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POPULAR COMMUNICATIONS

JULY 2000

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Comm
Systems
Basics...Pg. 50

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Contents

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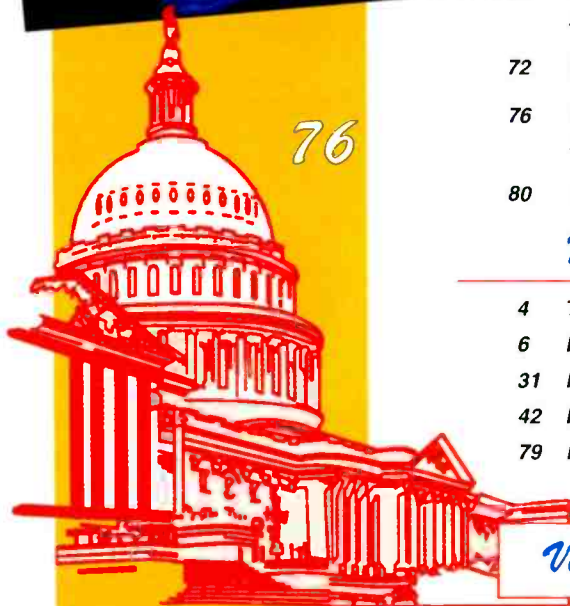


16



46

76



8 Catching The Colombians
It's A Hotbed Of Activity That YOU Can Hear! by Gerry Dexter

16 Historic Hotel Broadcasters:
The Key Was Location, Location, Location! by Alice Brannigan

Product Spotlights

24 • RadioShack's PRO-94 Scanner by Ken Reiss

30 • Am-Com ClearSpeech™ Speaker by Harold Ort

26 Going Mobile On High Frequency, Part 2:
Choosing The Right Mobile Whip Radio Resources

32 A Rose By Any Other . . . And Texas "Freebender" Fined \$17,000 CB Scene

34 Tales Of An American Bosch The Radio Connection

38 Pirate Dr. T Says — "Say What Needs To Be Said" Pirate's Den

40 Navigating International SW BC Bands The Easy Way World Band Tuning Tips

44 Diversity Reception Techniques Antennas & Things

47 Newsgroup And Mailing List News, And Making Your Own QSLs Radio & The Internet

50 Types Of Communications Systems 101 ScanTech

54 Getting Involved And Sharing Your Insight Utility Radio Review

59 Colombia, Kurdistan, And Sudan Clandestines Being Heard In The U.S. Clandestine Communiqué

60 Whatever Happened To Top-40 Radio? Broadcast DXing

66 How To Log Israeli Defence Forces Radio, And News Of A New Guatemalan Station! The Listening Post

72 How To Use Enroute Low And High-Altitude Aeronautical Charts Plane Sense

76 Congress "Steals" Another Base, And Anti-Scanner Legislation Is Reincarnated! Washington Beat

80 Our Top-30: You Can Tell You're A Radio Nut If . . . The Loose Connection

Departments

- 4 *Tuning In* — An Editorial
- 6 *Pop'Comm P.O.* — Letters
- 31 *How I Got Started*
- 42 *Product Parade*
- 79 *Readers' Market*

On The Cover

This U.S. Army Ranger from the 1st Battalion, 75th Ranger Regiment uses his radio at Hunter Army Airfield, Georgia in a training exercise. How far Washington is willing to go with helping the Colombian army fight insurgency and the illegal drug business there is anyone's guess. But in the meantime, Colombia remains a hot radio target. Gerry Dexter's "Catching The Colombians" feature on page 8 gives you the scoop on Colombian shortwave stations YOU can hear! (Photo by Larry Mulvehill)

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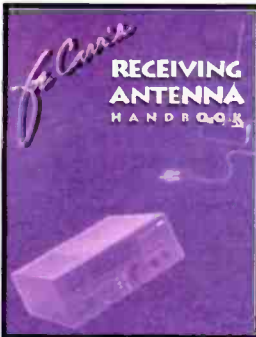
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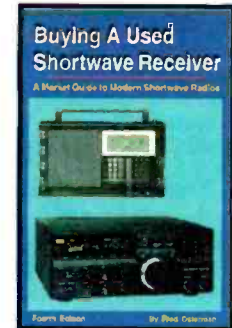
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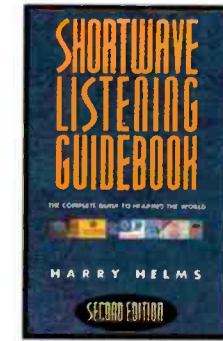


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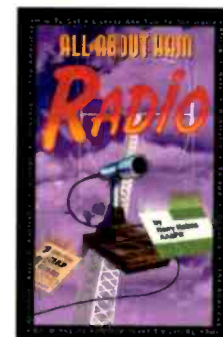
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An Editorial

You Get Three Wishes — And A 9-1-1 Call

We've all heard jokes about getting three wishes, some of which you could even tell your kids. But joking aside, if you were granted three wishes that had nothing to do with money — three that could potentially impact thousands of people — what would they be? Certainly, a long, healthy, rewarding life for family and friends would be at the top of the wish list. And without a doubt, some long-term ongoing sensitivity training for our politicians would also be in order. A reasonable person might also wish for them to walk a mile in our shoes, too. Of course, these are only "wishes" and require a little effort on our part to come true.

My first wish is to get all the drunk drivers off the road so you and I can enjoy a Saturday afternoon drive or run to the market without ending up in the morgue. I make no apologies to anyone for my unwavering stance against anyone driving after having a drink. I realize this may not be a very popular position. Many will say that one drink is harmless, but that drink, mixed with Heaven knows what prescription and over-the-counter drugs, can spell disaster for others on the highway that want to live to see their next paycheck. This thing called life is pretty neat, and frankly, the thought of some thoughtless jerk taking it away because he or she just had to have that beer makes my blood pressure go off-scale. I'm no doctor, but I can say that it's a lot more harmful than having a glass of seltzer and hitting the road.

Lately though, there's an increasing menace on the highway that many folks have compared to driving while under the influence that can *quadruple* your chance of being involved in an accident. You're right, it's the cellular phone user. Statistics from the Cellular Telecommunications Industry Association (remember the CTIA—Tom Wheeler's ever-waffling gang in D.C.?) say there are nearly 90 million cell phone subscribers, and the numbers continue to grow.

I'll admit that a few months ago when reviewing the Nextel phone for *Pop Comm* — the one with two-way radio capability — I found myself driving down the highway with one hand on the wheel

and the other holding the phone and making a call. Talk about a squirrely driving performance! Driving while under the influence of cellular phone isn't for me. If only my driver's ed teacher could've seen that operation. (Mr. Wilkinson was a different kind of guy, and frankly, for all his shortcomings, there was one thing he was right about: driving is *serious* business). With him, you had to "earn" the right to have the car radio on, and of course since he was the judge, jury, and executioner, few of us kids ever earned that privilege. And whatever you did, those hands had *better* be at "10" and "2" on the steering wheel, and don't even ask about turning on the car radio. But, his hands-on-the-wheel and "forget foolin' around with the damned radio" was, in the final analysis, correct. Let's face it, one second of inattentiveness can change your life and others, forever.

My second wish is that all cell phones would be magically rendered useless and unable to dial any number except 9-1-1 from a moving vehicle. Of course, it's not just *placing* a call that increases your risk of being involved in an accident. Receiving a call and the actual conversation is proving just as dangerous. And in the studies I've seen, the problem gets worse as the driver's age increases.

Ameritech Cellular has published some interesting guidelines for motorists intent on using their cell phones in moving vehicles. In part they say, "Motorists should focus complete attention on the road . . . refrain from eating, drinking, changing CDs, playing with the radio, putting on make-up, using laptop computers, brushing hair, note taking or reading while the car is in motion." They continue, "Motorists should also avoid complicated or emotional conversations." They also say, ". . . avoid talking on the phone in congested areas or bad weather. Exit the highway if necessary to dial or complete a conversation." Slight contradiction here, don't you think? Mobile cell phone users are yakking no differently than if they were in their living rooms. And the problem naturally gets *worse* in congested areas and bad weather. Isn't that when the cell systems

(Continued on page 78)

BY HAROLD ORT, N2RLL, SSB-596

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Don't Give Up The Ship

Dear Editor:

This is for all those operators who have given up on CB or feel CB is a sinking ship. I belong to U.S. Emergency Radio Monitors, a group similar to REACT that monitors CB Channel 9.

When we started U.S.E.R.M none of us knew if it would take off or crash and burn. But within a week, requests to join came in. Ever since then, requests to join have been coming in almost every day and membership has grown. The club took off, all because of caring CBers, hams, and VHF marine operators who wanted to make a difference. They joined, they monitored and they saved lives and still continue to do so. No matter if you are a REACT, USERM, CBERT, or an independent monitor, never give up because you and your CB can make a difference in someone's life — a big difference.

People complain that the FCC isn't doing anything. They are. Although they are a bit slow at catching violators, they do — the rest is up to us. On a recent trip across three states, I was pleased to hear people being assisted via CB channel 9. This shows that CB still lives and it will continue to, as long as caring people continue to monitor.

Many complain of all the problems they encounter while they monitor. Who said it was going to be easy? If you have ever answered an emergency call, you know the feeling and you know it's worth the trouble and the wait.

If CB has a problem, let's work together and solve it and restore CB to it's for-

mer glory. Do it for yourself and future generations and that person — maybe you or a family member — who will one day need assistance via CB. It's up to you. 10-4? If CB is a sinking ship, I, as well as many other dedicated monitors and CBers are prepared to go down fighting with it.

Let's work together and save CB and save lives in the process. Don't know where to begin? Join a local club such as REACT or U.S.E.R.M. There are many organizations out there who are looking for responsible operators.

73's
U.S. Emergency Radio Monitors
Main Headquarters

CB In The Sparkling City By The Sea

Dear Editor:

I've been a CBER for five years and I've heard all of the cussing, mindless yakking, illegal linears, illegal DX contacts, and other nonsense. I realize that there are people out there that just don't care. Nonetheless, I'm still a friend of CB. I've taken my Technician Test and passed. My call is KD5JDG. I'm also studying the General Test and CW. Even when I've moved on to ham, I'll still be part of CB.

I've started a radio club in my neighborhood called CCROG (Corpus Christi Radio Operators Group). There is a division of the club called Charlie-Kilo that deals with CB. We use the proper call-signs (KFC78415, for example), and also use a personal identifier for club operations (CKB0, for example). The members have a copy of the rules, and I expect them to follow it. And they do! See, there are quite a few people that care. Don't abolish CB. It's a great thing if used properly. It has introduced me and many of my friends to 2-way radio.

The FCC is finally starting to do something about CB, and I praise them for it. They just need to do a little bit more. If possible, they should restart licensing CB stations. They should also remove the 155.5 distance limit. It is downright silly.

I believe that if you can steer enough new CBers away from the "Dark Side,"

most of the future problems will be solved. A CBER was asking on a CB message board how he can increase his power from four watts to 25 watts, and I and some other Internet pals tried to persuade him, [not to] but here comes some idiot telling me and the others how they don't care and started explaining how to increase power. There is a really nice message board that focuses on legal CB at <http://www.insidetheweb.com/messageboard/mbs.cgi?acct=mb242900&TL=939280293>. We also need more CB clubs. It would be nice if the ARRL still supported CB.

I am 12 years old, and do not appreciate the comment made in the letter "If Elephants Could Sing" about "school-age kids tying up the channel." It was rude and very broad. My friends/club members do not use channels 9 and 19, although we monitor them. Unfortunately, most of the rude, illegal locals use 19 irresponsibly. My club operates on channels 12, 14, and 18. We would use 32, 37, and 40 USB but most of my friends are using vintage 23-channel gear that they were able to dig-up.

When CCROG runs nets, we try to keep the subject within radio and related subjects, although we occasionally ragchew off the subject. We also run our call-signs every 10 minutes, and take one-minute breaks, just as hams do. And we will always will give urgent radio messages the priority.

If you are within 155 miles of Corpus Christi, and your equipment is type accepted with no linears, and you can behave properly, you are welcome to join our nets. On weekends they are run anywhere between 9 p.m. and 10:25 p.m. I also have my radio on almost all the time. Try to QSO with us on channels 14, 12, or 18. You can also find me on 2-meters on 147.080 through a repeater up in Sinton or 146.520 simplex.

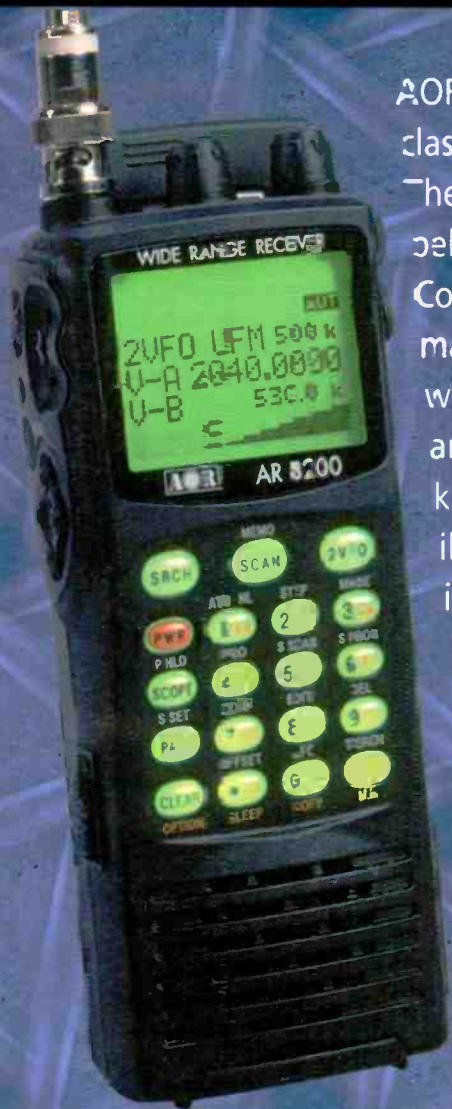
Thanks & 73's,

Fabian Carbone
K5JDG
KFC78415
CKB0
Corpus Christi, Texas

(Continued on page 78)



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Catching The Colombians

It's A Hotbed Of Activity That YOU Can Hear!

By Gerry Dexter

South America's oldest democracy is in trouble. Serious, big-time trouble. What's going on? In a word: drugs. Colombia is now the source of 75 to 80% of all the cocaine and heroin coming into the U.S. The illegal drug business there works hand-in-hand with an increasingly powerful guerrilla movement of some 30,000. Neither the Colombian nor the U.S. government seem to know what to do about it.

Between 1990 and 1998, the U.S. poured some \$600 million into the anti-drug effort in Colombia — with no effect. Colombia got another half a billion last year. Now Washington proposes to reportedly spend between \$1.3 and \$1.6 billion on eradication efforts and more military personnel and equipment to train the Colombian army to fight the insurgency. Some in our government are fearful that U.S. military personnel might get drawn (further?) into the actual shooting campaign. You can spell their concern: V-i-e-t-n-a-m.

Although the guerrillas, mainly a group called FARC (Revolutionary Armed Forces of Colombia) say they are not involved in drugs, that's where they get the money to support their effort. One estimate is that the guerrillas are profiting to the tune of \$1 million per day, perhaps even twice that amount. In trying to placate the enemy, Colombia has actually handed over to the guerrillas and drug lords an area about the size of Switzerland; a sort of one-sided demilitarized zone which the government has agreed not to enter without prior warning. In all, the guerrillas are believed to control as much as 40% of the country and are said to be expanding their operations into Venezuela, Ecuador — even Panama!

You can also toss in problems with far right paramilitary groups and a suffering economy. With all of these nasty ingredients in the mix, it seems pretty certain we're going to be hearing more and more about this growing crisis and the U.S. involvement in it as the months go by.



Armonias del Caqueta is sometimes active on 4915.

All this makes Colombia an interesting radio target, and our exercise today is to take a look at what's on the air these days (more or less!) and encourage you to set out after them.

A significant number of stations are classified as inactive, which always leaves some hope they might one day return, thus they're included in the following list, with their inactive status noted. Make it a point to check for the inactives now and then — you never know when one of them may return, although the longer they stay silent, the greater the chance that's a permanent condition.

Since all Colombians operate on the lower bands, the best times to hear these stations is during our North American evenings or their early morning sign-ons. Note that on and off times can sometimes vary now — from a few minutes to an hour or more if the station is covering a special event or it's a holiday. A number of stations are affiliates of one of the large national networks (RCN, Super, Caracol, Todelar) which means that individual station IDs may be few and far between. All the programming is in Spanish.

It shouldn't come as a surprise, especially these days, that getting your recep-

The image shows a logo for 'Emisora Armonias del Caqueta'. On the left is a stylized palm tree inside a square frame. To the right of the frame, the text 'Emisora' is written in a cursive font, followed by 'Armonias del Caqueta' in a larger, more decorative cursive font. Below this, in a bold, sans-serif font, is 'H.J.V.K.', '30 KW - 970 KHz', 'Canal preferencial', '3 KW - 4915 KHz', and 'Onda corta'. At the bottom right is a circular stamp that says 'EMISORA ARMONIAS DEL CAQUETA' around the perimeter and 'DIRECTOR' in the center. Below the stamp is a handwritten note: 'Un cordial saludo para Gerry L. Dexter. F. Alvarez de A.'.

Armonias del Caqueta is sometimes active on 4915.



The boundaries shown on this map do not imply endorsement or acceptance by the World Bank and its affiliates.

tion verified will often be a battle. On average, Colombian stations are about "average" in the ease of QSLing department, which means not very good. In a pinch, you can try sending a reception report to the headquarters of whatever network (if any) the station is affiliated with, although there's no guarantee on that working, either. We've included addresses for the active or normally active Colombian stations.

All right. So what's out there? Here's our list — and as usual, let us know what you're hearing.

4785 — Radio Super, Ibaque, Tolima department. Super network. Inactive.

4815 — Radio Guatapuri, Valledupar, Cesar department. Also inactive.

4835 — Radio Bueneventura, Valle del Cauca. Inactive.

4865 — La Voz del Cinaruco, Aruca. Irregular. Member of the Caracol network. Address: Calle No. 41B, No. 30-22, Meta.

4885 — Ondas del Meta, Meta, Meta Department. Listed for 24-hour operation but it's on only irregularly. It's pretty easy to hear when it is on, though. Member of the Super network. Address: Calle 38, No. 30A-106, Villavicencio.

4895 — La Voz del Rio Arauca, Aruca. Aruca Department is inactive at this writing but this, supposedly, is only temporary. Scheduled from 0900-0400 and a member of the Radio Cadena Nacional network. Reports go to Cra 22, No. 28-21, Aruca — or to Apartado Aereo 16555, SF (Santa Fe de) Bogota

4905 — Ecos del Orinoco, Puerto Carreno, Vichada department. Inactive.

4915 — Armonias del Caqueta, Florencia, Caqueta department is scheduled from 1000-0200. Apartado Aereo 71, Florencia.



The shortwave career of La Voz de Bogota (5960) ended in the early 1970s. This QSL card is for a reception in 1956!

4955 — Radio Nacional de Colombia, Bogota. Scheduled from 1700 to 0500 and easily heard during the evening hours. The programming is largely classical music. Reportedly they now air an hour of English Tuesdays through Sundays at 0200. Reception reports should be sent to Canal International, Apartado Aereo 93994, Bogota.

4965 — Radio Santa Fe, Bogota. This one is probably the longest inactive on the list.

4975 — Ondas del Orteguzza, Florencia, Ibaque department. A member of the Todelar network. This one now seems to sign off by 2300, though sometimes it is on into the evenings. When that's the case — and when the utility station on 4975 is absent — you can hear

em fairly easily. The address is Apartado Aereo 209, Florencia.

5020 — Ecos del Atrato, Quibdo, Choco department. A member of the Caracol network. The schedule runs from 1000 to 0600. You'll find that 5020 is more likely to prove out at 5019. The address is Apartado Aereo 196, Quibdo.

5040 — La Voz del Yopal, Yopal, Casanare department is inactive.

5077 — Caracol Colombia, Bogota. This 50 kilowatt runs 24 hours a day carrying Caracol network programming. Their assigned frequency is 5075. Address: Apartado Aereo 9271, Bogota.

5570 — Radio Nueva Vista, Bucaramanga, Santander del Sur depart-

(Continued on page 15)

Sr. (R) **GERRY L. DEXTER**

Muchas gracias por su informe de recepción.
Confirmamos que la emisora sintonizada es nuestra.

Emisora **RCN LA VOZ DEL RIO ARAUCA**

Ciudad **ARAUCA -ARAUCA-COLOMBIA**

Frecuencia **4.895 KHZ**

Potencia **40 KV**

Fecha y hora de recepción
Enero 15, 89; 7-5-88:4:49 a 5:10 a.m.

RADIO CADENA NACIONAL S. A.

Gerencia de Producción y Programación
Firma

RCN, Radio Cadena Nacional, inició labores hace 41 años, pero algunas de sus Emisoras como Nueva Granada, RCN Pereira, RCN Pasto y la Voz de Medellín, fueron fundadas en 1936.

Actualmente, RCN cuenta con Emisoras en A.M. y F.M. Stereo a lo largo de todo el territorio nacional, con la mejor programación en noticias, música, deportes y variedades.

Certificado de Sintonía



Calle 37 No. 13A-19 Bogotá, Colombia, Sur América

La Voz del Rio Arauca, on 4895, is a member of the Radio Cadena Nacional Network.

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The Millennium begins. The wait is over. The Grundig Satellit Legend continues. The Satellit 800 Millennium is your assurance of staying in touch with the world... Access radio programs the world over... fast-breaking news from the farthest corners of the globe... music from faraway countries.

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- You'll appreciate the smooth flowing design and functional control panel.
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World



"Performance ... exceptionally promising ..., Audio quality is delightful, superior to that of any other portable on today's market ..., This ergonomic radio is a cinch to operate straight out of the box"

Lawrence Magne,
Editor-in-Chief, Passport to World Band Radio

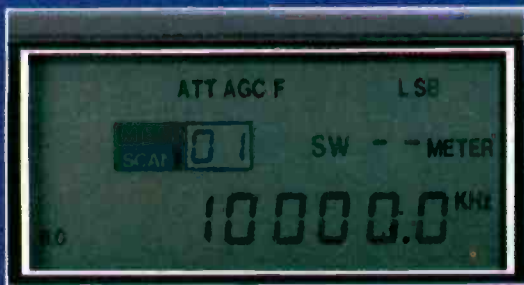
- Receives FM stereo with the included high-quality headphones.
- Superior audio quality for which Grundig is known.
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- 70 user-programmable memories.
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- Last station memory.
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Bogotá, D. E. - Colombia

Bogotá, D.E. Julio 9 de 1.978

Señor
GERRY L. DEXTER
Lake Geneva, U. S. A.

Estimado Señor:

Hemos recibido sus reportes de sintonía de nuestra Emisora Radio Melodía de Bogotá - Colombia. Agradecemos sinceramente sus estimulantes palabras y su interés por escucharnos.

Para su información, nuestra frecuencia en onda larga es de 730 kc, con - 50,000 vatios de potencia en A. M. y 5 kilovatios en onda corta en la frecuencia de 6.140 kilociclos, banda de 48 metros.

Le estamos enviando un recuerdo de nuestra emisora y nos será grato seguir teniendo correspondencia con usted.

Con toda consideración y aprecio, nos suscribimos

Cordialmente

CADENA LIDER DE COLOMBIA

RADIO MELODIA - BOGOTA

Elvira Mejía de Paéz
ELVIRA MEJÍA DE PAEZ
Gerente

CADENA LIDER

Radio Melodía, now Cadena Melodía on 6045, is inactive.

Villivoicencio, Meta Department This is one of the real old timers. You're more likely to find it on or about 6117, though. It's an affiliate of the Super network and operates from 0900 to 0500. Address Calle 41B, No. 30-11, Barrio La Grama, Villivencio.

6150 — Caracol Colombia, Bogota. Currently inactive.

6170 — Caracol Colombia, Florencia, Caqueta. Formerly La Voz de la Selva, it is inactive at the moment.

Clandestine Targets

The guerrillas operate two clandestine stations which, with effort and well-positioned personal geography can be picked up occasionally. (You would think that with all the money they're said to be making they could afford to run more power and longer schedules.)

The oldest of the two clandestine stations is **Radio Patria Libre**, operated by the National Liberation Army (ELN). When it comes to frequency usage, both stations have a history of doing that old "follow the bouncing ball" routine. They're also not real precise in their timing. Patria Libre normally uses variable **6250** and has transmissions in the morning around 1130 UTC and in our late afternoons, around 2200, each lasting 30-40 minutes. Of course, all the programming is in Spanish.

The second station, **La Voz de la Resistencia**, is operated by FARC — Fuerzas Armadas de Colombia (Armed Forces of Colombia) and uses variable **6240** for broadcasts beginning around 1100 and again around 2200. A second service, called "Bloque Oriental" uses **6095** from 1130-1230 and 2130-2230.

Although all three have been logged in North America, it's not an easy trick, especially the further you get from the Eastern time zone. To our knowledge, there are no workable mailing addresses for either station.

There's one more target you can go after, this one something of an oddity. Lately, a few DXers have been picking up the narrow-band FM feeder of Brisas del San Juan, relaying the Radio Cadena Nacional programming of a local FM station on 107.3 in Istimina, Choco department. This is being heard on **32005** MHz around their sign-on time of 0900.

So there are the Colombian SW targets. Why not sit down at the receiver tonight (with a cup of Colombian coffee!) and go after them? ■

ment. Although still listed, this one has been inactive for a long, long time.

5955 — La Voz de la Centauros, aka Caracol Villavicencio, Villivencio, Meta department. This one is somewhat irregular. It's scheduled from 0900 only to 0000, so your best bet for hearing it is at sign-on. It's a member of the Caracol network. Reports go to apartado Aereo 2472, Villavicencio.

5975 — Radio Autentica, Villivencio, Meta department. This one has been using this name for just a year or so. It was Radio Macarena before it was sold to Cadena Radial Autentica del Colombia — a network owned by the Bethesda Central Mission. It's on the air from 1000 to 0000 (again, making sign-on your best reception opportunity). Address: Cale 38, no 32-41, piso 7, Villavicencio or Calle 32, No. 16-12, Bogota.

6015 — Radio Mira, Tumaco, Narino department Caracol Network. Irregular operation from 1100 to 2300. Apartado Aereo 165, Tumaco.

6035 — La Voz de Guaviare, San Jose del Guaviare. A member of the Radio Cadena Nacional network. It's scheduled from 1100 to 0400. The address is Cra 22y Calle 9, P2, San Jose del Guaviare.

6045 — Cadena Melodia, Bogota. Formerly Radio Melodia. Inactive.

6065 — Colmundo Bogota, Bogota. Member of the Colmundo network but it seems to operate irregularly. When it is on it's supposed to be 24 hours a day, however it may operate only from 2300-0400, which still works for us. Reports go to Apartado Aereo 36750, Bogota.

6085 — Ondas del Darien, Turbo, Antioquia department Inactive.

6115 — La Voz del Llano,

Historic Hotel Broadcasters

The Key Was Location, Location, Location!

By Alice Brannigan

In the early days of the wireless era, it soon became obvious there would have to be some generally agreed-upon ground rules. For one thing, if ship-to-coast communications were to work, all stations needed to agree on a common operating wavelength. But which wavelength? At that time, any wavelength above 200 meters (that is, below 1600 kHz) was within the capabilities of commercial telegraph equipment, so you might assume *any* wavelength might have been selected at random.

By 1912, it had been established that the universal ship-to-coast wavelength would be 600 meters (500 kHz), with harmonically related 300 meters (1000 kHz) as the secondary wavelength. Why? The wavelength for optimum ship-to-coast communications distance was established at 600 meters largely because of the average distance between the antenna masts of typical ocean-going vessels. A vessel's masts also supported the wireless antenna. The average ocean-going vessel could accommodate an antenna that resonated beautifully on 600 meters, a wavelength that happened to provide excellent communications distance. The output was lower on 300 meters, with a series capacitor in the antenna lead needed to achieve resonance.

Lessons Still To Be Learned

Broadcasting in the U.S. began on 360 meters (about 833 kHz), and later the band expanded from there. Maybe early broadcasters assumed they could simply run out a damp string between any two randomly placed supporting masts and they'd have a passable antenna system. But no, they needed to learn that the size and placement of antennas were critical factors, thus limiting the possible sites where they might be suitably located. There were other factors, too.

One of the first major disasters in this area was AT&T's 500 watt station WBAY, New York City. WBAY went on the air in February of 1922, operating on 833 kHz. It was installed atop a 24-story office skyscraper, with an antenna system supported by 100-foot towers. Sadly, there was a disharmonious interaction between the broadcast antenna and the steel superstructure of the building. WBAY's signal was so noisy and had such a distorted pattern, it barely radiated. On the other hand, it did manage to jam all of the telephones in the building. Also, the antenna system became a giant lightning rod. After seven months, WBAY was declared such a mess it was beyond repair. It was shut down and dismantled. Taking the lessons they learned with them, AT&T moved its broadcasting operations to another location, replacing WBAY with an all-new



This WPCH tower, abandoned since 1927, stood until 1995 when it was torn down. (A 1994 photo by Douglas, N.Y.)

CANADIAN
RADIO BROADCASTING STATION

🍁 C J L S 🍁

OWNED AND OPERATED BY LAURIE L. SMITH

TRANSMITTER AND MAIN STUDIO
GRAND HOTEL, YARMOUTH, N.S.

We take great pleasure in verifying your reception of C J L S Yarmouth, Nova Scotia, at time and date of September 8, 1934 1934 as given in your report.

Please accept our thanks for your interest, and this station would be pleased to receive further reports regarding your reception of transmission from C J L S at any future date.

Radio Station C J L S Yarmouth, Nova Scotia

Laurie L. Smith - 100.W.

The Grand Hotel, Yarmouth, Nova Scotia, Canada hosted 100-watt station CJLS. This 1934 QSL is signed by the station's owner. (Courtesy Tom Buckley, D.C.)



WSB, long one of America's best known stations, had its antenna atop Atlanta's prestigious Atlanta Biltmore Hotel.



Station WDOD was located in Chattanooga's Hotel Patten.

station, WEAF. WEAF began a 66-year career as one of America's most successful stations.

Things They Never Before Thought About

Once early broadcasters finally grasped some finer nuances of antenna design, they were ready to forge ahead. But first they had to take into account various other special situations. Consider that in the early days, many stations preferred to have their antennas right in the center of town, adjacent to their studios and the core of their audience. This eliminated the expenses and problems of maintaining a remote transmitter site. So, many stations sought to locate in downtown hotels, department stores, theatres, stores, and office buildings. Deluxe hotels were especially desirable venues. Locating in a top-rated hotel gave any station, by association, instant prestige. Furthermore, it provided the station with free nightly big name band music feeds, direct from the hotel's ballroom, and without the expenses of doing remotes.

During the 1920s, broadcasting was considered cutting edge technology, and many downtown buildings actually courted broadcasting station tenants because rooftop antenna towers added eye-appeal and gave their structures a modern high-tech appearance. Fact is, numerous hotels, theatres, and stores established their own broadcasting stations. All downtown skylines sported one or more of these antennas.

These factors actually went towards limiting the available and suitable antenna sites. Keep in mind that the proximity

of an available downtown building site to other nearby existing broadcast antennas or tall buildings needed to be taken into account in order to avoid interaction or signal distortion problems. Would local building and fire codes, and the building's insurance, allow a broadcast station in the desired structure? The proposed building would have to be structurally sound and

have a roof area large enough to accommodate the proposed antenna system. Even so, extensive and costly structural and electrical modifications might still be

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BOSTON, MASSACHUSETTS

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WCOP

500 watts

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OUR SPECIAL DX TIP PROGRAM IS BROADCAST SATURDAY MORNINGS FROM 6 TO 7 AM EST. WE WOULD APPRECIATE REPORTS ON THIS PROGRAM. DX REPORTS TO BE USED ON THIS PROGRAM WILL BE ESPECIALLY WELCOME IN THE INTERESTS OF DXERS THROUGHOUT THE COUNTRY.

*Walter W. Blender
Chief Op.*

A 1936 QSL from WCOP, the 100-watt station located in Boston's Copley Plaza Hotel. (Courtesy Tom Buckley, D.C.)

required. If so, would the landlord or station licensee be willing and/or able to pay for those modifications? These factors made site selection in large cities quite tricky, and quickly ruled out many desirable and seemingly suitable potential radio sites.

First Sign Of Trouble

Notwithstanding everything appearing favorable, even the best-laid plans could go awry. In December of 1926, 1.5 kW station WPCH erected twin towers atop New York City's fashionable new *Park*

Central Hotel, Seventh Avenue and 55th Street, near Central Park. This Midtown antenna radiated a signal with wallop. Unfortunately, as soon as the station went on the air, the new hotel's owners shocked WPCH by constructing an enormous rooftop electric sign bearing the hotel's name. This sign, built on a steel framework, adjacent to WPCH's antenna system, absorbed most of its signal. Four months after going on the air, WPCH filed a damage suit against the hotel, but the station lost. By August of 1927, WPCH's frustrated owners were forced to use a remote transmitter site in Hoboken, New

Jersey. This signal was a dud. In 1929, WPCH closed its studios in the hotel and the station was sold to WMCA (of New York City's *Hotel McAlpin*). The abandoned WPCH towers stood atop the hotel for decades. One was razed around 1950, after the hotel had been renamed the *Park Sheraton*. The other lonely tower remained in place for about 70 years until being torn down in 1995. It was the last such tower to exist in New York City.

Stations Loved Hotels

Hotel-based stations flooded the airwaves during the 1920s and 1930s. A small sampling includes Philadelphia's WABQ (*Hotel Lorraine*) and WCAU (*Hotel Pennsylvania*); Yarmouth, Nova Scotia's CJLS (*Grand Hotel*); New York City's WFBH and WGL (at different times, both of the *Hotel Majestic*), also WSOM (*Hotel Somerset*); Brooklyn, New York's WLTH (*Leveritch Towers Hotel*), plus WSGH (*St. George Hotel*), also WARS (*Hotel Shelburne*); Montreal's CFCF (*Mount Royal Hotel*); Cincinnati's WFBE (*Garfield Place Hotel*), and WKRC (*Hotel Alms*); Dallas' KRLD (*Adolphus Hotel*), plus WRR (*Jefferson Hotel*); Cleveland's WDBK (*Bolton Square Hotel*), also WGAR (*Statler Hotel*); Chicago's WHFC (*Hotel Flanders*), as well as WDAP (*Drake Hotel*); Salt Lake City's KDYL (*Newhouse Hotel*); Seattle's KGBS (*Moore Hotel*); Hot Springs, Arkansas' KTHS (*Arlington Hotel*); Atlanta's WSB (*Atlanta Biltmore Hotel*); Shreveport's KSBA (*Yoree Hotel*); Detroit's WMBC (*Hotel Savoy*), to cite a few examples.

In the mid-1920s, 500-watt station WMBF ("Wonderful Miami Beach Fleetwood") was owned and operated by the *Fleetwood Hotel*, Miami Beach, Florida. The *Fleetwood* was one of Miami Beach's first opulent super-luxury hotels catering to the social elite. The *Fleetwood* was so snooty and exclusive that it (along with the neighboring state-ly *Floridian Hotel*) fronted west onto Biscayne Bay, facing the lavish mansions on private Star Island. Most other hotels looked eastward towards the ocean.

Short & Sweet

Because of the many considerations and factors that needed to come together, one of my favorite early hotel stations is KFSD, San Diego, California. KFSD had a strange antenna system that became a local landmark.



The novel thing about KFSD's antenna system atop the U.S. Grant Hotel is that the towers tilted away from one another.



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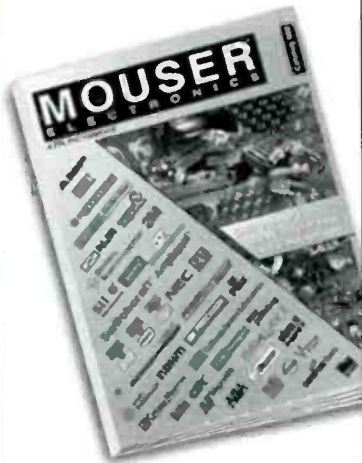
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CIRCLE 66 ON READER SERVICE CARD

In 1910, the son of President Ulysses S. Grant built an elegant 500-room hotel at 326 Broadway, San Diego, CA. This was in Horton Plaza, right in the center of the city. Named the *U.S. Grant Hotel*, over the years the facility hosted guests the likes of notables Albert Einstein, Charles Lindbergh, and Pres. Harry Truman. The hotel's watering hole, The Grant Grill, was a famous local gathering spot.

Though San Diego had a couple of small local stations, none ran more than 100 watts. In 1926, the Airfan Radio Corporation decided to put a 1000-watt station on the air. The company wanted nothing less than the prestigious *U.S. Grant Hotel* as the site for their new station. A license was applied for, and the call letters KFSD were assigned. In 1926, the broadcasting band extended from 202.6 meters (1480 kHz) to 545.1 meters (550 kHz). KFSD operated on a wavelength of 245.8 meters (1220 kHz).

Designers faced a few challenges; one being that the 11-story hotel was not very tall. Also, for the signals to radiate in the desired directions, placement of the twin 231-foot antenna towers was limited to only two specific rooftop sites. That meant the towers had to be spaced too



Another view of KFSD's leaning towers.

close to one another in order to string a resonant antenna between them. Designers erected each tower with a distinct tilt, leaning away from the opposite tower. This provided sufficient extra distance between the tops of the towers to

provide for the antenna. While this looked bizarre and caused much local comment, it worked. As with many hotel stations, KFSD occupied itself mostly by playing live dance music from the hotel's ballroom for a few hours nightly. The fol-

RADIO BROADCASTING STATION

KFSD

AIRFAN RADIO CORPORATION
U. S. GRANT HOTEL
SAN DIEGO, CALIFORNIA

Jan 25, 1928.

Mr. Milo H. Reynolds,

Dear Mr. Reynolds:-

We are glad to hear from you, and to know you enjoy the programs from K.F.S.D. and hope we may have the pleasure of hearing from you again.

In compliance with your request we are pleased to enclose herewith verification stamp.

When you come to San Diego, be sure and visit our Station.

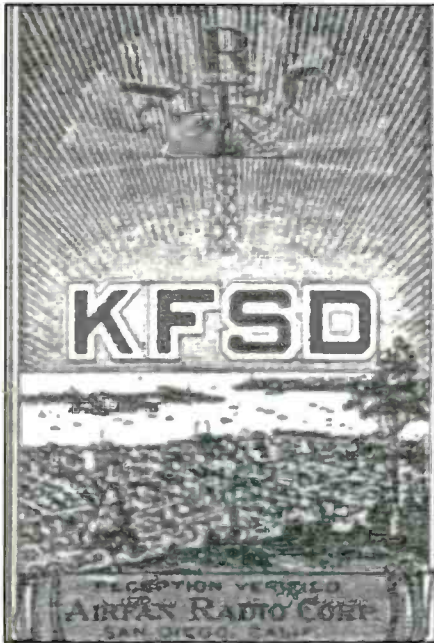
With best wishes, we remain

Yours for Radio,

K F S D

THS:D
Enc.

Despite its unusual antenna, KFSD managed to become monitored from coast-to-coast. This 1928 veri went to a listener in Vermont.



KFSO designed its own verification stamp, when most other stations used EKKO stamps.

lowing year, KFSO was ordered to shift from 1220 kHz (245.8 meters) to 680 kHz (440.9 meters). This stretch may have caused more than a few antenna loading problems, given the short spacing between its towers. Was that why KFSO also cut back to 500 watts? That's OK, because in November of 1928, the station was shifted to an even lower frequency, 600 kHz having a longer wavelength (499.7 meters).

They must have figured out how to live with their odd antenna because KFSO drew reception reports from DX'ers coast-to-coast, regardless of the station's frequency or power. The station was extremely reliable in sending out verification stamps, KFSO custom designed their own verification stamp. By the mid-1930s, KFSO was running 1 kW, and by the late 1940s they had upped power to 5 kW.

Changes

By the late 1940s, the Horton Plaza area of San Diego was suffering a steady decline, when post-WWII growth inflated San Diego's suburbs. KFSO continued into the 1950s, but as the early 1960s rolled around KFSO was gone, replaced by KOGO running 5 kW on 600 kHz from a different location. In 1993, KOGO was replaced by KKLQ running 5 kW (1 kW nights). Downtown AM antenna towers have pretty much become a thing of the past. Only a few



Most of the old downtown AM towers have long been razed. A few lingered on. This 1987 photo shows Seattle station KXA's abandoned 175-foot tower still atop the Bigelow Building, Fourth Avenue at Pike Street.

remain standing. The KKLQ transmitter site is in San Diego's eastern suburbs, many miles from Horton Plaza.

In 1985, the venerable U.S. Grant Hotel was given a total rehabilitation, along with the entire Horton Plaza area. The revitalized area contains a \$140 million mixed-use facility—residential, condos, offices, theatres, and a shopping plaza with more than 100 shops and restaurants. The hotel is still elegant,

though now minus its picturesque leaning towers, once its crowning glory.

That's a wrap for now. We look forward to hearing from you. Our postal address is Alice Brannigan, *Popular Communications*, 25 Newbridge Road, Hicksville, NY 11801. Our E-mail address is <Radioville@juno.com>. I am looking forward to comments, column suggestions, anecdotes, and material related to old time wireless and radio. ■

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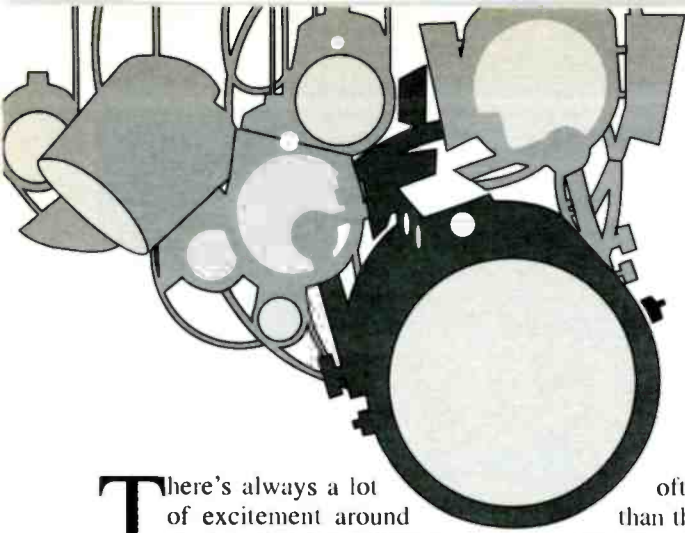
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POP'COMM REVIEWS PRODUCTS OF INTEREST

RadioShack's PRO-94 Scanner

There's always a lot of excitement around the introduction of any new scanner from RadioShack. This year, three new models at the high end appeared in the 2000 catalog several months before they were to be made available. They do this just to torture us, I think.

The first of those receivers is now available, and we've been fortunate enough to have one for review, courtesy of RadioShack. The triple conversion, 1,000-channel PRO-94 is a trunktracking handheld. Let's take a closer look at this new generation scanner and see how it stacks up.

The 1,000 channels are divided into 20 banks of 50 channels each, but the 20 banks are divided into two groups of 10. It's almost like having two sets of memory, because you can't scan something from group one and something from group two at the same time. I choose to put trunking channels in one group and conventional in the other. Banks A-1 to A-10 were used for conventional channels, and banks B-1 to B-10 were used for trunking. That made an even more natural divide than I realized at first, because while you can scan multiple banks in either the conventional or trunked modes, you can not mix the two modes.

"...most trunking systems should be pretty well covered."

On the plus side, the PRO-94 does track EDACS and Motorola systems. It will also allow for scanning Motorola type II systems in the VHF-Hi, UHF, and 900 MHz ranges, so most trunking systems should be pretty well covered.

The PRO-94 also features a unique priority system in the trunked banks. Each of the five scan lists can have one ID assigned as priority. The Priority ID in list one has priority over all other ID's. The priorities don't work exactly like the priority in a conventional scanner, but rather the special priority ID's are checked more

often according to the manual than the regular ID's in a scan list. This way, the priority channel has a better chance than the others of being found active. However, once activity has been found on any channel and you are listening to the voice channel, the data is not being checked for higher priority activity. In practice, it does increase the chances of finding activity on a priority channel, but you'll still miss things if you're listening to other ID's that are busy.

The PRO-94 is the first of the trunk-tracking scanners to feature standard AA batteries. I know that doesn't sound like much of a feature, but it is. You always have the option of using rechargeable NiCd or NiMH batteries in the receiver, but if they go dead you can replace them on a trip almost anywhere. I have gotten to the point, after having destroyed so many built-in NiCd batteries, that I won't take any scanner with me on a trip unless it can use AA batteries.

The PRO-94 features a switch under the battery door that allows you to set what kind of batteries are in use. This way, the charger won't be trying to recharge alkaline batteries if they're installed, which can result in a potentially dangerous situation. Make sure you set that switch correctly when you change battery types!

The PRO-94 also features a battery-saver function that will turn the receiver off for about one second at a time and then back on for about one-half second to check for activity. This only works when the receiver is in a manual mode (set to receive a single channel) and not in the trunking mode (where it has to continuously watch the data channel). It can be a real battery extender if you use this mode often, but I found that most of the time I was using the radio in the trunking or scanning modes, and the battery saver didn't apply. This feature can be disabled if normal operation in the manual mode is desired.

Unfortunately, as a conventional scanner, the PRO-94 suffers a bit. The scan-



The new RadioShack PRO-94 is a 1,000-channel scanner with trunking capabilities! The PRO-94 covers Motorola and EDACS trunking systems, making it a good choice for many listeners.

ner itself works fine, and there are lots of channels and banks to put things in. However, the performance of the PRO-94 in the presence of other strong signals was a bit lackluster, particularly in the VHF-Hi range. Pagers and other high-power signals were found all up and down the range. Once away from the strong signal areas, however, the PRO-94 did reasonably well. You might do



At last — standard AA batteries in a trunktracker scanner! The unusual “clamshell” holder splits off the back and holds two of the four batteries.

well to consider where you're going to be using this radio, and in what mode.

SAME Weather

For years the National Weather Service has used a single tone alert to indicate an upcoming alert notice on their weather broadcast stations. Recently, that system was upgraded with the Specific Area Message Encoding, or SAME system. SAME has the ability to encode messages just for a particular geographic area, and it is for this feature that it has gotten such wide acclaim. Now you don't have to listen to weather alerts for three or four counties away.

The SAME system can also encode the severity of the alert as a Level 1, Level 2, or Level 3. Level 1 is used for Warnings, and generally the most severe or impending

"The PRO-94 is the first of the trunktracking scanners to feature AA batteries."

ing danger warnings. Level 2 is used for Watches, and Level 3 is used for weather statements. Of course, all of these are merely alerts to get you to turn your weather receiver on and actually listen to the watch or warning message.

The PRO-94 can decode the levels, but not the geographic encoding. So you'll get all the Level 1 alerts that are handled by your local weather service transmitter. Also the PRO-94 can not be in standby weather mode and scan at the same time. So when you're using the radio for a weather monitor, you'll be out of business otherwise. It's a good standby feature for when you're not using the receiver.

PRO-94 Frequency Coverage

The new PRO-94 features all the popular bands and most of the trunking methods in use today for public safety systems.

MHz	Band
29-54	VHF Lo
108-137	Aircraft
137-174	VHF High band
216-225	220 Ham Band
406-512	UHF
806-956	800 MHz systems, less cellular
1240-1300	Ham

The Bottom Line

The PRO-94 works well where the primary function will be trunking. And it works well in areas without concentrated RF levels in the conventional mode. You'll have to judge for yourself if it's acceptable in your area. RadioShack guarantees your satisfaction and backs it up with a very generous return policy, so you really have nothing to lose. Add to that the sale price that we've seen already on the PRO-94, and you're likely to find it just a bit too much to resist. The list price is \$299, but it has been on sale for as low as \$199. Go have a look at a Radio Shack near you!

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radio resources

Interesting Thoughts And Ideas For Enjoying The Hobby

Going Mobile On High Frequency, Part 2: Choosing The Right Mobile Whip

Getting started with a 5-wpm General class license on the worldwide bands does not necessarily mean punching holes in your automobile roof for an antenna, or carving out a chunk of your bumper to support a major-sized mobile whip. For mobile operation on the popular ham radio, General class high-frequency bands, your antenna whip requirements for a one-quarter wavelength antenna — using your vehicle as the ground system — is as follows:

10 meters	8-foot whip
15 meters	11-foot whip
20 meters	16-foot whip
40 meters	32-foot whip
75 meters	64-foot whip

On 10 meters, a stainless steel, 8-foot, CB whip could easily work stateside DX and even bring in some exciting contacts across the water.

On 15 meters, a one-quarter wavelength mobile whip would need to be around 11 feet long; finding a stainless steel 11-foot whip is going to be mighty tough as they normally only come in 8- or 9-foot tapered lengths. But if you check some of the military outlets, you might be able to score a military green Shakespeare antenna that screws together in 3- or 4-foot lengths for the necessary height for proper resonance. I have seen some hams use these military Shakespeare antennas at 16-feet in length for the 20-meter band, and holy cow, they have a terrific signal on the airwaves once they figure out a way to accommodate the rather large, bulky, military, oval-body mount! For 40 meters, the whip is now 32-feet long!

But a more common way of achieving one-quarter wavelength resonance on a specific high-frequency ham band is to electrically lengthen an antenna that measures about 6 to 8 feet long. You do this by adding a *loading coil* along the mid-section of the antenna shaft. The reason we load in the *center or top-load* a high-frequency antenna is to improve its radiation capabilities where I^2R losses are kept at a minimum at the feedpoint.

While you can get away with base-loading a 6-meter or 10-meter CB-type whip, base-loading usually leads to higher than acceptable losses when you begin the loading process way down low at the antenna's feedpoint.

Good examples of center-loading a high-frequency antenna would be the white or gray coils you see on Hustler Nutronics mobile antennas. You normally see the coil on a 48-inch, aluminum, foldover shaft, and coming out of the coil is an adjustable foot-long "stinger." This allows the operator to lengthen the tip whip slightly to operate lower in the specific ham band, or to shorten the tip whip to operate higher in the band.

Another method of loading single-band, high-frequency whips is helical top-loading from a company called Mobile Mark. These antennas are about the same length as the Hustler — around 6 feet long — but are wound around a tough fiberglass shaft. The loading of this very sturdy antenna is at the top. You raise or lower the resonant frequency of the antenna by removing the red protective cap, and pulling and chopping off about 6 inches of wound wire for every 50 kilo-



Gordo, and Don Wilson, N92GE, look over HF whips during the AES Superfest snow-storm in April. This Outbacker Perth took the most honors.



The Yaesu ATLAS-100 gets inspected by Gordo at the AES Superfest.

BY GORDON WEST, WB6NOA

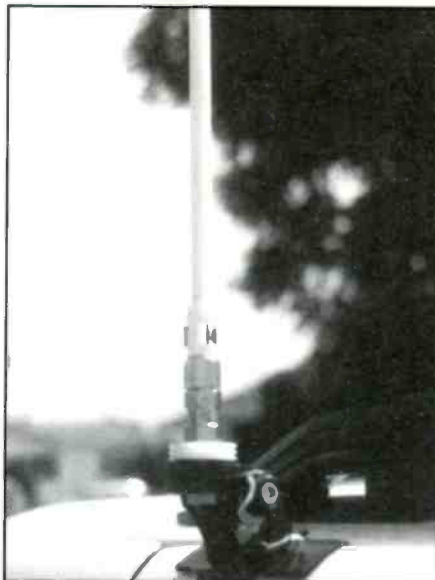
hertz of resonant frequency increase. They usually cut these whip coils on the long side, so you would never need to add wire to lower the resonant frequency — it usually comes a little bit on the low side, so you need to subtract wire.

But one important safety note: Make sure you push the bare end of the wire back into the shaft, making absolutely sure it's not sticking out into the red cap that you push back on. If the red cap comes in contact with the bare end of the Mobile Mark antenna, it will quickly light up, and the red cap may start a fire or goopy melt down.

Performance?

Is there a substantial difference in performance between helical top-loading and conventional center-loading? Not much that I can find, other than the helical loading gives me a few more kilohertz of band excursion when operating on 40 and 75 meters.

A very popular series of inexpensive mobile whip antennas are about 8-feet long, called "ham sticks," "ham whips," "ham stix," and the Valor ham antenna products. All are helical center-load with an approximately one-yard-long stainless steel whip that adjusts in and out for fine-tuning. They all perform about the same except for how sturdy they are constructed. The Valor antennas have about the best sturdy construction, yet the relatively inexpensive, helical center-loaded, individual-band, high-frequency whips are also constructed nearly as tough. On the air these "sticks" all sound about the



Trunk lip-mounts work on any vehicle lip.

same, and each one costs about \$20, so you need one for each ham band on which you plan to operate.

We recently tested the Antron amateur whips against a whole bunch of other similar length antennas, and performance on all of them was very good. Antron has recently gone from one set screw to two

set screws on the tip whip, which allows that tip whip to stand absolutely vertical when you dog it down with the two set screws.

There are some unique high-frequency whips that may look a bit strange on your vehicle, but nonetheless work several of the high-frequency bands, *all at the same time!* This could be done using Hustler coils on a multiple Hustler coil adapter, or the unique Spider antenna, or the Comet antenna with multiple resonators on a single shaft. These all work out relatively well and quite frankly, you really can't hear much difference between them and single-band whips of about the same size. But keep in mind that the smaller the center loading coil, the greater the opportunity of that coil to get warm and rob you of valuable high-frequency output power. Yaesu offers a small motorized antenna (ATLAS-100) that band changes automatically by the Yaesu HF radio — I like it a lot with the FT-100.

My favorite antenna is the relatively expensive Australian Outbacker. This is a \$300 antenna that works on all ham (and some marine) bands. With it you don't need to change loading coils; one big shaft carries all of the band tap points that you plug in the lead-in wire. There are



The Outbacker spring base on an MFJ lip-mount on Gordo's van.

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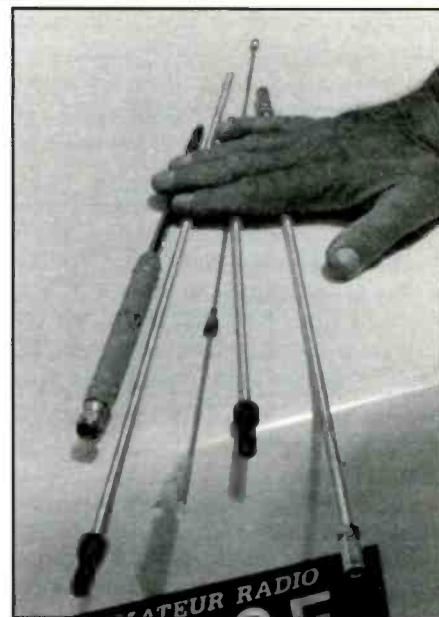


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Tuning the multi-band Spider antenna takes just a few minutes.



Hustler coils and whip tips.

several different variations of the Outbacker; one version is a short 4-foot shaft and a yard-long, stainless steel whip, yet another version is the 6-foot shaft and a short stainless steel whip. Then there's the slightly more expensive 8-foot shaft with a long 4-foot stainless steel whip which works terrific as long as you mount the base of the antenna no higher than about three-feet off the ground in order to clear bridges!

I like the Outbacker because I don't need to worry about losing loading coils or whip tips; everything is on one nice, neat shaft, and all I need to do is to stop the vehicle, move the tap lead, and get back on the air. They even have models to accommodate 500-watt, high-power, mobile stations.

I've tried them all, and the Outbacker is the easiest to mount, and provides one of the best signals because of its slightly longer configuration.

But is this the antenna, the absolute **MOST POWERFUL**, for mobile operation? No way. The very large "bug catcher" antennas with big capacity hats up near the top, and a major-sized loading coil that needs to be tapped for different bands is probably one of the best mobile performers around. Same thing with the big screw-driver-motor-type mobile antennas — they'll probably edge the S-meter a bit higher to the received station because of their extraordinarily low I^2R losses, their much greater radiation surface, and the top-loading effect that improves efficiency when operating on the lower bands.

The down side to these monster antennas would be the massive mounting that needs to take place on your vehicle, and a lower than normal feedpoint where

some of the RF goes into the car itself. I always try to go for the highest feedpoint possible, getting the RF as far away from people inside the vehicle as possible. This is why you will find the Outbacker on our communications van mounted at the very top of our rear doors.

The Mount

Most mobile high-frequency whips terminate to a 3/8" x 24 thread. This is a common thread that almost all large, high-frequency antenna mounts will accept. These mounts may be trunk lip, door lip, gutter lip, hatch lip, or just about any type of lip area that you can get at the back side of the vehicle to screw in the four Allen screws to secure the mount. You could even go with massive magnetic mounts, but they tend to scratch the top of your vehicle, so I use mag mounts on high frequency only as a last resort. I prefer the Diamond K400 lip mount as one of the strongest mounts for high-frequency whips. MFJ and Comet also make some very strong lip mounts to accommodate 3/8" x 24 thread, high-frequency mobile whips.

During a recent "antenna shootout" conducted at the Amateur Electronics Supply Superfest in Milwaukee in April, we tested a whole gang of different 6- and 8-foot whips between each other on the airwaves on 14.302.5 MHz — a popular high-frequency meeting spot for professional drivers on the road 24-hours-a-day. The performance difference was not so much the antenna type, but rather how and where it was mounted. We could see that high-frequency antennas mounted down low did not do as well as those up high on a lip mount. We also found that advertis-

ing claims that one high-frequency whip was going to do a much better job than another really didn't pan out if the two whips were about the same length. We also confirmed that trying to base load the high-frequency antenna leads to significantly lower output signal levels as recorded by the receive station. And we also concluded that everybody liked the idea of the Outbacker antenna, but wanted to first get started on high frequency with something less expensive in the \$20 range in case the antenna accidentally fell off the car during its first trial run! But the seasoned hams who tried a lot of other antennas ultimately ended up with the HF Outbacker because of its strength, stamina, and relatively quick band changing without having to unscrew coils.

For best high-frequency whip performance, mounted as high as possible on your vehicle, and if what you are mounting to is not really strong, go with the inexpensive fiberglass shaft whips, one per band. But if you're going with a really strong trunk lip mount or side door mount, do consider my all-time favorite, the Outbacker antennas. Structurally, mechanically, and electrically, their design promotes excellent high-frequency results if you can get almost the entire shaft above the roofline.

Next Month

How well can a stainless steel whip perform on all of the worldwide bands when an automatic antenna tuner in the trunk feeds it? The AES Superfest antenna showdown tells all, and we will reveal the test results in next month's column. ■

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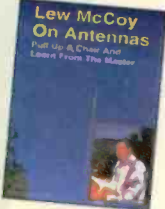
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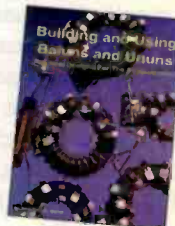
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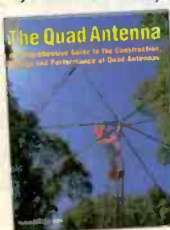
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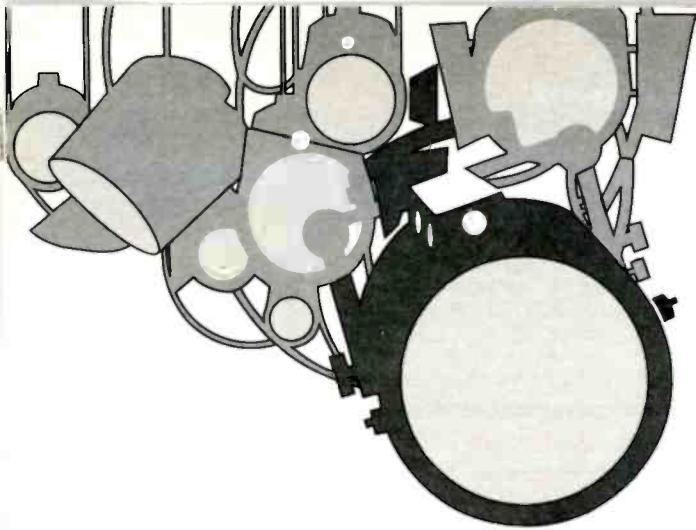


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POP'COMM REVIEWS PRODUCTS OF INTEREST

Am-Com ClearSpeech™ Speaker

It's no secret that many of us are plagued with powerline noise and all kinds of annoying snaps and crackling background noise. You have a couple of choices; either put up with it, or do something about it. The folks at Am-Com decided to do something about it with their new ClearSpeech™ speaker.

Measuring about (HWD) 4 3/4" (with mounting bracket in top-mounting position) x 7" x 2 1/2," it's a true miracle worker when it comes to improving your radio's audio quality — even if you aren't tortured by noise! Besides great performance, it's a professional-looking accessory that doesn't detract from the overall appearance of your monitoring station. It's constructed of a high-impact dark gray plastic and features a strong metal speaker grille, giving a very solid appearance. The on/off noise filter switch is on the bottom front of the unit for easy access, and the heavy-duty plastic mounting bracket (with two pre-drilled holes) is secured to the speaker by two hand-tightened knobs, giving you the flexibility to mount the speaker on virtually any angle you want. On the rear of the speaker, you'll find a "speaker out" jack (3.5mm), and at the bottom center of the speaker are the red and black power cords (the red is appropriately fused!), and an audio cable with a 3.5mm plug which connects the speaker to your radio.

The specs say the speaker will take a max input power of 2 watts. Over a three-week period, I used it with my 2-meter Alinco, a PRO-2006 scanner, and PRO-43 handheld scanner and found the resulting audio from the ClearSpeech™ speaker to be outstanding — a great improvement over the stock speakers on all of those rigs. (Of course, the Am-Com speaker requires a 12 Vdc power supply to operate, otherwise I would



Am-Com's ClearSpeech™ speaker — powerful and effective!

have mounted it somehow on my bike for around-the-town radio fun). At my base, it connected 1-2-3 to a Daiwa power supply and even to my solar power set-up (which we covered in the September '99 *Pop'Comm*). Any good wall transformer will work that supplies 300 mA or more. Or if you want, get their new ClearSpeech™ Base that connects between your base radio and an external speaker. The automatic digital noise canceling technology works wonders on background noise from your radio's audio output! Say goodbye to summertime atmospheric noise, too. The new base unit measures (HWD) 1" x 3" x 5 5/8" and has an audio output of (nominal) 5 watts.

The ClearSpeech™ speaker mounts like an ordinary external speaker and works on SSB, AM, FM, and CW. Noise cancellation characteristics are 300 Hz to 3,400 Hz voice bandwidth, signal tone noise reduction ->50dB, white noise reduction ->12dB. Set up and operation are simple; connect the speaker first to your radio, then apply DC power and operate your equipment as you normally would — of course adjusting your transceiver (or scanner's) volume to an appropriate listening level, then switch on the noise filter (the speaker will operate with the noise filter off, but you'll appreciate the enhanced



The new ClearSpeech Base is also \$149.95.

intelligibility and clarity this digital speaker provides.) Typically I've got major powerline noise, but not now!

I've also used the speaker in my car with an Alinco 2-meter mobile rig and frequently with the PRO-2006 — and believe me, the improved audio quality — the richness and clarity — is well worth the investment of \$149.95 (plus \$9.50 U.S. shipping) from Am-Com.

"Interestingly, with all the radio noise I get socked with, ignition noise isn't one of my problems."

Interestingly, with all the radio noise I get socked with, ignition noise isn't one of my problems, but noise from other sources such as the many electric commuter trains, crossing gates, signs and other vehicles is a thorn in my side. Besides the enriched audio, most of the outside pops from those pests were eliminated. Their official news release says it's a low-cost solution that enhances the audio quality of car and truck fleet, emergency vehicles, marine, and ham radio communications. We completely agree with that, and think you will too. Contact Am-Com at 100 Bierney Creek Rd., Lakeside, MT 59922 or call toll-free 888-803-5823. They also have a great secure Website at amateurcommunications.com. Be sure to tell them you read about the ClearSpeech™ speaker in *Popular Communications*. The company has a "No Hassle" warranty — your satisfaction is guaranteed or you get your money back (less shipping and handling charges) provided it is returned to Am-Com, Inc. within 30 days in original condition and packaging with your proof of purchase. ■

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how I got started

Congratulations To Roy Fortier Of Georgia!

Popular Communications invites you to submit, in about 150 words, how you got started in the communications hobby. Entries should be typewritten, or otherwise easily readable. If possible, your photo (no Polaroids, please) should be included.

Each month, we'll select one entry and publish it here. Submit your entry only once; we'll keep it on file. All submissions become the property of *Popular Communications*, and none will be acknowledged or returned. Entries will be selected taking into consideration the story they relate, and if it is especially interesting, unusual, or even humorous. We reserve the right to edit all submitted material for length, grammar, and style.

The person whose entry is selected will receive a one-year gift subscription (or one-year subscription extension) to

Popular Communications. Address all entries to: "How I Got Started," *Popular Communications*, 25 Newbridge Road, Hicksville, NY 11801 or E-mail your entry to popularcom@aol.com, letting us know if you're sending photos. If you're E-mailing photos, please send them in a separate E-mail with your name in the "subject" line.

Our July Winner

Pop'Comm reader Roy Fortier of Acworth, Georgia says, "I started DXing about 30 years ago when I was in grade school listening with my Dad to Deutsche Welle. During the Cold War, we'd listen to Eastern European stations which was the best times. I lost some interest in the '70s when I was a teenager, but I could always hear my dad listening.



Pop'Comm reader Roy Fortier and his son, Ryan and daughter, Amber.

When he passed away in '84, I sold his ICOM transceiver and scanner, but kept his Panasonic RF-2200, which I still have today. I now have a Drake SW-2, PRO-2048 scanner, Hallicrafters and numerous antique radios. Now I have a son and daughter who might be next generation DXers." ■

A Rose By Any Other . . . And Texas "Freebander" Fined \$17,000

What do you see when I say the word "Water?" Think about water for a minute and form a picture of it in your mind. What exactly do you see? Water running from the kitchen tap? Rain? An ocean? A flood? Whatever it is that you do see, remember it.

Now ask two or three other people what they see when you say the word "Water." What exactly do they see? Do any of them see the exact same thing you did? Do any of them see the same thing that anybody else saw? Probably not, especially when you get down to details. Chances are, the more you examine what each saw, the larger the differences in their perceptions of the word "Water" will become.

The more you play this game, the more people you involve, the more evident it becomes that while you thought you knew what I meant when I said what I said, I really didn't say what you thought that I meant! Confused? You should be. That is the point of this little game. Language is imprecise, even when we are working with such apparently simple, well-established, and highly-defined terms as "Water."

Now let's play the game one more time. This time, however, let us use a word that, unlike "Water," is new and almost totally undefined. Let us use the word "Freeband." First, of course, we will have to search far and wide to find anyone who has any idea of what the word means. When we do find them, however, I think we will find that their definitions will be all over the board. And therein lies a problem — especially for the Freeband.

Being "undefined," people can add or subtract meaning from the word at will. They can easily twist it to fit whatever meaning they want. They can also find meanings in the word "Freeband" that are not really there. This is particularly true with a word as new and as officially undefined as "Freeband." Unfortunately, it appears that increasingly, its lack of precise definition is encouraging the addition of negative connotations.

This point was painfully driven home in the early morning hours of February 29. The occasion was the Art Bell radio show and Art's guest, *Popular Communications* editor, Harold Ort. During the course of the show, Art and Harold explored many of the fascinating and varied aspects of the radio hobby, including a number of blatantly illegal activities. Yes, they both use radar detectors, why — oh (wink, wink) not to avoid speed traps, but to help keep alert while driving. And yes, they both agree that laws regulating such devices should be done away with.

Monitoring private conversations with scanners? Sure it is against the law BUT (wink, wink) people must be aware that they are using radios when they talk on a cordless or cellular phone. Boy what fun to drive around town and pick up the occasional "Baby Monitor." Illegal, hell yes but (wink, wink) the things you can hear. Did you ever listen to Pirate Radio stations? Sure (wink, wink) and some of them are really great. Aren't those 50,000 watt keydowns wild (wink, wink)! Who hasn't (wink, wink) talked over 155-miles on a CB when conditions were right? How about them "Freebanders?" Well, they'll get theirs and the sooner the better.

OK, these are not exact quotes, but they are close enough to give you the flavor of what went on. I am usually not up at those hours and just happened to catch the show by accident, or should I say I just happened to catch the show while preventing an accident (wink, wink). Nevertheless, while Art is always interesting and I really enjoy listening to Harold, I came away totally miffed about their attitude towards the Freeband.

Why do they feel this way? Is it because Freebanding is illegal? That would make sense except for the fact that many of the other activities they discussed that evening were also illegal. Yet as I recall, they were able to at least find something interesting, if not downright positive, about every one of them. Every one of them, that is, except the Freeband.

For the past several years, at Harold's direction, I have been studying life on the Freeband. All in all, I have found it to be a refreshing middle ground between the chaos of legitimate CB and the snobbery of the regimented amateur bands. Given a choice among the three, the Freeband is where I would prefer be. I think that the Freeband, if properly cultivated, could be a valuable asset. What I think, however, is not important. What Art Bell thinks, is. Especially when you consider that Art's views more accurately reflect those of "John and Jane Q. Public." What "John and Jane Q." think of the Freeband is important because they are where the Freebanders of tomorrow will, or won't, come from.

Harold Ort's view of the Freeband matters more than mine because he not only has the power to let you and I meet here every other month, more importantly, his views more accurately reflect those of the media in general. What the media thinks greatly influences the views of "John and Jane Q."

Both Art and Harold are licensed radio amateurs and so they reflect the views of our on-air neighbors. The view of the amateur community matters because they are well-organized and have substantial influence with the FCC. Should they continue to see the Freeband as the dark side of the radio hobby, a nuisance, and a threat, they will not hesitate to bring increased pressure on the FCC to pursue those who operate there.

What the FCC thinks of the Freeband is also more important than what I think because they have the full power of the law to enforce their views. The more they perceive the Freeband as a problem, the more active they will be in prosecuting its members.

In the end, it all depends on how you define the word "Freeband," whom you include in the group, and what you encourage them to do while they are there. Yes, we can agree that, by definition, all Freebanders are radio outlaws. Where the confusion starts to arise, and

where Freebanders have to start drawing lines, is when it is implied that all radio outlaws are Freebanders.

If the Freeband is to continue to be "Free" it is becoming increasingly important for all of its "legitimate" members to strive for higher operating standards and to be particularly choosy about the on-air company they keep.

Persistence Pays For Texas "Freebender"

Here is a case in point, about Leonard D. Martin of Houston, Texas, who in the eyes of many will be considered a Freebender. On March 2, 2000, the FCC fined Martin \$17,000. Martin came to the attention of the FCC as early as May 1998 when the Commission received written complaints that his amateur station, KC5WHN, had been observed operating on unauthorized frequencies. He was notified of and denied the allegations in November of the same year.

In February of 1999, Commission agents, using a mobile automatic direction finding ("MADF") vehicle heard him operating in the Freeband on 27.545 and 27.535 MHz. Again in March he was caught operating between CB channels on 23.370 MHz. The agent attempted to inspect Martin's station but was denied access. Shortly thereafter, Martin received an Official Notice of Violation for operation of his amateur station. He replied and promised to clean up his act. A couple of months later, he submitted his amateur license for cancellation.

On October 19, 1999, the FCC received another complaint against Martin. This time, his radio transmissions were interfering with his neighbor's telephone. Agents again caught Martin operating on 27.535 MHz and confirmed the interference to nearby telephones. Again on October 26, agents monitored Martin transmitting on 27.445 MHz. Once again they paid Martin a visit and attempted to inspect his station. Once again Martin refused them access.

Clearly, Martin is a radio outlaw. The question the Freeband community has to ask itself is should operations such as his be condoned or condemned, and is Martin truly a Freebender?

Other FCC Enforcement Action

Increased FCC enforcement action has earned four Salisbury North Carolina amateurs warning letters for high power



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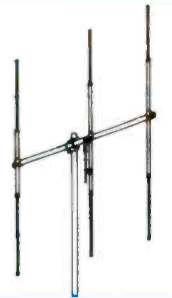
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CIRCLE 65 ON READER SERVICE CARD

FM and SSB operation on 27.320 (between CB channels 31 and 32) and 27.375 MHz (CB channel 37) and offering for sale over those frequencies transmitting equipment not meeting the FCC's certification standards. They are Thomas F. Reynolds, Sr., N4TFR, James W. Walls, NC4JW, James R. Christie, KF4QWR, and Jerry W. Canter, K4JWC.

For more information about these and other recent CB and Freeband related FCC enforcement actions visit <http://www.uscbo.org>.

July And August Mixers

Looking for a little chatter on the CB? Then plan on attending the next, regularly scheduled, on-air CB Mixer. They are held, wherever you are, on the last Saturday of the month (the next two will be on the 29th of July and 26th of August from 9 p.m. until 10 p.m. local time.) SSB operators should work channel 36 LSB. AM operators work 23 AM. Well, that's it for now. Thanks for writing me here at the magazine or via the Internet where my address ed@barnat.com. And as always, if you can (especially July 29th and August 26th) . . . catch me on the radio! 73 ■

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A Look Behind The Dials

Tales Of An American Bosch

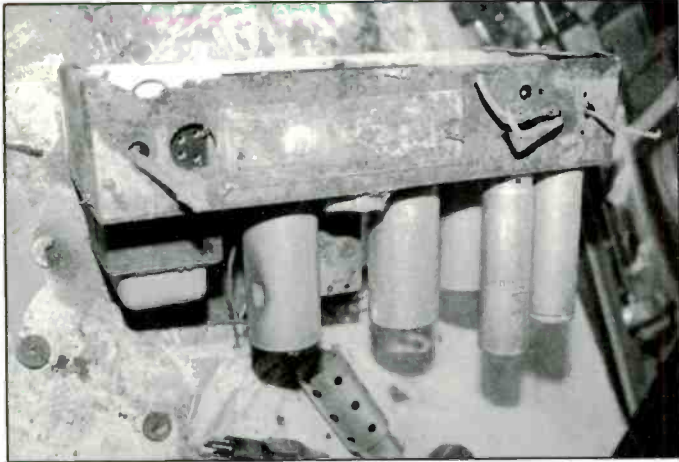


Photo 1. The Bosch chassis is a mess of rust and dirt.

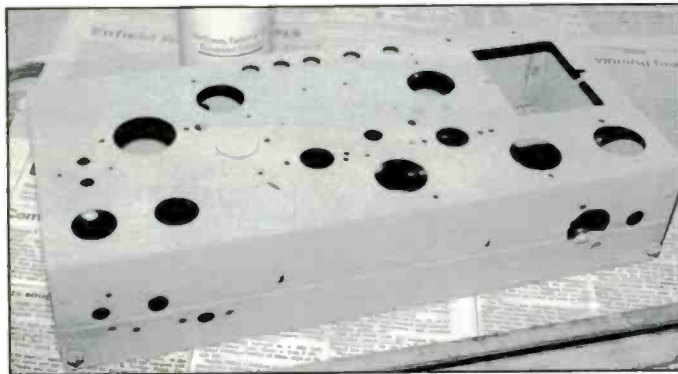


Photo 2. The chassis after the rusted areas have been sanded or repaired. The chassis has been painted using a zinc-bearing paint.

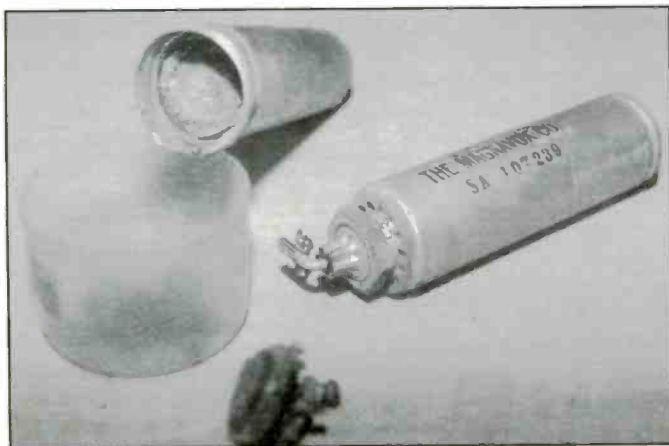


Photo 3. Bottom views of the two electrolytic capacitors. The dry capacitor has been opened for rebuilding, and the original foil and waxed paper form is visible.

I've been kind of remiss in continuing with our American Bosch restoration story. The tombstone radio I showed was retrieved from a damp and musty New England cellar; its home for many, many years. The radio dates to the mid-1930s, and I was drawn to the radio's history, as Bosch was a large manufacturing company in the Springfield, Massachusetts area, very near where I live and work. Westinghouse was another major radio manufacturer with roots in the Springfield area. I've never tracked down the exact location of the American Bosch radio manufacturing site, but I will try to find out from local historians for a future report in this column.

The wooden cabinet had just about completely delaminated, and sections of veneer were either missing or damaged. Inside the set, the radio chassis fared poorly; areas of the chassis apron had been completely corroded away and all of the other ferrous components had various degrees of rust damage.

Let's spend some time this month discussing the chassis restoration work. The cabinet woodworking will take several future columns to cover thoroughly, so this is a good time to continue with the nuts and bolts portion of the project, including some of the electrical work. A few issues ago, I showed how the chassis was stripped of parts and how the rusted out areas were repaired. **Photo 1** is a good reminder of how it looked when I removed the chassis from the set. **Photo 2** shows the same chassis with patches over the rusted out areas, and the chassis is sporting a new Rustoleum Zinc-Sele metallic finish which emulates the original factory plating.

Rebuilding Electrolytic Capacitors

We talked quite a bit about capacitors when I first started penning this column three or four years ago, and I will be revisiting some of the more important restoration points over the next few months. We have discussed how to select replacement electrolytic capacitors, and I suggested leaving the old caps in place to preserve the original chassis appearance; an important differentiation between repair and restoration.

Whether to rebuild the original electrolytic capacitors or not



Photo 4. A large wood screw driven into the capacitor body allows the innards to be pulled free of the shell and discarded.

BY PETER J. BERTINI <RadioConnection@juno.com>

is purely a personal decision. Some restorers feel it is not worth the work involved while others take a more purist approach. Now this is one can of worms I don't wish to open, but I have spoken to some fanatics who will not own a set that does not still contain the original, or at a minimum, exact factory replacement capacitors. Wow! Just be aware whatever you do to a radio, someone will disapprove of your actions. I know many collectors who insist on displaying non-working radios shown in the condition in which they were acquired.

Most will leave the original dud in place, but totally disconnected, to preserve the original outward chassis appearance. After all, modern electrolytics of equivalent capacitance and voltage rating are minuscule when compared to their earlier chassis mount counterparts and are easily hidden out of sight under chassis or behind or beneath other components; and thus the desired chassis appearance is still maintained.

The American Bosch tombstone is interesting because it sported both an early "wet" (liquid filled) electrolytic filter capacitor, and also a comparatively more modern "dry" multisection electrolytic filter capacitor. Both capacitors are shown in **Photo 3**. At the left is the bottom of the dry multisection capacitor with its terminal block forcibly removed from the base of the capacitor. The wet cap is to the right.

There are many approaches to rebuilding these styles of capacitors. Sometimes the best method is devised after carefully studying how the capacitor was assembled during manufacturer. There is no one method that covers all of the styles you will encounter in early sets. As you become more proficient and experienced, you will undoubtedly develop your own techniques for capacitor rebuilding.

In **Photo 3**, you are looking into the end of the body of the dry capacitor which reveals a tightly wound cylinder of aluminum foils and waxed paper insulator material. One method to remove the old capacitor innards is to drive a large wood screw into the center of the capacitor until it is firmly imbedded in the capacitor body. The innards are then pulled from the shell using a pair of gas pliers or small channel locks as I show in **Photo 4**. The next step I used is a bit unusual, but it worked well for this particular cap. A wood plug was cut from a section of 3/4" thick pine board using a hole saw and my drill press. The hole saw diameter was chosen to produce a wood plug that is a

tight fit when inserted into the base of the capacitor shell. You may find a capacitor that does not have a matching holesaw size; this would preclude using this method. The setup to make the plug is shown in **Photo 5**. The next step, shown in **Photo 6**, is drilling small pilot holes through the capacitor shell and into the wood plug at two points 180-degrees apart. Later, two small pan-head wood screws will be used to join the base and shell sections together at these points.

The wood plug is screwed to the chassis using two wood pan head screws run

into the plug from the bottom side of the chassis. The plug is first centered over the original mounting hole, and the two screws placed at points that span the entire diameter of the hole so that the screw heads grip over the hole edges. Take a look at **Photo 7**. The wet electrolytic capacitor has already been rebuilt and mounted in when that photo was taken. Drilling small pilot holes makes the task easier. I used three modern radial-lead electrolytic caps to rebuild the original capacitor. The bare capacitor leads were extended using cloth covered wires, and

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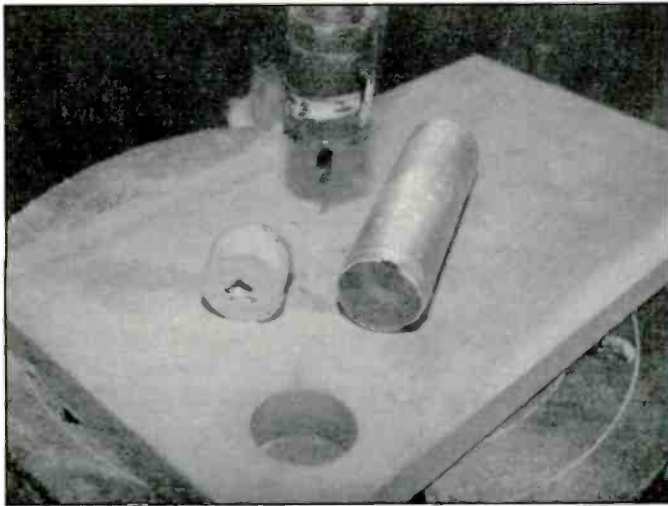


Photo 5. A new mounting base is made from a 3/4" pine plug cut with a hole saw.



Photo 8. Replacement electrolytic capacitors are in place. The leads run through the hole produced by the pilot drill bit in the hole saw. Everything is carefully taped and insulated before the shell is replaced and screwed to the mounting plug.

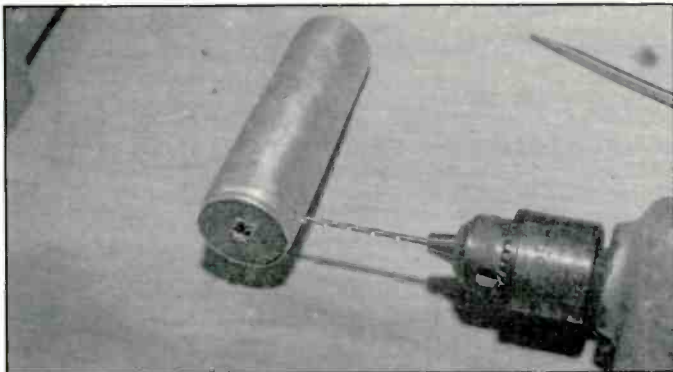


Photo 6. Two small pilot holes are drilled into the sides 180 degrees apart. Small wood screws will be used at these points to hold the rebuilt unit together.

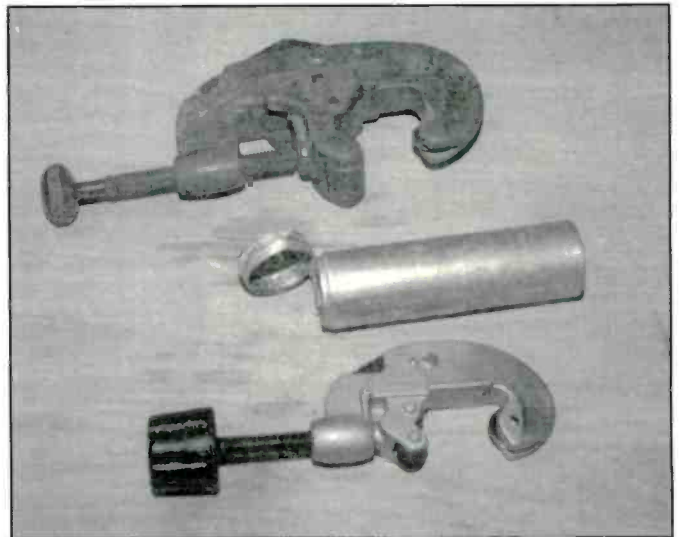


Photo 9. This wet electrolytic is carefully cut open using a sharp pipe cutter. The cut is placed over an existing ridgeline to hide the cut at reassembly.



Photo 7. Wood plug is mounted over the original mounting hole using wood screws through the bottom. They are pan head screws positioned so their heads grip the metal edges of the mounting hole.

all of the exposed wiring was covered with heat-shrink tubing. The capacitors were then tied into a neat bundle, and the cloth leads brought into the chassis using the hole made by the hole saw's pilot drill bit. See **Photo 8**. All exposed electrical connections should be covered with plastic electrical tape. As a final

step, the capacitor shell is placed snugly over the wooden plug, and attached using two small wood-screws.

The Wet Electrolytic

The liquid used in these early wet capacitors is not toxic or corrosive. This doesn't mean you should wallow in the liquid or allow it stand on your skin for extended periods of time. You can see the internal construction of the wet capacitor in **Photo 3**. The shell of the capacitor is the negative, or ground lead, and the positive lead is brought out through the bottom of the capacitor through a crimped natural-rubber seal. At the top of the capacitor are several vent holes that allow pressure to escape in case the capacitor should overheat. Most wet capacitors fail for two reasons. Either they develop internal shorts, or over many decades the liquid slowly evaporates and the capacitor dries out. Since the seal is natural rubber, it will eventually dry out, crack, and allow the electrolyte solution to slowly seep away. I've found old

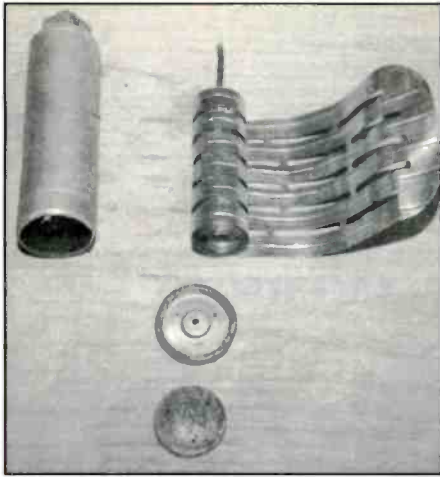


Photo 10. The wet capacitor uses an aluminum plate wound in a spiral to produce a large surface area in contact with the electrolyte liquid. The plate is discarded.

wet capacitors that still have liquid and work, but they are rare.

I decided a different approach was needed to rebuild this capacitor. Where the dry multisection cap was opened at the bottom, I chose to open the wet capacitor on the top end using a pipe cutter. The cut was carefully aligned with an existing seam to minimize the damage. A sharp cutter edge helps here. **Photo 9** shows how I did it.

The top of the capacitor includes a press fitted vent cap that was easily pried off — this part is a key element in the final restoration steps — don't misplace it! The metal rod that runs through the rubber insulation at the lower end of the capacitor is cut flush with the capacitor bottom. This removes the solder lug, and permits the capacitor assembly to be pulled freely away from the base once the capacitor is fully opened. **Photo 10** illustrates the key components of the wet electrolytic. At the right is the spiral wound aluminum positive plate of the capacitor; it has been partially unwound to show its construction.

This part of the capacitor is no longer needed and may be discarded.

To the left is the capacitor shell. The small round disk in the center is the top of the capacitor that was cut free using the pipe cutter. The small hole is part of a pressure relief valve that opens should the capacitor develop dangerous internal pressures. The bottom disk is part of the vent assembly and is mostly decorative. Wet electrolytic caps are single section capacitors; so fortunately we only need to hide one replacement capacitor inside of the shell. **Photo 11** shows how I rebuilt this capacitor. The secret lies in a length of doweling running the full inside length of the shell. A sheet-rock screw and washer secures the dowel at the bottom through the hole left where the metal rod exited the capacitor. The vent hole on the cut-off top cover provides a means to remount the top using another sheet-rock screw and washer. Once reassembled, the top vent cap is pressed and fit back into place to hide the repair details.

These steps are a bit tricky! The doweling must be large enough in diameter to provide a good grip for the wood screws with splitting, but not so wide in diameter as to take up the mounting space needed by the replacement capacitor. The leads were again extended using cloth-covered wired soldered to the radial leads of the replacement capacitor, just as I did in the dry capacitor. Shrink tubing covers all exposed leads, and the capacitor is firmly attached to the wood dowel using lacing cord. A white wire serves as the positive lead, while a black lead is used for the negative terminal. It might have been possible to make the negative connection directly to the metal shell, but that avenue was not explored. The new wire leads are routed through a hole carefully drilled in the area between the center of the capacitor base and the threaded area used by the mounting nut. The positioning of the hole



Photo 11. A wood dowel running the inside length of the capacitor is the secret of how it is put back together using sheet-rock screws.

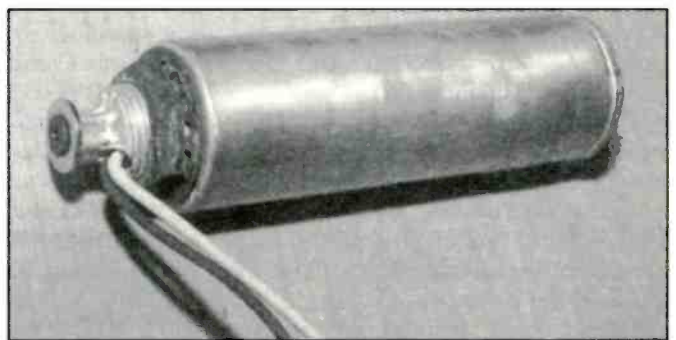


Photo 12. Where the original capacitor used a solder lug connection, this rebuilt version sports wire leads — a small variation from the original design that does not detract from the restoration technique.

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is somewhat critical as the wires must clear both the doweling and the threaded surface used by the mounting nut. **Photo 12** shows how and where I positioned the new hole for the wire leads.

Well, I guess that wraps up this issue! I'll go into more restoration details in future columns. I also want to get back to our crystal set projects for the upcoming Winter DX season. Please, keep your letters and suggestions coming. I'd like to do a few more columns dedicated to answering reader's questions about restorations or repairs. ■

the pirate's den

Focus On Free Radio Broadcasting

Pirate Dr. T Says — "Say What Needs To Be Said"

Let's get right to it with another serving of pirate radio logs. Have you sent in yours?

The Voice of Green Acres, 6955 USB at 2220, ID'ing as "this is the Voice of Bozo broadcasting from Oklahoma." (Jerry Coatsworth, Ontario)

Radio Bingo, 6955 USB at 1618 to sign-off at 1634. Drew the numbers G-54 and B-9. Signed off with "Secret Agent Man." Also at 0130-0145 with a variety-packed program of sound bytes, sound effects, and names of famous and infamous DXers. (Coatsworth, ON) Tentative, **6955** at 2202-2215 sign-off. Bingo cards and mentions of Sal Ammoniac and John Arthur. Tentative at 0132-0142 with No. 9 played over and over, bingo calling, Jimmy the Weasel, and Sal Ammoniac clips. (Lee Silvi, OH)

Radio Azteca, 6955 at 0127 to 0155 with program number 36. (Silvi, OH)

Deliverance Radio, 6955 at 0104 to 0124. (Silvi, OH)

The Voice of Captain Ron/WFMQ, 6955 at 0133-0155. Many Voice of Captain Ron IDs at 0137 and 0138, followed both times by music of the '80s. I left the room for a couple of minutes and returned to WFMQ IDs. (Silvi, OH)

WHYP, 6955 USB at 0028-0035 with James mumbling, "Tainted Love," "Cat," "Shoeshine Boy," and more. Good signal. Also at 0103 with James and then the CD cleaner babe's voice. Also maybe them at 0119. Also testing at 0030-0033 with "It's Not Unusual" by Tom Jones, talking, more music, James ID'ing, and saying "don't open the window." Also at 0136-0146 with various songs including "Living in America," "It Brings Me Down," and the usual James Brownyard comments. Very good signal. (Bill Finn, PA)

Captain Ron, 6955 USB at 0130-0145 with "Freak This" by Will Smith, "having fun playing pirate radio on test transmission Tuesday," "Rage Against the Machine," and told listeners to keep their receivers warmed up. Also at 0133-0146 with the anti-Grammy's '80s flashback show featuring "Take Me Home tonight" and "Any Way You Want It." Also at 0124-0153 with Captain Ron

RADIO FREE AMERICA



Free Americans exercising their right to free speech are called PIRATES by the government. Free Americans know their rights! Free Americans know the government is wrong!



I WANT YOU! TO LISTEN TO RADIO FREE AMERICA

This card is in a lot of QSL collections. Radio Free America was very active in the early '90s.

and sidekick ranting about Rosie O'Donnell, "Rage Against the Machine," E-mail mail bag, Tonya Harding, and Mike Tyson, etc. (Finn, PA)

Radio Tornado, 6955 USB at 0210-0227 with Dr. T. and the instrumental portion of "Secret Agent Man" theme played over and over. Also "Green Acres" theme (*see above — Ed*). Flintstones theme and more sayings and comments from Dr. T. also at 0128-0142 with "Secret Agent Man" theme, Drs. Tornado and Shortwave, as well as Jimmy the Weasel. Dr. T. said "Don't broadcast in feat — this is free radio" and "Say what needs to be said." (Finn, PA)

WFMQ, 6955 USB at 0150-0156, "Keep 'Em Separated," "Cinquo," and mail drop given. It sounded like the tape was speeding out of control. (Finn, PA)

Genesis Communications Network, 6955 USB at 0620-0700, also mentioning the TC Radio Network. Talk show with commercials for health products and maybe also an antenna. The host, Mike or Mark, talked about the "X-Files" and a book called "The Cosmic Test Tube." (James Young, IL)

Radio Cobaine/WFMQ, 6955 at 0104-0118. Music and many mentions of Kurt Cobaine, then WFMQ IDs later. (Silvi, OH)

KRMI, 6955 USB monitored at 2250-2310 sign-off. Talk about drinking beer. Off abruptly. Also at 2054-2101 sign-off. Off abruptly in mid-sentence just as before. (Coatsworth, ON) 2055-2102 sign-off. Music and many IDs as "KRMI" and "Radio Michigan International." (Silvi, OH)

Voice of Zapatista, 6955 at 0122-0139. Talk in Spanish by male and female announcers. Covered by Radio Bingo at 0130. (Coatsworth, OH) 0110-0139 sign-off. I presume this was a repeat broadcast of this clandestine/pirate. Fair to good signal and very clean audio. (Silvi, OH)

Blind Faith Radio, 6955 at 2037-2055 with music by the Lovin' Spoonful. (Coatsworth, ON) 2012-2107, played "Born to Be Wild" and other oldies. (Silvi, OH)

WHYP, tentative, 6955 at 0025 to 0033 sign-off. Music, weather, "That wasn't supposed to happen . . ." was repeated, along with other phrases. (Silvi, OH)

And that's all you wrote! We're just a touch on the short side this time. Maybe station activity is down of late. Anyway, keep those cards, letters, and E-mails (to popularcom@aol.com) coming my way and we'll have another round for you next month. 'Til then, take care! ■

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Tuned circuitry minimizes intermod, improves selectivity, reduces noise outside tuned band. Use as a preselector with external antenna. Covers 0.3-30 MHz. Tune, Band, Gain, On/Off/Bypass Controls. Detachable telescoping whip. 5x2x6 in. Use 9 volt battery or 110 VDC or 110 VAC with MFJ-1312. \$14.95.

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Plug this compact MFJ all band active antenna into your receiver and you'll hear strong, clear signals from all over the world, 300 KHz-200 MHz including low, medium, shortwave and VHF bands.

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Pop'Comm's World Band Tuning Tips

July 2000

This listing is designed to help you hear more shortwave broadcasting stations. The list includes a variety of stations, including international broadcasters beaming programs to North America, others to other parts of the world, as well as local and regional shortwave stations. Many of the transmissions listed here are not in English. Your ability to receive these stations will depend on time of day, time of year, your geographic location, highly variable propagation conditions, and the receiving equipment used.

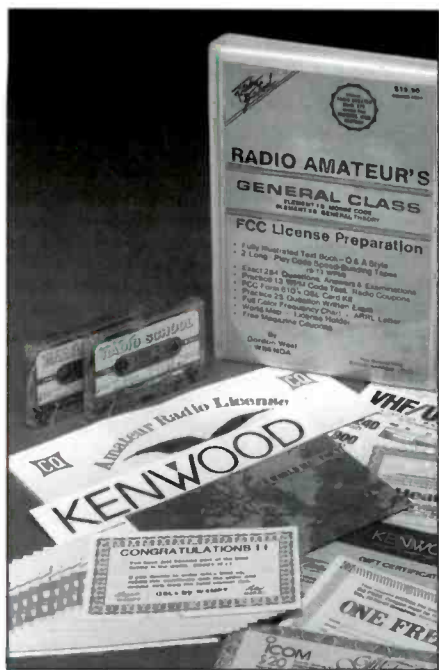
AA, FF, SS, GG, etc. are abbreviations for languages (Arabic, French, Spanish, German). Times given are in UTC, which is five hours ahead of EST, i.e. 0000 UTC equals 7 p.m. EST, 6 p.m. CST, 4 p.m. PST.

UTC	Freq.	Station/Country	Notes	UTC	Freq.	Station/Country	Notes
0000	6165	Radio Netherlands, via Bonaire		0200	9925	Croatian Radio, via Germany	EE/Croat
0000	7375	Radio Bulgaria		0230	4534	Radio Horizonte, Peru	SS
0000	9400	Radio Bulgaria		0230	6480	Radio Altura, Peru	SS
0000	11915	Radio Gaucha, Brazil	PP	0230	7200	Radio Omdurman, Sudan	AA
0000	15100	China Radio Int'l	CC	0230	7270	Radio Tirana, Albania	
0000	15180	Voice of Russia		0230	11775	Radio Marti, USA	SS
0000	15240	Radio Australia		0245	6265	Zambia National Broadcasting/ Radio Zambia	EE/vern
0000	15290	Voice of America, via Philippines		0300	4800	Radio Lesotho	
0000	17510	KWHR, Hawaii		0300	4830	Radio Tachira, Venezuela	SS
0030	6120	Radio Vilnius, Lithuania, via Germany		0300	4885	Radio Clube, Brazil	PP
0030	6458.5	Armed Forces Radio, Puerto Rico	SSB	0300	4976	Radio Uganda	
0030	7325	Radio Austria Int'l	GG	0300	5975	BBC, via Antigua	
0030	13695	Radio Thailand		0300	6940	Radio Fana, Ethiopia	vern
0030	15260	China Radio Int'l		0300	11600	Far East Broadcasting Assn., Seychelles Is.	Farsi
0050	6010	RAI, Italy		0300	11665	YLE Radio Finland	
0050	7305	Vatican Radio		0300	11785	Radio Iraq Int'l	GG
0100	5930	Radio Slovakia Int'l		0300	11925	Radio Bandeirantes, Brazil	PP
0100	5940	Voice of Vietnam, via Russia		0300	15345	Radio Thailand	
0100	6055	Radio Exterior de Espana, Spain		0300	15355	Radio Sultanate, Oman	
0100	7105	Radio Tashkent, Uzbekistan		0330	7215	Trans World Radio, South Africa	unid
0100	9440	Radio Slovakia Int'l		0330	11980	Radio Vlaanderen Int'l, Belgium, via Bonaire	
0100	9560	Radio Ukraine Int'l		0330	12020	Voice of Russia	
0100	9665	Radio Prague, Czech Republic		0340	9660	Vatican Radio	
0100	11710	RAE, Argentina	SS	0400	4819	La Voz Evangelica, Honduras	SS
0100	13630	Radio Japan-NHK	FF	0400	4865	La Voz del cinaruco, Colombia	SS
0100	13650	Radio Pyongyang, North Korea	FF	0400	4955	Radio Nacional, Colombia	SS
0100	13690	Deutsche Welle, Germany, via Sri Lanka	GG	0400	6105	Radio Universidad, Costa Rica	SS
0130	7160	Radio Tirana, Albania		0400	9600	Radio Ukraine Int'l	
0130	7300	Radio Slovakia Int'l	Slovak	0400	9820	Radio Havana Cuba	
0130	9745	HCJB, Ecuador		0400	9885	Swiss Radio Int'l	
0130	11620	All India Radio	Hindi	0400	11810	Radio Jordan	AA
0130	15245	Sri Lanka Broadcasting Corp.	EE/vern	0400	11945	UAE Radio, Abu Dhabi	AA
0145	7275	Voice of Islamic Republic of Iran	unid	0400	15285	Radio Cairo, Egypt	AA
0200	3250	Radio Luz y Vida, Honduras	SS	0400	15310	BBC via Oman	
0200	3280	La Voz del Napo, Ecuador	SS	0430	4770	Radio Nigeria	
0200	4919	Radio Quito, Ecuador	SS	0430	9675	Radio Taipei Int'l, Taiwan	CC
0200	6185	Radio Educacion, Mexico	SS	0430	15215	Channel Africa, South Africa	FF
0200	9495	Radio Sweden		0430	15470	Voice of Russia	
0200	9755	Radio Canada Int'l					

UTC	Freq.	Station/Country	Notes	UTC	Freq.	Station/Country	Notes
0430	15515	Radio Australia		1600	11615	Radio France Int'l	
0430	15575	BBC, via Cyprus		1600	15345	Broadcasting Service of Kingdom of Saudi Arabia	AA
0430	17675	Radio New Zealand Int'l		1600	15435	Radio Jamahiriya, Libya	AA
0430	21660	BBC, via Thailand		1600	15475	Africa Number One, Gabon	FF
0430	21700	UAE Radio, Dubai	AA	1600	15590	Radio Netherlands, via Madagascar	
0445	17780	RAI, Italy	II	1600	15615	Kol Israel	HH
0500	4960	Radio Vila, Dominican Republic	SS	1630	15355	Voice of Turkey	TT
0500	4991	Radio Apinte, Surinam		1630	15545	YLE Radio Finland	Finnish
0500	5025	Radio Parakou, Benin	FF	1630	15550	Voz Cristiana, Chile	SS
0500	5047	Radio Lome, Togo	FF	1630	21700	Radio Exterior de Espana, Spain	
0500	6085	Bayerischer Rundfunk, Germany	GG	1700	10330	All India Radio	unid
0500	6130	CHNX, Halifax, Canada		1700	17870	Channel Africa, South Africa	
0500	6160	CKZU, Vancouver, Canada		1730	15150	Voice of Indonesia	SS
0500	7210	Radiodifusion Nationale, Benin	FF	1830	13640	RTE, Ireland, via Canada	
0500	7255	Voice of Nigeria		1830	21630	RTE, Ireland, via Ascension Is.	
0500	7475	Kol Israel		1900	9535	Radio Thailand	
0500	9580	Africa Number One, Gabon	FF	1900	11655	Qatar Broadcasting Service	AA
0500	11955	Radio Nacional, Angola	PP	1900	11734	Radio Tanzania, Zanzibar	Swahili
0500	17760	Broadcasting Service of Kingdom of Saudi Arabia	AA	1900	11950	UAE Radio, Dubai	AA
0530	17615	Radio Free Asia, via Northern Marianas	CC	1900	15190	Radio Pilipnas, Philippines	vern
0600	5025	Radio Rebelde, Cuba	SS	1900	15325	Radio Canada Int'l	RR
0630	17545	Reshet Bet service, Israel	HH	2000	9525	Radio Polonia, Poland	
0700	510	Radio Liberia Int'l		2000	13790	Swiss Radio Int'l, via French Guiana	
0700	5055	Faro del Caribe, Costa Rica	SS	2000	15160	Radio Algiers Int'l, Algeria	
0730	4760	ELWA, Liberia		2000	15345	RTV Marocaine, Morocco	AA
0800	6175	Radio Cultura, Brazil	PP	2000	15400	BBC via Ascension	
0800	9615	KNLS, Alaska		2030	12080	Voice of America, via Botswana	
0800	11805	Radio Globo, Brazil	PP	2030	15705	Radio Denmark, via Norway	DD
0830	4960	Radio Vanuatu		2030	17660	HCB, Ecuador	
0830	9505	Radio Record, Brazil	PP	2030	17745	RDP Int'l, Portugal	PP
0930	5955	Caracol Villavicencio, Colombia	SS	2100	9965	Voice of Armenia	
0930	6010	Radio Mil, Mexico	SS	2100	15084	Voice of Islamic Republic of Iran	Farsi
0930	7230	AWR Europe, Italy		2100	15185	Radio Africa, Equatorial Guinea	
1030	3290	Radio Centro, Ecuador	SS	2100	15410	Deutsche Welle, Germany, via Rwanda	GG
1100	3315	Radio Manus, Papua New Guinea		2100	21645	Radio France Int'l, via Fr. Guiana	SS
1100	4725	Radio Mynmar, Mynmar	Burmese	2130	7475	RTT Tunisiene, Tunisia	AA
1100	4755	Radio Huanta 2000, Peru	SS	2130	9990	Radio Cairo, Egypt	unid
1100	4779	Radio Cultural Coatan, Guatemala	QQ	2130	17705	Voice of Greece, via Delano	GG
1100	4835	Radio Tezulutlan, Guatemala	SS	2200	6205	Vatican Radio	CC
1130	3905	RRI, Merauke, Indonesia	II	2200	9735	Radio Sultanate, Oman	AA
1130	4890	NBC, Papua New Guinea		2200	9780	Radio Sana'a, Yemen	AA
1200	6015	Radio Singapore	unid	2300	7195	Radio Bucharest, Romania	
1200	6020	Radio Australia		2300	9705	Radio Mexico Int'l	SS
1200	9590	Radio Singapore		2300	11402	INBS, Iceland	Icelandic
1200	12085	Voice of Mongolia		2300	11800	RAI, Italy	II
1230	15295	Voice of Turkey		2300	11940	Radio Romania Int'l	
1230	15650	Voice of Tibet (cland) via Tajikistan	Tibetan	2300	11990	Radio Budapest, Hungary	unid
1230	18960	Radio Sweden		2300	15495	Radio Kuwait	AA
1245	9405	Far East Broadcasting Co., Philippines	CC	2300	15550	Radio Budapest, Hungary	Hung.
1245	15500	Vatican Radio		2300	15575	Radio Korea Int'l, S. Korea	KK
1300	11530	Voice of Hope, Lebanon		2300	17835	KSDA, Guam	CC
1300	18950	Radio Norway Int'l	NN	2330	9445	Voice of Turkey	
1330	9540	Radio Nacional, Venezuela	SS	2330	11585	Kol Israel	HH
1330	9675	Radio Veritas Asia, Philippines	EE/other	2330	12020	Voice of Vietnam	
1330	9715	Radio Tashkent, Uzbekistan		2330	15270	Radio Taipei Int'l, Taiwan	CC
1330	13730	Radio Austria Int'l		2330	15315	Radio Netherlands, via Bonaire	SS
1430	9505	Radio Japan — NHK		2330	15390	China People's Broadcasting Station	CC
1530	15110	Radio Kuwait	AA	2330	15395	Voice of America, via Sri Lanka	
1545	15105	KTWR, Guam		2330	15520	Far East Broadcasting Co., Philippines	unid
1550	15500	Vatican Radio		2330	17810	Radio Japan-NHK	
1600	11570	Radio Pakistan					

product parade

Review Of New, Interesting And Useful Products



Be sure to check out Gordon West's Radio School for the latest amateur radio study guides.

New Gordon West Amateur License Manuals

Gordon West, WB6NOA, announces completion of his three new and updated-for-restructuring license manuals for Element 2 Technician Class, Element 3 General Class, and Element 4 Extra class. West also announces his six-tape Morse Code cassette course, specifically recorded for the 5 wpm Element 1 examination.

"Our new Technician class book covers all 394 questions and answers, plus my description of the correct answer," comments West. He says, "The Technician book is fully illustrated and will provide the new ham operator with plenty of VHF/UHF references including the all-important band plans." The Element 2 Technician class book is valid April 15, 2000 through June 30, 2003 and contains approximately 192 pages. There are several chapters specifically for the new ham to learn all about the restructured amateur radio service, plus a chapter specifically on how to learn the Morse Code Farnsworth method.

West's General Class Element 3 book is 160 pages, including a special 16-page pullout section that focuses the reader on recent changes in General class licensing requirements. The new restructured General class written exam is 385 total questions. The book is well-illustrated and places emphasis on high-frequency operation, band plan courtesies, and illustrated figures on propagation. The General book is valid April 15, 2000 through June 30, 2004.

"My new Extra book covering Element 4 will be a whopping 240 pages with all technical formulas worked out in great detail," adds West. "My students reading the book won't need to be experts in trigonometry to get through the technical problems — I work them out in our pages with such detail that anyone can follow the math, and I even give some shortcuts on how to immediately recognize the correct answer without all of the lengthy calculations," added West. There are also detailed pages on frequency privileges for all classes of license including grandfathered Advance operators, plus discussions about RF safety. The new Element 4 Extra class book is valid April 15, 2000 through June 30, 2002 and contains all of the 676 Element 4 question pool.

Gordon West, our *Pop Comm* "Radio Resources" columnist, is well-known for his audio code-learning, long-play cassettes, and his new six-tape cassettes are the most effective way to learn about on-air operating techniques, plus preparation for the FCC authorized code test. West also produces commercial radiotelegraph test preparation courses for 16 and 20-wpm code groups, and 20-wpm commercial radiotelegraph plain language.

For present Extra class operators, West also authors the 492-page General Radiotelephone Operator License plus Ship Radar Endorsement, which is a fully illustrated test preparation book, updated in January.

All books are copyright from Master Publishing, Inc., in Lincolnwood, Illinois, and are sold by all RadioShack stores, ham radio dealers, at ham flea markets, plus the W5YI distributor in Dallas, Texas, at 800-669-9594. West is a con-

tributor to the NCVET Question Pool Committee. West originally submitted some of the amateur radio test questions.

West says, "All of these amateur radio and commercial radio books reflect my enthusiasm for successful upgrades as well as a better understanding on amateur radio operation over the bands." He continued, "These study guides do a lot more than get you through the test — I relate many of the test questions to the real world of good ham radio operating techniques over the airwaves."

For more information, contact Gordon West, WB6NOA at the Radio School, Inc., 2414 College Drive, Costa Mesa, CA 92626 or phone their hotline at 714-549-5000 from 10 a.m. to 4 p.m. or their info line (24 hours) at 714-434-0666. Be sure to tell Gordon that *Pop Comm* sent you!

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The new Radio Badge™ fits the majority of the new micro-radios such as the Yaesu VX-1R and ones of similar size.

Priced at \$19.95, order part number HI-B from Cutting Edge Enterprises, 1803 Mission Street, Suite PMB-546, Santa Cruz, CA 95060 or call 800-206-0115. You can also E-mail the company at cee@cruzio.com.

CIRCLE 102 ON READER SERVICE CARD

PowerPort VX-5 Leather Radio Glove

This new product, produced by Cutting Edge Enterprises, holds your VX-5 in protective leather and solves a couple of problems you may have encountered. The Radio Glove's sturdy spring steel belt clip is a real gripper. And the perfectly sized pocket at the back of the pouch securely holds either extra tip, keeping them right there with your radio.

The Radio Glove is beautifully crafted and the Velcro-style closure provides easy access to the display. The PTT button is still fully accessible while the radio is in the pouch. The speaker holes are well placed for optimal listening. In fact, the leather seems to attenuate some high-pitched speaker hiss. The Radio Glove also fits the VX-500 receiver. It's priced at \$19.95 from Cutting Edge Enterprises,

1803 Mission Street, Suite 546, Santa Cruz, CA 95060. Phone 800-206-0115 or E-mail the company at cee@cruzio.com. Be sure to tell them you read about it in *Popular Communications*.

CIRCLE 103 ON READER SERVICE CARD

Stentofon Offers Protective Covering For Outdoor Comm Stations

Stentofon Communications, Inc., a worldwide supplier and manufacturer of security, critical, and industrial communications systems, now offers a rain hood to provide extra protection for its No. 62925 and 9625 stations when installed outdoors.

The extended hood keeps excessive moisture off the station and shields the speaker and microphone from rain and ice. The hood is made of 5052 aluminum, which provides excellent corrosion resistance and durability. It's painted with a high-visibility yellow for easy locating.

The hood is designed to easily attach to the station and its backbox. For more information on Stentofon's 62995 rain hood, which measures (HWD) 5 3/4" x 8" x 4," contact the company's technical department at 800-654-3140.

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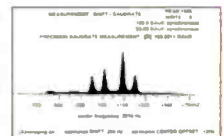
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Diversity Reception Techniques

Ionospheric fading affects shortwave propagation more than the other bands. Because of the unpredictability of ionospheric propagation, high frequency shortwave signals cannot be depended on for highly critical applications. But in amateur radio, international broadcasting, and a host of other services, the high frequency shortwave bands are as still popular as ever.

Perhaps the main mechanism for ionospheric distortion of the signal on shortwave radio is fading. Unfortunately, on amplitude modulation (AM) stations, the two sidebands fade out of phase with each other, and also with the RF carrier, producing a hollow, rolling fade. Added to ordinary amplitude fading, this produces a difficult-to-receive situation.

So how do the big international broadcasters and other users of spectrum space deal with fading? Well, truthfully, most of them today use satellite reception. It is much more reliable. But in their heyday, shortwave broadcasters and locals relaying signal from a shortwave source used diversity reception techniques. Even today, commercial users of the shortwave spectrum will use diversity reception as a matter of course.

Diversity Reception

The best method for ridding ourselves of fading in the shortwave is **diversity reception**. There are three versions of diversity reception: frequency diversity reception, spatial diversity reception, and

polarization diversity reception. Let's take a look at all three methods.

Frequency Diversity

Frequency diversity reception is based on the fact that the different shortwave frequencies fade differentially. That is seen in the fact that the sidebands and carrier fade out of phase with each other. By its nature, AM separates the lower sideband, carrier, and upper sideband in frequency equal to the audio spread of the input signal to the transmitter's modulator. The signals don't all fade the same amount and the same time. By using different frequencies, and then voting on the output received, they can often get the reception that they desire. Sometimes,

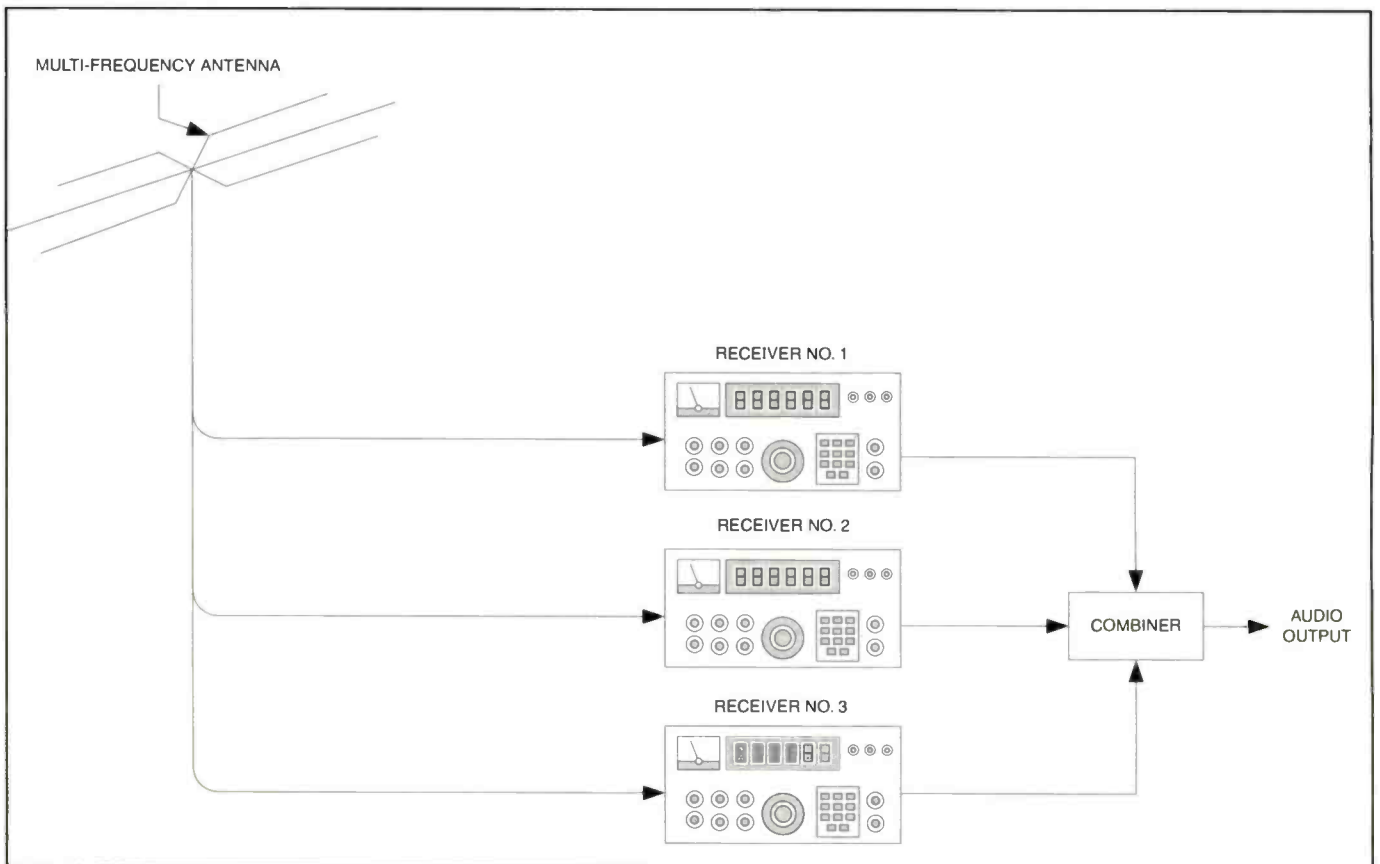


Figure 1. A frequency diversity scheme.

BY JOE CARR, K4IPV <carrj@aol.com>

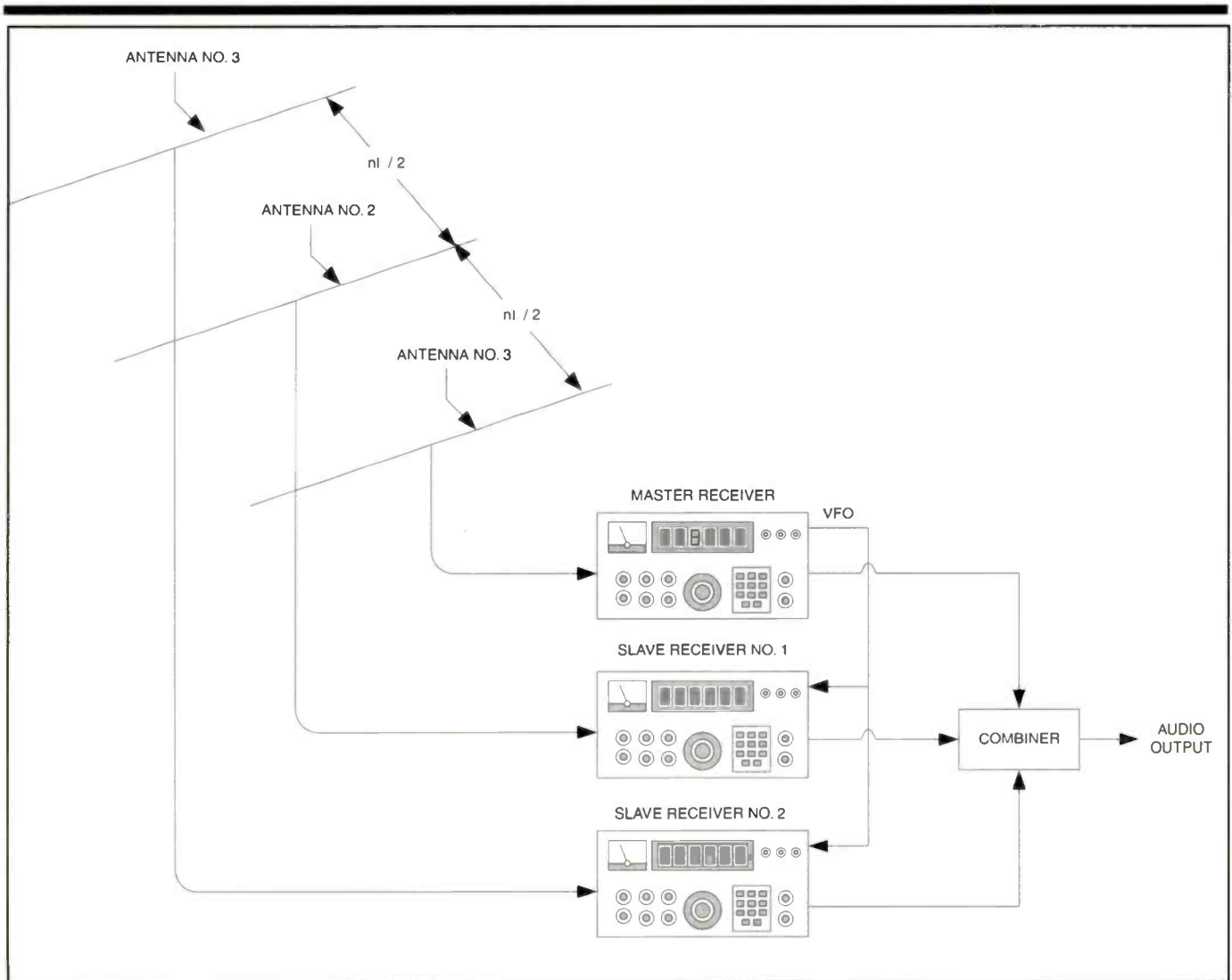


Figure 2. Spatial diversity reception system.

remarkably small differences in frequency will yield diversity performance.

Figure 1 shows a frequency diversity scheme. Three receivers are used in this scheme, although two, four, and five may be used in actual practice. Each receiver is tuned to a different frequency, or perhaps a different band. The antenna inputs of the receivers are tied together in a single multi-frequency antenna that covers all of the bands.

Note the outputs of the receivers. They go to some sort of combiner that votes on which has the best signal. This circuit may be at IF or it is at audio. In the case of IF based systems, the combiner also includes the demodulator circuitry so that audio comes out of the combiner.

Spatial Diversity

Spatial diversity reception depends on the fact that the wave moves from place

to place as it fades. This is due largely to the ionosphere being unstable height wise, and thereby having the signal walk about a bit. The spatial diversity reception system is shown in Figure 2.

The key to spatial diversity reception is the antenna field. Although three antennas and receivers are shown here, real systems may have two to five antenna-receiver combinations. The key to the antenna field's performance is the fact that they are spaced $n/2$ apart, where n is an integer (including 1). This spacing is dictated by the physics of the situation. Any closer spacing would nullify the operation considerably.

Three receivers are shown in the spatial diversity reception scheme of Figure 2. Notice that the same audio or IF combiner circuitry is used as was used in the frequency diversity reception method (why mess up a good thing!). The IF/audio combiner will output the highest signal automatically.

Note that the variable frequency oscillators (VFOs) of the three receivers are linked together. More correctly, that there is a designated "master" receiver that drives a VFO input on the other two receivers. This configuration permits the user to adjust just one receiver, while controlling all three. One sure sign that a receiver is designed for the diversity reception is the existence of VFO IN/OUT connectors on the rear panel.

Polarization Diversity Reception

The polarity of the transcendental electromagnetic wave that forms the short-wave signal is, to say the least, messed up. Although there is as much as 30 dB difference between the vertical and horizontal polarization (i.e., if you cross-polarize your receiver antenna you will suffer up to 30 dB loss!), it rarely matters

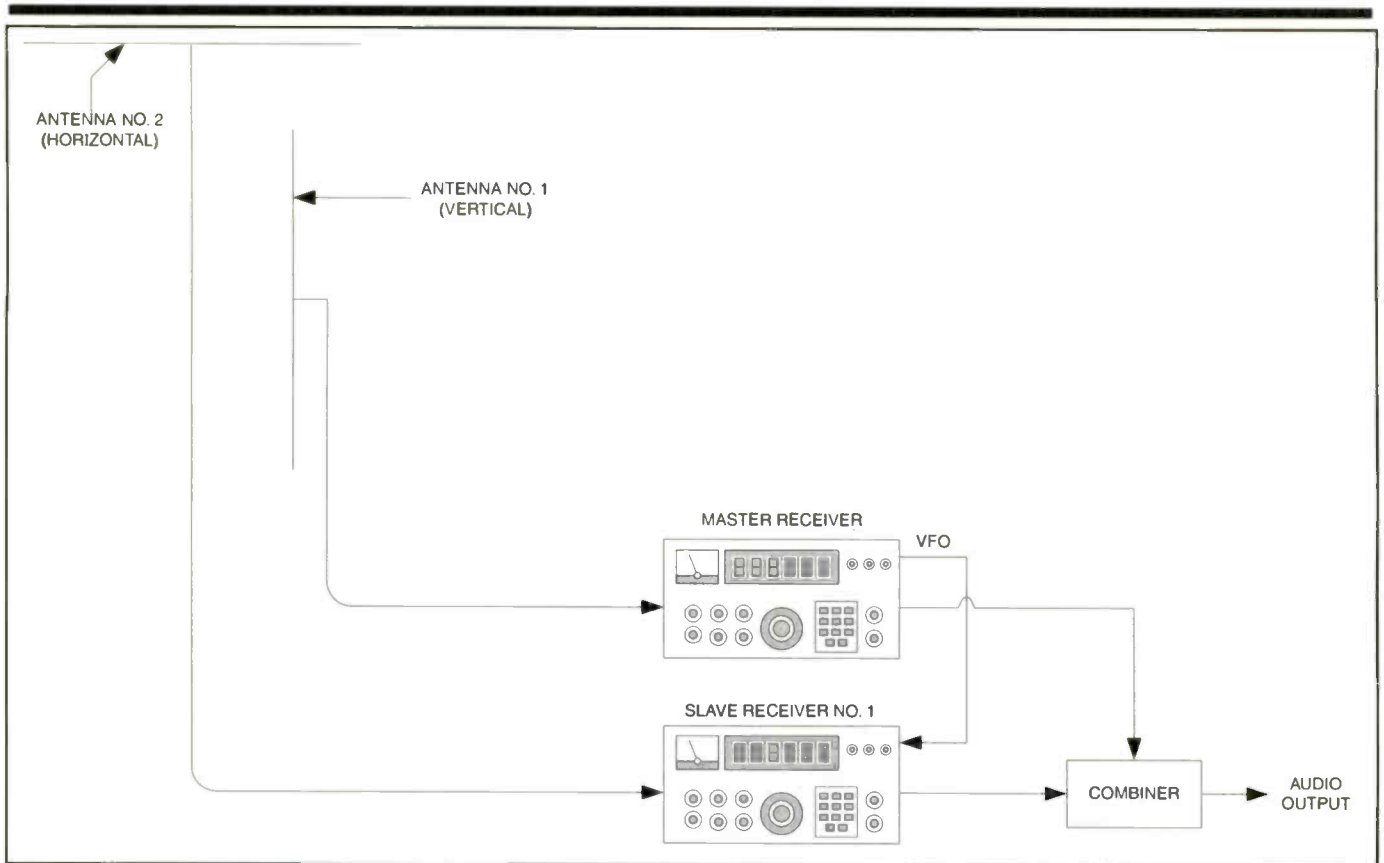


Figure 3. Polarization diversity reception system.

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on shortwave whether or not the polarity of the receiver antenna matches that of the transmitter antenna (normally good engineering practice). The reason is that the polarity of the incoming signal keeps shifting and rotating.

The solution to the problem is shown at **Figure 3**. Polarization diversity reception uses two or more receivers tuned to the same frequency, but fed with co-located vertically and horizontally polarized antennas. The antennas are located at the same site, but are of opposite polarization. That way, when the polarity shifts from more vertical to more horizontal, the proper receiver takes over.

The same IF/audio combiner that was present in the previous two methods is used again in polarization diversity reception. Similarly to **Figure 2**, the VFO of the Master Receiver is driving the VFO IN terminal on the Slave Receiver. Again, that allows a co-channel receiver to be operated by the Master Receiver.

IF/Audio Combiner

The IF/audio combiner might be a simple voting logic signal selector on the audio signal. It will select whichever of

the two to five receivers is putting out the strongest signal, or if two or more are putting out equally strong signals, it will select according to a protocol.

There is another type of combiner that operates at the IF frequency of the receivers. This type of combiner takes the signal and suppresses the carrier and one sideband, and then reinserts a strong local carrier from an oscillator circuit. The recreated single-sideband signal is more free of fading than any of the input signals, so it's used to create the audio output on top of the advantages provided by diversity reception. At least it eliminates the problem of the sidebands fading out of phase with each other and the carrier. This method was called the Farnsworth method by some authorities, and the Crosley method by others.

Still another method for the combiner is **synchronous AM reception**. This is an updated version of the Farnsworth or Crosley methods as nearly as I can tell because it requires the carrier to be nulled out through phasing, and then uses an oscillator to reconstitute the carrier.

As always, I welcome your questions about antennas — receiving or transmitting — at *Popular Communications*, 25 Newbridge Road, Hicksville, NY 11801.

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Pop'Comm's Cyber Sleuth Checks Out Online Resources

Newsgroup And Mailing List News, And Making Your Own QSLs

In a previous column, we discussed how to use solar noon (on a sunny day) and the shadow cast by a perpendicular road in finding True North for your location. Here's an informative note from *Pop'Comm* reader John McDermott outlining another, and perhaps the most accurate way of doing it.

"To find true north I have found the easiest method is to go to the engineering department of my municipality. There you will find maps of your street area. Usually you can get the engineer to make you a copy of your section on an 8.5" x 11" sheet and he/she will transfer the true north heading found on all these larger maps to your copy for a small sum — usually a dollar or two. As most houses are laid out parallel to your plot lines, all you need is a plastic compass (the drawing type) to determine the difference between your site and true north to layout your antennas and beams. As the true north via the sun varies from location to location within the time zone, this is the most accurate method available. If you live near one of the time zone borders, your Sun noon is not the same as those living near the middle."

Thanks again for sharing this information with us John!

Internet Newsgroups And Mailing Lists

The World Wide Web is probably the hottest thing since boiling water. However, there are two other, "hot," Internet-based systems that pre-date the Web by several years. These "ancient" systems are (Usenet) Newsgroups and Internet (E-mail) Mailing List systems. With an estimated 30,000+ Newsgroups and 80,000+ Mailing Lists, they're more popular today than ever.

Basically, Newsgroups and Internet Mailing Lists (a.k.a. "Reflectors") can be thought of as public forums (or virtual communities) where people with a shared interest in some topic can submit questions or comments which are then answered or commented on by others hav-



You'll smile too! See text for details.

ing appropriate expertise and knowledge in that field. In both cases, E-mail is the common denominator. The main difference between the two is that you manually access a Newsgroup where you can read or respond to submissions if desired. With Internet Mailing Lists, once you are a subscriber, you will automatically receive a copy of all E-mail submitted to the Mailing List server. (Hence the term "reflector" — i.e. all submissions are "reflected" back to subscribers). This could mean a LOT of E-mail if it's a popular list. Although one also "subscribes" to a Newsgroup, it is not a subscription in a technical sense — rather just "telling" your browser (or other E-mail system) that you wish to ACCESS a given Newsgroup. Most Web browsers support Usenet Newsgroups as one of their default E-mail functions. Use your browser's HELP function for more details.

In terms of radio-related activities, both Newsgroups and Internet Mailing Lists offer a large and diverse range of topics. Which one(s) to use is a personal preference and will generally depend on your level of interest. If you have a casual interest in a subject, Newsgroups are probably the better choice since *you* choose when and if to access the information. If you're more "serious" about a specific theme, then the Mailing List route (with its automatic E-mail delivery) might be more suitable since the topics (and submissions) tend to be more focused with much less off-topic chatter.

If you haven't tried Newsgroups or Internet Mailing Lists, pick a topic and try them — you might be pleasantly surprised at the quality (and quantity) of information available. From the UK (and the Grim Reaper?), here's an online sampling of radio related Newsgroups at

BY ERIC FORCE <eric@dobe.com>

The Amateur Radio Elmers Resource Directory

<http://www.novia.net/~pschleck/elmers/>

Help is just a click away with this "Master/Apprentice" approach.

If antenna construction is your bag, don't miss this resource.

<http://www.thegrimreaper.demon.co.uk/ham/radio-news.html>.

And, from MAILING LISTS@QTH.NET, a SUPERB resource where you can subscribe (and unsubscribe) to a wide variety of radio-related Mailing Lists plus get more information on them at <http://www.qth.net/>.

TIP: Be sure to BOOKMARK the above URL so you can go back and unsubscribe to the list(s) if it no longer meets your needs. Unsubscribing *must* be done in a certain way (somewhat awkward if done manually) so make it easy on yourself and use the above URL.

If you don't find what you're looking for at the above resources, here's another superb resource from Liszt.com where you can search for just about every Newsgroup and Mailing List there is at <http://www.liszt.com/news/>.

Amateur Radio "Elmers" Resource Directory

Paul W. Schleck's, K3FU, "Amateur Radio Elmers Resource Directory" is probably one the most comprehensive directory of "Elmers" on the Internet. What's an "Elmer?" Paul offers this definition: "An Elmer today is of any age, male or female, who has some expertise and is willing to share it with beginners. Elmers don't even need to be licensed amateurs, just people with knowledge in some area of electronics or communications technology." If you're just beginning your voyage into radio or radio electronics or can't seem to find the answer to a radio question, visit Paul's site where you'll no doubt find an "expert" or two who will be more than willing to help. Don't miss this outstanding resource at <http://www.novia.net/~pschleck/elmers/>.

Make Your Own QSL Cards

Here's a neat resource by Bob Inouye (WA7S). If you have a computer with word processing software and a printer, you can

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<http://www.btinternet.com/~g4fgq.regp/>

make your own custom QSL cards, with each card individually printed for the ham you just contacted. Bob walks you through the easy process with several examples and tips for creating that perfect card. If you prefer to send your card via E-mail, it's as easy as 1-2-3. Do a "Print Screen" of your document. Use a "PAINT" program like the one included with Windows® to crop and save the image as a JPEG. And then attach that image to your E-mail. Let your creativity loose and take a peek at <http://www.qsl.net/wa7s/>.

Boat Anchor Manual Archive

Covering over 60 brands from Alliance to Yaesu, Ken Grimm's, K4XL, "Boat Anchor Manual Archive" (BAMA) site is one slick puppy. In Ken's words: "The manuals in this archive are available to all who enjoy working on and restoring old tube-type amateur radio equipment and shortwave receivers. This is a totally free cooperative service to the Boat Anchor community. It is made possible by the generous folks who take the time and make the effort to scan and upload their manuals to the BAMA site." You'll also find tips on how to best use his resources, plus pointers to many other web sites offering schematics and manuals. BRAVO Ken! Be sure to check Ken's "need" list and consider helping him to make this incredible free resource even better! Visit <http://bama.sbc.edu/>.

Super Antenna Modeling Software Archive

From West Midlands, England, comes R.J. ("Reg") Edwards', G4FGQ, "Amateur Radio Station — G4FGQ's Software" site. Containing predominately antenna modeling programs, it's a super resource for high quality (and Free) DOS based software. In "Reg's" words: "The primary purpose of this site is to freely distribute computer programs, composed by G4FGQ himself, which mathematically model the behavior of components, circuits, aerials, earths, radio paths, etc. "Working"

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The

BoatAnchor Manual Archive

<http://bama.sbc.edu/>

Incredible collection of "Boat Anchor" Schematics and Manuals.

Bob Inouye shows you how to make your own QSL Cards.



To: Albert, FO5JR in Tahiti Island

WA7S

hereby confirms our 20 meter CW QSO, on
Apr-02-1999, at 03:43 UTC. Your RST was 459.

Bob Inouye, 310 Viewmont Drive, Yakima, WA 98908 USA
E-mail: wa7s@arrl.net Web page: www.qsl.net/wa7s/
QTH: Yakima, Yakima County, WA Grid Square CN96qo
Rig: Kenwood TS-570S(G) 100 W Ant: 4-band dipole, 21' up

our other hobby: horses

73's, Bob Inouye

Thank you for the CW QSO this Thursday evening. I am very pleased to make my first Tahiti contact, and will be happy to receive your QSL. It is nice to reach a distant station from here in Washington State.

No. 6142

<http://www.qsl.net/wa7s/>

models allow experimenters to examine quantitatively how the various input data interact and affect performance. They will relieve the hobbyist of some of the labor, the costs, and the disappointments of building unsuccessful prototypes. Also of tedious arithmetic. He/she will gain further insight and will better appreciate the finer points of design. Opportunities for original contributions to the hobby will be broadened." Many thanks "Reg" — outstanding work!

Don't let the fact that the programs are DOS-based dissuade you. They are *top-notch* programs requiring NO installation (i.e. run 'em right after download), are compact in size and will produce highly accurate and useful results. The only negative (from my perspective) is that all programs use Metric values for input and results. Regardless, that's a small price to pay for the quality of this software. Complete descriptions, tips on how to download and use them (plus more) are available at Mr. Edwards' site. One program, RJLOOP3.EXE will be of particular interest to those building small receiving loop antennas — such as those used for MW DXing. Don't miss this extraordinary resource at <http://www.btinternet.com/~g4fgq.regpl/>.

FCC Consumer Information Bureau Page

If you've ever had trouble finding information at the Federal Communications Commission's Website, this new page will

definitely put an end to those frustrations. Be *sure* to bookmark it so you'll always have a ready reference to their vast array of information. A tip of the old Sleuth's hat to the FCC for creating this outstanding (and time saving) resource! Check out <http://www.fcc.gov/cib/>.

Antique Radio

If antique radio strikes a pleasant chord in your heart then "AntiqueRadioOnline" is the place for you. There you'll be able to enjoy a forum where you can ask questions about radios, including repair and restoration, participate in live chat sessions on Wednesday nights, gain access to one of the largest listings of radio collecting related links on the Web, review articles about a wide variety of radio topics, listen to vintage radio programs in streaming RealAudio, peruse a list of radio clubs around the world and more! Don't miss it at <http://www.antiqueradios.com/>.

It looks like we're out of space again so we'll head back to the barn for now. Thanks for joining me on this month's journey into cyberspace and keep those comments and suggestions coming! Don't forget to visit the *Pop'Comm* Website at <http://www.popular-communications.com/> for the latest and greatest radio communication.

Until next time, 73



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GEORGE BURNS & GRACIE ALLEN

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Friday, April 07, 2000

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scan tech

Trunking, Tips, Techniques, And Mods

Types Of Communications Systems 101

Why can I hear the cars talking back to the dispatcher on a frequency two counties away, while I can only hear our local police once in a while? This question, or something very much like it gets asked with great regularity in the letters I've been getting from folks. So, like many other "ScanTech" topics, a letter or two — or six — sparked this column, so I won't mention names specifically, but let's see if we can answer that question for everyone.

In our attempt to listen to the many radio systems that dot the radio spectrum all around us, we are likely to encounter a number of systems that seem to behave strangely. If you think about it, since VHF/UHF communications are supposed to be line-of-sight, why can you hear cars on a system further away but not locally? The answer to this puzzle lies in what we'll call "system architecture," borrowing a phrase from the jargon happy computer world.

Keep It Simple — Simplex

The easiest and simplest way to put together a communications system, whether it's for a police or fire department, ambulances and hospitals, a local business, or just a volunteer group running communications for a local parade, is to use *one frequency*. Everybody transmits and receives on the same frequency. This type of system is called "simplex" operation.

Of course, only one person can be talking at once or there will be a mess. The radio dispatcher or central controller has to unkey the transmitter to receive the reply. If two or more mobile units talk at once, there will be interference, but generally the one with the strongest signal will be heard.

This type of system is also true "line-of-sight" in that the transmitting and receiving station have to be able to "see" each other directly or the communication will not take place. Power level of the transmitters also affects the distance that these type signals can go. Handheld trans-

mitters with low power may only be able to communicate a mile (or sometimes less if there are buildings or other things in the way), while mobiles with 25 or 50 watts and better antennas might be good for five or 10 miles, sometimes further depending on terrain and frequencies in use.

Better Ears

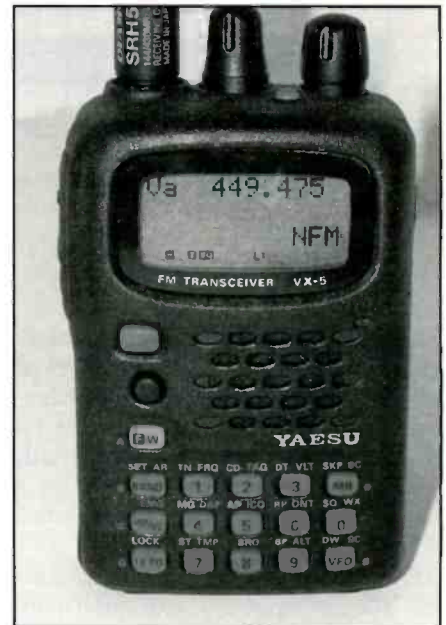
One of the first things we can do to enhance the functionality of this type of system is to add more ears — more precisely, remote receivers. These are receive-only stations located at various points around the desired coverage area. By having more listening places, a transmitter, like a handheld radio carried by so many officials, becomes more useful as there's a bigger chance that its signal will hit at least one of the listening stations.

Wait a minute — if it hits more than one listening station, isn't there going to be a mess in the dispatcher's receiver? Well, yes, if you just hooked all the receivers together. But there's a trick.

Most of the time, the receivers all connect back to the central dispatcher via phone lines or sometimes microwave radio links. At the place where those signals come together, a device called a voting comparator is positioned. This gizmo listens to all of the incoming signals and decides which is the strongest. Only the strongest signal is sent on to the dispatcher's console. Most consoles I've seen also have a way for the dispatcher to disable a particular receiver if it's receiving interference or otherwise causing problems.

If the system you're monitoring is simplex and has a large or hilly terrain to cover, there's a good chance that a voting system and remote receivers are in use. There can be several receivers or just two. Either way, the higher and more central the placement of these receivers, the better range will be achieved with the system.

Of course, on these type systems, we're limited to one receiver site: the one with our scanner. So the dispatcher is going to be able to hear and communicate with handheld transceivers and possibly even



Ham radio systems use simplex and half-duplex operation for most mobile units, while the repeaters operate in full duplex mode. If you're licensed, see how far you can get on a simplex channel with two handhelds. It's a few miles at best, and sometimes much less with terrain or obstructions.

mobile units that are well outside *your* range. There's not much you can do to fix that, unless you have unlimited resources and want to rent space for remote receive sites just like they do!

Two Frequencies

Another common way to extend the range and functionality of a system is to use two frequencies. Of course, the two frequencies could be used to divide the larger area into two smaller simplex networks like above, but that's not what we're referring to here. In this type of system, the base transmits on one frequency, while the mobiles transmit back to the base on another. There is a number of configurations possible with this arrangement, so let's have a look.

The simplest way to do it is to work just like the simplex system but with two

BY KEN REISS <armadillo1@aol.com>

"You'll need a scanner that can interpret the data channel. . . to follow a trunked system."

frequencies. The base transmits messages out on one frequency; the mobiles receive on that frequency, but transmit back to the base on another frequency.

From a radio standpoint, there is absolutely no advantage to this system over the simplex system. There might, however, be an operational advantage. By having the mobiles transmit on a different frequency, they cannot interfere with the dispatcher's transmissions so the dispatcher won't get blocked. Also, unless they are specifically set up to do so, the mobiles will not be able to hear each other with this arrangement. Most public safety operations would find this a huge disadvantage, but certain businesses might want to operate in this manner.

This type of system is referred to as "half-duplex." Duplex because there are two frequencies involved, but "half" because the intention is that the base or the mobiles have to stop transmitting to receive the reply.

Full duplex uses the same frequency arrangement, but the equipment is wired so that the transmitter and receiver operate at the same time. A very common use of this type arrangement is mobile telephone service. Both people in the conversation can talk at once. Since two frequencies are used, the transmissions from both ends are heard in their counterpart receivers. How much communication takes place in these types of conversations is another matter that sometimes boggles the mind, but we won't even try to explain that here.

In telephone operation, the transmitter is left on all the time so that the system functions just like your wired telephone. But some business systems also operate in full duplex mode. The one that comes to mind immediately is many taxi dispatch operations. The dispatcher can be talking and dispatching somebody, while he can hear the request of another unit. Of course, that usually interrupts his train of thought and he has to start over, but that's how they're configured.

The third common method (and perhaps the most common) of using two frequencies for operation is **repeater operation**. A repeater is a transmitter/receiver combination set up so that whatever it hears on the receiver (the input) it rebroadcasts on the transmitter (the out-



The most common form of full duplex operation we find today is in those little phones everyone carries around. Of course, it's illegal to listen to the radio portion of these calls in the United States, even if you could. Most cellular, and all PCS systems are predominately digital these days.

put). Ideally, these repeaters are placed in a central and high location so that it can hear as many of the transmissions from the area served as possible. Downtown buildings and mountaintops are frequently dotted with repeater antennas. In fact, some repeaters even use remote receivers just like the simplex systems above.

Repeaters are almost always set up in a half duplex mode (the person talking has to release the transmit button to hear the reply). The big advantage for public safety users, and for many businesses, is that a larger area can be covered because of the remote location of the repeater than might be possible wherever the headquarters building happens to be.

The other advantage is that all of the mobile transmissions are rebroadcast for everyone to hear. This makes it more like a long-range simplex operation, and helps improve communications between units at opposite ends of the area served by the repeater. In typical operation, nobody actually listens to the input channel except the repeater itself; all of the receivers are tuned to the output channel.

It's also worth pointing out that all of these duplex systems would be considered one "channel" to the user. In fact, the person using the radio may be totally unaware that his transmissions are on a different frequency than the receiver. Channels are something created for convenience. I know it seems like a terrible thing, but most two-way radio users are not concerned at all with the actual frequency of their communications as long

as they're all talking to each other. The radio is likely to refer to the operation as channel 1, or frequently F1.

Some mobile units which use repeater also have an F2 (or some other arbitrary designation) that allows them to transmit and receive on the same frequency. Sounds like simplex again, right? Yes, it certainly is, and by doing it this way, the repeater will be avoided, but the units can talk directly if they're close to each other. This function is frequently called **talk around**, although many users just refer to it as another channel.

Technical Problems

From a technical standpoint, the operation of repeaters can cause a problem. If you've ever been close to a transmitter with your scanner, you'll know what it is. When a strong transmitter is near your receiver, it tends to overload the receiver so that only the close transmitter is what you hear, even if it's on another frequency close by. How are we going to hear a weak handheld unit out in the field with our own transmitter right there? And here's the real kicker: often repeaters transmit and receive on the SAME antenna! Talk about close by!

There are two ways to deal with this problem. The first is frequency separation. The further apart the transmit and receive frequencies are, the easier it is to prevent interference. So physics helps us out here.

The second method, and one used by almost all repeater systems, is to use a



If the system you want to monitor is trunked, you'll need one of these trunk-tracking radios. This is the relatively new PRO-2052 from RadioShack, which can follow both EDACS and Motorola systems. Stay tuned to Pop'Comm for a full review soon!

start. Most UHF systems have the input frequency (mobiles) a full 5 MHz higher than the output frequency (repeater transmitter). This, combined with the higher frequency, makes duplexers for UHF much smaller than the ones used in VHF systems.

At 800 MHz, repeaters are standard operating procedure. There are a few simplex operations in the 800 MHz range, but mostly they're for short-range, low-power operations. Spacing in this band is a full 45 MHz apart! This separation makes very small units possible, and helps to make the handheld cellular telephone (a full duplex system, after all) possible.

Trunking

The final type of radio system that we need to consider is trunked. We've had more complete discussions of this concept in the past, and no doubt will repeat the topic in the future if you've joined Pop'Comm recently (where you been?), but let's summarize it here.

Most trunking systems right now operate in the 800-MHz range, but expect to see more and more of them moving down to the other bands in the future. It's just too efficient from a frequency standpoint not to use it anywhere a large number of channels are necessary.

Notice I said "channels" not frequencies. In traditional two-way systems, we need a frequency (or two for duplex systems) for each "channel" or function that we need in our two-way system. A large city might easily have five or 10 channels just for dispatch, plus a few others for car-to-car, detectives, and whatever else they might need. That's a lot of frequencies.

With a trunked system, we assign a fixed number of frequencies, usually in blocks of five (5 input and 5 output) although large systems can have 20 to 30 in a single system, and combine multiple systems for statewide or regional coverage. One of these frequencies is used for a computer

duplexer. This is a device that electronically separates the transmit and receive frequencies from each other. We won't go into the technical details here, but the

closer the frequencies are to each other, the bigger and more expensive the duplexer has to be. Some repeater systems also use multiple antennas that are separated by some distance to help get around this problem.

On the VHF bands, there is no standard plan for placement of repeater inputs and outputs. There were too many simplex users on these bands before repeaters became possible. So you try to find two frequencies in your area that aren't used and then deal with the technical issues as necessary. As a side note, amateur repeaters in the two-meter band are usually only 600 kHz apart, and with good duplexers can work just fine. Many public safety systems can get a Megahertz or more between the frequencies.

By the time the UHF bands became popular, repeaters were already in widespread use. So the FCC built in allowances for repeaters right from the

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The Adventures of Scanner Dweeb

by M.A. Coletta

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controller to direct the mobile units to a particular frequency when necessary.

The idea here is the most of the time many of the channels are dead. Nobody is talking, and almost none of the channels are busy all the time (if it is, there's a system loading problem that needs to be addressed). So why have a frequency sitting there doing nothing while we listen to nothing? In the conventional systems above, that's exactly what happens.

In a trunking system, mobiles tuned to a channel that's not talking monitor the computer-based control channel. When somebody in the "talkgroup" (channel) needs to talk, they press their microphone button to talk, and it beeps for a fraction of a second. During this time, the computer is looking to see which of the available frequencies is not in use, then sends out a signal to all of the radios tuned to that talk group to jump to that available frequency. They have their conversation, and then the frequency is released back into the pool for use by the next group that needs to talk. The whole conversation can happen faster than you can read this paragraph.

By sharing frequencies this way, a trunked system can have many more "virtual channels" than actual frequencies are available. And depending on how busy those virtual channels are with traffic, the users will never know that they don't have their own dedicated half duplex repeater system, because that's what it sounds like to them.

You'll need a scanner that can interpret the data channel and jump to the right frequency to follow a trunked system. These systems are the only one of the group we've discussed that can't be followed very well on a traditional scanner. But just like the outbreak of trunking has become more and more popular with two-way radio users, trunk-tracking scanners from Uniden and RadioShack are becoming more popular too. If you have, or anticipate trunking radio systems in your area, make sure you get a trunking scanner to follow along!

Your Input Needed

That's about it for another month! I'm looking for your questions and suggestions on article topics. You can write to Ken Reiss, 9051 Watson Rd. #309, St. Louis, MO 63126, or for faster response, use E-mail at armadillo1@aol.com. If you need a direct reply, please include an SASE, or use E-mail. Until next month, good listening!

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Subject: Comparative Gain Testing of Citizen's Band Antennas
Ref: Rye Canyon Antenna Lab File #870529

We have completed relative gain measurements of your model 1000 antenna using the K-40 antenna as the reference. The test was conducted with the antennas mounted on a 16' ground plane with a separation of greater than 300' between the transmit and test antennas. The antennas were tuned by the standard VSWR method. The results of the test are tabulated below:

FREQUENCY (MHZ)	RELATIVE GAIN (dB)	RELATIVE POWER GAIN (%)
26.965	1.30	35
27.015	1.30	35
27.065	1.45	40
27.115	1.60	45
27.165	1.50	41
27.215	1.60	45
27.265	1.75	50
27.315	1.95	57
27.365	2.00	58
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utility radio review

News, Information, And Events In The Utility Radio Service Between
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Getting Involved And Sharing Your Insight

Welcome to the second column of "Utility Radio Review." This month I'm focusing on what services are available for target monitoring and their frequencies. I'm doing this to encourage many of you who have not supplied monitoring logs to *Pop'Comm* before. It's not enough to be an armchair listener. You've got to get involved, and share what you have heard if this column is going to have something to report about its reader's monitoring activities!

To get things started, the column is first going to do a basic survey of the frequencies associated with the different services for air, marine, military, and land based radio operations. In doing this, I would like to say something to the "Master Class" of radio monitors who have played such an important role in forwarding their logs to *Pop'Comm* in the past. I know things are different here than they were before, and some things may be missing that you used to enjoy reading, but I am asking each of you to be patient as the column comes up to speed. I want to see your contributions, along with those just starting out, sitting side-by-side in the log section.

Along with log information, I also want to put a new emphasis on how you *made* that special monitoring catch that all of the others missed. What equipment, antenna system, and other electronic tools do you use?

Pictures of people's monitoring stations, with or without them sitting at the controls, are also wanted for the column. If we get enough of a response, I want to have people who specialize in utility monitoring profiled on a monthly basis.

I would also like to profile clubs that specialize in monitoring utility radio through the pages of this column. Club executive members, please write to me with information about events, activities, or how to be contacted. I'd be more than happy to keep people up-to-date on the activities taking place in these groups.

Likewise, I would again ask that people who are directly involved in any ser-



Grimeton transmitter site in Sweden with LF vertical antenna pointing at the U.S.

vice in the utility radio industry contact me as well. I'd like to provide more background information on what takes place at the *transmitter* site or on the receiving end of a signal. Operators, technicians, or owners of these services are welcome — be they civilian, military, or government. I'm sure the readers would be interested in learning more about those who make their living by playing an operational role in a utility service.

Loggings should be forwarded to me by the 5th of the month in order to appear in the following month's column. Electronic formats should be either plain text (TXT) or MS Word for Windows (DOC). Typed and handwritten logs are acceptable if legible. Please be certain to include your name, address, and contact number in the header or footer of your logs.

Getting In Touch With Me

To make it as easy as possible to contact me, particularly if you have logs to share, there are several methods available to you. E-mail is always welcome and I have a dedicated address for you to use. It is ur-review@provcomm.net, and I

have a personal policy of replying promptly to any message sent to me.

You can also use the *Pop'Comm* E-mail address at editor@popular-communications.com, where your message will be forwarded to me.

I also have a personal Webpage with a section dedicated to this column located at: <http://www.provcomm.net/pages/joe>. Plans are in place to set up an on-line discussion group at that Website so that people with an interest in utility radio can have a place to share ideas and information. The Webpage will also have a section of links to other utility radio sites on the Internet, once they have been collected and verified.

For those who wish to contact me by mail, you can do so through *Popular Communications*, "Utility Radio Review," 25 Newbridge Road, Hicksville, NY 11801. I also have U.S. mailbox that you can send cards and letters at PMB: 121 1623 Military Road, Niagara Falls, NY 14304-1745.

If you do send a photo, please be certain to send color prints and put your name and address on the back, along with a brief explanation as to what it is. If you

BY JOE COOPER <ur-review@provcomm.net>

Tuning In The Last Operating Anderson Generator Site

About once a year, the last remaining operating Alexanderson high frequency alternating transmitter, located in Grimeton, Sweden, is tuned up and used to transmit VLF (16.7 kHz) CW signals.

While outside of the range of frequencies that this column normally monitors, the station is important to the history of utility radio. At one time, the Anderson type of transmitter was the only way that reliable trans-Atlantic radio communications could be maintained, and many transmitters of this type were operating up into the 1960s. The Alexanderson transmitter, named after the General Electric engineer who perfected them, uses a high frequency AC generator rather than a vacuum tube (or even spark gap) oscillator. These generators were able to operate at the very high speeds needed to reach into the radio frequency spectrum in order to generate the radio waves frequencies.

The Grimeton station uses an alternator built by General Electric in the U.S., and was installed in 1924. King Gustav V sent the first official traffic to the United States on July 2, 1925. While unconfirmed at this time, there is a possibility that the station may be operated on the same date this summer in order to celebrate the 75th anniversary of the station. This may prove to be a unique opportunity for those capable of monitoring the transmitted frequency to be able to secure a very historic QSL card.

The Grimeton station has been undergoing extensive restoration of its equipment, particularly its antenna towers, to ensure it's continued ability to operate. It is, for all intents and purpose, in as good shape today as it was when first put into use.

This column will post information as it becomes available. In the meantime, announcements on when, where, and how to listen to the Grimeton station, and how to get a QSL if you are able to receive them, is available on the station's Webpage at <http://www.telemuseum.se/grimeton/defaulte.html>.

want to send a QSL for publication in the column, that's fine, but remember that we can't be responsible for its loss or damage. A good photocopy or digital scan would be preferred.

With any mailed item, please include a stamped, self-addressed envelope

(SASE) if you want me to return the material to you. Otherwise it goes into the *Pop'Comm* archives.

Now that we have that out of the way, let's get on to some utility radio topics!

Utility Radio Services Review

Now that all of the necessary information about communicating with me is over with, let's get down to looking at what will be happening in the column during the next two issues. This list will provide a guide to monitoring topics that future columns will cover in more detail. Again, the more information passed on to me about activity taking place in these services, the more that can be published here.

Maritime Services — Coming In August

Of all of the utility services, marine-based may well undergo the greatest change in the early years of the 21st century. Commitments on the part of government agencies around the world towards satellite-based navigation and communications may see the end of many LF and HF maritime services.

The next five to 10 years may be important ones for catching some soon-to-be-rare QSL cards, just like we saw with the recent end of CW traffic on most frequencies. This column will keep you informed of these developments. Again, you the reader, particularly those who work in these services, will be an invaluable source of information on this subject. Please share your experiences in those areas that are now in transition due to new technologies and policies.

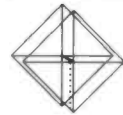
Meanwhile, there is still considerable station-to-station activity, be it voice or digital mode (RTTY and RadioTelex) available to monitor. Next month's column will focus on maritime services, so here are some U.S. Coast Guard distress frequencies to target on. Over the coming months we will provide more detailed lists of active target frequencies to work from.

Aeronautical Services — Coming In September

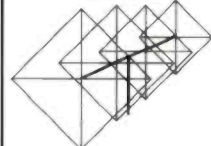
Of all forms of transportation, other than the automobile, the airplane dominates the news. Whether it is a disaster such as happens with a crash of a large passenger carrier or a mishap with a small Cessna, events about aircraft capture the

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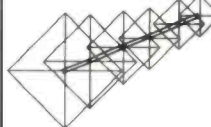
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			NMN	NMN/NMF	NMG
424	4134	4426	2300-1100	2230-1030	24 HRS
601	6200	6501	24 HRS	24 HRS	24 HRS
816	8240	8764	24 HRS	24 HRS	24 HRS
1205	12242	13089	1100-2300	1030-2230	24 HRS
1625	16432	17314	(- on request only-)		

ITU CHANNEL	kHz SHIP STATION	kHz COAST STATION	Station and Schedule (UTC)		
			NMC	NMO	NOJ
—	4125	4125	—	—	24 HRS
424	4134	4426	24 HRS	0600-1800	on request
601	6200	6501	24 HRS	24 HRS	24 HRS
816	8240	8764	24 HRS	24 HRS	on request
1205	12242	13089	24 HRS	1800-0600	on request
1625	16432	17314	(- on request only-)		

ITU CHANNEL	kHz SHIP STATION	kHz COAST STATION	Station and Schedule (UTC)	
			Guam	NMN/NMA
601	6200	6501	0900-2100	24 HRS
1205	12242	13089	2100-0900	24 HRS
1625	16432	17314	—	24 HRS

Source: U.S. Coast Guard

Figure 1. HF Radiotelephone (SSB)

headlines. Yet there is still much that takes place without incident that is still interesting and worthwhile monitoring.

A significant amount of radio traffic takes place in the HF bands, even with the availability of satellite communication. Following in **Figure 2** are some target frequencies for MWARA (Major World Air Route Area) communications. Traffic found here includes position reports, amended level, speed and route clearances. All frequencies in kHz.

In the upcoming months, more comprehensive lists will be provided, as well as news stories about the air transpiration industry. Here is where those readers with specialized knowledge about the aviation industry would be a real asset to this column.

An announcement will be made soon when another aeronautical service theme column will be run. The assistance of those who specialize in that service will be greatly appreciated for those who are interested in following the traffic found between aircraft and ground stations.

Other Themes

Future columns will cover military, digital, news services, weather, navigation, and equipment. I am always looking for subject experts in each of these fields for contributions.

“Mini-Columns” or small news and information articles, which cover new developments, equipment, or events in any of the above themes, are welcome. Likewise news, tips, and suggestions are also needed. Suggestions for new themes not mentioned here are also welcome.

Spectrum Survey: 30 kHz To 150 kHz

To start our spectrum survey, I'll begin with the VLF portion of the spectrum. Over the next few months, we will work our way up to 30 MHz, looking at a section at a time. We will try and provide a summary of what you will find in tuning areas, along with target stations to look for.

While the vast majority of radio communication and broadcasting now takes place in the HF, VHF, and UHF portions

of the radio spectrum, the frequency range between 30 kHz and 150 kHz was once the dominant location of such activity. Generally called the Very Low Frequencies (or VLF), their ability to provide reliable long distance radio communications under adverse conditions made them popular with early utility radio companies.

Even with the switch in emphasis to the shortwave high frequencies, during periods of intense solar flares when all other frequencies were unusable, a VLF signal not only got through, but their propagation characteristics improved!

Up to the beginning of the space age in the 1960s, many important commercial and military transmitting stations operating in the VLF frequencies still carried a large amount of routine “traffic” due to this ability to deliver a message. The

Canary Islands, Gander, New York, Santa Maria, Shanwick	Gander, Iceland, Shanwick
	2872
	2899
3016	4675
5598	5616
8906	5649
13306	8864
17946	13291
	13306
(All frequencies in kHz)	17946

Figure 2. MWARA Comms

expanded use of communications satellites has brought about a decline in the use of the LF/VLF range of frequencies, but they are still used in many transmissions that people can monitor.

In this section, I'll outline who is using the VLF frequencies today. A further identification will be made of which government, military, or private organizations are using which particular frequencies, and why they have chosen to use the frequencies that they have.

The radio spectrum below 150 kHz offers many interesting monitoring possibilities due to its unique characteristics. Here propagation is even more "unusual" than what most people find in the HF and LF spectrum.

The frequency range between 30 kHz to 150 kHz begins to exhibit the troughing effects and wave front characteristics that are unique to this long wave band. The ionosphere influences taking place here are due to the presence of the D region of the ionosphere, which is found roughly 20 to 25 miles above the surface of the earth.

Being close to the ground, the angle of the reflected radio signal required multiple hops in order for any great distance to be traveled. This contributes to the rapid attenuation of the signals as they move out from their point of origin, and explains why very high power is often required for reliable use.

In addition to open-air propagation, frequencies below 100 kHz have an additional characteristic of being able to travel long distances through solid rock. This has been used to great advantage by cave explorers and mining crews to keep in contact with each other underground.

The waves can also penetrate under the surface of the ocean and seas, which normally blocks radio waves at the higher frequencies. This has allowed navies to be able to transmit radio messages to submarines working at depth and at speed.

Another interesting use of these frequencies is point-to-point communication and remote control of switching stations by electrical power utilities. Radio frequencies just above 100 kHz are used to carry these signals along high-power transmission lines. While the signals will follow the lines for long distances, they are quickly attenuated a short distance from them. Monitoring of these transmissions is still possible if you are located within a short distance from the power lines themselves.

At one time, the VLF frequencies were heavily used by utility stations to transmit and receive the large percentage of

message traffic, but today only a handful of military and government stations remain on the air on a regular basis.

What can be heard in these frequencies with a good radio receiver? The table shown in **Figure 3** provides a potential target list for first-time and experienced UTE monitors. Some, such as USN RTTY stations, are fairly easy catches. Others, such as European and Japanese stations, will be more of a challenge, even under the best of conditions.

In future columns, we will return to the VLF band in order to look at the future of LORAN as a navigational aid. While

many people are quite taken with satellite based GPS (Global Positioning System) navigation, there are others who continue to use the older LORAN system. Why? Because they feel that LORAN, when properly used, is still more accurate than GPS. What do you think? Your opinions and experiences are requested.

Next month I will survey the LF band between 150 and 530 kHz. This band of frequencies contains many Non-Directional Beacons (NDB) used for aviation and marine navigation. While there are a great many of these beacons available for listening, are there some that are

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*35.6	800		275		LORAN C-Attu, AK (9990-X)
37.2	110	"XLC" USAF SAC-Hawes, CA (FSK 5/50 Bd, MSK) (off)	1000		LORAN C-Port Clarence, AK (9990-Y)
40.00	40	JG2AS SFTS-Sanwa, Ibaraki, Japan	112.15	3	CII DND-Shilo, MAN, Canada (FSK) (moved to 193.0)
40.75		NAU PR AGUDA MSK	112.620	1.2	VGW 270 DECCA-Shoe Cove, NF, Canada (2c/red) (off)
44.0	200	VII B Belconnen, Australia (FSK/75 Bd)	113.2	3	VER DND-Ottawa, ON, Canada (FSK/to VEX)
*46.9	50	Bd EAM	113.573	1.2	VGW 273 DECCA-Port aux Basque, NF, Canada (6b/red) (off)
48.5	110	"FXL" USAF SAC-Silver Creek, NE (FSK 5/50 Bd, MSK)	113.827	2.4	VGW 275 DECCA-Alma, NF, Canada (7c/red) (off)
50.00	7	OMA SFTS-Liblice, Czechoslovakia	114.300	1.2	VGW 278 DECCA-Shippegan Is., NB, Canada (9c/red) (off)
	Low	SFTS-Podebrady, Czechoslovakia	115.435	1.2	VGW 269 DECCA-Comfort Cove, NF, Canada (2c/purple MP) (off)
	10	RTZ SFTS-Irkutsk, USSR 0100-2400 (no recent information)		1.2	VGW 268 DECCA-Port Blandford, NF, Canada (2c/master MP) (off)
51.95	60	GYA Naval-London, UK (FSK)		1.2	VGW 271 DECCA-Shoe Cove, NF, Canada (2c/red MP) (off)
53.6	100	RTO Moscow, USSR (FAX-Meteo)		1.2	VGW 271 DECCA-St. Lawrence, NF (2c/green MP) (off)
55.5	100	GXN USN-Thurso, Highland, Scotland (FSK)	116.412	1.2	VGW 272 DECCA-Grindstone, PQ, Canada (6b/master MP) (off)
57.4	100	CNL USN-Kenitra, Morocco (FSK)		1.2	VGW 273 DECCA-Port aux Basque, NF, Canada (6b/red MP) (off)
*57.7		LBH?		1.2	VGW 266 DECCA-Antigonish, NS, Canada (6b/green MP) (off)
57.9		NAM USN-Norfolk (Driver), VA (FSK/MUL) (moved to 77.15)	117.157	1.2	VGW 280 DECCA-Sept Isles, PQ, Canada (9c/purple MP) (off)
58.7	100	"NBH" ANMCC Ft. Ritchie, PA (FSK 5/50 Bd, MSK, 800 Bd)		1.2	VGW 279 DECCA-Port Menier, PQ, Canada (9c/master MP) (off)
59.0	100	NGR USN-Kato Soli, Greece		1.2	VGW 278 DECCA-Shippegan Is., NB, Canada (9c/red MP) (off)
60.00	13	WWVB SFTS-Fort Collins, CO		1.2	VGW 281 DECCA-Natashquan, PQ, Canada (9c/green MP) (off)
	50	MSF SFTS-Teddington, Middlesex, UK		10	DCF37 Meteo-Mainflingen, GFR (FAX-RPM/IOC)
65.8	15	FUB Naval-Brest, Finistere, France (FSK)(actual call FUE)+	117.4	10	CII DND-Shilo, MAN, Canada (FSK/to VEX)
66.66	10	RBU SFTS-Moscow, USSR 2100-1700 (no recent information)	119.15	3	NPG USN-San Francisco (Dixon), CA (FSK)
68.0	80	GBY 20 Naval-Rugby, Warwickshire, UK (FSK)	119.85	50	SA Y2 Meteo-Norrkoeping, Sweden (FAX-RPM/IOC)
68.9	25	XPH USAF-Thule AB, Greenland (FSK)	122.3	3	CIF DND-Cp. Borden, ON, Canada (FSK/to VEX)
70.387	1.2	VGW 269 DECCA-Comfort Cove, NF, Canada (2c/purple) (off)	122.5	15	CFH Naval-Halifax (Mill Cove), NS, Canada (FSK/CW/FAX)
71.142	2.4	VGW 277 DECCA-Ecum Secum, NS, Canada (7c/purple) (off)	123.0	3	VEN DND-Nanaimo, BC, Canada (FSK/to VEX)
71.4375	1.2	VGW 280 DECCA-Sept Isles, PQ, Canada (9c/purple) (off)	124.0		CKN Naval-Vancouver, BC, Canada (CW)
73.6	250	CFH Naval-Halifax (Mill Cove), NS, Canada (FSK 75 Bd)	125.8	10	CII DND-Shilo, MAN, Canada (FSK/to VEX)
75.0000	20	HBG SFTS-Prangins, Switzerland	126.697	1.2	VGW 271 DECCA-St. Lawrence, NF, Canada (2c/green) (off)
76.2		CKN Naval-Vancouver, BC, Canada (FSK)	127.770	1.2	VGW 266 DECCA-Antigonish, NS, Canada (6b/green) (off)
76.35	50	TFK Keflavik, Island (FSK) (moved to 142.25)	128.055	2.4	VGW 276 DECCA-Jordan Bay, NS, Canada (7c/green) (off)
76.9	50	NAM USN-Norfolk (Driver), VA (FSK 50 Bd) (alt. for 77.15)	128.5875	1.2	VGW 281 DECCA-Natashquan, PQ, Canada (9c/green) (off)
77.15	50	NAM USN-Norfolk (Driver), VA (FSK 50 Bd)	128.3	3	VDD DND-Debert, NS, Canada (FSK/to VEX)
77.500	50	DCF77 SFTS-Mainflingen, GFR		3	VEX DND-Penhold, ALTA, Canada (FSK/to CII)
81.0	40	GYN2 Naval-London, UK	131.05	2	FUF Naval-Port of France, Martinique (CW)
82.75	40	MKL Military-Petreavie, Rosyth, Scotland (FSK/CW)	131.4	3	VEV DND-Valcartier, PQ, Canada (FSK/to CIF)
83.1	40	OFA83 Meteo-Helsinki, Finland (FAX-RPM/IOC 120/576)	131.8	20	FYA31 Meteo-St. Assise, France (FAX-RPM/IOC 120/288&576)
83.8	45	FTA83 SFTS-Saint Andre de Corcy, France	133.15	15	CFH Naval-Halifax (Mill Cove), NS, Canada (FSK)
84.465	1.2	VGW 268 DECCA-Port Blandford, NF, Canada (2c/master) (off)		25	CKN Naval-Vancouver, BC, Canada (FSK)
85.180	1.2	VGW 272 DECCA-Grindstone, PQ, Canada (6b/master) (off)	133.85	10	CII DND-Shilo, MAN, Canada (FSK/to CIF)
85.370	2.4	VGW 274 DECCA-Chester, NS, Canada (7c/master) (off)	134.2	50	DCF54 Meteo-Mainflingen, GFR (FAX-RPM/IOC 120&240/288&576)
85.725	1.2	VGW 279 DECCA-Port Menier, PQ, Canada (9c/master) (off)		3	VEV DND-Valcartier, Canada (FSK/to VEX)
91.15	150	FTA91 SFTS-Saint Andre de Corcy, France (replaced by 83.8)	136.3	3	NSS USN-Norfolk (Driver), VA (FSK 50 Bd/MUL/CW)
100	350	LORAN C-Caribou, ME (5930-M/9960-W)	134.9	200	NPG USN-San Francisco (Dixon), CA (MUL)
275		LORAN C-Nantucket, MA (5930-X/9960-X)	135.95	50	CFH Naval-Halifax (Mill Cove) (FSK)
1500		LORAN C-Cape Race, NF, Canada (5930-Y/7930-W)	137.0		DCF39 Meteo-Mainflingen, GFR (FAX-RPM/IOC 120&240/288&576)*
800		LORAN C-Fox Harbor, LAB, Canada (5930-Z/7930-M)	139.0	50	VEV DND-Valcartier, PQ, Canada (FSK/to VDD)
760		LORAN C-Angissoq, Greenland (7930-X)		3	CIF DND-Cp. Borden, ON, Canada (FSK)
400		LORAN C-Dana, IN (8970-M/9960-Z)	139.1	3	VER DND-Ottawa, ON, Canada (FSK)
800		LORAN C-Seneca, NY (8970-X/9960-M)	139.5	3	TFK USN-Keflavik, Iceland
500		LORAN C-Baudette, MN	140.5	3	VDD DND-Debert, NS, Canada (FSK)
800		LORAN C-Malone, FL (7980-M/8970-W)	142.25	25	NPM USN-Lualualei, Oahu, HI (MUL)
800		LORAN C-Grangeville, LA (7980-W)	143.5	3	WCC Coastal-Cape Cod, MA (CW) (off)
400		LORAN C-Raymondville, TX (7980-X)	146.1	20	NPL USN-San Diego (Chollis Heights), CA (FSK)
275		LORAN C-Jupiter, FL (7980-Y)	147.5	15	VER DND-Ottawa, ON, Canada (FSK/to CIF)
550		LORAN C-Carolina Beach, NC (7980-Z/9960-Y)	148.2	25	
400		LORAN C-Fallon, NV (9940-M)	148.55	3	
400		LORAN C-Middletown, CA (9940-X)			
540		LORAN C-Searchlight, NV (9940-Y)			
400		LORAN C-Williams Lake, BC, Canada (GR15990/SH1-M)			
1600		LORAN C-George, WA (5990-Y/9940-W)			
400		LORAN C-Port Hardy, BC, Canada (5990-Z)			
540		LORAN C-Tok, AK (7960-M)			

Note: Many of these frequencies and stations have been identified on a number of lists, but at this time are not substantiated as being accurate regarding their operational status. It is suggested that this list be used for potential targets only, and not for the purpose of identification or verification. QSL reports on existing stations are requested in order to bring this list up to date, and make it accurate.

Figure 3. Sample VLF target stations (see note)

worth targeting? Find out in August.

Likewise these frequencies also contain a number of digital stations. What's out there to decode that's worthwhile? Target stations from around North America and the world will be provided.

Signing Off

That's all for now. Again, please begin to forward your loggings to the

column for inclusion in the upcoming months.

Since we will be into the middle of summer with next month's column, our theme will be marine utility radio. We will look at how to monitor weather and navigational information, and what traffic is to be found most active.

Part of the coverage will be on receiving digital information on a shoestring. I will be reviewing what software and

hardware is available, and how to get it to work. With the abundance of inexpensive personal computers now available, there is no excuse not to be able to copy RTTY and FAX transmissions intended for the general public. Even those without computers can still use many of the stand-alone units that employ built-in displays or printer outputs.

Until next time, good listening! ■

clandestine communique

Tuning In To Anti-Government Radio

Colombia, Kurdistan, And Sudan Clandestines Being Heard In The U.S.

Quick! Let's duck around the corner, slip into this alley, and talk about clandestine broadcasting for a few minutes.

Colombian clandestine **La Voz de la Resistencia** continues to be reported on a fairly regular basis. Not that long ago, it was a pretty rare reception. The station is run by the Revolutionary Armed Forces of Colombia (FARC) you read about in the newspapers every now and then. Richard D'Angelo in Pennsylvania heard them on **6261** during their morning broadcast, signing on 1132 with an anthem, woman with IDs (in Spanish), and then a newscast. (The morning schedule runs to about 1230). Brian Alexander, also in Pennsylvania, had them on **6261** from 2215 tune in to 2224 when they signed off with a vocal anthem (the sign-off time is fairly variable). Brian notes there was another weak station on variable **6261.75**, also in Spanish, which signed off around 2228. I would hazard a guess that the unidentified station might have been a jammer operated by the Colombian government with the intention of confusing listeners and drawing them away from the opposition station. They have also pulled this trick against the other Colombian clandestine, **Radio Patria Libre (6250)**. Oddly, the latter station used to be the most easily heard of the two but, to our knowledge, hasn't been reported in some time. Perhaps it is inactive. Now the bad news: summer's longer daylight hours will make hearing these two even more difficult. Your chances of a catch will improve in the fall when there are more hours of darkness.

Alexander and D'Angelo also report logging the **Voice of the People of Kurdistan**. Rich picked them up on **4060.7 (variable)** at 0404-0421 with news, brief music, ID, and talking by a man and woman. Brian had a presumed logging them on variable **4062.43** at 0410 with talk local music. By 0420, they had drifted down to **4062.28**. (These low fre-

quency Kurdish clandestines are best heard if you live under EST rules.)

The **Voice of Sudan** now seems to have a parallel channel (in addition to **8000**) in the middle of the 31-meter band. They've been heard on **9517.3** around 0500. **12000** appears to be yet another active channel. Brian Alexander hears the new outlet from 0359 sign-on to past 0425 with local music and talk in an unidentified language. He notes that reception on **8000 (8000.75)** was much better.

Even though Russia has pretty much had its way in Chechnya, the government-run **Radio Free Chechnya (Radio Chechnya Svoboda)** is still in operation. Pete Becker logged them in Washington State on **7335** at 0513 (via St. Petersburg) and **9470** at 0638 (from Moscow).

Que Huong Radio is broadcast to Vietnam over KWHR, Hawaii, at 1300-1400 on **9930** and 2300-0000 on **17510**, in Vietnamese. A Vietnamese language mediumwave station in San Jose, California, produces the broadcasts. Reports may be sent to 2670 S. White Road, San Jose, CA 95148.

Echo of Hope, a South Korean clandestine beaming to the North is currently scheduled from 0300-0700 on **6348**, 1100-1600 on **3985 and 6003** and 1600-2300 on **3985**. For most of us, the 1100 on **3985** should be the best opportunity. Years ago, 6348 was used in the early morning hours, making "Echo" a much easier catch.

Also broadcasting from South to North Korea is the **Voice of the People**, on from 0300-0600 on **6518 and 6600** and 0900-2100 on variable **3880 and 3912**.

The **Voice of Oromo Liberation** (anti-Ethiopia) broadcasts in Oromo Sundays, Thursdays, and Fridays only from 1700 to 1800 on **15105**, via German government transmitters.

The **Voice of the Democratic Path of Ethiopian Unity**, also known as the **Radio Voice of United and Free Ethiopia**, broadcasts in Amharic on Sundays from 0800-0900 on **21550** and Wednesdays from 1600-1700 on **15105**.

The **Free Voice of Jammu Kashmir** is on **5101** from 1300 to 1415. Also from 0230 on **5988.6**. Presumed in local language(s), but also with an English newscast at 1400. If you like impossible challenges, this one serves the bill.

That covers things for this time. Remember that we are always interested in receiving any clandestine loggings you are lucky enough to get. Other bits and pieces we're looking for include clandestine station schedules, copies of QSLs you've received, background info and other literature, media mentions of clandestine stations or the groups which operate them, addresses, and so on. Your continued interest and support of your column are very much appreciated.

Until next time, good hunting! ■

BY GERRY L. DEXTER

broadcast dxing

DX, News And Views Of AM And FM Broadcasting

Whatever Happened To Top-40 Radio?

Remember Top-40 radio? There was a time when you might have heard several styles of music on a single radio station. It began in the '50s when record companies realized the potential of radio for music promotion. A mix of country, blues, and rock music from stars like The Everly Brothers, Conway Twitty, and The Platters topped the charts. Back then, AM radio stations like KHJ, KGB, WABC, WKBW, WLS, CKLW, and WMEX entertained us with lively disc jockeys and the top tunes. In the '60s you might have heard Led Zeppelin, Diana Ross, and Simon and Garfunkel with Don Steele on KHJ, Dick Biondi on WCFL, Jim Edwards on CHUM, Wolfman Jack on XERB, or Bruce Morrow on WABC. Top-40 radio perhaps peaked in the '70s on AM radio, when you could hear KC and the Sunshine Band singing "That's the Way I Like It," The Eagles' "Take It to the Limit" and the C.W. McCall CB radio theme "Convoy" on WNBC and WPRO. Then something happened: FM radio, once the home of easy listening instrumentals, classical music, and album rock, became the new home of Top-40 radio. The format began to fragment as a growing number of broadcasters sought to differentiate themselves from the Top-40 standard. Disco music broke away from Top-40, and the first modern specialized format was born with stations like "Disco 93 WBOS" and "Kiss 108" FM. Threatened by the pop-

LPFM Application Groups And Filing Dates

Group 1 — May 2000

Alaska, California, District of Columbia, Georgia, Indiana, Louisiana, Maine, Mariana Islands, Maryland, Oklahoma, Rhode Island, Utah

Group 2 — August 2000

Connecticut, Illinois, Kansas, Michigan, Minnesota, Mississippi, Nevada, New Hampshire, Puerto Rico, Virginia, Wyoming

Group 3 — November 2000

American Samoa, Colorado, Delaware, Hawaii, Idaho, Missouri, New York, Ohio, South Carolina, South Dakota, Wisconsin

Group 4 — February 2001

Arizona, Florida, Iowa, New Jersey, North Dakota, Oregon, Tennessee, Texas, U.S. Virgin Islands, Vermont, West Virginia

Group 5 — May 2001

Alabama, Arkansas, Guam, Kentucky, Massachusetts, Montana, Nebraska, New Mexico, North Carolina, Pennsylvania, Washington

ularity of disco, some Top-40 radio stations retaliated by removing disco from their play lists, promoting themselves as rock hits only, to attract listeners from the anti-disco movement.

Narrow-Casting

Today, the specialization of formats has been fueled by the sheer number of stations on the air, and the FCC deregulation that allowed multiple station ownership in a single market. This specialization is referred to as "narrow-casting," broadcasting to a narrow segment of the population. For example, one broadcaster could own three FM stations in a listening area. One station might be classic rock targeting male listeners over 24 years of age, the second with hard rock aimed toward younger male listeners, and the third with alternative rock for the college crowd, thus cornering the market for rock music listeners. Rather than compete directly with the rock music broadcaster, a competing company may choose to run light adult contemporary to attract women over 24 years old and easy hits from the '70s to today for adults on its two FM stations. A third competitor formats its FM stations with contemporary hit radio for 12 to 24 year-olds and urban contemporary music marketed toward teenage urbanites and minorities. In other words, it's no longer one radio station competing against another. Instead, groups of stations compete with other groups. Despite these



BY BRUCE CONTI <BAConti@aol.com>

changes in the radio industry, you'd think that there would be greater variety due to the number of specialty formats on the air. However, *Pop 'Comm* reader David Hunt observes the opposite; "It seems that with all of the consolidation in the broadcasting business, there is much less variety than there used to be. Broadcast DXing just is not a much fun as it once was because the distant stations that you hear are playing the same songs and using the same slogans as the local stations."

David recently received a call from a polling agency that had been hired by a local FM station considering a format change. "I was asked what I would put on the air if I were creating my own radio station. I said that I would like to have a FM news/talk station and more sports broadcasts, but then I was told that 'FM is for music only.' When I said that I would like to hear a station that played a wide variety of music, I was told that the only choices were adult contemporary, new rock, classic rock, urban, or country. Are stations like this everywhere today?"

In the late '70s and early '80s, I remember having several variety and split format stations."

How It's Done Today

Today the music heard on corporate radio stations is pre-selected through national music subscription services or corporate music directors. They follow proven formulas for success rather than experiment with new or different music. Thus the music you hear on the adult contemporary station in Chicago will likely be the same as what's playing in Boston. In the old days of Top-40 radio, each station had a music director who would adjust the play list according to listener requests and local record sales. Each station maintained its own record library, and a DJ would prepare for a show by pulling music from the library to supplement the current stack of 45s. Now it's all preprogrammed on the computer, semi-automated, so DJ skills like song selection, cueing up records, and ex-

ecuting seamless segues are no longer needed. Some DJs have adapted to the latest technologies, taking advantage of the free time to work on their banter. For others, technology and the corporate bottom-line have meant the loss of jobs, the end of an era — Top-40 radio.

In the United States, the closest thing to Top-40 might now be what's called Contemporary Hit Radio. College radio stations are the best source for a wide variety of block programming or split formats. In Canada, Top-40 radio seems to still be alive to some extent, perhaps because of government requirements for Canadian content. For example you can still hear a mix of adult contemporary, urban hits, and country on CJYR "YR Radio," CKBC "The Bay's Best Music Mix" and CIHI "C-Hi AM & FM." Will Top-40 radio ever return to its former glory? It's more likely that radio broadcast formats and the music industry will only continue to fragment with the advent of digital radio and Internet broadcasting, such that radio becomes

Pending								
<i>New Call</i>	<i>Location</i>	<i>Freq.</i>	<i>Old Call</i>					
WRCR	Spring Valley, NY	1300	WLIR	WQMJ	Forsyth, GA	100.1	WFXM-FM	
WTNM	Water Valley, MS	105.5	WLPX	WFXM	Gordon, GA	107.1	WALJ	
				KBOB-FM	Geneseo, IL	104.9	KQLI	
				WYHY	Winnebago, IL	95.3	WKMQ	
				WNOU	Indianapolis, IN	93.1	WNAP-FM	
				WKWH-FM	Rushville, IN	94.3	WRCR	
				KBEA-FM	Muscataine, IA	99.7	KBOB	
				KWCY	Haysville, KS	105.3	KWSJ	
				WNSX	Winter Harbor, ME	97.7	WAKN	
				KQRB	Windom, MN	89.9	New	
				KSXR	Worthington, MN	90.1	New	
				KBZI	Deerfield, MO	100.7	New	
				KBZ	Hamilton, MT	95.9	KBMG	
				KRNO	Reno, NV	106.9	KRNO-FM	
				WFEX	Peterborough, NH	92.1	WNHQ	
				WGBZ	Cape May Ct. Hse., NJ	105.5	WZBZ	
				WZBZ	Pleasantville, NJ	99.3	WGBZ	
				WIBF	Port Republic, NJ	88.7	New	
				KMDZ	Las Vegas, NM	96.7	New	
				WTSS	Buffalo, NY	102.5	WMJQ	
				WBDI	Copenhagen, NY	106.7	WWLF-FM	
				WAQZ	Lebanon, OH	97.3	WYLY	
				KNOR	Coalgate, OK	105.5	KCNR	
				WQRD	Sulphur, OK	89.3	New	
				KQRD	Sulphur, OK	89.3	WQRD	
				KIFS	Ashland, OR	107.5	KKJJ	
				WZRI	Middletown, RI	100.3	WHKK	
				WZRA	Wakefield, RI	99.7	WHCK	
				KJBB	Watertown, SD	89.1	New	
				KCRI	Clifton, TN	106.5	New	
				KKGO-FM	Minor Hill, TN	92.1	WEUP-FM	
				WZMQ	Crockett, TX	88.5	New	
				WVMQ	Dumas, TX	95.3	KMRE	
				New	KORQ	Winters, TX	96.1	KATX

ture. Address: 27 3rd Avenue NE, Dauphin MB R7N 0Y5. (Procop, OH)

870 WWL New Orleans, Louisiana, QSL postcard in eight days, signed by Steven Huerstel, no title. Address: 1450 Poydras Suite 440, New Orleans, LA 70112. (Procop, OH)

1070 KFDI Wichita, Kansas, two stickers, KFDI writing paper, and a hand written verification letter in eight days after E-mail, signed by Ralph Cramm, CE. E-mail address: <am@kfdi.com> and <rcramm@kfdi.com>. The second E-mail address was in the hand written letter. (Procop, OH)

1200 KFNW West Fargo, North Dakota, bumper sticker, schedule, verification letter in seven days, signed by Gary Ellingson, CE. Address: P.O. Box 6008, Fargo, ND 58108. (Procop, OH)

1230 KXO El Centro, California, QSL letter in 25 days from J. Carroll Buckley-VP. Address: 420 Main Street or P.O. Box 140, El Centro, CA 92244. (Martin, CA)

1360 WGEE Green Bay, Wisconsin, verification letter in 22 days signed by Dave Edwards, Operations Manager. Address: 115 S. Jefferson, Green Bay, WI 54301. (Procop, OH)

1660 WMIB Marco, Florida, nice new QSL card apparently supplied by the National Radio Club (NRC logo on it), in 11 days signed Phil Beckman-Op Mgr./CE. Address: 601 Elkcam Circle #B, Marco, FL 33937. (Martin, CA)

1670 WRNC Warner Robins, Georgia, verification letter in 11 days, no signature, names on bottom of letter were Richard W. Hamilton, Transmitter Engineer, and James K. Gay II, Studio Engineer. Address: 7080 Industrial Hwy, Macon, GA 31216. (Procop, OH)

1700 KQXX Brownsville, Texas, perhaps the first and only verification from this station; received signed homemade QSL card only after a year of sending more than eight separate reports including tapes by certified mail and follow-up phone calls, signed Sandra G. Conche. I sent her a thank-you card and flowers in return. (Jackson, CA) Address: P.O. Box 3407, Brownsville, TX 78520.

Broadcast Loggings

Here are this month's selected DX'cellent loggings. All times are UTC.

570 KLAC Los Angeles, California, at 0411 with Laker basketball, finally snagged this 5 kW'er with KNRS nulled out. (Kelly, AZ)

580 KMJ Fresno, California, at 0435

faint but clear with Dr. Dean program, local KSAZ nulled. (Kelly, AZ)

620 KMKI Plano, Texas, at 0404 with ID, "The station cooked up just for Dallas/Fort Worth, AM 620, Radio Disney." It was a surprise as I thought I was listening to KRDY in Grand Junction, Colorado (which is also Disney) until I heard several local inserts for Dallas/Ft. Worth. No sign of KRDY on any loop bearing. (Griffith, CO)

640 WWJZ Mount Holly, New Jersey, at 1215 with Radio Disney, fair under WHLO. (Procop, OH)

710 XEBL Culiacan, Mexico, with a blaster signal at 0448, jingle ID, Chihuahua business mention, and salsa music. (Kelly, AZ)

780 WBBM Chicago, Illinois, caught on a Walkman® at 0516, dominating the frequency long enough to hear O'Hare weather and local news, proof that one can DX with any old radio! (Kelly, AZ)

780 Ecos del Torbes, San Cristobal, Venezuela, good at 0020 with Ecos Ciclismo talk program about Italian and Venezuelan cycling teams, parallel 4980 SW. (Conti, NH)

830 XEVQ Culiacan, Mexico, at 0520 ID as "La Grande de Sinaloa" and traditional Spanish pop music. (Kelly, AZ)

890 WLS Chicago, Illinois, at 0522 excellent skywave opening, otherwise in a jumble with Utah's KDXU. (Kelly, AZ)

920 KARN Little Rock, Arkansas, poor to fair, ID before Art Bell at 0606. (Procop, OH)

1000 KOMO Seattle, Washington, at 0600 Art Bell, ABC news, and promo for KOMOradio.com, "Send your mouse on a mission..." (Kelly, AZ)

1110 KFAB Omaha, Nebraska, poor to fair in very heavy splatter from WTAM, ads, legal ID, news from 2358-0000. Not an easy catch in my area. (Procop, OH)

1230 WNAW North Adams, Massachusetts, poor at 0907 with a

sports report from a nationally syndicated broadcaster, followed by a female announcer, "You're listening to music, news and weather . . . You're listening to WNAW." I was surprised to be able to pick up WNAW, with WNEB, WLAT, and WXNI on 1230 closer to me. (Walker, CT) Skywave reception at distances of hundreds of miles is often possible over closer graveyard stations.

1260 XEL Mexico City, Mexico, at 0400 with a Spanish version of the Beatles' "Let It Be" and a quickie ID. (Kelly, AZ)

1350 XELBL San Luis, Sonora, Mexico, fair at 0342 with ID, "Esta es la musica romantica, esta Radio Centro" and telephone service ad, Spanish ballads. (Kelly, AZ)

1370 WFEA Manchester, New Hampshire, at 0917 with a fairly clear signal, big band music. WKFD Wickford, Rhode Island on 1370 is off the air. (Walker, CT)

1380 WSYB Rutland, Vermont, poor, ID heard through mess at 0040. First log from VT, state #37. (Procop, OH)

1500 KSTP St. Paul, Minnesota, monitored at 0530 on the Walkman, "The Talk Station, AM 1500, KSTP" ID and Art Bell. (Kelly, AZ)

1510 KDKO Littleton, Colorado, at 0710 urban contemporary music mixing with local KFNN. (Kelly, AZ)

1630 La Red 92, Buenos Aires, Argentina, at 2245, a brand new station! Man and woman with interviews, ads and local announcements, short bits of music, ID's as "La Red 92 AM, Buen Aire," SIO 352 with heavy static. (Burnell, NF)

Thanks to Jean Burnell, Patrick Griffith, David Hunt, Gary Jackson, Nile Kelly, Patrick Martin, Mariaelena Murrell, Michael Procop, and Paul Walker. 73 and good DX! ■

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April '96

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the listening post

What's Happening: International Shortwave Broadcasting Bands

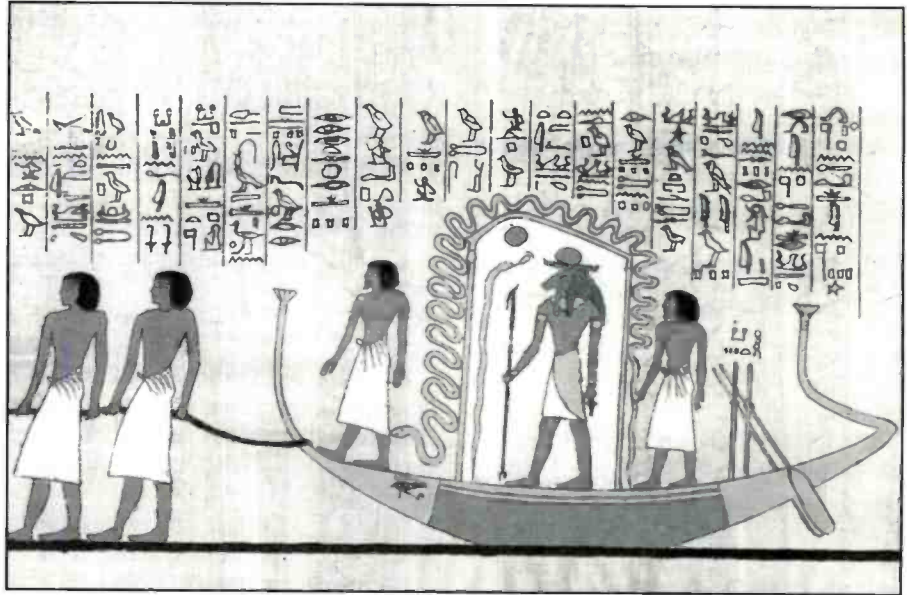
How To Log Israeli Defence Forces Radio, And News Of A New Guatemalan Station

Your opportunity to log Galei Zahal, (Israeli Defence Forces Radio) the Israeli military broadcaster, is still there. Normally this station appears on shortwave only rarely, and then only for a matter of a few days or weeks, depending on the special need for military broadcasts over a greater distance than usual in a particular situation. Its current appearance has lasted a lot longer than usual. If you haven't gotten this fairly rare station yet, better go for it while you can. Galei Zahal is currently operating on **15785 upper sideband**. We don't have a specific schedule, but try the 19-meter band frequency during the days and **6895 upper sideband** in the evenings. They issue a QSL card for correct reports sent to Zahal Military Mail, No. 01005, Israel.

InfoRadio, a domestic station in the Netherlands, will be broadcasting on shortwave for a few weeks this summer, airing over the German government's shortwave transmitters. It will be active on Saturdays only between June 17 and September 2, airing from 0800 to 0830 on **7285**.

There may be a new Guatemalan broadcaster on the air! **Radio Verdad**, in the town of Chiquimula, is being heard on the oddball frequency of **4052.5** from sign-on sometime before 1130. We don't yet know how far into the evening hours the station runs, but if it's active into the evenings that would be a better time for most of us now that we're into the summer months. If you hear this one, reports can be sent to Apartado Postal 5, Chiquimula, Guatemala.

World Beacon is a new broadcast service carried over transmitters operated by England's Merlin Communications and South African government transmitters at Meyerton. Operated by the Affiliated Media Group, the service features independently produced programs by various African ministries beamed to Africa. The initial schedule is 0430-0630 on **6115** and 1600-1800 on **6145** and 1800-2200 on **9675**. Send reports to Affiliated Media



Depictions of the sun god RA are a common subject of post cards and QSLs from Radio Cairo. (Courtesy of Sue Wilden, IN)

Group, 2251 St. John's Bluff Rd., Jacksonville, FL 32246.

Here's the current schedule for the **National Voice of Cambodia** on somewhat variable **11940**: 0000-0115 with 15-minute segments in English, French, Thai, Lao, and Vietnamese, in that order. Also 1200-1300 with 15-minute segments in English, French, Thai, and Lao.

As we mentioned last month, **ELWA** has now resumed broadcasts from Liberia. It's on **4760**. Most North American listeners won't hear it during its late afternoon reception period until the fall season returns. However, reception from their sign-on at around 0600 shouldn't be a problem for most listeners, though you shouldn't count on its being five-by-five.

Meantime, **Star Radio**, also in Liberia, has had its license revoked. Star Radio is supported by three or four international agencies (including USAID) and exists to try and encourage stability and democracy in that country. The government, however, feels its programming contributes to instability. Still, odds are that

this station will be back on the air eventually, in one guise or another.

In Zimbabwe, station **ZBC Radio Four** is on the air from 0300 to 0530 on **4828**, 0530-1630 on **5975**, and 1630-2200 on **4828**.

Guess we aren't supposed to call the **Voice of Greece** by that name any longer. They've renamed their external service "**ERA Interprogramme**." Don't stations (and sports teams) know how hard it is to adapt to such changes? Not to mention that most people wouldn't make any connection between Greece and a name like ERA Interprogramme.

Radio Exterior de Espana currently has English to Africa and Europe from 2000-2100 (Monday to Friday) on **9595** and **9680**; Saturdays and Sundays 2200-2300. To North America they're on **6055** from 0000-0200 and 0500-0600.

Croatian Radio, aired via Germany, operates from 0000-0200 on **9925**, 0200-0400 on **7280**, 0400-0600 on **7285**, 0600-0800 on **11880**, 0800-1000 on **13820**, and 2100-2200 on **9405**. Although the vast majority of the pro-

BY GERRY L. DEXTER

Nord-Amerika, vest				Vest-Afrika - Kanariøyene			
Kl. UTC	Frekvens MHz	Retning	Program	Kl. UTC	Frekvens MHz	Retning	Program
1400	17.505	315°	1	0600	7.180	165°	1
1500	17.505	315°	2		9.590	195°	1
1900	17.505	315°	1		13.800	220°	1
0300	11.635	315°	1		15.705	165°	1
0400	11.635	315°	2	0700	15.705	220°	2
				1000	13.800	180°	2
				1100	13.800	180°	1
				1800	13.810	180°	1
				1900	13.800	180°	2

Nord-Amerika, øst og sentral				Øst-, Sentral- og Sør-Afrika			
Kl. UTC	Frekvens MHz	Retning	Program	Kl. UTC	Frekvens MHz	Retning	Program
1100	15.735	280°	1	0300	13.800	145°	1
1200	15.735	300°	2	0400	13.800	145°	2
	18.950	280°	2	0500	13.800	165°	1
1300	15.735	300°	1	0600	15.705	165°	1
1600	21.755	280°	1	1600	21.730	145°	1
1700	17.505	300°	2	1700	21.730	145°	2
2300	13.805	280°	2	1800	13.810	180°	1
0000	11.635	300°	1	1900	13.800	180°	2
	13.800	280°	1				
0100	9.985	300°	2				
	11.635	280°	2				

Mellom-Amerika				Midtøsten			
Kl. UTC	Frekvens MHz	Retning	Program	Kl. UTC	Frekvens MHz	Retning	Program
1100	15.735	280°	1	0300	7.465	95°	1
1200	18.950	280°	2		13.800	145°	1
1600	21.755	280°	1	0400	9.475	110°	2
2300	13.805	280°	2		13.800	145°	2
0000	13.800	280°	1	0500	11.615	120°	1
0100	11.635	280°	2	0800	18.950	110°	1

Sør-Amerika				Europa			
Kl. UTC	Frekvens MHz	Retning	Program	Kl. UTC	Frekvens MHz	Retning	Program
1000	21.755	235°	2	0300	7.465	95°	1
2200	11.625	235°	1	0400	7.465	180°	2
2300	11.625	235°	2		13.800	145°	2

Øst-Europa - Russland				Sør- og Sørøst-Asia			
Kl. UTC	Frekvens MHz	Retning	Program	Kl. UTC	Frekvens MHz	Retning	Program
0300	7.465	95°	1	2300	9.935	80°	2
0400	7.465	180°	2	0000	13.805	80°	1
	13.800	145°	2	0100	13.800	95°	2
0500	7.465	180°	1	0200	13.800	95°	1
	11.615	120°	1	1200	21.755	80°	1
	13.800	165°	1	1300	21.755	80°	2
0600	7.180	165°	1	1400	18.950	95°	1
	9.590	195°	1	1500	15.735	110°	2
0700	7.180	165°	1	1600	13.800	95°	1
	9.590	180°	1				
1000	13.800	180°	2				
1100	13.800	180°	1				
1300	9.590	180°	1				
1600	12.080	180°	1				
	13.800	95°	1				
	21.730	145°	1				
1700	12.080	180°	2				
	21.730	145°	2				
1800	7.485	180°	1				
1900	7.485	195°	2				
2000	7.485	195°	1				

Øst-Asia				Australia			
Kl. UTC	Frekvens MHz	Retning	Program	Kl. UTC	Frekvens MHz	Retning	Program
2200	15.735	35°	1	2000	9.985	65°	1
2300	15.735	35°	2	2100	11.610	65°	2
0900	21.755	35°	2	2300	9.935	80°	2
1200	17.535	40°	1	0000	13.805	80°	1
1300	17.535	40°	2	0800	18.910	235°	1

New Zealand			
Kl. UTC	Frekvens MHz	Retning	Program
1800	13.800	35°	1
0600	7.180	165°	1
	9.590	195°	1
	13.800	220°	1
	15.705	165°	1
0700	15.705	220°	2

Korttholdestasjoner

Kvittøy: 2x 500 kW - 05.27 Ø 59.04 N
Sveio: 2x 500 kW - 05.19 Ø 59.37 N

UTC=GMT

Radio Norway's current frequency and target schedule.

gramming is in Croatian, there are some brief English newscasts at the beginning of some hours.

This month's "Listening Post" reporter winner is **Robert Montgomery of Levittown, Pennsylvania**, who has checked in several times, submitting

Abbreviations Used in Listening Post	
AA	Arabic
BC	Broadcasting
CC	Chinese
EE	English
FF	French
GG	German
ID	Identification
IS	Interval Signal
JJ	Japanese
mx	Music
NA	North America
nx	News
OM	Male
pgm	Program
PP	Portuguese
RR	Russian
rx	Religion/ious
SA	South America/n
SS	Spanish
UTC	Coordinated Universal Time (ex-GMT)
v	Frequency varies
w/	With
WX	Weather
YL	Female
//	Parallel Frequencies

some very nice catches in each instance. Bob will receive a copy of the *Shortwave Listening Guidebook* by Harry Helms from **Universal Radio**. If you don't have a copy of Universal's mammoth catalog in your radio library, you should! There's everything from high end receivers to portables to antennas and endless line of accessories, as well as a great selection of useful books. You can get a copy by calling Universal at 614-866-4267 or writing them at 6830 Americana Parkway, Reynoldsburg, OH 43068. Our thanks to the good people at Universal for their continued support of our monthly book giveaway.

Remember that your reception logs are always welcome. Please be sure to list your logs by country, provide at least a double-space between each (so we can navigate scissors more easily) and add your last name and state abbreviation after each. And also, be sure to use only one side of the paper — otherwise some of your logs won't make it into the column. Other things we can use in the column are spare QSL cards you don't need returned (or good quality copies), station photos and other items from stations,

including schedules, brochures, etc. And, how about a photograph of you at your listening post? As always, thanks for your continued interest and cooperation!

Here are this month's logs. All times are in UTC, which is five hours ahead of EST, i.e. 0000 UTC equals 7 p.m. EST, 6 p.m. CST, 5 p.m. MST, and 4 p.m. PST. Double capital letters are language abbreviations (FF = French, AA = Arabic, SS = Spanish, etc.). If no language abbreviation is included, the broadcast is assumed to have been in English.

ALBANIA — Radio Tirana, **7160** at 0130 with news. (Gale, NC) **7270** at 0248 in FF with national anthem at 0256. IS at 0259. Also at 0403 in EE. (Miller, WA)

ALGERIA — Radio Algiers Int'l, **11750** in FF monitored at 2135. (Brossell, WI) **15160** in EE at 2000 with news, music. (Gale, NC)

ANTIGUA — BBC relay, **5975** at 0300 with "The World Today." (Jeffery, NY)

ARMENIA — Voice of Armenia, **9965** at 2100 talking about Armenian genocide by the Turks. (Ziegner, MA)

ASCENSION — Radio Telefis Eireann, Ireland, relay on **21630** at 1835 with news and weather. (Gale, NC)

AUSTRALIA — Radio Australia, **6020** at 1300. (Miller, WA) **15240** with news at 0010.

17750 at 0505 with IS to past 0515. 17580 at 0535 with cricket updates. Olympic news. 21725 at 0435. (MacKenzie, CA) 15515 with pops at 0430. (Brossell, WI) 0532 with an interview. (Wilden, IN) 17750 at 0033. (Jeffery, NY)

AUSTRIA — Radio Austria Int'l. 7325 at 0030 in GG with ID. news. (Jeffery, NY)

BELGIUM — Radio Vlaanderen Int'l. 11980 via Bonaire monitored at 0357 with news. (Miller, WA)

BENIN — Radiodifusion Nationale, 7210.25 from 2100-2304 close. FF talk. African folk and pop. Off with National Anthem. Fair, with adjacent channel splatter. (Alexander, PA)

BOTSWANA — Voice of America relay, 12080 at 2025 with African music. Man in FF at 2028. (Foss, AK)

BRAZIL — Radio Nacional Amazonas, tentative, 11780 heard at 0230 with rapid fire announcer in PP. (Linonis, PA) Radio Gaucha. Porto Alegre. 11915 in PP at 2355. Music and conversation. (Miller, WA)

CANADA — CKZU. Vancouver, 6160 at 0548 discussion the flaws of globalizing the economy. (Foss, AK) Radio Canada Int'l, 9755 at 0205 with stock market and Canadian weather. (Wilden, IN)

CHILE — Voz Cristiana, 1550 at 1638 with religious broadcast in SS. (Miller, WA)

CHINA — Guangxi Broadcasting Station,

9820 in CC until Havana comes on at 2350. (Hughes, MO) China People's Broadcasting Station, Lingshi 15390 at 2330. Woman in CC with music. (MacKenzie, CA) China Radio Int'l, via Xi'an, barely audible on 15100 in CC at 0015 with music and talk. 15260 at 0026 with music briefly, then faded. (Jeffery, NY) 15400 at 2322 in CC. (MacKenzie, CA)

COSTA RICA — RFPI, 15050 at 2125. (Brossell, WI) 0035. (MacKenzie, CA)

CROATIA — Croatian Radio, 9925, via Germany, at 0213 with news, sports, "Topic of the Day" editorial and into unidentified language at 0224. (Alexander, PA) News at 0302 and Croatian pops at 0402. (Miller, WA) 0410 with news. (Brossell, WI)

CUBA — Radio Havana, 9820 at 0411 with news, "Spotlight on the Americas," and feature about a South American crafts exhibition in Havana. (Jeffery, NY)

CYPRUS — BBC relay, 15575 at 0435 with a report on Muslim converts. (Brossell, WI)

CZECH REPUBLIC — Radio Liberty (Azadi) 1910 monitored at 1600 in Tajik. News of happenings in Kabul and Dushambe. (Ziegner, MA)

DENMARK — Radio Denmark, via Norway, 15705 at 2030 with news in DD. Off at 1256. (Miller, WA)

ECUADOR — La Voz del Napo, tentative, 3279.6 in SS at 1024. Man with talks, children singing religious songs. (Montgomery, PA)

HCJB, 9745 at 0147 with "Ham Radio Today." Also at 0501 with "Saludos Amigos" program. (Wilden, IN) 0211 with "Adventures in Odyssey." Also 17660 at 2028 with music. ID, frequency info. "Inspirational Classics." (Jeffery, NY)

EGYPT — Radio Cairo, 9990 in EE at 2130. In unidentified African dialect at 1910 on 15210, 15285 in AA at 0425, and 15335 in FF at 2110. (Brossell, WI)

ENGLAND — BBC, 6195 (via Antigua) at 1330. (Northrup, MO) 15400 at 2000. (Jeffery, NY)

EQUATORIAL GUINEA — Radio Africa, 15185, 2113 with religious program. (Brossell, WI) 2158 with EE Bible broadcast, 2155 national anthem and sign-off with "Radio Africa, Town Center, Cupertino, CA" and addresses in Liberia, Nigeria, and Ghana. (Miller, WA)

FINLAND — YLE Radio Finland, 9655 at 0251 with news, discussion. 15400 in Finnish at 1540 and 15545 at 1630. (Miller, WA) 11665 at 0302 with work stoppages at Finnish paper plants, customs bust on illegal cigarettes, weather forecast. (Wilden, IN)

FRENCH GUIANA — Radio France Int'l relay, 21645 at 2119 in SS with South American news. (Miller, WA)

GABON — Africa Number One, 15475 at 1608 in FF with rap. (Miller, WA)

GERMANY — Deutsche Welle, 15275,

Radio Netherlands at-a-glance programme and frequency guide

Valid from March 26th - October 28th 2000. All times are Universal Time Co-ordinated (UTC) (same as GMT)

North America
(evening)
23.30: 6165, 9845
00.30: 6165, 9845
04.30: 6165, 9590

Europe
(lunch)
10.30: 6045, 9860
11.30: 6045, 9860
(evening)
20.30: 1512 mw
21.30: 1512 mw

Astra 1G satellite
09.30 (Sunday only), 10.30, 11.30,
14.30, 15.30, 18.30, 19.30, 20.30,
21.30, 23.30, 00.30

Step 1 Choose your part of the world
Step 2 See what time we are on-air
Step 3 Check the frequencies in use
Step 4 Refer to programme colour

Day	Programme	Frequency
Sunday	News, Sincerely Yours	6165, 9845
	Week Ahead, Dutch Horizons	6165, 9845
Monday	Newsline, Research File	6165, 9845
	EuroQuest, Newsline	6165, 9845
Tuesday	Newsline, Music 52.15	6165, 9845
	A Good Life, Newsline	6165, 9845
Wednesday	Newsline, Documentary	6165, 9845
	Dutch Horizons, Newsline	6165, 9845
Thursday	Newsline, Media Network	6165, 9845
	Research File, Newsline	6165, 9845
Friday	Newsline, A Good Life	6165, 9845
	1512 kHz: Roughly Speaking	6165, 9845
Saturday	News, Europe Unzipped	6165, 9845
	Insight, Aural Tapestry	6165, 9845

Asia / Far East
(afternoon service)
09.30: 9795, 12065, 13710
10.30: 9795, 12065, 13710

South Asia
(evening service)
14.30: 9890, 12075, 15590
15.30: 9890, 12075, 15590

Pacific
(evening service)
09.30: 9795, 12065, 13710
10.30: 9795, 12065, 13710

Africa
(evening service)
17.30: 6020, 7120, 9895, 11655,
13700, 17605, 21590
19.30: 6020, 7120, 9895, 11655,
13700, 17605, 21590

AsiaSat 2 satellite
09.30, 10.30, 14.30, 15.30, 17.30,
18.30, 19.30, 00.30, 04.30

AsiaSat 2 satellite
09.30, 10.30, 14.30, 15.30,
17.30, 18.30, 19.30, 00.30, 04.30

Tracking down which frequencies (in kHz) come from which sites — Bonaire 6165, 9590, 9795 and 9845 / Flevoland 9895, 11655 and 13700 / Irkutsk 13710 / Jilich 6045 / Madagascar 6020, 7120, 9890 and 15590 / Petropavlovsk 12065 / Tashkent 12075 / Wertachtal 9860 / Wolverham 1512 MW

Key to satellite transmission: Astra RNW1/2 = Astra 1G, 19.2° East, Transponder 109, 12.574 GHz/H, MPEG2/DVB, AsiaSat 2: 105° East, Transponder 108, 4.000 GHz/H, MPEG2/DVB (European Bouquet), Intelsat 707, 1° West, Transponder 238, 3.915 GHz/RMCP, MPEG2/DVB. Note, all satellite transmissions are 'Free to Air' (FTA). © nfp/rmw (08/Febr. 2000).

Here's where to look for Radio Netherlands at practically any time of day.

via Rwanda, at 2311 with news analysis in GG. (Miller, WA)

GREECE — Voice of Greece, 12105 monitored at 2345 in Greek. (Brossell, WI) 17705 via Delano in Greek at 2142. Off at 2200. (Jeffery, NY)

GUAM — KTWR — Trans World Radio, 15105 with EE religious broadcast at 1548. (Miller, WA)

GUATEMALA — Radio Cultural, San Sebastian, 4779 in Quechua at 1224. (Miller, WA) Radio Buenas Nuevas, San Sebastian, 4799 in SS at 1228. (Miller, WA) Radio Mam, Cabrican, 4825 in SS at 1234. (Miller, WA) Radio Tezulutlan, Coban, 4835 at 1242 in Quechua. (Miller, WA) Radio Kek'chi, San Cristobal, 4845 at 1247 in SS. (Miller, WA)

HAWAII — WWVH, 10000, mixing with WWV at 0542. (Wilden, IN) KWHR, 9930 with religious song at 1247. (Brossell, WI) 17510 at 007 with religious music. (Jeffery, NY) 0017 with southern gospel music. (Foss, AK)

HUNGARY — Radio Budapest, 11990 at 2325 in unidentified language. Clear EE ID at 2330. (Brossell, WI) 15550 at 2310 in Hungarian. (MacKenzie, CA)

INDIA — All India Radio, 10330 at 1714 in unidentified language. (Miller, WA) 11620 at 0130 in possible Hindi. 11735 at 0230 in unidentified language. (Linonis, PA)

INDONESIA — Voice of Indonesia, 15149 in SS at 1731. (Ziegner, MA) RRI

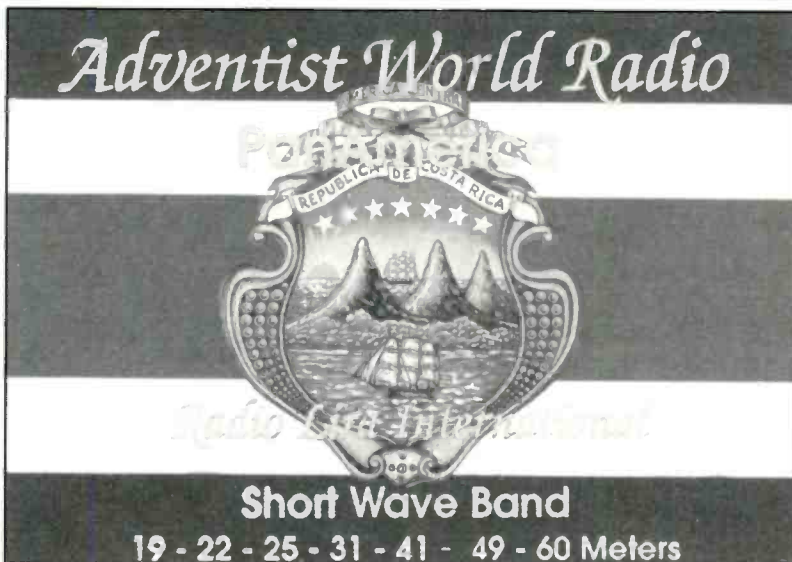
This QSL card marks the last transmission from Radio Lira International, the Adventist World Radio station in Costa Rica.

Merauke, Irian Jaya, tentative, 3905 at 1131 with continuous Indian music. Man in local language at 1134, back to music. (Montgomery, PA)

IRAN — Voice of the Islamic Republic of Iran, 7275 (variable 7272-7275) at 0145 in either AA or Farsi; possible interview pro-

gram. The rhetoric on their EE broadcasts has been toned down somewhat. (Linonis, PA) 15084 in AA at 0032. Koran. (MacKenzie, CA) 1544 with discussion in Farsi. (Miller, WA) 1620 in Farsi. (Ziegner, MA) 2120 in unidentified language. (Brossell, WI)

ISRAEL — Kol Israel, 11585 at 0247 in



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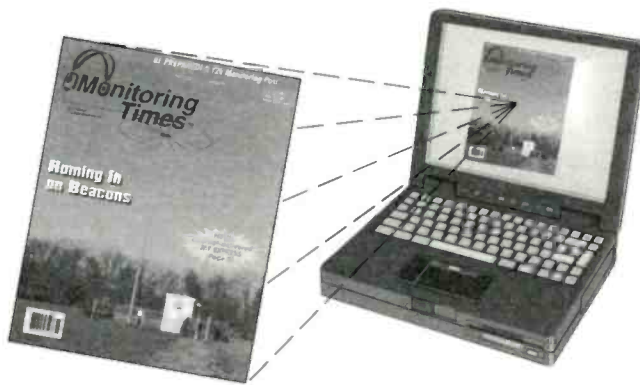
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English Service To North America (EAST COAST)
P.O.BOX566, ARAB REPUBLIC OF EGYPT

DAILY BROADCAST: 22:00 TO 00:30 U.T.C.
FREQUENCY: 9900 kHz-31 MB.
DAILY ITEMS: 22:02 EGYPTIAN MUSIC.
22:15 NEWS 1
23:00 ARABIC BY RADIO.
23:15 NEWS 2.

JANUARY TO JULY 2000

SUNDAY: 22:05 THE HOLY KORAN & ITS MEANINGS.
22:25 COMMENTARY.
22:35 TOURISM IN EGYPT.
22:50 EGYPTIAN ACHIEVEMENTS.
22:55 QUESTION & ANSWER.

MONDAY: 22:05 THE LIGHTER SIDE OF THE NEWS.
22:25 THE EGYPTIAN WOMAN THROUGHOUT HISTORY.
22:35 SPORTS IN EGYPT.
22:45 LITERARY READINGS.
22:55 A MINUTE FOR EGYPT.

TUESDAY: 22:05 THE ARCHIVES OF A DEPARTING CENTURY.
22:25 SPOTLIGHTS ON THE MIDDLE EAST.
22:40 EGYPT & COOPERATION HORIZONS.
22:45 CONFERENCE NEWS & INTERVIEWS.
22:55 ADD TO YOUR KNOWLEDGE.

WEDNESDAY: 22:05 PROFILE.
22:25 COMMENTARY.
22:35 SANCTUARIES IN EGYPT.
22:45 PRISM OF ARTS IN EGYPT.

THURSDAY: 22:05 A PAGE FROM EGYPTIAN HISTORY.
22:25 LISTENER'S MAIL.
22:55 EGYPTIAN ACHIEVEMENTS.

FRIDAY: 22:05 THE HOLY KORAN & ITS MEANINGS.
22:25 A MESSAGE FROM EGYPT.
22:35 ISLAM IN INTELLECTUAL FOCUS.
22:45 MODERN ARABIC POETRY.

SATURDAY: 22:05 TOURISM NEWS.
22:25 LISTENER'S MAIL.
22:55 THE LIGHTER SIDE OF THE NEWS.

ENGLISH STAFF (OMNEYA - MONA - DOAA - SALLY & SAMAR)

Radio Cairo's current program line-up.

presumed Hebrew. (Foss, AK) 2330. Also 11615 at 1603 with news in HH. (Miller, WA) Reshet Bet home service, 17545 at 0645 in presumed Hebrew. (Foss, AK)

IRAQ — Radio Iraq Int'l, 11785 at 0307 with music and political comment. Into GG at 0313. (Miller, WA)

ITALY — RAI, 11800 at 2310 with discussion in II. (Miller, WA) 17780 at 0445 with "Noticia de Italia." (Brossell, WI)

JAPAN — NHK, Sapporo, 6005 monitored at 1254 in JJ. Also on 6020. (Miller, WA) Radio Japan-NHK, 6145 with classical music at 1250. (Northrup, MO) 13630 in FF at 0110. (MacKenzie, CA) 17810 in JJ at 2352 with

music. ID, news. (Jeffery, NY)

JORDAN — Radio Jordan, 11810 at 1250 in AA. Also here and //15435 at 0400 sign-on and into Holy Koran. (Brossell, WI)

KENYA — Kenya Broadcasting Corporation, 4885 at 0430 with music and ID. (Gale, NC) 7210 at 1019 with man in EE talking about Angola and recent problems. Weak but audible, with rapid fades or jitter. 1022 with more talks, difficult copy and think not in EE at this point. ID at 1031. Not heard on //7125. (Montgomery, PA)

KUWAIT — Radio Kuwait, 11675 at 0215 in AA. (Linonis, PA) 15110 in AA at 1533. (Miller, WA) 15495 in AA at 0430. (Brossell,

WI) 3213 in AA. (MacKenzie, CA) 15505 in AA at 1600. (Miller, WA)

LIBERIA — ELWA, 4760 from 2150 to 2201 close. Local choral music. EE sign-off announcements. Off with national anthem. Also at 0737 with EE preacher. (Alexander, PA) Radio Liberia Int'l, 5100 at 2230 to 2400 close. EE/FF pops, Afropops, EE/vernacular talk. Off with national anthem. (Alexander, PA)

LIBYA — Radio Jamahiriya, 15435 at 1605 in AA. (Miller, WA) Radio Jamahiriya's EE Voice of Africa program at 0115. (Gale, NC)

MADAGASCAR — Radio Netherlands relay. 12090 at 1440 with EE to Asia. (Silvi, OH) 15590 at 1609, with Dutch markets. (Miller, WA)

MEXICO — Radio Mexico Int'l, 6185 at 0208 in SS. (Miller, WA)

MONGOLIA — Voice of Mongolia, 12085 at 1204 with EE news. Talk of medical school requirements, hospital requirements, 160 patient load but actually 3,000 patients, use of acupuncture, and regular Western medicine. (Montgomery, PA)

MOROCCO — RTV Marocaine, 11920 monitored at 0405 in AA. (Brossell, WI) 15345 at 1830-2159 sign-off, all AA. Sounded like a telephone call-in program from 2110 to 2145 or so. (Silvi, OH) 2315 in AA. (Miller, WA) 2340. (MacKenzie, CA)

MYANMAR (Burma) — Radio Myanmar, 5985 at 1410 in unidentified language. (Miller, WA)

NETHERLANDS ANTILLES — Radio Netherlands via Bonaire, 6165 at 0010. (Wilden, IN) 15315 at 2345 in SS. (MacKenzie, CA)

NEW ZEALAND — Radio New Zealand Int'l, 17675 monitored at 0402 with news, weather, "Viewpoint." (Jeffery, NY) 0435 with news from Kiribati, the Cook Islands and Fiji. (Brossell, WI) 0515 with news. (MacKenzie, CA)

NORTH KOREA — Radio Pyongyang, 11710 at 1910 in SS. Later EE ID. 13650 at 0105 in FF and 13760 at 0015 in SS. 15180 in EE at 0021. (MacKenzie, CA) 13760 at 2009 with chorus. (Foss, AK)

OMAN — Radio Sultanate of Oman, 9735 in AA at 2247. (Miller, WA) 15355 at 0300 with news in EE. (Gale, NC) BBC relay, 15310 at 0425. (Brossell, WI)

PAPUA NEW GUINEA — Radio New Ireland. Kavieng, 3905 at 1149. Continuous pops. Weak, and gone by 1200. (Montgomery, PA) National Broadcasting Commission, 4890 at 1248 with EE and local pops. (Miller, WA) Radio Manus, Lorengau, 3315 at 0846 with South Seas type song. (Foss, AK)

PERU — Radio Huanta 2000, 4755 in SS at 1215. (Miller, WA) Radio Altura, 6479.7 at 0255 in SS with announcements, folk music, ID. (Alexander, PA) Radio Horizonte, 4534.15, 0245 to past 0435, in SS with talks, Peruvian folk music. ID. On later than usual. (Alexander, PA)

PHILIPPINES — Radio Pilipinas, 11730

at 1731 in Tagalog. "Radyo Periodico." Also 11890. (Miller, WA) **15190** at 1927 in local language. Off at 1930. (MacKenzie, CA) Voice of America relay, **15185** at 0015 and **15235** at 1932. (MacKenzie, CA) **15290** at 0000 and **17735** at 0018. (Jeffery, NY) Far East Broadcasting Corp., **15520** at 2354 in unidentified language. Listed as intended for Burma. (Foss, AK)

PORTUGAL — RDP Int'l, **17745** in PP at 1920. (Brossell, WI) 2036 in PP. (Jeffery, NY)

PUERTO RICO — Armed Forces Radio, **6458.5 USB** with discussion on race relations, disclaimer at 0058, frequencies, and address for comments. (Wilden, IN)

ROMANIA — Radio Romania Int'l, **11940** with EE at 2300–2355. //9570. (Silvi, OH)

RUSSIA — Voice of Russia, **15180** in EE at 0020. (MacKenzie, CA) **15470** with news at 0430. (Brossell, WI)

RWANDA — Deutsche Welle relay, **15275** at 2348 in GG. (MacKenzie, CA) **15410** at 2105 with GG music and soap opera. (Brossell, WI)

SAUDI ARABIA — BSKSA, **9555** in AA at 2135 with Koran reading, news, music. (Gale, NC). **15345** in AA at 1622, mixing with Morocco. (Miller, WA) 17760 at 0503 in AA and **21495** in AA at 0445. (MacKenzie, CA)

SINGAPORE — Radio Singapore Int'l, **6015** at 1257 mixing with Radio Korea Int'l. (Miller, WA) **9590** at 1205 with news in EE. (Gale, NC)

SLOVAKIA — Radio Slovakia Int'l, **5930//9440//7300** at 0100–0126. **5930** had terrible bleed from WWCR on 5935. (Silvi, OH) **7300** at 0130 in presumed Slovak. (Linonis, PA)

SOUTH AFRICA — Trans World Radio, **7215** monitored at 0329 sign-on. IS, EE ID and into unidentified language with Afro pops. (Alexander, PA) Channel Africa, **15215** at 0436 with news in FF. (Miller, WA)

SOUTH KOREA — Radio Korea Int'l, **15575** at 0215 with EE to North America. (Linonis, PA) 2300 sign-on by woman and into news in KK. (MacKenzie, CA)

SPAIN — Radio Exterior de Espana, **6055** at 0108 with male-female tag-team news. (Wilden, IN) 0140 with EE and '50s style rock. (Linonis, PA) **21700** at 1646. (Miller, WA)

SRI LANKA — Sri Lanka Broadcasting Corp., **15245** at 0150 in EE and local. Mention of Sri Lanka and lots of U.S. pop Deutsche Welle relay, **13690** at 0102 in GG. (MacKenzie, CA) Voice of America relay, **15395** at 2326. (MacKenzie, CA)

SWAZILAND — Trans World Radio, **9704.2** with broadcast from Abidjan studio at 1825–2020 in FF and African languages. (Ziegner, MA)

SWEDEN — Radio Sweden, **9495** at 0200 with techno pop, IS, announcements in EE and Swedish. News in presumed Swedish. (Wilden, IN)

TAIWAN — China Broadcasting Service, **15125** at 0020 in CC with talk by woman, music, talk by man. Very weak. (Jeffery, NY) Radio Taipei Int'l, **9675** (via WYFR) at 0457



This very stylish QSL, mostly in blue, is from RDP International, aka Radio Portugal.

in CC. (Wilden, IN) **15270** in CC at 2356. (MacKenzie, CA)

THAILAND — BBCrelay, **17790** at 0038. (Jeffery, NY) **21660** at 0443. (MacKenzie, CA) Radio Thailand, **9535** at 1900–2000 in EE with news, features. (Alexander, PA) **13695** in EE at 0038. Off at 0055. (MacKenzie, CA) **15395** at 0300 with news, sports, weather for Bangkok and other Asian cities. (Linonis, PA)

TUNISIA — Radio Tunis, **7475** at 2140 in AA. (Brossell, WI)

TURKEY — Voice of Turkey, **9445** in TT at 0000, news by woman. (Wilden, IN) **15295** in TT at 1240. (Brossell, WI) **15350** at 1625 in TT. (Miller, WA) **15355** in TT at 1645. (Ziegner, MA)

TURKMENISTAN — Radio Mayak via presumed site in Turkmenistan, **4930** at 0055 to past 0135. Light instrumental music, Mayak IS at 0059 and 0129, RR talk and RR pops. (Alexander, PA)

UGANDA — Radio Uganda, **4976** monitored at 0420 with news and music in EE. (Gale, NC)

UNITED ARAB EMIRATES — UAE Radio, Dubai, **11950** in AA at 1905. (Brossell, WI) **21700** at 0440 in AA. (MacKenzie, CA) UAE Radio, Abu Dhabi, **11710** in AA at 2135 and 0410 on **11945**. (Brossell, WI) **21735** in AA at 0430. (MacKenzie, CA)

UKRAINE — Radio Ukraine Int'l, **9560** at 0100–0200 with news, features, //6020 weak under QRM, //9610 barely audible. **9600** at 0400. //9610 weak, //11870 very strong, //11825 very weak. (Alexander, PA)

UZBEKISTAN — Radio Tashkent, **7105** at 0100 sign-on with IS, ID, EE news and features, local music with a Mideast flare. Strong but audio somewhat muffled, //7285 which

was weak under co-channel QRM. (Alexander, PA)

VANUATU — Radio Vanuatu, **4960** at 0857 with religious song. (Foss, AK)

VATICAN — Vatican Radio, **6205** at 2200–2245. Religious programming in listed Mandarin, IS at 2242 to 2245 sign-off. (Alexander, PA) **9660** at 0340 with EE to North America. The Pope's weekly address. (Linonis, PA) **15500** at 1243. EE ID at 1245. (Brossell, WI) 1555. (Miller, WA)

VIETNAM — Voice of Vietnam, **5940** (via Russia) in EE at 0100 with talk on relations with Russia. (Linonis, PA) **12020** at 2335 with news. (Brossell, WI)

And that's the list. Sound a mighty roar of approval for the following readers who took the time to contribute this time: Brian Alexander, Mechanicsburg, Pennsylvania; Tricia Ziegner, Westford, Massachusetts; Robert Brossell, Pewaukee, Wisconsin; Marty Foss, Talkeetna, Alaska; Dave Jeffery, Niagara Falls, New York; Jack Linonis, West Middlesex, Pennsylvania; Dave Gale, Newland, North Carolina; Dave Hughes, Kansas City, Missouri; Stewart MacKenzie, Huntington Beach, California; Mike Miller, Issaquah, Washington; Mark Northrup, Gladstone, Missouri; Sue Wilden, Nobelsville, Indiana; Robert Montgomery, Levittown, Pennsylvania, and Lee Silvi, Mentor, Ohio.

Thanks to each one of you. Until next month, good listening! ■

plane sense

Your Link To Aviation Communications

How To Use Enroute Low And High-Altitude Aeronautical Charts

In spite of the unusually cool weather we're having here in Florida, the "air" waves are starting to heat up. As I'm writing this, one of the premier events in aviation is being held just 45 miles north east of me in Lakeland. It's called "Sun 'n Fun." The only bigger event is the Oshkosh fly-in in late summer. They're a scanner enthusiast's dream. If you could see it on radar, it looks like an anthill in slow motion. This one week of the year you can see virtually any and every type of general aviation aircraft around—from the small to the large, slow to the fast, old to the new, inexpensive to the outrageous. Those living in the Lakeland, Plant City, Winter Haven, and Bartow areas of Florida either love it or hate it. It's all there.

So far I've received a few comments about the column. After reading them I feel like Sally Fields at the Oscars a couple of years ago, "You like me. You really like me." At any rate, I feel that I may be filling in the blanks for many scanner enthusiasts. One E-mail from Ron H. even gave an idea for an additional column for those of you who are "Lowfers" in monitoring the LF/MF non-directional radio beacons (NDBs) that are used in air navigation. Thank you, Ron.

In addition to the IFR maps I'll be describing, I will be adding two new features to the column, one temporary, and one permanent. For a few issues I'll be giving the company names and IDs of callsigns you may have heard. I will only cover those from the U.S. and Canada. This month is "A" callsigns from the U.S. Also I will be putting in changes to frequencies that are given between issues of the A/FD I described in the May issue. And I'll respond to an inquiry from one of the readers.

Enroute Low-Altitude Charts

The "Aeronautical Information Manual" or AIM describes them saying, "These charts are designed to provide

A sample legend. →

L-19
PANELS
ABCD
1°=16 NM

L-20
PANELS
EFGH
1°=12 NM

UNITED STATES GOVERNMENT
FLIGHT INFORMATION PUBLICATION
IFR ENROUTE LOW ALTITUDE - U.S.
For use up to but not including 18,000' MSL
HORIZONTAL DATUM: NORTH AMERICAN DATUM OF 1983

LEGEND

AIRPORTS

Airports/Seaplane bases shown in BLUE and GREEN have an approved Low Altitude Instrument Approach Procedure published. Those in BLUE have an approved DOD Low Altitude Instrument Approach Procedure and/or DOD RADAR MINIMA published in DOD FLIPS or Alaska Terminal. Airports/Seaplane bases shown in BROWN do not have a published Instrument Approach Procedure.

<p>LAND</p> <ul style="list-style-type: none"> ◇ ◇ ◇ Civil ◇ ◇ ◇ Civil - Military ● ● ● Military ⊕ ⊕ ⊕ Heliport <p>SEA</p> <ul style="list-style-type: none"> ◇ ◇ ◇ Civil ◇ ◇ ◇ Civil - Military ● ● ● Military 	<ol style="list-style-type: none"> 1. Parentheses around airport name indicates no military landing rights available (U.S. only) 2. A solid line box enclosing the airport name indicates FAR 93 Special Requirements - see Directory/Supplement 3. "NO SVFR" above the airport name indicates FAR 91 fixed-wing special VFR flight is prohibited 4. Pvt - Private use 5. [] or [] following the airport name indicates Class C or Class D Airspace. <p>Part time or established by NOTAM. See A/G tabulation for times of operation. In Alaska see Supplement Alaska</p>
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* Longest runway length to nearest 100 feet with 70 feet as the dividing point (add 00) indicates soft surface

L Lighting available
 - No lighting available ⊕ Pilot Controlled Lighting
 * Part-time or on request

NAVAIDS AND COMMUNICATION BOXES

NAVAIDS

VHF/UHF Data is depicted in BLACK
LF/MF Data is depicted in BROWN

COMPASS ROSES Oriented to Magnetic North of NAVAID which may not be adjusted to the charted isogonic values. Smaller sizes are used in congested areas

VORTAC VOR VOR/DME TACAN

LF/MF Non-directional Radiobeacon or Marine Radiobeacon with magnetic north indicator

UHF Non-directional Radiobeacon

NDB/DME

Compass Locator Beacon

Flight Service Station (FSS)
Remote Communications Outlet (RCO)

ILS Localizer Course with additional navigation function

COMMUNICATION BOXES

CHECK NOTAMS

PINE BLUFF (T)
116.0 PBF 80(Y) 123.6
N34°14.81' W91°55.57'

VOR with TACAN compatible DME
Underline indicates No Voice Transmitted on this frequency

TACAN channels are without voice but not underlined

Overprint of affected data indicates Abnormal Status, i.e. CHECK NOTAMS/DIRECTORY

(T) Frequency protection usable range at 12,000' AGL - 25NM

(Y) TACAN must be placed in "Y" mode to receive distance information

ASOS/AWOS - Automated Surface Observing Station; Automated Weather Observing Station

HIWAS - Hazardous Inflight Weather Advisory Service

TWEB - Transcribed Weather Broadcast

Automated weather, when available, is broadcast on the associated NAVAID frequency.

Part-time or On-Request

MALVERN
215 MVQ 48(111.1) 123.6

NDB with DME
DME channel and paired VHF frequency are shown

123.6 122.1R
HARRISON
112.5 HRO 72
N36°19.0' W93°12.80'

FSS associated with a NAVAID

123.6 122.65
EL DORADO ELD

Name and identifier of FSS not associated with NAVAID

JONESBORO 122.55

Remote Communications Outlet (RCO)
FSS name and remoted frequency are shown

SHADOW BOXES indicate Flight Service Stations (FSS). Frequencies 122.2, 255.4 and emergency 121.5 and 243.0 are normally available at all FSS's and are not shown. All other frequencies are shown. Certain FSSs provide Local Airport Advisory (LAA) on 123.6. Frequencies transmit and receive except those followed by R or T: R - Receive only; T - Transmit only

122.6
PINE BLUFF
116.0 PBF 107
N34°14.81' W91°55.57'

Controlling FSS Name: **JONESBORO**

Frequencies positioned above this line NAVAID boxes are remoted to the NAVAID site. Other frequencies at the controlling FSS named are available, however, altitude and terrain may determine their reception.

This line NAVAID boxes without frequencies and controlling FSS name indicates no FSS frequencies available

A/G VOICE COMMUNICATION

Airports with approach and departure control services are listed below, alphabetically by airport name. Airports with proper names are listed by last name. A five point star (*) preceding the ATIS frequency indicates less-than-continuous or part-time operation frequencies transmit and receive unless otherwise noted. An asterisk (*) follows the part-time tower freq remoted to the collocated full-time FSS for use as LAA during hours the tower is closed. Radials defining sectors are outbound from facility. Chart panel identification letter is shown to right of listing. (G) indicates Ground Communication Outlet available. For additional communications data, refer to Airport/Facility Directory and/or DoD FLIP IFR/VFR Supplements.

	PANEL		PANEL
AIKEN MUNI, SC (AIK)	F	DAVID FLD, TOM B, GA (CZL)	E
Augusta App/Dep Con—119.15 231.1		Atlanta Center App/Dep Con—133.8 353.7 Cinc Del—118.55	
Columbia App/Dep Con—124.15 338.2		CLASS C—(Continuous)	
ALLENDALE CO, SC (88J)	F	DAWSON MUNI, GA (16J)	A
Jax Center App/Dep Con—132.5 363.2		Jax Center App/Dep Con—125.75 226.8	
ANDALUSIA-OPP, AL (78J)	A	DAYTONA BEACH INTL, FL (DAB)	B
Cairns App/Dep Con—133.45 237.5		App Con—125.72 379.95 (8000-11000) 118.85 387.0	
Jacksonville App/Dep Con—120.2 346.4		(N 4000-7500) 125.8 385.5 (N 3500' and blo) 127.075 351.95	
Twr—119.55 Gnd Con—121.9		(S 4000-7500) 125.35 322.3 (S 3500' and blo)	
CLASS D—Mon-Fri except holidays 1430-2230Z†		Twr—120.7 118.1 257.8 Gnd Con—121.9 348.6	
ANDERSON REGIONAL, SC (AND)	F	DECATUR CO INDUSTRIAL AIRPARK, GA (BGE)	A
Greer App/Dep Con—118.8 385.4		AWOS-A 359 A	
Atlanta Center App/Dep Con—127.5 316.05		Tallahassee App/Dep Con—128.7 254.3	
ANDREWS-MURPHY, NC (6A3)	E	Jax Center App/Dep Con—135.325 343.8	
AWOS-3 119.675		DE KALB-PEACHTREE, GA (POK)	E
ANSON CO, NC (APP)	G	ATIS 128.4	
Charlotte App/Dep Con—120.05 288.15		Atlanta App/Dep Con—119.3 381.65	
APALACHICOLA MUNI, FL (AAF)	A	Peachtree Twr—120.9 127.2 228.3 Gnd Con—121.6	
Tyndall App/Dep Con—124.15 341.7 (blo 5000')		Cinc Del—125.2	
119.75 392.1 (abv 5000')		CLASS D—Mon-Fri (1130-0400Z), Sat-Sun (1200-0400Z)	
Jax Center App/Dep Con—119.1 379.3		DELAND MUNI-SIDNEY H. TAYLOR FLD, FL (DED)	B
ASHEBORO MUNI, NC (HBI)	G	Daytona Beach App/Dep Con—125.35 322.3	
AWOS-3 119.275		DESTIN-FORT WALTON BEACH, FL (DTS)	A
Greensboro App/Dep Con—118.5 247.2		ASOS 133.925	
ASHEVILLE REGIONAL, NC (AVL)	F	Eglin App/Dep Con—132.1 Eglin Cinc Del—127.7	
ATIS +120.2		Jax Center App/Dep Con—132.1 360.6	
App/Dep Con—125.8 226.8 (340'-159') 124.65 351.8 (160'-339')		DILLON CO, SC (DLC)	G
Atlanta Center App/Dep Con—132.625 281.1		Florence App/Dep Con—118.6 347.7	
Twr—121.1 257.8 Gnd Con—121.9		Jax Center App/Dep Con—133.45 306.3	
CLASS C—(1130-0400Z)		DOBBINS AIR RESERVE BASE, GA (MGE)	E
ATHENS/BEN EPPS, GA (AHN)	E	ATIS +271.6	
ASOS 132.875		Atlanta App/Dep Con—121.0 254.25 Twr—120.75 397.2	
Atlanta Center App/Dep Con—127.5 316.05		Gnd Con—125.3 275.8	
Twr—126.3 336.2 Gnd Con—121.8		CLASS D—(1200-0400Z)	
AUGUSTA REGIONAL AT BUSH FLD, GA (AGS)	A-F	JONALDSON CENTER, SC (GYH)	F
ATIS 132.75		AWOS-3 127.325	
Augusta App/Dep Con—126.8 270.3 (170'-349') 119.15 231.1		Greer App/Dep Con—118.8 385.4	
(350'-169') Augusta Twr—118.7 239.3		Atlanta Center App/Dep Con—135.35 322.4 Cinc Del—125.95	
Gnd Con—121.9 348.6 Atlanta Center App/Dep Con—128.1 323.0		DONALDSONVILLE MUNI, GA (17J)	A
CLASS D—(1145-0400Z)		Cairns App/Dep Con—125.4 234.4	
AVON PARK MUNI, FL (AVD)	C	Jacksonville App/Dep Con—134.3 353.5	
Miami Center App/Dep Con—134.55 257.7		DOTHAN REGIONAL, AL (DHN)	A
BACON CO, GA (AMC)	A	ATIS 135.72	
Jax Center App/Dep Con—132.3 290.4		Cairns App/Dep Con—125.4 234.4	
BALDWIN CO, GA (MLJ)	A-E	Jacksonville App/Dep Con—134.3 353.5 Twr—118.4' 257.6	
AWOS-A 380		Gnd Con—121.7 348.6	
Macon App/Dep Con—124.2 279.6 (5000' and below) 119.6 388.2		CLASS D—Mon-Fri (1200-0300Z), Sat and Sun (1400-0200Z)	
(Above 5000') Atlanta Center App/Dep Con—123.95 269.3		DOUGLAS MUNI, GA (DOH)	A
BARNWELL CO, SC (BNL)	F	AWOS-3 119.075	
Jax Center App/Dep Con—132.5 363.2		Jax Center App/Dep Con—132.3 290.4	
BARRON, W.H. 'BUD', GA (DBN)	A-E	DUNN AIR PARK, ARTHUR, FL (X21)	B
AWOS-3 118.425		Daytona App/Dep Con—134.95 239.275	
Macon App/Dep Con—124.2 279.6 (5000' and below) 119.6 388.2		DUNNELLON/MARION CO & PARK OF COMMERCE, FL (X35)	B
(Above 5000') Atlanta Center App/Dep Con—123.95 269.3 (G)		Jacksonville App/Dep Con—134.95 239.275	
BARTOW MUNI, FL (BOW)	C	DUPLIN CO, NC (DPL)	G
Tampa App/Dep Con—120.65 119.9 290.3		AWOS-3 120.675	
Twr—121.2 121.5R Gnd Con—121.9		Seymour Johnson App/Dep Con—119.7 338.6	
CLASS D—(1230-2302Z) except Easter, Thanksgiving, Christmas and other holidays by NOTAM		Washington Center App/Dep Con—135.5 272.75	
BAXLEY MUNI, GA (BHC)	A	EAST COOPER, SC (85S)	G
AWOS-A 376		Charleston App/Dep Con—135.8	
Jax Center App/Dep Con—132.3 290.4		EGLIN AFB, FL (VPS)	A
BEAUFORT CO, SC (73J)	F	ATIS 273.5	
Beaufort App/Dep Con—118.45 301.2		App/Dep Con—132.1 281.45 (090'-270') 125.1 281.45 (271'-089')	
Jax Center App/Dep Con—120.85 322.5		Jax Center App/Dep Con—132.1 360.6 Twr—118.2 353.65	
BEAUFORT MCAS/MERRITT FLD, SC (NBC)	F	Gnd Con—121.8 335.8 Cinc Del—127.7 377.2	
ATIS +278.0		CLASS D—(Continuous)	
App/Dep Con—123.7 251.7 (3000' and blo) 118.45 301.2 (abv 3000')		EGLIN AF AUX NR 3 DUKE FLD, FL (EGI)	A
Jax Center App/Dep Con—120.85 322.5 Beaufort Twr—119.05 340.2		App Con—132.1 358.3 Duke Twr—133.2 290.425	
Gnd Con—128.15 336.4 Cinc Del—128.15 336.4		Gnd Con—251.125 Dep Con—120.9 290.5	
CLASS D—Mon-Thu (1200-0400Z), Fri (1200-2300Z)†		CLASS D—(1500-0600Z) except holidays	
Sat (1500-2300Z), Sun (1700-0100Z) except holidays		ELBERT CO-PATZ FLD, GA (27A)	F
BERRIEN CO, GA (4J2)	A	Atlanta Center App/Dep Con—127.5 316.05	
Valdosta App/Dep Con—126.6 285.6 (blo 8000') 119.525 259.3		ELIZABETHTOWN, NC (4W1)	G
(8000' and above) Jax Center App/Dep Con—125.95 379.2		Fayetteville App/Dep Con—133.0 295.0	
BERKELEY CO, SC (58J)	G	ELLIS, ALBERT J., NC (OAJ)	H
Charleston App/Dep Con—135.8 257.1		AWOS-3 124.475	
BLACKWELL FLD, AL (71J)	A	Wilmington App/Dep Con—121.4 257.6	
Cairns App/Dep Con—125.4 234.4		Washington Center App/Dep Con—135.5 272.75	
Jacksonville App/Dep Con—134.3 353.5		EMANUEL CO, GA (SBO)	A-F
BOCA RATON, FL (BCT)	C	AWOS-3 133.375	
Palm Beach App Con—125.2 343.6		Atlanta Center App/Dep Con—135.55 343.75	
Palm Beach Dep Con—127.35 343.6		ENTERPRISE MUNI, AL (EDN)	A
BOGUE MCALF, NC (NJM)	H	Cairns App/Dep Con—133.45 237.5 A	
Cherry Point App/Dep Con—124.1 268.7 Twr—119.5 321.8		Jacksonville App/Dep Con—120.2 346.4	
Gnd Con—262.6 Cinc Del—262.6		EXECUTIVE, FL (ORL)	B
CLASS D—Mon-Thu (1400-0000Z) and Fri (1400-1700Z) except holidays,		ATIS +127.25	
when daylight savings time is in effect Mon-Fri (1600-0200Z)		Orlando App/Dep Con—124.8 307.0 (000'-180' above 5000')	
and Fri (1300-1600Z) except holidays		120.15 284.7 (181'-359' above 5500') 121.1 351.9 (311'-060' 5500'	
BREWTON MUNI, AL (12J)	A	and blo) 135.3 397.85 (061'-180' 5000' and blo) 119.4 259.1	
Jax Center App/Dep Con—120.2 346.4		(181'-310' 5500' and blo) Twr—118.7 239.0 Gnd Con—121.4 239.0	
BRUNSWICK CO, NC (SUT)	G	Cinc Del—128.45 Charleston App/Dep Con—135.8	
Wilmington App/Dep Con—118.25 276.3		CLASS D—(1100-0400Z)	
Washington Center App/Dep Con—135.5 272.75		FAIRFIELD CO, SC (FDW)	F
BURKE CO, GA (BXG)	A-F	Columbia App/Dep Con—133.4 285.6	
Augusta App/Dep Con—126.8 270.3		FAYETTEVILLE REGIONAL/GRANNIS FLD, NC (FAY)	G
Atlanta Center App/Dep Con—128.1 323.0		ATIS 121.25	
		App/Dep Con—133.0 295.0 (061'-230') 127.8 340.7 (231'-320')	
		119.175 393.0 (321'-060')	
		Twr—118.3 269.2 Gnd Con—121.7 348.6	
		CLASS C—(Continuous)	

Sample air/ground voice comms section.

aeronautical information for enroute navigation under IFR (Instrument Flight Rules) in the low altitude stratum. The series also includes Enroute Area Charts, which furnish terminal data at a large

scale in congested areas. Information includes the portrayal of L/MF (Low and Medium Frequency) and VHF airways, (surface up to, but not including 18,000 feet above sea level) limits of controlled

airspace, position, identification and frequencies of radio aids, selected airports, special use airspace areas, military training routes, and related information. Charts are printed back to back and are revised every 56 days." There are 26 charts found on 13 maps for the lower 48 with four charts on two maps for Alaska. Unlike the visual charts I described last month, few are the same scale, so you cannot tape two or more together to get a larger map. However, the routes do carry over the other maps.

Many airways keep the same number across the country. All low-altitude airways that navigate off VORs and VORTACs (I'll describe those in detail in a later column) are printed in black, preceded by the letter "V" and are pronounced "Victor" with the number; for example: "V441" is pronounced "Victor four-four-one" or "Victor four-forty-one." Some airways are shown in a single direction arrow box instead of a plain black box. These are naturally one-way airways. These maps show you the actual route the aircraft is on. In the middle of the legend page is the section which deals with Navigational Aids (NAVAIDS) and Communications. Most of this is self-explanatory and is quite similar, for the most part, with what was written about in the last column.

"But what makes these (and the Enroute High Altitude Charts) special are the left and/or right map edges when the maps are open. There, for your use, is virtually every VHF and UHF frequency that is in use at the airports found on the map."

But what makes these (and the Enroute High Altitude Charts) special are the left and/or right map edges when the maps are open. There, for your use, is virtually every VHF and UHF frequency that is in use at the airports found on the map. For example on the L-19/L-20 maps which covers portions of Florida, Georgia, North Carolina, South Carolina, and Tennessee, there are frequencies and miscellaneous information for nearly 300 public, private, and military airfields. Also included is a listing of all Restricted,

Warning, and Alert Areas, military IR (Instrument Routes) that are flown low level by most military fighters, bombers and cargo aircraft, and Military Operating Areas (MOAs), their active times, and the agency in control of the MOA. Unfortunately, the frequencies used in these areas are not published in this section and must be randomly scanned.

“From the AIM, ‘These charts are designed to provide aeronautical information for enroute navigation under IFR in the altitude stratum (from 18,000 to 60,000 feet above sea level).’”

Enroute High-Altitude Aero Charts

From the AIM, “These charts are designed to provide aeronautical information for enroute navigation under IFR in the altitude stratum (from 18,000 to 60,000 feet above sea level). Information includes the portrayal of jet routes, position, identification and frequencies of radio aids, selected airports, distances, time zones, special use airspace areas, and related information. Charts are revised every 56 days effective with the date of airspace changes.” Unlike the low altitude charts, five of the six maps are on the same scale and *can* be taped together to form a completed map of the jet routes of the U.S. Like the sectionals, you must acquire two of the

U.S. ASSIGNED CALLSIGNS

Call	Company	ID
ABEX	Airborne Express, Inc. (Wilmington, OH)	ABX
ACADEMY	Academy Airlines (Griffin, GA)	ACD
ACADEMY AIR	FAA Academy (Oklahoma City, OK)	AYA
ACE AIR	Alaska Central Express Inc. (Fairbanks, AK)	AER
ACK AIR	Nantucket Airlines (Nantucket, MA)	ACK
ACOM	Southern Jersey Airways Inc. (Atlantic City, NJ)	AJC
ACTION AIR	Action Airlines (Action Air Charter)	AXQ
ACTIVE AERO	Active Aero Charter, Inc. (Belleville, MI)	AVR
AERIAL TRANZ	Aerial Transit Company (Miami, FL)	AEZ
AERO COACH	Aero Coach Aviation Intl, Inc. (Ft. Lauderdale, FL)	DFA
AERO DYNAMIC	Aero Dynamics, Inc. (Dallas, TX)	DYN
AERODYNE	Aerodyne (Milwaukee, WI)	ADY
AEROSUN	Aerosun International Inc.	ASI
AFRICA EXPRESS	USAfrica Airways, Inc. (Reston, VA)	USF
AGRICULTURE	Dept. of Agriculture (Hyattsville, MD)	AGR
AIR AM	Air Specialties Corporation D/B/A Air America/	AMR
AIR ARCTIC	Arctic Circle Air Service Inc. (Fairbanks, AK)	CIR
AIR CAMAI	Village Aviation, Inc. D/B/A Camai-Air (Bethel, AK)	CAM
AIR ERIE	Erie Airways, Inc. (Erie, PA)	ERE
AIR EXPRESS	U.S. Express (Plymouth, MA)	USX
AIR FORCE	U.S. Air Force	A
AIR FREIGHTER	Aeron International Airlines, Inc. (Newburgh, NY)	AXI
AIR GUAM	Air Guam (Tamuning, GU)	AGM
AIR ILLINOIS	Air Illinois, Inc. (Carbondale, IL)	AHL
AIR INDIANA	National Jet Service (Indianapolis, IN)	AND
AIR JOHNSON	Johnson Air, Inc. (Batavia, NY)	JHN
AIR KITTYHAWK	Kitty Hawk Air cargo, Inc. (Dallas-Ft. Worth, TX)	KHA
AIR L-A	Air L.A., Inc. (Los Angeles, CA)	UED
AIR MIDWEST	Air Midwest, Inc. (Wichita, KS)	AMW
AIR MIKE	Continental Micronesia Inc. (Tamuning, GU)	CMI
AIR NEVADA	Air Nevada Airlines, Inc. (Las Vegas, NV)	ANV
AIR OHIO	North Coast Aviation, Inc. (Cleveland, OH)	AOH
AIR PARCEL	Parcel Express (Denver, CO)	APE
AIR PROFESSIONAL	Professional Express Courier Service Inc. (Seattle WA)	PAD
AIR PROP	Propheter Construction Co., Inc. D/B/A Propheter Aviation (Sterling, IL)	PPA
AIR RESORTS	Air Resorts (Carlsbad, CA)	ARZ
AIR ROYAL	Royal Air Freight, Inc. (Waterford, MI)	RAX
AIR SEATTLE	Spurling Aviation (Seattle, WA)	ASL
AIR SHUTTLE	Mesa Aviation Services, Inc. (Farmington, NM)	ASH
AIR SPIRIT	Air Spirit Inc. (Dallas, TX)	SIP
AIR SPUR	Corporate Air (Billings, MT)	CPT
AIR SUNSHINE	Air Sunshine Inc. (Ft. Lauderdale, FL)	RSI
AIR TODAY	Air Today, Inc. (Denver, CO)	TDY
AIR TRANSPORT	Air Transport International (Tulsa, OK)	ATN
AIR TRAVEL	Air Travel Corp (Worcester, MA)	ATH
AIR VEGAS	Air Vegas Airlines, Inc. (Las Vegas, NV)	VGA

New/Changed/Deleted Frequencies

NEW

Berrien Springs, MI (C20)
Lansing FSS Remote Comm Outlet — 121.625 MHz
Cape Romanzof, AK (CZF)
NDB — 275 kHz
Dansville Municipal Airport, NY (DSV)
ASOS — 118.325 MHz
John Day — Grant County Regional Airport, OR (5J0)
AWOS-3 — 118.375
Northway Airport, AK (ORT)
ASOS — 135.4MHz
Stockton, CA (ECA)
Oakland AFSS — 122.0 MHz

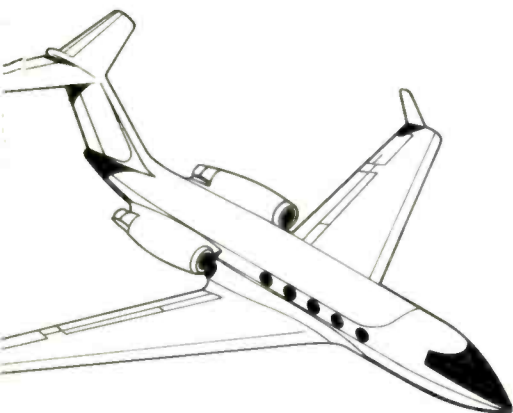
DELETED

Salt Lake City International, UT (SLC) Ground Control — 121.65 MHz

CHANGED

Del Rio International Airport, TX (DRT)
Del Rio Approach — was 264.8 MHz — now 298.875 MHz
Laughlin AFB, TX (DLF)
Del Rio Departure — was 264.8 MHz — now 298.875 MHz
New Castle Municipal Airport, PA (UCP)
Youngstown Approach — was 128.25 MHz — now 118.9 MHz
Rocksprings Edwards County Airport, TX (69R)
Del Rio Approach — was 264.8 MHz — now 298.875 MHz
Youngstown Lansdowne Airport, OH (04G)
Youngstown Approach — was 128.25 MHz — now 118.9 MHz
Youngstown Warren Regional Airport, OH (YNG)
Youngstown Approach — was 118.9 MHz — now 118.25 MHz and 128.25 MHz is now 118.9 MHz

Call	Company	ID
AIR VIRGINIA	Cardinal/Air Virginia (Lynchburg, VA)	FVA
AIR WISCONSIN	Air Wisconsin Airlines Corp. (Appleton, WI)	AWI
AIRE HAMPTON	East Hampton Aire (East Hampton, NY)	EHA
AIREX	Air Xpress, Inc. (Greensboro, NC)	ARX
AIRFED	Panorama Flight Service (White Plains, NY)	AFD
AIRFLIGHT	Alpha Aviation, Inc. (Dallas, TX)	APH
AIRGO	Universal Airlines, Inc. (Detroit, MI)	WEC
AIRLIFT	Airlift International Inc.	AIR
AIRLOG	Air Logistics (LaFayette, LA)	ALG
AIRNAT	Airways International, Inc. (Miami Springs, FL)	AWB
AIRPAC	Airpac (Seattle, WA)	APC
AIRVANTAGE	Airvantage Inc. (St. Paul, MN)	AVV
ALASKA	Alaska Airlines	ASA
ALASKA ISLAND	Alaska Island Air, Inc. (Anchorage, AK)	AAK
ALASKA PACIFIC	Airpac Inc. (Anchorage, AK)	APM
ALCOA SHUTTLE	Aluminum Company of America (West Mifflin, PA)	AQO
ALL STAR	All Star Airlines, Inc. (Woburn, MA)	ASR
ALLEGHENY	Pennsylvania Commuter Airlines Inc. (Middletown, PA)	ALO
ALLEGIANTE	Allegiant Air, Inc. (Fresno, CA)	AAV
ALLIANCE	AMR Services Corp. (Dallas, TX)	XAM
ALOHA	Aloha Airlines	AAH
ALPHA AIR	Alpha Air (Van Nuys, CA)	ALH
ALPINE AIR	Alpine Aviation, Inc. (Provo, UT)	AIP
ALTUS	Altus Airlines (Altus, OK)	AXS
ALYESKA	Alyeska Air Service (Anchorage, AK)	ALY
AM CORP	Aviation Management Corp. (Lansing, MI)	AAM
AMERICAN	American Airlines, Inc.	AAL
AMERICAN CHECK	Flight Line, Inc. (Denver, CO)	ACT
AMERIJET	Amerijet International (Ft. Lauderdale, FL)	AJT
AMERISTAR	Ameristar Jet Charter, Inc. (Dallas, TX)	AJI
AMFLIGHT	Ameriflight, Inc. (Burbank, CA)	AMF
AMP-INC	Amp Inc. (Harrisburg, PA)	MMP
AMTRAN	American Trans Air, Inc.	AMT
ANDAX	Anderson Aviation, Inc. (Anderson, IN)	ADX
APPALACHIAN	Appalachian Flying Service Inc. (Blountville, TN)	APL
AQUILINE	Aviation Services, Inc. (Hartford, CT)	AVQ
ARCTIC TRANSPORT	Ryan Air Service, Inc. (Anchorage, AK)	RCT
ARIZAIR	Arizona Airways, Inc. (Tucson, AZ)	AZY
ARIZONA	Arizona Air (Phoenix, AZ)	AAE
ARIZONA PACIFIC	Arizona Pacific Airways (Prescott, AZ)	AZP
ARROWHEAD	Arrowhead Airways (Minneapolis, MN)	ARH
ASPEN	Aspen Helicopters, Inc. (Oxnard, CA)	AHF
ATLANTIC GULF	Atlantic Gulf Airlines, Inc. (Clearwater, FL)	AGF
ATLANTIS AIR	Atlantis Airlines (Myrtle Beach, SC)	AAO
ATLAS-AIR	Atlas Airlines (Muncie, IN)	ATR
AUDI AIR	Audi Air, Inc. (Kaktovik, AK)	AUD
AVALON	Merlin Express, Inc. (San Antonio, TX)	MEI
AVCO	Airway Express, Inc. (Mesa, AZ)	AEX
AVERITT	Averitt Air Charter (Nashville, TN)	VRT



same map in order to complete the picture, but you need not buy a copy of each and every Enroute Low and High altitude charts.

Next month will be the first of four installments on air traffic control facilities. There are four types of facilities: Flight Service Stations (FSS), Airport Traffic Control Towers (ATCT), Approach Controls (TRACON, RAPCON, and conventional), and Air Route Traffic Control Centers (ARTCC). You'll see who pilots communicate with and how they fly the Country's National Aerospace System.

Keep the letters, questions, and E-mails coming. See you next month. ■

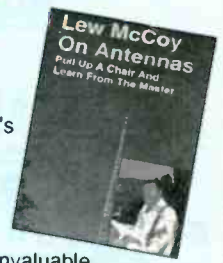
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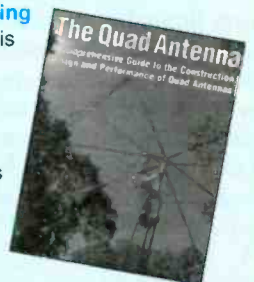
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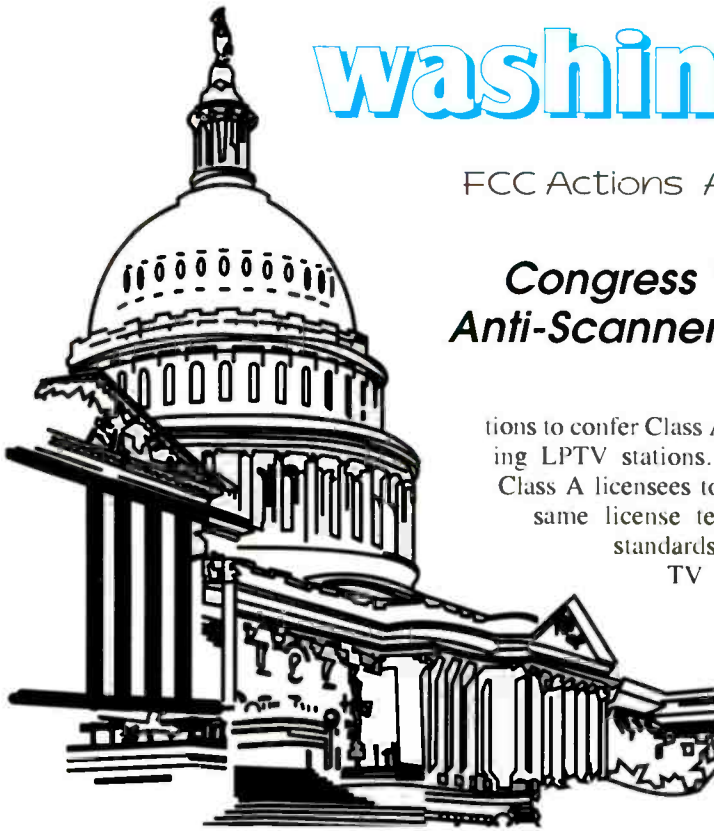
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washington beat

FCC Actions Affecting Communications

Congress "Steals" Another Base, And Anti-Scanner Legislation Is Reincarnated!



Though Congress is expressing grave doubts about the viability of Low Power FM broadcasting, there is little doubt about congressional sentiment toward Class A Low Power Television (LPTV). Much like LPFM radio, these stations are to provide locally originated programming in localities with limited or no access to this sort of information and entertainment. These stations are likewise expected to provide programming to specialized niche audiences such as ethnic communities. Last fall, the FCC already had a proceeding underway to consider giving "Class A" protection status to LPTV stations. Class A stations will enjoy primary status, thereby having some interference protection from full power TV stations. Before the Commission could get through its proceeding, Congress jumped the gun and passed the Community Broadcasters Protection Act of 1999 (CBPA, PL 106-113, 47 USC §336(f)). Since the FCC had been following due process in advancing Class A LPTV, one can speculate that Congress' motive in hastily passing the CBPA was to take the accolades of being the good guy, for themselves.

The CBPA directs the FCC, within 120 days of enactment, to establish regula-

tions to confer Class A status to qualifying LPTV stations. The act requires Class A licensees to be subject to the same license terms and renewal standards as full power

TV stations. Additionally, CBPA provides guidelines for interference protection that Class A licensees must afford to full power NTSC TV stations as well as to digital

ATSC stations. Toward that end, the Commission, on March 28, adopted Report and Order FCC 00-115 (MM Docket 00-10), "Establishing a Class A Television Service." This new television service class is intended for existing LPTV stations that have met certain criteria during the 90 days preceding the enactment of the CBPA. Class A stations must broadcast a minimum of 18 hours per day. These stations must broadcast an average of at least three hours per week of specified local programming. And, these stations must be in compliance with the FCC's LPTV rules, transitioning to compliance with rules for full power TV stations from the date of Class A application. Unspecified limited exemptions to these requirements are also provided. The FCC had not yet released the full text of the docket at press time.

H.R. 514 Is Reincarnated — Again!

Will the Congressional follies never end? This time, the familiar anti-scanner and anti-consumer legislation lives as S. 2326, the Wireless Eavesdropping Protection Act of 2000. Barring minor

editorial differences, the text of this new bill reads the same as H.R. 3489, reported in last month's "Washington Beat." The language is nearly identical to H.R. 514, as well. As of deadline, the bill has been referred to the Senate Commerce Committee, where it awaits action. If the committee gives S. 2326 the same reception it gave H.R. 514, the newer bill could languish indefinitely, perhaps never seeing a full Senate floor vote.

The Cellular Telephone Industry Association "strongly supports" the new bill, according to a CTIA news release. Perhaps digital encryption "enhanced privacy" services aren't selling as well as the industry would like. The *Pop'Comm* legislative affairs desk will continue closely watching these three bills.

Software Defined Radio

The FCC is studying the future of Software Defined Radio. And the future may be here before you know it. The Commission has issued a Notice of Inquiry, OET Docket 00-47 (FCC 00-103) to solicit input on SDR. The Notice describes Software Defined Radio as using software that controls high-speed signal processors to perform functions conventionally performed in hardware. Such functions include signal generation, tuning, and receiver signal detection. According to the FCC, SDR equipment can be quickly reprogrammed to transmit and receive on any frequency utilizing nearly any transmission format. This frequency-hopping ability, the Commission contends, could enable a software-defined transceiver to operate in various cellular, PCS, and other radio communications bands. The FCC's vision apparently anticipates that such frequency agility would facilitate more efficient use of the spectrum by diverting radio traffic from busier bands to less busy bands.

BY ALAN DIXON, N3HOE/KST8678 <n3hoe@juno.com>

The goal of Software Defined Radio is indeed to adapt a radio's function to any of a number of possible transmission and signaling modes. For example, a given transceiver will not care if it is to transmit and receive in TDMA, CDMA, IDEN, GSM, TETRA, FM, SSB, or other modes. It will, depending on design, adapt manually, or automatically by sense or by software direction, to the necessary mode. No specific rulemaking by the FCC is necessary to implement this basic concept, other than to possibly allow specific transmission modes that may be currently prohibited in a given radio service.

Unfortunately, the FCC is already confusing the issue of Software Defined Radio. In OET 00-47, the Commission vaguely describes some form of frequency hopping scheme, utilizing various widespread portions of the spectrum across "traditional" radio services. Good or bad as that concept may be, it is *not* within the de facto industry definition of Software Defined Radio. As known within the telecommunications industry, Software Defined Radio does not necessarily include any sort of frequency hopping ability.

Nonetheless, some limited frequency agility would be useful for interoperability among dissimilar communications systems and bands within a given radio service. One example of this would be crossband, multimode communications between neighboring public safety jurisdictions. The FCC is taking into consideration issues regarding hardware and software equipment authorization and interference control. Time will tell *how*, not *if*, Software Defined Radio will advance. We will watch for future SDR direction from the Commission and its Technological Advisory Council.

Getting To The "Core" Of The Matter

Frustrated by the FCC's new Universal Licensing System (ULS)? Don't worry about ULS. Here comes CORES — we think. In early spring, the FCC announced its intention to implement the Commission Registration System (CORES) along with the FCC Registration Number (FRN), in Public Notice DA 00-407. Presumably, CORES would replace the ULS system. A major difference between these two registration programs would be that ULS is solely for the Wireless Telecommunications Bureau, while CORES would involve the entire agency.

According to the Commission, most entities already registered with the ULS would automatically be registered in CORES. The ten-digit FRN would be required for anyone doing business with the FCC. Though not required for petitioners or complainants, the Commission was urging all to obtain an FRN for identification purposes.

However, less than a week after announcing the CORES program, the

FCC issued DA 00-644, rescinding the entire CORES/FRN Public Notice. The new program was to have been phased in by January 2, 2001. Now CORES is in limbo. This latest Public Notice advises that the Commission will soon issue yet another Public Notice, re-implementing the program at a later, undetermined date.

Keep cool this summer, and let me have your questions and comments at n3hoe@juno.com. See you next month! ■

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CIRCLE 68 ON READER SERVICE CARD

A Chief Engineer Weighs In

Dear Editor:

I've been a *Popular Communications* reader for 10 years, and have enjoyed the banter back and forth about the amateur license Morse code requirements. I'm normally a live-and-let-live person, but Ray Yakesh's comments really were the last straw for me. As one of those dreaded no-code techs, I'm glad you let him have it like you did, and I'd like to add a few comments of my own.

To begin with, the Morse code requirement is unprecedented in any of the other types of operation allowed by hams. You don't have to demonstrate a knowledge of foreign languages in case you want to run phone and happen to talk to a person who speaks one of the many other languages in this world other than English. You don't have to demonstrate a knowledge of ASCII code or computer programming in case you want to run packet. You don't have to demonstrate a knowledge of TV camera tubes in case you want to run amateur TV. If you want to operate in any of these modes and they interest you, you will be inspired to learn about them and improve your knowledge base, but intimate knowledge of them is not required to get an amateur license. So, then, why Morse code?

I am the Chief Engineer of a TV station, and have spent over 20 years maintaining every class of broadcast transmitter there is. I daresay I have spent many more hours than Mr. Yakesh has sending radio waves out into the ether. I was appalled at how easy the written test was for the no-code license. On my test, there were no questions about modulation, power output, frequency tolerance, or many other topics that have to do with preventing interference to other services. I understand to some degree the desire to keep amateur radio an "exclusive" hobby, but a much easier and productive way would be to make the written test harder! At least then we are requiring people to learn something and acquire knowledge that would be useful, instead of something useless (to most hams) like Morse code.

I resent the implication that I am lazy or stupid because I don't want to waste my time learning code. I am of average intelligence, and I could learn Morse code if I so desired. I enjoy gaining new knowledge and learning new techniques. By the

same token, I am a busy person and I don't have time to burden myself learning something I will never use.

I understand and wholeheartedly agree with the pursuit of "nostalgia." If you want to set aside parts of the bands for CW, if you want to form CW clubs and use that mode of communication for your own enjoyment, to remember those techniques from the early days of radio, fine. I collect and restore antique tractors, and enjoy revisiting the machinery and techniques of farming from 60 years ago. However, I would never insist that all new farmers demonstrate a working knowledge of a 1940 Farmall "M" just because that was the state of the art 60 years ago it makes about as much sense as the Morse code requirement for today's amateurs.

Sincerely,
Brian L. Hoover
South Bend, IN

Another Message For Ray

Dear Editor:

Bravo on your reply to Ray in the April issue! You hit the nail on the head. I am getting very tired of these people that just can't give up on the CW issue. Outsiders see this as a very ridiculous issue for us hams to be fighting over.

I welcome new hams, CW or no CW. In this day and age there is no point in forcing CW upon many who would make very good hams even if they don't know the code. Yes, the code can be fun and helpful at times but it certainly has very little relevance in this day and age. Yes, I had to take a code test when I got my ticket, but I didn't have to know anything about digital communications because when I got my ticket there were no digital communications. Maybe we should retest all of the older hams and make them pass a test in digital communications! I am just kidding of course, but let's get with it folks. Times change and we need to get a lot more people into this radio hobby or ham radio or it may not exist in 15 or 20 years. Just look at the electronics industries in the U.S. Where is all of our gear coming from? Most is from overseas manufacturers. There is a desperate need for electronic engineers and techs right here in the U.S. and we are supposed to be providing a service to our country as hams. One of those services is to provide people skilled in the electronics field.

Thank you for such a great magazine!
Larry Shaunce, WD0AKX

are typically overworked because of high call volume?

Have you seen these bozos driving down the highway? They're easy to spot rolling through stop signs, running red lights, making sudden turns without signaling, crossing over into oncoming traffic, braking unnecessarily, and usually driving too slowly (or fast). Why not defer the call for a few minutes? And why not let your voice messaging take the call?

Obviously, the cell phone is a great business tool. Many people tell me they couldn't live without it, and frankly when I was playing with that Nextel phone my life was indeed a bit more organized. And as a lifesaving device, it's superb. So are our CBs and ham radios. Our radios don't get overloaded, and the airtime is free. But as states and municipalities look seriously at making mobile use of cellular phones illegal, it *could* impact our mobile use of radio. Fact is, like mobile cellular users, we should also be aware of the safety aspect when driving and playing the radio. Proper mobile radio installation, familiarizing yourself with the radio's simpler keypresses and, yes, even pulling to the side of road to make a call could save your life. Either we exercise caution with our hobby or sadly Uncle Sam will do it for us.

My third wish is that perhaps we shouldn't be so quick to *wish* for laws restricting mobile cell phone use. Keying the microphone on that brand new mobile ham or CB rig could run you afoul of the law if we're not careful what we wish for. And we don't want that, do we?

And if you still think it's still OK to dial up Grandma or order a pizza while zipping down the highway, see if you can pass my "This is America and We The People should be allowed to use our cell phone anywhere we want to" test. It's simple, really. Some early morning, just give your cell phone to your kid's school bus driver and instruct him to call you as he begins driving the kids down the rain-slicked highway. Or better yet, when you 747 is in the last minute of final approach ask the pilot to call your wife and ask what's for dinner. He should tell her you might be late — very, very late. The obvious answer to using cell phones on the road is not to answer — or make — the call unless it's an emergency.

And while you're mobiling this summer — with that cell phone *or* radio — don't forget to call 9-1-1 to report that drunk driver. ■

advertisers index

ADI/Premier Communications.....	35
AOR USA, Inc.	7
Antique Radio Classified.....	37
Atomic Time, Inc.....	27
Bill's CB & 2-Way Radio Ser.....	33
C. Crane Company.....	Cov III
C & S Sales, Inc.	57
CQ Merchandise.....	29
CRB Research.....	53
Computer Aided Technologies.....	43
Cutting Edge Enterprises.....	23
Firestik Antenna Company.....	46
GRUNDIG.....	11-14
ICOM America, Inc.....	5
Jo Gunn Enterprises.....	31
Lee Electronics Company.....	37
Lentini Communications, Inc.....	1,21
Lextronix, Inc.....	11-14
MACO Mfg./Majestic Comm.....	33
MFJ Enterprises, Inc.....	39
Monitoring Times.....	69
Mouser Electronics.....	22
Optoelectronics, Inc.....	Cov IV
Phillips-Tech Electronics.....	33
REACT International, Inc.....	77
RadioWorld, Inc.....	52
Ranger Communications, Inc.....	19
Scanning USA.....	53
shoc.....	55
Shortwave Listening Guide.....	25
Signal Engineering.....	55
Universal Radio, Inc.....	3
Viking Systems International.....	65
Wilson Antenna, Inc.....	53
Yaesu U.S.A.....	Cov. II

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the loose connection

Radio Communications Humor

Our Top-30: You Can Tell You're A Radio Nut If . . .

You can see it in our eyes at hamfests and hear it in our voices; we're different than folks in most other hobbies. Now, I know that there's a great crossover — lots of hams are hunters, bikers, and golfers, and scanner nuts are also interested in those things, plus all kinds of sports, parachuting, and fishing. But our radio hobby itself just seems to me to have such a diverse spectrum of folks that we'd do practically anything short of selling our home to play with our gear. So we've come up with a special Top-30 list of what really goes on inside the radio person's mind. We'd like to hear from you — are any of these you, and what would you add to our list?

You know you're knee-deep in radio if —

1. You remember the exact date and time that lightning hit "the tower." And — the whole radio room was burned to a crisp, but you tell friends, "at least my wife wasn't home when it happened."
2. You'll spend hundreds of dollars on a new rig, and then wander the hamfest pausing each time you pass the booth selling those \$7 embroidered hats. "I wonder if they'll take \$6?"
3. You're a CBer who buys a new \$300 five-watt, perfectly operating rig, opens the cabinet to "tweak" it to 20 watts, knowing full well it'll end up being sent back to the company for repair. The radio comes back, and a few weeks later you repeat the process — by watching your CBer friend from across town do surgery on *your* radio.
4. When shopping for a new vehicle, you somehow end up sitting in the front seat staring blankly at the dashboard area, feeling underneath seats, and poking around the backseat for ways to mount the radio and route the coax. If caught looking under the hood for holes in the firewall for your power cables, you tell your wife, "Nothing honey, just checking the connections under here."
5. Your family has a special annual garage sale just to get rid of the boxes of wire, coax and power adapters — but you pay your friends to "buy" the stuff and get them to return it to you the following weekend.
6. You absolutely need a radio with thousands of channels — even though you live in a town with three cops and a volunteer fire department and the airport is 350 miles away.
7. In your determination to get that new vertical antenna up, or longwire strung in the backyard, you tell family and neighbors that "it's only temporary — I'm testing it for this guy."
9. The \$10 bargain you got at the flea-market that smoked up the whole house when you turned it on is one of your prized radio possessions.
10. You'd rather sell your family's TV and VCR than give up the box of vacuum tubes you got at a "bargain" even though 90% of them are dead.
11. It still doesn't matter to you if the antique radio you brought home was an apartment for mice.
12. You're not speaking to your elderly neighbor because last week just as you tuned Radio Kiribati, he turned on his power drill.
13. Your wife has called you three times for dinner — the **FOURTH** could be a call from her lawyer.
14. You're the only one in your family that understands the real meaning of CW. And you get stressed out if someone's CW transmission rate varies from one wpm to 75 with no warning.
15. When going on a vacation, the first thing you think about packing is your scanner and frequency book.
16. You take your scanner to work disguised as a cell phone.
17. You acknowledge conversations with your family and friends by saying 10-4 — *and* they think it's normal.
18. The total number of radio related books in your home are five times the number of other books and magazines.
19. You store extra "emergency" AA batteries in the refrigerator.
20. You're immediately recognized and spoken to by name at your favorite radio dealer.
21. You think a good time is "breaking in" a new part-time RadioShack employee with your radio wisdom.
22. Your spouse goes to the supermarket while you "look around" in RadioShack.
23. You visually check your outdoor antennas and coax once a week, regardless of the weather.
24. People ask you to turn down the volume on the radios when they call you.
25. The total number of antennas on your house is greater than six other houses on your block — counting the ham down the street.
26. You've considered contacting NOAA offering your voice as a substitute for that awful sounding mechanical computer-generated voice.
27. People keep asking your family about the "light that's always on" in the back room where your radio shack is located.
28. More than 95% of the photos in your family album show you with a radio strapped to your belt or a microphone in your hand.
29. You have more certificates and licenses on the wall than your local veterinarian or dentist.
30. Your cat or dog instinctively knows not to bother you when you're in your radio shack. ■

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