly newsletter; 8-1/2" x 11", 12 pages typed and reproduced; \$2 per issue or sample. Write to the editor at 2661 Sheridan Rd., Zion, IL 60099)

This new bimonthly newsletter has an ambitious premise: to take over the review of new radios and accessories, a void left by the death of Larry Brookwell of the San Diego DX'ers over a year ago.

Ron's first edition (March/April '85) explores various reports on the ICOM R71A. Ron welcomes input from readers and includes classified ads from subscribers at very low cost.

We wish Ron well on this challenging undertaking and hope that his subscription list grows.

POLICE CALL RADIO GUIDE edited by Gene Hughes (9 volumes, 8-1/2" x 11", paperbound; \$6.95 each. Available from Radio Shack or from Police Call, Dept. 1, Lebanon, NY 08822 for \$6.95 plus \$.75 4th Class mail, \$1.75 first class.)

Still recognized as the leading scanner frequency directory nationwide, the 1985 edition, finally in circulation, is bigger and better than every.

Concentrating on public safety (police, fire, local government, and emergency), POLICE CALL also includes an appendix containing aircraft, non-sensitive federal government and railroads assigned in the region covered by the specific volume.

Listings are cross referenced by state and frequency, with sublistings by call sign, agency and city. Uses for the frequency within the various agencies are listed where known.

With each volume containing an average of 20,000 to 25,000 entries, they are regionally assembled as follows:

Volume 1: CT, ME, MA, NH, NY, RI, VT

LIBRARY SHELF cont'd

- Volume 2: DE, MD, NJ, PA
- Volume 3: MI, OH
- Volume 4: IL, IN, KY, WI
- Volume 5: IO, KS, MN, MO, NE, ND, SD
- Volume 6: DC, FL, GA, NC, SC, VA, WV
- Volume 7: AL, AR, LA, MP, OK, TN, TX
- Volume 8: AZ, CO, ID, MT, NM, NV, UT, WY
- Volume 9: CA, OR, WA

LATE RELEASES FROM TAB BOOKS

(Blue Ridge Summit, PA 17214)

MASTER HANDBOOK OF 100 MORE PRACTICAL ELECTRONIC CIRCUITS edited by Michael L. Fair (#804, 5" x 8", 698 pages, softbound; \$19.95)

The previous collection of 1001 circuits were primarily designed around discrete semiconductors. With the advent of domination by integrated circuits in the electronics marketplace, TAB elected to update the compendium around IC circuitry.

As with the previous edition, the book is largely --virtually exclusively--an assemblage of manufacturers' applications notes. Diagrams are large and easily read; they are provided by both consumer and commercial chip manufacturers like Motorola, GTE Sylvania, National, TI, Analog Devices, Burr-Brown, and others.

Categories of circuits include amplifiers, receivers, oscillators, transmitters, power control, computer peripherals, indicators, test equipment, converters, waveform generators and many, many more. All in all, it's quite a massive collection!

BROADCASTING AROUND THE WORLD by William E. McCavitt (#1193, 6" x 9", 336 pages, hardbound; \$22.95)

For the hard-core international broadcast SWL, this book is rich in history and statistics regarding broadcasting around the world. Virtually every aspect of international and domestic AM and FM radio and even television is intensely covered, documented by charts, tables and surveys.

The book is assembled by country, covering South Africa, Poland, Russia, Japan, South Korea, Israel, Canada, the U.S., Brazil, Guyana, India, Germany, Britain, Ireland, Italy, the Netherlands, Sweden, and Australia.

The photo illustrations are generally poor, apparently clipped from brochures and news releases; the text, however, is well written, showing the polish of

professional journalism.

THE ENCYCLOPEDIA OF ELECTRONIC CIRCUITS by Rudolf F. Graf (#1938, 7" x 9", 760 pages, softbound; \$29.95)

Author Graf, a highly-respected technical writer, has assembled some 1300 applications circuits including both ICs (the majority) and discrete semiconductors.

Topics--some 98 chapters' worth--are drawn from such diverse sources as amateur radio publications, manufacturers' applications notes and trade journals.

Alphabetized from alarms through zero-crossing detectors, the encyclopedia contains such a wealth of information it is difficult to conceive of an application not covered. We would consider the work a must for the serious designer.

THE TAB HANDBOOK OF RADIO COMMUNICATIONS by Joseph J. Carr (#1636, 7" x 9", 1048 pages, softbound; \$29.50)

This ambitious undertaking is designed to present the basics of radio communications--the circuits, the techniques, the tables--without laborious chapters on advanced theory.

Recognition of schematic symbols is required since the book is liberally illustrated with simple diagrams to support the text. Pictorial representations are also included for familiarity.

The encyclopedia might be thought of as an introductory alternative to the ARRL HANDBOOK; while not as complete, it does approach the ham radio hobby from a much more readable perspective. The text is written in a conversational style to avoid the intimidation frequently encountered in more theoretical works.

Chapters include topics on components and basic electromagnetic theory, transmitters and receivers, amplifiers, test equipment, antennas, shop techniques and safety--58 chapters in all.

ELECTRONIC DESIGN AND CONSTRUCTION OF ALTERNATE ENERGY PROJECTS by R. Andrew Motes (#1672, 5" x 8", 285 pages; \$12.95)

Interested in putting solar and wind power to work? Motes' new book shows you how. Punctuated with charts, diagrams, tables and photos, this handy manual describes equipment and techniques allowing the home experimenter to derive practical power from nature. Windmills and photovol-

taic techniques are examined from every perspective, with liberal theory sprinkled over the 14 separate chapters. Throughout the book, the overriding theme is maximum efficiency, a major consideration when power density is often at a minimum.

Discussions include the basics, measuring wind speed, DC/AC conversion, battery charging, load switching and control, automobile alternator modifications, and electric vehicles. Appendices include codes and instructions for the 8080A microprocessor which can be used to control some of the projects.

We would recommend this book to anyone, regardless of experience, interested in alternate energy sources and power.

BOOK REVIEW
by Ken Wood

INTERNATIONAL RADIO BROADCASTING by David R. Browne

Trans World Radio began in 1954 as The Voice of Tangiers and operated from Morocco until 1959. Radio Havana Cuba carried a service in the early 1960s which it called "Radio Free Dixie" and which preached that blacks in the United States were being exploited by whites.

The sensitivity of the Japanese about their image abroad seems to have been an important factor in the long delay before the recent beginnings of Radio Japan's expansion of its shortwave services to provide stronger, clearer signals through relay bases and higher power.

Those facts are representative of the dozens of things one learns about the fascinating field of international broadcasting in David R. Browne's book, International Radio Broadcasting - The Limits of the Limitless Medium (Praeger, New York, 1982).

At \$34.95 a copy, this 370 page book may be something only the most dedicated SWL's would want to add to their collection of materials on the subject. But for those whose interests or billfolds aren't that strong, the public library is just a phone call away.

Browne has a strong conviction that international radio broadcasting "has been and remains a significant form of international communication" but he also recognizes its problems, chiefly those of politics, culture, technical matters, and economics. He points out

successes and failures.

"The book," Browne says, "is intended to help its readers understand the birth and growth of international stations, the internal and external pressures on them, the sorts of messages they broadcast and the type of listeners they have."

Chapters cover the process of international broadcasting itself--including programming, technical considerations, regulation, financing, and purposes for broadcasting in the first place. Also discussed are the growth of stations, clandestine broadcasting in World War Two, and radio's use as a strategic weapon.

Still other chapters focus on individual stations such as the VOA; other American stations including those which have been operated by the CIA, the BBC, Radio Moscow and other Soviet broadcasters; the BBC; other large western broadcasters; other communist bloc broadcasters, third world stations, religious stations, and a review of the audience research that has been applied to the medium.

One learns, for example, that Tokyo Rose and Lord Haw Haw were hardly the only personalities featured on enemy stations during World War Two; Germany had Lindley Fraser, Carl Brinitzer, Donald Day, Otto Koischwitz, Constance Drexel, among others. The Japanese aired programs by "Mopy Dick" and "Orphan Annie."

One learns that, in the early 1980s at least, the Voice of America had larger audiences in some parts of the world than the vaunted BBC, and that the BBC has had periodic financial woes since the end of the war.

Browne is a professor of speech-communication at the University of Minnesota and his book is based on a quarter century of interest in the medium. He served with the United States Information Agency in Africa between 1960-63 and has also taught at Boston University and Purdue University.

He visited some three dozen stations in gathering material for the book which also relies heavily on books and articles published earlier (and hence there is a fine bibliography) as well as off-the-air excerpts used to illustrate various points. Many of these were monitored by Browne himself.

The book is readable, entertaining, extremely informative, all the while maintaining a scholarly approach to its subject. ●

BROADCASTING...

HANK BENNETT ON SHORTWAVE

"W2PNA from WD4JTS. Sure been nice talking to you, Hank, and hope to be able to contact you again in the near future. Please QSL and I'll get my card in the mail to you. 73."

Sound like the tail-end of a typical ham radio QSO? Could well be, although I haven't had the good fortune of actually talking to John Heaton, WD4JTS, of Largo, Florida, as yet. But to confirm the fact that I might have worked him, I sent the promised QSL card and anticipate receiving his within a few days.

A QSL sent between ham operators is much the same thing as a verification sent from radio stations to shortwave listeners. So, you ask, what is this leading up to?

Just this. In years past, and in the present time as well, hams and radio stations were not the only people to have station cards. Virtually every serious SWL at one time or another has had his own station card made up to his own specifications and design. Some were fairly simply while others were fantastically overdone.

Most of these cards contained much the same type of information as that found on the ham radio QSL cards: places for date, time, signal and readability reports, frequency, perhaps even one line for program data. Receiving equipment and antenna systems would also be listed.

Note that I mentioned "perhaps even one line for

program data." This one line would be fine for reports to ham operators but it would be a sorry excuse for a report to a broadcast station if sent by itself. More on this later.

At one time these SWL cards were used extensively for card swapping among the SWLs. SWLs often vied to have the finest card available and some of them would appear to have been prepared by a local chamber of commerce. Those states that boasted fewer SWLs than others (Nevada, the Dakotas and South Carolina, for example) would often find the SWLs requesting return postage for the privilege of having someone else have their card. One SWL in one of the states mentioned above once had the colossal gall to send his card out in return for one buck.

Card swapping was often accompanied by a short list of other card swappers and if the recipient hadn't already received or swapped cards with those listed, he was, of course, welcome to go after them.

Most of the radio clubs in those days devoted anywhere from a quarter page to several pages listing SWL card swappers and it was a simple matter to fill up a wall with incoming cards in little time.

Card swapping was an interesting and fun part of the hobby and we're sorry to see that it has virtually disappeared. Oh, there are still a few swappers around and our mail brings one in now and again.

The WDX Monitor Registration Program has helped to revive this facet of the hobby a bit since SWL cards can now have a specific identifier listed on them rather than the more vague term such as SWL-W3. While unofficial with no legal status, all of the WDX identifiers now in use have been issued on an individual basis with no two alike. More on this can be obtained for return postage from your editor at Box 3333, Cherry Hill, New Jersey 08034.

Returning to the sixth paragraph, I have always strongly recommended against using SWL cards for reports to broadcast stations since they rarely, if ever, contained sufficient technical and program data to warrant verifying by the station receiving the report. Cards could be sent with a separate detailed report, of course, along with return postage, but the use of the card by itself - and usually sent without return postage - often quickly found their way into the round file.

Have you heard the International Red Cross on the air yet? The Red Cross Broadcasting Service continues to broadcast on the last Sunday of each month from Switzerland. There are omnidirectional broadcasts on 7210 kHz in English at 1100, German at 1200 and Spanish at 1220, with a repeat in English the following day at 1700. There are broadcasts in English at 0940-0955 to west Africa on 17795 kHz, to east Africa on 21630 kHz, to Asia and Australia on 21520 kHz, and to Asia on 17830 kHz.

There is also a broadcast to Asia at 1545-1600 on 11870 kHz, broadcasts in Portuguese at 1010-1025 to west Africa on 11795 kHz, and to east Africa on 21630 kHz. There are broadcasts in Spanish on the following day (still Sunday in the target area) to Central America at 0000 and 0200 on 9635 kHz. (Our thanks to Sweden Calling DXers for this schedule.)

Your editor is currently having a battle royal with a mail-order firm that has both my money and two returned (in mint condition) items. Their advertising and their business practices are two totally different things. However, we would like to make mention of the fact that we also purchased a Bearcat scanner through another mail-order firm.

The scanner was delivered as advertised, within the time specified, in perfect condition, and

with a smile attached. Who was the second company? Grove Enterprises, of course! The next time you have a few loose bucks, give my boss a chance to show that he can do for you what he did for me. And if you don't have his catalog, drop him a card and he'll get one off to you.

Here's another entry into my "I'm not so perfect" column. Seems that I made another error in our recent nostalgia column. Good friend Patrick O'Connor in Hinsdale, New Hampshire, points out that I had (in question #7) Festus Hagen as having been played by Ken Curtis and Dennis Weaver. To be correct, Ken Curtis DID play the part of Festus Hagen; Dennis Weaver played a similar role in earlier "Gunsmoke" shows, but he was known as Chester Goode. Both Pat and I feel that there might have been one season where the two gentlemen played in the series together.

As a parting shot for this month, I'm requesting help in identifying a station (possibly a repeater of some sort) on 151,925 kHz using the CW callsign of KSX885. It's probably within 50 miles of Camden, New Jersey.

SWL WORLD WATCH



by Ken Wood

The arrival of the summer months brings to mind that sick old joke about seeing your mother-in-law go over a cliff in your brand new car; your feelings are decidedly mixed! Summer's many attractions are very welcome but at the same time the tried 'n true SWL cringes a bit and mourns the loss of quiet band conditions.

Take heart; summer may bring higher noise levels but it occasionally brings some excellent openings that aid reception of the fly-weight out-of-band Latins. And, despite the low sunspot count, you should also find the higher bands open later in the evening. Keep at it and don't let the QRN get you down.

TOP O' THE LINE - An intriguing new mystery station is presenting a puzzle. It's been noted over the past few weeks on 7.400

SWL WORLD WATCH cont'd

(before that on 7.360), airing the same music tape night after night - much of it sentimental Latin vocals by a man.

The station signs on at 0000 and usually runs until around 0200 with no announcements whatsoever. Signals are very strong, dominating La Voz del CID on the same frequency. More recently the station has also been heard around 1400 on 9.920.

Radio Nacional Archangel San Gabriel in Argentine Antarctica has been noted lately on 14.474 in Spanish to sign-off around 0040. Frequency and sign-off time are both slightly variable.

The Chad station, Radio Moundou, is being occasionally heard around 0500 with weak signals on 5.288. Power is reported to be just 2.5 kilowatts. Broadcasts are in French at this hour.

AFRICA - ANGOLA - Gary Hickerson in Arkansas hears Radio Nacional on new 5366 variable (ex-5334v) from 0405 sign-on. Mostly music and all in Portuguese (editor).

BENIN - ORTB in Parakou noted at 0510 in French on 5.025, but Radio Rebelde in Cuba usually blocks this channel.

BURKINA FASO - Radio Burkina now noted often on 4.815 in French around 0630.

BURUNDI - Rare La Voix de la Revolution on 3.300 heard during a very good African evening around 0500 after TGNA had left the frequency.

CAMEROON - Radio Bertoua heard at 0500 on 4.750.

CENTRAL AFRICAN REPUBLIC - RTC at Bangui in French and local languages on 5.035 from tune in around 0520, often quite good level.

CLANDESTINE - A Vox de Verdade (Voice of Truth) anti-Angolan heard from 0300 sign-on on 4.950 and to sign-off at 0350. Weak but clear, best in ECSS/USB. Pop music, several IDs and abruptly off at 0350 reports Hickerson.

Radio Truth, the anti-Zimbabwe station, continues to be heard at very good levels on 5.015 from 0430 sign-on with a bird call, then into a half hour English program.

CONGO - Radio Television Congolaise noted in French at 1900 on 15.190.

LIBYA - LJBC heard in all-Arabic on 3.200 virtually every evening with good signals. Radio Jamahiriya heard on new 9.890 evenings and at night in Arabic with

a good signal, reports Hickerson in Arkansas.

MADAGASCAR - Radio Madagasikara often heard on 5.010 variable with sign-on around 0257. Also at 0500 sign-on on 9.688, both transmissions in French.

MALI - Radio Bamako has returned to 4.783 and is noted to sign-off at 0000.

SIERRA LEONE - SLBS noted around 0600 on 5.980 with local music and IDs.

SOMALIA - Radio Mogadishu heard in vernaculars around 0400 on 7.200 but reception is very difficult due to a Voice of America outlet on the same frequency.

SOUTH AFRICA - Capital Radio, Transkei heard on variable 3.930 at 0345 with pop music, commercials in English.

SUDAN - Omdurman Radio on 5.039 in Arabic from sign-on at 0427.

ZAIRE - La Voix du Zaire from Kinshasha sometimes found with African music and French announcements around 2200 on 15.245. Lubumbashi is noted signing on at 0357 on 7.205, in parallel to 4750 (variable), but the 41 meter band outlet is usually better.

ASIA - AFGHANISTAN - Radio Afghanistan via USSR transmitters is noted at 1730 on 9.665.

BANGLADESH - Radio Bangladesh has its new 250 kilowatt outlet at Kabripur in English at 1230 on 11.935, but reception is still poor despite the higher power.

BURMA - The Burma Broadcasting Service noted occasionally in Burmese around 1230 on 4.725, but usually quite weak.

CENTRAL AMERICA - COSTA RICA's Radio Universidad on 6.107 variable is noted with sign-on just prior to 1300 but with the earlier sunrise that's unlikely now. Also heard occasionally in the evening up to 0400 sign-off.

Radio Rumbo noted at 1200 on 6.072 with music and commercials in Spanish. Announcements are often just "en Rumbo." Location is Cartago.

HONDURAS - La Voz del Junco 6.075 heard several evenings recently around 0030, all in Spanish and with pop music.

NICARAGUA - Michael Chinakos in Washington state notes the Voice of Nicaragua on 6.015 with its English hour at 0407 tune in. Jammed or interfered with from 0446.

Radio Zinica at Bluefields on 6.120 from 1100 variable sign-on, mostly music and time checks.

Radio Sandino, 6.200; all Spanish at 0130 with music and political talks.

MEXICO - XEQQ, which relays medium wave outlet XEQ, has been reactivated after a multi-year absence. Often heard in the 1300-1600 time period on 9.680. Announced as "La Q" or "La Q Mexicana."

EUROPE - AUSTRIA - ORF's English service to North America well heard at 0100 and again at 0330 tune on 6.000.

DENMARK - Radio Denmark on 15.165 at 1500 in Danish but with its usual English identification just prior to the start of the Danish hour.

ICELAND - European sources report that the Voice of Iceland is now using 9.859 around 2000 with an all-talk, all-Icelandic program.

ITALY - RAI in English noted on 9.475 at 0100.

MALTA - IBRA Radio via the Voice of Germany's relay here, heard in English at 2030 on 9.510.

MONACO - Trans World Radio heard from sign-on at 0725 on 7.160 with English and announcing a parallel frequency of 9.495.

MIDDLE EAST - IRAQ - English from Baghdad heard on 9.610 at 2130.

KUWAIT - Radio Kuwait heard with English at 1900 on 11.675. Sometimes good, but normally only fair reception.

SYRIA - The English program from Damascus is still being noted at 1200, but now on 17.840 rather than the previous 17.510.

UNITED ARAB EMIRATES - Voice of the UAE at Abu Dhabi heard on 7.310 with an English program at 0330.

SOUTH AMERICA - BRAZIL - Radio Liberal on 3.325 noted around 0600 with pop music, commercials; all Portuguese.

Radio Cultural Araraquara on 3.365 at 0205.

Radio Clube do Para on 4.895 at 0415.

Radio Araguaia on 4.905 at 1000.

Radio Rio Mar on 9.695 at 2305; all the above in Portuguese only.

COLOMBIA - Radio Nacional on 9.635 at 0500 in Spanish at sign-off.

Ondas del Orteguaza occasionally shows through on 4.975 when the strong utility station, normally here, is silent. Evenings or around 1000.

Armonias del Caqueta still being heard around 1100 on 4.915.

ECUADOR - Religious and cultural outlet La Voz de

Upano on 5.040 noted at good strength to sign-off at 0200. Location is Macas.

FALKLAND ISLANDS - FIBS still on 3.958 to sign-off at 0530. Signs on at 0900 and this is usually a better time to catch them as the ham radio QRM is not as severe.

PERU - Radio Satellite noted on 6.725 in Spanish to sign-off at 0400.

Radio Bagua on 3.310 at 1030 with a campesino program.

Radio Atlantida on 4.790 at 0305 in Spanish.

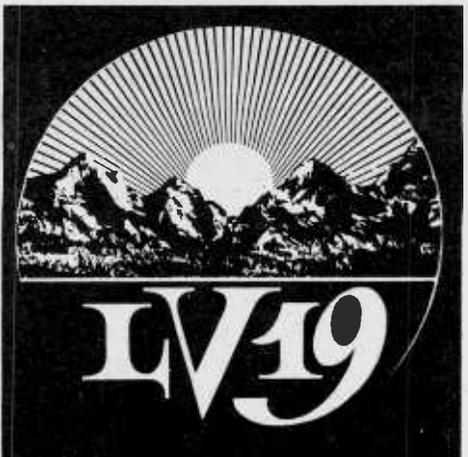
Radio San Martin, 4.810 heard to 0328 sign-off, also all Spanish.

Radio Imagen now on 5.445 and noted in Spanish around 0430. Reception from most of the Peruvians is inconsistent.

SURINAM - Gary Hickerson notes the return of Radio Apinte which he hears on 5005.7 to 0400 sign-off. Programs in Dutch; signal is weak and suffers from utility QRM.

VENEZUELA - Look for Radio Capital currently active on 4.850 as early as 0800.

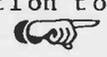
Radio Continente on 5.030 heard in Spanish at its 0900 sign-on.



CHALLENGER - It's no trick to tune in Radiodifusora Argentina al Exterior from Buenos Aires; but there's at least one active Argentine outlet which will score as a real DX catch - Radio Malargue on 6.160.

Located in the city of Malargue, the station has a listed power of only 500 watts. Nonetheless, careful tuning under the right band conditions may produce this one for you around its 1000 sign-on time. Programs are all in Spanish. The station is a fairly good verifier and takes reports to Esquivel Aldao 350, 5613 Malargue, Argentina.

JEEVES SAYS: In case you hadn't heard, Radio Earth ceased its broadcasts over Radio Clarin in the Dominican Republic at the end of March. As of this writing, Radio Earth hasn't located another station to



ENGLISH LANGUAGE BROADCASTS

by Tom Williamson

This month we will take another look at broadcasting in English from Asian countries. It should be understood, however, that apart from a few stations such as Beijing and Tel Aviv, reception is less reliable than from most other areas. This may be due to both geographical and economic reasons.

BANGLADESH: This is a rare visitor to the dial these days, but Dacca (Dhaka) has been heard in its English segment 1230-1300 in the 16 meter band on 17765 kHz (DX0, Sellers/Hopkins). Also has English sked for 1815-1915 (frequencies currently uncertain, but perhaps in 31/41/49 meter bands).

CHINA: As per earlier issues, Beijing has several broadcasts directed to North America: between 0800-1100 on 15385/15520/11650 kHz; and 1900-2100 on 15520/11650 kHz. These are directed to the east coast, while for the west they are scheduled at 1100-1200 on 17795/15520/15385...and 1200-1300 on 17795/15385 kHz.

However, China jumps around a bit, and they have recently been heard on 11360 and 9820 so check out these channels. Programs include their viewpoint on the news and interesting musical segments (see previous articles).

CYPRUS: Nicosia has not been heard here for some time but they used to have an English schedule around 1730 in the 49 meter band. Anyone hearing them now?

SWL WORLD WATCH cont'd

carry its broadcasts and is thus in a state of limbo.

We understand they have an application in the works for a station of their own which would operate from the island of Curacao in the etherlands Antilles. In the meantime, we wish the Radio Earth team good fortune in finding an interim home.

As we sail into summer, Ken and I hope you'll continue to monitor the SWBC bands and let us know what you are hearing. It may surprise you but my duties as a gentleman's gentleman prevent me from doing all of the monitoring for this column by myself. So, let us know what you are hearing.

'Til next month - when I hope you are will into your tan - 73s from Ken and me.

INDIA: The Delhi transmitters of All India Radio ought to be heard more often than they are, but they are very temperamental in signal! Many times segments are scheduled but not heard here. Try 9545 at 1300 to fadeout, whenever that may be in your area (also supposed to be on 11810/15330 at this time). Another possibility is 2045-2230 on 9912 with 11/15 MHz channels also listed, but the HF region still is very poor due to low sunspot activity. Apart from the news bulletins, they present some very distinctive and enchanting music.

IRAN: Well, of course this WOULD be an interesting one...if only they had a reliable signal! They may sometimes be audible on 9022 kHz around 1930-2030 but it is a struggle to pull in a readable signal. Otherwise they are sometimes strong on 15084 but usually in Farsi or some other unintelligible language!

IRAQ: The other half of this terrible Mid-East conflict is also a poor performer, but English may be heard on 9610 around 2130-2230...good luck!

ISRAEL: Tel Aviv continues to be the solid reliable signal from this part of the world with English on many frequencies during the day (see box summary for details). 7412/9440/9815 are the best channels for me, but even the 31 meter frequencies may be a flop in these days of poor propagation.

JAPAN: Tokyo used to be one of the all-time regular signals from Asia, but how things have changed! These days reception is infrequent but the channels of 11815/9505 are worth watching and, remember, they have conducted tests over Moyabi, Gabon, which has a powerhouse signal here in eastern North America. Much depends upon which frequency they might use in the future. I hear rumbles that NHF, the Japanese broadcasting authority, is going to spend more money on new (renovated?) short-wave facilities, so we'll see what develops.

KOREA-NORTH: Pyongyang is another irregular signal on the dial, but English may be heard sometimes at 1200-1300 on 31 meters (9745/9977 kHz). (DX0)

KOREA-SOUTH: Seoul has some powerful transmitters, but you wouldn't know it from the scarcity of loggings! 15575/11820/11810 are the most likely bets at 0200-0300 and 1400-1500, but other times are scheduled.

KUWAIT: Now here is one of the more regular signals on the dial. The 1800-2100 segment in English is audible most days with variable strength. Programs of news and Western pop music seem to predominate. If that's not a good time; try 15345 from 0500.

MALAYSIA: Despite the many parts in this nation and several transmitting sites, it continues to be elusive. Suara Malaysia, the external service, is a rare one; but the more adventurous listener may hear Kuching, Sarawak, in the 60 meter tropical band, especially with a good longwire antenna. The Red network in English may sometimes be quite audible on 4950 kHz around 1300-1400 UTC, depending upon propagation.

MONGOLIA: Ulan Bator is one of those "in-and-out" stations which, at times, can put in a good signal; not surprising because it is believed to have some 250 kW transmitters and the old frequency of 12070 kHz used to be good around 1200-1230; 6383 was another possibility. Not heard lately.

PAKISTAN: Karachi used to be good when the HF bands were in better shape; now they seem only to be heard when they are in other languages. Listen around 0230 or 1600 for scheduled English programs in the 16 or 19 meter bands...15175/15565/15590/17760/17895 variously reported, but I am uncertain of current choices.

TAIWAN: I don't need to tell you much about them! Everyone hears Taipei, the Voice of Free China (or the Republic of China if you prefer). This is due to their use of a relay via WYFR Florida, of course. 5985/6065 are the old reliable frequencies at 0200-0400 and also at 0600-0700, with exhaustive discussions on their culture and customs, along with Eastern music. But as to direct reception, that's another matter! Used to be heard on 25 meters (11825 kHz).

TURKEY: Ankara is maintaining a good reliable signal these days, at least in the 31 meter band. From 2300-0000 and 0400-0500 they

are scheduled in English on 9560 kHz. Most evenings I am able to hear them around 2300 with news bulletins and cultural talks (also a lot of politics about this Armenian matter!). They also have entrancing Eastern music.

SAUDI ARABIA: Riyadh (BSKSA) has been variously reported in the 25 meter band in English around 1700-2100 either on 1840 or 11855; however, they are a variable performer with days of absence from the dial.

SYRIA: Damascus has an improved service these days with two English segments being heard: 1200-1300 on 17510, and 2000-2100 on 11685 kHz. News with emphasis on Middle East, Oriental music, sometimes classical music.

UNITED ARAB EMIRATES: Dubai service to North America at 0230-0415 seems to be best on 7310 kHz, but a broadcast to Europe is sometimes audible here at around 1600 on 15320 kHz. Note that Abu Dhabi (Voice of the U.A.E.)--a different station from the above U.A.E. Radio--has been testing a high power transmitter lately on different channels including 60 meters. It was widely heard both in Europe and North America, so perhaps we will have a new English voice soon from this part of the world.

There are other smaller countries such as Burma, Singapore, Sri Lanka, etc. with English language broadcasts, but their reception is, in general, so infrequent as to make their inclusion somewhat impractical at present. So we conclude with a table of selected schedules from some of the above listed broadcasters.

| SELECTED ASIAN SCHEDULES | | |
|--------------------------|-------------------|------------------------------|
| CHINA | 0000-0200 | 15385 15520 11650 |
| | 0200-0300 | 15385 11650 |
| | 1100-1200 | 15520 |
| | 1200-1300 | 15520 |
| ISRAEL | 0000-0300 | 9815 9440 7410 |
| | (each is 30 min.) | |
| | 2000/2230 | 9815 9440 9425 7410 |
| KUWAIT | 1800-2100 | 11675 |
| TAIWAN | 0200-0400 | 6065 5985 |
| | 0600-0700 | 5985 |
| TURKEY | 0400-0500 | 9560 |
| | 2300-0000 | 9560 |

PIRATE RADIO



by
John Santosuosso

P.O. Box 1116
Highland City, FL 33846

KPF-941: Last month we reported the return to the airwaves of the now famous KPF-941. Now more good news has arrived from Al Weiner, owner of KPF-941 Yonkers, New York, and WOZI FM and WOZW AM of Presque Isle, Maine. According to Mr. Weiner, Congressman Biaggi of New York is going to submit a bill to establish KPF-941 as a legal broadcast station for Yonkers. Currently it must operate as a "production tool" for WOZI and WOZW.

Weiner reports the power and antenna of KPF-941 remain the same as they have been from the start. The station uses 100 watts and a 40-foot vertical. Look for it on 1622 kilohertz.



PROGRAMMING PERSPECTIVE

BY JOHN T. ARTHUR: A different kind of station is appearing these days that isn't afraid to speak its mind. KNBS appears to be something of an outspoken relay station. The broadcast on tape sent by a friend in Oklahoma featured relays of the Voice of Laryngitis and Tangerine Radio, as well as a tribute to KQSB and an editorial advocating decriminalization of pot. Phil Muzik, announcer, and Pat Seedy, studio engineer, say KNBS is operated by the California Marijuana Cooperative and supports NORML's attempts to change the law. Of course, they also say they operate from Alcatraz Island...

The Cannabis 41 staff is a friendly bunch, but mail from there smells kind of strange, and the mailman may look at you funny. If

you hear them and want to write anyway, send a complete detailed report and three mint first-class stamps to KNBS, Box 982, Battle Creek, MI 49016. Say you read about 'em in MT.

IRELAND: A wealth of material from Ireland's Tony Donlon recently arrived, bringing us up to date on the free radio scene in that country. Tony feels that current government proposals could lead to the legalization of non-government radio within six months. In the meantime the Irish pirates, most of whom are commercial, continue to operate in great numbers thanks to legal loopholes. There are at least 49 outside the Dublin area with many more in that capital city.

In Dublin the hottest station right now is Q102 which began broadcasting in January. Similar to American stations in format, it has been highly popular. However, it had to overcome the difficulty of having its original transmitter stolen a few days after transmission began.

Meanwhile, the owner of still-popular Radio Dublin finds himself in trouble with the authorities, but not for broadcasting. He is currently facing a charge of arson, but Radio Dublin can still be heard in North America evenings with its shortwave relay on 6910 kilohertz. Sometimes even in the summer months it will put in a surprisingly strong signal.

THE 1985 PIRATE POLL: John Arthur notes that his popularity poll was not based on a scientific sample but rather on supporters of free radio, so there is a statistical skew. Nonetheless, according to all but two ballots, the most popular North American pirate is the Voice of Laryngitis. Second is Radio Clandestine; third is Secret Mountain Laboratory; and fourth place is tied between KQRP, KQSB International, Radio Sine Wave, and Tangerine Radio.

"Good show, Maynard!" to Global American Network, KPRC, NWRI, the original Radio Free Insanity, Radio Morania, Radio North Coast International, Radio USA, Radio Woodland International, Samurai Radio, Voice of Bob, Voice of Communism, Voice of Venus, WBST, WDX, WIMP, and WYMN.

The station listeners clearly love to hate is Voice of Tomorrow (political commentary, no variety). KRZY pulled second place, mainly for overkill. WMTV

ranked third for insipid Top 40 programming and only sending out one QSL.

Dishonorable Mention to PRN (pretentious), Radio Bag (stupid), Radio Clandestine (anyone can talk over a record), WBST (too fake), WIMP (too heavy on KPR), KROK and WKUE (same old crap), and KTGR (too technical).

Both this poll and one taken during 1982 indicated the desire for original, creative programs. In 1982 the most popular stations were Radio Confusion and Syncom.

GREECE: Three anarchists have been sentenced to five months in prison for running an unlicensed radio station called "Mole." Another was sentenced to seven months for an unlicensed operation known as "Free Radio." Four others were acquitted (Black Flag, Feb. 25, 1985, via Raunchy Rick of Tangerine Radio).

PUBLICATION REVIEWS: The Wave is the new quarterly publication of Tangerine Radio. Issue one recently arrived here, and it is six pages of anarchist editorials, technical material, letters from listeners, and other interesting information pertaining to Tangerine Radio and the free radio movement. Anyone intrigued with pirate radio should enjoy this: it's only \$2.00 (cash only) per year via DVS Communication Specialists, Box 5074, Hilo, Hawaii 96720.

The 1984 (latest) edition of the Free Radio Handbook has arrived. If you ever wondered what is involved in putting a pirate on the air, this 20-page book will tell you. There are some excellent background articles on the nature of free radio as well as some solid technical information. Suggested sources for parts and manuals are also given. This makes fascinating reading even if you have never entertained the slightest thought of becoming an "unofficial broadcaster." It is just \$2.00 (cash only) from the DVS address indicated above.

PERU: Commenting on an item appearing in our April column, Luis Suarez of Venezuela says that the title of the Cuban radio program "A Los Cuatro Suyos" is translated incorrectly. It can best be translated as "To the Four Incas' Territories." Luis declares that the ancient Incan Empire included the north of Argen-

tina and Chile, Bolivia, Peru, Ecuador, and southern Colombia. It was divided politically into four suyos or territories, and it is strictly a coincidence that suyos is written similarly to the Spanish possessive pronoun of the third person, "suyos."

Quechua, one of the languages used in the broadcast, was the language of the Incas. Today it is an official language of Peru, along with Spanish, and is spoken by several million people in South America.

Finally, Luis notes that in addition to the above Radio Habana program several eastern European stations broadcast instructions to the Sendero Luminoso (Shining Path) terrorists of Peru.

RADIO CAROLINE: New York's Dave Alpert sends along an item from the March 8 issue of Billboard. Faced with increasing competition, including fellow offshore Laser 558, Europe's legendary North Sea pirate is now trying to break into the American advertising market. British advertisers are prohibited by law from purchasing time on the station, but Caroline and its new consultant, Lee Abrams, hope to lure the American movie industry, breweries, record companies, and others.

Caroline has been around since 1964 but was off the air for several years after a 1980 storm sank the original ship. Today a Dutch station, Radio Monique, also transmits from the present vessel anchored off England's southeast coast.

While on the subject of the European offshore pirates, it is interesting to note that some are currently speculating there may be American government money silently backing such stations as Caroline and Laser 558. Since European government stations are often in disagreement with American policy, perhaps Washington wants to make sure its position will be heard. Much of the staff of these stations is American.

HOLLAND: Those who have been reading this column for some time will recall Michiel Schaay's outstanding article on clandestine stations which appeared here in condensed form. We were authorized to use Michiel's material after Europe's Benelux DX Club refused to print it.

Now Michiel writes from



PIRATE RADIO cont'd

Holland to tell us that both he and the club want us to know they have settled their differences. A compromise version of the article has been published, and the club has dropped proposals for his expulsion. In fact Michiel is once again writing for the Benelux DX Club bulletin. It is good to know that one of Europe's most talented writers in the field of radio communication and one of its most respected DX clubs are a team again. Among other things, Michiel's article dealt with Radio Freedom, the anti-apartheid station of the African National Congress of South Africa.

COLOMBIA: A last minute item from David Crawford has just arrived. The Colombian revolutionary group M-19 has now established a clandestine radio station. From his Florida location Dave logged it April 7 on 10544 kilohertz from 2102 to sign-off at 2150. He obtained a tentative ID as "Radio Maquisaria" along with additional IDs as "La Voz de Libertad" and "Voz de las Fuerzas Armadas Revolucionarias de Colombia" (Voice of the Revolutionary Armed Forces of Colombia). Signal strength was good but with extensive fading. Programming consisted of commentaries with some music.

ODDS AND ENDS: Havana Moon reports hearing announcements by an anti-Castro clandestine in the 80-meter ham band. The transmissions are no longer than five minutes in length and give a schedule for the 7 megahertz spectrum of the band. So far he has been unable to get an ID, but he notes the hams are rather unhappy about this intruder.

Dave Crawford has been hearing La Voz de los Cubanos en Africa on 6045 kilohertz at 0500 GMT. This writer understands that the anti-Castro organization Abdala is the sponsor, and the station's purpose is to broadcast to the Castro forces in Angola.

Also from Florida, Terry Krueger says that the formerly silent clandestine Radio Free Surinam (Radio Free Surinam) is not broadcasting over the facilities of the anti-Castro La Voz del CID. One possible frequency to try is 11680 around 2030 GMT.

Some persons who wrote the controversial political pirate Voice of Tomorrow are now starting to turn up on some interesting mailing lists. They are receiving

mail from organizations expressing a philosophy similar to that of the station.

In Italy even organized religion is into unlicensed radio, which for now at least is legal there.

Recently the Seventh Day Adventists with their Adventist World Radio have been testing from Italy.

Thank you all for your continued superb support of this column.

4030 kHz CEASE just before the start of its Czech transmission. A very cozy relationship?

Last monitored on 4030 kHz at 0330Z on 4/11/85, transmissions often last several hours! Mode is AM.

"Los Numeros"

32444 69213 88816 52196 63811 94216

Havana Moon



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RX FOR INTRIGUE

HI AND WELCOME BACK!

A portion of this column, and all of the next, will be devoted to just what has actually been learned--"numbers-wise"--over the past few years. It's hoped that RX FOR INTRIGUE will be of benefit to the veteran as well as the novice "numbers" monitor. Let's take a look at some recent developments...

...NO, let's save that for just a bit later. First a true confession...

I DO NOT ACCEPT THE PREMISE THAT ALL 5-DIGIT SPANISH TRANSMISSIONS ORIGINATE FROM A SITE NEAR HAVANA, CUBA! Five-digit Spanish transmissions have--for the past several months--been monitored from various sites near Mobile, AL, on 3090 and 4030 kHz! Intercept times have been reported from 1400 through 2100Z. It's a long trip from Mobile to Havana!

LIVE ON THREE SIX EIGHT EIGHT

A LIVE 5-digit Spanish transmission noted on 3688 kHz at 0337Z on 4/9/85! This YL with a "sing-song" delivery also heard on 5118 kHz and 4011 kHz on 4/10 and 4/11/85 (bank teller by day; Mata Hari by night!). Time for last two frequencies was 0330Z. Message format varies slightly from that of regular 5-digit Spanish transmissions. Format as follows:

Atencion (3X)
472 (Identifier)
40 (Group count)
XXXXX XXXXX XXXX . . .
Final (3X)

A call to the FCC produced nothing more than the usual "we are not aware..." statement.

A well placed source--speaking on the condition that he or she remain anonymous--tells me that these LIVE transmissions originate from a site no further south than Hialeah, Florida! The same source says to expect more of these live type "numbers" transmissions. Wonder which anti-Castro group is responsible?

This is a real "out-house" operation. Ultra-low-tech at its worst!

ANOTHER NEW TRANSMISSION FORMAT

Another slight variation on the regular 5-digit Spanish format has been noted over the past weeks. Seems as if an extra set of digits has been added to the transmission header. Format as follows:

Atencion! 918 05 45 (For several minutes)
05 45 05 45 05 45 05 45
05 45
XXXXX XXXXX . . .
Final (3X)
1 = Identifier
2 = Unknown
3 = Group Count

This modified format has been noted on a small percentage of 5-digit Spanish transmission, last noted on 3445 and 4030 kHz on 4/11/85 at 0200 and 0230Z. This format--minus group count--was also noted on some few 3090 and 4030 kHz transmissions! Group count on this version appears just before start of crypt. This makes four known 5-digit Spanish transmission formats.

THE CZECH AND THE SENORITA

A five-digit Czechoslovakian numbers (a tentative ID) station has been monitored the past several weeks on 4030, 3225 and 3212 kHz. This YL was also noted simulcasting on 4030 and 3212 kHz on 3/31/85. Transmissions begin with five musical notes transmitted for three minutes before the start of the actual numbers transmission. All 5-digit Spanish transmissions on

THE INTERCEPTS: 5-DIGIT SPANISH

Z/kHz / (SS=Spanish)
1400-2130//AM/YL/5-D SS and some MCW groups. Monitored in the vicinity of Mobile and many parts of Florida.
2300/3090/AM/YL/5-D SS
2330/4030/report of above
0000/3090/CW/Alpha-characters in 5-element gps
0100/3445/AM/YL/5-D SS
0130/4027/repeat of above
0200/4210/AM/YL/5-D SS
0200/3090/AM/YL/5-D SS
0230/4030/repeat of 3090
0200/3080/AM/YL/5-D SS
0230/3445/repeat of above
0200/3445/AM/YL/5-D SS
0230/4037/repeat of above
0200/4044/AM/YL/5-D SS
0300/6835/AM/YL/5-D SS
0300/3445/AM/YL/5-D SS
0330/4442/repeat of 3445
0300/4025/AM/YL/5-D SS
0330/4307/repeat of above
0400/4051/AM/YL/5-D SS
0430/7431/repeat of above
0400/4027/AM/YL/5-D SS
0430/3445/repeat of above
0500/6822/AM/YL/5-D SS
0500/3090/AM/YL/5-D SS
0500/4825/AM/YL/5-D SS
0600/4027/AM/YL/5-D SS

The frequencies of 6822 and 6835 kHz are very interesting as 4-digit Spanish is monitored on a nightly basis on 6802 and 6840 kHz.

A CW station transmitting OA3 continually often noted on various frequencies between 6802 and 6840 kHz. At other times this station alternates with OA3 and OA4.

ANOTHER CURIOUS TRANSMISSION

A CW station transmitting: "VVV DE BONNIE SUE" continually on 6840 kHz at 0043Z to almost 0100Z on 3/23/85.

Russian propagation beacons, 4-digit Spanish, 5-digit Spanish, phonetic alphabet stations and many mystery CW stations heard on an almost nightly bases in this range of frequencies.

OTHER INTERCEPTS:

3/2-digit English, 0511Z on 7860 kHz (3/23/85) YL/AM terminates with: "End"

Beacons D, G and Z all at same time on 6802.5 kHz. Often heard as early as 0000Z on many different dates. Anti-Castro clandestine with 5-minute transmission on 3622 kHz at 0300Z on 4/2/85. Unable to catch ID. Here's another case

LOS NUMEROS cont'd

where the FCC reportedly knows nothing.
 3/2-digit, English 0230Z on 6875 kHz (4/1/85) AM/YL
 5-digit Spanish (in progress), 0307Z on 6776 kHz (4/31/85) AM/YL
 Continuous musical tones at 0300Z on 7400 kHz (3/31/85); not a station interval tone or signal.
 4-digit English on 0500Z at 7375 kHz (3/30/85) AM/YL; exact format as 4-digit Spanish
 5-digit German on 0300Z at 9068 kHz (3/23/85) AM/YL; intro is Morse "N" for several minutes.
 Random Spanish numbers on 0025Z at 3644 kHz/AM/YL

BULGARIAN NUMBERS STATION(?)

John Santosuosso reports that his sources indicate that a Bulgarian(?) numbers station is operating on 6676 kHz at approximately 2300Z. Thanks for the information, John. Let's all keep a close watch on this frequency!

IT'S BEEN A LONG TIME

Despite fears of an "electronic Bay of Pigs," legislation for Radio Marti was approved on August 10, 1982. Now, after months and months and millions of dollars there is not--AND MAY NEVER BE--a Radio Marti on the AM or any other band.

WHAT HAS BEEN LEARNED

- *Not ALL "numbers" monitors subscribe to the premise that 5-digit "numbers" transmissions originate from Cuba (Nor do I).
- *Many--but not ALL--4-digit Spanish, 4-digit English and 3/2-digit English transmissions originate from sites near Warrenton/Remington, VA.
- *Most "numbers" stations tend to "cluster" around the same frequencies. There are, however, a few "strays and mavericks."
- *CW and MCW transmissions of similar content as 5-digit Spanish are common on the frequencies of 3090 kHz and 4030 kHz. They are more common during the day.
- *CW and MCW number groups equate as follows: A=1, N=2, D=3, U=4, W=5, R=6, I=7, G=8, M=9 and T=0.
- *At least four transmission formats are in use for 5-digit Spanish.
- *The common terminator for all 5-digit Spanish transmissions is now "Final"; not too many years ago the common

terminator was "Adios."
 *Most 5-digit Spanish transmissions repeat at 30 past the hour rather than the once common 15 past the hour.

I'll continue with more --much more--in the next issue of Monitoring Times.

WATCH FOR IT

A non-electronics publication will--in a very short time--publish an in-depth "numbers" article. Watch this column for further details on the article which will be written by Eric Conners.

Till next time...
 Time now for a Tecate and...
 Adios,
 Havana Moon y Amigas

The views expressed in this column are those of Havana Moon and do not necessarily represent the views of the Monitoring Times management, staff or readers.

INTELLIGENCE LITERATURE

by Michael Speers

If anyone doubts that the publication of books on various aspects of intelligence is a growth industry, one need simply visit any well stocked new bookstore and examine the titles displayed therein. The public fascination with intelligence/espionage matters has always been considerable and nowhere more evident than in the British Isles where the number of new titles regularly exceeds those in the U.S.

The difficulty has always been to make some sort of judgement as to the relative worth of such books before investing in them. The same problem exists in regards to early books now out of print.

Unless one has had an extensive career in intelligence and therefore had

access to the facts in a particular case or on the operations of the CIA or the NSA, it is very difficult to determine whether one is reading artfully contrived "disinformation"--a book by a hack essentially based on press reports and handouts from the Agency's press relations people--or is truly reading about matters that have either not been published before or represent a truly informed opinion by a professional.

It is because of such a dilemma that one needs to know about three excellent bibliographies now in print. All such bibliographies are expensive--they are not intended for the mass market. If one is not a serious collector, he can probably find one or more of these volumes at any public or college library.

Cryptography

PART II

by Bob Russ

As mentioned earlier, the "slide" crypto is possibly the oldest form of alphabet cryptogram; for a brief message, it is probably as good as any other kind of crypto.

The longer a message is, regardless of form, the more vulnerable it becomes. Top experts have said that one thousand characters are enough of any crypto to allow entry and solution.

THE SLIDE

By a "slide," we mean taking one alphabet and sliding it against itself, thusly--

abcdefghijklmnopqrstuvwxy
 zyxwvutsrqponmlkjihgfedcba

This "D shift" slide crypto is said to have been used by Julius Caesar to communicate with his generals. It could well have been as it fits all the characteristics of a good "field" crypto. Battles and wars have been lost because an otherwise brilliant commander used poor crypto.

The difficulty with the simple shift is that a few trials will solve it--no sweat. A slide of this type can be broken in ten minutes or less.

The next step up the ladder of complexity is to slide an alphabet against itself, but reverse one of

the two alphabet series, thusly--

abcdefghijklmnopqrstuvwxy
 zyxwvutsrqponmlkjihgfedcba

This is still pretty simple, and could only resist breaking until the series of tests showed it to be a reversed slide--possibly a total of fifteen minutes. Hardly time enough to warm a pencil.

Yet, oddly enough, the slide is still with us today. It has survived because of adaptations made in the golden age of crypto, the years when the city-states slowly built themselves into trading empires, and Machiavelli was prime minister to a Borgia.

We have recognized the weakness of the simple slides in that elementary tests could crack them open in minutes. There had to be a quick and easy solution to this weakness. One such answer was the crypto wheel.

In this, the alphabets are wrapped into concentric circles, mounted inside one another. Then, the wheels are shifted in relation to each other according to some understood sequence. This idea works well, and was soon refined by using a "key word" to give successive values of "A".

About the same period, another crypto genius published a "table" of 26 alphabets, each beginning with the next letter of the standard alphabet. This was used with a keyword also.

This system, either table or wheel, was used for several centuries, and was

generally thought to be invulnerable. Of course, it was not. The major powers of Europe read each others' crypto easily, each one pretending that it was deaf and blind.

Finally, the secret got out. The way to break the wheel and table crypto was to treat each position separately. Guess the length of the keyword, set the crypto up in rows of that length, and analyze letter frequencies in each position.

Running over possibilities takes longer, but this type of crypto is broken in several days when trained men work on it. Jefferson saw this difficulty and sought to make it harder for breakers by using alternating, mixed alphabets. His system used 30 different mixes and was used until WW II by the U.S. Navy.

In U.S. history, aside from a few outstanding men who understood the importance of good crypto and could handle it well (like Jefferson, Washington, and J.Q. Adams), the crypto scene might be called a disaster area until the time of Grant's first administration.

Grant's Secretary of State suddenly introduced a new crypto, unlike any used in our history. He used it for several years until the first of our new code books was introduced.

The crypto apparently was devised by Grant's V.P., who seems to have been one of the best crypto minds of

INTELLIGENCE LIT cont'd

BIBLIOGRAPHIES

A SCHOLAR'S GUIDE TO INTELLIGENCE LITERATURE: BIBLIOGRAPHY OF THE RUSSELL J. BOWEN COLLECTION. University Publications of America, Frederick, MD \$60. This book lists and categorizes some six thousand titles in intelligence and military literature. The Bowen collection is one of two famous collections of intelligence literature. Bowen turned over his collection to Georgetown University but continues to build the collection.

The titles are grouped under various categories, but the book is simply a listing of titles, authors and dates of publication. There is no analysis as to the relative worth of a particular book. Sigint related material listed comprises 54 titles. Because

CRYPTOGRAPHY cont'd

the century. It was basically a slide, but used a mixed alphabet slide against itself. It is the only example of such a technique that I have found in the reference books.

To make it even messier for a breaker, this crypto used very unusual keywords, such as "scythe," "sceptre," "sphinx," and other horrors. The whole thing was a nightmare.

In this day of computers, the shift has been jumped up still higher in complexity. Now, the best computer crypto uses a "key phrase" which may be up to 256 characters in length. The breaker's agony has been prolonged to where it may take weeks of computer time to sweat out solutions.

And in answer to H. Moon: The "numbers" are probably wheel or table slides, with keys less than a dozen characters in length--classic field crypto. Text for drills are mottoes and should be recoverable.

ALPHABET SHIFT WITH WHEEL

RSTUVWXYZABCDEFGHIJKLMNO
PQRSTUVWXYZABCDEFGHIJKLMN
BCDEFGHIJKLMNOPQRSTUVWXYZ
EFGHIJKLMNOPQRSTUVWXYZABC
RSTUVWXYZABCDEFGHIJKLMNO
PQRSTUVWXYZABCDEFGHIJKLMNO
TUVWXYZABCDEFGHIJKLMNO
PQRSTUVWXYZABCDEFGHIJKLMNO

PART OF A POLYALPHABETICAL TABLE

ABCDEFGHIJKLMN
BCDEFGHIJKLMN
CDEFGHIJKLMN
DEFGHIJKLMN
EFGHIJKLMN

the book was published in early 1981, it does not list David Kahn's latest book, KAHN ON CODES, nor James Bamford's THE PUZZLE PALACE. George Constantinedes' AN ANALYTICAL BIBLIOGRAPHY OF INTELLIGENCE LITERATURE. The author was a senior CIA official before retirement and is a considerable scholar of intelligence literature. In my estimation, this is the most valuable of the current bibliographies although it, too, is somewhat dated, having been published in 1981 by the Westview Press of Boulder, Colorado (\$60).

Constantinedes lists over six hundred books, appending each with an analysis describing the contents, assessing the author's credentials, and the relative merits of the book. There is no comparable bibliography.

U.S. DEFENSE INTELLIGENCE COLLEGE, BIBLIOGRAPHY OF INTELLIGENCE LITERATURE. This official document listing and analyzing some 300 titles is intended as a reading guide for those studying at the College. It is edited by Walter Pforzheimer, who, together with Bowen, is considered the leading authority on intelligence literature. As an official document it reflects official thinking as to the merits of the works covered. A new and expanded edition is due soon.

The guides listed above are expensive but valuable if one wishes to assess what a particular book is about and what the experts think of it.

RECOMMENDED READING

The classic sigint related books which stand high on my own particular list are as follows:

David Kahn, THE CODE-BREAKERS. Macmillan, NY 1967 (now out of print).

James Bamford, THE PUZZLE PALACE. Houghton Mifflin, Boston, 1982 (out of print in hardback, still available in Penguin paperback which includes material on GCHQ and the Prime case not included in the earlier hardback edition.)

Patrick Beesly, ROOM 40, BRITISH NAVAL INTELLIGENCE 1914-18. Published in 1982 by Hamish Hamilton in London, I am unsure whether this book was ever reprinted in the U.S.

Gordon Welchman, THE HUT SIX STORY - BREAKING OF THE ENIGMA CODES. McGraw Hill, 1982.

Ronald Lewin, THE AMERICAN MAGIC: CODES, CIPHERS AND THE DEFEAT OF

JAPAN. Farrar Straus Giroux, New York, 1982. Lewin, who died recently, was a highly regarded British military historian. This book deals with the U.S. successes in breaking the Japanese codes.

Herbert O. Yardley, THE AMERICAN BLACK CHAMBER. NY 1931. This classic early book in the sigint field was written by one of the most gifted and colorful figures in the field (and an arch enemy of William Friedman). It is long out of print.

-- Yardley, YARDLEY-GRAMS. NY 1932. This is a fascinating and little known book dealing with actual intercepts of German submarine traffic during World War I. The author describes the incident and gives some hints on the message itself which is then printed in its unbroken form. Following each narrative page is a full page blank matrix which the reader is invited to use in breaking the code (with hints and guidance supplied by Yardley). Long out of print, copies can be found now and then.

-- Yardley, THE CHINESE BLACK CHAMBER. Houghton Mifflin, Boston, 1983. This is a long suppressed partial autobiography by the author relating to his days as an employee of the Nationalist Chinese in wartime Chungking. The book contains an introduction by James Bamford. Copies can still be located now and then at new bookstores.

Yardley also wrote a best selling book on poker, THE EDUCATION OF A POKER PLAYER which is regarded as one of the classics in the field. It went into over 20 printings and can often be found in used bookstores. It contains no sigint material but does serve to give an interesting profile of this unusual man.

Yardley also tried his hand at spy fiction with mediocre results. His novels were: THE BLONDE COUNTESS, RED SUN OVER NIPPON and CROWS ARE BLACK EVERYWHERE. His books are interesting reading but difficult to find.

Finally, many of William Friedman's training manuals and dissertations have been reprinted in large format paperback form by the Aegean Park Press which has published a total of some 39 books by Friedman and others under their "Cryptographic" series.

SOURCES

As a dealer in rare and out of print books under the name of WESTON BOOKS, I can supply or have on hand most of the titles listed above-- or can order them. The only

exceptions are the scarce novels by Yardley.

One of the major difficulties encountered by those seeking out of print intelligence and sigint books is to find them at your neighborhood used book store. Not only are these books scarce today, but their subject matter meant more than likely that few copies were originally printed. This is compounded by the fact that most antiquarian book dealers know little and usually care less about such books and regularly misfile them on their shelves and in their catalogues.

Weston Books publishes quarterly lists of intelligence/sigint books, most of which are out of print or are foreign and have never been reprinted in this country. My most difficult task is to find such books, a task which usually takes me and my associate, Dian Soucy, months of seeking out at used book stores, through dealer's catalogues, at bookfairs, and library sales. It is a painfully slow and frustrating process.

I also receive books in trade from customers who have substantial collections, often built while on active service in intelligence. My first list, published four years ago, contained some 200 titles; my latest list contains over 600 separate titles.

I am probably the only specialist dealer in such books, not because of my great knowledge in the field, but because I like to read them myself. Customers often have to wait for their order until I have finished reading one of the books!

JUST BECAUSE IT'S IN PRINT..

A word of warning: there are many authors and many books in the field which should be viewed with caution if not outright disbelief. A very interesting new book has been published in English by my partner and co-editor of our newsletter, The Intelligence Quarterly.

The book, soon to be published in this country, is entitled UNRELIABLE WITNESS - INTELLIGENCE MYTHS OF WORLD WAR II by Nigel West. It deals with a number of well known books and popularly believed facts (Pearl Harbor, for example). By careful and logical reporting, West demonstrates how much of what we have come to believe is, in fact, untrue.

One of those to fall before West's analysis is William Stevenson, author of THE MAN CALLED INTREPID. The book is shown to be well

PROFILES

While all of us have had the opportunity to listen in on public service communications, few of us have had the opportunity to see some of the remarkable advances in communications

recently introduced by the communications industry.

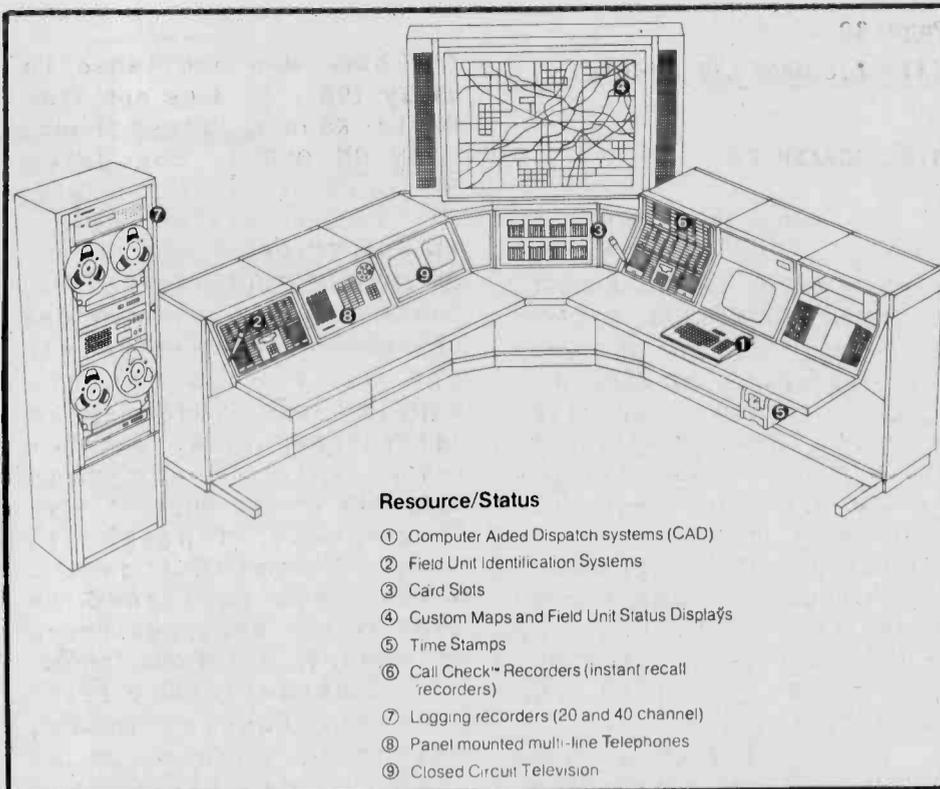
Author John Dorsey guides us in a tour of a new system developed by the undisputed leader of land mobile communications, Motorola.

MOTOROLA CENTRACOM II: Total Communications Control

by John Dorsey

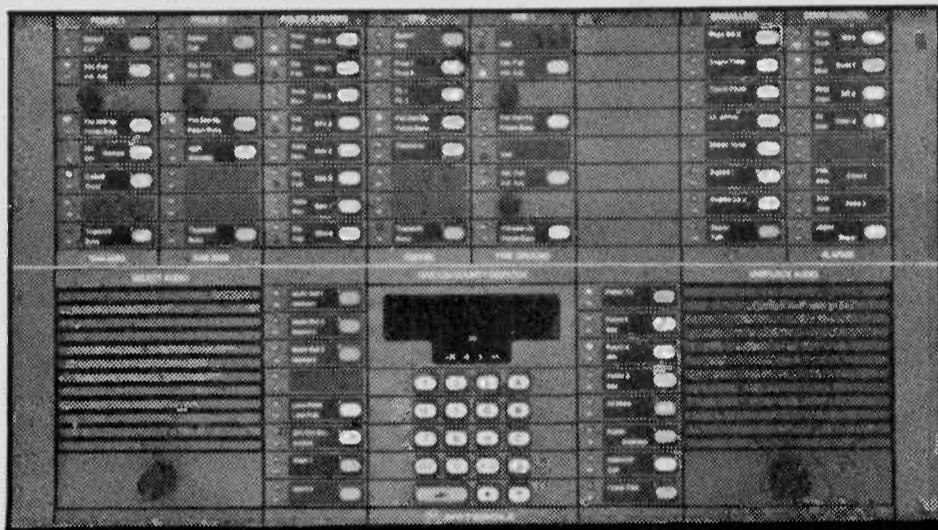
On a beautiful day in spring the normal work load in the communications room of most communities consists of a kid needing rescue to get a fish hook out of his finger or the sheriff checking off for lunch. Turn a line of tornadoes loose on

that tranquil scene and we've got instant bedlam! Switchboards that normally sit idle light up like Christmas trees. Instead of the normal two or three agencies, we're now handling traffic for Red Cross, National Guard, various state agencies, news media, and thousands of terrified



Resource/Status

- ① Computer Aided Dispatch systems (CAD)
- ② Field Unit Identification Systems
- ③ Card Slots
- ④ Custom Maps and Field Unit Status Displays
- ⑤ Time Stamps
- ⑥ Call Check™ Recorders (instant recall recorders)
- ⑦ Logging recorders (20 and 40 channel)
- ⑧ Panel mounted multi-line Telephones
- ⑨ Closed Circuit Television



INTELLIGENCE LIT cont'd

filled with exaggerations. For example, William Stevenson, the head of the British intelligence mission in New York during World War II, did not have the code name "Intrepid," nor is there any basis to support the author's contention that Stevenson had a secret meeting with Churchill prior to his departure for the U.S.!

There are a number of authors whom I have heard professional intelligence officers describe as "unreliable." Among those so described was William Winterbotham, author of the ULTRA SECRET. Most recently a sensational new book by the British author Chapman Pincher, TOO SECRET TOO LONG, was published in the U.S. The book is well and plausibly written to support the author's long held thesis that a former Director of MI 5 was, in fact, a Soviet agent.

This is a case which is unlikely ever to be decided: since the person named is now dead and the KGB is unlikely to open its files for us, it is doubtful we shall ever know the truth. The book relies on conjecture and coincidence (the accused was stationed in China and might have been recruited by the famous

Sorge spy ring then resident in Shanghai, for example). There are a number of small factual errors in the book which, taken together, tend to decrease the degree of confidence which can be placed in the overall effort.

Finally, Pincher is known to have been fed a lot of material over the years by a now-retired and disaffected MI 5 officer. If it were found that one of the current crop of U.S. intelligence authors had been relying on the likes of the infamous Philip Agee, one might understandably question the book in question.

While you will never get senior intelligence officers to agree on any one author or book, certainly the cumulative efforts of the bibliographers mentioned above serve as a useful guide.

With the publication next month of my newsletter, Intelligence Quarterly, I hope to draw on informed opinion from former or serving intelligence experts in various fields for articles as well as book reviews. If any of your readers would like to contribute such material they should contact me at IQ's address: P.O. Box 232, Weston, Vermont 05161. ●

people. The radio room is simply not equipped to handle the increased traffic.

Motorola has designed-- or rather, upgraded-- a system that is intended to be custom-equipped for the user's individual needs. It can be set up for digital or voice operation, or a combination of the two. From the smallest to the most complex operation, there is something here to help. While it permits central dispatching, it still allows individual agency dispatching controlled by a central station.

I certainly can't guess the goals Motorola had in designing the system. If their ultimate goal was to produce a system that minimizes the switching functions required by a dispatcher and gives a central station knowledge and control of what's going on in the community, they've come mighty close to achieving it.

The average radio room involves too many people and too much passing of information. Mention "simulcasting" in the conventional radio room and you'd need an octopus to press all the necessary buttons! The Centracom II permits DIRECT COMMUNICATION BETWEEN THE INVOLVED PARTIES! With the cross-

patch and phone-patch features the need for a dispatcher to transfer information is eliminated. I don't care how good your dispatchers are, they can transpose letters on occasion. Misspell a word handling hazardous material and you can blow up half the county!

Paging is always a time-consuming function; if you need the sheriff, for example, you have to determine the proper channel, find the pager number, then press three buttons. In this system you punch the button marked "sheriff"--the machine handles the rest! The conventional pager in the system can be set up for roughly 10,000 pagers and can also do group paging.

From a manpower-utilization standpoint (important to all operations, critical to larger ones) this system has numerous ways to vary the number of people required in the operation. On a mid-winter 3 AM Thursday morning one dispatcher could handle the whole community. At 11 PM on the Fourth of July you're going to need extra chairs.

The system diagnoses its own problems and will switch to a back-up unit automatically. It also tests its own audio loops and phone lines, invaluable to digital use.



Multiple console bays assembled to permit effective access to radio control, telephone, CCTV, and resource status equipment.

In the auxiliary feature department, you can control bay doors, magnetic lock doors, alarms on the mayor's whiskey cabinet, public address, intercom--you name it.

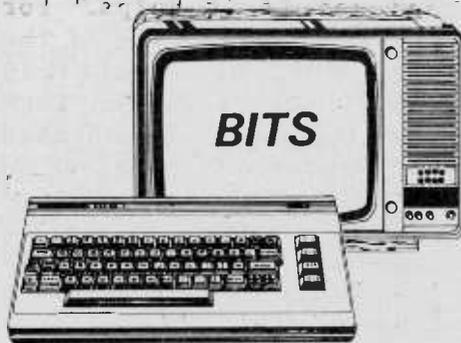
We've seen the system installed in two localities; the old equipment is still in place in both locations. The "old" features the usual control heads, microphones, pagers, telephones of the desktop variety, and 25 or 30 et ceteras normally found in radio rooms complete with warning labels in big red letters reminding the user to shut off speakers not in use before he fires off a different radio to avoid creating a feedback audible in Central Siberia.

The new system is in one console about four feet wide with not a wire in sight.



OTHER FEATURES AND OPTIONS

- * Select and unselect audio routing
- * Swivel or gooseneck mounted microphone
- * Headset operation
- * Telephone interface for headset operation.
- * VU meter for transmit and receive levels
- * Foot switch or panel transmit switch
- * LED indicators for long life
- * Channel busy indicators with lockout of parallel dispatchers
- * Timed mute of all unselect radio channels
- * 3 distinct alert tones to communicate different levels of urgency to field units
- * Monitor speakers are available as required
- * Logging recorder outputs provide mixed transmit and receive audio without guard tone (per operator and per channel)
- * Public address output is available at each dispatcher position
- * Error tone indicating improper operator action
- * Auxiliary switches with momentary, latching, or two simultaneous button operation
- * Telephone line testing (with Motorola MSF 5000 base station)
- * Per radio channel capabilities:
 - Main/standby site selection



C. W. Ellis
13 Public Avenue
Montrose, PA 18801

(We are pleased to continue our BITS column under the able leadership of C.W. Ellis, whose expertise in computers is welcome. Readers with specific questions are invited to send them directly to the author at the address above.)

RFI ELIMINATION

In a previous column I discussed some of the ways home computers and radio equipment interfere with each other. This month I would like to take a look at some methods and tricks that can be employed to help that interference.

One product I have found to be an indispensable tool in the fight against RFI and other noise is a copper tape that works wonders for shielding, grounding, bonding, and in general taping those little EMI gremlins down tight.

Called Scotch Brand (tm) Electrical Tape No. 1181, it comes in one inch by eighteen yard rolls, complete with a pressure sensitive adhesive backing. The amazing part about this tape, and really what makes it so useful, is that the adhesive itself is conductive. Tape two pieces of metal together, with this stuff, and not only is it sealed, but for all practical purposes they are one and the same electrically.

I use it for ground bussing and for heavy conductors on experimental printed circuit boards. It cuts easily with common scissors, and the adhesive will hold it tightly to the board even after it has been soldered. Since it solders quite easily I find it

- FCC supervisory control of remote radio control units
- Repeater disable
- Remote busy indicator (L.O.T.L.)
- Wildcard tone signalling
- F1 to F8 frequency select
- Multi PRIVATE-LINE or DIGITAL PRIVATE-LINE select
- Mute receiver #2
- Positive mode control of DVP or DES scramblers

useful for a wide range of home brewing and EMI tasks.

Getting your hands on it might not be too easy, but check with industrial supply houses, electrical stores, or write 3M Corporation, Industrial Electrical Products Division, St. Paul, MN 55144 for the name of your nearest distributor. One more caution - the tape has devilish sharp edges and can cause a painful cut for the careless, much like a paper cut.

POWER LINE NOISE

Let's take a look at the ac line that supplies power to every device in the typical monitoring or computing setup. Supposedly it supplies 117 or 220 volts of 60 hertz alternating current within narrow limits. Other countries use different voltages or frequencies but, in general, the EMI and noise problems are the same. The noise on a residential or suburban ac line can be so intensive that radio reception is virtually impossible over some portions of the spectrum.

Almost everyone is familiar with the noise effect of a fluorescent light on the AM broadcast band. This is just one source of noise that can be conducted over long distances via the ac wires.

Take a look inside most of the cheap and medium priced FM receivers sold today; most have an internal antenna consisting of a metal clip wound around the ac power cord to provide capacitive coupling, and a wire from this clip goes directly to the receiver antenna input. The ac wiring is the FM antenna.

It is not uncommon for a large inductive load such as a refrigerator or an oil burner turning on or off to induce large voltage pulses on the ac line, often to several thousand volts. These pulses are extremely short in duration and seldom do much damage to the average device on the line; however, when these voltage spikes get too large, damage can occur.

Most prone to damage are electronic equipment and appliances, especially those

containing MOS devices, such as CMOS and HMOS logic chips, and FET transistors. Such devices are extremely sensitive to high-voltage, short-duration pulses from whatever source. Even walking across a carpet and then touching the antenna terminal could cause damage to a receiver. It is a tribute to the many electrical designers that more equipment is not damaged.

So how do we cut the interference from the ac line to an acceptable level? There are many commercial devices on the market that claim to condition the ac line, and with the increasing popularity of home computers, many more are showing up every day.

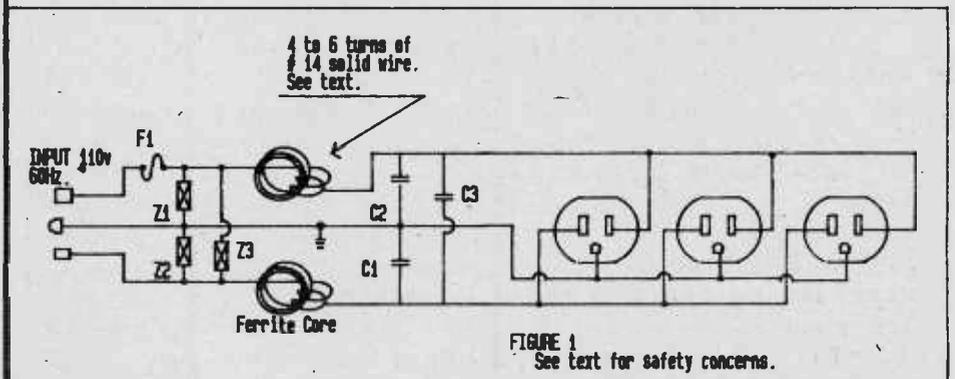
In think that some of the tactics used to sell these devices in the computer field lean slightly toward the "scare the customer" side, with threats of loss of data and even equipment damage that can occur with the "delicate" computer equipment.

Truth is that the average home computer is no worse off than any other piece of electronic gear as far as damage from the ac line is concerned. However, the devices do provide some insurance against voltage spikes and line noise, but this is every bit as important to a radio or TV or scanner, etc., as it is to a home computer.

These protection devices range in complexity (and price) from a multi-outlet strip with a circuit breaker and perhaps a ceramic capacitor or two across the ac line to large units with varistors, isolation transformers, chokes, ferrite beads, and who knows what else in them. Some are overkill for the job, and some are overpriced for any job.

Figure 1 shows how a simple line filter and surge protector can be put together in a reasonable time to provide a rather large amount of protection and filtering for a small outlay in cash. Here is how you go about putting it all together:

1) Decide how many



BITS cont'd

devices you want to power from the filter and obtain enough ac outlets and a metal box to hold them. Usually three or four outlets is about right.

2) Locate two ferrite cores that you can put inside the box, and pick a size that will allow you to wrap about four to six turns of wire around each core. If you have trouble finding these, try a TV repairman or TV parts distributor. Some experimenters even salvage them from old AM radios.

3) For hooking everything up, obtain some number 14 solid copper wire from an electrical supply, lamp shop or hardware store. Only a few feet of black, white and green are needed. Often stripping down a few feet of standard three conductor house type wire (like Romex) will yield enough individual wires for several filters.

4) Several ceramic capacitors, .01 microfarads in size with a 600 volt rating, will cut line noise considerably. These and the varistors mentioned next are probably also available at your local TV parts store. They are labeled C1 through C3 in Figure 1.

5) At least one, and if you feel unlucky, three of the surge absorbing devices known by various names such as varistors, transient absorbers, surge protectors, etc. The varistors should be rated at 130 volts for a 120 volt line. These are labeled Z1 through Z3 in Figure 1. Z3 is the minimum to be installed; Z1 and Z2 are optional.

6) Ac line cord, and fuse holder with fuse. The line cord must be of the three wire type, both for safety and filter effectiveness. Select the fuse according to the number of devices and total current draw.

7) Wire the outlets as shown in the drawing, and install the various components as shown, keeping the leads on the varistors and capacitors as short as practical. One varistor can be installed across the ac line as shown, and additional varistors from each line to case ground can be added for further protection if you feel particularly unlucky.

There is some debate as to whether these two additional varistors are effective or not. I don't know, but if you want maximum protection, put them in.

8) Be sure that the third (ground) wire is firmly attached to the box and making good electrical contact. This is a safety

consideration as well as a filter return point for line noise.

CAUTION: Exercise care in all your wiring and, if possible, have a knowledgeable friend check your wiring. The ac line is not a plaything and, if you don't know what you are doing, can be lethal!

Once the filter unit is wired, plug it into the outlet that normally powers your equipment, and plug the equipment into the filter. You may never know if the varistors ever conduct and perhaps save your equipment, but you would surely know if the opposite were true.

Interestingly enough, the filter described will also aid in keeping noise generated in your equipment from being fed back into the ac line, and perhaps causing interference in a neighbor's equipment.

Other steps that might aid in the reduction of interference and noise fall in the category of "try it

and see if it helps." For example, a ground rod of the type sold by electrical supply houses driven into the ground can be connected to the ground terminal of an hf receiver to see if noise is reduced or sensitivity is improved.

Using coaxial antenna lead-in usually helps. Often a line filter installed on a noise producing device may reduce noise coupled into the ac line. Examples include oil burners, brush type motors, air conditioners, etc.

Oh, yes; make sure the third wire ground on your ac wall outlet really is a ground. If not, have it fixed right now - before you forget it. It could otherwise pose a real safety hazard. Check also the ac power entrance and service box, fuse box, etc., to make sure the ground wires have not become damaged or corroded. And if in doubt, consult a licensed electrician or the local utility company to be sure.

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆
GETTING STARTED
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by John Avery

"SOLID STATE"

...What Does It Mean?

Most of today's radio equipment is "solid state", as opposed to "tube type". "Solid state" simply refers to the material being solid rather than gaseous or liquid. Another term is semiconductor. "Semi" means half, so the material is half way between a conductor (conducts electricity) and an insulator (does not conduct electricity). Semiconductors are the heart of solid state devices such as the diode and the transistor.

The most common semiconductors used today are:

- 1. Germanium (rare chemical element)
- 2. Silicon (not so rare)
- 3. Selenium (another rare one)
- 4. Gallium arsenide (rare synthetic)

Before the transistor radio, crystal set radios were used. The heart of a crystal radio was a natural semiconductor, usually gaseous (lead sulfide). This component was a natural semiconductor which contained natural impurities. Today, we are smart enough to fool Mother Nature and create our own semiconductors with chemical impurities.

Why the chemical impurity, you may ask?

Because chemicals can change the amount of conduction/insulation and also the mechanism of current flow. Chemicals are introduced into the semiconductor during manufacture in a process called "DOPING".

Doping is used to create either (A) an excess of free electrons or (B) a "hole"--a place where an electron should be and, in fact, would have been had we not fooled Mother Nature with the doping process. Doping chemicals that donate electrons are called "donors", while doping chemicals which create holes are called "acceptors."

After the doping process, we are left with two kinds of materials or semiconductors:

- 1. N type (negative) material with extra free electrons.
- 2. P (positive) type material with lots of holes.

N Type or P Type material standing alone is not much different than any ordinary conductor. But if they are placed next to one another in the manufacturing process--look out. Things are going to happen.

A PN Junction is created when N Type material and P Type material are manufactured next to each other. The magic happens when electric current is introduced to a PN Junction so as to cause current flow

through it. Since a battery has two (2) terminals (+ and -), we have two choices for connection:

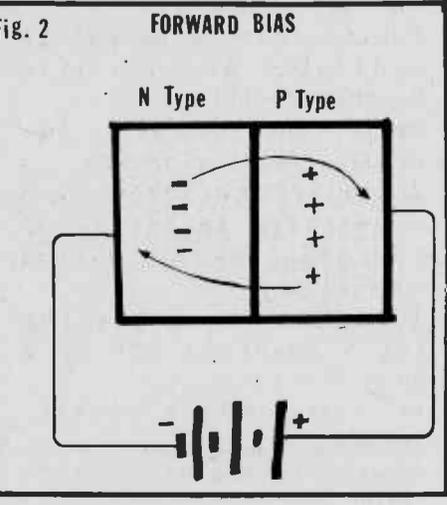
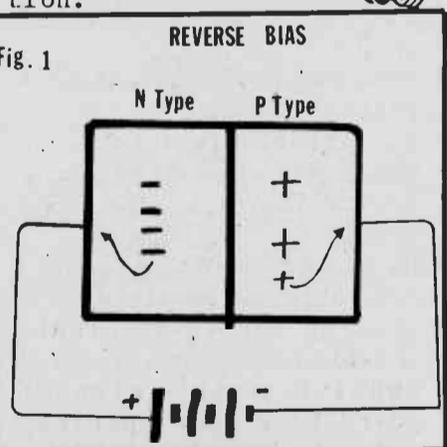
1. Connect the battery (+) to the N Type material and the Battery (-) to the P Type material; not much happens. Here, the current in the N Type flows to the Battery (+) while the holes in the P Type flow to the Battery (-). Note that the current does NOT flow through the junction to get to the battery.

2. Connect the battery (+) to the P type material and the battery (-) to the N type material. Things are going to happen now. For the holes in the P type to get to the battery (-), they must flow THROUGH the PN junction. Likewise, for the electrons in the N type material to get to the battery (+), they must flow THROUGH the PN junction.

3. Surprise. There is really a third choice. Do NOT connect the battery. While nothing happens, this is very important: with neither forward nor reverse bias, NO CURRENT FLOWS. Now, view the P type as (+) and the N type as (-). Examples 1 and 2 above were examples of REVERSE BIAS (#1) and FORWARD BIAS (#2).

REVERSE BIAS: Battery (-) connected to the P type (+) and battery (+) connected to the N type (-). Electricity flows to where it wants to go WITHOUT going through the PN junction.

FORWARD BIAS: Battery (-) connected to N type (-) while battery (+) is connected to P type (+). Here, for the P type (+) to flow to the battery (-), it must flow THROUGH the PN junction.

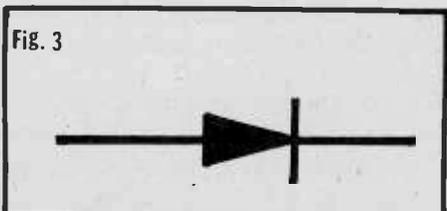


GETTING STARTED cont'd

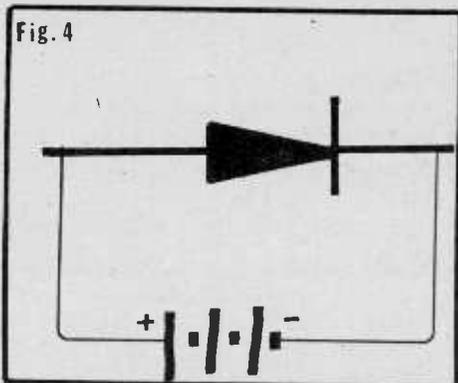
With reverse bias, only a small amount of current can flow through a diode--on the order of .7 volts. There is no such limitation with forward bias. If current in excess of the rating of the component is pushed through it, the device will be destroyed. With reverse bias the device is much more forgiving.

The direction of the current flow as I have explained is exactly backwards from the way some electrical circuits are drawn. N type (-) material has excess electrons and they flow to the (+) battery terminal. Ben Franklin and his pals assumed that positive flows toward negative; they drew electrical diagrams that way.

A diode is N type material bonded to P type material. Its symbol is:



To forward bias the diode, attach the battery (+) to the P type material and the battery (-) to the N type material. Just remember, the arrow in the symbol is pointing from (+) toward (-) for forward bias.



To reverse bias the diode, connect the (+) battery terminal to the N type material and the battery (-) to the P type material (position the diode so that the arrow points toward the (-) battery terminal).

If a diode is a junction of two semiconductors, what is the junction of three semiconductors called? You--there in Texas with your hand up. Right!, a transistor.

If we are going to use two materials to form a junction of three materials then we are going to have to use one material twice. Thus, we have two types of transistors:

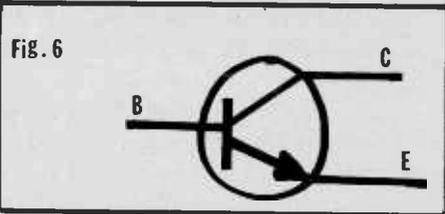
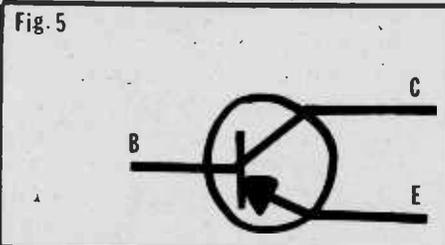
1. P-N-P
2. N-P-N

Either kind of transistor is composed of three parts:

1. Emitter
2. Base
3. Collector

The BASE is always sandwiched in the middle.

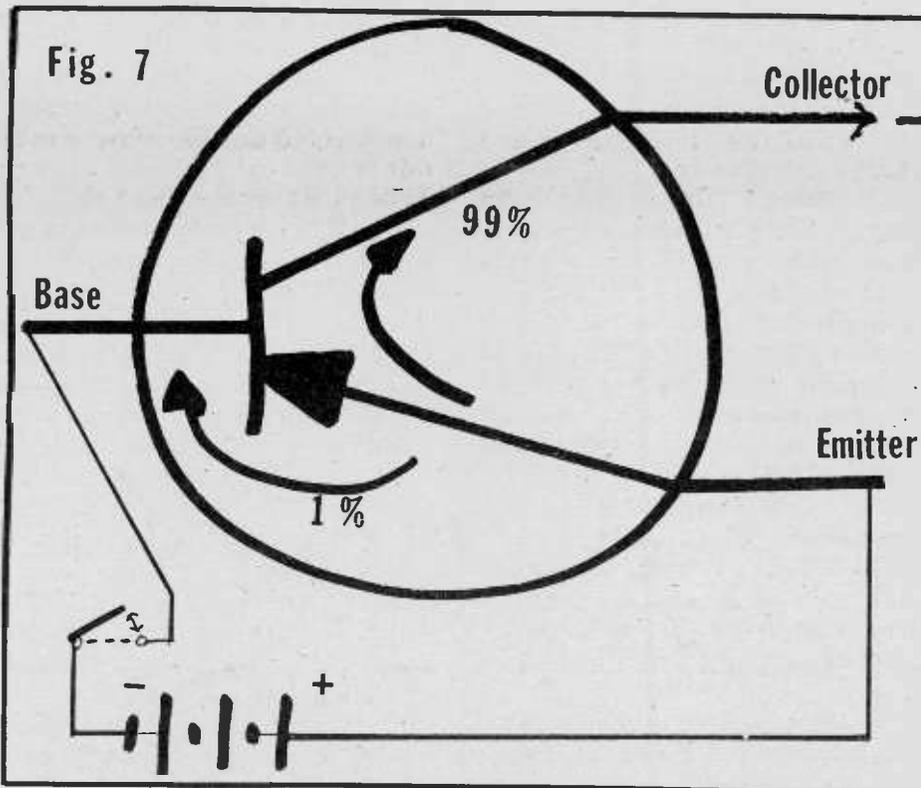
The symbol for each kind of transistor is:



Just remember: the arrow is in the direction of the "positive current flow" for forward bias.

Usually, the EMITTER/BASE junction is forward biased, permitting current flow.

Now, let's suppose a PNP transistor has 99% of the holes from the EMITTER flowing to the COLLECTOR and only 1% of the holes flowing from the EMITTER to the BASE in a working circuit, a portion of which is shown below:



If the EMITTER/BASE is forward biased, the (+) battery terminal is connected to the EMITTER and the (-) battery terminal is connected to the BASE (from + to - in the direction of the arrow for forward bias).

By opening the switch in Fig. 7 the circuit from the battery terminal to the base, we stop the forward bias. Remember the third possibility of bias for a semiconductor?::NONE. That is what happens all over the place: nothing. No current flows. Not only does the 1% current flow stop, but the 99% current flow from the EMITTER to the COLLECTOR stops as well.

This is the KEY to...transistor. (the feather to my neighbor's arm) we can control or do the exact same thing to the larger current flowing from the EMITTER toward the COLLECTOR (the sledgehammer to your head). So amplification is just doing something to the small current to the BASE that is duplicated by the larger current from the EMITTER to the COLLECTOR.

"Beta" is the Dolly Parton of the transistor world--I like transistors with big betas. The Beta of a transistor is the amplification factor, obtained by dividing the COLLECTOR current by the BASE current. In Fig. 7, we have 99% divided by 1% for a product of 99. So that transistor has a beta of 99.

"Alpha" is the ratio obtained by dividing the COLLECTOR current by the EMITTER current. In Fig. 7, we have 99% divided by 1% for a product of .99, or a little less than 1.

So how does the pre-amplifier between your outside antenna and scanner work? Let's say that you and I have developed a simple code. If I tap on your head once, it means "yes" and if

I tap on your head twice, it means "no".

Now, let's suppose that the only thing I have to tap you on the head with is a feather. That is going to be a pretty weak signal. Perhaps you cannot even receive my message. We need an amplifier between my feather and your head. Let me get my neighbor to use as an amplifier. Meet my neighbor. See the sledgehammer he is holding? Now, when I tap out our little code on his arm with my feather, he taps out the same code on your head with the sledgehammer.

By starting, stopping, raising, or lowering the current to the BASE of the

On another note, if anyone has a Grove Scanverter to sell for \$48 to \$50 please write me in care of Monitoring Times. John Evans (Ohio) is confined to bed or a wheelchair and would enjoy listening to the 225 to 400 MHz aero band.

See you next month. ●

EXPERIMENTER'S



WORKSHOP

**MAKE THIS
AEA/KANTRONICS
HYBRID**

Reader Bob Skwirsk has discovered a simple method of using the AEA SWL TEXT RTTY/Morse ROM with the Kantronics RADIO TAP, saving the cost of the AEA CP-1 interface.

Bob's modification involves the removal of the AEA interconnecting plug, substituting an audio plug. It goes like this:

1. Cut off the plug on the end of the cable supplied with the SWL TEST that would normally plug into the demodulator.
2. Snip off all wires for about 1 inch except for the red and bare wires; these will be connected to the plug in the next step.
3. Select a miniature 1/8" (3.5 mm.) phone plug like the Radio Shack #274-286; slide the plastic insulation over the cable and prepare to mount the jack on the cable.
4. Solder the red wire (data line) to the center terminal of the plug; solder the bare wire (common ground) to the barrel (ground) terminal of the plug.
5. Reassemble the plug which is now inserted into the audio output jack of your receiver. ●

IMPROVING THE NXL-1000 ACTIVE LOOP ANTENNA

by John Henault KDX1SWL

(ED.NOTE: After a brief flurry of promotion by the manufacturers, customer dissatisfaction became apparent and Contemporary Electronic Products ceased operation, leaving many owners high and dry. A caveat was published by Monitoring Times after it was determined to our satisfaction that the company had no intention of making good on their mail order business.

But experimenters take heart--apparently there are a few modifications which can be performed, rendering the NXL-1000 loop usable once again.)

Some time back, a company called "Contemporary Electronic Products" of Florida offered for sale an NXL-1000 noise cancelling, active, indoor loop antenna.

The NXL-1000 offered the shortwave listener several innovative features and one was ordered and subsequently received.

As received from the manufacturer the NXL-1000 consisted of a metal box base unit with a selection of controls and a 12-1/2 inch shielded loop terminated in PL259 connectors and a coaxial "T" connector to mate with an S0239 connector mounted on the top of the control box.

After reading the instruction manual and assembling the loop antenna, the unit was put to use and although the unit performed well enough, subsequent usage by this listener showed there was room for improvement.

Being the type of listener who is not totally qualified to go digging into the interior of this type equipment without hazard of rendering the unit totally useless by the time I'm finished, I decided to have a few friends, qualified in electronics, explain some of the intricacies to me. I decided to experiment with some modifications.

Fresh from the factory, the NXL-1000 offers the operator four controls: power on/off switch, attenuator on/off switch, range select switch (which also offers calibrator markers of 1 MHz and 100 kHz), and a tune control.

Performance was greatly enhanced through the modifications described below.

The nine volt battery required to power this unit (which can also be powered with an ac adapter) was originally mounted inside the metal case. A nine volt battery clip holder was mounted on the rear panel of the base using a couple of pop rivets. The battery clip top and wires were unsoldered, rerun through a small hole and rubber grommet near the new battery clip, and then resoldered. This allows for rapid change of the battery.

The original power and attenuator toggle switches would not make positive contact each time and, after several hours of use, fell apart. They were replaced with good quality switches.

The loop antenna configuration, a coaxial "T"-to-S0239 arrangement, would constantly loosen the mounting nut allowing the coax cable to become wrapped up and eventually part from the connector.

It was discovered that an inferior coaxial cable had been used in manufacture and I replaced it with high quality RG-174 cable. At this time it was determined that a BNC type connector would allow for easy rotation of the loop and a UG909 bulkhead connector was used to replace the original S0239 connector.

NOTE: Care must be taken here to avoid damage to the rf coil (indicated at "1" in the accompanying schematic diagram) soldered to the base of the S0239 connector. It is resoldered to the center conductor of the new coax cable and

center connection of the new UG909 connector. Be sure to check the grounded end of the rf coil for cold solder joint.

Even new, the tune control gave me headaches when trying to fine tune the antenna. Many times it was impossible to get the tune control to stay in the position required for best signal reception. Close inspection revealed a cheap variable capacitor of the type used in any portable AM radio.

First consideration was to attempt to use the same type originally provided by the manufacturer, but I learned that these were actually the poorest quality variable capacitors manufactured. Shopping around at the various electronic supply houses in this area I found a single section 365 picofarad air variable capacitor manufactured by the Colectro Corp.

Upon disassembling the NXL-1000 and removing the existing cap, I found that the original unit is plastic faced and therefore insulated from the enclosure. I decided to use small rubber grommets to insulate the cap from the case.

A period of testing followed and the improvement in performance was truly noticeable; the unit performed as was expected.

After several months of use there was an unexplained degradation in performance. Several resistors and capacitors were out of tolerance and were replaced with good quality equivalents. Resistors were all replaced with

tightest tolerances available at the local Radio Shack stores and capacitors were replaced with polystyrene or mylar types when available.

After completing all modifications I determined that I had spent approximately \$25 to improve the unit.

To those of you who have purchased an NXL-1000 and relegated it to some dark corner of your shack for whatever reasons, why not dig it out, dust it off and try for some modifications and enjoy what was conceived as a good idea.

Should anyone reading this article know how to increase its low end range down to about 150 kHz to 1.5 MHz, I'd appreciate hearing from him.

LIGHT SWITCH FOR YOUR PRO-30

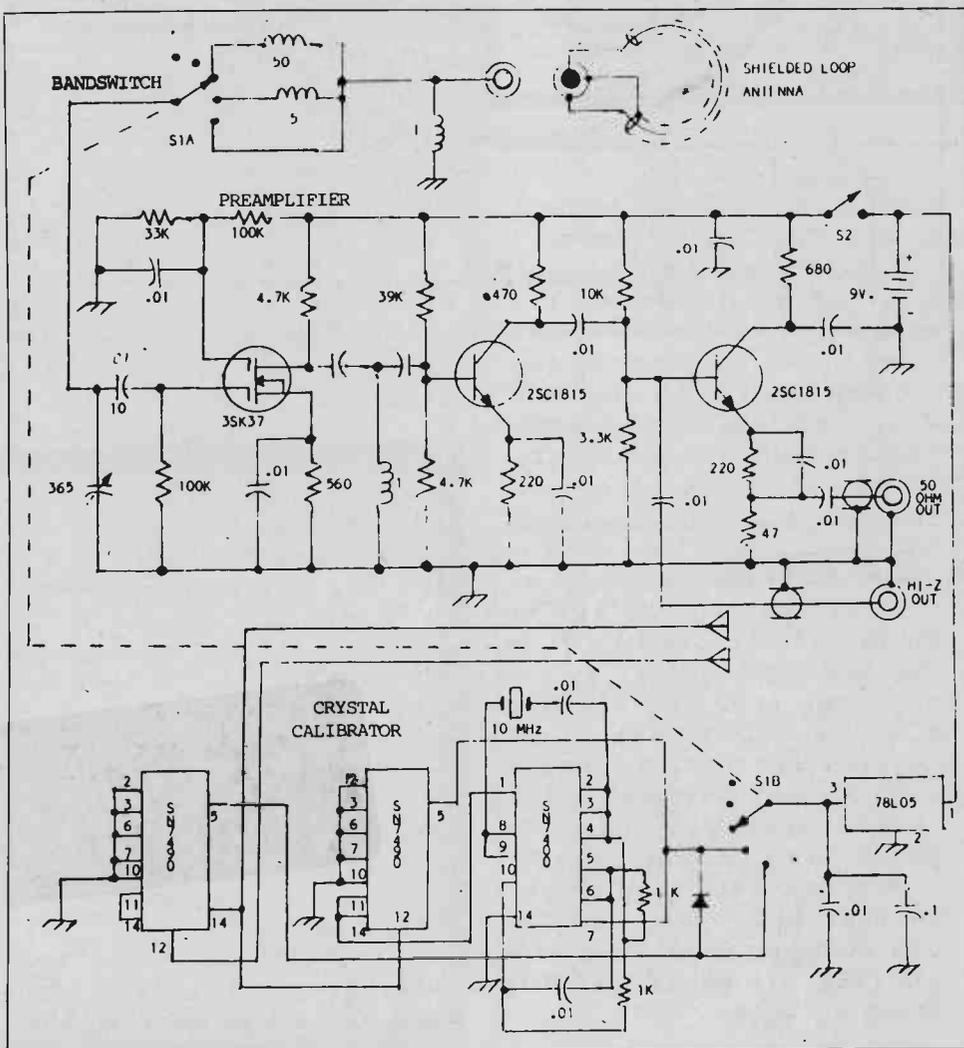
by Larry Whately

If you are like me, you carry your Radio Shack PRO-30 portable scanner with you just about everywhere. But if you are in your car at night or programming in the dark, it's hard to see the display without holding the light button down. I used to use a rubber band and piece of plastic to hold down the light button, but a small slide switch can be added to do the job much better.

CAVEAT: Keep in mind that any modification done to a commercial product will void the warranty, so proceed only if you know what you are doing!

Remove the six screws from the back of the PRO-30, two of which are under the battery pack cover. Turn the PRO-30 over and carefully remove the front cover by pulling it straight up to prevent bending the touchpad pins which plug into the circuit board. Also be careful of the speaker wire.

After the cover is off you will see where the touchpad was plugged in. Starting at the bottom, pins 1 and 2 will be where you will solder the wire from the switch. Run the wires to the switch under the circuit board to the other side. I have found the best place to put the switch is on the back cover over the power and charge jacks. Use a small slide switch (SPST Radio Shack part #257-327 or equivalent). You will have to shorten the terminals on the switch in order for the switch to fit under the cover. Make sure there is slack in the wire for taking the cover off.



STOCK EXCHANGE

PERSONAL

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SUBSCRIBER RATES: \$.10 per word, 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.

SONY ICF 5900 WANTED: Robert Stoneburner, 19 Guinevere Court, Santa Ana, CA 95407.

>>>><<<<

FOR SALE: RADIO SHACK PRO-2 scanner, tunable (30-50; 152-172) \$20; 1984 callbooks - \$10; 1982 callbooks - \$.5. Bill Smith, RFD 238W3, Locust Street, Douglas, MA 01516.

INFORMATION PLEASE

Monitoring Times will print at no charge (as space permits) announcements and questions of a non-commercial service nature.

ATTENTION: Richard L. Kramer has a new address. 3300 G Kingston Drive, Sinking Spring, PA 19608. Will correspond with anyone on HF-VHF-UHF monitoring.

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WANT BACK ISSUES OF MT for Nov-Dec, 1984, and Jan 1985. Missed out while at sea. K5CN, 456 Glenmore St., Corpus Christi, TX 78412. Will pay or accept free.

>>>><<<<

WANTED: Schematic diagram for Sony ICF-2001. Will gladly pay for copying costs and postage. Rick Mainart, 2 Oslo St., Mystic, CT 06355.

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WANTED: Copy of 1981 WRTV Handbook. Bob Floyd (704)366-6549.

>>>><<<<

WANTED: Old WRTH's (World Radio TV Handbooks) Contact Ed Soomre, 1 Alcott Drive, Northboro, MA 01532.

HAMS IN SPACE

A year ago astronaut Owen Garriott, W5LFL, made amateur history as the first ham radio operator to work earth stations from an orbiting spacecraft. The frequency used was 145.55 MHz.

Now it would appear that the same frequency will be busy again, this time with Tony England, W0ORE, operating aboard Shuttle

COMMERCIAL

\$25 payment must accompany ad. Send 2 1/4" wide x 2" long camera-ready copy or we will type copy (35 words maximum).

BOB'S BARGAIN BIN: One-only items, like new, include UPS shipping.

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ONE GIGAHERTZ AND ABOVE: Who's Up There?

by Bob Grove

With scanning receivers reaching ever upward in their frequency ranges, it is logical that many listeners begin to question "Who are the users above UHF?"

As frequencies grow higher and wavelengths become proportionately shorter, radio signals begin behaving more like light, traveling in straight lines and bouncing off reflective surfaces.

These characteristics make it easier to use simple antennas to provide high gain as typified by the dish antennas associated with satellite TV terminals.

But what other users of the microwave spectrum can be found on either side of the 3.7-4.2 gigahertz (3700-4200 megahertz) portion of the spectrum?

The table below, reprinted from CQ Magazine, provides a guide to other services besides satellite TV and telephone company relays (shown in the chart as "1").

FREQUENCY (GHZ)

| | |
|-------------|--|
| 0.960-1.350 | Land-based air navigation systems |
| 1.350-1.400 | Armed forces |
| 1.400-1.427 | Radio astronomy |
| 1.427-1.435 | Land-mobile: police, fire, forestry, railway |
| 1.429-1.435 | Armed forces |
| 1.435-1.535 | Telemetry |
| 1.535-1.543 | SAT-maritime mobile |
| 1.605-1.800 | Radio location |
| 1.660-1.670 | Radio astronomy |
| 1.660-1.700 | Meteorological-Radiosond |
| 1.700-1.710 | Space-research |
| 1.710-1.850 | Armed forces |
| 1.990-2.110 | TV Pick-up |
| 2.110-2.180 | Public common carrier |
| 2.130-2.150 | Fixed point-to-point (non-public) |
| 2.150-2.180 | Fixed-omnidirectional |
| 2.180-2.200 | Fixed, point-to-point (non-public) |
| 2.200-2.290 | Armed forces |
| 2.290-2.300 | Space-research |
| 2.450-2.500 | Radio location |
| 2.500-2.535 | Fixed, SAT |
| 2.500-2.690 | Fixed point-to-point (non-public) |
| 2.655-2.690 | Instructional TV |
| 2.690-2.700 | Fixed, SAT |
| 2.700-2.900 | Radio astronomy |
| 2.900-3.100 | Armed forces |
| 2.900-3.700 | Maritime radio navigation |
| 3.300-3.500 | Maritime radio location |
| 3.700-4.200 | Amateur radio |
| 4.200-4.400 | Common carrier (telephone) |
| 4.400-4.990 | Earth Stations |
| 4.990-5.000 | Altimeters |
| 5.250-5.650 | Armed forces |
| 5.460-5.470 | Meteorological-radio astronomy |
| 5.470-5.650 | Radio location (coastal radar) |
| 5.600-5.650 | Radio navigation-General |
| 5.650-5.925 | Maritime radio navigation |
| 5.800 | Meteorological-Ground based radar |
| 5.925-6.425 | Amateur |
| 6.425-6.525 | Industrial and scientific equipment |
| 6.525-6.575 | Common carrier and fixed SAT |
| 6.575-6.875 | Common carrier |
| 6.625-6.875 | Operational land and mobile |
| 6.875-7.125 | Non-public point-to-point carrier |
| 7.125-8.400 | Fixed SAT |
| 8.800 | TV pick-up |
| | Armed forces |
| | Airborne Doppler Radar |

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