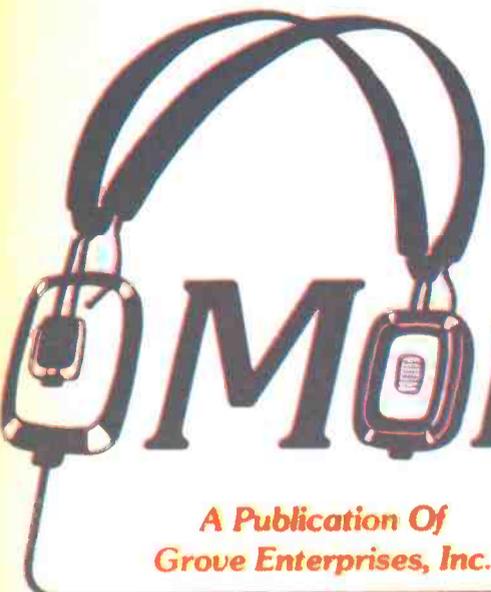


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- ★ **Radio Bangladesh**  
by Gayle Van Horn & Larry Miller
- ★ **Utility Primer**  
by Bob Grove
- ★ **Random Thoughts**  
by Jeff White
- ★ **Magne on Shortwave Antennas**
- ★ **New Federal Frequency Column**



# MONITORING TIMES

A Publication Of  
Grove Enterprises, Inc.

## RACING RADIOS

*Monitoring the Speed Merchants*

By Jock Elliott  
See Page 4

CHRISTIAN FALLS UH 44022-  
 \*\*\*\*\*3 DIGIT FHE \*\*\*\*\*  
 GUDDMAN, DAVID J. 0188  
 51870 HIRAM TRAIL



**Plus—Other Sports Frequencies for Summer Listening!**

by Bob Parness See Page 4

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**Our "Hidden Antenna System" is your key to exciting short wave reception without an outside antenna!**

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|-----------------------|---|
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# MONITORING TIMES

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**On the Cover:** #16 Tony Bettenhausen (IMS photo by Mag Binkley); inset, Dave Cotter with headphones (IMS photo by Steve Swope). Cover design by Owassa Graphics, Murphy, NC

## Bugs Bug Embassy Officials



**U.S.** officials are displaying righteous indignation over the realization that security at the new embassy in Moscow may be compromised by surreptitious listening devices. Russian officials countercharge by showing the press tiny electronic implantations they have found in their quarters. This is big news?

Even top-secret NSA has gotten into the pop-spy fad. You can turn in a spy toll-free by calling 1-800-CALL-SPY and a trained NSA agent will listen to your story and investigate your claim. To prevent witch hunts the caller will be screened first by a series of questions to determine the quality of the allegation--and its allegator!

For decades, the east has been bugging the west and the west has been bugging the east. From the famous cavity resonator in the beak of the eagle in the U.S. Seal to the legend (and highly overrated) martini olive bug, an endless array of James Bond devices has been planted, used, discovered, and replaced by both sides in sensitive offices around the world.

Now, after allowing Muscovites to have free access to the U.S. Embassy construction site during all phases of its erection, U.S. officials are crying "foul"! Is it possible that Russian agents could have slighted good sportsmanship and actually planted listening devices in the building? Surely not!

The surprise is not that high-tech eavesdropping is a way of life in the spook business, but that such an accepted and fully-anticipated practice is even newsworthy. More likely, the revelation is timed to influence world opinion during a period of delicate strategic negotiations with the Soviets.

## See You at Atlanta and ANARC

The next couple of months will be busy for me. I have been asked to present several listening forums at the ARRL national convention to be held at the Atlanta Hamfest; one at 3 PM Friday, July 10th; another at 4PM Saturday, July 11th; and a third at 11 AM Sunday, July 12th.

The Grove Enterprises/*Monitoring Times* booth will be busy at work in the exhibit area as well. This year's hamfest will be held at the spacious World Congress Center.

The Association of North American Radio Clubs (ANARC) will hold their annual convention in Missauga (near Toronto) July 17th-19th. I have been asked to give the banquet address on the evening of Saturday, July 18th. The subject is "Communications: Yesterday, Today and Tomorrow".

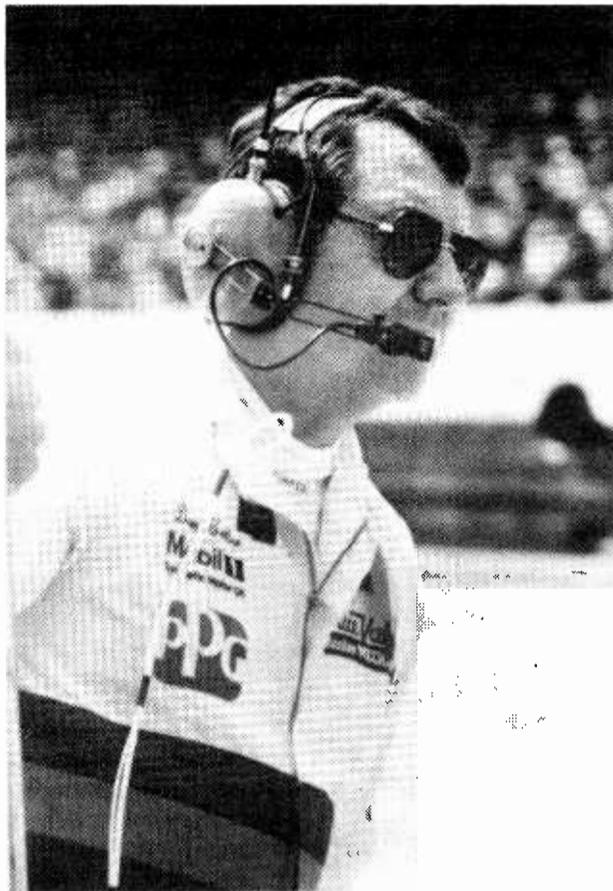
For reservations and other information, contact ANARCON '87 chairman Harold Sellers, P.O. Box 232, Station Z, Toronto, Ont. Canada M5N 2Z4.

*Bob Grove*

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# Monitoring the Speed Merchants

by Jock Elliott



Dave Cotter (IMS photo by Steve Swope)

As Bedard's car slid to a halt, the Wee Scot, ABC race commentator Jackie Stewart, said quietly into his microphone, "This is Ver-r-ry ser-r-rious indeed." At the same time, dozens of other microphones in several radio networks throughout the Speedway complex were keying up to get Bedard the help he needed.

Radio has become an essential part of modern auto racing, and it operates at a level of sophistication that is astounding. Most of us know that race drivers and their pit crews communicate with radios, but knowing that is like seeing the tip of an elephant's trunk and figuring you know what the rest of the animal looks like.

Here's a hint: when I called Indianapolis Motor Speedway to find out how they use radios in racing, the public relations office said they would put me in touch with their *Frequency Coordinator*. Frequency Coordinator?

Tom Allebrandi is the Frequency Coordinator for the Speedway. "On race day, it's an RF zoo," he says laughing. And he should know. It's his job to make sure that all the different radio users at the Speedway don't interfere with each other.

The complexity of the task is daunting. I am suspicious that Allebrandi would find Rubik's Cube "too easy."

To start, there are the various race teams. "30 of the 33 starters this year will be running with radios," Allebrandi says. The race car-pit crew link generally operates in the 460 to 470 MHz range. "You have to get above 400 MHz to avoid the spikes from the race cars' ignition systems," Allebrandi adds.

Next, there is the United States Auto Club (USAC) Race Control. Operating "all over the place in UHF and VHF," the USAC network ties together the pit stewards, various official race observers, and the pace car. The pace car not only starts the race but comes out on the track to keep the field under control whenever there is a yellow caution flag. When Race Control is certain that the reason for the yellow has been removed, they radio the pace car: "Turn off your yellow light, and get ready to pull in the next time around, we're going green." The pace car pulls into the pits; the field goes back up to speed and the deafening whine of high speed engines once again fills the air.

When things go wrong, a medical radio network, also linked into Race Control, provides communications for the crash trucks, the ambulances, and the race hospital. As soon as a crash occurs, this network makes it possible to summon help and to notify everyone involved that they may be needed.

Those who saw it will likely never forget. On the 59th lap of the 86th running of the Indianapolis 500, journalist Pat Bedard's Buick-powered racer, running off the pace but well into the Pampers Zone (three times the legal limit), breaks loose. His open-wheeled Indy car gets airborne, tumbling end over end, shedding wheels, wings, suspension, and other parts of the car. What's left -- the driver's "tub" and the engine -- finally comes to rest upside down on the pavement, a wreck of a car holding, in all probability, a dead driver.

Bedard, later writing in an article entitled, "They Say the Earth Moved, but I don't Remember It," would say that the only thing his crash lacked for sheer spectacle was a mushroom cloud.

A second medical radio network exists to provide communications for the first aid teams that help the race spectators. When you get 300,000-plus people gathered together in one place for most of one day, you are likely to get a certain number of heart attacks, child births, injuries, upset stomachs, and so forth. Well-coordinated, professional radio communications can make all the difference.

Yet another network operates within the Speedway grounds to coordinate the activities of the people who take care of the parking, maintenance, spectator control, and general security. At the same time, at locations in and around the track, the Indiana State Police (the only units on lo band), the Marion County Sheriff's Department, the Indianapolis Police, and various fire departments are all operating their own radio services on UHF and VHF to enforce the law, control traffic, and handle a wide variety of emergencies.

Then there come the communications needs of the media -- those wonderful folk who make it possible to bring the 500 right into our living rooms.

"ABC television wants at least 42 separate frequencies to cover this year's race," Allebrandi says. "These vary from 450 MHz communications for chatter, queuing, and production, to 950 MHz radios for wireless microphone inputs for roving reporters and 'wild sound' microphones picking up crowd and racing noises."

The race track itself runs its own network to provide radio coverage of the 500 to some 1,400 stations worldwide, and this means another bunch of frequencies, mostly in the UHF range, for reporters free to cover the pits and garage, as well as some additional frequencies for feeding queues and instructions to the people running the network.

At a different kind of racing facility -- Lime Rock Park, a road racing course in Connecticut -- Jim Shane, the track's general manager, says radio is an "essential part" of their racing efforts.

Like Indianapolis, Lime Rock operates three networks within the track grounds. One network controls the race; another coordinates track operations such as security, medical, and ambulances; and a third links the various concessionaires. In addition, various law enforcement agencies are operating their own networks. If the race is televised, like Indianapolis there are additional radio communications to meet the needs of the media.

During race day, Lime Rock also operates its own low-power radio station, WLRP on 530 AM. As Shane puts it, "No PA system in the world could overcome the combination of the noise of the engines and the hills and valleys around our race track. We operate WLRP so spectators can keep abreast of ongoing race action by tuning in on their AM radios with headphones."

The next time you tune in a motor race, remember there's a lot more to radios in racing than meets the ear. All you've got to know is what there is to hear and where to tune it in. ■

## Sports Frequencies

by Bob Parnass, AJ9S

Scanner enthusiasts who bring their radios to sporting events can enjoy a double dose of entertainment. By listening in on race car drivers, press reporters, and coaches, hobbyists can get the inside track on what's happening behind the scenes.

The following compilation of sports frequencies is believed to be the largest list ever published. Auto racing, football, baseball, horse racing, skiing, and golf activities are just some of the sports included.

Frequencies in the 450 - 470 MHz range are usually paired in the following way:

- 1) channels between 450 - 455 MHz are paired with channels 5 MHz higher (455 - 460 MHz)
- 2) channels between 460 - 465 MHz are paired with channels 5 MHz higher (465 - 470 MHz)

To save on space, only one half of the frequency pair for some licenses is listed. So, if a station is listed on 461.300 MHz, try listening on 466.300 MHz also.

Remote control (R/C) channels and public safety frequencies, used for purposes like ambulance squads and fire fighting, have not been listed. ▶

2X Racing	[USA-wide]	468.8000	KB87636	mobile	Goldberg, Mike, racing	[location?]	464.625? call?	Odeum-Midwest Stadim aka/Odeu	[Villa Park]	463.8250	KNCX219	mobile
5 Racers Corp	[USA-wide]	462.8375	KA80478	mobile	Goodyear Blimp, ACSB mode	[USA-wide]	151.8725+ call?	Ohio Gun Collectors	[USA-wide]	469.5500	WQ5786	mobile
59 Racing Team	[USA-wide]	466.3875	KA80478	mobile	Goodyear Blimp	[location?]	132.0000? WOP6	Ohio Special Olympic	[USA-wide]	464.5500	KB68731	mobile
AAR Toyota Motor Sports	[USA-wide]	464.5000	KA81552	mobile	Great Lakes Balloon	[USA-wide]	464.5500	Old Milwaukee Racing	[USA-wide]	463.9000	KNZ3955	mobile
Academy of Model Aero..	[USA-wide]	467.6000	KA84048	mobile	Great Lakes Dragway	[location?]	154.5700? KA73209	Olympia Fields Country Club	[Illinois]	464.3250	KNXG824	mobile
Alexander, Mike, racing	[location?]	467.6500	KA84064	mobile	Gymnastic Federation	[USA-wide]	464.5000	Olympic Torch Relay	[USA-wide]	464.5000	KB77943	mobile
All American Racers, racing	[location?]	461.2750? call?	KNEU447	mobile	Hagen Racing, racing	[location?]	461.8750? call?	P & S Racing	[location?]	35.0400	KNBV535	mobile
Allied Auto Racing	[USA-wide]	154.6000	KP3213	low power	Hall Racing Enterprises	[USA-wide]	466.5500	Parnelli Jones Racing	[USA-wide]	469.5000	KB82627	mobile
Alison, Bobby, racing	[location?]	463.3125? call?	KN7685	mobile	Hallett Motor Racing	[USA-wide]	151.9550	Parrott, Buddy Racing	[USA-wide]	464.8250	KNEE321	mobile
American Balloon Svc	[location?]	123.3000	KN7685	low power	Halpern Racing Teams	[USA-wide]	461.1750	Patrick Racing Team,auto sprt	[USA-wide]	494.5000	KA95649	mobile
American Bicycle Assn	[USA-wide]	154.6000	KB29116	low power	Hardies Racing Inc	[USA-wide]	461.1500	Peles Racing	[USA-wide]	464.5500	KB95649	mobile
American Honda, motorsports?	[USA-wide]	151.9550	KA95286	mobile	Haver, John, racing	[location?]	464.5000	Penske Racing Inc	[USA-wide]	464.7500	KA95649	mobile
American Junior Golf...	[USA-wide]	151.8250	KA69423	mobile	Hawkins, Bobby Racing	[Cicero]	154.6000? KN3447	Penske Speedway Inc,auto sprt	[USA-wide]	466.0250	WNCB374	mobile
American Quarter Horse...	[USA-wide]	151.8250	KNAW827	mobile	Hawthorne Race Track	[USA-wide]	464.4500	Penske Speedway Inc,auto sprt	[USA-wide]	154.6000	KV8498	low power
American Speed Assn, racing	[USA-wide]	469.5000	KB39932	mobile	Hayes, Johnny Racing	[location?]	464.5500? call?	Peterbilt Racing Inc.	[USA-wide]	466.7750	KB74420	mobile
American Totalisator measuring	[USA-wide]	467.8625	KB37113	low power	Hertz Penske Inc?	[USA-wide]	461.0750	Petty Enterprises Inc,racing?	[USA-wide]	464.7250	KNAP470	mobile
AMI Racing Division	[USA-wide]	469.5000	KA65469	low power	Hervon, Doug, racing	[location?]	464.3500? call?	Rezendes, KR, Racing	[USA-wide]	469.5000	KB63907	mobile
Appaloosa Horse Club	[USA-wide]	464.5000	KB24782	mobile	Hidalgo Cove Marina	[like Zurich]	464.1750	Richards Racing Team	[USA-wide]	464.5500	KB9001	mobile
Appie Jack Racing	[like Zurich]	467.8000	KT5645	low power	Hietala, Brad, racing	[USA-wide]	469.7375? call?	Ruff Racing Inc	[USA-wide]	468.1750	KB7648	mobile
Arlington Park Racetrack	[ArlingtnHts]	464.9750+ WQH523	call?	High Sierra Sports	[location?]	151.8250	Road Inc, racing?	[USA-wide]	468.8125	KB2971	mobile	
Arlington Park Racetrack	[ArlingtnHts]	151.6250+ WQH523	call?	Hillin, Bobby, racing	[location?]	856.8000? call?	Robbins Racing Inc	[USA-wide]	463.7250	KB71766	mobile	
Arrington, Buddy, racing	[Illinois]	464.4750+ WQH523	call?	Hoffman, John, racing	[location?]	461.0875? call?	Robertson Racing Inc	[USA-wide]	467.0750	KB73588	mobile	
Arrowhead Golf Club	[Wheaton]	467.0750? call?	KB63726	mobile	Holden Racing Inc	[USA-wide]	466.7500	Rodea America Inc	[USA-wide]	464.5000	KB54275	mobile
Auto Race Promotions	[USA-wide]	151.5550	KC9961	low power	Holden on Ice, wireless mike	[location?]	171.9000? call?	Rose Racing Inc	[USA-wide]	464.5500	KB54275	mobile
Auto Sport	[USA-wide]	469.5000	KB86174	mobile	Hooker Racing Enterprises	[USA-wide]	180.1000? call?	Rose Racing Inc	[USA-wide]	464.5500	KB79041	mobile
Babb, Robert, racing	[USA-wide]	468.2000	KB31133	mobile	Horst Racing Team	[USA-wide]	469.4250	Rose Racing Inc	[USA-wide]	463.8000	KB35895	mobile
Bahre, Richard, racing	[USA-wide]	436.3000	KN61428	mobile	Hot Air Corps, Balloons	[USA-wide]	469.5000	Rosemont Horizon, parking lot	[Rosemont]	468.2250	KB26445	mobile
Baker Schiff Racing	[USA-wide]	466.7000	WNB8791	low power	Hot Air Inc, balloons	[USA-wide]	123.3000	Rush Racing Inc	[USA-wide]	463.9250	KB61075	mobile
Baldwin, Tom, racing	[location?]	467.8275? call?	KB81174	low power	Houlihan, Dick, racing	[location?]	123.3000	Saint Louis Football	[USA-wide]	469.5000	KA52104	mobile
Ball Racing	[USA-wide]	469.3000	KB70815	mobile	Hylton, James, racing	[USA-wide]	460.8250	Santa Fe Park Enterprises,rac	[Hinsdale]	151.9250+ KNDD389	call?	low power
Balloon Adventure	[USA-wide]	151.6250	KA89677	mobile	Ideal Kitchens Racing	[USA-wide]	464.8125	Schick Sunn Classic,motorsprt	[USA-wide]	464.8000	KSD444	low power
Balloon Adventure	[USA-wide]	123.3000	KB9559	mobile	IL: Bur.of Race Track Police	[location?]	151.6250? call?	Shaheen Speedway/aka Springld	[Illinois]	154.8000	KA77979	low power
Balloon Depot Inc	[USA-wide]	123.3000	KB9559	mobile	Indian Speedway	[location?]	154.6000? KL3446	Sharp, Bob, Racing inc	[USA-wide]	457.5250	KD6198	low power
Balloon Media Ltd.	[USA-wide]	464.5500	KB97546	mobile	Ingram Racing Inc.	[USA-wide]	468.2250	Shepherd, Morgan, racing	[USA-wide]	466.2000	KN8738	mobile
Balloon Promotions Ltd	[USA-wide]	123.3000	KU8011	mobile	Ingram, Jack, racing	[location?]	468.2250? call?	Ski Club Keystone	[USA-wide]	464.5500	KA78361	mobile
Balloonatics Inc.	[USA-wide]	151.6250	KB20846	mobile	International Tennis	[USA-wide]	464.5000	Ski View, Inc	[USA-wide]	151.6250	KB28816	mobile
Balloons Aloft	[USA-wide]	123.3000	WNQ5	mobile	Iowa Parachute Team	[USA-wide]	464.5500	Ski-Hut Racing Team	[USA-wide]	151.6250	KB31109	mobile
Balloons of Medina	[Illinois]	151.6250	KB83557	mobile	Jarrett, Glenn Racing	[USA-wide]	461.1000	Skip Barber Racing, spotter's	[USA-wide]	151.6250	KA72881	mobile
Balmoral Racing Club	[Illinois]	154.3700	KS4358	mobile	Jarzbek, Charlie, racing	[location?]	465.6625? call?	Skool Bandit Racing	[USA-wide]	464.4250	KB19129	mobile
Balloon Raceway	[USA-wide]	469.8250	KS4358	mobile	Jax Raceway	[USA-wide]	469.5500? call?	Southern Wisconsin Drag Racing	[USA-wide]	154.6000	KB21723	low power
Barry, Art, racing	[location?]	464.6125? call?	KB83557	mobile	JET Racing	[USA-wide]	469.5000	Sports Car Club of America,Ch	[Chicago]	151.6250	KQ3450	mobile
Baton Rouge Road Run,racing	[USA-wide]	469.5500	KB40093	mobile	Johnson, Butch, Racing	[USA-wide]	462.0500	Sports Car Club of Amer,Racing	[USA-wide]	151.6250	KB8971	mobile
Bayside Racing Team	[USA-wide]	464.5000	KNJD379	mobile	Kent & Bagly Racing	[USA-wide]	464.3750	Sports Car, Club of America	[USA-wide]	451.2875	KA1063	mobile
BDR Racing	[USA-wide]	469.5500	KB8624	mobile	Keystone Sports Foundation	[USA-wide]	461.0250	Stadium Motorsports	[Illinois]	151.9550	KA95890	mobile
Beebe, Jack, racing	[location?]	469.5500? call?	KB8624	mobile	Kosar Racing Inc	[USA-wide]	468.0250	Stadium View Inc?	[Illinois]	151.9550	KA37993	mobile
Berli, Gilda, racing	[location?]	463.8375? call?	KB8624	mobile	Kyle Racing	[USA-wide]	464.8000	Stadium View Inc?	[Illinois]	151.9550	KA37993	mobile
Birmingham Golf Association	[USA-wide]	154.6000	KB2665	low power	Lajoles Racing Inc	[USA-wide]	464.8000	Starr Racing Inc	[USA-wide]	467.1000	KB73282	mobile
Bodine, Brett, racing	[location?]	469.4750? call?	KB2665	mobile	Leeward Racing Inc	[USA-wide]	469.9500	Starr Racing Inc	[USA-wide]	469.5500	KU4287	mobile
Bodine, Geoff, racing	[location?]	854.5000? call?	KB2665	mobile	Longhorn Racing Inc	[USA-wide]	464.4625	Stavola Brothers Racing	[USA-wide]	464.1250	KN1968	mobile
Bon Temps Racing, Inc	[USA-wide]	464.3250	KNFW308	mobile	M & R Associates Inc	[USA-wide]	464.4625	Stevp Racing Inc	[location?]	467.0000	KB73278	mobile
Bouchard, Joe, racing	[location?]	464.3000? call?	KB2665	mobile	Mach I Racing Inc	[USA-wide]	464.4625	Sugarloaf Mountain W..	[location?]	464.5500	KB73728	mobile
Bouchard, Ken, racing	[USA-wide]	462.8625? call?	KB2665	mobile	Mach I Racing Team Inc	[USA-wide]	466.9750	Sun Country Golf Assn	[Sycamore]	464.5000	KNW5974	mobile
Brinks Racing Team	[USA-wide]	42.9800	KA46958	low power	Malibu Grand Prix Inc, racing	[USA-wide]	467.9000	Sycamore Speedway	[USA-wide]	151.8950	KVT665	mobile
Brune, Leslie V Racing	[USA-wide]	466.3000	KB28380	mobile	Market Sqaure Assoc., Indoy	[Indianapls]	467.8000	Taft School Athletics	[USA-wide]	469.5000	KB78178	mobile
Buck Baker Racing Inc	[USA-wide]	463.8250	KN43324	mobile	Marmors Racers Inc	[USA-wide]	463.2000	Television Racing Patrol	[USA-wide]	467.8500	KA96176	low power
Bulen Horse Enterprises?	[USA-wide]	464.5500	KA83165	mobile	Martin, Mark Racing	[USA-wide]	463.4000	Thomas Racing Inc	[USA-wide]	469.5000	KB49990	mobile
Butler National Golf Course	[Illinois]	151.6250	KA92953	mobile	Mash Racing	[USA-wide]	464.0500	Tool, James Racing	[USA-wide]	464.5500	KA40604	mobile
Byron Dragway	[location?]	154.6000? call?	KA4444	low power	Maywood Park Racetrck aka/May	[Maywood]	464.9750	Transact Racing Inc	[Illinois]	154.5700	KJ8784	low power
C & C Racing Enterprises	[USA-wide]	464.5000	KB54954	mobile	McCann Racing	[USA-wide]	466.3750	Tri City Speedway	[Illinois]	467.7500	KB29026	low power
Calumet Raceway Assn	[Illinois]	154.3700	KA80464	low power	McCown, Doug, Racing	[USA-wide]	469.5750	True Sports Company	[USA-wide]	467.7500	KB29026	low power
Carnes Racing Inc	[USA-wide]	469.9625	KB72455	mobile	Medinah Country Club	[USA-wide]	151.6550	Ultraight Flying Machines	[USA-wide]	468.2500	KB29026	mobile
Cars & Concepts	[USA-wide]	464.2250	KNQ724	mobile	Megabucks Racing	[USA-wide]	154.6000	United Drag Racers	[USA-wide]	460.7500	KA91935	mobile
CBS News Sports, press, heard	[location?]	450.2125+ call?	KNQ724	mobile	Mid South Sports	[USA-wide]	469.5000	United Shows Inc	[USA-wide]	464.5500	KB97939	mobile
CBS, announcers headsets.	[USA-wide]	450.2125+ call?	KNQ724	mobile	Midwest Regional Gun...	[USA-wide]	469.5000	United States Golf Assn	[USA-wide]	461.0875	KB69938	mobile
Champion Spark Plug,motorsprt	[USA-wide]	464.5500	KT5267	mobile	Milwaukee Sports Svc	[USA-wide]	469.5000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Championship Auto Racing,pace	[USA-wide]	464.5500	KA44115	mobile	Moroso, Dick, Racing	[USA-wide]	469.5500	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Championship Auto Racing	[USA-wide]	464.6250	KA44115	mobile	Motion Raceway Park, Rochelle	[USA-wide]	466.2750	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Chicago Bears	[USA-wide]	151.6250	KA77887	mobile	Mound Racing	[USA-wide]	465.9000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Chicago District Golf Assn.	[Oakbrook]	464.5000? call?	KA77887	mobile	NASCAR auto races	[USA-wide]	466.1000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Chicago Glider Club	[Minooka]	123.3000	WS27	mobile	National Football League	[USA-wide]	469.5000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Chicago National League Ball	[Illinois]	469.5375+ KA94018	mobile	National Football League	[USA-wide]	469.5000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile	
Chicago Sportfishing, marine	[Chicago]	156.4500	WD751	marine	National Football League	[USA-wide]	469.5000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Chicago Stadium Corp.	[Illinois]	151.6250	KA88023	mobile	National Football League	[USA-wide]	469.5000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Chicago White Sox	[USA-wide]	151.6250	KA93479	mobile	National Football League	[USA-wide]	469.5000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Chicago Women's District Golf	[Olymp Flds]	462.6500? call?	KA93479	mobile	National Football League	[USA-wide]	469.5000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Chrysler Racing Inc.	[USA-wide]	464.5500	KN20669	mobile	National Football League	[USA-wide]	469.5000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Clarke Race Cars	[USA-wide]	151.9550	KB7097	mobile	National Football League	[USA-wide]	469.5000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Cobra Racing	[USA-wide]	469.5000	KB24827	mobile	National Football League	[USA-wide]	469.5000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Colton, Bill, racing	[location?]	464.0125? call?	KB24827	mobile	National Football League	[USA-wide]	469.5000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Competition Limited	[USA-wide]	35.0400	KA7951	mobile	National Football League	[USA-wide]	469.5000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Concord Racing Inc	[USA-wide]	461.3500	KB71765	mobile	National Football League	[USA-wide]	469.5000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Cookman, Corky, racing	[location?]	464.5125? call?	KB71765	mobile	National Football League	[USA-wide]	469.5000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Coward, Delma, racing	[location?]	460.8875? call?	KB71765	mobile	National Football League	[USA-wide]	469.5000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Coy Pierce's Aerial...?	[USA-wide]	464.5500	KA80471	mobile	National Football League	[USA-wide]	469.5000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Crowd Management Consultants	[USA-wide]	154.6000	KA73200	low power	National Football League	[USA-wide]	469.5000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Curb Racing, racing	[location?]	461.5250? call?	KA73200	mobile	National Football League	[USA-wide]	469.5000	United States Golf Assn	[USA-wide]	461.1125	KB69938	mobile
Custom V Racing Inc.	[USA-wide]											

## on Daytime Listening and Sending Money in the Mail

I suppose I'm pretty unusual in that I have a shortwave radio in my office (a Kenwood R-1000). I can and usually do listen to shortwave all day long.

This has been a relatively recent phenomenon for me, however, and I'm just beginning to get the hang of what's on the air during the day. Unfortunately, the offerings are fairly limited -- at least in comparison with nighttime shortwave. But even so, I've found quite a bit of worthwhile listening.

If I want to catch up on the latest headlines, I tune in to AFRTS on 15330 kHz, which always comes in well here in central Florida. I usually begin my day's shortwave listening with Radio Sweden's show at 1400-1430 UTC on 15345 kHz, which also puts in a good signal here. Radio Moscow World Service booms in on 15475, and sometimes I'll listen to their jazz show or Soviet folk music -- or if I'm in the proper mood, to their newscasts or *Focus on Asia and the Pacific*.

Perhaps the highlight of the day, though, is Radio France International's *Paris Calling Africa* over the lunch I usually don't eat from 1600-1700 UTC. The best frequency in these parts is 176200 kHz.

For daytime listening, I've found that it helps to be diversified in terms of foreign languages. Radio France International and Africa Number One have some pretty decent programming -- both news and music -- in French. But there's a lot more available in Spanish.

Radio Clarin on 11700 kHz is on all day long (except for brief power outage breaks), and it's worth listening to between breaks in the anti-Castro CID programs when they carry the domestic AM service relay. Radio Nacional in Chile is on 15140 kHz with some good music and interesting news (although you often have to listen between the lines) most of the day with a decent signal. Recently, I've been listening a lot to Radio Exterior de Espana on 17845 kHz. During late mornings, they have a special program for Spaniards at sea, which makes great use of live international radio and telephone interviews.

Also available during the day in Spanish is Radio Havana Cuba with its pleasant Cuban music, and KVOH with a friendly-sounding program from 1600-1900 UTC on 17775 kHz. At 1900, they switch to English programming, which tends to be a bit more hard-sell -- at least the times I've listened.

Somewhere around the same time, Radio Kuwait offers an interesting mixture of Western pop, Arabic music and Islamic religious programs in English on 11675 kHz, with generally good reception until sign-off at 2100 UTC. You may want to forego the last hour of Kuwait, however, to take in Africa Number One's bilingual (French/English) Kilimanjaro African music program on 15475. Of course, after 2100 UTC or so, the choices become a bit more varied in all languages, as the late afternoon/early evening DX conditions set in.

A few more daytime possibilities are HCJB's "Morning in the Mountains"

show to North America in 16, 19, and 25 meters; their English programs to Europe during the afternoon in the same bands; and Radio Nacional de Venezuela, which has been experimenting during the past several months now with relays of its domestic service and special external service programs around 11862 kHz, variable -- and sometimes using 11695 kHz.

Frankly, I find the domestic service relays more interesting than the external service programs from Venezuela, and the 11862 kHz (variable) frequency is almost always plagued by a terrible heterodyne. Somebody should tell them that shortwave stations use intervals of 5 kHz separation.

One other station I spend a lot of time listening to is Radio Discovery in Santo Domingo -- although I admit to having more than a passing interest in it. Discovery is on from 1800 - 0100 UTC (electrical service permitting) on 15045 kHz, and

generally comes in fairly well here in Florida. It relays Dominican Radio and Television (the government-owned station) from 1800-2230 UTC, and that consists mainly of Dominican popular music until 2130, followed by an hour of sports and news.

The continuity is in Spanish, of course, but you'll hear frequent ID's in English as Radio Discovery, with a relay of RTVD. A bilingual (English/Spanish) program of music and features can be heard from 2300-0100 UTC, preceded by United Nations Radio programming in English and Spanish from 2230-2300.

I really wonder just how many people here in North America do listen regularly to shortwave during the day. It may be a larger group than we think.

### Interference Problems

One of the problems of listening to shortwave in your office is excessive interference. Where my office is located, we have power transformers, telephone company equipment, and various computers and machines around that cause all kinds of noise. The worst type is a machine-gun-like sound (somewhat like the Woodpecker) that is obviously coming from some local source, and is audible throughout the shortwave range -- worse at certain times and on certain frequency ranges. I've heard various theories as to what it could be, including power transformers, telephone company micro-waves, computers, or even alarm systems. I'd be most interested to hear from anyone who might have some experience with this kind of problem, and any suggestions for dealing with it.

### Return Postage

I read some comments recently about the best kinds of return postage to use when writing to shortwave stations. This is of interest to me, because we get a little bit of everything here.

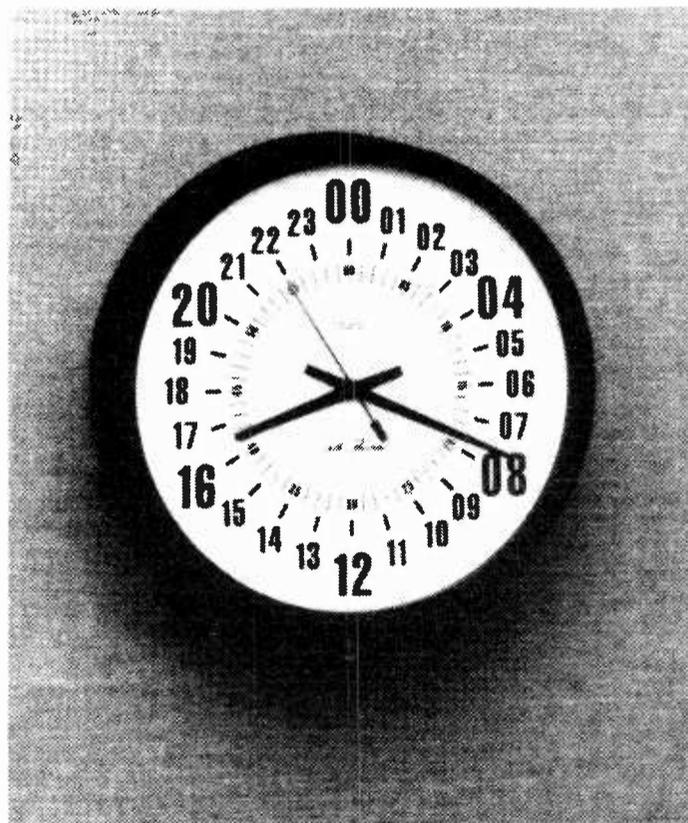
Basically, I guess, there are three kinds of return postage you can send: mint stamps, IRC's or currency (i.e. dollar bills). We receive a lot of

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### BREAKING NEW TERRITORY

"...Getting the hang of what's on the air during the day."

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mint stamps from U.S. listeners, and that's fine since it costs us 22 cents to mail out a QSL and program schedule. Most overseas listeners send 1, 2 or 3 IRC's, which is also OK, since that just about covers the cost of sending the same thing to them. (It takes two IRC's for airmail, actually).

But recently, we've been receiving a lot of U.S. dollar bills from overseas listeners. I've always had qualms about accepting dollar bills for return postage, but I'm now beginning to accept the idea. My change of attitude occurred the other day when I got a letter from a listener in

Sweden who said that IRC's cost him a bit more than US\$1.00 each, so it's much cheaper for him to send us a dollar bill than to buy two or three IRC's. And it's better for us, because we only got 37 cents postage when we cash in the IRC's, whereas a dollar allows us to send an overweight (over 1/2 oz.) airmail reply.

So the bottom line is that we no longer hesitate to accept dollar bills as return postage from overseas listeners. A few send \$2.00, in which case we return the second one. I should add that we don't absolutely require return postage, as we

consider it our duty to send out QSL's and program schedules to anyone who requests them. Return postage is, however, appreciated. You can imagine how expensive it gets when you're receiving hundreds of letters from overseas that you have to respond to at 44 cents a crack. It sure adds up. Of course the government-owned stations have tax dollars to cover such expenses, but private stations don't have that luxury.

### Phone Calls

In the last issue of *Monitoring Times*, I saw some comments about calling overseas stations by phone, and the cost thereof. Larry Miller was absolutely right that here in the U.S. the cost of overseas phone calls has gone down dramatically during the past few years, and it's now quite reasonable to call most parts of the world.

For example, I make a lot of calls to the Dominican Republic, and I know that if you call during the economy rate (10 p.m. - 7 a.m.) it only costs 64 cents a minute. (The first minute is somewhat higher.) The discount rate (from 7 a.m. - 4 p.m.) is 80 cents a minute, and the standard rate (4 p.m. - 10 p.m.) is \$1.06 per minute. So a 10-minute call during the discount rate only costs \$8.38. Rates to Europe are about the same, and in the case of the U.K., less. But beware, the rate periods vary from country to country.

The point is, you can call these overseas shortwave stations without spending a fortune. The key is knowing the best times to call. I would suggest calling AT&T's International Information Service at (800) 874-4000 and requesting a copy of the latest international phone rate brochure. ■

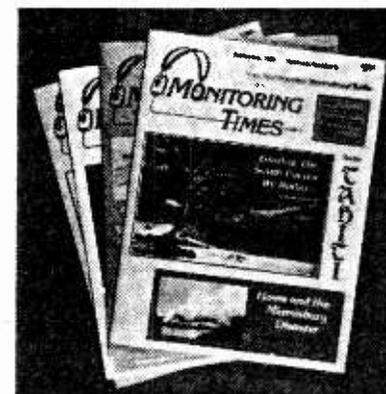
## Jeff White's Phone Book

All India Radio	38 2021
BBC, England	01 580 4468
Belgian Radio and TV (BRT)	737 3805*
Deutsche Welle, West Germany	0221 3890
Kol Israel	222121
Radio Australia	23 52222
Radio Austria International	0222 8291 2130
Radio Berlin International	02 6360
Radio Bucharest, Romania	162080
Radio Budapest, Hungary	338 330
Radio Cairo, Egypt	75 7155
Radio Havana Cuba	74 954
Radio France International	42 30 22 22*
Radio Jamahiriya, Libya	32451
Radio Japan	46 51111
Radio Kuwait	24 23774
Radio Luxembourg	47661
Radio Monte Carlo, Monaco	505 376
Radio Moscow	2177898
Radio Norway International	48 89 90
Radio Polonia, Poland	478501
Radio Portugal	654 041
Radio Prague, Czechoslovakia	44462
Radio RSA, South Africa	714 9111
Radio Sofia, Bulgaria	02 8541
Radio Sweden International	78 40000
Radio Tirana, Albania	3239
Radio Yugoslavia	433 647
RAI, Italy	3878*
Spanish Foreign Radio	711 27 42
Swiss Radio International	43 92 22
Vatican Radio	6982
Voice of Greece	79760
Voice of Turkey	28 22 30

\*These numbers are direct to the shortwave department. Others go through a switchboard.

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# MONITORING TIMES

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## A Future for Shortwave

# The Foundation for International Broadcasting

The modern blossoming of shortwave began, according to *Radio Database International's* Larry Magne, with the introduction of a very special radio. That radio was the Sony ICF-2001 and the year was 1980.

The Sony '2001 was important in that it was the first affordable, easy to use radio that utilized a touch-tone phone-like keypad for entering the desired frequencies and a digital display. Shortwave stepped out of the closet of electronic gadgets for the technically inclined and into the bright sunshine of the mass market. Now anyone with a healthy curiosity about their world and two hundred or so dollars to spend could tune in stations from the four corners of the world. Sales were brisk.

At about the same time, a gentleman by the name of Joseph Costello announced that he would be signing on the first U.S. commercial shortwave station since World War II. While Costello wasn't exactly correct (WINB, an often-overlooked religious station in Red Lion, Pennsylvania, has that honor) he did raise a lot of excitement and a number of eyebrows, especially when it was found that WRNO Worldwide would be a top-40 station. Hard core DXers howled in protest! "No one will listen to rock music on shortwave," they cried, "when you can already hear it on FM!" Quite the opposite happened, however.

In fact, last year, at an office in Beltsville, Maryland, workers tallying survey information on domestic radio listening habits from U.S. cities around the United States began noticing something odd. There and again, in listener diaries (records of radio listening habits kept by randomly selected people for the rating company) a strange set of call letters began appearing: WRNO.

Puzzled, the people at the Arbitron rating service at first simply scratched their heads and dismissed it as an error. Finally, someone decided to pick up the phone and call the only station known to hold those call letters, WRNO-FM in New Orleans to find out just what was going on. To their surprise, they were told about WRNO-FM's sister station on shortwave. WRNO Worldwide -- a shortwave station -- was showing up in the local ratings of

radio stations all over the United States!

### The Selling of Shortwave

Why, may you ask, is all of that so important? The answer becomes immediately clear when you realize that Arbitron ratings are the basis on which many advertisers and advertising agencies determine how advertising money will be distributed among stations.

Up until now, selling advertising time on shortwave has been, at best, a dismal failure. Spin the dial and listen to the number of commercials on WRNO Worldwide. Or Radio Earth. You can count them on one hand. And those that you do hear are often PI's -- per inquiries. That means that the station runs the ads for free and collects only when someone calls a toll-free number or orders a piece of merchandise. As a result, stations like WRNO Worldwide rely almost solely on selling airtime to religious organizations to raise revenue. But, if a shortwave station were to begin showing healthy ratings around the country at decent levels, that situation could change dramatically.

In short, big ratings for 'RNO will mean advertising agencies for companies like American Express, Chevrolet and others will begin to place commercials on the station. And that means money for Mr. Costello. And if other people see Mr. Costello making the big bucks, they'll want a piece of the action and more shortwave stations will undoubtedly sign on. And there will be a greater diversity of programming. Which will bring in more listeners. And more advertisers. And more money. And money makes the world go round. Shortwave is no exception.

### Gaining Respect

Equally important, and having absolutely nothing to do with money, was the announcement by the Christian Science Publishing Society that they would put a station on the air.

Indeed, the *Christian Science Monitor* did sign on the air, quickly and professionally. What's so important about the sign-on of that station -- sixty five percent of whose air-time is devoted to unbiased, high-quality, international news -- is that it draws

attention to the medium of shortwave, not only by people interested in news, but by other media groups. After all, if a group as important and well-respected as the *Christian Science Monitor* makes such an incredible commitment to the medium, maybe it's not such a bad idea. In any case, you can bet that the idea of going on shortwave is no longer dismissed immediately as "far out" since the *Christian Science Monitor* signed on.

### A Sunny Outlook!

Finally, and not without its own very special merit, is the sun. As you may know, something called sunspots are responsible for shortwave reception. And sunspots run on an eleven year cycle, the worst of which just ended. We are now on the way up and improvements in reception are already evident.

How important is the relationship between the sunspot cycle (and improved reception) and actual listening? Well, an official of the American Radio Relay League (ARRL), the organization that works on behalf of ham radio operators -- people who also rely on that same sunspot cycle for improvement in the reception of two-way communications -- was once quoted as saying that they increase their staff by several dozen employees during the height of the cycle. That's how much improved reception gets people back to their radios and puts increased demands on that industry. The same is obviously true for shortwave listeners.

But how will the shortwave industry -- the listeners, the manufacturers, the broadcasters -- cope? Not only does it face an increase in activity based on steadily improving reception conditions but it is, quite possibly, in the grips of the blossoming of a new, golden age. Up until now, there has been no centralized organization to meet the needs of shortwave community in North America.

### Organizing

The answer came late last year as a group of broadcasters, writers and other shortwave professionals met to try and resolve the problem. The result was the creation of The Foundation for International Broad-

casting, Inc. (FIBI). Organized as a officially registered non-profit company, it sees itself as the shortwave listener's version of ham radio's American Radio Relay League (ARRL), complete with enthusiastic volunteers.

"There are so many things to be done," says Board Member Larry Miller. "We're only a little over seven months old. And we felt that a monthly magazine would be a great way to not only promote shortwave but get the word out about the Foundation. So we founded *World Radio Report* and I volunteered to edit it. Now that's a lot of work on its own. But there are also books to be kept, volunteers to be coordinated, correspondence to be answered, a public relations effort to be met, research projects, fund raising and more. I can't do it all. What we need are people. And lots of them."

"Responsible people with a serious commitment to shortwave listening," adds Radio Earth broadcaster and attorney Michael Poulos, also on the Board of Directors. "You just can't hand off the organization's book-keeping to anyone."

And that's why the Foundation applied for formal IRS non-profit status -- so that, say, a shortwave listener who is also an active or perhaps retired professional accountant, could donate his time to the Foundation and receive a tax deduction.

"We're looking for people who are serious. Serious about shortwave and serious about the goals of Foundation. People who want to get in on the ground floor of a hot, new, shortwave organization," say Poulos. "It's time to get shortwave up, on its feet and into the mainstream and everyone can help."

### Setting the Goals

Overall, the primary goal of the Foundation is to provide a centralized organization through which all parties in the shortwave community can work. This ranges from coordinating group promotional efforts with businesses to offering a place where listeners and potential listeners can turn for information to publishing the Foundation's monthly magazine, *World Radio Report*.

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*The idea of going on shortwave is no longer "far out" since the Christian Science Monitor signed on*

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"Outside of the manufacturers like Sony, Panasonic and so forth, I don't think there are any shortwave organizations -- commercial or non-commercial -- that can afford to take on the promotion of the medium single-handed," said Miller. But if several retailers got together under the auspices of the Foundation, a professional advertising campaign could be arranged. "Heck, look how often you see ad space donated to the ARRL in mass-circulation magazines. Shortwave listening needs to take advantage of that sort of publicity, too."

Research is also an important part of the Foundation's work. Little solid information is available on the true size, let alone make-up of the shortwave audience. Just who is it that listens? And why?

Says Board Member Ken MacHarg, an HCJB broadcaster, "That's one thing I'm excited about the Foundation doing: research -- whether it's research itself or facilitating grants for people in universities or even to assist the research of stations. So much research is to be done in terms of promoting shortwave and

programming shortwave. I think the Foundation can play a very big role in that." MacHarg, an experienced grantsman, has volunteered to take on the task of soliciting corporate and institutional funding.

"And once we get that kind of information from the research," says Dr. John Santosuosso, "we'll be in better shape to know how to help."

### Spread the Word

Right now, the Foundation relies primarily on the popular shortwave monthly *World Radio Report* to get the word out about its activities. "We want people to know that they can get involved in the Foundation, no matter what their level of expertise."

"I want to stress," says Miller, "that this is not a one-man show. It's commonly thought that I own *World Radio Report* as a profit-making venture. No one 'owns' *World Radio Report* or the Foundation. The purpose of this is not to make money or showcase egos like some of the clubs. The purpose is to get work done. And to do that we need to get folk involved."

In fact, Miller was so enthusiastic about the project that he donated his entire business, Miller Publishing, to the Foundation. "We had to have some way to raise funds in order to meet our goals yet we didn't want to compete with existing retailers by selling equipment. So we set up

Miller Publishing as an arm of the Foundation." Like everyone else at the Foundation, Miller receives no compensation for his work, aside from occasional reimbursement of expenses.

Says MacHarg. "I do think we need to have a holistic approach to shortwave. We certainly don't and won't ignore the hobbyist. In fact the Foundation's publication *World Radio Report* has been widely praised as the best source of DX information for the hobbyist. But we also want to reach the casual listener who would want to know more about what's on the radio and might subscribe to *World Radio Report* in much the same way as someone subscribes to *TV Guide* to know what's happening with TV."

"Unfortunately, we're seeing a serious decline in the clubs," says Miller, "and we've got to do something to turn that around." MacHarg agrees. "We see a lot of people dropping out of shortwave as a hobby and we need to get more people in as hobbyists, or simply as listeners. It's very qualitative, alternative media to domestic broadcasts."

*If you're interested in learning more about this exciting new organization, send a self-addressed, stamped envelope to the Foundation for International Broadcasting, Inc., 3 Lisa Drive, Thorndale, PA 19372. Those interested in obtaining a sample copy of the Foundation's monthly publication, World Radio Report can receive a sample copy (during June only, one per person) for a mint 56 cent stamp.* ■

## How You Can Help The Foundation

Send a self-addressed, stamped, envelope to 3 Lisa Drive, Thorndale, PA 19372 for the Foundation's brochure. And then join!

Donate Your Time or Your Company's Services

Needed: Accounting, Public Relations, Printing, Advertising Sales, Volunteer Coordination, graphics, use of a toll-free number.

If you or your company can donate tax deductible time or services, contact Ken MacHarg at 502-458-4076 during regular business hours.

## How Much Are You Missing?



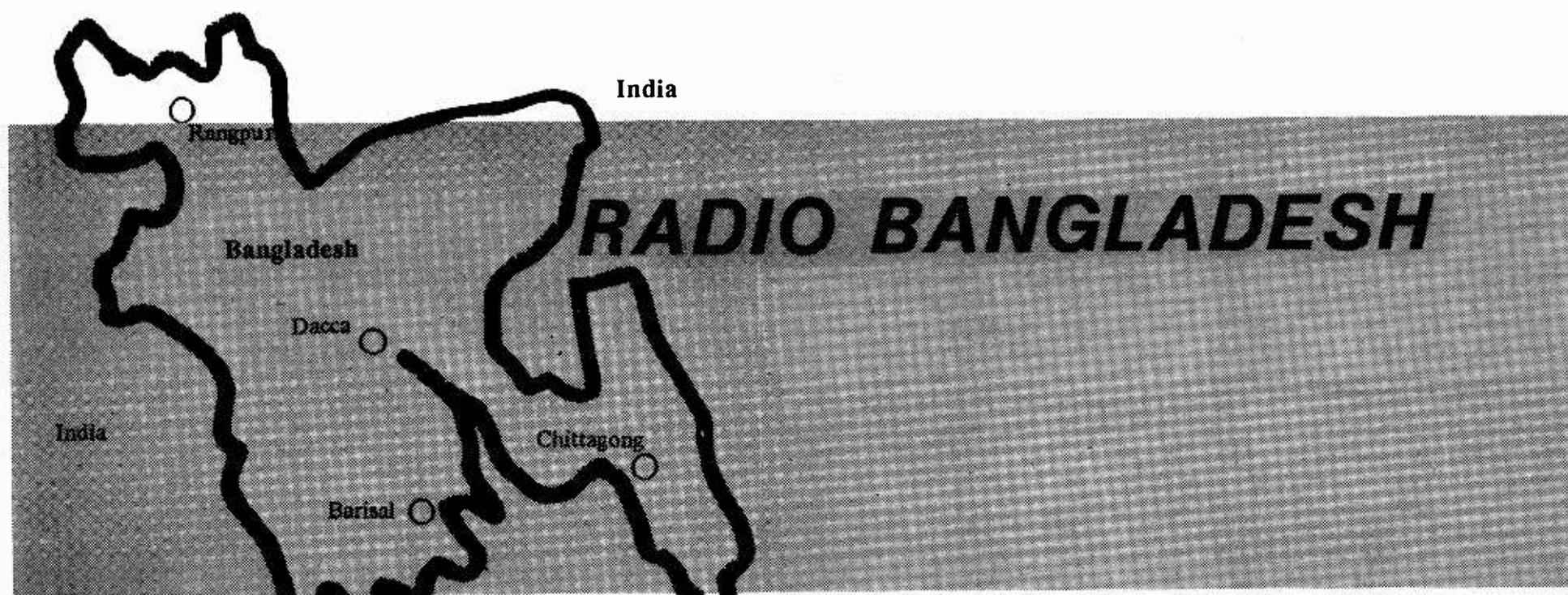
### World Radio Report

It's Nothing Flashy. It's Just the Best.

Shortwave radio brings you your world. And that's a lot of ground for any magazine to cover. It's also why most magazines just don't measure up. It takes a full-time staff to dig up the information you need -- not volunteers who only sit down at their radios after a hard day's work at the office. Shortwave radio is all we do -- nothing more, nothing less. And precious few other shortwave magazines can say that. While you're at work, we're at work, so that when you do have time to listen to your radio, you'll know everything you need to know to get the most out of your radio. -

If you're serious about your shortwave, you owe it to yourself -- and your radio -- to check out a full-time shortwave magazine. One year of *World Radio Report* is just \$18.00. Sample copies are just \$2.50 in the U.S.; \$3.50 elsewhere in the world. Send check, money order or cash to World Press International Inc., 3 Lisa Drive, Thorndale, PA 19372. From the publishers of International Radio.

Station News \* DX Tips \* Advance  
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Equipment News \* Articles \* and More



by Gayle Van Horn  
and  
Larry Miller

*Radio Bangladesh hasn't always talked about peace and good will as they do now. It wasn't so long ago that Bangladesh was born out of bloodshed.*

*The year was 1971 and civil war was tearing Pakistan apart -- literally. The nation was in chaos. Rioters filled the streets and thousands died in brutal battles with government troops. Over a million people fled to neighboring India.*

#### Little in Common

True, the people of east and west Pakistan had shared a common Moslem religion. But there was little else. They spoke different languages, had different cultures, traditions and even physical traits.

Over the years, the east Pakistani people had grown increasingly disenchanted by the government in the west and by the early 70s, the disenchantment turned ugly. Massive civil disobedience -- in the best tradition of India's Gandhi -- changed to violence when the first National Assembly session was postponed. Negotiations for a solution failed and before long, army troops from the west stormed Dhaka to put down the protest. The ensuing strife raged on for nine hellish months.

On December 16, 1971, however, the government troops surrendered and the east emerged victorious as the People's Republic of Bangladesh.

#### Bleak Outlook

Perhaps, however, victorious was not the right word. Even prior to the fighting, the outlook for Pakistan was bleak. Dividing this already poor country only served to create a new, lower grade of poverty.

The problems faced by an independent Bangladesh were staggering. Virtually an entire nation had to be created from the what little shards were left from its union with desperately poor Pakistan. Millions of people were homeless. Transportation routes had to be redeveloped within the framework of a new nation. Communications had to be restored. Hospitals, schools and factories had to be created or rebuilt from the rubble.

And just as the nation started this massive project, it was hit with a series of disastrous floods. Food shortages caused widespread suffering. And charges of political corruption began to weaken the struggling government.

#### A Positive Image

Faced by these formidable obstacles, a favorable national image had to be created on the international scene and from this need came Radio Bangladesh.

Radio Bangladesh gave voice to the national aspirations of the Bangladesh people. And it was, the country's leaders quickly realized, the fastest and most effective medium of communication.

Radio Bangladesh's initial goals were modest -- the establishment of an external broadcast directed to the neighboring countries of India, Nepal and Pakistan.

#### Projecting a "True" Image

Well over a decade later, Bangladesh's external service continues to attempt to project a "true" image of the country abroad. This image includes the culture of its people, their progress, the government's views on international affairs, and the fostering of friendships with other countries.

Programs are aired in six languages extended over ten transmissions for seven and a half hours a day. The Voice of Islam service began broadcasting in English in 1984.

Broadcasts from Bangladesh are grouped into two categories: those for citizens living abroad and programs for listeners in foreign countries.

The first category -- for expatriates -- provides its listeners with news and entertainment from home. Broadcasts are in Bengali and directed to the Middle East and Western Europe.

The second -- for non-citizens in foreign countries -- run for thirty to ninety minutes and include music, scripture, documentaries, radio dramas and interviews, pretty much the standard fare for external services worldwide.

#### News Considered Important

Also like many other world-band stations, news plays a large part in Radio Bangladesh's programming. There are newsreels, short bulletins, and "eyewitness accounts." And if all of this sounds much like the BBC World Service, keep in mind that Bangladesh was once part of British India.

Radio Bangladesh, known as "the office" by personnel, is situated in Shahbag, in Dhaka. Residences, parks and hospitals surround the neat, two-story building that houses the station's six studios.

Hearing Bangladesh in North America is no small chore. The transmitters -- two 100 kW and two 250 kW -- are not large by today's standards of international broadcasting. "But," says Radio Bangladesh Director Mohammad Taher, "What our country has to contribute to the rest of the world is its own excellence and its own distinctiveness -- excellence does not mean bigness." ■



Balal Muhammad, Deputy Director of External Services



M. A. Halim Sarder, Assistant Director of External Services



Kazi Rafique, Assistant Director of External Services



Obaidul Huo, Editor of the Bangladesh Observer and Radio Bangladesh contributor

*The Staff of Radio Bangladesh*

**RADIO BANGLADESH**

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National Broadcasting Authority  
NBA House  
Shahbag Avenue  
Dhaka-2  
Bangladesh

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0300-0305 6195 (7.5 kW) 4879 (100 kW) kHz  
0900-1130 4879 (100 kW) kHz  
1130-1200 4879 (100 kW) 4890 (100 kW) kHz  
1200-1715 4890 (100 kW) kHz

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A radio transmitter operator carries on his duties during a simulated chemical attack (Photo by Eric Derrenbacher)



Both military and commercial long distance overflight communications can be heard on shortwave (Photo courtesy U.S. Army)



## Calling All Utes!

### A Beginner's Guide to Shortwave Utilities Monitoring?!

Utilities. The term conjures up an image of electric power poles and water lines. After all, when we have a problem with metropolitan services, don't we call the appropriate utility company?

But to the serious radio hobbyist the term "utilities" takes on an entirely different context. It is a polyglot category of considerable dimensions.

#### BC or UTE?

Most radio devotees have learned to classify their listening into two broad areas. Simply stated, if a transmission is intended for reception by the general public it is a broadcast; everything else is a utility transmission.

Utes, therefore, can be police, hams, spies, press services, rescue efforts, ship to shore, air to ground, military exercises, Coast Guard drug interdiction, even federal undercover operations. They may be heard in clear voice, scrambled, Morse code, facsimile, data, or telemetry.

A simplistic definition might be that if it was not intended for you to hear, it was a utility transmission!

#### Who Cares?

Just as Chevy owners can't understand Ford enthusiasts and hams are suspicious of CBers, many broadcast listeners don't understand the allure that utes hold for their devotees. Of course, the same argument goes both ways.

#### Excitement

Perhaps the key to utilities monitoring is vicarious, the fantasy

of being there as news is being made: the valiant effort of Coast Guard personnel risking their own lives to save those on a sinking vessel; the strained voice of an airline pilot as he relays the demands of a hijacker or reports a major system failure on his complex aircraft.

A ute buff reported hearing machine gun bursts punctuating the shouts of a drug smuggler resisting Coast Guard arrest--then, silence.

Many utilities listeners were there when the Challenger exploded, sharing the grief that surrounded the sacrifice of seven space pioneers.

Of course, not all monitoring is so dramatic; many ute fans are hooked on weather facsimile maps, military exercises, satellite monitoring, radio-teletype press transmissions, or other non-broadcast emissions to be heard throughout the radio spectrum.

#### Equipment

What is needed to participate in this stimulating aspect of radio monitoring? For voice and Morse code transmissions, nothing more than what the serious broadcast listener uses: a good receiver and a good antenna. Kenwood, ICOM, Yaesu, JRC--these are the names we hear the most. Even Sony and Panasonic have entry level receivers which permit sampling the utilities.

Antennas may be simple random wires or dipoles 30-150 feet long. Don't use trap dipoles which favor specific broadcast bands at the expense of the rest of the shortwave spectrum. After all, you have a general coverage receiver; don't you want a general coverage antenna?

by Bob Grove, WA4PYQ



A concerned fireman administers first aid (Photo by Henry Ortega, Amarillo Globe/Times)



Testing some innovative military field communications equipment (Courtesy U.S. Army)



Listen for maritime ship-to-shore communications on shortwave, above (Canada Today). Left, communications aboard a WC-130 (Photo by Jerry Tomaselli, Chicago Tribune).

Once you get hooked you will probably want to try your hand at receiving radioteletype (RTTY) or facsimile (FAX); these modes require special converters (demodulators) at a cost equal to another receiver. Here we find names like Infotech, HAL, AEA, Alden and Kantronics.

### Publications

Where would we be in an information-obsessed hobby without publications? Two monthlies, *Monitoring Times* and *Popular Communications*, dominate the radio hobby marketplace; many clubs also cater to various specialized interests.

Books are available which provide frequency information and utilities background material for more productive monitoring. Check the advertisers in *MT* for noted authors like Schaay, Klingenfuss, Ferrell, Kneitel, and, of course, Grove!

### When to Listen

There is drama, excitement and entertainment to be heard 24 hours a day, 365 days a year. Your newspaper or TV newscast can assist your efforts. Is there a pending hurricane? Listen to the hurricane hunter aircraft as their daring pilots fly into the eye of the storm, radioing back to Miami visual observations.

Political upheavals, major sports events, NATO training exercises, the launch of a spacecraft—all of these events will have radio support, and a good shortwave frequency directory can tell you where to listen.

The high frequency spectrum abounds with fascinating communications, and it's all legal to monitor with conventional radio receivers. What might be happening right now? Tune your receiver between the broadcast bands and find out!

Next month tune up that scanner and watch for a primer on VHF/UHF listening.



(photo by Henry Ortega, Amarillo Globe/Times)

## A Utilities Sampler (Upper Sideband Voice)

2670	U.S. Coast Guard	8291.1	Ship to shore, Pacific
4063	Mississippi River barges	8418	"Spy numbers" broadcast
4069.2	Ship working channel	8740.6	Ship to shore
4087.8	Mississippi River barges	8778	U.S. Navy
4112.6	Ship calling channel	8784	Ship to shore, Pacific
4125	Ship calling channel	8805.7	Ship to shore
4143.6	Mississippi River barges	8808.8	Ship to shore
4413.4	Ship working channel	8825	International airlines
4419.4	Ship working channel	8846	International airlines
4467.5	Civil Air Patrol	8879	International airlines
4517	Air Force MARS	8891	International airlines
4593.5	Air Force MARS	8921	International airlines
4637.5	Offshore petroleum	8972	U.S. Navy, Atlantic
4670	"Spy numbers" broadcasts	8984	U.S. Coast Guard, air/grnd
4742	"Spy numbers" broadcasts	8989	U.S. Air Force, air/ground
5015	Army Corp of Engineers	8993	U.S. Air Force, air/ground
5320	U.S. Coast Guard	9014	U.S. Air Force, air/ground
5598	International airlines	9027	U.S. Air Force, air/ground
5616	International airlines	10493	FEMA, emergency net
5680	U.S. Coast Guard	10780	NASA air/ground
5692	U.S. Coast Guard air/grnd	11176	U.S. Air Force, air/ground
5696	U.S. Coast Guard air/grnd	11182	Scott AFB, air/gnd
5703	Tactical Air Command	11200	RAF, flight weather
5812	"Spy numbers" broadcasts	11233	Canadian Air Force air/grnd
6506.4	U.S. Coast Guard ships	11234	RAF, air ground
6518.8	Inland waterways	11243	Strategic Air Command
6521.9	Mississippi River barges	11246	U.S. Air Force, air/ground
6577	International airlines	11282	International airlines
6586	International airlines	11538	U.S. Navy, Mars
6604	Flight weather	12429.2	Ship to shore
6673	NOAA hurricane hunters	13113.2	U.S. Coast Guard marine wx
6683	Andrews AFB, VIP	13181	U.S. Navy
6697	U.S. Navy	13201	U.S. Air Force air/ground
6705	U.S. Air Force air/grnd	13215	U.S. Air Force air/ground
6723	U.S. Navy	13241	U.S. Air Force air/ground
6738	U.S. Air Force air/grnd	13270	Flying weather
6753	Canadian Air Force	13282	Flight weather
6761	Strategic Air Command	13306	International airlines
6802	"Spy numbers" broadcast	13354	NOAA, hurricane hunters
6927	Andrews AFB, VIP		

# MONITOR



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**If you've been at the dials of your shortwave radio in recent weeks, you're undoubtedly excited about the rather dramatic improvement in reception conditions. No longer have the nights been limited to six through nine megahertz, but the bands are now opening as high as 21 and even, at times, 27 MHz!**

There's some exciting listening to be heard and stations missing from the dial for years are once again becoming audible. So if you've "forgotten" about some of the higher frequency ranges over the past few years, it's time to reinvestigate.

I talked with Dave Rosenthal, host of "Skyline" (Radio Earth's Wednesday and Saturday astronomy and propagation program) and Dave confirms that indeed, we seem to be out of the trough in the sunspot cycle. As you may know, sunspots, which affect shortwave reception, go through an eleven year cycle. Although there's some discussion among the experts as to exactly when we hit the bottom of the cycle (most agree it was last September or so) but for all practical purposes, it appears as though we're on our way up. Look for an interview with the personable Rosenthal in next month's *Monitoring Times*.

**Before we take a look at some of the latest DX news from World Radio Report, I'd like to tip you off to an excellent program I found on Radio Canada International.** It's called "Northern Country" and it runs from 1200 to 1300 UTC on 9625, 11955 and 17820 kHz. It's hosted by Wojtek Gwiazda (First name pronounced *Voy* as in "voyage"; *tek* as in "technical." Second name, *vee* as in the letter "v," *oz* as in the "Wizard of Oz" and *da* as in "Canada." Add the "g" sound as in "gun" to the beginning of the last name and you've got it. *Voy-tek G-vee-oz-da*. That's the ticket.)

"Northern Country" is hot for a lot of reasons. It's broadcast live which gives it a very natural sound. Too, Gwiazda is an excellent host; warm and friendly.

You'll hear some very, very good CBC news at 1200 UTC, plus music, sports, weather and even press review. But if all of that sounds somewhat pedestrian, you've got to hear how Gwiazda handles it. Even the press review is well done with the host probing, asking questions, clarifying. Not just the standard, "In the Daily News, the lead story was..." But most important of all is the fact that Northern Country sounds *modern*. The approach is urban; sophisticated. The music up to date -- not like so much of the "1950's European swing" that dominates the bands.

"Northern Country" is, simply put, good radio. If more stations offered this kind of fare, there'd be more people tuning in shortwave. Show Mr. Gwiazda your support. Drop him a line at Radio Canada International, P.O. Box 6000, Montreal, H3C 3A8 and tell him what you think. And be sure to mention that you heard about his program in *Monitoring Times*.

**Radio Austria's official schedule** calls for eleven English transmissions a day and they are heard on the following schedule (frequencies kHz):

0130-0200 6155  
 0330-0400 6155  
 0430-0500 5945, 6155, 11830  
 0630-0700 5945, 6000, 6155, 11830  
 0830-0900 5945, 6000, 6155, 11840,  
 11915, 15410  
 1230-1300 6000, 6155, 11915, 15320  
 1400-1430 11915  
 1530-1600 6000, 6155, 9755, 12015  
 1830-1900 5945, 6000, 9505, 12015,  
 17745  
 2130-2200 5945, 6000, 9655, 9870

If Canada's "Northern Country" is good, modern radio, then Austrian Radio's programs are the exact opposite: sluggish and uninspired. Thrill to such shows as "Austria and the UN" (UTC Wednesdays), "The Austrian Economy" (UTC Thursdays) and "The Tourist Scene" (UTC Sundays). The

staff of Austrian Radio's English section is notorious for crying "understaffed" -- it's even repeated endlessly in their brochures, something like "a tiny group of overworked journalists tries to bring you the latest from Austria." They may succeed in putting the information on the air but as far as enticing anyone to listen to it, well, that's another question.

There is one bright spot on Austrian Radio, however. It's their special Sunday program, "Austrian Coffeetable." No, it's not about furniture as one might suspect after hearing Austrian Radio's other sleepy shows, but rather an informal discussion of music and the arts. Try for it at 0305, 1205, 1400 and 2030 UTC.

**Fred Carlisle, despite his location in the U.S.'s far northwest (Tumwater, Washington) catches a lot of Latin stations.** He's been hearing Radio Panamerica in Brazil on 6105 kHz at around 1040 UTC. Fred says there's lots of soft U.S. rock and Spanish music. But beware some terrible interference from Radio Moscow operating on 6105 kHz in Russian.

From Brazil, also look for Radio Nueva America, which Fred heard on 4795 kHz at 1015 UTC and Radio Aboroa on 4720 kHz at 0305 UTC, heard by Earl Urbellis of King's Park, New York.

**Trans World Radio Bonaire has what is probably one of the most listenable "inspirational" programs on the dial.** It's called "Caribbean Nite Call" and I last heard it on 9535 around 0430 UTC Mondays. The regular host, McDaniel Phillips, is currently on vacation until August but the very capable Bill Early keeps the ship afloat in the interim. There's no preaching, no Bible-thumping, just light music, some interesting discussions and even a really good international newscast by a very fast-talking lady announcer.

**Radio Botswana's been coming in reasonably well** on 4820 in recent months. And, of course, you've probably heard that this anti-QSLing station is now once again issuing those treasured cards, so there's added impetus to try for them now. It was also announced on "Media Network" a short time ago that Botswana registered 9600 kHz with the ITU for use between 0630 and 1400 UTC. Now that may be nothing more than a "wish list," but it might be worth checking out. A beer to the person getting the first confirmation on that frequency.

As an aside, however, a curious thing was noticed on "Media Network" the other night. There's now a copyright notice at the end of the program. Radio Canada International's program retaliated some nights later by ending their show with a notice that "Shortwave Listeners' Digest" was *not* copyrighted. What's going on in Holland? Hmmm.



"Skyline" host Dave Rosenthal (shown here at Radio Tahiti) says reception conditions are on their way up!

Anyhow, if Botswana doesn't whet your appetite for some DXing, here's one that might. But first a word of caution. This one is beyond tough.

**Indo-China DXer Isao Ugusa, who lives in Japan, has been hearing the seldom-reported local Burmese station in Tang-gyi** on the new frequency of 6570 kHz from 1251 to sign off at 1330 UTC -- Sundays only. This one was so tough that Isao went to his friends at Radio Japan's Burmese Service for some help. What he found was that the station is named after a flower call "Thazin," is located in Shan state -- more precisely, the capital, Tang-gyi, and is operated by the Burmese Ministry of Information for soldiers "on the front." A case of beer for the first person in North America getting a QSL on that one!

**Carl Volz is hearing the very powerful Latin clandestine, Radio Caiman,** on 7470 kHz around 0220 UTC in Spanish. This is a perfect "first" for anyone interested in exploring the shadowy world of clandestine radio on shortwave.

**Radio For Peace, located in Ciudad, Costa Rica but based in Sweet Home, Oregon, is due to be on the air now.** I spoke with station program director James Latham just before he headed down to Costa Rica in late April and he told me that the station had picked a number of frequencies: 5970, 7470 and 15405 kHz. I do not yet have the official schedule, but I do know that they're using a fairly small 2.5 kilowatt transmitter. Just on a hunch, check 15045 kHz as well. Let me know if anyone has caught this one yet.

Down in about the same part of the world in the Dominican Republic, Jeff White struggles with **Radio Discovery**. The latest word is that White sealed a deal for his station to relay the domestic programs of RTV Dominicana. That means that there'll now be a lot more Spanish on Discovery, specifically between 1800 and 2230 UTC. English and multi-lingual programs are run from 2230 to sign off at 0100 UTC. The station is on the air -- barring frequent island-wide power outages -- Monday through Saturdays on 15045 kHz.

**HCJB's new antenna is up** and that means an additional frequency for the entire 0035 to 0700 UTC English transmission. 11775 is added to the existing frequencies from 0035 to 0500; from 0500 until 0700 it replaces 11910. Comments on the new frequency and all of HCJB's programming is welcome at their new number, 011-593-2-241-550. You'll get the operator before you hit the answering machine; ask for extension cuatro, ocho, nueve or 489.

**Betcha didn't know that the Ecuadorian government has its own programs.** Yep, there's a Radio Nacional de Ecuador which broadcasts in Spanish. Greg Earhart of the ASWLC says they're on from 0030 to 0100 UTC on 11960 kHz to the U.S., 2200 to 2215 UTC on 15270 and 17790 kHz to Europe. It's heard via the transmitters of HCJB.

**Speaking of relays,** don't forget that Japan is now trying out a nighttime transmission via Canada's transmitters in Sackville. There's Japanese from 0200-0300 and English from 0300 to 0400 on 5960 kHz. (Listen to that nasty jammer in the background!). That's in addition to the AM transmission at 1000-1100 (Japanese) and 1100-1200 (English) on 6120 kHz.

**Richard Pinney of Rhode Island is a big fan of Radio Luxembourg.** So much so that he called them up a couple of times. Apparently, that wasn't appreciated. According to Richard, the announcer who answered the phone insulted him with dirty, abusive language and gave him the very distinct impression that listeners in North America were not wanted. And that's very sad. Roger and Gene give two "no" votes to Radio Luxembourg and suggest they clean up their act.

**Stewart McBirnie, host of the ultra-right wing domestic radio program, Voice of Americanism,** is now on shortwave with a new show. It's called International Freedom Alert and is scheduled over WINB on Saturdays from 1600 to 1630 UTC on 15295 kHz.

**KVOH,** the High Adventure Ministries station in California is extending its broadcasts into the local evening. Check the frequency section for the times.

**Also expanding is Radio France International.** They've added a 24 hour French world service. More importantly is the addition of program in English. There's now an 0200 UTC transmission, as well as the 0330 and 0415 UTC news. In addition to the news at those times, however, there's a multi-lingual music program. Add to that an 1100 UTC news transmission and the long-standing "Paris Calling Africa" show -- a must for anyone interested in African and Third World information -- at 1600. Not the easiest to hear but worth the effort if you're so inclined.

Running out of space -- so much to tell you -- **Ghana has reintroduced their West Africa Service after a ten year absence.** Look for that in English from 0645 to 0800 UTC and again from 1845 to 2000 on 6130.

**Tune in some fantastic Guatemalan marimba music** on Radio Chortis Jocotan around 0315 UTC on 2280 kHz. That from *Monitoring Times'* own Larry Van Horn.

**Radio Earth celebrated its fourth birthday this past week.** Congratulations to this pioneering outfit for weathering many, many stormy years to fulfill a dream. Few know the commitment these people have put into the station. Support them by tuning in at 0300 on 7355 kHz, Monday through Saturday.

**Finally, in the surprise of the century, WRNO has apparently been turning up in the domestic ratings.** According to owner Joe Costello, the Rock of the World was called by the Arbitron rating service and asked how in the world an FM station in New Orleans (WRNO Worldwide has a sister station on FM) was being heard in places like New York, Philadelphia and so forth. The answer, of course, was shortwave.

The appearance could have big ramifications on the world of commercial shortwave. If the ratings prove significant, chances are more advertisers will begin to buy time on the station. And where there's money, more stations are sure to follow. So important is this to Costello that if you tune in the Rock, you'll hear an announcement saying, "If anyone should ask, you're listening to WRNO Worldwide in New Orleans, Louisiana. Please. Write it down." That, of course, is directed to listeners holding ratings diaries.

**More stations?** Two more have filed applications with the U.S. Federal Communications Commission. One is WNQM Inc., in Nashville, 'NQM is the flagship AM station of the three-station F.W. Roberts Broadcasting Company. According to a station official, the shortwave station, officially dubbed "World Wide Christian Radio," will sell time to religious and perhaps political groups denied airtime on other stations. The second applicant, the New Covenant Educational Ministries, is out of Jacksonville, Florida. More information as it becomes available -- but look for 'NQM to be one of the most aggressive religious stations to ever hit the airwaves.

**Some late program details that have slipped in from the BBC World Service.** There's two more editions of the popular call in program, "It's Your World." On June 7th at 1615 the guest is Viktor Karpov, the Head of the Soviet Arms Control and Disarmament Directorate. There's an edited repeat the next day at 0230. On the 14th, look for fireworks as South African Foreign Minister Pik Botha (who looks remarkably like "Jaws" star Robert Shaw in the BBC press release) takes the phones. Again, an edited repeat the next day at 0230 and as always, the frequencies can be found further back in the magazine.

For more advance program details and the latest in world radio news, pick up a copy of *World Radio Report* at your favorite hobby store or send \$2.50 for a single copy, \$18.00 for a one year subscription to 3 Lisa Drive, Thorndale, PA 19372 USA. *World Radio Report* is the official publication of the non-profit Foundation for International Broadcasting.

And with that, let's turn the floor over to you. Here are some of the loggings we've received this month. ▶

# MONITORING POST: Loggings

Many of this month's loggings are based on material in the bulletin of the American Shortwave Listener's Club. Comments are by *Monitoring Times*.

- 0005 UTC on 7470 kHz  
Clandestine: Radio Caiman. Spanish announcer with program, "Musica de la juventad." (Frodge-MI). *For those interested in such things, this is the easiest clandestine to hear.*
- 0010 UTC on 10059 kHz  
Vietnam: Voice of Vietnam. Instrumental and vocal music. Male and woman announcer in Vietnamese. (Blair-CA)
- 0045 UTC on 4952 kHz  
Brasil: Radio Clube Rondonopolis. Tentative logging. Heard several club IDs, low-key English and Portuguese music, news at 0100 UTC followed by more music and a commentary on South Africa. (Frodge-MI)
- 0120 UTC on 15070 kHz  
Soviet Union: Moscow One (domestic). Male announcer with pop music then talk. (MacKenzie-CA)
- 0203 UTC on 9725 kHz  
Switzerland: Swiss Radio International. News and commentary on problems between Turkey and Greece. (Kopriva-CA)
- 0205 UTC on 9755 kHz  
Canada: Radio Canada International. English news. (Dokulil-CA)
- 0213 UTC on 9625 kHz  
Canada: CBC Northern Quebec Service. Man with talk in French. Also heard on 6195 kHz. (Shanmugam-KS)
- 0231 UTC on 6110 kHz  
Pirate: Interplanetary Radio. Strange announcement by people calling themselves "Celldorians" about an ongoing war and the need for us to keep our dome areas sealed. (Serar-CA) *What's so strange about that? --*
- 0254 UTC on 7270 kHz  
Poland: Radio Polonia. English program called "Modern Classical." Mutilated by Radio RSA sign-on. (Shanmugam-KS)
- 0255 UTC on 7065 kHz  
Albania: Radio Tirana. English broadcast of Pop-Opera music; national anthem, interval signal. (Earhart-NE) *Whatever happened to the Albanian domestic station, Radio Gjirokaster? Never see it reported anymore. It couldn't be its programming or signal quality.*
- 0313 UTC on 15150 kHz  
New Zealand: Radio New Zealand International. Cricket comentary in English. (Shanmugam-KS)
- 0325 UTC on 6060 kHz  
Cuba: Radio Havana Cuba. Program "Developments of the Revolution" in Spanish. (Shanmugam-KS) *You didn't actually sit through that, did you?*
- 0330 UTC on 3955 kHz  
United Kingdom: BBC. Big Ben Chimes. (Blair-CA)
- 0347 UTC on 5025 kHz  
Cuba: Radio Rebelde. Live coverage of baseball game in Spanish. (Dokulil-CA) *How do you know it was "live?"*
- 0358 UTC on 11800 kHz  
Pakistan: Radio Pakistan. Drawn-out interval signal and male announcer with ID. (Park-HI)
- 0410 UTC on 11760 kHz  
Cook Islands Broadcasting. English and Maori language program of island music. (MacKenzie-CA) *Warning: Mr. MacKenzie is a professional. If you're on the east coast, don't try this at home without a note from your doctor.*
- 0425 UTC on 11825 kHz  
Society Islands: Radio Tahiti. Talk followed by Island music. (Parker-OH)
- 0440 UTC on 6185 kHz  
United States of America: WRNO, New Orleans, Louisiana. English religious program with Roy Masters. (Neff-OH)
- 0513 UTC on 5055 kHz  
Costa Rica: Radio Reloj. Spanish guitar music. (Earhart-NE)
- 0528 UTC on 7135 kHz  
France: Radio France International. 20's type music with female announcer in French, then man with news. (Park-HI)
- 0541 UTC on 3285 kHz  
Belize: Radio One, Belmopan. Light English and Spanish vocals, heavy interference from code station. (Earhart-NE)
- 0607 UTC on 5953.8 kHz  
Costa Rica: Faro del Caribe. Religious program in Spanish. (Dokulil-CA)
- 0633 UTC on 4940 kHz  
Marshall Islands (New Country): WSZO. Male and female announcer with talk in both English and local language. (Pettit-IA) *The country's not new, the station is.*
- 0638 UTC on 5047 kHz  
Togo: Radio Togo. VER:Mx, tlc, (343,3/10,Dokulil-CA) *Must have been in a foreign language. -ed.*
- 0910 UTC on 9735 kHz  
Paraguay: Radio Nacional. Talk about "La vida en Paraguay." (Natale-MO)
- 1123 UTC on 5015 kHz  
Radio Moyabamba, Peru. Upbeat Latin music. (Frodge-MI)
- 1130 UTC on 3250 kHz  
Guatemala: Radio Luz y Vida. Music of the campesinos. (Robinson-TN) *This station is located in Santa Barbara, Honduras, not Guatemala.*
- 1145 UTC on 3325.2 kHz  
Ondas Quevedenas, Quevedo, Ecuador. Male announcer in Spanish with program of local Ecuadorian music played on native instruments. Time checks and mentions of Quevedo. (Kaplan-FL) *Oh yeah?*
- 1155 UTC on 3324.8 kHz  
Guatemala: Radio Maya de Barillas. Spanish folk music, short speech, then religious vocals with an all-girl choir. (Thompson-FL) *How do you know it was "all girl?"*
- 1245 UTC on 6070 kHz  
Canada: CFRX, Toronto. English language relay of CFRB report on recreational opportunities in the Toronto area -- ice-flow races and watching migrating birds and the sap flow. (Fischer-PA) *Kinda makes you wish you were there.*
- 1245 UTC on 5953.8 kHz  
Costa Rica: Radio Casino. Male announcer with commentary. Many mentions of Radio Casino and Central America. (Thompson-FL)
- 1250 UTC on 4460 kHz  
People's Republic of China: Chinese People's Broadcasting Station,

- Beijing (CPBS-1). Instrumental and vocal music. Two women announcers. Code interference. (Blair-CA)
- 1316 UTC on 6195 kHz  
United States: AFRTS. Gary Nunn with NBC news then CBS news. Paralell on 15340 kHz. (Earhart-NE)
- 1340 UTC on 6016.1 kHz  
Nicaragua: La Voz de Nicaragua. Up-beat Latin rhythms then political commentary. (Thompson-FL) *Anyone hear these folks in English recently? Where? When? --ed.*
- 1344 UTC on 17775 kHz  
United Arab Emirates: UAE Radio. Talk on Arab philosophy. (Parker-OH)
- 1410 UTC on 9700 kHz  
North Korea: Radio Pyongyang. Young lady with news -- puppet this and hooligan that -- followed by choral and band music. (Frodge-Hong Kong)
- 1430 UTC on 15560 kHz  
The Netherlands: Radio Netherlands. Newline program followed by Shortwave Feedback program. also heard on 13770 kHz. (Choitz-IL)
- 1446 UTC on 9600 kHz  
Mexico: Radio Universidad. Classical music program. ID with chimes. (Natale-MO)
- 1502 UTC on 9840 kHz  
Guam: KTWR. Arthur Cushen's DX World program. (Blair-CA)
- 1525 UTC on 6120.7 kHz  
Nicaragua: Radio Zinica. Up-beat Latin vocals. Some Spanish patter between songs. (Thompson-FL)
- 1618 UTC on 6250 kHz  
North Korea; Radio Pyongyang. Korean language broadcast of news with male and female announcer. (Owsley-CA)
- 1633 UTC on 7355 kHz  
United States of America: KNLS, Anchor Point, Alaska. "The Swing Years" program in English with host Chuck Cecil. (Blair-CA)
- 1644 UTC on 3910 kHz  
Japan: Far East Network. Woman announcer with oldies. Ad for Griffin Dining Hall. (Frodge-MI) *Harold, you make it all look so easy! --ed.*
- 1657 UTC on 6140 kHz  
Federal Republic of Germany: Deutsche Welle. Symphony music in the Greek Service, "Edo Deutsche Welle..." (Park-HI)
- 1722 UTC on 9455 kHz  
United States of America: WMLK, Bethel, PA. Jacob O. Myer with talk of survival in today's world. (Earhart-NE)
- 1850 UTC on 11705 kHz  
People's Democratic Republic of Yemen: Man with talk and music in Arabic. Tentative logging. (Parker-OH)
- 1910 UTC on 11735 kHz  
United States of America. KCBI, Dallas, Texas. Talk about the family in English. (Neff-OH) *What ever happened to this station? All their ambitious plans for live and original programs? Can barely hear them, if at all, in Pennsylvania. --ed.*
- 1947 UTC on 11860 kHz  
India: All India Radio. Woman with commentary on Indian space program. (Frodge-MI) *Kaboom! --ed.*

- 2002 UTC on 9670 kHz  
Saipan: KYOI. Uninterrupted -- except for KYOI IDs -- middle-of-the-Road music. (Frodge-MI) *Now owned by the Christian Science Publishing Society as you know. Has officially change format, to no one's surprise. --ed.*
- 2325 UTC on 11700 kHz  
Dominican Republic: Radio Clarin. Program of Latin music. (Dokulil-CA)
- 2357 UTC on 4940 kHz  
Ivory Coast: Radio Abidjan. "Male announcer in French. IDs as Radio Abidjan. (Pettit-IA)

*Send your station news, schedules, and loggings to Larry Miller, 3 Lisa Drive, Thorndale, PA 19372 USA. And thank you for your support.*



**From Soup  
to Nuts...**

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**E**CPA '86 may have made it unlawful to tune in on mobile 'phones, but the industry itself is embroiled in bitter battle.

A few months ago Metroplex charged Southwestern Bell, an outspoken supporter of the telephone privacy legislation, with deliberate monitoring of their cellular mobile system for commercial benefit.

Bell admitted to the "deliberate commercial spying" charge whereby they tuned in on the data portions of the transmissions only to "obtain an estimate of its market share" but maintained that they had "not used the information for its own or another's benefit".

Bell went on to elaborate: "Transmissions that may be intercepted by the use of readily available scanning equipment are not protectible", a total turnabout from their claims and demands during the Privacy Act hearings.

Bell went on to say that the cellular signals which they had tapped were "noncommunicative" and that section 705 of the 1934 Communications Act (which prohibits use or divulgence of overheard transmissions) "does not apply to cellular data transmissions."

Metroplex replied that Southwestern Bell "presents a totally confused and inaccurate picture of interception law" and continued by observing that their competitor had been "caught with their hands in the cookie jar." (From *Personal Communications Technology*)

**Regency Electronics Corporation has filed a formal rulemaking petition** to the Federal Communications Commission requiring mandatory warning labels on scanning receivers.

Designated RM-5836, the proposal was open to a comment period which closed May 15. Intended to safeguard consumers from possible penalties resulting from illicit monitoring under the provisions of the new Electronic Communications Privacy Act of 1986, the wording proposed by Regency follows:

*"Improper use of this device may violate the provisions of the Electronics (sic) Communications Privacy Act of 1986 through the intentional unauthorized interception of protected radio communications."*

Although there are no guidelines as to how the listener would know what was legal and what was not, the labeling would possibly indemnify the manufacturer from any lawsuit brought by a consumer convicted of misusing the device.

We would like to thank Benn Kobb, editor of *Personal Communications Technology*, for bringing this proposal to our attention.

**At Least One Common Carrier is Abandoning the Old Low Band Frequencies.** Pacific Northwest Bell has filed with the FCC their intent to drop services on 35.26 MHz (wide area paging) while maintaining high band and UHF coverage (Item from Gary Westfall, KG6ASP, Beaverton, OR).

**...and Cellular Receivers Remain Strong.** The June Consumer Electronics Show (CES) in Chicago will reveal new scanners covering the 806-960 MHz band which include the controversial cellular telephone band. If you can't go, watch for coverage in *MT*!

**Navtex Comes in, Morse Code Goes Out.** Shipping interests worldwide will benefit from growing Navtex network, intended to provide timely updates affecting the safety of both ocean-going and inland waterway vessels.



*The Consumer Electronics Show, Chicago, Summer 1986 (Photo by Michael Perlman)*

Printing out messages on a continuous-roll paper and utilizing an inexpensive receiver, Navtex transmissions are made on 518 kHz in the Sitor (FEC) mode. Coastal stations expect the expanding network to obsolete current Morse transmissions over the next few years; voice broadcasts will remain unaffected.

The U.S. Coast Guard is vigorously installing Navtex equipment at its 12 communications stations and expect all to be in operation by 1990, providing virtually continuous coastal coverage for 100 miles distance.

Call signs and locations which may be heard are: NMF (Boston, MA), NMN (Portsmouth, VA), NMA (Miami, FL), NMG (New Orleans, LA), NMR (San Juan PR), NOJ (Kodiak/Adak, AL), NMC (Long Beach/San Francisco, CA and Astoria, OR), NMO (Honolulu, HI), and NRU (Guam).



**During three days of testimony in the spy trial of former National Security Agency employee Ronald W. Pelton**, jurors learned how the super-secret agency had tapped into Russian military high-level communications as well as targets in many other countries as well.

Prosecuting Attorney John Douglas admitted that almost nothing classified below "top secret" was done by his agency whose job, he went on, was to handle signals intelligence, collecting radio signals, microwave transmissions and telephone calls. Much of the material is encrypted.

Testimony disclosed that an on-going project at NSA is to upgrade equipment for more rapid data processing. One listening post was revealed as being near the Sea of Okhotsk near the Russian port of Vladivostok. (Item sent in by Jack Pletman, Huntington Station, NY)

**Frequency Hopping Thwarts Jamming** according to military communications experts. A new system developed by Hughes for the U.S. Army is designed to work in the high frequency (HF) range, 2-30 MHz.

Called Short Term Anti-Jam (STAJ) by the company, much longer distances without repeaters as compared to VHF and UHF systems are forecast by Hughes.

Purposeful jamming remains a high priority in Soviet offense, according to the latest edition of Janes Military Communications Yearbook: "Their massive emphasis on offensive electronic warfare clearly indicates that they consider their first priority in any East-West conflict is to make the electromagnetic spectrum as unusable as possible" through "intense broadband jamming."

**The Mysterious Case of the Fatal Phone Call** could be the title of another military item which recently came to light. During the 1982 Falklands War, Commodore James Salt, captain of the British frigate Sheffield, made a radiotelephone call which disrupted the ship's counter-measures system.

During that brief interruption, a French-made Exocet missile, fired by an Argentine warplane, hit the Sheffield on May 4th, killing 20 crewmen when the vessel sank.

As readers may recall, Argentine troops captured the poorly-defended Falklands (Malvinas) off the southeast Argentine coast on April 2, 1982. The resulting 74-day war to regain the British colony killed 255 Britons and 712 Argentines.

**Kantronics Is Pushing Packet Radio.** Although primarily a manufacturer of amateur radio accessories, Kantronics of Lawrence, Kansas, is hoping to press forward, expanding into commercial and government clientele with their packet computer system.

Packet communication allows highly-compressed bursts of stored data to be exchanged by radio signals. Phil Anderson, president of the company, hopes that their diversification will improve sales from the present \$1-\$2 million range to as much as \$10 million per year. (Item from Zel Eaton, Kirksville, MO)

**FCC Drops Consumer Radio Service Proposal:** After a controversial period of inquiry the Federal Communications Commission has terminated further consideration of a low-power personal communications service in the 460 MHz band which would have replaced the long-established General Mobile Radio Service (GMRS).

Little support and strong opposition faced the Commission regarding their proposal which would have undone a very popular private radio service which is presently shared by families and businesses in the 462.550-462.725 MHz range (mobile inputs 5 MHz higher).

**Radio Plus -- Down But Not Out:** An MT advertiser, Radio Plus, has asked us to notify prospective customers of their plight so that their excellent credibility would not be tarnished. A series of family health problems has plagued Gerry Thomas, owner of the company, and orders have been set back by about two weeks.

Gerry assures us that he expects an improvement in service within the next few weeks and hopes that customers will be understanding about the unforeseen problems and unavoidable delay.

**Stolen cars can now be tracked by RF.** Recently patented by the Lo-Jack Corporation of Massachusetts, a homing device transmitting on 173.025 MHz is tracked by a mobile receiver. A demonstration in Puerto Rico resulted in the location of a target vehicle within 14 minutes using a conventional scanner.

Puerto Rico is an ideal test market for the device; 20,000 cars are stolen every year, an average of one every 30 minutes.

**Of the 500 transponders aboard the 25 active U.S. domestic communications satellites,** a full 30 percent are totally unused and many of the remaining are part time only, according to a clipping sent in recently by Warren Leach of Portland, Oregon.

As if this idle capacity weren't bad enough, some 22 additional DOMSATS are scheduled for launch within the next ten years. Some industry sources think the market has just about dried up, pointing out the proliferation of fiber optics by land-based companies.



**Voice Privacy? Cost overruns and construction delays have frustrated** attempts by the Federal Bureau of Investigation to upgrade their voice privacy systems. According to an unreleased report from the General Accounting Office, the FBI did not realistically budget for the expenditure.

Attorney General Edwin Meese III expanded the system to include the Drug Enforcement Administration (DEA) and U.S. Marshals Service. Motorola has been selected as the prime contractor and FBI officials hope that the full system will be operational by 1992.

Four contracts have been signed covering 36 of its 59 field offices nationwide. At the present time, fully operational systems are installed only in Washington, New York and Los Angeles; partially-completed are Baltimore, Buffalo, Houston, Dallas, Las Vegas, and San Francisco. (Submitted by Bill Black, Washington, DC)

**Armed Forces Day -- A slight change in the initial time for the test call** to precede special Armed Forces Day commemorative communications (MT May 1987, page 4) has been sent to our desk. Instead of the tuning call beginning at 0300 UTC May 16 on the frequencies listed it will begin at 0335 UTC.

## Mars Field Day Operations

Every year on the last weekend in June (the 27th and 28th this year) the American Radio Relay League (ARRL) sponsors Field Day, a nationwide contest in which hams attempt to work as many stations during the authorized period as possible.

This year the hams will be awarded extra points by working MARS (Military Affiliate Radio System) stations using crossband operation, whereby the hams transmit on amateur frequency allocations,

listening for replies on the MARS frequencies.

MARS station will announce the amateur frequencies they will be monitoring during Field Day; their transmitting frequencies (kHz) are as follows:

**Air Force:**  
3229.5, 7528.5, 14528.5, 20874.5  
**Navy/Marine Corps:**  
4042.5, 7382.5, 14385.0, 20998.5  
**Army:**  
4018.5, 6997.5, 13997.5, 20995.5

**Pirate Radio Net Closed by FCC**

A "Pirate Radio Network" operating in the Los Angeles area since 1982 has been "busted" by the FCC. Claiming some 300 members, identifiers like "Pirate 0" (the control station) and "Pirate 68" were commonly heard on the system's single repeater output frequency, 27.275 MHz (CB channel 27), in the illegal narrowband FM mode.

Crossband inputs to the repeater included out-of-band CB frequencies, cordless telephone frequencies, and even unallocated split frequencies between the UHF General Mobile Radiotelephone Service (GMRS) channels (see accompanying chart).

For privacy, a subaudible tone squelch (194.6 Hz, formerly used by Pace/Pathcom) was employed, leading observers to speculate that the equipment--and perhaps even one or two of the operators--might have been formerly associated with that company. An alternate access tone is 103.5 Hz.

A standard Touchtone (DTMF) pad was used to bring up autopatch, power output changes (linear amplifier on and off), and selection of repeater input frequency. Although a 24 hour operation, the most active period was from about 4:30 PM until around midnight.

Licensed amateurs in the LA area are understandably concerned; two prime suspects in the unlawful operation are hams as are several suspected users (amateur two-meter activity could often be heard in the background behind the pirates' voices).

Two-meter frequencies commonly inhabited by the pirates included 147.435 (primary), 146.610 and 147.045 MHz.

South Bay listeners were in a prime location to monitor the pirate intercom; coverage was reported from Orange County to West Los Angeles. The control link seemed to be near the south side of the Palos Verdes Peninsula.

On Friday, May 8, the primary link was brought down as FCC inspectors arrived at the doorstep of the suspected control station operator who refused to allow the officials inside to inspect his equipment.

By 5:45 PM, Monday, May 11, the entire network had been shut down. Several amateurs suspected to have been involved were reportedly trying to dispose of their equipment on local swap nets, leading observers to speculate that the FCC cut a wide swath in the Bay area imposing legal sanctions against the unlawful operators.

**Shortwave Shenanigans**

The HF (high frequency, 3-30 MHz) spectrum is irresistible to many unlicensed operators looking for reliable, inexpensive, long distance communications. It is also inhabited by countless tactical operators who transmit under umbrella authorizations of government and military agencies.

The following loggings made here at MT headquarters are typical of these phantoms of the spectrum, some of whom appear briefly, others who may be heard repeatedly. Some are drug runners, a few are fishing fleets, more may be paramilitary, while others are pure hobbyists--"bootleggers". All frequencies are in kilohertz, all modes are single sideband voice, all times are UTC.

Freq	ID	Time/Day	Comments
3165	names	2350 Mon.	Drug runners in boats
4472.5		0135 Sat.	Bootleggers
4645			Military
4895	933, etc	2300 Sat.	Paramilitary
5211.6	Jim	2335 Mon.	Bootleggers
5715			Military
5770			Tuna fishermen
5813.7	Eagle	2323 Sat.	Paramilitary
5835		1200 Sat.	
6062			U.S. Air Force
6593		0000 Daily	Mercenary net
6598		0200 Daily	Phone patches
6622.5		0045	Mercenaries
6650			Bootleggers
6668			Phone patches
6767		1700	Paramilitary war games
6796.2		2350 Sat.	Radio checks
6833	6TM	0020 Fri.	Paramilitary
6835			Bootleggers
6838	Butter	0050 Sun.	Government
6870	Nightcap, Pemican, Cornsnow		Secure voice check
6879	Choker	1200 Sat.	U.S. Marine Corps tactical
6895	Arrowpoint		
6905	Durant, Compass		
6933			Bootleggers
6930			Bootleggers
6960		0035 Wed.	Bootleggers
6970	Choker	1200 Sat.	U.S. Marine Corps tactical
6985		0130 Tues.	
7775		0100 Sat.	Techs in aircraft
7920	Front Door, Kidney Stew	1900 Sun.	
8157		1200 Sat.	Selcall
8461	Boundless	2000 Sun.	Reserves
8652	O3J,H9Q		Military
8827		0230	Fishing fleet
8889			Fishing fleet
8907			Tuna fishermen
11403\$	KCP6530	1900	Equipment tests
13277			Tuna fishermen
13925		2100 Sun.	Phone patch from van
14407/14425/14450	Alpha Lima		Arabic; possible terrorists
14455			Shipboard surveillance
14775	Sky Chief, Side Pocket		
16450		0100 Sun.	Medical developmental

**Pirate Radio Network**

11 Meters:

27.275 MHz **primary** output/input channel NBFM  
 27.725 MHz secondary use/standard input was 49.860 MHz (suspected second discrete repeater) - also "main" 11 meter input to "pirate."

11 Meter inputs:

(all link on 49 MHz band to other TX sites)  
 27.725 MHz main "low level" user input - most active 11 meter input  
 26.825 MHz main "low level user input"  
 26.660 MHz option "low level user input"  
 27.375 MHz available at control operator's discretion, nearly no activity

49 MHz Links, Inputs and Talkbacks:

49.770 MHz  
 49.815 MHz input frequency (Pirate 0 private input)  
 49.860 MHz repeats to 27.725 (may be a discrete repeater)  
 49.900 MHz input frequency  
 49.930 MHz  
 49.990 MHz input frequency. Simplex operation also observed  
 (Yes, these are cordless phone frequencies!)

UHF inputs/outputs:

467.5375 MHz  
 467.7125 MHz  
 467.6125 MHz proposed second output for 27.275 MHz

**Scanning Alabama**

*contributed by Mark Cobbeldick, KB4CVN*

The state of Alabama extends from the Gulf of Mexico in the south to the Tennessee Valley and Lookout Mountain to the north. Because of the varied terrain, Alabama is licensed on a large number of radio frequencies. The following list contains all known licensed frequencies as of October 1986. If you have any corrections or additions please forward them to me at P.O. Box 931, Fort Payne, AL 35967.

**Key:**

- (SIM) Simplex
- (INP) Repeater input frequency
- (RPT) Repeater output frequency
- (CAR) Car to base frequency
- (BAS) Base to car frequency
- // Paired with following frequency
- HP Highway Patrol
- VFD Volunteer Fire Department
- \*1 Reference note, see list

Freq	Ch	Agency/Usage
37.260		Police common to Tenn.
37.400		Unknown
44.620		Surface Mining
44.780		Unknown
45.160		Unknown
45.980		Dept of Corrections
47.300		Unknown
151.010		Unknown
151.055		Highway Dept
151.175//		
159.330	F3	Forestry Comm(INP)
151.190//		
159.345	F4	Forestry Comm(INP)
151.220		Unknown
151.250		Unknown
151.325		Unknown
151.460//		
159.465	F8	Game & Fish Comm(INP)
		Marine Police (INP)
153.755		Unknown
154.025		Unknown
154.115		Agriculture Service
154.770		Unknown
154.800		Unknown
154.815		Unknown
154.920//		
155.445	F2	HP (BAS)*1
	F6	HP (SIM)*1
154.995		Unknown
155.010	F3	HP (SIM)#1,2
155.040		Unknown
155.085		Unknown
155.100		Unknown
155.115		Unknown
155.250		Unknown
155.280		Health Dept
155.340		Health Dept
155.370		Police common to FL/GA
155.445//		
154.920	F2	HP (CAR)*1
155.475	F4	HP (SIM)*1,4
155.505	F8	Bureau of Investigation(SIM)*1,5
155.535		Unknown
155.640		Unknown
155.775		Unknown
155.835		Unknown
155.895		Unknown
155.925		Unknown
158.790//		
159.030	F1	HP(BAS)*1
	F5	HP (SIM)*1
158.820		Unknown
158.865		Unknown
158.940		Unknown

CODE INTERPRETATION

00 Given as "double zero". Officer needs all possible assistance.  
 10-0 Use caution. Details not known.  
 10-1 Unable to copy - change location.  
 10-2 Signal good.  
 10-3 Stop transmitting.  
 10-4 Acknowledgment (OK).  
 10-5 Relay. (J1 - Personnel; J2 - Property; J3 - Prisoner; J4 - Papers).  
 10-6 Busy - unless urgent.  
 10-7 Out of service. Not subject to call.  
 10-8 in service.  
 10-9 Repeat.  
 10-10 Out of service. Subject to call.  
 10-11 Remain in service.  
 10-12 Stand by (Stop). Remain alert for further details.  
 10-13 Weather and road conditions.  
 10-14 Correct time.  
 10-15 Have in possession: (J1 - Personnel; J2 - Property; J3 - Prisoner; J4 - Papers).  
 10-16 Pick up: (J1 - Personnel; J2 - Property; J3 - Prisoner; J4 - Papers).  
 10-17 Urgent. Rush present detail.  
 10-18 Any traffic for this unit or station?  
 10-19 No traffic for your unit or station.  
 10-20 Location?  
 10-21 Call . . . by telephone.  
 10-22 Report in person to . . .  
 10-23 Arrived at scene.  
 10-24 Assignment completed.  
 10-25 Disregard last information or assignment.  
 10-26 Detaining person or vehicle. Expedite.  
 10-27 Drivers license information.  
 10-28 Vehicle registration information.  
 10-29 Check for wanted.  
 10-30 illegal use of radio.  
 10-31 Hit and run. (J1 - Personnel; J2 - Property).  
 10-32 Man with gun.

10-33 **EMERGENCY.** Maximum priority. All units and stations not involved - maintain radio silence.  
 10-34 Tower lights.  
 10-35 Major crime alert.  
 10-36 Urgent. Use light and siren.  
 10-37 Urgent. Silent run.  
 10-38 Investigate suspicious vehicle. (J1 - Occupied; J2 - Unoccupied).  
 10-39 Stopping suspicious vehicle. Give all information before stopping.  
 10-40 Stolen vehicle.  
 10-41 Beginning tour of duty.  
 10-42 Ending tour of duty.  
 10-43 Complete present assignment quickly.  
 10-44 Permission to leave assigned patrol area.  
 10-45 Off day.  
 10-46 Assist motorist.  
 10-47 Emergency road repairs needed.  
 10-48 Need assistance. Not 00 or 10-33.  
 10-49 Traffic light out . . .  
 10-50 Accident. (F - Fatal; PI - Personal injury; PD - Property damage; S - State veh.).  
 10-51 Wrecker needed.  
 10-52 Ambulance needed.  
 10-53 Road blocked.  
 10-54 Livestock on highway. (J1 - Live stock; J2 - Carcass).  
 10-55 Intoxicated driver.  
 10-56 Intoxicated pedestrian.  
 10-57 Crime in progress.  
 10-58 Direct traffic.  
 10-59 Convoy or escort.  
 10-60 Attempt to contact.  
 10-61 Return to . . .  
 10-62 Reply to message.  
 10-63 Prepare to make written copy.  
 10-64 Message for local delivery.  
 10-65 Radio log number.  
 10-66 Message, dispatch, or assignment cancellation.  
 10-67 Prowler report.  
 10-68 Dispatch information.  
 10-69 Car to car clearance.

10-70 Fire alarm. (F - Forest; H - House; V - Vehicle).  
 10-71 Report progress on fire.  
 10-72 Meet complainant.  
 10-73 Supervisor needed.  
 10-74 Intoximeter operator needed.  
 10-75 Photographer needed.  
 10-76 Investigator needed.  
 10-77 Narcotics agent needed.  
 10-78 Notify coroner.  
 10-79 In contact with . . .  
 10-80 D.C.G. (Disaster Control Group) (Op. Con. 1; Op. Con. 2; Op. Con. 3).  
 10-81 Squad in vicinity.  
 10-82 Reserve lodging.  
 10-83 Cancel reservations.  
 10-84 En route.  
 10-85 Will be late.  
 10-86 Missing person.  
 10-87 E.T.A. (Estimated time of arrival).  
 10-88 Present telephone number of . . .  
 10-89 Dead person.  
 10-90 Bank alarm.  
 10-91 Unnecessary use of radio.  
 10-92 Murder.  
 10-93 Blockade. (Road block).  
 10-94 Drag racing.  
 10-95 Reckless driving.  
 10-96 Mental person.  
 10-97 Civil Disturbance; (A - Racial; B - Teenagers; C - Crowd gathering; D - Fighting).  
 10-98 Prison or jail break.  
 10-99 Records indicate wanted or stolen. (A - Felony; B - Misdemeanor).  
 10-100 Hot Pursuit.  
 10-100A Attempting to out run patrol car.

159.970 Unknown  
 159.030//  
 148.790 F1 HP (CAR)\*1  
 159.210 Unknown  
 159.285//  
 Unknown F2 Forestry Com (RPT)  
 159.330//  
 151.175 F3 Forestry Com (RPT)  
 159.345//  
 151.190 F4 Forestry Com(RPT)  
 159.420 F1 Forestry Com (SIM)  
 F2 State Parks (SIM)  
 159.465//  
 151.460 F8 Game & Fish(RPT)\*5  
 F8 Marine PD (RPT)\*5  
 F1 State Parks (SIM)  
 Unknown  
 452.425  
 453.050//  
 458.050 Rural VFD (RPT)\*6  
 453.100//  
 458.100 Rural VFD (RPT)\*6  
 453.150//  
 458.150 Rural VFD (RPT)\*6  
 153.200//  
 458.200 Rural VFD (RPT)\*6  
 453.250//  
 458.2j50 Rural VFD (RPT)\*6  
 453.300//  
 458.300 Rural VFD (RPT)\*6  
 453.350//  
 458.350 Rural VFD (RPT)\*6  
 453.375//  
 458.375 Unknown  
 453.400//  
 458.400 F1 Emer Mgt Agency (RPT)\*8  
 453.425//  
 458.425 F2 Emer Mgt Agcy (RPT)\*8  
 453.475//  
 458.475 Unknown  
 453.500//  
 458.500 Rural VFD (RPT)\*6  
 453.550//  
 458.550 Rural VFD (RPT)\*6  
 453.600//  
 458.600 Rural VFD (RPT)\*6  
 453.650//  
 458.650 F3 Emer Mgt Agcy (RPT)\*8  
 453.675//  
 458.675 Unknown  
 453.700//  
 458.700 Rural VFD(RPT)\*6  
 453.725//  
 458.725 F4 Emer Mgt Agcy (RPT)\*8  
 453.750 Rural VFD(SIM)\*7  
 453.775//  
 458.775 Rural VFD(RPT)\*6  
 453.800//  
 458.800 Rural VFD(RPT)\*6  
 453.850//

458.850 Rural VFD(RPT)\*6  
 453.900//  
 458.900 Rural VFD(RPT)\*6  
 453.950//  
 458.950 Rural VFD(RPT)\*6  
 453.975//  
 458.975 Unknown  
 460.325//  
 465.325 Unknown

Reference Notes:

- \*1-The Highway Patrol maintains a statewide radio system (F1-F7) for use of various state agencies including, but not limited to, the following: Highway Patrol, Bureau of Investigation (ABI), Marine Police, Game and Fish Commission, State Fire Marshall, etc.
- \*2-Frequency of 155.010 MHz is the statewide police common frequency to all law enforcement agencies, plus ambulances, fire departments, rescue squads, etc.
- \*3-This is the primary ambulance to hospital frequency in Alabama (H.E.A.R. network)
- \*4-This frequency is often referred to as the "NELEF" (National Emergency Law Enforcement Frequency)
- \*5-These agencies use the Highway Patrol radio system (F1-F7), but F8 in their radios is reserved for their private agency frequency.
- \*6-The Forestry Commission has established UHF repeater systems statewide for rural volunteer fire departments to use. Some forest rangers have a radio for these frequencies in addition to their VHF agency radio.
- \*7-This frequency is a simplex only channel for mutual-aid communications between volunteer fire departments who are on different UHF repeater frequencies. Commonly referred to as the "truck-to-truck" channel (see \*6)
- \*8-The Alabama Emergency Management Agency maintains eleven repeater sites on four UHF frequencies covering the entire state and controlled by Montgomery headquarters. Some of their vehicles are also equipped with a Highway Patrol system radio (F1-F7; F8 is empty).

# HUGE

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# VOLMETS

A VOLMET is, or is covered by, a broadcast-only aviation weather reporting station. While most VOLMETS (a contraction of the French "flying weather") are found on the HF bands, there are also some on the VHF aero band; however, we will cover only the HF frequencies in this column.

If any readers would like to have a listing of VHF VOLMETS, please send an SASE to me and I will send them to you. However, unless you live in Europe or Asia, you're not likely to monitor these stations, since there are none in the United States.

One point that must be made is that VOLMETS are not the same as an ATIS. An ATIS (Automatic Terminal Information Service) only gives the terminal weather and conditions therein for its specific location. A VOLMET will give the weather, terminal conditions, forecasts, etc., for all of the cities (sometimes as many as 20) within area it covers; sometimes these areas cover more than one country.

The purpose of a VOLMET station broadcast is to alert pilots of flights enroute to a particular destination of changes in existing weather and forecast conditions at that destination, including potential alternate airports. The types of weather given on VOLMET broadcasts consist of the following: Actual weather forecasts (real time); Landing forecasts; Sigmets (significant meteorological) Forecasts and notices; and Forecasts - Trend Type.

Note that there is a decided sequence to these broadcasts with aviation wx (weather) for each city's airport repeated at least once, if not more often per broadcast. We will also see that more than one country shares each VOLMET frequency.

## VOLMET Frequencies

The VOLMET frequency listings are grouped by area. Most areas have two or more countries under the area heading. Each country's broadcast will give aviation weather for cities within its boundaries and also, in many cases, for cities in adjacent countries.

For instance, the New York VOLMET broadcasts weather for three Caribbean island cities, as well as for 22 cities within the continental United States. These are located in the eastern and middle western regions of the country. New York's program is divided into four five-minute segments; each dealing with six airport terminals on a fixed schedule. This broadcast occurs on the hour and 30 minutes past the hour. Immediately after the New York VOLMET broadcast, a similar presentation, which lasts for 10 minutes, is made by Gander Radio (Gander, Newfoundland, Canada) for major airports within Canada.

In some cases, when a given city within the frequency listing has more than one major airport (such as London), it will be listed, i.e. London Heathrow and London Gatwick. In other instances, you might see the letters FIR after a city - FIR means Flight Information Region - and the weather given will be for more than just the city's airport, and may include an area of thousands of square miles.

A VOLMET station usually identifies itself as "This is New York Radio", or whatever the VOLMET station is that you are listening to; consequently, they are relatively easy for a listener - especially a first time listener to recognize it as a VOLMET station, even if you have an analog receiver instead of digital.

Now on with the frequencies!

## AFRICA VOLMET (AFI-VOL)

All areas under this heading use the frequency of 10057

### ANTANARIVO, MADAGASCAR

Ivato, Mahebourg, Saint Denis, Antsiranana, Mahahanga, Toamasina, Moroni Comores

### BRAZZAVILLE, CONGO

Brazzaville, Ndjamena, Douala, Bangui, Libreville, Sao Tome, Kinashasa, Kano, Lagos, Luanda

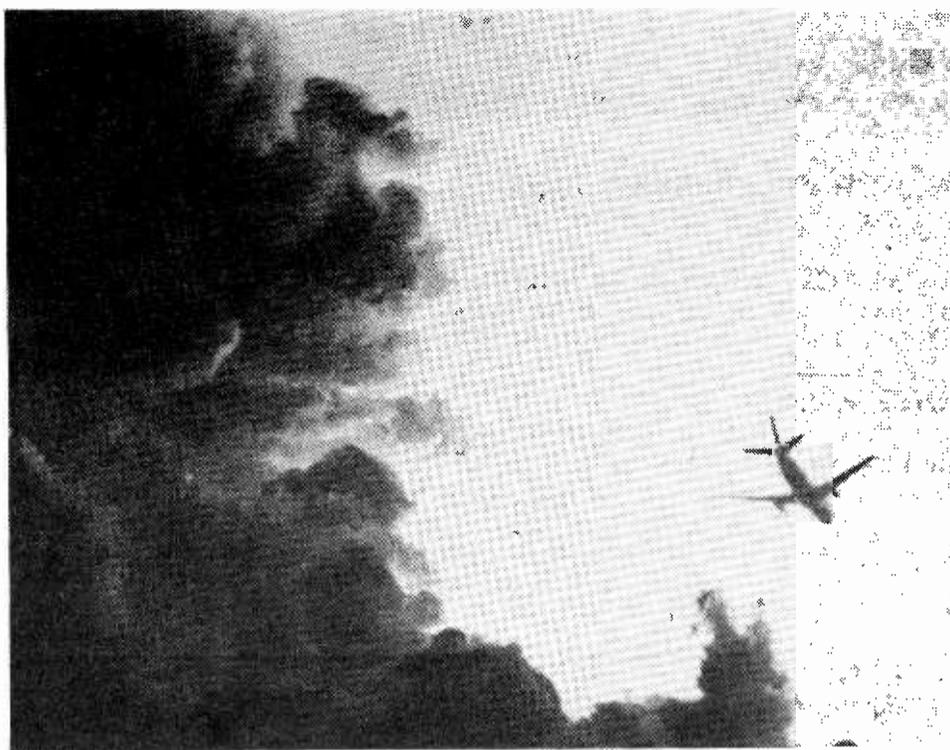
### TEL-AVIV/BEN GURION

2980, 5575, 11391

Tel-Aviv/Ben Gurion (airport), Haifa/Ramat David, Elat, Jerusalem, Larnaca, Athens, Ankara/Esenboga, Istanbul/Yesilkoy

## EUROPE VOLMET (EUR-VOL)

3413, 5640, 8957, 13264



In stormy weather or fair, tune up the VOLMET weather reporting stations to hear just what the airliners are hearing (Photo by The Interceptor)

## SHANNON, IRELAND

Brussels, Hamburg, Frankfurt Main, Cologne, Bonn, Dusseldorf, Munich, Shannon, Prestwick, London/Heathrow, London/Gatwick, Amsterdam/Schipol, Manchester, Copenhagen/Castrup, Stockholm/Arlanda, Goteberg/Landvetter, Bergen/Flesland, Oslo/Gardermoen, Helsinki/Vantaa, Dublin, Barcelona, Madrid/Barajas, Lisbon, Paris/Orly, Paris/DeGaulle, Santa Maria, Lyon/Satolas, Rome/Fiumicino, Milan/Malpensa, Zurich, Geneva/Cointrin, Turin/Caselle, Athens.

## MIDDLE EAST VOLMET (MID-VOL)

2956, 5589, 8945

### BAGHDAD, IRAQ

Baghdad International Airport, Basrah/Maqal

### BEIRUT, LEBONON

Beirut International, Larnaca, Damascus International, Amman, Cairo International, Baghdad International, Abadan, Kuwait, Istanbul/Yesilkoy, Bahrain International, Ankara/Esenboga, Tehran/Mehrabad, Jeddah International

### CAIRO, EGYPT

Cairo International

### ISTANBUL, TURKEY

Istanbul/Yesilkoy, Ankara/Esenboga, Izmir/Cigli, Athens, Thessaloniki, Sofia, Varna, Bucharest, Bandirma

## NORTH ATLANTIC VOLMET (NAT-VOL)

### NEW YORK, NEW YORK, USA

3485, 6604, 10051, 13270

Detroit, Chicago, Cleveland, Niagara Falls, Milwaukee, Indianapolis, Bangor, Pittsburgh, New York FIR, Windsor Locks, St. Louis, Syracuse, Minneapolis, Newark, Boston, Baltimore, Philadelphia, Washington, D.C., New York (metro), Bermuda, Miami, Miami FIR, Nassau, Freeport, Tampa, West Palm Beach.

### GANDER, NEWFOUNDLAND, CANADA

3485, 6604, 10051, 13270

Montreal/Dorval, Montreal/Mirabel, Toronto, Ottawa, Gander Domestic, Gander Oceanic, Goose, Halifax, Moncton, Montreal (Metro), Winnipeg, Edmonton, Calgary, Sydney, Frobisher, Sondrestrom.

## PACIFIC VOLMET (PAC-VOL)

2863, 6679, 8828, 13282

### ANCHORAGE, ALASKA (USA)

Anchorage, Fairbanks, Cold Bay, King Solomon, Shemya, Vancouver

### AUCKLAND, NEW ZEALAND

Auckland, Christchurch, Wellington, Nandi International, Moumea/La Tontouta, Pago Pago, Tahiti/Faaa

### HONG KONG

Hong Kong International, Guangzhou/Baiyan, Chiang Kai Shek International, Manila International, Naha, Kaohsiung International, Mactán International, Hong Kong FIR

### HONOLULU, HAWAII (USA)

Honolulu International, General Lyman Field, Agana, Kahului, Honolulu FIR

### OAKLAND, CALIFORNIA (USA)

Oakland, San Francisco, Portland, Seattle, Las Vegas, Reno, Sacramento

### SHANGHAI (PRC)

Shanghai

### TOKYO, JAPAN

Tokyo International (Narita, new International Airport), Tokyo International (Haneda), Chitose, Nagoya, Osaka International, Fukuoka, Kimpo International/Korea

## NORTH/CENTRAL ASIA VOLMET (NCA-VOL)

5676, 8939, 11297, 13279

(Cities covered under each major area's jurisdiction were unavailable; however, the major areas covered are Moscow, Khabarovsk, Novosibirsk, and Tashkent.)

## SOUTH AMERICA VOLMET (SAM-VOL)

13352, 6603, 10057, (Recife, only)

### MANAUS, BRAZIL

Cruzeiro Do Sul, Guajara-Mirim, Tarauaca, Eduardo Gomes, Ponta Pelada, Porto Velho, Presidente Medici, Santarem, Tabatinga, Val De Caes, Vilhena, Belem, Manaus

### RECIFE, BRAZIL

Bom Jesus Da Lapa, Campina Grande, Dix Sept Rosado, Pres. Castro Pinto, Augusto Severo, Dois De Julho, Fernando De Noronha, Guararapes, Ilheus, Palmares, Parnaiba, Petrolina, Pinto Martins, Santa Maria, Teresina, Tirirical, Recife FIR

## SOUTHEAST ASIA VOLMET (SEA-VOL)

2965, 6676, 11387

### BANGKOK, THAILAND

Bangkok International, Mingaladon, Tan Son Nhut, Kuala Lumpur International, Singapore Changi, Singapore Paya, Lebar, U-Tapao

### BOMBAY, INDIA

Bombay, Colombo/Katunayake International, Madras, Karachi Civil, Ahmadabad

### CALCUTTA, INDIA

Calcutta, Bombay, Delhi, Khaka/Tezgaon, Mingaladon

### KARACHI, PAKISTAN

Karachi Civil, Nawabshah, Lahore

## SINGAPORE, SINGAPORE

Singapore Changi, Singapore Paya, Lebar, Kuala Lumpur, Jakarta, Brunei, Kota Kinabalu, Bali, Penang

## SYDNEY, AUSTRALIA

Sydney/Kingsford Smith, Brisbane, Melbourne, Adelaide, Alice Springs, Darwin, Townsville, Perth

The following area VOLMETS' frequencies are located outside of the usual bands on which HF aero communications and VOLMET stations are usually found:

## JOHANNESBURG, SOUTH AFRICA

3047, 6716, 9026

Bloemfontein, Jan Smuts, Kimberly, Pietersburg, Durban, Matsapa, Messina, Phalaborwa, Welkom, Nelspruit, Newcastle, Skukuza

## JEDDAH, SAUDI ARABIA

4570, 10215

Jeddah, Taif, Dhahran, Medina, Riyadh

## MONTEVIDEO, URUGUAY

5803

Montevideo FIR

In August, we will look at some Air Route Traffic Control Centers (Indianapolis and Cleveland) and see just how traffic is routed through the various sectors and from one Center to another.

'73s and out.

*"To me, Monitoring Times is like boiled crawfish -- The next one is even better than the one before it!"*

Kevin Chedville  
Port Sulphur, LA

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## Getting on the Map

I visit local bookstores frequently to look for reference volumes that are useful in connection with utility monitoring. On my most recent visit I discovered a dandy book with the title of *The Map Catalog* by Makower & Bergheim.

The book is a comprehensive guide to the various kinds of maps and where you can obtain them. It is divided into four main categories: land maps, sky maps, water maps, and map products. This latter section includes information on atlases, map software, globes, map aids and relief maps.

The appendix contains lists of federal, state and international map agencies, map libraries and stores, plus selected map terms. All in all, I found the volume to be just exactly what I had been looking for and the cost was reasonable at \$14.95. I would imagine it can be found in (or through) any bookstore.

## Eliminating Jamming

According to an article in the *Washington Post*, Engineers of the U.S. Information Agency are experimenting with a device which, it is hoped, will eliminate or reduce jamming efforts against VOA broadcasts. Reportedly, the device can be made out of household items, such as aluminum foil. The article points out, however, that it may be many months before the testing has been concluded and even then the results will have to be analyzed.

## Direction Finding Book

I am anxiously awaiting my copy of a new book, *Transmitter Hunting: Radio Direction Finding Simplified* by Moell & Curlee. This is an Electronic Book Club alternate selection and I will comment further on this title after I have it in hand. I am hoping the book will contain some good practical information on HF DF antennas suitable for hobbyist applications.

## The Garage Door Mystery

In going through some material I previously could not use due to space limitations, I found a short newspaper item contributed by Patrick Griffin, Colorado, which he had clipped from the *Rocky Mountain News* of Denver (This item was also touched on briefly in the pages of *MT* a few months ago).

It seems that residents of San Bernardino, California, had been complaining that their remote-control garage door openers were periodically going haywire. The Genie Garage Door Company determined this was always taking place when President Reagan visited his California ranch.

When the president is in California, his E4-B airborne command plane, a modified Boeing 747 which has an extensive electronic equipment installation on-board, is kept at March AFB (about ten miles south of San Bernardino) in a state of readiness. Apparently, transmissions from this aircraft were creating interference in the frequency range of the garage door openers in the surrounding area, thus causing the erratic opener operation.

According to the Genie shop owner, the operating frequency of the opener can be easily adjusted to eliminate the problem.

## Special Interest Loggings (monitored in March)

### 6612.7 kHz 270033Z USB

This was a very strange activity with several OM/EE in conversation and exchanging periodic short messages consisting of digits and phonetic letters. Here is what a typical message looked like: 4456 4505 477 281 516 529 ZCG OG ULG JIG Good Weather.

It appeared that there were four to five stations on the net, a couple of them being about QSA3 and the others about QSA1.

Due to bad QRM which came up on an adjacent frequency, it was not possible to determine what the plaintext conversation was all about. I wonder if this is related to the activity previously heard on 6593 kHz?

### 6924.6 kHz 111355Z CW

This is possibly a Soviet activity and has been seen often in the past. Only one end was heard and I cut in on him sending V's and then going into 18 character segments of cut numbers. Conditions between the two stations must have been bad because the end I could hear sent each segment three times. Here is one of the segments: WHANMRH-HWUAMRMTMNU QSL AR and then went back to sending V's for awhile.

### 7828.5 kHz 201905Z RTTY 75-850

I picked up this station as he was transmitting an encrypted form

of RTTY. The carrier went off the air abruptly at 1906Z and a station came up very briefly in a voice mode but I was unable to tune the signal in properly in time to determine the language.

Immediately after the short voice transmission the station went off the air. However, two minutes later I noted a transmitter being tuned and the following was sent in CW: UR66 UR66 DE 09GI 09GI INT QRK - QRH F7 F8 K and he continued sending this several times. I am not certain about the latter call-sign because sometimes he sent it as 09GI and other times as 09Z.

### 18161.2 kHz 252049Z RTTY 50-425

This station was in the process of sending 5F groups and upon completion of the message he switched to CW and sent repeats utilizing a cut number system of 1 2 3 4 5 6 7 8 9 0 = A U 3 4 5 6 7 D N T. After the repeated groups were taken care of he began to send lengthy batches of chatter in 2L, 3L and 4L groups. VVH was noted, probably the callsign of the unheard station; suspected Vietnamese diplomatic network. ■

## MARCH 1987 LOGGINGS

KHZ	DTOI	MODE/IDENTIFICATION/COMMENTS
219	220221	MCW/BA Beacon, Baltimore (Washington! - Jeans) MD
223	220223	MCW/DA Beacon, Ft. Belvoir (Davison AAF - Davee) VA
265	220224	MCW/XPZ Beacon, Winchester, VA
300	180304	MCW/3B Beacon, Brockville, Ontario
326	180308	MCW/WV Beacon, Warton, Ontario
335	180310	MCW/YLD Beacon, Chappleau, Ontario
351	180314	MCW/YKQ Beacon, Ft. Rupert, PQ, Canada
353	220227	MCW/FME Beacon, Ft. Meade (Tipton AAF) MD
360	220230	MCW/PN Beacon, Pt. Menier (Anicosti Island) PQ, Canada
362	220229	MCW/AK Beacon, Akron (Municipal-Washington Co.) OH
366	180319	MCW/YMW Beacon, Maniwaki, PQ, Canada
379	180324	MCW/BRA Beacon, Asheville (Municipal- Broad River) NC
516	180328	MCW/YWA Beacon, Petawawa, Ontario, Canada
3072.5	220154	CW/5-charac grps, Ltrs A-Z, digits 2,3,8 and Spanish Nyeh (MW)
3461.7	220158	CW/NCO DE KKV (unid) QSA IMI
3484.8	160026	USB/Wx in English for Canadian loc.
4124.8	220218	USB/Barge t/c. One Capt. sez he in Pensacola, other at unid loc
4357.4	220214	USB/unid ship calling High Seas WOM Miami, FL
4444.4	220207	CW/5L grps, pauses after every 10 grps
4470.4	220205	USB/MARS freq, trc from Beloit, WI, to San Diego, CA
4607.1	220202	CW/970MR DE 960QZ (Prob Spain Navy freq)
4623.2	250033	CW/Wx in English
6204.9	131546	USB/3 Stns (all OM) in conversation in unid language. Some tonal changes for certain words but not like Chinese
6240.8	231610	RTTY 75-850/Encrypted transmission
6273	102037	CXW/6VA DE SXYI (Dakar, Senegal from Greek ship)
6274.2	220148	CW/WNU DE D4FQ (Slidell, LA, from Liberian ship)
6328.3	131553	RTTY 75-850/Coded Aero WX
6465.3	270054	CW/VVV DE Y5M (Ruegen, GDR)
6491.4	151558	CW/3EKM5 DE VCS (Polo-Panamanian ship from CG Halifax, Canada)
6518.7	16001	USB/Unid party trying contact fishing vessel thru Halifax CG stn
6623.9	250016	CW/No CS, Addee indicators G9J, D1J, S9L, L1F. Poss Peruvian naval net. Port of Callao indicated in text
6760.9	161429	USB/"Eager Two One this is Emination," requests "earliest entry into IR 69"
6870.2	181411	LSB/FAA Southern Region Emerg Net. KDM50 acting as CT, Hampton, GA; KDM49 Atlanta, GA; KDA93 unlocated; KJK79 Hilliard, FL; KCA58 Raleigh, NC
7405.6	161447	RTTY 50-425/RCC Havana testing with ITT NY, Quick Brown Fox tape
7767	200010	CW/No CS/Stn sending cut nbrs, very slow, hand sent. Went down with VA VA VA. Used A N D U W R I G M T.
7964	200004	CW/PWH33 DE PWW22 (Prob Brazilian navy stns)
12906.1	251510	CW/Poss DZJ Manila, Philippines with news in English re Philippine Islands
13364	151619	CW/Press in German from DAP Deutsche Presse-Agentur Hamburg, FRG
13370	231629	RTTY 75-850/NBA (US Navy Balboa, Panama) with test tape. Note: This is Inter-American Naval net freq
13399	231624	RTTY 75-425/Prob MFA Prague from Czech Emb Havana/Czech Diplomatic t/c
13528	102046	CW/..DE CMU967 (Santiago Naval Rdo, Cuba) Rpts QSX18167 over & over
13528.2	151632	RTTY 50-425/5F grps, coded WX
13545.7	151648	CW/DE PCW1 (Hague, Netherlands)
13750.5	151650	RTTY 50-425/Coded WX
13937.8	281507	CW/ONY24 DE ONY27 (Unlocated Belgium stn from Brussels, Belgium) Sent ZKJ1 which means "Close your station" & is usually used by military stns
14420	241558	RTTY 50-170/Arabic text
14617.4	281520	RTTY 50-425/QRA Y7A51-53-55-59-63-65-67 (MFA Berlin, GDR) CS equate to 11574, 13436, 13946.5, 14619, 16199, 16268 & 19445 kHz
17065	251504	CW/4LT3 DE UBF2 (Soviet ship from Odessa, Ukrainian SSR)
18128.4	201831	CW/GMN (British alloc) sending 5F gps to unknown stn
18150.5	251449	RTTY/Sounds like Piccolo RTTY
18166	182039	CW/DE CMU967 Santiago Naval Tdo, Cuba, wkg unknown stn
18167.2	251453	RTTY 75-850/Encrypted transmission

## Federal and Military Monitoring

The majority of our readers who enjoy monitoring the intriguing two-way communications to be heard throughout the spectrum seem to prefer listening in on military and other federal government agencies.

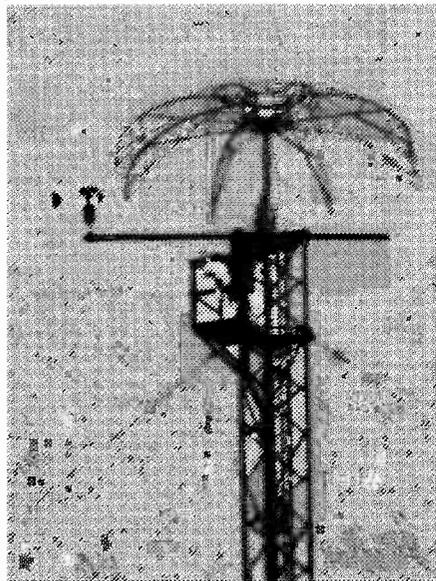
From drug boat interception to war games, monitoring federal frequencies provides endless hours of fascination to utilities listeners. Distress calls from sinking oceanliners and hijacked international aircraft are made over the airwaves as is response from rescue teams.

While drama of this magnitude is--fortunately--rare, the alert monitor with the proper equipment tuned to the appropriate frequency will be on the edge of his seat, witness to history in the making.

### An Invitation to Writers

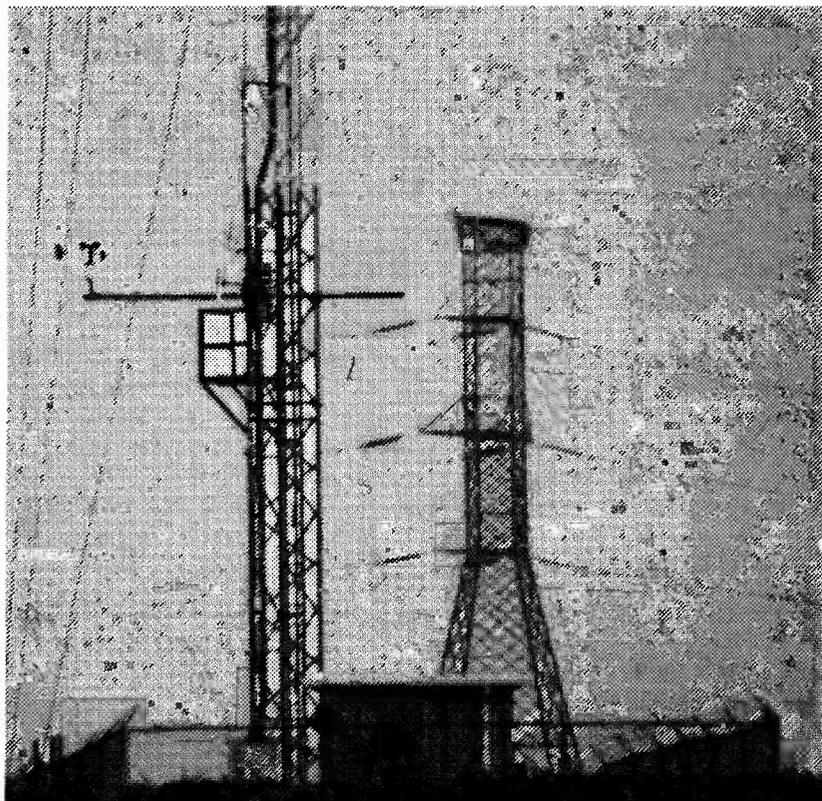
Each month this new column will feature frequency lists, agency identifications, system profiles, and other monitoring information of benefit to the serious ute listener. We encourage experienced monitors to submit material for the column. We are also seeking a skilled writer to handle this column on a permanent basis.

## A New Antenna at Byron Hill, Illinois



Reader Bruce Gustafson sent in photos of this interesting antenna newly erected near the Byron Hill, Illinois, nuclear power plant. The capacitance hat at the top would indicate that this may be one of the Project GWEN installations.

GWEN (ground wave emergency network) is being installed nationwide as part of the U.S. survivable low frequency communications system(SLFCS). The wind vane/anemometer complex mounted on the tower could be used to determine the drift pattern of radioactivity in the atmosphere following a nuclear "event."



## Government Users of the Spectrum

The U.S. government is a major user of the radio spectrum. But just which agencies take the lion's share? *MT* shows in the following list the major

federal users who occupy over 216,000 discrete frequencies in the U.S. and possessions alone.

Department or Agency	Number of Assignments	% of Gov't Master File
Agriculture	11598	5.35
Air Force	27472	12.67
Army	28446	13.12
Commerce	4967	2.29
Coast Guard	11018	5.08
Dept of Energy	6883	3.17
Fed Aviation Admin	28035	12.93
Fed Comm Commission	690	0.3183
Gen Services Admin	591	0.2727
Health & Human Serv	1526	0.7040
Interior	16143	7.45
Justice	16589	14.59
Natl Aero & Space Ad	1447	0.6676
Natl Science Foundtn	160	0.0738
Treasury	6522	3.01
Transportation	1445	0.6666
U.S. Information Agency	1165	0.5375
U.S. Postal Service	1233	0.5688
Veterans Admin	2151	0.9923
Other Agencies	15762	7.27

## Bugging the Birds

The sight of a flock of game birds overhead inspires different feelings: the conservationist senses the freedom, the sublime expression of nature, while the hunter feels a surge of adrenaline as he waits in his blind. But there is another type of hunter whose job it is to preserve wildlife, and he does it with the help of radio.

The Fish and Wildlife Service, a bureau of the Department of the Interior, tracks game birds by attaching radio transmitter collars which send out tone pulses which may be heard on a standard scanner in the 164-167 MHz range for up to a mile or more.

Wildlife agents search for the birds with hand-held (or truck-mounted) Yagi beam antennas attached to standard programmable scanners, listening for the tell-tale 30-120 pulses per minute which signals the presence of a tagged bird.

The tiny waterproof transmitters sprout flexible whip antennas several inches long and must be capable of sending their beacons for several months. The following frequencies are used by the Northern Prairie Wildlife Research Center at Jamestown, North Dakota, and are

typical of frequency assignments nationwide.

164.4375	164.7125	166.9875
164.4625	166.7375	167.0125
164.4875	166.7625	167.0375
164.5125	166.7875	167.0625
164.5375	166.8125	167.0875
164.5625	166.8375	167.1125
164.5875	166.8625	167.1375
164.6125	166.8875	167.1625
164.6375	166.9125	167.1875
164.6625	166.9375	167.2125
164.6875	166.9625	167.2375
		167.2625



## Docking with the MIR

The Soviet space station MIR (Peace) now has a 22.7-ton astrophysics laboratory. The vehicle, named Kvant (Quantum), was expected to dock with MIR on April 5. Unfortunately, there were problems.

The first indication of trouble came on Radio Moscow when it was announced that Kvant was 200 meters from MIR and backing away. Soviet officials, however, were quick to add that enough fuel existed for a second attempt.

Four days later on April 9, however, there was still no information on the docking. Instead of news about Kvant, Radio Moscow carried a story about the spaceplane they have under development. During the 0100 UTC newscast, the Soviets did announce that docking had been achieved but the next hour coverage shifted back to the spaceplane and no mention of Kvant was made.

Eventually, the Soviets admitted that a hard docking was not achieved. This meant no electrical or fuel connections could be made nor could the crew open the hatch to work in the module's transfer compartment; a foreign object had lodged in the docking mechanism. The only solution was to send the two cosmonauts outside MIR for a look.

What cosmonauts Yuri Romanenko and Alexander Laveikin found was a cloth sack 40 cm long and 40 cm wide lodged in the docking mechanism. They removed it and the module docked with the MIR on April 12th, the third attempt. Romanenko and Laveikin remained outside the craft during the maneuver. According to Radio Moscow, the EVA lasted three hours and thirty minutes.

The docking, at the stern of the core vehicle, brings the overall length of the MIR/ Soyuz TM-2/ Kvant complex to 35 meters and once Kvant's 10.6-ton service pod is jettisoned, leaves the laboratory in a straight line configuration with MIR. Total weight is now 51 tons.

At launch, Kvant measured 5.8 meters (19.1 ft) long with a diameter of 4.15 meters (13.8 ft). It contains a laboratory bay for the main research equipment and a transfer compartment to the MIR, Blagov said.

Included in the transfer compartment is an airlock for a joint Soviet-Swiss ultraviolet telescope developed jointly by Soviet and Swiss scientists. The telescope is located in an unpressurized scientific payload bay

that surrounds the transfer compartment.

The Kvant also carries x-ray experiments manufactured by agencies of West Germany, Holland, Britain and the European Space Agency.

European scientists who contributed the x-ray instruments to Kvant have been told it will remain in orbit for at least a year and possibly two. So far, frequencies for the Kvant have not been located but voice activity from the two cosmonauts aboard MIR Laveikin continues on 143.625 MHz.

Kvant will be the first of five modules for MIR. In addition to the astrophysics lab, there will be modules for conducting Earth resources experiments, an Earth photography module, and a technology module that will contain furnaces to manufacture pure materials. Once all the modules are in place the announcer stated that the total weight of the complex will be 135 tons.

### The Mailbag

Readers, including Bob Hambuchen, have asked for a MIR schedule. "After all," they say, "since the orbit is so predictable, we should know exactly when it and other space objects cross over the United States." Unfortunately, objects like MIR are not as predictable as is commonly thought, shifting orbit quite frequently.

Bob also wanted to know if I could devote a column to upcoming events such as the Voyager mission and give the frequencies. Wherever possible, we certainly do so.

### More Information

There is a computer BBS in Dallas called Datalink RBBS that carries current keplerian elements for over 35 satellites. The board is run by *Monitoring Times* reader Jeff Wallach and is one of the finest satellite BBS's in the country. Jeff has plenty of on-line storage and supports downloads of satellite programs. Datalink RBBS can be reached via modem 3090/1200 baud at 214-340-5850. Be sure to tell Jeff that *MT* sent you.

Dave Latsch mentions that he has monitored CW carriers with doppler shift on 215.980 MHz. What Dave is hearing is radar signals bouncing off of space objects from the Navy's NAVSPUR radar system. There are several transmitters in the southern United States that transmit

a CW signal straight up. Once it hits an object a return signal is monitored by ground receivers. Using computers, orbital parameters can be determined and the information is sent to NORAD. Congratulations on an unusual intercept, Dave.

According to another reader -- one who wishes to remain anonymous -- during the Mt. St. Helens eruption a few years back he heard a voice downlink on 149.999 Mhz. A base station told helicopter crews not to handle bodies. The transmission came from one of the ATS satellites.

I have additional information that a government agency was supplied with transceivers for the ATS satellite that has an uplink around 136 MHz and a downlink around 150 MHz. Could this be the voice channel I have been looking for? *MT* monitors are encouraged to report any voice activity on this frequency and the first to submit a cassette tape with the date/time/frequency of voice in the 136 - 138 MHz range or in the 150 MHz area from the ATS satellite will receive a space shuttle color photo.

John Henault in Massachusetts wrote to say he wishes we would indicate mode of reception next to the frequencies in *Signals from Space*. This we'll do, but when it comes to the Fleetsatcom milsats this is difficult (unless it is an actual intercept) because almost every mode you can think of is being used on the birds. And, of course, there are no schedules or set frequencies on the milsats. There is no *Radio Database International* for the milsats. It is catch as catch can.

### Starship Enterprise BBS

Recently I was asked to sysop two subboards on board the Starship Enterprise BBS here in Jacksonville. The two subboards (8/9) are devoted to scanner/SWL/utility frequencies and news, and space and satellite news. *MT* readers wishing to contact the Starship via 300/1200 baud modem by calling 904-786-8142.

On your initial visit access will be limited; however if you mention that you are an *MT* reader at logon, your access level will be raised as soon as you are validated. Please be patient and give Curtis, the Starship sysop, 24 hours to validate and update your access. I can be left private electronic mail by addressing it to User ID number 139.

### Jacksonville Hamfest

The Jacksonville, Florida, hamfest has invited me back this year to put on two forums. While the final details have yet to be decided, I hope to have the opportunity to meet a lot of you. We had a large crowd from all over last year and we expect a larger one this year.

The convention will be held at the newly opened Prime F. Osborne Convention Center in Jacksonville on August 1 and 2. There will be major exhibitors and a huge indoor swap area. For hams the talk-in is on 146.16/76. Registration is only \$5.00. If you would like further information, call 904-350-9193 or write G.J.H.A., P.O. Box 10623 Jacksonville, FL 32207. I'll have more information on the forums next month.

Please remember, when writing to SFS please enclose a SASE for a personal reply and be patient. ■

### Satellite Signals Easy to Hear

Many transmissions from earth-orbiting objects are in the 135-300 MHz range, readily receivable on the new breed of wide-frequency-coverage scanners and tunable VHF/UHF receivers.

Radio signals from the Russian Mir space station, American Space Shuttle and tactical fleet communications satellites (FLEETSATCOM) are within the tuning range of such scanners and receivers as the Regency MX7000, MX5000/5500, Realistic PRO-2004, JIL SX400, AOR AR-2002, Yaesu FRG-9600, and ICOM R7000.

At least one more continuous-coverage scanner will be introduced to the marketplace within the next year. Connected to an outside antenna, any of these radios is capable of picking up satellite transmissions, most of which are encrypted data but many are clear voice.

**NEXT MONTH:** *Signals From Space* editor Larry Van Horn will present a special feature article on monitoring these signals entitled, "Satellites You Can Hear".

# Installing BNC Connectors on Your Scanners

by Larry Wiland

If you have been fortunate enough to purchase one of the extended coverage scanners that are now on the market, chances are the first "problem" you encountered was trying to adapt the ol' familiar PL-259 connectors you have on all of your antenna & patch-cables to the new BNC connectors on the scanner. The fact is that BNC connectors are appearing in increasing numbers on scanning equipment. Though the initial reaction to this change-over has been a certain amount of frustration, it is actually a "blessing in disguise".

Blessing or no, as a new scanner owner, you still face the problem of making everything "fit together." You could go to your local radio store and purchase an adapter which connect the PL-259 to the BNC. Now you've got a whole snakepit of cables, connectors and adapters.

The fact is that PL-259 connectors and Motorola jacks are about worthless for any applications other than automobile radios and CB equipment. Not only are they extremely "lossy" (i.e. create excess signal loss and degradation above 300+/- or so MHz), but the Motorola-type antenna jacks found on older scanners, and so forth tend to loosen-up, thereby creating poor connections and nullifying any benefits of whatever external antenna is plugged into it. So actually, by adapting these connectors to the BNC's, you are defeating the purpose they were installed for -- to avoid signal loss and degradation.

The best solution is the most obvious, to change the ancient PL-259's to BNC-types and dispose of these outdated relics altogether. This is fine unless it is necessary to connect several scanners/radios to the same antenna connection, and they each have a different type of antenna connector. Which puts you back where you started!

But don't give up quite yet. There is a simple and practical solution if you are (1) capable of operating a soldering iron and (2) able to remove the outer case(s) from your scanner/receiver. If these actions are not a problem, then it is merely a case of replacing or adding a chassis-mount BNC connector to the back apron (i.e. rear of the chassis) of the scanner.

## The Fix

To begin, you must first take a trip to

your local electronics dealer and obtain what is technically referred to as a "type 1094 female BNC" connector for *each* radio you wish to "change-over". They cost less than two dollars each, although the silver plated ones (for corrosion-resistant protection) may run as high as six. However, unless you can hear butterflies flap their wings, the difference between the two is unnoticeable.

While you're at the store, pick up a new tip for the soldering iron, some fresh solder, and a roll of desolder braid (used to "suck up" excessive solder).

The next thing on the agenda is to remove the scanner's outer case or case halves (depending on the vintage of the radio being changed-over). Locate the Motorola jack (external antenna input jack) on the rear of the radio, and where it actually sticks through the metal chassis of the receiver. You will find one connection from the center post of this jack to the circuit board of the radio, as well as either a point where a grounding braid is soldered to the chassis or a point where the jack itself is soldered to a ground connection on the radio or the board.

Heat up your soldering iron (low wattage ones work best here) and desolder the connections, using the desoldering braid you just bought. Use only enough heat to desolder the connections; too much can damage fragile printed-circuits on the board!

Once completed, you now want to remove the jack assembly itself. Usually, it is only a matter of removing two screws and pulling out the jack. On some older radios, however, you may find this jack is riveted in. Not to worry, though, as an electric drill and a 3/32 or 1/8 inch drill bit can make short work of these rivets. Just be careful when drilling to check what's behind the connector to prevent ruining some internal component of significant importance!

Now pull the jack out the rear of the radio. You're now almost halfway home.

Next, test-fit the BNC connector in the hole which formerly housed the jack you removed. Make sure that it does not touch or interfere with any objects near to, above, or behind it. If the hole is too large, you may either drill a new hole the right size

next to this existing one or use thin hardware-type washers to "shim"-up the existing hole and keep the BNC from pulling through the hole. Some BNC connectors fit right in this hole with no mods; however, with a bit of experimenting, you will find the right combination of "shims" or hardware needed for this phase of the project.

Install the chassis-mount BNC in the hole. As the BNC may sit a bit differently in the plug hole than did the Motorola jack, it may be necessary to add or delete wiring to reach the soldered connection points. To delete wiring, merely cut off the excess length and strip back the coating at the solder points. To add wiring, you may either entirely remove the too-short piece and replace it with a longer piece, or buy a short length of what is known as "mini-coax" (mini braided-shield low-loss cable).

If you are unable to find this cable, you may also straighten out a common paper clip, cut the length of wire you need, and use this in a manner similar to hard-wire (Yes, a bizarre solution, but one that's "tried and true"). Resolder the connections on both the center conductor and ground connections respectively, and you need only reinstall the outer case and hook up your antenna! Easy, right??

On an average, it should take about 40 minutes to do each radio or scanner, even allowing for riveted

plugs and stubborn joints. Take your time and remember to blow out any metal chips or filings that may fall into the radio during any drilling or soldering process to avoid "deep-frying" your trusty Bearcat!

## Was it all worth it?

Well, you now have a standard, low-loss connector on each of your radios, you don't have to buy a million expensive adapters, you don't have to "invent" odd connectors by using three outdated ones, the external antenna connection will be firm and tight and have very low loss at UHF and above -- reception at UHF and above should improve noticeably. Best of all, you have just made that six year old scanner compatible with your new state-of-the-art all-band outdoor receiving antenna!

You will still find it necessary to change to BNC male connectors on your coax ends, but it's worth the time to do it. Also, if you own an ICOM R-7000, you might want to mount a BNC *next to* the UG-213 antenna input while retaining the '213. This allows you to use *either* input instead of hunting for one of those hard-to-find connectors.

One last thing to think about ... it's only a matter of time until nearly all scanners will be sporting BNC connectors for external antenna hook-ups. So why not get the jump on standardizing your equipment connections by doing it now? ■

## Scanning the Bridgeport Disaster

News broadcasts carried daily reports of rescue efforts at the collapse of a building under construction at Bridgeport, Connecticut. Now that rescue and recovery operations are over, cleanup has begun.	42.04 153.77 154.10 a55.34	Troop G/ Westport "Command Post" Bridgeport FD Bridgeport PD Ch 4/ car-car Used by many depts (FD, PD, State PD, etc) Primary "command post" freq
During the initial emergency period radio communications buzzed with activity and John Klaff of Stratford, Connecticut, was listening. He shares the frequencies which were most active.	155.43 155.805 161.64 161.70 462.95	Bridgeport PD Ch 2 (emerg comms) Trumbull EMS Chan 8 news, New Haven WICC radio, Bridgeport SW C-Med Disp (emerg use)
John's listing provides an interesting profile for Bridgeport area monitors and the agencies involved give a clue as to where to look in your area should a similar emergency arise.	464.225 881.7625 884.2875	Bridgeport Hosp Security Mayor's office CBS news crew

**CONVENTION CALENDAR**

Date	Location	Club/Contact Person
Jun 5-7	Arlington, TX	Texas State/ John Fleet WA50HG Box 25028, Dallas, TX 75225
Jun 6	Pittsburg, KS	Pittsburg Rptr Assn/ Debi Rankin N0FIR 509 W. Euclid, Pittsburg, KS 66762
Jun 7	Princeton, IL	Starved Rock RC/ Ken Stasiak WB9ZFO P.O. Box 34, Lostant, IL 61334
Jun 7	Salina, KS	Central Kansas ARC/ Jim McKim 1404 S. 10th St, Salina, KS 67401
Jun 7	Erlanger, KY	Northern KY ARC/ John Thernes WM4T 60 Locust Ave. Covington, KY
Jun 7	Rome, NY	Rome Radio Club/ William Effland Rte 233 Box 157, Westmoreland, NY 13490
Jun 7	Manassas, VA	Ole VA Hams ARC/ Art Whitium W1CRO 12212 Woodlark Ct, Manassas, VA 22111
Jun 7	Muncie, IN	Muncie Area ARC/ Harvey McMath WB9SYL PO Box 2283, Muncie, IN 47302
Jun 7	Pittsburgh, PA	The Breeze Shooters/ Wm Kristoff Jr N3BPB 205 Twin Oak Dr, Wexford, PA 15090
Jun 7	Akron, OH	Goodyear ARC/ D.R. Buckwalter KC3CL Akron, OH 44316
Jun 13-14	Albany, GA	GA State Convention/ John Crosby K4XA 2506 Devon Dr, Albany, GA 31707
Jun 13-14	Hays, KS	Hays ARC/ Robert Pletcher NN0N 1104-C East 17th St, Hays, KS 67601
Jun 13-14	Coeur d'Alene, ID	Kootenai ARS/ Neil Chamberlain 604 Lucetford La, CDA, ID 83814
Jun 14	New York, NY	Hall of Science ARC/ Stephen Greenbaum 85-10-34 Ave, Jackson Heights, NY 11372
Jun 14	Willow Spgs, IL	6 Meter Club of Chic/ Jim Novak WA9FIH 2337 So.6th Ave, No. Riverside, IL 60546
Jun 14	Terre Haute, IN	Wabash Valley ARA/ David Johnson N9EZV RR 51 Box 739E, Terre Haute, IN 47805
Jun 14	Monroe, MI	Monroe Co. Radio Assn/ Elaine Wessel 3015 Dennison Rd, Dundee, MI 48131
Jun 20	Cortland, NY	Skyline ARC/ Billy Williams N2AGF Cortland, NY 13045
Jun 20-21	New Orleans, LA	Jefferson ARC/ John Wondergem K5KR 600 Smith Dr, Metairie, LA 70005
Jul 5	Wilkes-Barre, PA	Murgas ARC/ Jeff Dent KB3JK 302 Bi Centennial, Wilkes-Barre, PA 18701
Jul 10	Atlanta, GA	National Convention/ Sandy Donahue WA4ABY 2805 NE Expway Apt B-27, Atlanta, GA 30345
Jul 10-12	Minot, ND	Int'l Peace Garden/ William Feist III WB8BZH c/o Book Trader, Dakota Wq, Minot, ND 58701
Jul 11	Eau Claire, WI	Eau Claire ARC/ Lisa Hauch-Harper KA9RII 514 Fall St., Eau Claire, WI 54703
Jul 11-12	Indianapolis, IN	Indiana Hamfest/ Cornelius M. Head 9045 Mercury Dr, Indianapolis, IN 46229
Jul 12	Downers Gr, IL	DuPage ARC/ Ed Weinstein 7511 Walnut Woodridge, IL 60517
Jul 12	Bowling Gr, OH	Wood County ARC/ Ross Mergenthaler NS8C 2782 Joseph Rd, Pemberville, OH 43450
Jul 12	Pittsburgh, PA	North Hills ARC/ Robt Ferry Jr N3DOK 9821 Presidential Dr, Allison Park, PA 15101
Jul 12	Alexander, NY	Genesee RA Batavia Hamfest/ Colin Ware 60 Spencer Court, Batavia, NY 14020
Jul 12	Newtown, PA	Penn Wireless Assn/ Paul Gondos KA3JOI 23 Hunt Rd, Levittown, PA 19056
Jul 19	Wheeling, WV	Triple States RAC/ Ralph McDonough K8AN Box 240 RD 1, Adena, OH 43901
Jul 19	Washington, MO	Zero-Beaters ARC/ Ken Bowles K9OCU 14 Geotown, Union, MO 63084
Jul 24-25	Topsfield, MO	Heavy Hitters Hamfest/ Richard Palm K1CE 27 Green House Blvd W, Hartford, CT 06110
Jul 25	Marquette, MI	Hiawatha ARA/ James F. Jacobson WD8D 105 Raymbault Dr, Marquette, MI 49855
Jul 25-26	Jacksons Mill, WV	W. Virginia State/ Albert Hix W8AH 860 Alta Rd, Charleston, WV 25314
Jul 26	Belvidere, IL	Big Thunder ARC/ James Grimsby W9HRF 210 Oak Lawn La, Poplar Grove, IL 61065
Jul 26	W Friendship, MD	Baltimore RAT/ Bob Bennett W3WCO 626 Lake Dr, Towson, MD 21204

**MONITORING TIMES IS HAPPY TO RUN ANNOUNCEMENTS OF RADIO EVENTS OPEN TO OUR READERS. Send your announcement at least 60 days before the event to: Monitoring Times Convention Calendar, P.O. Box 98, Brasstown, NC 28902.**

**THE HISTORY CONTINUES -  
Law and Order Comes to the Ham Bands**

**The Radio Act of 1927**

With all the technical improvements we've seen which occurred in the '20s, and with the tremendous growth of all types of radio, it was clear by the late '20s that "real" (clear, concise and enforced) regulations for all radio, both nationally and internationally were required.

On February 23, the Radio Act of 1927 (replacing the 1912 Radio Act) created the Federal Radio Commission. One of the five original commissioners was an ARRL official, but he died shortly after his appointment.

Six months later, the International Radiotelegraph Conference was held in Washington, DC. Formulation of a new set of rules and bands (with a 40% reduction for amateur radio!) was accomplished during 1928 and became effective on January 1, 1929.

Amateur radio was at last written directly into the law, and a new radio world came into existence with all nations having some say in it (radio is notorious for ignoring political borders!).

The new frequencies allocated in 1929 were: 1715-2000, 3500-4000, 7000-7300, 14000-14400, 28000-30000, and 56000-60000 kHz.

During the period when these new laws were taking effect, the long term ham/military love/hate relationship finally completed a swing toward the love sector where it has more or less stayed ever since.

There were both Army and Navy programs for hams as well as a Red Cross program. Hams with various classes of licenses could join the Naval Reserve in preassigned ranks from Radioman Third Class to Chief Radioman.

All this togetherness helped the adjustment to the new radio laws. Special message relays were held to show that hams could live within the new restrictions, and they went very well.

It did not hurt us that the President of the U.S. (Herbert Hoover) had previously been the U.S. representative at several international radio conferences. It also didn't hurt that his son was also an avid ham! The 17,000 or so hams of that period did much better than they might have with a less understanding government!

**The Communications Act of 1934**

Once the Federal Radio Commission (FRC) was well established, and the initial radio laws working, and with the Madrid treaty going into effect on January 1, 1934, the radio laws of the U.S., and especially amateur regulations, were fully reviewed.

The result was the Communications Act of 1934 (the one, with amendments, which we still exist under) which brought all communications, radio, wire, etc. under one law and replaced the FRC with the Federal Communications Commission (FCC). Very little changed for amateurs in the rules, but we were finally well entrenched in law and much better protected.

This statute protection was enhanced by Whitehurst vs Grimes, a 1927 U.S. District Court case, wherein the court stated that amateur radio was interstate commerce even without compensation and even within a single state. In simple language it said that local and state governments could not tax, regulate, or otherwise control amateur radio.

It would be nice to think that these legal changes caused the explosive growth in amateur radio during the five years from 1929 to 1934, but truth to tell it was most likely the additional "leisure" time gained by many people during that period. It was known as the Great Depression.

During the first five years of the depression, hams grew by 240 percent (real growth), with 46,000 hams by mid 1934! It also didn't hurt that the broadcast boom of 1922 was repeated by the shortwave listening boom of the early 1930's.

Perhaps the biggest factor, however, was the cutthroat competition in radio equipment and parts which lowered prices and made hamming and SWLing more available to those who had some money (it must be remembered that even during the depression, 75 percent of all working people were employed). So it is sort of a sad fact that amateur radio benefitted greatly from the Great Depression!

**Next Month:** The 1930's and how we learned to number our world wars!?

## The Long and Short of DX or

*DX is in the eye of the beholder!*

Since the earliest times of amateur radio, the main preoccupation of hams has been DX. Originally it was a few city blocks. About one step better than two cans and a piece of string.

It progressed to 5 to 10 miles, then to 50, 500, 5000 and eventually to 12,000 miles or half way around the world (24,000 miles by long path!). And finally (?), now that we have satellites, the sky's the limit!

After the distance battles were won, the varieties game became the goal. Three hundred plus countries, 5 different bands, several different modes, etc. And today, the DX game still continues.

DX for some may consist of hitting a distant repeater (full quieting) on two meters. For others it may consist of hitting the DXCC Honor Roll. In either case, it's fun for the participant to attempt to achieve the goal.

One of the biggest tricks for we ratchet mouthed (or heavy CW fisted) hams is to learn to listen, really listen, to the bands. SWLs, who have become hams too, often make the best DXers because they have learned the art of listening. Simply put, you can't talk to what you can't hear.

In order of importance for DXers, receivers rank 1, antennas rank a very close or equal 2, a good ear and lots of patience ranks 3, and finally, after many other things, the transmitter ranks about 25 or 30! Like I said above, you've got to hear them to talk to them!

It is also necessary to learn all you can about propagation. You're going to have to learn how to read those prop charts in the ham/SWL magazines and listen to WWV for updated info. Terms like Maximum Usable Frequency (MUF), local sunrise and sunset windows, etc. will have to become part of your vocabulary.

It's not as hard as it seems and it can really produce contacts. After all, if you've learned to listen and set up the best equipment, it does no good to be listening on the wrong band at the wrong time!

## Mana from W9 Land

Now I could go on for column after column giving you lots of great help and hints to lead you to the promised land of DXCC, but someone else has done it much better (I hope you realize that I really had to get control of my ego in order to say that!). The book I am referring to reads much like a mystery novel, but yet is interspersed with most of the things you will need to know about DXing.

Bob Locher, W9KNI, wrote *The Complete DX'er* in 1983 and there is no doubt it will become a classic. I would not be surprised to see it selling well 10 to 15 years from now, perhaps only with an update as to equipment to keep it current.

It has excitement, humor, clear explanations, sources of info, etc. all of which make it totally useful as well as totally readable (though he could have given us a list, by name, of devices which use A timing and B timing so we get the right keyers, but then nobody is perfect!).

Once I started to read it, I found it hard to put down. I wanted to know how the story came out! As I neared the end, I skipped a few technically oriented chapters to finish the story, then went back and read them.

So I find it hard to sit down at my typewriter and say too much about DXing with that book staring at me from the bookshelf (I tried putting it in another room, but that didn't work). So I decided that the only way to write this portion of the column was to make sure you knew about the book and could get it for yourself.

SWLs listen up. *The Complete DX'er* is also great for you too. The techniques and story are just as applicable to SWLing as to hamming, and it's good reading.

The book also has drawings by Wayne Pierce, K3SUK, which are of a quality and style I personally happen to like, and they add to the pleasure of the book. So don't just sit there reading this stuff. Go get a copy and get with the program! It's available from your favorite ham or book store, or from the ARRL (Newington, CT 06111 - \$10.00 plus \$2.50 for postage and handling).

PS: The answer to your question is NO. I have never even met W9KNI

or K3SUK and have no financial interest in the book. I simply like it a lot because it educates in an entertaining way. In addition to info on the timing devices I mentioned above, the only other thing it lacks is an index, because it is a reference work of sorts. Oh well, maybe on the second edition.

## BITS AND PIECES

I've received several letters regarding the Novice Enhancement program. Of course there are lots of questions, but by the time you read this things should have settled down a bit.

*QST* provided quick updates on the testing in their April issue and reprints are available in most ham stores as supplements to "Tune In The World" or the "Technician/General License Manual".

They are also available directly from the ARRL for \$1.00 each.

One big question has been, "Can Novices use repeaters on 220?" Yes! Any repeater which has its input inside the novice band can be used without regard as to where its output is, even if it is a crossband repeater and the output is on HF or 2 meters!

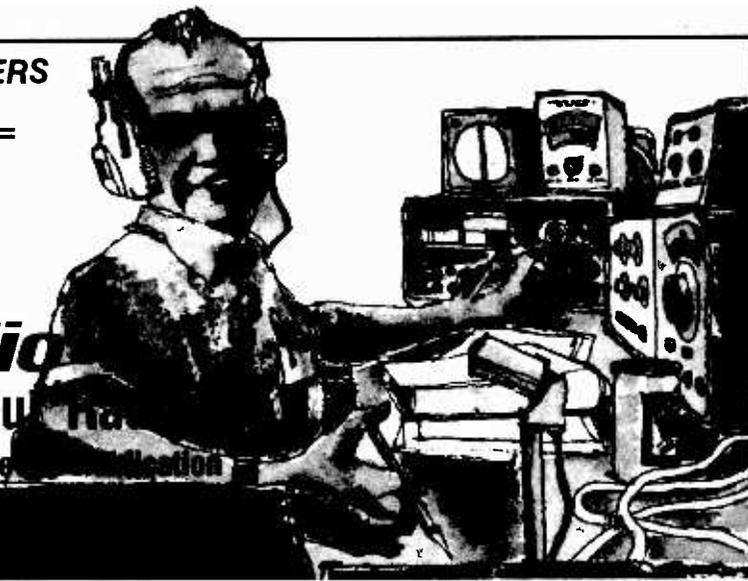
You can also use RTTY, AMTOR, packet and slow scan television on the proper segments of the 220 band and RTTY, AMTOR and packet on 10 meters (in the 28.10 to 28.15 MHz portion for these modes to stay within the band plan). The May issue of *QST* has a good bit of info on the band plans and lots of great info for Novices who want to use their new privileges. ■

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## G.O.E.S. Wefax

Wefax (weather facsimile) is the re-transmission of low resolution satellite pictures or other meteorological data to a large number of modified automated picture transmission or other data stations, enabling the greatest number of individuals to have easy access to satellite weather imagery and data.

The system incorporates three geostationary meteorological satellites (GOES West, Central and East) as well as one or more polar orbiting satellites, two ground stations, the NOAA computer center in Suitland, Maryland, and data links provided by commercial vendors and land-line telephone systems.

Wefax transmission, which had its origins in the applied technology satellites (ATS) relay signal experiments of the 70s, was lifted out of the experimental stage with the launching of the "Synchronous Meteorological Satellite" (SMS), better known as the Geostationary Orbiting Earth Satellite (GOES) in 1974. Although launched in 1974, it was not fully operational until 1978.

Originally, the wefax signal was to have been downlinked to receiver stations at 135.60 MHz, but due to the probability of interference from aircraft communications (188-136 MHz), the downlink frequency was changed to 1690.1 MHz.

Since many potential users already had VHF APT receivers for the polar orbiting and ATS satellites, a way had to be found to use the 1691.0 MHz frequency on non-compatible VHF receiving equipment. The problem was remedied by the introduction of a signal converter into the receiving system.

As this successful system progressed, other world nations became aware of its value and began to press for world-wide compatibility. Prior to 1972, only the French were directly involved in our space program, then the European Space Research Organization, Japan and the World Meteorological Organization met in Washington, D.C., to discuss a world-wide network of GOES-type satellites. By 1973 the Soviet Union and the World Meteorological Organization (which formerly was skeptical) joined in the effort, followed in 1978 by India.

By the end of the second conference, it was suggested that a minimum of five geostationary meteorological satellites be injected into orbit to overlap one another, thus complementing the information from one nation to another. Inevitable questions of national sovereignty and security arose, so a compromise satellite positioning proposal finally placed the GOES-type satellites in the following positions:

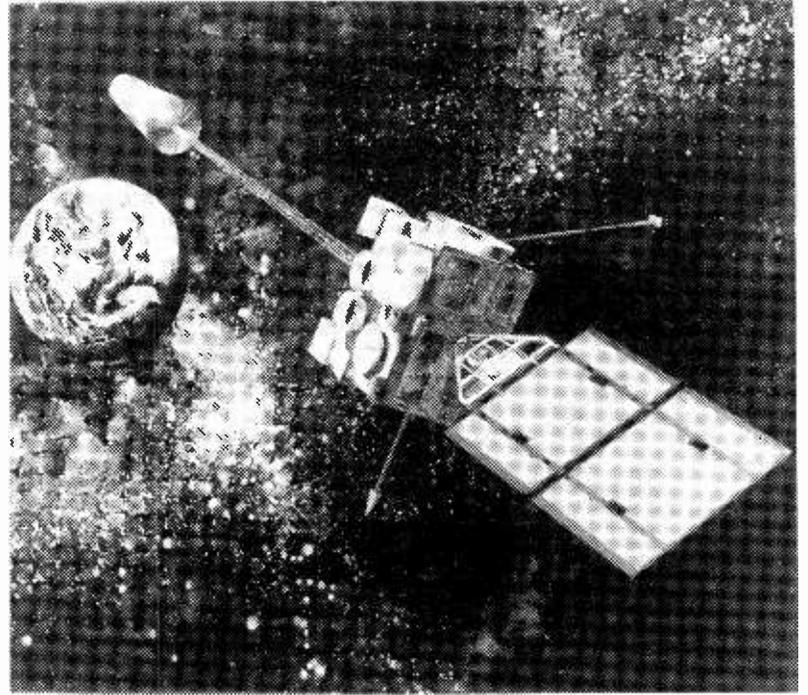
Meteosat (Euro Space Agency)	0°
GOES East (USA)	75°W
GOES West (USA)	135°W
GMS (Japan)	140°E
GOMS (USSR - now INSAT)	79°E

From the early beginnings, France and the United States had agreed to position GOES East so it would be accessible from Lannion, France, thereby allowing the receipt of GOES East data from relays at Lannion via Meteosat to users in the European Space Agency's sphere of utility.

Another important consideration in the locating of GOES East in this position was the ability for Lannion to receive data from the polar orbiting Tiros-N satellite and to feed it via relay from GOES East back to the National Oceanographic Atmospheric Agency computers. This proved successful and, by 1975, both countries agreed to provide the World Meteorological Organization with continuously updated wefax schedules.

### Wefax Today

The present wefax net consists of GOES positioned at 75 W; GOES 4 at 135 W; and the repositioned and reactivated GOES 2 at 107 W, also known as GOES Central, the primary wefax terminal. There are significant problems due to the difference in transmitting antennas on the spacecraft, however; what works well on satellite 1 and 5 will not prevail on the earlier SMS/GOES2.

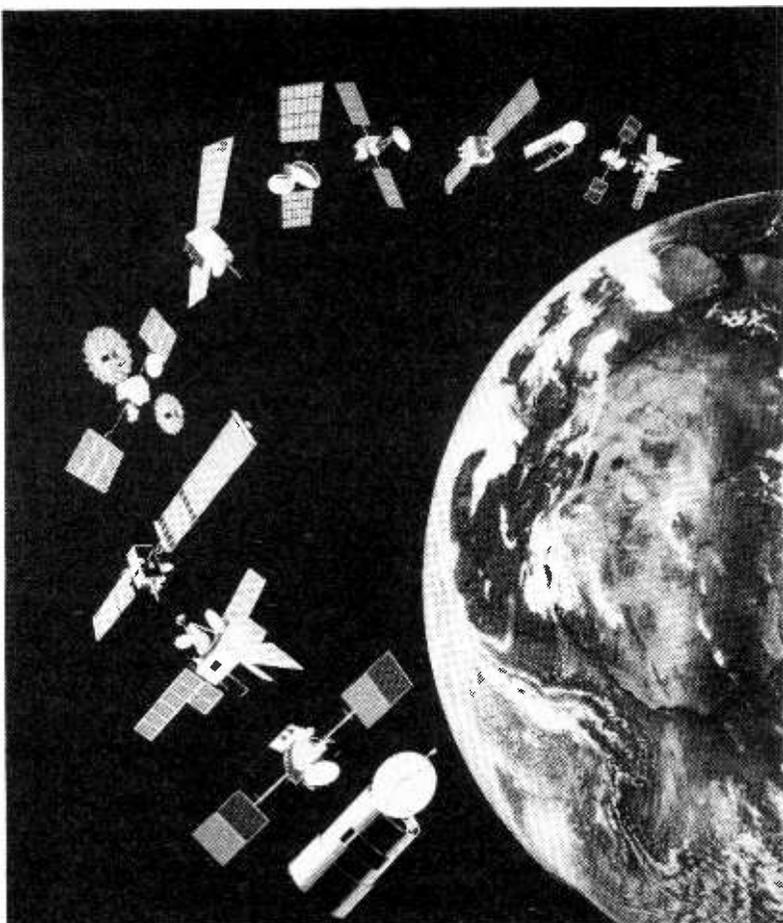


Next generation GOES satellite (Courtesy Ford Aerospace and Communications Corporation)

Visible Infrared Spin Scan Radiometer (VISSR) is the heart of the GOES system and deserves some mention. It is the present successor to the vidicon tubes in the earlier satellites and provides the GOES system with both visible and infrared imaging capability -- a full earth disc in approximately 20 minutes. This image is not broadcast directly to subscribers and private users; it is, instead, relayed back to the command and data acquisition center at Wallops Island, Virginia, where it is processed; grids are added (lines of longitude and latitude as well as national boundary lines), then retransmitted via high power microwave back to the GOES unit for downlinking to users and subscribers alike.

NOAA has at its disposal two polar orbiter receiving sites: Wallops Island, Virginia, and Gilmore Creek, Alaska. Data received from Tiros-N are processed, fed via computer into an RCA Satcom orbiter, and are retrieved at Wallops Island after being retransmitted through the GOES wefax system. The result, due to computer enhancement, is a superior contrast quality and different perspective of global weather events.

National Meteorological Center weather charts, originally sent as test material, are usually 12 hour or 24 hour forecast displays sent out via Wallops Island and relayed over GOES Central and GOES West. Satellite predict codes (where you should point your antenna), schedules, etc. are also sent via this system. ■



# frequency SECTION

## The MT Monitoring Team

Greg Jordan, NC

Rich Foerster, NE

Gayle Van Horn, FL

### LEGEND:

- \* The first four digits of an entry are the broadcast start time in UTC.
  - \* The second four digits represent the end time.
  - \* In the space between the end time and the station name is the broadcast schedule.
- S=Sunday M=Monday T=Tuesday W=Wednesday  
H=Thursday F=Friday A=Saturday

If there is no entry, the broadcasts are heard daily. If, for example, there is an entry of "M," the broadcast would be heard only on Mondays. An entry of "M,W,F" would mean Mondays, Wednesdays and Fridays only. "M-F" would mean Mondays through Fridays. "TEN" indicates a tentative schedule and "TES" a test transmission.

- \* The last entry on a line is the frequency. Codes here include "SSB" which indicates a Single Sideband transmission, and "v" for a frequency that varies.
- \* Frequencies in bold are most likely to be heard regularly in North America.

We suggest that you begin with the lower frequencies that a station is broadcasting on and work your way up the dial. Remember that there is no guarantee that a station will be audible on any given day. Reception conditions can change rapidly, though, and if it is not audible one night, it may well be on another.

Frequency updates from readers are also welcome and should be sent to:

Larry Miller, Frequency Coordinator  
Monitoring Times  
P.O. Box 691  
Thorndale, PA 19372

Anyone whose material is used will receive a certificate of appreciation from Monitoring Times. All frequencies on this list in bold have been heard by one or more MT monitors during the previous month.

0000 UTC	[8:00 PM EDT/5:00 PM PDT]		
0000-0015	Voice of People of Kampuchea	9693, 11938	
0000-0025	Kol Israel.....	<b>9435, 9855</b>	
		<b>11619</b>	
0000-0030	BBC, England.....	<b>5975, 6005</b>	
		<b>6120, 6175</b>	
		<b>7325, 9515</b>	
		<b>9590, 9915</b>	
0000-0030	KGEI, California.....	15280	
0000-0030	Radio Berlin International..	<b>6080, 9730</b>	
0000-0030	Radio Canada International..	<b>5960, 9755</b>	
0000-0030 M	Radio Norway International..	<b>9580, 9605</b>	
0000-0045	WYFR, Florida.....	<b>9680, 15170</b>	
		<b>11855</b>	
0000-0050	Radio Pyongyang, North Korea	15140, 15160	
0000-0100	Armed Forces Radio and TV..	<b>6030, 15345</b>	
0000-0100	All India Radio.....	9910, <b>11715</b>	
0000-0100	CBC Northern Quebec Svce....	<b>6195, 9625</b>	
0000-0100	CFCX, Montreal, Canada.....	6005	
0000-0100	CFRX, Toronto, Canada.....	6070	
0000-0100	CFVP, Calgary, Canada.....	6030	
0000-0100	CHNX, Halifax, Canada.....	6130	
0000-0100	CKFX, Vancouver, Canada.....	6080	
0000-0100	KCBI, Texas.....	11910	
0000-0100	KSDA, Guam (AWR).....	15115	
0000-0100	KVOH, California.....	<b>17775</b>	
0000-0100	KYOI, Saipan.....	15405	
0000-0100	Radio Australia.....	15160, 15240	
		<b>15320, 17750</b>	
		<b>17795</b>	
0000-0100	Radio Baghdad, Iraq.....	<b>11705</b>	
0000-0100	Radio Beijing, China.....	<b>9550</b>	
0000-0100	Radio Discovery, Domin. Rep.	<b>15045</b>	
0000-0100v	Radio Dublin International..	6910	
0000-0100	Radio Havana Cuba.....	<b>6090, 9740</b>	
0000-0100	Radio Korea (South).....	<b>15575</b>	
0000-0100	Radio Moscow.....	<b>6000, 9530</b>	
		<b>9685, 9720</b>	
		<b>9765, 9865</b>	
		<b>11750, 13605</b>	
		<b>9650, 9665</b>	
0000-0100	Radio Thailand.....	9650, <b>9665</b>	
		11905	
0000-0100	Radio Veritas, Philippines..	<b>9740</b>	
0000-0100	Radio New Zealand Int'l....	11780, 15150	
		<b>17705</b>	
0000-0100	RTL Luxembourg.....	<b>6090</b>	
0000-0100	Spanish Foreign Radio, Spain	<b>9630, 11880</b>	
0000-0100	Voice of America.....	<b>5995,</b>	
		<b>6130, 9455</b>	
		<b>9650, 9775</b>	
		<b>9815, 11580</b>	
		<b>11695, 11740</b>	
		<b>15205</b>	
0000-0100v	Voice of Nicaragua.....	<b>6015</b>	
0000-0100	WCSN, Boston, MA.....	<b>7365</b>	
0000-0100	WINB, Pennsylvania.....	<b>15145</b>	
0000-0100	WHRI, Indiana.....	<b>11770</b>	
0000-0100	WRNO Worldwide.....	<b>7355</b>	
0015-0100	AWR, Costa Rica.....	<b>15460</b>	
0030-0100	BBC, England.....	<b>5975, 6005</b>	
		<b>6075, 6120</b>	
		<b>6175, 7325</b>	
		<b>9515, 9590</b>	
		<b>9915, 11750</b>	
0030-0100	HCJB, Ecuador.....	<b>9870, 11910</b>	
		<b>15155</b>	
0030-0100 A	KTWR, Guam.....	15340	
0030-0100	Radio Belize.....	3285	
0030-0100 W,A	Radio Budapest Hungary.....	<b>6025, 6110</b>	
		<b>9520, 9835</b>	

0100 UTC	[9:00 PM EDT/6:00 PM PDT]		
0030-0100 T-A	Radio Portugal.....	<b>9680</b>	
0030-0100	SLBC, Sri Lanka.....	6005, 9720	
		15425	
0045-0100 M	Radio Cultural, Guatemala...	3300, <b>5955</b>	
0045-0100	Radio Korea World News Svc..	7275	
0050-0100	Vatican Radio.....	<b>6030, 9605</b>	
		<b>11780</b>	
0100 UTC	[9:00 PM EDT/6:00 PM PDT]		
0100-0115	All India Radio.....	6035, 7215	
		9595	
0100-0115	Vatican Radio.....	<b>6030, 9605</b>	
		<b>11780, 11900</b>	
0100-0120	RAI, Italy.....	9575, <b>11800</b>	
0100-0124	Kol Israel.....	9435, <b>9855</b>	
		<b>11610</b>	
0100-0130	HCJB, Ecuador.....	<b>9870, 11910</b>	
		<b>15155</b>	
0100-0130 T-A	Radio Budapest, Hungary....	<b>6025, 9520</b>	
		<b>9585, 9835</b>	
0100-0130	Radio Japan General Service	<b>15280, 17845</b>	
0100-0130	Radio Vientiane, Laos.....	7112v	
0100-0130	WINB, Pennsylvania.....	15145	
0100-0145	Radio Baghdad, Iraq.....	<b>11705</b>	
0100-0145	Radio New Zealand Int'l....	<b>15150, 17705</b>	
0100-0150	Deutsche Welle, West Germany	<b>6040, 6085</b>	
		<b>6145, 9545</b>	
		<b>9565, 11785</b>	
0100-0200	ABC, Perth, Australia.....	15425	
0100-0200	Armed Forces Radio and TV...	<b>6030, 15345</b>	
		<b>15355</b>	
0100-0200	BBC, England.....	<b>5975, 6005</b>	
		<b>6120, 6175</b>	
		<b>7325, 9515</b>	
		<b>9590, 9915</b>	
0100-0200	CBC Northern Quebec Svce....	<b>6195, 9625</b>	
		<b>11920</b>	
0100-0200	CFCX, Montreal, Canada.....	6005	
0100-0200	CFRX, Toronto, Canada.....	6070	
0100-0200	CFVP, Calgary, Canada.....	6030	
0100-0200	CHNX, Halifax, Canada.....	6130	
0100-0200	CKFX, Vancouver, Canada.....	6080	
0100-0200	FEBC, Manila, Philippines..	15315, 21475	
0100-0200	KCBI, Texas.....	11910	
0100-0200	KSDA, Guam (AWR).....	15115	
0100-0200	KVOH, California.....	<b>9495</b>	
0100-0200	KYOI, Saipan.....	15405	
0100-0200	Radio Australia.....	<b>15320, 15395</b>	
		<b>17715, 17750</b>	
		<b>17795</b>	
0100-0200	Radio Belize.....	3285	
0100-0200	Radio Canada International..	<b>5960, 9535</b>	
		<b>9755, 11845</b>	
		<b>11940</b>	
0100-0200 M	Radio Cultural, Guatemala...	5955	
0100-0200v	Radio Dublin International..	6910	
0100-0200	Radio Havana Cuba.....	<b>6090, 9740</b>	
0100-0200	Radio Moscow.....	<b>6000, 7165</b>	
		<b>9685, 9700</b>	
		<b>9720, 9765</b>	
		<b>9865, 11750</b>	
		<b>12060, 13605</b>	
		<b>15425</b>	
0100-0200	Radio Moscow World Service.	<b>17850, 17880</b>	
		<b>11720, 11845</b>	
0100-0200	Radio Prague, Czechoslovakia	<b>5930, 6055</b>	
		<b>7345, 11990</b>	
0100-0200	Radio Thailand.....	<b>9665, 11905</b>	
0100-0200v	RAE, Argentina.....	<b>9690, 11710</b>	
0100-0200	SBC Radio 1, Singapore....	11940	
0100-0200	Spanish Foreign Radio, Spain	<b>9630, 11880</b>	
0100-0200	Sri Lanka Broadcasting Corp.	6005, 9720	
		15425	
0100-0200	Voice of America.....	<b>5985, 6130</b>	
		<b>7205, 9455</b>	
		<b>9650, 9775</b>	
		<b>9815, 11580</b>	
		<b>11740, 15205</b>	
		<b>9680, 11790</b>	
0100-0200	Voice of Indonesia.....	9680, 11790	
0100-0200v T-A	Voice of Nicaragua.....	<b>6015v</b>	
0100-0200	WCSN, Boston, Mass.....	<b>7365</b>	
0100-0200	WHRI, Indiana.....	<b>9852.5</b>	

0100-0200	WINB, Pennsylvania.....	15145	
0100-0200	WRNO Worldwide.....	<b>7355</b>	
0100-0200	WYFR, Florida.....	<b>9580, 11855</b>	
0115-0200	Radio Berlin International..	<b>6080, 9730</b>	
0130-0200	KNLS, Alaska.....	<b>11905</b>	
0130-0140	Voice of Greece.....	<b>7430, 9395</b>	
		<b>9420</b>	
0130-0200	HCJB, Ecuador.....	<b>9870, 15155</b>	
0130-0200	Radio Austria International.	<b>9550</b>	
0130-0200	Radio Veritas Asia, Philipp.	<b>15135, 15360</b>	
0130-0200	WINB, Pennsylvania.....	15145	
0145-0200	Radio Berlin International..	<b>6125, 6165</b>	
0145-0200	Radio Korea.....	6480, 7275	
0200 UTC	[8:00 PM EDT/7:00 PM PDT]		
0200-0210	Radio France Int'l.....	<b>5950, 6115</b>	
		<b>9715, 9790</b>	
0200-0215	Radio Budapest, Hungary....	<b>6025, 9520</b>	
		<b>9585, 9835</b>	
0200-0230	BBC, England.....	<b>5975, 6005</b>	
		<b>6120, 6175</b>	
		<b>7325, 9410</b>	
		<b>9515, 9590</b>	
		<b>9915</b>	
0200-0230	Burma Broadcasting Corp....	7185	
0200-0230 S,M	WINB, Pennsylvania.....	<b>15145</b>	
0200-0230 S	Radio Austria Int'l.....	<b>9550</b>	
0200-0230	Radio Berlin International..	<b>6125, 6165</b>	
0200-0245	Radio Berlin International..	<b>9560, 9620</b>	
0200-0230 M-F	Radio Canada International..	<b>5960, 9755</b>	
0200-0230	Radio Kiev, Ukraine SSR....	<b>7260, 9640</b>	
		<b>9800, 11790</b>	
		<b>11875, 13645</b>	
0200-0230	Swiss Radio International...	<b>6135, 9725</b>	
		<b>9885, 12035</b>	
0200-0230 T-A	Voice of Nicaragua.....	<b>6015</b>	
0200-0250	Deutsche Welle, W. Germany..	6035, <b>7285</b>	
		9650, 9690	
		11945	
0200-0256	Radio RSA, South Africa....	<b>6010, 9615</b>	
		<b>9695</b>	
0200-0300	ABC Perth, Australia.....	15425	
0200-0300	Armed Forces Radio and TV...	<b>6030, 15345</b>	
0200-0300	CBC Northern Quebec Service.	<b>6195, 9625</b>	
0200-0300	GBC, Guyana.....	5950	
0200-0300	HCJB, Ecuador.....	<b>9870, 11910</b>	
		<b>11775</b>	
0200-0300	KSDA, Guam (AWR).....	15115	
0200-0300	KVOH, California.....	<b>9495</b>	
0200-0300	KYOI, Saipan.....	15405	
0200-0300	Radio Australia.....	15240, 15320	
		15395, <b>17715</b>	
		1795	
0200-0300	Radio Belize.....	3285	
0200-0300	Radio Bras, Brazil.....	<b>11745</b>	
0200-0300	Radio Bucharest, Romania....	5990, <b>6090</b>	
		9510, <b>9570</b>	
		<b>9835, 11810</b>	
		11940	
0200-0300	Radio Cairo, Egypt.....	<b>9475, 9675</b>	
0200-0300 T-A	Radio Canada International..	<b>5960, 9755</b>	
0200-0300 T-S	Radio Dublin International..	6910	
0200-0300	Radio Havana Cuba.....	<b>6090, 6035</b>	
		<b>9740</b>	
0200-0300	Radio Japan.....	11870, 15420	
		15195, 17825	
0200-0300	Radio Korea, South.....	<b>15575</b>	
0200-0300	Radio Moscow, U.S.S.R.....	<b>6000, 7165</b>	
		<b>9685, 9665</b>	
		<b>9700, 9765</b>	
		<b>11750, 11845</b>	
		<b>12060, 13605</b>	
		<b>12050, 15425</b>	
0200-0300	Radio New Zealand Int'l....	15150	
0200-0300	Radio Polonia, Poland.....	6095, 6135	
		<b>7145, 7270</b>	
		<b>9525, 11815</b>	
		15120	</

# frequency SECTION

0200-0300	Sri Lanka Broadcasting Corp.	6005, 9720	0300-0400	SLBC, Sri Lanka.....	6005, 9720	0400-0500	Radio Moscow.....	11845, 12030
0200-0300	Voice of America.....	15425, 5995, 6130, 7205, 9455, 9650, 9775, 11580, 15205	0300-0400	Trans World Radio, Bonaire..	15425, 9535	0400-0500	Radio Moscow World Service.	12050, 13605, 13645, 15425, 17850, 17960, 17880
0200-0300	Voice of Free China, Taiwan.	5985, 9680	0300-0400	Voice of America.....	9575, 9715	0400-0500	Radio New Zealand.....	6000, 7165
0200-0300	WCSN, Boston, Mass.....	9815	0300-0400	Voz Evangelica, Honduras....	5985, 9680	0400-0500	Radio Pyongyang, N.Korea...	9640, 9685, 9765
0200-0300	WHRI, Indiana.....	9852.5	0300-0400	WCSN, Boston, Mass.....	4820, 9815	0400-0500	Radio Uganda.....	9620, 11780
0200-0300 M	World Music Radio.....	6910	0300-0400 M	WHRI, Indiana.....	7355	0400-0500	RAE, Argentina.....	15140, 15160
0200-0300	WRNO Worldwide.....	7355	0300-0400 S-F	WMLK, Pennsylvania.....	9455	0400-0500	VLW 15, Lyndhurst, Australia	15180
0200-0300	WYFR, Florida.....	11805	0300-0400 M	World Music Radio.....	6910	0400-0500	VLW 15, Waneroom, Australia	4976, 5026
0215-0220	Radio Nepal.....	5005	0300-0400 A	WRNO Worldwide.....	6185	0400-0500	Voice of America.....	9690, 11710
0230-0300	BBC, England.....	5975, 6005, 6120, 6175, 7325, 9410, 9515, 9915	0310-0330	Radio Austria International.	9550	0400-0500		15230
0230-0300	Radio Netherland.....	6020, 6165, 9590, 9895	0313-0400	Vatican Radio.....	6150	0400-0500		15425
0230-0245	Radio Pakistan.....	5905, 7315, 11745, 15115	0330-0400 M	Radio France International..	6045, 6055, 6175, 7135, 7175, 7235, 7280, 9535, 9550, 9790, 9800, 11995	0400-0500		3990, 5995, 6035, 7200, 7280, 9550, 9575, 9670
0230-0300	Radio Tirana Albania.....	7060, 7120, 9760	0330-0400	CBC Northern Quebec Service.	6195, 9625	0400-0500	WCNS, Boston, Mass.....	11835, 9465
0230-0300	SLBC, Sri Lanka.....	9720	0330-0400	BBC, England.....	3955, 5975, 6120, 6175, 9410, 9600	0400-0500 M	WHRI, Indiana.....	7400
0240-0250	All India Radio.....	6110, 9545, 9610	0330-0400	Radio Austria International.	9550	0400-0500	World Music Radio.....	6910
0250-0259	Radio Yerevan, Armenian SSR	11790, 11875, 13645	0330-0400	Radio Berlin International..	9560, 9620	0400-0500	WRNO Worldwide.....	6185
			0330-0400	Radio Havana Cuba.....	6090, 6100, 6140, 9740	0400-0500	WYFR, Okeechobee, Fla.....	15440
			0330-0400 S,M	Radio Japan, Tokyo.....	5960	0415-0430	Radio France International..	6055, 6175, 7135, 7175, 7280, 9535, 9550, 9790, 9800
			0330-0400	Radio Sweden International.	11705	0425-0440	RAI, Italy.....	5980, 7275
			0330-0400	Radio Tanzania.....	5985	0430-0500	BBC, London, England.....	5975, 6175, 9510
			0330-0400	Radio Tirana Albania.....	7065, 9760	0430-0455	Radio Tirana Albania.....	9480, 11835
			0330-0400	UAE Radio, Dubai.....	9640, 11940	0430-0500	Deutsche Welle, W. Germany..	7150, 7225, 9565, 9765
			0335-0340	All India Radio.....	15435, 3905, 4860, 7105, 9545, 9610, 11830, 11895, 11940	0430-0500	Radio Austria International.	5945, 6155
			0340-0400	Voice of Greece.....	7430, 9420	0430-0500	Radio Truth, S. Africa.....	5015
			0345-0400	Radio New Zealand Int'l....	9620, 9645, 11705	0430-0500	TWR, Swaziland.....	7210
						0445-0500	Radio France International..	6055, 6175, 7135, 7175, 7280, 9535, 9550, 9790, 9800
<b>0300 UTC</b>	<b>[11:00 PM EDT/8:00 PM PDT]</b>		<b>0400 UTC</b>	<b>[12:00 PM EDT/9:00 PM PDT]</b>		<b>0500 UTC</b>	<b>[1:00 AM EDT/10:00 PM PDT]</b>	
0300-0310	CBC Northern Quebec Service.	9625	0400-0405	RAI, Italy.....	9710, 11910	0500-0505	Radio Belize.....	3285
0300-0315	Radio Budapest.....	6025, 9520, 9835, 11910	0400-0410	Voice of Kenya.....	15330, 6090	0500-0510	Radio Lesotho.....	4800
0300-0325	Radio Netherland.....	6020, 6165, 9590, 9590	0400-0415	Kol Israel.....	7464, 9435, 9815, 9855, 11585, 11960, 15585, 17620	0500-0515	Vatican Radio.....	11725, 15190
0300-0330	BBC, England.....	5975, 6005, 6120, 6175, 7185, 7325, 9410, 9515	0400-0415	Radio Berlin Int'l, E. Germany	9560, 9620	0500-0530	BBC, London.....	5950, 5975, 6005, 6195, 7160, 7185, 9510, 9580, 9600
0300-0330	Radio Cairo, Egypt.....	9475, 9675	0400-0415	Radio Cultural, Guatemala...	3300	0500-0530	Capital Radio, S. Africa....	3927.5
0300-0330	Radio Canada International..	5960, 9755	0400-0415	Radio Netherlands.....	7175, 9895	0500-0530 M	Radio Norway International.	11735, 15180
0300-0330	Radio Japan General Service	11870, 17825	0400-0425	Radio RSA, South Africa.....	3230, 4990, 7270, 9585	0500-0530 S,M	Trans World Radio, Bonaire..	9535
0300-0330	Radio Kiev, Ukrainian SSR...	6200, 7165, 9765, 11790, 13645	0400-0425	BBC, London, England.....	3955, 5975, 6005, 6175, 6195, 7160, 7185, 7320	0500-0550	Deutsche Welle.....	5960, 6120, 6130, 9635
0300-0330 T-S	Radio Canada, Montreal.....	5960, 9755	0400-0430	KNLS, Alaska.....	9670	0500-0600	ABC, Melbourne, Australia..	15330
0300-0330 T-A	Radio Portugal.....	9705	0400-0430	Radio Bucharest, Romania...	5990, 9510, 9570, 11810, 11940	0500-0600	ABC, Perth, Australia.....	15425
0300-0350	Deutsche Welle, West Germany	6010, 6045, 9565	0400-0430	Radio Finland, Helsinki....	6120, 11715, 11755	0500-0600	Armed Forces Radio and TV...	6030, 11790, 15330, 17765
0300-0350	Voice of Turkey.....	9560, 17700	0400-0430 M	Radio Norway International..	9650, 11735	0500-0600	CBC Northern Quebec Service.	6195, 9625
0300-0400	Armed Forces Radio and TV...	6030, 11790, 15345, 21570	0400-0430	Swiss Radio International...	6135, 9725, 9885, 12035	0500-0600	CFCX, Montreal, Canada.....	6005
0300-0400	CFCX, Montreal, Canada.....	6005	0400-0430 S,M	Trans World Radio, Bonaire..	9535	0500-0600	CFRX, Toronto, Canada.....	6070
0300-0400	CFRX, Toronto, Canada.....	6070	0400-0430	Trans World Radio, Bonaire..	4835, 7295	0500-0600	CFVP, Calgary, Canada.....	6030
0300-0400	CFVP, Calgary, Canada.....	6030	0400-0450	ABC, Perth, Australia.....	15425	0500-0600	CHNX, Halifax, Canada.....	6130
0300-0400	CHNX, Halifax, Canada.....	6130	0400-0500	Armed Forces Radio and TV...	6030, 12060, 11730, 11790, 15345, 17765	0500-0600	CKFX, Vancouver, Canada.....	6080
0300-0400	CKFX, Vancouver, Canada.....	6080	0400-0500	Capital Radio, South Africa.	3927, 3930	0500-0600	HCJB, Quito, Ecuador.....	6230, 9870, 11910
0300-0400	HCJB, Ecuador.....	6205, 9870, 11775	0400-0500	CBC Northern Quebec Service.	6195	0500-0600	KYOI, Saipan.....	15190
0300-0400	KNLS, Alaska.....	9670	0400-0500	CFCX, Montreal, Canada.....	6005	0500-0600	Radio Australia.....	15160, 15240, 15320, 15395, 17715, 17750, 17795, 17795
0300-0400	KSDA, Guam (AWR).....	17840	0400-0500	CFRX, Toronto, Canada.....	6070	0500-0600	Radio Beijing, China.....	9565
0300-0400	KYOI, Saipan.....	15190	0400-0500	CFVP, Calgary, Canada.....	6030	0500-0600v	Radio Dublin International..	6910
0300-0400 M	La Voz Evangelica, Honduras	4820	0400-0500	CHNX, Halifax, Canada.....	6130	0500-0600	Radio Havana Cuba.....	5965, 6035, 6090, 9740
0300-0400	Radio Australia.....	15160, 15240, 15320, 15395, 17715, 17750, 17795	0400-0500	CKFX, Vancouver, Canada.....	6080	0500-0600	Radio Japan General Service	11705, 15235, 15280, 17810
0300-0400	Radio Beijing, China.....	9645, 11960, 11970, 15445	0400-0500	HCJB, Ecuador.....	6205, 9870, 11775	0500-0600	Radio Moscow.....	7150, 7165, 7175, 7320
0300-0400	Radio Belize.....	3285	0400-0500	KVOH, California.....	9852.5	0500-0600	R. New Zealand, Wellington	11780
0300-0400	Radio Cultural, Guatemala...	5955	0400-0500	Radio Australia.....	9755, 11910, 11945, 15160, 15240, 15320, 17715, 17795	0500-0600	Radio Uganda.....	4976, 5026
0300-0400	Radio Dublin International..	6910	0400-0500	Radio Beijing.....	9645, 11980	0500-0600 S	Radio Zambia.....	11880
0300-0400	Radio Earth.....	7355	0400-0500 T-S	Radio Belize.....	3285	0500-0600	SBC Radio 1, Singapore....	11940
0300-0400	Radio Havana Cuba.....	6090, 9640, 9740	0400-0500	Radio Dublin International..	6910	0500-0600	Soloman Islands Bcsting Co	5020
0300-0400	Radio Japan.....	5960, 15280, 17810, 17845	0400-0500	Radio Havana Cuba.....	5965, 6035, 6090, 6140, 6190, 9740	0500-0600	Spanish Foreign Radio.....	6125, 9630
0300-0400	Radio Moscow.....	9640, 9685, 9765, 11845, 12030, 12050, 12065, 13605, 13645, 15425, 17850, 17880, 17860	0400-0500	Radio Japan.....	9525, 9675	0500-0600	TWR, Swaziland.....	7210
0300-0400	Radio New Zealand Int'l....	11780, 15150	0400-0500			0500-0600	VLW 15, Lyndhurst, Australia	15230
0300-0400	Radio Polonia, Poland.....	6095, 6135, 7145, 7270, 9525, 11815	0400-0500			0500-0600	VLW 15, Waneroo, Australia.	15425
0300-0400	Radio Prague, Czechoslovakia	5930, 6055, 7345	0400-0500			0500-0600	Voice of America.....	6035, 7200, 7280, 9575, 9760
0300-0400	Radio RSA, South Africa.....	3230, 4990, 7270, 9585						
0300-0400	Radio Sofia Bulgaria.....	11735, 11750						
0300-0400	Radio Thailand.....	9560, 11905						

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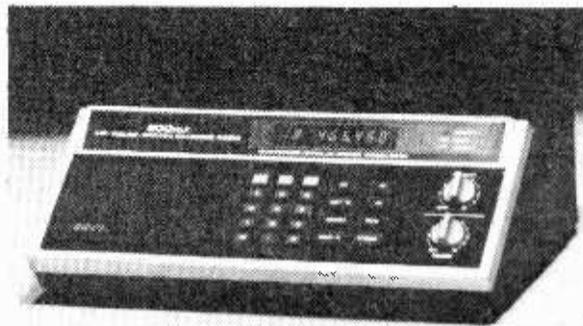
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# frequency SECTION

0900-1000 S	Radio Prague.....	6055, 9505 11990
0900-1000	SBC Radio 1, Singapore.....	5010, 11940
0900-1000	TWR Monte Carlo.....	<b>7105</b>
0900-1000	Voice of Nigeria.....	15120, 15185 17800
0900-1000	WHRI, Indiana.....	<b>7355</b>
0900-1000	WRNO Worldwide.....	<b>6185</b>
0900-1000	WSZO, Marsall Island.....	<b>4970</b>
0915-1000	BBC, London.....	<b>9760, 9750</b> <b>11750</b>
0930-1000	Radio Australia.....	9580, <b>9655</b> <b>9710</b>
0930-1000	Radio Budapest Hungary.....	9835, 11910 15160, 15220 17710, 21665
0950-1000 M-F	Radio Budapest Hungary.....	9585, 9835 11910, 15160 17710

1000 UTC	[6:00 AM EDT/3:00 AM PDT]	
1000-1010	Voice of Kenya.....	9665
1000-1025 M-A	BRT, Belgium.....	<b>15515, 17595</b>
1000-1030	Afghanistan.....	6085, 9590 15255, 17655 7225, 9735
1000-1030	Deutsche Welle, W. Germany..	17765, 21600 <b>11585, 11605</b> <b>15095, 15640</b> <b>15650, 17630</b> <b>17815</b>
1000-1030	Kol Israel.....	<b>9580, 9655</b> <b>9710, 9770</b> <b>15415</b>
1000-1030 S	Radio Norway International.	<b>11870, 15175</b> <b>15230</b>
1000-1030	Swiss Radio Int'l.....	9560, <b>9885</b> 11905, 15570
1000-1030	Voice of Vietnam.....	9755, 9765 12035
1000-1100	AFRTS.....	6030, 6125 <b>9530, 9590</b> <b>9700, 11805</b>
1000-1100	All India Radio.....	11705, 11810 15320, 15335 17387, 17875
1000-1100	BBC, London.....	6195, 9410 9740, <b>9750</b> <b>9760, 11750</b> <b>12095, 15070</b> 15280, <b>15400</b> 21660
1000-1100	B.S. Kingdom Saudi Arabia..	11855v
1000-1100	CFCX, Montreal, Canada.....	6005
1000-1100	CFRX, Toronto, Canada.....	<b>6070</b>
1000-1100	CFVP, Calgary, Canada.....	6030
1000-1100	CHNX, Halifax, Canada.....	6130
1000-1100	CKFX, Vancouver, Canada.....	6080
1000-1100	FEN, Japan.....	3910, 6155
1000-1100	HCJB, Quito, Ecuador.....	<b>6130, 9745</b>
1000-1100	KNLS, Alaska.....	<b>11930</b>
1000-1100	Radio Dubai, UAE.....	17775
1000-1100	Radio Honaire, Soloman IIs..	5020
1000-1100	Radio Moscow.....	<b>6000, 7390</b> <b>11950, 15375</b>
1000-1100	Radio New Zealand Int'l.....	9600, 11780
1000-1100 S	Radio Prague.....	6055, 9505 11990
1000-1100	SBC Radio 1, Singapore.....	5052, 11940
1000-1100	Voice of Nigeria.....	7255, 15120
1000-1100	WCSN, Massachusetts.....	<b>17640</b>
1000-1100	WHRI, Indiana.....	<b>7355</b>
1000-1100 S	WRNO Worldwide.....	<b>6185</b>
1005-1010	Radio Pakistan.....	15605, 17660
1030-1040	Voice of Asia, Taiwan.....	5980
1030-1100	Radio Austria International.	9625, 12025 <b>15270</b> <b>9580</b>
1030-1100	Radio Netherland.....	<b>6020, 9650</b>
1030-1000	Radio New Zealand.....	6100, 9620
1030-1100	Sri Lanka Broadcasting Corp	11835, 15120 17850
1030-1100	UAE Radio, Dubai.....	17775, 17865 21605, 21700
1040-1050	Vatican Radio.....	6250, 9645 11740
1040-1050	Voice of Greece.....	15630, 17565
1045-1000	Radio Nepal.....	5005, 9590
1050-1100 M-F	Radio Budapest Hungary.....	6025, <b>7225</b> 9835, 11910 17710

1100 UTC	[7:00 AM EDT/4:00 AM PDT]	
1100-1115	Radio Pakistan.....	15605, 17660
1100-1120	Radio Budapest, Hungary.....	<b>6025, 6175</b> <b>7225, 9790</b> <b>9805, 9835</b> <b>11910, 15365</b> <b>15425, 17710</b> <b>17720, 17850</b> <b>21620</b>
1100-1120	Radio France Int'l, Paris..	<b>11670, 11845</b> <b>15195, 15300</b> <b>15315, 15365</b> <b>17620</b>
1100-1125	Radio Netherland.....	<b>6020, 9650</b>
1100-1130	Radio Australia.....	5995, 6080 <b>7215, 9580</b> <b>9645, 9710</b> <b>9770, 11705</b> <b>11800</b>
1100-1130 M-A	Radio Finland.....	11945, 15400
1100-1130	Radio Japan General Service.	<b>5990, 6120</b> <b>17810</b>
1100-1130	Radio Maputo, Mozambique....	9525, 11815
1100-1130	Radio Sweden Int'l.....	9630, 15115
1100-1130	Sri Lanka Broadcasting Corp	11835, 15120 17850
1100-1130	Swiss Radio International..	9665, 9870 11795, <b>15570</b>
1100-1130	Voice of America.....	<b>6110, 9760</b> 15160, 15210 15425
1100-1130	Voice of Vietnam.....	9755, 9765 12035
1100-1156	Radio RSA, South Africa....	11900, 15220 17780
1100-1200	4VEH, Haiti.....	4930
1100-1200	ABC, Brisbane, Australia....	<b>4920</b>
1100-1200	ABC, Perth, Australia.....	<b>9610</b>
1100-1200	AFRTS.....	<b>6030, 9590</b> <b>9700, 15430</b> <b>5965, 6195</b> <b>9510, 11775</b> <b>12095, 15070</b> <b>17790</b>
1100-1200	BBC, London.....	11855v 6005 6070 6030 6130 6080 6080 17765, 17800 11740, 15115 17890
1100-1200	B.S. Kingdom Saudi Arabia..	11855v
1100-1200	CFCX, Montreal, Canada.....	6005
1100-1200	CFRX, Toronto, Canada.....	6070
1100-1200	CFVP, Calgary, Canada.....	6030
1100-1200	CHNX, Halifax, Canada.....	6130
1100-1200	CKFX, Vancouver, Canada....	6080
1100-1200	Deutsche Welle, W.Germany..	17765, 17800
1100-1200	HCJB, Quito, Ecuador.....	11740, 15115 17890
1100-1200	KYOI, Saipan.....	<b>11900</b>
1100-1200	Radio Beijing.....	<b>9535</b>
1100-1200	Radio Korea.....	7275, 15575
1100-1200	Radio Malaysia, Sarawak....	4950
1100-1200	Radio Moscow.....	<b>6000, 11950</b> <b>13710, 15375</b> <b>15595</b>
1100-1200	Radio New Zealand.....	6100, 9600
1100-1200	Radio Pyongyang, N. Korea..	7300, 9750 9977
1100-1200	SBC Radio 1, Singapore.....	5052, 11940
1100-1200	Trans World Radio Bonaire..	11815
1100-1200	Voice of Asia, Taiwan.....	5980, 7445
1100-1200	Voice of Nigeria.....	7255, 15120
1100-1200	WCSN, Massachusetts.....	<b>17640</b>
1100-1200	WHRI, Indiana.....	<b>5995</b>
1100-1200 S	WRNO Worldwide.....	9715
1100-1200	WYFR, Florida.....	5985, <b>9680</b> 11875
1115-1200	Radio Berlin International.	21465, 21540
1115-1130	Vatican Radio.....	17840, 21485
1115-1200	Voice of Islamic Rep. Iran.	<b>11790</b>
1130-1200	Radio Australia.....	5995, <b>6060</b> <b>6080, 7215</b> <b>9580, 9645</b> <b>9710, 9770</b> 11800
1130-1200	R. Berlin Intl.E.Germany	<b>15240</b>
1130-1200	Radio Japan.....	<b>5990, 6120</b>
1130-1200	Radio Netherland.....	5955, 9715 <b>15560, 17575</b> 17605, 21480 9655, 11905
1130-1200	Radio Thailand.....	9655, 11905
1130-1200	TWR Bonaire.....	11815
1130-1200	WYFR, Florida.....	9680
1145-1200	Radio Berlin Intl.....	<b>15240</b>

1200 UTC	[8:00 AM EDT/5:00 AM PDT]	
1200-1210	Voice of Is.Rep.of Iran....	<b>11790, 15084</b>
1200-1215	Radio New Zealand.....	6100, 9620
1200-1215 M-A	Vatican Radio.....	15190, <b>17840</b> 17865, 21485
1200-1215 S	Vatican Radio.....	<b>17840, 21485</b>
1200-1215	Voice of People of Kampuchea	9693, 11938
1200-1225	Radio Bucharest, Romania....	9530, 11740 15345
1200-1225	Radio Netherland.....	5955, 9715 <b>15560, 17575</b> 17605, 21480
1200-1225	Radio Polonia.....	6095, 7285
1200-1230	HCJB, Quito, Ecuador.....	6075, 11740
1200-1230	Radio Berlin Intl.....	<b>15240</b>
1200-1230 M-A	Radio Finland.....	11945, 15400
1200-1230	Radio Tashkent.....	7325, 9600 9715, 15460 3905, 4800 4920, 7280 9565, 9615 11620, 15245
1200-1235	All India Radio.....	12015
1200-1235	Radio Ulan Bator Mongolia..	12015
1200-1242	Trans World Radio Bonaire..	<b>11815</b>
1200-1250	Radio Pyongyang, N. Korea..	<b>9715</b>
1200-1300	4VEH, Haiti.....	4930
1200-1300	ABC, Wanneroo, Australia....	6140, <b>9610</b>
1200-1300	ABC, Brisbane.....	4920
1200-1300	AFRTS.....	<b>6030, 6125</b> <b>9700, 15330</b> <b>15430, 21670</b> 5965, <b>6195</b> <b>9510, 9740</b> 9750, 11710 11750, <b>11775</b> <b>12095, 15070</b> <b>17790, 17705</b> 21710
1200-1300	B.S. Kingdom Saudi Arabia..	11855v
1200-1300	CBC Northern Quebec Service.	9625
1200-1300	CFCX, Montreal, Canada.....	6005
1200-1300	CFRX, Toronto, Canada.....	6070
1200-1300	CFVP, Calgary, Canada.....	6030
1200-1300	CHNX, Halifax, Canada.....	6130
1200-1300	CKFX, Vancouver, Canada....	6080
1200-1300	FEN, Tokyo.....	3910, 6155
1200-1300	GBC, Accra, Ghana.....	7295
1200-1300	HCJB, Quito, Ecuador.....	<b>11740, 11745</b> <b>15115, 17890</b>
1200-1300	KYOI, Saipan.....	<b>11900</b>
1200-1300	Pt Moresby,Papua New Guinea	4890
1200-1300	Radio Australia.....	<b>5995, 6060</b> <b>6080, 7205</b> <b>7215, 9580</b> <b>9710, 9770</b> <b>11800</b>
1200-1300	Radio Beijing.....	<b>9535, 9645</b>
1200-1200	Radio Moscow.....	<b>6000, 13680</b> <b>13710, 15360</b> <b>15375, 15490</b> <b>15530, 15540</b> <b>17645</b> 9685 15345
1200-1300	Radio Tanzania.....	15345
1200-1300	RAE, Argentina.....	5010, 5052
1200-1300	SBC Radio 1, Singapore.....	11940
1200-1300	Voice of America.....	<b>9760</b> 11715, <b>15425</b> 15430, 17790
1200-1300	WHRI, Indiana.....	<b>5995</b>
1200-1300 S	WRNO Worldwide.....	9715
1200-1300	WYFR, USA.....	6105, 9680 <b>11830, 11875</b> 15170
1210-1300	Voice of Nigeria.....	7255, 15120
1215-1300	Radio Cairo.....	17675
1215-1245	Radio Japan Regional Serv..	11875, 15300
1215-1230	Voice of Islamic Rep. Iran.	11895, 15085
1230-1300	Radio Austria International	<b>15320</b>
1230-1300	Radio Australia.....	9560, 15320 17655, 17800
1230-1300	Radio Bangladesh.....	<b>15525, 12030</b>
1230-1300	Radio Berlin Intl.....	21465
1230-1300	Radio Jordan.....	9560
1230-1300	Radio Polonia.....	15190, 15430
1230-1300	Radio Sweden Int'l.....	9565, 11735
1230-1300	TES Radio Veritas,Philippns.	6160
1230-1300	Sri Lanka Broadcasting Corp.	6075, 9720 15425
1230-1300	Voice of Turkey.....	15255
1230-1300	WYFR, Florida.....	15055
1235-1245	Voice of Greece.....	11645, 15360
1255-1300 M-A	Radio Ulan Bator Mongolia..	7235, 9575 15305
1255-1330 A-S	TWR, Bonaire.....	11815

# frequency SECTION

1300 UTC	[9:00 AM EDT/6:00 AM PDT]
1300-1315	Radio Berlin International. 21465
1300-1330	BBC, London..... 9510, 11775 15070, 17705 17780, 17790
1300-1330	Radio Australia..... 5995, 6060 6080, 9580
1300-1330	Radio Bucharest, Romania... 11940, 15250
1300-1330	Radio Finland..... 15400, 11945
1300-1330	Radio Korea..... 6135
1300-1330 S	Radio Norway International. 15310, 17760
1300-1330	Swiss Radio Int'l, Bern... 15570, 17830
1300-1337 A-S	TWR, Bonaire..... 11815
1300-1330 S	WRNO, Worldwide..... 9715
1300-1350	Radio Pyongyang, N. Korea... 9345, 11665
1330-1355 S	Radio Finland..... 11945, 15400
1300-1400	4VEH, Haiti..... 4930
1300-1400	ABC Waneroo, Australia..... 6140, 9610
1300-1400	AFRTS..... 9700, 15430
1300-1400	B.S. Kingdom Saudi Arabia... 11855v
1300-1400	CFCX, Montreal, Canada..... 6005
1300-1400	CFRX, Toronto, Canada..... 6070
1300-1400	CFVP, Calgary, Canada..... 6030
1300-1400	CHNX, Halifax, Canada..... 6130
1300-1400	CKFX, Vancouver, Canada..... 6080
1300-1400	CKZU, Vancouver, Canada..... 6160
1300-1400	FEBC, Manila..... 11850
1300-1400	FEN, Tokyo..... 6155
1300-1400	GBC, Accra, Ghana..... 7295
1300-1400	HCJB, Quito, Ecuador..... 11740, 15115 17890
1300-1400	NBC, Port Moresby, Papua New Guinea..... 4890
1300-1400	Radio Australia..... 5995, 6060 6080, 9580
1300-1400	Radio Beijing..... 9730
1300-1400 S	Radio Canada Int'l..... 11955, 15440
1300-1400	Radio Jordan..... 9560
1300-1400	Radio Moscow..... 11840, 15375 15475, 15585
1300-1400	Radio RSA, South Africa.... 15220, 21535 21590
1300-1400	SBC Radio 1, Singapore..... 5010, 5052 11940
1300-1400	Sri Lanka Broadcasting Corp. 6075, 9720 15425
1300-1400	Voice of America..... 6110, 7230 9660, 9760 15205
1300-1400	Voice of Nigeria..... 7255, 15120
1300-1400	WHRI, Indianapolis..... 11790
1300-1400	WYFR, USA..... 5965, 11830 11875, 15055
1315-1400	Radio Berlin Int'l..... 11795, 15445 17700
1330-1400	All India Radio..... 11810, 15335
1330-1400	Laotian National Radio..... 7113v
1330-1400	BBC, London..... 9750, 9760 12095, 15070 17885, 21710
1330-1400 M-A	BBS, Bhutan..... 6035
1330-1445	BBS, Burma..... 4725
1330-1355 M-A	BRT, Belgium..... 15515, 15590
1330-1400 M-A	Radio Budapest Hungary.... 9835, 11910 15160, 15220 17710, 21665
1330-1400 S	Radio Finland..... 11945, 15400
1330-1400	Radio Tashkent..... 7325, 9715 15460
1330-1400	Radio Yugoslavia..... 9620, 15240
1330-1400	Swiss Radio International.. 9730, 9885 11905, 11955 12030
1330-1400	U.A.E. Radio..... 9640, 11940 15320, 17775
1330-1400	Voice of Vietnam..... 9755, 9840 12020, 12035
1330-1400 S	WRNO, Worldwide..... 11965
1337-1400 A	TWR, Bonaire..... 11815
1345-1400	Vatican Radio..... 7250, 9645 11740

1400 UTC	[10:00 AM EDT/7:00 AM PDT]
1400-1415	GBC-2, Accra, Ghana..... 7295
1400-1430	Radio Australia..... 9580
1400-1430	Radio Finland..... 15400
1400-1430	Radio Japan General Service 11870
1400-1430 S	Radio Norway International. 15250, 15300 15310
1400-1430	Radio Sweden International. 11785, 15345
1400-1500	AFRTS..... 9700, 11805 15330, 15430
1400-1500	All India Radio..... 11810, 15335
1400-1500	BBC, London..... 12095, 15070 15275, 17705 17790, 17885

1400-1500	CBC Northern Quebec Service. 9625, 11720
1400-1500	CFCX, Montreal, Canada..... 6005
1400-1500	CFRX, Toronto, Canada..... 6070
1400-1500	CFVP, Calgary, Canada..... 6030
1400-1500	CHNX, Halifax, Canada..... 6130
1400-1500	CKFX, Vancouver, Canada..... 6080
1400-1500	FEBC, Manila..... 9665, 11815 11850
1400-1500	HCJB, Quito, Ecuador..... 11740, 15115 17890
1400-1500	Kuching, Sarawak, Malaysia 4950
1400-1500 S	Radio Canada International. 11720, 11955 15440
1400-1500	Radio Jordan..... 9560
1400-1500	Radio Korea, South..... 9570, 9750 15575
1400-1500	Radio Moscow..... 11840, 11840 11950, 15375
1400-1500	Radio Pyongyang, N. Korea.... 7300, 9555 9750
1400-1500	Radio RSA, South Africa..... 21590
1400-1500	Radio Veritas, Philippines 6160
1400-1500	SBC Radio 1, Singapore..... 5010, 5052 11940
1400-1500	Sri Lanka Broadcasting Corp. 6075, 9720 15425
1400-1500	Voice of America..... 6110, 7230 9760, 11715
1400-1500	WHRI, Indiana..... 11790
1400-1500 S	WRNO Worldwide..... 11965
1415-1430 A,S	KTWR, Guam..... 9870
1415-1500	Radio Berlin Int'l..... 15240
1415-1430	Radio Nepal..... 5005
1415-1500 S,A	GBC-2, Accra, Ghana..... 3366
1430-1500	KTWR Guam..... 9840
1430-1500	Radio Australia..... 5995, 6045 6060, 6035 6080, 7205 9580
1430-1500 M-A	Radio Budapest Hungary.... 11910, 15055 15220, 17710 21525, 21665
1430-1500	Radio Korea, South..... 9750, 15575
1430-1500	Radio Netherland..... 5955, 11735 13770, 15560 17575
1430-1500	Radio Yugoslavia..... 9620, 15240
1430-1500	WYFR, USA..... 9535, 11830 11875, 15055
1448-1455	Radio Vatican..... 15090
1445-1500	Radio Ulan Bator, Mongolia.. 9575

1500 UTC	[11:00 AM EDT/8:00 AM PDT]
1500-1505 M-F	Africa #1, Gabon..... 15200
1500-1520	Radio Ulan Bator Mongolia... 9615, 12015
1500-1530	BBS, Burma..... 4725
1500-1530	HCJB, Quito, Ecuador..... 11740, 15115 17890
1500-1530	Radio Berlin Int'l..... 15255
1500-1530	Radio Netherland..... 13770, 15560
1500-1530	Radio Veritas, Philippines.. 9565, 15120
1500-1530	TWR, Guam..... 9870
1500-1530	Voice of Nigeria..... 7255, 11770
1500-1550	Deutsche Welle..... 15135, 17825
1500-1556	Radio RSA, South Africa.... 17780, 21590
1500-1600	AFRTS..... 9700, 15330
1500-1600	BBC, London..... 11775, 12095 15070, 15260
1500-1600	CBC Northern Quebec Service. 9625, 11720
1500-1600	CFCX, Montreal, Canada..... 6005
1500-1600	CFRX, Toronto, Canada..... 6070
1500-1600	CFVP, Calgary, Canada..... 6030
1500-1600	CKFX, Vancouver, Canada..... 6080
1500-1600	CHNX, Halifax, Canada..... 6130
1500-1600	FEBC, Manila..... 9670, 11850
1500-1600	KTWR Guam..... 9840
1500-1600	Radio Australia..... 5995, 6030 6060, 6080 6035, 7205 9580
1500-1600 S	Radio Canada International. 9625, 11720 11955, 15440
1500-1600	Radio Japan General Service. 9695, 21700
1500-1600	Radio Jordan..... 9560
1500-1600	Radio Moscow..... 11840, 11850 11860, 11950 15375
1500-1600	RTM, Sarawak, Malaysia..... 4950
1500-1600	SBC Radio 1, Singapore..... 5010, 5052 11940
1500-1600	Sri Lanka Broadcasting Corp. 6075, 9720 15425
1500-1600	Voice of America..... 15205
1500-1600	Voice of Nigeria..... 7255, 11770
1500-1600	Voice of Indonesia..... 11790, 15150
1500-1600	V. Revolutionary Ethiopia.. 9560
1500-1600	WHRI, Indiana..... 15105

1500-1600	WRNO Worldwide..... 11965
1500-1600	WYFR, Florida..... 9535, 11550 11830, 11875 15170
1513-1600 F-S	FEBC, Seychelles..... 11820
1530-1600	KNLS, Alaska..... 7355
1530-1545	Radio Bangladesh..... 7195
1530-1600	R. Prague, Czechoslovakia.. 9735, 11690 11990, 13715 17705, 17840 21505
1530-1600	Swiss Radio International.. 9735, 11690 15430
1530-1600	Voice of Asia, Taiwan..... 5980, 7445
1540-1550	Voice of Greece..... 11645, 15630 17565
1545-1600	Vatican Radio..... 11810, 15090 17730

1600 UTC	[12:00 PM EDT/9:00 AM PDT]
1600-1605	SBC Radio 1, Singapore..... 11940
1600-1615	Radio Pakistan..... 9645, 11615 11675, 11735 11925, 15515 15595, 17660
1600-1630 S	Radio Norway International. 15180, 17840
1600-1630 M-F	Radio Portugal..... 15105
1600-1630	Radio Sweden Int'l..... 15110
1600-1630	Voice of Vietnam..... 9755, 9840 12020, 12035
1600-1645	TWR, Swaziland..... 3200
1600-1700	AFRTS..... 9700, 15330 15430
1600-1700	BBC, London..... 11775, 12095 15070, 15260 17880
1600-1700 A	CBC Northern Quebec Service. 9625, 11720
1600-1700	CFCX, Montreal, Canada..... 6005
1600-1700	CHNX, Halifax, Canada..... 6130
1600-1700	CFRX, Toronto, Canada..... 6070
1600-1700	CFVP, Calgary, Canada..... 6030
1600-1700	CKFX, Vancouver, Canada.... 6080
1600-1700 S	KCBI, Texas..... 11735
1600-1700	KNLS, Alaska..... 7355
1600-1700	KYOI, Saipan..... 9665
1600-1700	Radio Australia..... 6035, 6060 6080, 9550 9580, 15320
1600-1700	Radio Beijing..... 9570, 11600
1600-1700	Radio France International. 6175, 9860 11705, 11845 17620, 17795
1600-1700	Radio Jordan..... 9560
1600-1700	Radio Korea..... 5975, 9870
1600-1700	Radio Malawi..... 3380, 5995
1600-1700	Radio Moscow..... 11840, 11850 11860, 11950
1600-1700	Radio Prague, Czech..... 11990, 13715 15110, 17705
1600-1700	Radio Riyadh, Saudi Arabia.. 9720v
1600-1700	Radio Tanzania..... 6105
1600-1700	Radio Zambia..... 9505
1600-1700	UAE Radio..... 9640, 11940 11955, 15320
1600-1700	Voice of America..... 9575, 15205 15410, 15445 15580, 15600 17785, 17800 17870
1600-1700	Voice of Nigeria..... 7255, 11770
1600-1700	WCSN, Boston, Mass..... 15270
1600-1700	WHRI, Indiana..... 15105
1600-1700	WINB, Pennsylvania..... 15295
1600-1700	TEST WMLK, Pennsylvania..... 9455
1600-1700	WRNO Worldwide..... 11965
1600-1700	WYFR, Florida..... 9535, 11830 11875, 15170 15440, 17845 21525
1610-1620 M-F	Radio Botswana..... 4820, 7255
1610-1645	Radio Belem..... 3205
1630-1655 M-A	BRT Belgium..... 17595
1630-1700	ELWA, Liberia..... 11830
1630-1700	Radio Nacional Angola..... 7245, 9535 11955
1630-1700	Radio Netherland..... 6020, 9515
1630-1700	Radio Polonia..... 7125, 9525
1630-1700	Radio Sofia, Bulgaria..... 11735, 11840 15310
1630-1700	Voice of Africa, Egypt..... 15255
1645-1700	Radio Berlin Int'l..... 9730
1645-1700	Radio Pakistan..... 6205, 7100 9560, 9465

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1700 UTC	[1:00 PM EDT/10:00 AM PDT]		
1700-1710	Voice of Lebanon.....	6548	
1700-1715	Kol Israel.....	9460, 11585	
		<b>13750, 15095</b>	
1700-1720	Radio Netherland.....	6020, 9515	
1700-1730	Radio Australia.....	6035, 6060	
		7205	
1700-1730	Radio Berlin Int'l.....	9730	
1700-1730	Radio Japan.....	5990, <b>9695</b>	
1700-1730 S	Radio Norway International.	<b>9655, 11925</b>	
		15310	
1700-1745	BBC, England.....	<b>11775, 12095</b>	
		<b>15070, 15260</b>	
1700-1800	AFRTS.....	<b>9700, 11805</b>	
		<b>15330, 15345</b>	
		<b>15430</b>	
1700-1800	CBC, N. Quebec, Canada....	9625, 11720	
1700-1800	CFCX, Montreal, Canada.....	6005	
1700-1800	CFRX, Toronto, Canada.....	6070	
1700-1800	CFVP, Calgary, Canada.....	6030	
1700-1800	CHNX, Halifax, Canada.....	6130	
1700-1800	CKFX, Vancouver, Canada....	6080	
1700-1800	CKZU, Vancouver, Canada....	6160	
1700-1800	KCBI, Dallas.....	<b>11735</b>	
1700-1800	KNLS, Alaska.....	7355	
1700-1800	KYOI, Saipan.....	9665	
1700-1800	Radio Beijing.....	9570, 11600	
1700-1800	Radio Korea, South.....	5975, 15575	
1700-1800	Radio Moscow.....	<b>11840, 11860</b>	
1700-1800 MWF	Radio Nacional, Eq. Guinea	9535	
1700-1800	Radio Nacional Angola.....	7245, 9535	
		11955	
1700-1800	Radio Pyongyang, N. Korea...	7105, 7205	
		7305, 9325	
		9960, 9977	
		11665	
1700-1800	Radio Riyadh, Saudi Arabia..	9720v	
1700-1800	Radio Tanzania.....	6105	
1700-1800	Radio Zambia.....	9505	
1700-1800	Voice of Africa, Egypt....	15255	
1700-1800	Voice of America.....	<b>15600, 17870</b>	
1700-1800	Voice of Nigeria.....	11770	
1700-1800	WCSN, Boston, Mass.....	<b>15270</b>	
1700-1800	WHRI, Indiana.....	<b>15105</b>	
1700-1800	WINB, Pennsylvania.....	15400	
1700-1800	WMLK, Bethel, Pa.....	9455	
1700-1800	WRNO Worldwide.....	<b>15420</b>	
1700-1800	WYFR, Florida.....	<b>9535, 11580</b>	
		<b>11830, 11875</b>	
1715-1800	Radio Berlin International..	6080, 6115	
1730-1755	BRT, Belgium.....	5910, 11985	
1730-1800	Radio Australia.....	6035, 9580	
1730-1800	Radio Bucharest, Romania....	7145, 9640	
		9690, 11830	
1730-1800	Radio Polonia.....	6135, 9540	
1730-1800	Radio Portugal.....	11915, 13250	
1730-1800	Radio Prague, Czechoslovakia	<b>5930, 7270</b>	
		<b>734, 9605</b>	
		<b>9725, 11690</b>	
		<b>11990, 15190</b>	
1730-1800	Radio Surinam.....	17755	
1745-1800	BBC, London.....	<b>12095, 15070</b>	
1745-1800	SLBC, Sri Lanka.....	11800	

1800 UTC	[2:00 PM EDT/11:00 AM PDT]		
1800-1810	Voice of Kenya.....	6135	
1800-1830	Radio Mozambique.....	3340, 9620	
1800-1830	Radio Prague, Czechoslovakia	<b>5930, 7290</b>	
		<b>7345, 9605</b>	
		<b>9725, 11690</b>	
		<b>11990, 15190</b>	
1800-1830	Swiss Radio Int'l.....	9535	
1800-1830	TWR, Monte Carlo.....	11965	
1800-1900	Voice of Africa, Egypt....	15255	
1800-1830	Voice of Vietnam.....	9755, 9840	
		12020, 12035	
1800-1900	Deutsche Welle.....	7285, 9700	
		9745, 11785	
1800-1850	Radio Nacional do Brasil...	15265	
1800-1900	4VEH, Haiti.....	4930	
1800-1900	AFRTS.....	15330, 15345	
		15430, 17765	
1800-1900	All India Radio.....	11620, 11940	
		15280	
1800-1900	BBC, London.....	6180, 6195	
		9410, 11820	
		<b>12095, 15070</b>	
		15275, 15400	
1800-1900	CBC, N. Quebec Service....	9625, 11720	
1800-1900	CFCX, Montreal, Canada.....	6005	
1800-1900	CFRX, Toronto, Canada.....	6070	
1800-1900	CFVP, Calgary, Canada.....	6030	
1800-1900	CKFX, Vancouver, Canada....	6080	
1800-1900	CKZU, Vancouver.....	6160	
1800-1900	KCBI, Texas.....	<b>11735</b>	

1800-1900	KNLS, Alaska.....	7355	
1800-1900 M-F	KVOH, California.....	17775	
1800-1900	KYOI, Saipan.....	9665	
1800-1900	Radio Australia.....	5995, 6045	
		6060, 6035	
		6080, 7215	
		9580	
1800-1900 A,S	Radio Canada International.	<b>15260, 17820</b>	
1800-1900	Radio Korea.....	5975, 15575	
1800-1900	Radio Maputo, Mozambique...	9620	
1800-1900	Radio Moscow.....	<b>11840, 11850</b>	
		<b>11860, 11950</b>	
1800-1900	Radio Kuwait.....	<b>11675</b>	
1800-1900 MWF	Radio Nacional, Eq. Guinea...	9553	
1800-1900	Radio New Zealand Int'l....	11780, 15150	
1800-1900	Radio Riyadh, Saudi Arabia..	9720v	
1800-1900	Radio Tanzania.....	6105	
1800-1900	Radio Zambia.....	9505	
1800-1900	RAE, Argentina.....	15435	
1800-1900	TWR, Swaziland.....	9550	
1800-1900	Voice of America.....	<b>15205, 15445</b>	
		<b>17870</b>	
1800-1900	WCSN, Boston, Mass.....	<b>15105</b>	
1800-1900	WHRI, Indiana.....	<b>11705</b>	
1800-1900	WINB, Pennsylvania.....	15400	
1800-1900	WRNO Worldwide.....	<b>15420</b>	
1800-1900	WYFR.....	<b>9535, 11580</b>	
		<b>11830, 11875</b>	
		<b>9725, 12015</b>	
1805-1830 A,S	Radio Austria Int'l.....	17755	
1814-1817	Radio Suriname Int'l.....	17755	
1815-1900	Radio Bangladesh.....	6240, 7295	
		7505	
1830-1855 M-A	BRT Brussels, Belgium.....	5910, <b>9905</b>	
1830-1855	Radio Finland.....	<b>6120, 9610</b>	
		<b>11755</b>	
1830-1900	Radio Polonia.....	5995, 6135	
		7125, 7285	
		9525, 9675	
		11840	
1830-1900	Radio Sweden Int'l.....	<b>9655</b>	
1830-1900	Radio Tirana.....	7065, 9480	
1830-1900	Swiss Radio International...	6165, 9535	
		9885, 11955	
		9540, <b>17605</b>	
		<b>21685</b>	
1830-1900	Radio Netherlands.....	9700, 11720	
1830-1900	Radio Sofia, Bulgaria.....	7275, 9765	
1830-1900	Spanish Foreign Radio.....	11840, <b>15375</b>	
1830-1900	Radio Abidjan, Ivory Coast.	11940	
1830-1900	Radio Havana Cuba.....	<b>11795</b>	
1830-1900	Radio New Zealand.....	11780, 15150	
1840-1900	Voice of Greece.....	11645, 12105	
		15630	
1845-1900	All India Radio.....	7412, 11620	

1900 UTC	[3:00 PM EDT/12:00 PM PDT]		
1900-1915	Radio Bangladesh.....	6240, 7295	
		9855, 11555	
1900-1925	Radio Netherland.....	6020, 9540	
		<b>17605, 21685</b>	
1900-1925	Radio Prague, Czechoslovakia	5930, 7345	
1900-1930	Kol Israel.....	<b>9010, 11610</b>	
		<b>12060, 13725</b>	
1900-1930	Radio Budapest Hungary.....	6025, 7220	
		9585, 9835	
		11910, 12000	
1900-1930	Radio Japan.....	11705	
1900-1930	Radio Kiev, Ukrainian SSR...	7230, 6010	
		6090, 6165	
1900-1930 S	Radio Norway Int'l.....	<b>11825, 15310</b>	
1900-1930	Radio Yugoslavia.....	6100, 7240	
		9620	
1900-1930	Spanish Foreign Radio.....	<b>15375</b>	
1900-1930	Voice of Vietnam.....	9755, 9840	
		12020, 12035	
1900-2000	4VEH, Haiti.....	4930	
1900-2000	AFRTS.....	15330, 15345	
		15430, 17765	
1900-2000	All India Radio.....	21620	
		7150, 9665	
		11620, 11845	
		15265	
		<b>12095, 15070</b>	
1900-2000	BBC, London.....	9720	
1900-2000	B.S. Kingdom Saudi Arabia..	9625	
1900-2000	CBC Northern Quebec Serv...	9625	
1900-2000	CFCX, Montreal, Canada.....	6005	
1900-2000	CFRX, Toronto, Canada.....	6070	
1900-2000	CFVP, Calgary, Canada.....	6030	
1900-2000	CKFX, Vancouver, Canada....	6080	
1900-2000	CKZU, Vancouver, Canada....	6160	
1900-2000	HCJB, Ecuador.....	<b>15270, 17790</b>	
1900-2000	KCBI, Texas.....	<b>11735</b>	
1900-2000	KVOH, California.....	<b>17775</b>	
1900-2000	Radio Australia.....	5995, 6045	
		6060, 6035	
		6080, 7205	
		9580	

1900-2000	Radio Beijing.....	9860, 11500	
1900-2000 TES	R. Discovery, Dominican Rep	15045	
1900-2000	Radio Havana Cuba.....	<b>11795</b>	
1900-2000	Radio Kuwait.....	<b>11675</b>	
1900-2000	Radio Moscow.....	<b>11840, 11850</b>	
		<b>11860, 11950</b>	
		<b>13605</b>	
1900-2000 MWF	Radio Nacional, Eq. Guinea...	9553	
1900-2000	Voice of America.....	<b>9760, 15445</b>	
		<b>17870</b>	
1900-2000	Voice of Nigeria.....	7255, 11770	
1900-2000	WCSN, Boston, Mass.....	<b>15230</b>	
1900-2000	WHRI, Indiana.....	<b>15105</b>	
1900-2000 S,A	WINB, Red Lion, Penna.....	15185	
1900-2000	WMLK, Bethel, PA.....	<b>9455</b>	
1900-2000	WRNO Worldwide.....	<b>15420</b>	
1900-2000	WYFR, Okeechobee, Florida..	<b>9535, 11830</b>	
		<b>15566, 21615</b>	
1910-1920	Radio Botswana.....	3355, 4820	
1920-1930 M-A	Voice of Greece.....	7430, 9395	
		9420	
1930-2000	Radio Beijing, China.....	9440, 11515	
		11905	
1930-2000	Radio Bucharest, Romania...	7145, 9690	
		9750, 11940	
1930-2000	Radio Finland.....	6120, 11755	
1930-2000	Voice of Islamic Rep. Iran..	9022	
1935-1955	RAI, Italy.....	7275, 9710	
1940-2000	Radio Ulan Bator Mongolia...	7235, 15305	
1950-2000	Vatican Radio.....	6190, 7250	
		<b>9645</b>	

2000 UTC	[4:00 PM EDT/1:00 PM PDT]		
2000-2005	Radio Ghana.....	4915	
2000-2005	Radio Ulan Bator Mongolia...	9575, 15305	
2000-2010	Vatican Radio.....	6250, 7250	
		<b>9645</b>	
2000-2010	Voice of Kenya.....	4808	
2000-2015 M-F	Radio Cotonou, Benin.....	4870	
2000-2015	Radio Togo, Lome.....	3220, 5047	
2000-2025	Radio Beijing, China.....	9440, 11515	
		11905	
2000-2025	Radio Bucharest, Romania...	7145, <b>9690</b>	
		9750, 11940	
2000-2025 M-H	Radio Polonia.....	7125, 7145	
		9525, 9695	
2000-2030	Radio Australia.....	6060, 6035	
		6045, 6080	
		7250, 9580	
		9620	
2000-2030	Radio Algiers, Algeria.....	17745	
2000-2030	Radio Budapest, Hungary.....	<b>6110, 7225</b>	
		<b>9585, 9635</b>	
2000-2030 M-F	Radio Canada International.	<b>11945, 15325</b>	
2000-2030 S	Radio Norway International..	<b>17820, 17875</b>	
		<b>9590, 11865</b>	
		<b>15310</b>	
2000-2030	Radio Polonia.....		

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2000-2100	WYFR, Okeechobee, Florida..	9535, 11830 11875, 15566 17750, 21525
2005-2100	Radio Damascus Syria.....	9950
2015-2100	ELWA, Liberia.....	11830
2015-2100	Radio Cairo, Egypt.....	9670
2025-2045	RAI, Italy.....	7235, 5990 11800
2030-2100	Falkland Islands Bcast Svc..	2373
2030-2100	IBRA Radio.....	6110
2030-2100	Radio Australia.....	6035, 6045 6080, 7215 9580, 9620
2030-2100	Radio Beijing.....	6955, 7480 9440, 11515
2030-2100	Radio Netherland.....	9540, 9715 9895, 11740
2030-2100 M-F	Radio Portugal.....	6170, 9740
2030-2100	Voice of Nigeria.....	11770
2030-2100	Radio Sofia, Bulgaria.....	11750
2030-2100	Voice of Vietnam.....	9755, 9840 12020, 12035
2045-2100	All India Radio.....	7160, 9550 9665, 9910 11620, 11870
2045-2100	Radio Berlin International.	6125
2050-2025	Voice of Islamic Rep., Iran..	9022

<b>2100 UTC</b>	<b>[5:00 PM EDT/2:00 PM PDT]</b>	
2100-2110	Vatican Radio.....	6200, 7250 9645
2100-2115	Radio Cairo, Egypt.....	9670
2100-2115	Radio New Zealand Int'l....	11780, 15150
2100-2220	ELWA, Liberia.....	11830
2100-2125	BRT, Belgium.....	9675
2100-2125 S-F	CBC Northern Quebec Service.	9625, 11720
2100-2125	Radio Beijing.....	9440, 11515
2100-2125	Radio Netherland.....	9540, 9715 9895, 11740
2100-2130	Radio Finland.....	6120, 11945 15400
2100-2130	Radio Australia.....	9580
2100-2130	Radio Berlin International..	6125

2100-2130	Radio Japan General Service.	7280, 9695 15195, 17755
2100-2130	Radio Sweden International.	11845, 11955
2100-2140	Radio Havana Cuba.....	15230
2100-2145	WINB, Red Lion, Penna.....	15185
2100-2150	Deutsche Welle, West Germany	6010, 7130 9675, 9765 11815
2100-2150	Radio Pyongyang, N. Korea...	6575, 9360 11660
2100-2155	Radio Beijing.....	11500
2100-2200	AFRTS.....	15430
2100-2200	All India Radio.....	7412, 9665 9910, 11620 6005, 6175
2100-2200	BBC, London.....	7325, 9410 12095, 15070 15260
2100-2200	CFCX, Montreal, Canada.....	6005
2100-2200	CFRX, Toronto, Canada.....	6070
2100-2200	CFVP, Calgary, Canada.....	6030
2100-2200	CHNX, Halifax, Canada.....	6130
2100-2200	CKFX, Vancouver, Canada.....	6080
2100-2200	Falkland Islands Bcast Svc..	2373
2100-2200	FEN, Tokyo.....	15260
2100-2200	King of Hope, Lebanon.....	6280
2100-2200	KSDA, Guam.....	7160, 11965
2100-2200	KVOH, California.....	17775
2100-2200	KYOI, Saipan.....	9670
2100-2200	Radio Baghdad, Iraq.....	9875
2100-2200v	Radio Jamahiriyah, Libya.....	7245
2100-2200	Radio Moscow.....	11675, 11750 11840, 11860 11980, 13605

2100-2200 M-A	Radio Nacional Angola.....	9535, 7245
2100-2200	R. Nacional, Equat. Guinea.	15106v
2100-2200 F,A	Radio Zambia.....	9505
2100-2200	RTL, Luxembourg.....	6090
2100-2200	Voice of Africa (Cairo)...	15375
2100-2200	Voice of America.....	9760, 11760 15445, 17870 7445 LSB
2100-2200	Voice of Asia.....	7445, 9845
2100-2200	WCSN, Boston, Mass.....	11695
2100-2200	WHRI, Indiana.....	9770
2100-2200	WRNO, Louisiana.....	11705
2100-2200	WYFR, Okeechobee, Florida..	9535, 11830 11875, 15566 17750, 21525

2105-2200	Radio Damascus, Syria.....	9950
2115-2230	Radio Yugoslavia.....	6100, 7240 9620
2130-2200 T,F	BBC Falklands Service.....	9915, 11820 12040, 15390
2130-2200 S-F	CBC Northern Quebec Service	11720
2130-2200	HCJB, Quito, Ecuador.....	11740, 15270 17790
2130-2200	KGEI, San Francisco, CA....	15280
2130-2200	Kol Israel.....	9010, 9435 11610, 13725 15485, 15585
2130-2200	Radio Austria International.	5945, 6000 9870
2130-2200	Radio Australia.....	15150, 15160 15395 17795
2130-2200	Radio Canada International.	11945, 15150
2130-2200	Radio Prague.....	6055
2130-2200	Radio Sofia, Bulgaria.....	6070, 11720

<b>2200 UTC</b>	<b>[6:00 PM EDT/3:00 PM PDT]</b>	
2200-2207	Voice of America.....	11740, 15120
2200-2210	Radio Sierra Leone.....	5980
2200-2215	Vatican Radio.....	9615
2200-2225	RAI, Italy.....	5990, 9710 11800
2200-2230	All India Radio.....	7160, 9550 9665, 9910 11620, 11870
2200-2230 S-F	CBC Northern Quebec Service	9625, 11720
2200-2245	Radio Berlin Int'l.....	6165, 6125 11750
2200-2230	Radio Canada International..	5960, 9755
2200-2230 S	Radio Norway International.	11930, 15165
2200-2230	Radio Sofia, Bulgaria.....	9700, 11720
2200-2300	AFRTS.....	6030, 15345 15430
2200-2300	BBC, London.....	5975, 6005 6120, 6175 7325, 9410 9515, 9590 9915, 12095
2200-2300	CFCX, Montreal, Canada.....	6005
2200-2300	CFRX, Toronto, Canada.....	6070
2200-2300	CFVP, Calgary, Canada.....	6030
2200-2300	CHNX, Halifax, Canada.....	6130
2200-2300	CKFX, Vancouver, Canada.....	6080

2200-2300	CKZU, Vancouver.....	6160
2200-2300	Falkland Islands Bcast Svc..	2373
2200-2300	King of Hope, Lebanon.....	6280
2200-2300	KVOH, California.....	17775
2200-2300	KYOI, Saipan.....	15405
2200-2300	Radio Australia.....	15320, 17795
2200-2300	Radio Moscow.....	7195, 9720 9865, 11750 11850, 12060 13605, 15425
2200-2300	Radio Pyongyang, N.Korea...	11735
2200-2300	R. Vilnius, Lithuanian SSR..	7260, 9640 11790, 11875 13645
2200-2300	Voice of Free China, Taiwan	15440, 17845 9955
2200-2300	Voice of Turkey.....	9560
2200-2300	WCSN, Boston, Mass.....	15300
2200-2300	WHRI, Indiana.....	9770
2200-2300	WRNO Worldwide.....	11705
2200-2300	WYFR, Florida.....	9535, 11830 11855, 21525
2205-2230	Vatican Radio.....	6015, 9615 11830
2230-2300 S	CBC Northern Quebec Service.	9625, 11720
2230-2300	Swiss Radio International...	6190
2245-2300	All India Radio.....	6035, 7215 9595, 9912 11765
2245-2300	GBC1 Ghana.....	4915

<b>2300 UTC</b>	<b>[7:00 PM EDT/4:00 PM PDT]</b>	
2300-2330	BBC, London.....	5975, 6005 6120, 6175 7325, 9590 9915, 9515
2300-2330	KGEI.....	15280
2300-2330	Kol Israel.....	9435, 9855 11610
2300-2330	Radio Canada International..	9755, 11710
2300-2330	Radio Sweden International..	9695, 11705
2300-2345	Radio Berlin International..	6080, 9730
2300-0000	4VEH, Haiti.....	4930
2300-0000	AFRTS.....	6030, 15345
2300-0000 A,S	CBC Northern Quebec Service.	6195, 9625
2300-0000	CFCX, Montreal, Canada.....	6005
2300-0000	CFRX, Toronto, Canada.....	6070
2300-0000	CFVP, Calgary, Canada.....	6030
2300-0000	CHNX, Halifax, Canada.....	6130
2300-0000	CKFX, Vancouver, Canada.....	6080
2300-0000	CKZU, Vancouver.....	6160
2300-0000	Falkland Islands Bcast Svc..	2373
2300-0000	FEBC, Manila.....	15320
2300-0000	KCBI, Texas.....	11910
2300-0000	KVOH, California.....	17775
2300-0000	KYOI, Saipan.....	15405
2300-0000	Radio Australia.....	15320, 17795
2300-0000	Radio Japan.....	9695, 11800 15195, 15280 15300
2300-0000	Radio Korea, South.....	15575
2300-0000	Radio Moscow, U.S.S.R.....	9530, 9685 9720, 9765 9865, 11750 12060
2300-0000	Radio Sofia Bulgaria.....	6070, 11720
2300-0000	Radio Pyongyang, N. Korea..	11735, 13650
2300-0000	Radio Thailand.....	9650, 11905
2300-0000	RTL, Luxembourg.....	6090
2300-0000	Spanish Foreign Radio.....	6020
2300-0000	Voice of America.....	9640, 11740 15160, 15185 15290, 17730 17740, 17820
2300-0000	WCSN, Boston, Mass.....	15300
2300-0000	WHRI, Indiana.....	11770
2300-0000	WRNO Worldwide.....	9852.5
2300-0000	WYFR, Florida.....	9680, 15170 15440
2330-2355	BRT Belgium.....	9675, 9925
2330-0000	BBC, London.....	5975, 6005 6120, 6175 7325, 9410 9515, 9590 9915
2330-0000 S-F	Radio Canada International..	5860, 9755
2330-0000	Radio Kiev, Ukrainian SSR...	7260, 9640 11790, 11875 13645
2330-0000 TES	Radio Veritas, Philippines...	9740
2330-0000	Voice of Vietnam.....	9765, 9840 12020, 12035
2330-0000	Voice of Nicaragua.....	6015
2330-0000	WINB, Pennsylvania.....	15145
2345-0030	Radio Berlin Intl.....	6080, 9730
2345-0000	Radio Korea, South.....	7275, 15575

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## Chinese Carping

The campaign by leaders in Peking against "bourgeois liberalization" has led to renewed ideological struggles against the Western media. Now, Voice of America has come under special censure from the Chinese government for being an "unseen inciter" of the student demonstrations for freedom and democracy last year.

Among the "crimes" of the U.S. radio network, according to the writer of an article that appeared in an internal Chinese Communist Party journal: "It takes a firm bourgeois stand and stubbornly clings to an anticommunist viewpoint."

As if all this were not enough, Voice of America's "selection of material, editing of scripts and even its terminology are all notably tinged." Admonishes the writer: "People of goodwill, if you listen to VOA broadcasts, please do not forget that this is a mouthpiece of the bourgeoisie that is speaking to you."

*Insight*, May 18, 1987  
via Martin Shelford, Dallas,  
Texas

## Slain Disc Jockey's Cousin Sentenced to 15 years for Murder

A cousin of slain Spanish language radio personality Rodolfo Cortez was sentenced to 15 years in state prison for bludgeoning to death the popular KWKW disc jockey, then stuffing his body in a trash container.

Gustavo Garcia Aguilar, 21, pleaded guilty last month to one count of second degree murder in a plea bargain with the district attorney's office in LA. Cortez was the host of "El Show de Rodolfo" which aired weekdays on KWKW from 10 a.m. to 2 p.m. for three years.

## Shortwave Aided by Elcom Bauer

Some might think that the 50 kW medium wave transmitter is putting out a horrendous sixth harmonic. However, such is not the case at CFRB-CFRX in Toronto.

What they're doing is using an Elcom Bauer 701B modified for shortwave. CFRX broadcasts 24 hours a day on 6070 kHz. CFRB broadcasts on 1010 kHz with 50 kW full time using three towers for daytime operation and four towers at night.

CFRX utilizes a 1/4 wavelength omnidirectional antenna. CFRB broadcasts in C-QUAM stereo with the mono output of the audio processing chain being fed to the shortwave transmitter for fully duplicated programming.

Information from *Radio World*  
via Kevin John Klein,  
Appleton, WI

## AMs to Get Interference Dollars

Florida AM stations that had filed for federal funds to compensate them for improvements they made to battle Cuban interference may finally see some cash.

Although the FCC had approved nine compensation requests during the past two years, it did not handle the actual cash disbursements.

That is provided by the US Information Agency (USIA). However, a dispute over how to pay the approved claims has, until now, blocked the release of any funds.

As of mid-March, no station had seen any compensation funds. However, USIA Counsel John Lindberg told RW that a least some stations could receive their compensation checks by spring or summer.

*Radio World*  
Via Kevin John Klein,  
Appleton, WI

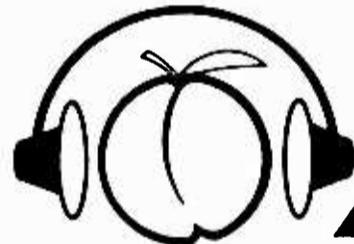
## Israeli Leader Hosts Radio Talk Show for Arab Callers

It was not your usual radio talk show, but with Israeli Foreign Minister Shimon Peres as the telephone host and the Arab world as his call-in audience, how could it have been?

"Can you hear me?" the caller said over a scratchy telephone line patched through West Germany from somewhere in Jordan.

"I want to ask Mr. Peres, why won't Israel negotiate with the Palestine Liberation Organization?" the caller asked.

"The question of PLO participation depends very much on



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**RADIO ROUNDUP**  
cont'd from page 39

the O" Peres answered over the Arab Service of the Israeli radio. "As long as it is remaining a shooting organization and refuses to negotiate, how can one bring them into negotiations?"

Thus did Peres make some history in the first telephone call-in news conference ever held by an Israeli leader with an audience in the Arab world. Although he did not make any dramatic overtures, Peres sounded an eloquent and conciliatory note in answering even the most hostile questions. But at times his answers regarding Israel's treatment of Arabs or settlement activities in the West Bank stretched credulity to the limit and drew some raised eyebrows from even the Israeli journalists following the broadcasts in the studio.



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The Israeli radio's Arabic service is widely listened to throughout the Arab world, both for its generally informative news and Arab music.

*Los Angeles Herald Examiner*  
Via James Kline, Santa Monica, CA

**For Libyans War in  
Chad is a Whisper**

Colonel Muamar el-Qaddafi appeared on national television in early April and, as has been his pattern, he made no mention of the heavy losses suffered by Libyan troops in the war in Chad. Some 3,000 Libyans have been killed, wounded or are missing and the Libyan people officially know nothing about the defeats. In a nation of only 3.5 million, this means that virtually every family is affected.

But Libyans have found ways to get around the official lid on information. Many households have up to three television sets and with the arrival of spring, the reception of Italian television news from across the Mediterranean has been clearer than ever.

Other have found a way to overcome the jamming by the Libyan government of the BBC's Arabic Service. By putting the radio in a large saucepan, a Western Diplomat said, the jammed stations suddenly come alive. "I've seen it myself, a lady with a radio in a big spaghetti pot," the diplomat said.

*New York Times*  
Via Mel Bridgeman, Ornkay, Wyoming

**When Money Radio  
Talks Regulators Listen -  
- Closely**

When brash, fast-talking radio investment adviser Edward "Buz" Schwartz asked his listeners to invest in his pet

project -- a financial news radio station -- late last year, Ann, a senior citizen from Silver Lake, sent in \$10,000.

"He has such a wonderful way of drawing you in," she said. "He's fantastic."

Other listeners invested, too, accounting for nearly all of the 4.7 million Schwartz said he raised -- enabling him to buy a small Pomona, California, radio station, which he dubbed Money Radio.

But late in March, the owners of radio station KIEV (870 AM), pulled the plug on Schwartz's 3-year-old financial advice programs.

And now, in response to questions raised by the Herald Examiner, state regulators are investigating how Schwartz and his employee, Vera Gold, raised the money. "I think we have a real problem here," said Bill McDonald, head of enforcement for the state Department of Corporations. "There's enough here that's going to cause us to open an investigation."

At issue are:

Whether Schwartz's claims about Money Radio and the hours he devoted to promoting the project on his daily show on KIEV constituted unauthorized, fraudulent or misleading advertising.

Whether the prospectus made false claims about how far the station could reach.

Whether Schwartz made statements on the air encouraging listeners to flout state security laws.

The state is just beginning its investigation of Schwartz's programs on other stations as he and Gold have begun test broadcasts on KWOW (1600-AM) in Pomona, changed its name to KMNY and started test broadcasts.

*The Los Angeles Herald Examiner*  
Via James Kline, Santa Monica, CA

**Chilean Rebels Seize 4  
radio stations and News  
Office, Announce End of  
Papal Truce**

Armed rebels seized the offices of the Associated Press and four radio stations in Chile to announce the end of a truce proclaimed for Pope John Paul II's visit.

Three men with pistols broke into the AP offices Monday night and scrawled on the walls slogans of the Manuel Rodriguez Patriotic Front, the guerilla group that claimed responsibility for an attempt on the life of President Augusto Pinochet last September.

Four armed men forced their way into Radio Beethoven and made an announcer read a two-minute statement, police sources said. They also said a radio station in Santiago and two in Valparaiso, 75 miles west of the capital, were also raided.

*Los Angeles Times*

**Radio Better than Boys**

A poll of 100,000 American females between the ages of 12 and 19 by the Donnelley Marketing firm found that listening to the radio outscored dating boys as a favorite leisure activity -- by a full five percent.

Actually, radio listening ranked second, with dating way down in sixth place. Number one? Why, going shopping, naturally!

*When you see newspaper and magazine articles on radio related subjects, clip them out and send them to: Larry Miller, 3 Lisa Drive, Thorndale, PA 19372. Everyone who sends in a clipping that is published will have an extra issue added to their Monitoring Times subscription and our warm appreciation. In cases where the same clipping is received from several readers, the first one received will receive the free issue.*

## A Hundred Million Questions

Back in the days when I was still teaching school, I found that knowing how to ask the right questions was the key to learning -- rather than having all the right answers at hand.

With input from a few other DXers, I'm going to ask a few questions and hope for some input from readers of *Monitoring Times*. We may never arrive at the right answers, you see, but in the search we may unearth some information of value to us DXers.

Gene Martin of Denver, Colorado, asked this question: "If the auroral zone blocks out Japanese signals en route to the Eastern United States, how come it failed to do so way back in the early 1930s?" Certainly, few people are logging Japanese stations today.

That question was enough to set several knowledgeable DXers into action. Tom Farmerie of Grafton, Massachusetts, checked out some early 1930s radio publications and found many loggings of Japanese and Far East stations in the Eastern U.S. His answer? No one is trying!

Randy Seaver of Chula Vista, California, agreed with Farmerie but added that no club member is a true expert on the subject because of lack of time, interests and resources to research questions in chemistry, geomagnetism, electromagnetism, solar physics, ionospheric physics, and meteorology.

Seaver added a few questions of his own: What ionospheric region dominates medium wave DXing? Why does the auroral zone play a major part in high latitude DXing? What are the power, frequency and distance relationships? Pointing out that some research has been done in these areas, he nevertheless quite correctly states, "We still have a very incomplete understanding of how that signal travels over distances of thousands of miles, over mountains, plains, oceans, cities, through the walls and into our receivers for deciphering of anything intelligible."

Segueing into a question of my own: "Why wouldn't digital broadcasting on the AM and shortwave bands be the next development in radio?" Why wouldn't a digital receiver system "deciphering anything intelligible" be able to reproduce sound as pure as that from a compact disc, in stereo, of course? Why couldn't a subcarrier trigger a call letter display, making it easier for DXers/listeners to identify stations?

Of course, it would be expensive -- but most *Monitoring Times* readers,

including myself, have managed to acquire various receivers, televisions, VCRs, stereo and computer systems. Perhaps a conventional receiver could be used to tune a signal which could then be fed into a home computer to be recorded on a floppy diskette, transferred to tape and played through one's analogue stereo system. What the heck! Let's do it with a high-resolution picture while we're at it and feed it through our TV system!

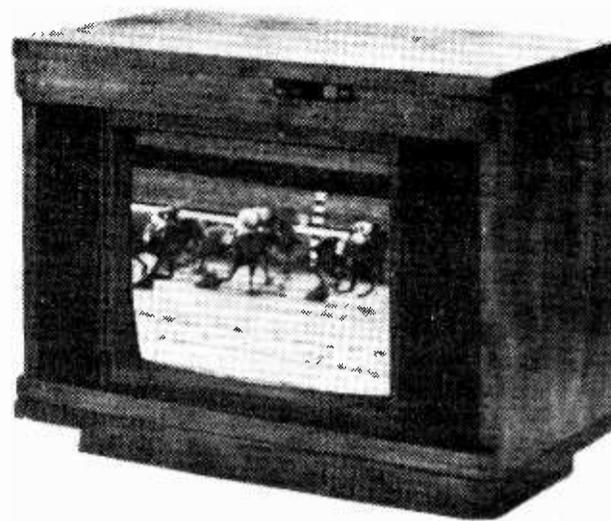
WTFDA's Tim McVey provided some provocative answers to the question, "What effect does the weather have on FM/TV DX?" in the April issue of *VHF-UHF Digest*. He makes the point that a long, stable, stationary front contributes to long-haul tropo enhancement to FM/TV DX and speculates as to the influence of inversion on DX.

Now, let's jump to the past. Why don't stations playing only oldies resurrect their old jingle packages and use them with their music selections? Perhaps a station is doing so but I haven't heard of one yet. And *Radio\*Philes* members would report such an event. Twenty dollars to P.O. Box 1261, Milville, New Jersey 08332 gets you a one year subscription to this nifty radio-lovers publication devoted to "the modern radio broadcasting industry."

Let's dip a little farther into the realm of technology with our next question: "Do you need the latest in solid-state equipment to have fun with DXing?" Heck, no! You may even have more fun with the *oldest* in solid-state receivers -- the crystal set. Just ask DXer Ray Cole. He's having more fun than he can stand with his crystal set.

Finally, let's turn from questions to thank-you's. First, thanks to *MT* reader Charles L. Michulka, Stafford, Texas, who sent a copy of my column detailing the deficiencies of the Worldstar MG-6001 to a Seattle mail-order firm which still carries it -- now with a cassette player (not recorder) added. Second, thanks to Roger Giannini, Belleville, Illinois, who forwarded two copies of the *World Radio TV Handbook* which I promptly sent to Argentina for distribution there by the Asociacion DX del Litoral. And thanks to reader Chuck Boehnke, Keaau, Hawaii, who agrees that the Sony ICF-S5W is a fine AM/FM DX receiver.

From California Carl Smith writes to tell us that a licensed old timer on the medium waves is up for sale. It is KMJ Fresno on 5800 kHz. The station first went on the air in 1922 and has been owned by the



*It's time for TV DXing again!*

McClatchy Newspaper chain since 1925.

And a TV tip: Los Angeles is probably the worst spot in the world for FM and TV DX. Each band is almost entirely filled up with stations. Nonetheless, I will have turned my

attentions to TV DXing by the time you read this. After all, what's the only practical use for smog known to man? Believe it or not, when LA smog is at its worst, TV DX here is at its best. You read it here first! (Cough, cough.) ■

## How Much Are You Missing?



### World Radio Report

**It's Nothing Flashy. It's Just the Best.**

Shortwave radio brings you your world. And that's a lot of ground for any magazine to cover. It's also why most magazines just don't measure up. It takes a full-time staff to dig up the information you need -- not volunteers who only sit down at their radios after a hard day's work at the office. Shortwave radio is all we do -- nothing more, nothing less. And precious few other shortwave magazines can say that. While you're at work, we're at work, so that when you do have time to listen to your radio, you'll know everything you need to know to get the most out of your radio. •

If you're serious about your shortwave, you owe it to yourself -- and your radio -- to check out a full-time shortwave magazine. One year of World Radio Report is just \$18.00. Sample copies are just \$2.50 in the U.S.; \$3.50 elsewhere in the world. Send check, money order or cash to World Press International Inc., 3 Lisa Drive, Thorndale, PA 19372. From the publishers of International Radio.

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P.O. Box 1116  
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**Scott McClellan**

P.O. Box 982  
Battle Creek, MI 49016

**Central America:**

It is "make it or break it" time for the Contras. In the wake of "Iranscam" and "Contragate" Congress is not likely to approve further aid without some decisive victories, and soon. The Contras are fully aware of this. Already they are penetrating deeper into the Nicaraguan countryside and increasing attacks on their selected targets.

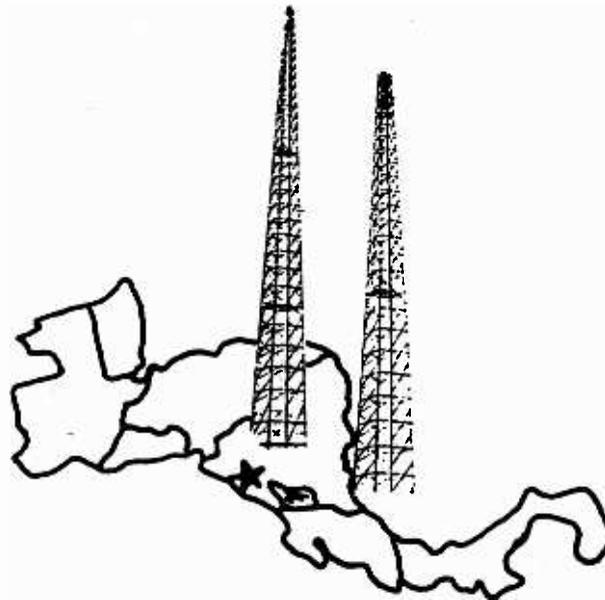
The shortwave monitor is in an excellent position to keep track of this activity. If you know some Spanish, even a little, it can be helpful, but it is not necessary. If you will listen for key words, such as the names of towns, and those that sound essentially the same in Spanish as English (cognates), you'll be able to understand a great deal. It does take a little practice, but almost anyone can do it. As an added bonus, if you listen often enough you may just run across some occasional English on some of the stations.

It was rumored that once the Contras got their mediumwave outlet, they might close down their shortwave operation, Radio Quince de Septiembre (15th of September). It is still active and easily heard. Look for it around 2100 or 2200 on 6215 kHz. Some Quince programs feature distinctive sound effects including sirens and machine gun fire. They certainly make for some rather unusual listening!

Of course, you do not want to forget the new Contra medium wave station, Radio Liberacion, on 1520 kHz. This one is tougher, especially if you have some local interference or have to battle 50 kw WWKB Buffalo, but it is being widely reported. Look for it during the hours of darkness.

Another shortwave station run by the Contras, is La Voz de UNO, or the Voice of the United Nicaraguan Opposition. Search for morning and evening transmissions on 5890 kHz, although there may be some slight variations in the frequency.

An occasional check of 6230 in the evenings might also be worthwhile. This was the "home" of Contra station Radio Monimbo. It is currently inactive but could reactivate at anytime. Several months ago this station was believed to be running test transmissions consisting



*No other clandestine has Radio Caiman's signal strength and quality audio. Try for it on 7470 kHz.*

of nonstop music with no announcements of any kind.

I cannot encourage too strongly the frequent monitoring of clandestine Radio Caiman, which broadcasts for several hours both in the mornings and evenings on 7470. There are several advantages to tuning in Radio Caiman. No other clandestine has a stronger signal or cleaner audio. Even if you had never turned on a shortwave receiver before in your life, you would not have difficulty tuning in this one! Another advantage is that the station broadcasts a lot of music, and this is enjoyable even if you do not hear anything out of the ordinary.

While Radio Caiman is controlled by the Cuban exile group Pro Libertad Cubana, it has indicated in the past that it could be involved in Nicaraguan activity sometime in the future. Further, one might wonder about all that music played on such shows as "Hit Parade" and "Radiatorama." Is it really just to entertain the "juventud" (youth), as the station claims, or could there just possibly be some sort of message being transmitted? If there is such an intention, Caiman would not be the first shortwave broadcaster to utilize such techniques.

Finally, I would suggest staying tuned to licensed Honduran broadcaster Sani Radio which evenings puts in a nice signal to many parts of the United States on 4755 kHz. In addition to Spanish, the stations uses English and the Indian language Miskito. Located in an area where

many Miskitos live, it could be a useful source of information if the Indians also step up their operations against the Sandinistas. Since Sani Radio was started with a grant from the American Agency for International Development, (USAID) it would hardly be suspected of being hostile to the Contra cause.

So, there you have a number of monitoring targets to keep you well ahead of anything that might trickle down into the conventional news sources available to the general public. Good luck, and let me know what you hear. And now, let's see what our pirate expert Scott McClellan is up to.

**The McClellan Report:**

As has been the case for the past several months, pirate radio activity has been rather low, despite the overall improvement in propagation conditions. It's a "vicious circle;" listeners are not spending much time scanning the pirate bands because of lack of activity, and when a station does take to the air, few people are there to hear it. Perhaps the summer months will bring a change to this situation.

I did manage to nab one new pirate, *Psilocybin Radio*, which wins the award for the most unusual name! They were heard on 3420 kHz, between 0150 and 0207 UTC. The format was a mix of jazz and rock, with ID announcements which spelled out the station name phonetically. The signal was fairly strong with no interference. Maybe

other pirates will take the hint and move from the overcrowded 41-meter band. No address was heard.

*Radio North Coast International* made another appearance on 7437 kHz, between 2151 and 2203 UTC. Signal strength was good, but some interference hampered reception. At sign-off they reminded listeners that they have changed their mail drop to P.O. Box 5074, Hilo, Hawaii 96720. Enclose three first-class stamps to cover postage costs.

A reader who wishes to remain anonymous (what a shy bunch!) writes with a question for the mailbag. He asks, "How long does it take the FCC to find a pirate station? And what happens then?" Good questions. The length of time required by the FCC to locate and close down a pirate is variable, depending on a number of factors. These factors include the distance of the pirate from the nearest FCC office, how frequently the pirate takes to the air, the length of transmissions, and so forth. The downfall of most "busted" shortwave pirates has been transmitting too frequently. Stations that maintain a sporadic, unpredictable schedule last the longest, while those that are on most every weekend are asking for trouble.

When a station is caught, the usual penalty of late has been a fine of \$750 to \$1000 for a first offense. Repeat offenders are dealt with a bit more severely.

**Other News:**

From Maryland Matt Vurek writes us about an unusual logging. On April 1 and 2 between 0200 and 0215 UTC he heard something out of the ordinary on 6610. Unfortunately heavy QRN made monitoring difficult. He reports hearing orchestral music and a male voice speaking Spanish. On the second evening the carrier was abruptly cut off in mid-sentence at 0215, but earlier he had heard several references to El Salvador's President Duarte.

Anyone have any ideas? We'd be interested in your feedback on this one, and, as usual, on all aspects of pirate and clandestine broadcasting. Drop us a line!

That's it for this month. Until the next time, keep listening! ■

# WHAT'S NEW?



## IC Master

(5121 pages in two volumes, 8-1/2" x 11", perfect bound; \$130 from Hearst Business Publishing, 645 Stewart Avenue, Garden city, NY 11530)

Few publications for the electronics designer are as crammed with useful data on integrated circuits as this annual master catalog from Hearst. Conveniently color coded, the volumes are sectionalized by topic and quarterly updates keep the listings timely.

An alphabetical listing of advertisers permits access by company name, while devices themselves are categorized by application: digital, microprocessors, microcomputers, interface, linear, memory, custom/ semicustom, automation, and surface mount.

A hefty set nearly four inches thick, the IC Master is internationally recognized as the most comprehensive listing of ICs in the industry, indispensable to the design engineer.

## Aeronautical Radio Handbook

By Michiel Schaay (124 pages, 8-1/4" x 11 3/4", perfect bound; 55 Dutch guilders includes surface postage payable to Uitgeverij Michiel Schaay, Postbus 139, 3940 AC Doorn, Holland)

Entirely in English, this worldwide listing contains more than 5500 frequency entries for air-to-ground communications between 2 and 30 MHz. Arranged in frequency order, other data fields include agency, location, call signs, and schedules as applicable or known.

Military, civilian and federal users are included along with major airports and worldwide sector maps. An excellent reference for the HF utilities listener.

## Utility QSL Address Guide

Volume 1: The Americas by Darryl Symington and John Henault (99 pages, 8-

1/2" x 11", offset print, drilled for three-ring binder; \$12.95 from RadioData Unlimited, PO box 399, Holland, OH 43528)

Symington and Henault are real veterans at utility monitoring and several years of data collection and verification have paid off with this excellent resource of addresses for the most commonly-encountered two-way users of the shortwave spectrum.

Encompassing all of ITU region 2 (North, Central and South America including the Caribbean), this QSL guide is a logical and updated outgrowth of the SPEEDX Utility Guide (less frequencies) of a number of years ago. The authors ambitiously hope to release the companion which covers "the rest of the world" later this year.

Some 4500 address are included in this new edition which covers merchant vessels, federal and military agencies, air carriers, embassies, time and frequency standard stations, MARS stations, Civil Air Patrol, and many more.

Arranged first by service, then

alphabetical by call sign, the guide is prefaced by a chapter on tips for effective QSLing.

## Radio Handbook

23rd Edition by William I. Orr (657 pages, 7-1/2" x 10", hardbound; \$24.95 plus \$2.50 shipping from Howard W. Sams & Co., 4300 W. 62nd St., Dept MT, Indianapolis, IN 46268)

When we saw the name Orr coupled with Sams we knew that this respected author and technical publishing team would have a respectable book. Bill Orr, W6SAI, has earned a reputation for technical expertise, especially in the field of amateur radio.

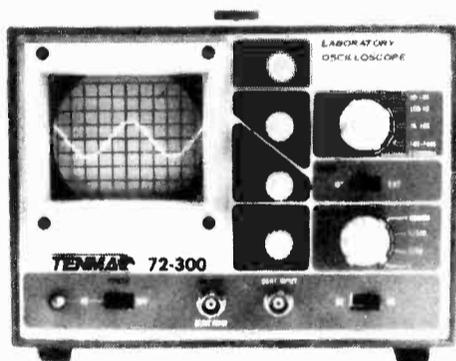
This 23rd edition of his *Radio Handbook* is liberally illustrated and written in an informative style that makes complex topics easy to follow.

It is tempting to compare Orr's work with the annual *ARRL Radio Amateurs Handbook*; perhaps it would be fair to say that while the ARRL book is quite theoretical, the Orr handbook is more tutorial with practical projects, written in a slightly more conversational style.

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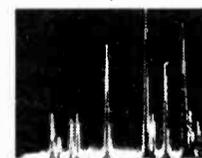
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Photo #2 shows a group of frequencies between 152 & 153 Mhz and photo #3 shows the expanded view of this same group!

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## WHAT'S NEW cont'd from p.43

Although the pitch is obviously to the licensed amateur with its considerable coverage of transmitters and power amplifiers, there is much to offer listeners as well. Pages abound with discussions on antennas, transmission lines, interference reduction, receiver design, preamplifiers, filters, test equipment, and power supplies.

Unusual communications techniques like moonbounce, satellite relays, slow-scan TV, and packet radio are introduced without dwelling on extensive theory.

For the inquisitive radio hobbyist who is not ready for deep theory but wants to know more about what's in the box, Bill Orr's *Radio Handbook* will provide good reading.

### Guide to Facsimile Stations

Seventh edition by Jorg Klingenfuss (252 pages, 6-1/2" x 9-1/2", paperbound; cost DM 35 including air mail delivery from Klingenfuss Publications, Hagenloher Str. 14, D-7400 Tuebingen, FRG)

Jorg Klingenfuss has earned international respect for his painstaking efforts to insure accuracy and currency of his frequency records. His latest facsimile book (May 1987) is packed with such information.

The reference book is handily classified into a number of cross-referenced topics: frequencies, call signs, schedules, addresses, satellites, APT predicts, formats, regulations, and charts. Separate appendices include abbreviations, equipment and techniques for reception.

Unlike previous limited-distribution handbooks on FAX, this one lists worldwide manufacturers of affordable FAX equipment along with associated ads.

### So You Bought a Shortwave Radio!

by Gerry L. Dexter (74 pages, 8-1/2" x 5", paperbound; \$6.95 from Tiare Publications, PO Box 493, Dept MT, Lake Geneva, WI 53147)

Described as "a get-acquainted guide to the wide world of shortwave", this little handbook is intended to provide the newcomer some orientation as to just what to expect from his hobby, where to tune for various services and publications available for his further education.

Punctuated with cute cartoons, the style is distinctly informal. Discussions include antennas, controls and their functions, international and clandestine broadcasters, utilities, and non-voice modes.



## Sneak Preview

June is the month for the summer Consumer Electronics Show (CES) in Chicago. Several new products will be displayed by leading scanner manufacturers.

Uniden will be showing two new programmables: The BC-580XLT will tune major bands between 29 and 570 MHz, including aircraft, storing them in five banks of 100 channels total: a handheld BC-200XLT will include the 800 MHz band, aircraft reception, and sport 200 memory channels in 10 banks.

Rumor has it that ICOM's R7000 will be facing serious competition from a lower cost, VHF/UHF, general coverage receiver to be

offered by another off-shore manufacturer.

Look for a new hand-held programmable with 800 MHz coverage small enough to be tucked in a shirt pocket! This little gem, also imported, is being custom manufactured for a domestic company.

## Regency Turbo-Scan

Last month *Monitoring Times* reported the imminent release of a new series of rapid scan/search programmable scanners from Regency Electronics. We took a close look at the top-of-the-line TS-2. This month we look at the lower cost TS-1.

Scanning its 35 memory channels at a rapid 50 channels per second, the TS-1 includes an instant weather button and covers the following frequency ranges (MHz): 29-54 FM, 118-136 AM, 136-175 FM, and 406-512 FM.

The translucent rubber keypad is

backlit for night viewing and a vacuum fluorescent display calls out frequency and status information. Priority, delay, and direct channel access are additional key features.

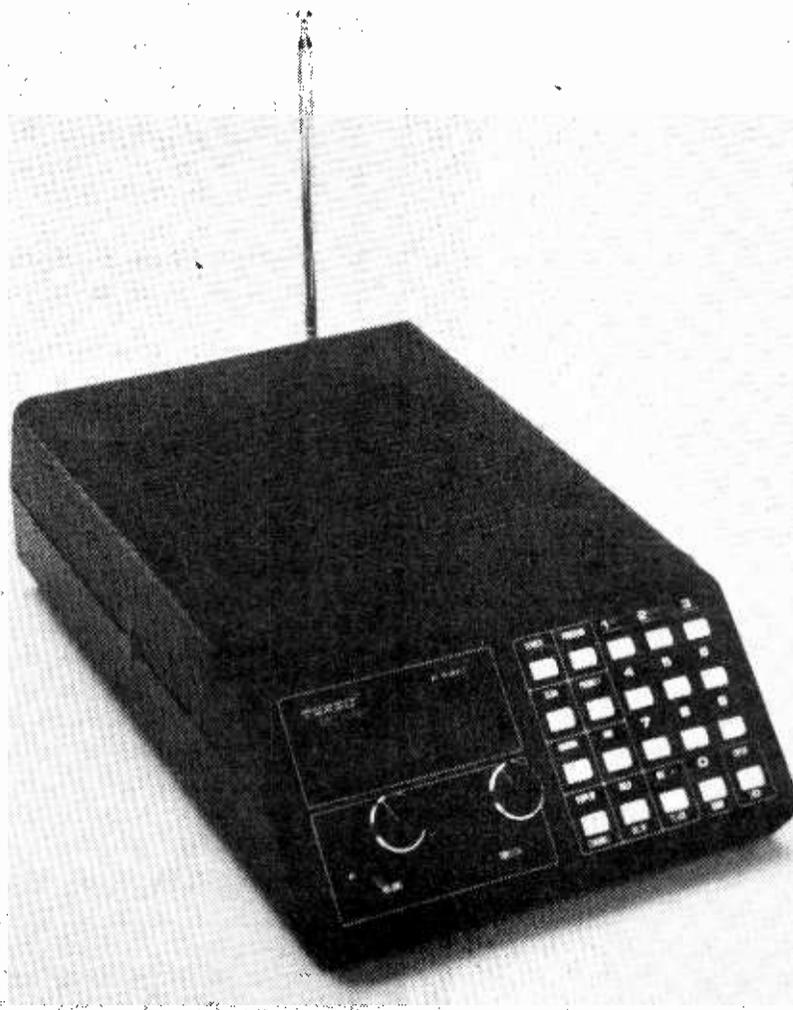
Equipped with AC power supply, DC mobile cord, telescoping whip, and mobile mounting bracket, the TS-1 is listed at \$359.95 (but available at a discount from *MT* advertisers).

## Regency Mobile Scanner Antenna

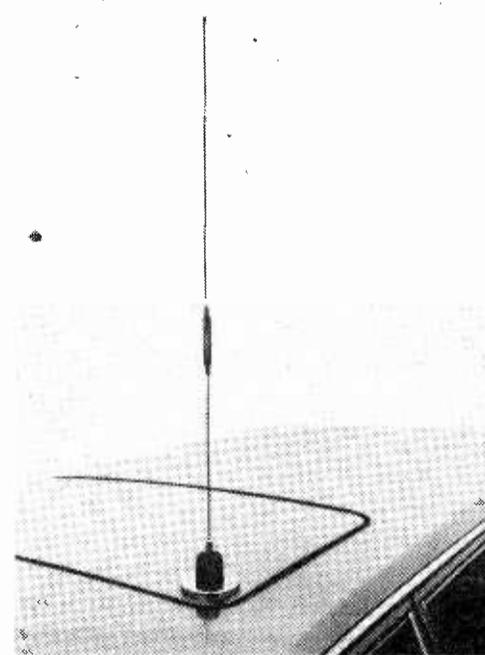
Timed for release with the new mobile "Informant" scanner, Regency's MA-547 low/high/uHF magnetic mount antenna is also available with a mirror mount for cars, trucks, RVs, and vans.

Under 30 inches in height, the MA-547 (and MA-548 mirror mount version) carry a suggested retail price of \$49.95.

Speaking of the Informant, that scanner was initially available only at truck stops! Regency has told us that as of this writing, however, the INF-1 is now available through normal distribution. There is no word on a release date for the INF-2.



Regency's new Turbo-Scan scanner can monitor up to 35 channels at a rate of 50 channels per second -- nearly five times faster than any competitive scanner.



The Regency "Informant" MA-547 magnet mount monitor antenna is specially-designed for optimum use with the Regency Informant Public Information Radio.

## Shortwave Antennas

The first thing most people do when they get a television set to pick up ordinary local signals is to hook it up to an outdoor antenna or cable system. But when they get a world band receiver to hear faint stations from continents away, they'll usually make do with the set's tiny built-in antenna!

### Exhaustive Tests for RDI White Paper

This doesn't make a whole lot of sense, so for the past several months we at *Radio Database International* have been testing popular types of outdoor shortwave antennas for a comprehensive *RDI White Paper* that we've issued recently. So let's take a moment to touch on the subject, because what you do with an antenna can make quite a difference in how well stations are received. And the cost is surprisingly low for all that they can do to improve reception.

### What To Expect From An Outdoor Antenna

What is an antenna supposed to do? In this regard, world band radio is really not all that much different from TV. Unless you live in rural Montana or Brasstown, North Carolina, you're not hooking your TV up to an outdoor antenna to get a stronger signal. What you're trying to do, instead, is to get a better signal -- free from ghosts and the like. Well, the same is true with a shortwave antenna. The main task of a good world band radio antenna is to reduce unwanted noises, with increased signal strength being a useful but secondary bonus.

Let's start with the easiest situation. If you have a simple low-cost portable, a really fancy antenna can be too much of a good thing. The radio's cheap circuitry simply can't handle signals that are too strong. Sort of like if you tried putting a 300 horsepower V-8 engine into a Yugo. So, here the solution is easy and inexpensive. Just run a hank of wire -- say ten yards or meters at most -- from your radio to a tree outdoors. This allows the radio to receive signals from the fresh outdoors, where local electrical noises are lowest.

But if you've gone and dropped hundreds of dollars into a high-quality tabletop receiver, a good

outdoor antenna is a "must". We tested a number of types of antennas for this *Radio Database International* project, and our findings are really encouraging. There are some top notch antennas available now that cost well under \$100. There's no more cost-effective way to improve your reception than with one of these excellent devices.

### An Excellent Trap Dipole

To begin with, we tested two popular makes of "trap dipole" antennas -- the "Eavesdropper" and the Mosley SWL-7. These cover most or all of the 13 shortwave broadcasting bands, and here there is a clear winner: the \$64.50 Eavesdropper, manufactured by Antenna Supermarket, Box 563, Palatine, Illinois 60067. By and large, the Eavesdropper provides excellent results within the international broadcasting bands above 5.8 MHz. It's also very well made and has provided trouble-free results for thousands of listeners since it was introduced some seven years back. On the other hand, the Eavesdropper provides only mixed results within the tropical broadcasting bands where the really faint catches lie. On 60 meters, it performs well, but below that results are not inspiring.

The Mosley SWL-7 trap dipole antenna fares less well, even though it costs more...but not because of its performance when new. The problem is that both our SWL-7's have deteriorated physically over time. This physical deterioration has also caused performance to drop.

### Alpha Delta "Sloper" A Superb Performer

We also tested the Alpha Delta "Sloper", which is a different type of antenna that came on the market just a few months back. We certainly didn't expect anything to top the Eavesdropper's performance, but in some respects the Sloper did.

Above 5.8 MHz, the Sloper performs comparably to the Eavesdropper. However, in the tropical bands it does appreciably better than the Eavesdropper. And it's really toughly constructed, too. It's so sturdy, in fact, that it's rated to be used by smaller broadcasting stations to transmit!

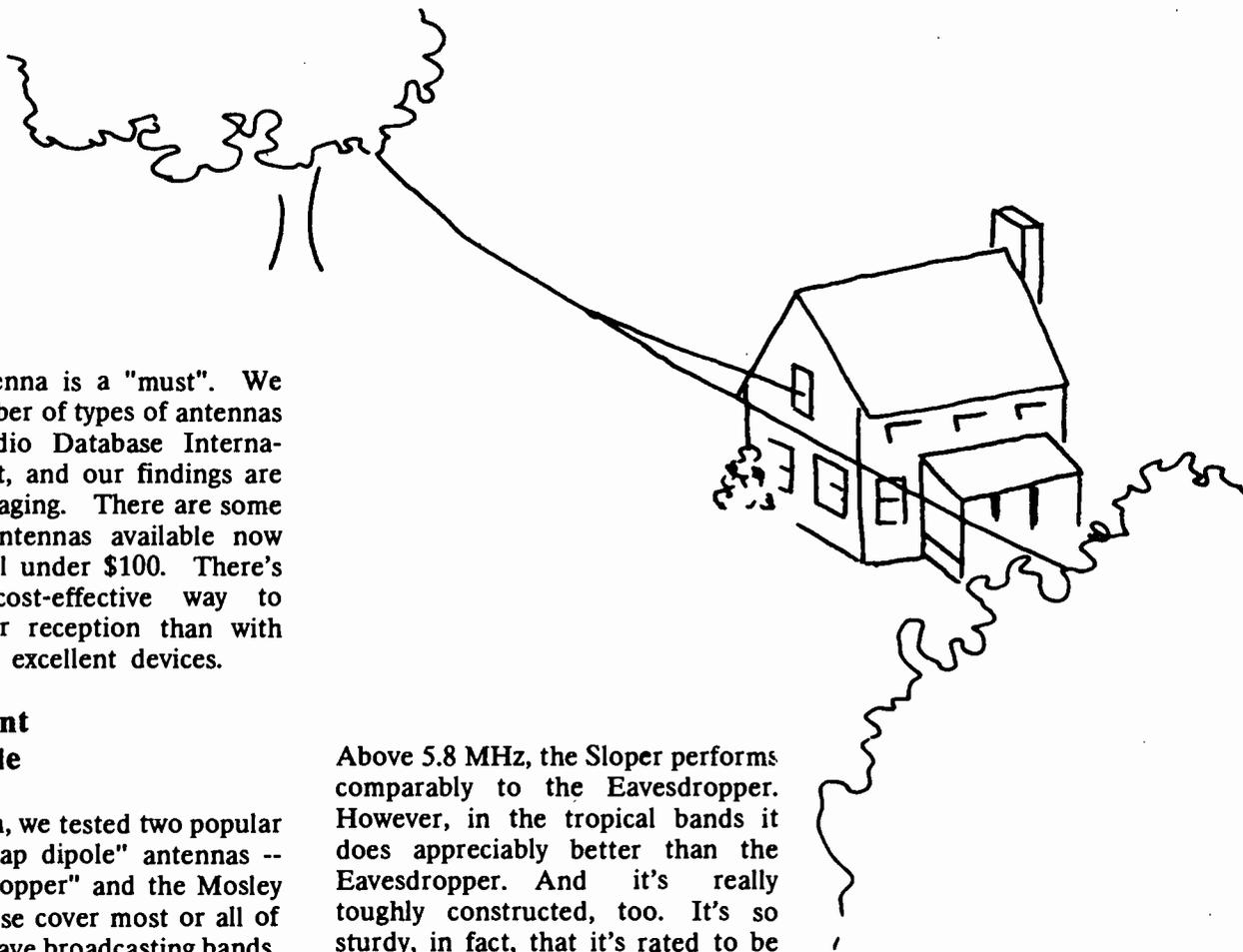
Alpha Delta is located at Box 571, Centerville, Ohio 45459. The Sloper lists at \$69.95. But, unlike the Eavesdropper, you have to purchase the lead-in wire separately. This adds around \$15-20 to the price.

### Best Bet: Eavesdropper and Sloper, Switchable

One of our bottom-line findings is that the two best antennas complement each other quite nicely, with one or the other providing better results depending on the characteristics of the specific signal being received. With both the Sloper and Eavesdropper, plus an antenna switch, we were able to squeeze just about any trace of a signal from a reluctant ionosphere. Another pleasant finding is that we discovered various ways in which antenna performance can be improved simply by innovative mounting.

### Inverted L's: Great For The King Ranch

Finally, we tested various inverted-L antennas. Unsurprisingly, we found that they work best when they're long and mounted as high as possible. But we also found times when shorter ones can be the best choice.



### Erection Secrets for Enhanced Antenna Performance

After several months of testing and constructing all these antennas, the resulting 30-page *RDI White Paper*, with its instructions and charts on what are often little-realized tips concerning construction, maintenance and erection, has become at least as much a "how-to" manual as it is the straightforward ratings guide we originally envisioned. But this was one of the most satisfying tests undertaken during the past ten years. We've always enjoyed good antennas at our monitoring facilities, but now -- Wow!

You can hear Larry Magne's equipment reviews, along with reports from *Radio Database International's* Don Jensen and Tony Jones, the first Saturday night each month over *Radio Canada International's "SWL Digest"* at 8:10 PM Eastern Time on 5960 and 9755 kHz. Larry's "What's New in Equipment" is also featured over "SWL Digest" various other Saturdays throughout the month.

## BUYING YOUR FIRST RECEIVER

by Bob Grove  
WA4PYQ

So you've been "bitten by the bug" as they say? And now you are puzzled as to which radio receiver will best suit you? Certainly, there is a puzzling array of radios on the market and plenty of Madison Avenue blitz to get your attention! The fact of the matter is that cute, cheap portables have only their size going for them--no inexpensive portable is going to measure up when the going gets rough.

The portables are easily overloaded by strong signals and they cannot separate closely-spaced signals on the air. Sound quality is often marginal and their dial settings are often unstable, resulting in drift from their settings. In a nutshell, portable radios are designed for mass-marketing at low cost, and you get what you pay for.

### HOW TO CHOOSE

Once you have made your mind up that you are going to skip the portables and move into a real radio receiver, how do you decide which radio will do the best job for you? Let's start by pointing out that there are two basic listening targets of the SWL (shortwave listener): broadcasting and utilities. Broadcasting refers, of course, to those transmitting organizations whose emissions are designed for everyone to hear. Examples include the voice of America, Radio Moscow, the BBC, and even your local AM, FM, and TV stations. Utilities are everything else--essentially, the two-way communicators of the shortwave spectrum: hams, ships at sea, long-distance aircraft, military units, government agencies, and so forth.

Even a casual glance through a club bulletin or book for radio hobbyists will immediately disclose some user-unfriendly terms like SSB, RTTY, passband tuning, RIT, CW, ECSS, selectivity, noise blanker, attenuation, notch filter, AGC, images, intermodulation, spurious signals... the list goes on. How is it possible, given an apparently endless variety of technical specifications, to make a valid decision as to which radio finally represents the best choice? It isn't easy, but there are some guidelines.

How much should we pay? Yes, that's the bottom line, isn't it? We all want the best radio for the least money; and in this business, as we've said before, you do get what you pay for. Generally speaking, any

*Excerpted from Hands-on Electronics, December 1986 (Copyright Gernsback Publications, 1986) Reprinted with permission.*

shortwave receiver that costs under \$200 is not going to give competitive performance. It may be cute, and it may have great sound, but when the going gets tough, it won't pull the weak ones through. From about \$300 to \$500, there is a substantial improvement in performance; this is the domain of Kenwood, Yaesu, and the better Sony and Panasonic radios. The \$600 to \$1000 range is dominated by three receivers of supremely good quality at this writing; the Icom R-71A, the JRC NRD525 and the Kenwood R-5000. It would be difficult to make a recommendation between these three fine performers without knowing just what the application would be.

Are you really serious about listening or is it a passing fancy? Will you be at home with the major world-broadcasting services or are you looking for more exotic DX? Will your home turf be full-carrier AM (amplitude modulation) as used by the broadcasters or are you interested in listening in on some of the two-way intrigue?

If you are only a casual listener to the shortwave bands, you probably won't need one of the more feature-filled receivers; a simple inexpensive portable might just fill the bill. Choose one that has good audio (sound), decent weak-signal sensitivity, and reasonable selectivity to avoid adjacent signal interference. Plan on settling for the big guns of the shortwave spectrum like the VOA, BBC, Radio Moscow, and so on.

If you are more serious about all that, then pay more attention to the specifications and stay with name-brand receivers. Sensitivity should be 1 microvolt or better; the receiver should have a selectivity switch for battling interference on the crowded shortwave spectrum.

For AM reception, selectivity of around 6 kHz will provide excellent clear-channel crispness, while sharper selectivity (3-4 kHz) will help stave off the brutal interference...but at a reduction in fidelity.

For SSB, CW, RTTY, and ECSS reception modes, you need even sharper selectivity--typically 2-3 kHz for SSB and ECSS, and 0.25-0.5 kHz for CW.

Spurious-signal suppression should be as great as possible, typically stated at 50-60 dB (decibels) in the specifications. Consult the accompanying glossary for other considerations.

Generally speaking, if the manufacturer is willing to publish the detailed specifications of his radio, it is probably a pretty-good radio. Compare stated specs among competitors and find the best price for the best specs.

### TURN ON THE RECEIVER-- THEN WHAT?

Click--the receiver comes alive. Status lights glow, the S-meter wavers slightly and, as the volume control is advanced, a hiss emerges from the speaker. An appropriate antenna has been connected. "Now what?" you ask. The operating manual is usually pretty good about telling you what your initial control setup should be:

- RF gain control full clockwise.
- Audio gain (volume) control at a comfortable listening level.
- Bandswitch set to the frequency range of interest.
- Model on AM (broadcasting) or USB (for voice communications).
- ANL (automatic noise limiter or noise blanker) off unless severe electrical noise is present.
- Attenuator off.
- AGC fast (for AM) or slow (for SSB or CW).
- Filter (selectivity) wide (unless the band is unusually crowded).
- Passband tuning and notch filter off.

### AM RECEPTION

Now, start tuning! Naturally, AM broadcast signals will be the easiest to find: Simply watch the S-meter for greatest deflection as you tune into the signal. If adjacent-channel interference is present, try using the passband tuning or notch filter to remove the irritating signal. If that doesn't work, switch to the next narrower selectivity filter. If the interference is still present, repeat the passband tuning/notch filter "tweaking" for reduction of the unwanted intruder. Some additional juggling of the main tuning dial may be necessary to optimize the interaction of all controls.

### SSB RECEPTION

Single sideband is a little more difficult to tune in initially, but with slight practice, it will become as automatic as tuning AM. First, a rule of thumb: Outside the amateur bands, virtually all SSB heard in the shortwave spectrum will be upper sideband (USB). That includes ship-to-shore, aircraft, government, commercial, and military. Hams use USB above 10 MHz, LSB below. If



your receiver is equipped with a control that allows choice of upper or lower sidebands, simply select the appropriate mode and slowly turn the main tuning dial for the most natural voice. If you have only an SSB switch, you will need to adjust the main tuning dial first in the AM mode, watching the S-meter for the strongest deflection of the muffled SSB signal, then switch on the SSB mode and slowly tune the BFO (beat frequency oscillator) control for a natural voice sound. Interference may be reduced in the SSB mode similar to the procedure used above for AM interference, using the passband tuning and notch filter along with switching to a narrower selectivity filter.

### CW RECEPTION

Morse-code reception is performed identically as with SSB, only an even narrower selectivity may be used, since only one tone frequency need be passed by the filters, thus reducing background noise as well.

### THE RIGHT STUFF

Are you interested only in international broadcasting stations with their voice and music programs? Is your quarry two-way intrigue utilizing single sideband, radioteletype (RTTY) or CW (continuous wave or Morse code)? Those different modes require different receiver adjustments, and not all receivers adequately handle all modes. A while back we listed quite a number of perplexing terms which are likely to be seen while perusing the specifications of a new receiver. Let's take a brief look at what they mean.

#### Selectivity--

We are interested in receiving only one signal at a time. The ability of a receiver to slice a piece out of the spectrum just wide enough to detect that one signal is a measure of its selectivity.

#### Sensitivity--

Weak signals have enough trouble getting through the background of atmo-

spheric static and man-made electrical interference. But the circuitry of radios also adds noise of its own. Low-noise circuits must be designed to allow the weakest signal to stand out above the noise. That is sensitivity.

#### Stability--

A radio signal occupies a very small space in the electromagnetic spectrum. In order for it to be heard, the receiver must be able to remain right on frequency, unaltered by a jarring of the cabinet or changes in temperature.

#### Images and Intermodulation--

Modern superheterodyne (there's another one of those words!) receivers--and they all are superhets--create additional unwanted spurious signals as a result of their design. The ability of a receiver to suppress those unwanted products of signal processing is a measure of its quality.

#### AGC--

Automatic gain control is a method that a receiver uses to decrease its amplification of a received signal when that signal proves to be of such a high intensity that it could cause overloading problems (like intermod and images). AGC used to be called AVC (automatic volume control).

#### Passband Tuning--

It is possible to electronically manipulate a signal in the receiver to "move it" away from a nearby interfering signal via that control. PBT is an excellent feature and often an indicator of quality design.

#### Attenuation--

As a guard against the inrush of excessively strong signals, some receivers allow manual front-panel selection of a resistor "pad," a small network of components which lower the strengths of all incoming signals. In low-cost receivers, the attenuator camouflages the inability of the receiver to handle a wide range of signal strengths, a characteristic called dynamic range.

#### Noise Blanker--

Early-on in radio, it became apparent that if the listener's ears were to be salvaged during high static levels, as during a nearby thunderstorm, some means of quieting those deafening cracks had to be devised. Automatic noise limiters (ANL's) which would "clip" high static levels were developed, but those inevitably led to distortion of desired audio signals.

More recently, circuits have been developed which detect the incoming burst of noise and shut down the receiver during the period of the annoying noise pulse.

#### RIT--

Modern general-coverage receivers usually rely on frequency synthesizers for their tuning circuits, which use crystals for their inherent stability. Those circuits tune in frequency increments rather than continuously, thus resulting in the inability to be perfectly on frequency for some signals. By providing a circuit which allows a slight "pulling" of the crystal frequency, one can tune through that increment. Receiver incremental tuning (RIT), then, is simply a fine-tuning control for a synthesized receiver.

#### Notch Filter--

Many received signals are accompanied by annoying whistles or tones superimposed on them by near-frequency interfering signals. A notch filter is a "razor-sharp" frequency-adjustable filter which may be swept

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- Memory Back-up
- Noise Blanker
- "S" Meter or center meter for FM
- AM, FM Wide, FM Narrow, SSB, CW

Watch for ICOM full page Ads for more details. EEB engineers are developing options for the enhancement of the R7000 performance-computer control video output, filter options and more. Call or Write for details.

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- Keyboard frequency entry
- Dual 24 hour clock timer recorder control
- Optional FRV8800 VHF converter 118-174 MHz \$99
- All mode AM - SSB - CW - FM
- Green LCD display
- 150 kHz to 30 MHz

#### EEB Exclusive Options

- 24 hour bench test and complete realignment for optimum performance including double-extended warranty \$40
- 4 kHz ceramic filter replaces 6 kHz AM Wide ceramic filter Installed \$50
- 2.4 kHz mechanical filter replaces SSB ceramic filter Installed \$95

A premium VHF/UHF scanning communications receiver.

- The 9600 is no typical scanner. And it's easy to see why.
- You won't miss any local action with continuous coverage from 60 to 905 MHz.
- Cable T.V. "Analyser." Check out everything on your cable.
- Satellite T.V. Analyser.
- You have more operating modes to listen in on: upper or lower sideband, CW, AM wide or narrow, and FM wide or narrow.
- You can even watch television programs by plugging in a video monitor into the optional video output. **\$25.00**
- Scan in steps of 5, 10, 12 1/2, 25 and 100 KHz. Store any frequency and related operating mode into any of the 99 memories. Scan the memories. Or in between them. Or simply "dial up" any frequency with the frequency entry pad.
- Plus there's much more, including a 24-hour clock, multiplexed output, LCD readout, signal strength graph, and an AC power adapter.



### ELECTRONIC EQUIPMENT BANK

516 Mill Street, N.E.  
Vienna, VA 22180

Order Toll Free: 800-368-3270

Technical and VA Orders (703) 938-3350

across the signal and left at a setting which suppresses the unwanted tone.

#### ECSS--

Exalted Carrier Selectable Sideband is a technique of tuning in a full-carrier AM signal from a broadcasting station as though it were a single-sideband signal. That procedure eliminates at least half of the signal's bandwidth in the receiver, along with any interference imposed on that half.

For example, if interference is being experienced from a strong signal slightly below the desired station, upper sideband mode would be selected, eliminating the lower sideband and its attendant interference.

#### Frequency Readout--

Years ago, a printed (analog) dial provided approximate frequency readout, often subject to erroneous interpretation by the user, and certainly subject to drift with age. Now, modern electronics has brought digital display, whereby the exact frequency is called out in glowing numerals which change as the tuning dial is moved.

#### Frequency Coverage--

It is common for virtually all general-coverage receivers to tune continuously from 100 kHz through 30 MHz with no gaps. Above 30 MHz, the scanners take over and FM (frequency modulation) dominates as a mode. No FM will be heard below 25 MHz, so the presence of that feature on a short-

wave receiver is of marginal value unless the receiver is intended to be used with a VHF or UHF converter.

#### Memory--

Of great convenience to a listener who likes to target-shoot throughout the spectrum is frequency memory. Depending upon the capacity of the particular radio, anywhere from a few to as many as 200 discrete frequencies (and mode) may be memorized, selected instantly, or even scanned among while looking for activity. Depending upon your listening habits and your budget, that feature is either a luxury or a tremendous convenience. ■

# Morse Code

Just about everyone who listens to shortwave at one time or another gets interested in RTTY. And usually, I recommend several of the readily available interface units that are used with a home computer. If the writer indicates that he does not have a computer I will suggest a stand alone unit. For the last few months, however, more letters are arriving asking "How can I learn Morse code?"

Chances are that this interest has something to do with the expanded Novice amateur radio privileges the FCC granted in March of 1987. Granting radio telephone and digital techniques privileges to novices has encouraged hundreds of radio enthusiasts all over the country to begin studying for a license.

## I Hate Morse Code

But wait. I *hate* Morse code! As long as I have been involved in amateur radio the most consistent complaint has been the requirement for learning Morse code. As in all my years, I have never met anyone who *wanted* to learn Morse! It has been a necessary evil that had to be conquered so the individual could get on with the important things he or she wanted to do in amateur radio.

Recalling my own dismay when I learned of the code requirement for an amateur license I can well sympathize with newcomers. Considering the advances in radio techniques that have been made in the last twenty years it seems truly odd -- even cruel -- that something as old as Morse code is still required for an amateur license. Unfortunately, that does not change the fact: the FCC does require the ability to receive Morse at the rate of five words per minute (WPM) before they will issue an amateur license to you.

## Teacher Sez

When you learned to read and write the teacher wrote a letter on the black board and said this is the letter A. Had teacher said this is the letter didah and wrote A, to this day whenever you saw the character A you would say didah. That is all Morse is, a different way of saying the alphabet and numbers. As you learn Morse, try to get into the habit of *not* repeating the phonic sound you learned in

school. Simply say didah, dahdidit and so forth.

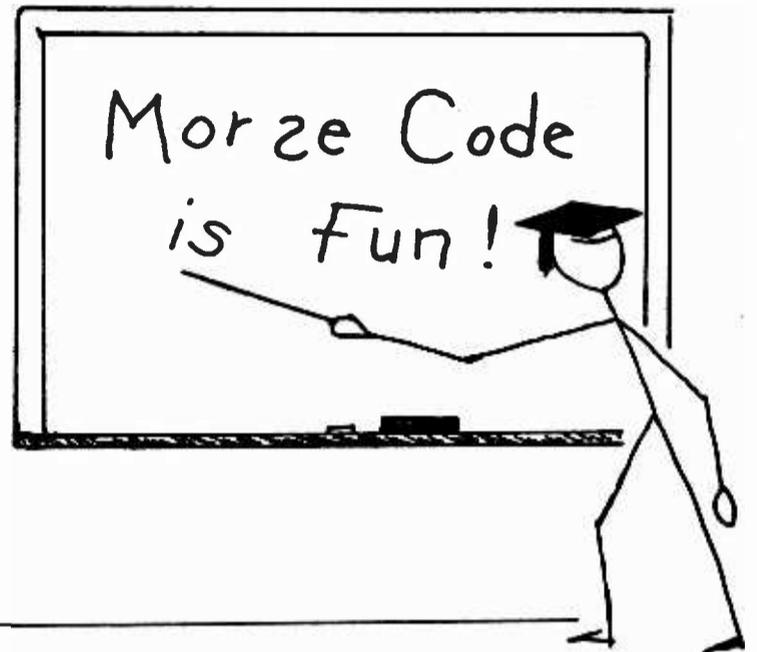
Each character of Morse code has a distinct individual sound. It is not made up of longs and shorts or dots and dashes! There are three phonic sounds to Morse code they are dah, di and dit; individual letters are formed by putting these phonic sounds together.

The important thing for you to learn is how to string these sounds together to make a letter or number. The easiest way to show you what the sounds should be like is by example; consider the letter E -- its sound is dit. Now look at the letter T -- its sound is dah. The letter A is didah not dit dah. If you heard dit dah on your radio it would represent the letters ET. Whenever a dit is used in the body of a character it becomes the sound di, if the dit is at the end of the character it is then dit, for example the character S is dididit and the character C is dahdidahdit. It is very important to remember this rule so your characters will have the correct rhythm.

## Finding an Instructor

Check around your area and see if you can find someone who knows Morse and is willing to teach you. The ARRL (American Radio Relay League) keeps a list of certified instructors and you can obtain the name of one near you by writing to ARRL, 225 Main Street, Newington, CT 06111. Be sure to include an SASE. It is possible for you to learn the code by yourself, but having an instructor is far better and he will keep you from making mistakes in the early stages.

To learn the sounds initially I suggest you start at the beginning of the alphabet and continue to the end. Don't jump around and learn the simple letters then the difficult ones. There is no such thing as simple or difficult letters. *They are all easy!* Remember you learned the alphabet from A to Z in school and that pattern is firmly implanted in your head; there is no reason to disturb it. Take five or six letters at a time and say them to yourself till you know them forward, backward and sideways, then continue with five or six more till all are firmly in your memory. After you know all the sounds, then have someone send the characters to you with a practice set. Another good



idea is to use a computer with a code program and there are many good ones. I have an excellent code training program for the Apple II. In fact, if you would like a copy, send me a blank diskette and return postage and I'll send a copy of it to you.

After you feel comfortable that you know all the characters it's time to begin copying actual code signals being sent over the air. Tune your receiver to the Novice amateur radio band on 80 meters (3700 to

3750 kHz) and try to copy some of the slower stations you hear. At first it will be difficult and you will miss a lot of letters, but keep on. It takes practice and then more practice. The ARRL broadcasts code practice every day over station W1AW, speed varies from five to thirty-five words per minute. Check *QST* magazine for time and frequency or write to the ARRL.

As you progress you will find Morse operators seem to be sending strange words like es, abt, tmw and

A	didah	1	didahdahdah
B	dahdididit	2	dididahdah
C	dahdidahdit	3	didididah
E	dit	4	dididididah
F	dididahdit	5	dididididit
G	dahdahdit	6	dahdidididit
H	didididit	7	dahdahdididit
I	didit	8	dahdahdahdidit
J	didahdahdah	9	dahdahdahdahdit
K	dahdidah	0	dahdahdahdahdah
L	didahdidit		
M	dahdah	Period (.)	didahdidahdidah
N	dahdit	Question (?)	dididahdididit
O	dahdahdah	Comma (,)	dahdahdididahdah
P	didahdahdit	Fraction Bar (/)	dahdididahdit
Q	dahdahdidah		
R	didahdit	Procedural signals:	
S	dididit	Error	dididididididit
T	dah	Wait	didahdididit
U	dididah	Double Dash	dahdidididah
V	didididah	End of Message	didahdidahdit
W	didahdah		
X	dahdididah		
Y	dahdidahdah		
Z	dahdahdidit		

many more you will not understand. These strange words are abbreviations that code operators use to make communications faster. To understand what they mean get a copy of the *ARRL Handbook* or the ARRL book *How to Operate an Amateur Radio Station*. Both books have a complete list of code abbreviations.

### A Change of Heart

It was August of 1955 when I passed the 13 WPM code test to qualify for a General class amateur license. No longer would I be confined to struggling along with Morse on the hated Novice bands. My first act after leaving the FCC office was to head for Arch street in Philly to buy some 75 meter phone band crystals for my rig. Arriving home I quickly plugged one into my 50 watt home brew transmitter and proceeded to call CQ 75 (looking for a contact). But contacts were few and far between. This was not as I had imagined it at all! With heavy heart I returned to Morse where the little rig made contact after contact. That same 50 watt rig, now operating on the General class bands now allowed me to talk to other amateurs half way around the earth with ease. I started thinking that maybe Morse was not too bad after all.

After about a year of operating Morse I found my code copying speed had increased to about 20 WPM. Now my contacts were fun, it was no longer work. I was able to copy in my head without using a pencil. Morse was, I concluded, one of the finest communication tools that man has ever developed! Using it, I've talked to folks from all walks of life, from kings to school children and everything between.

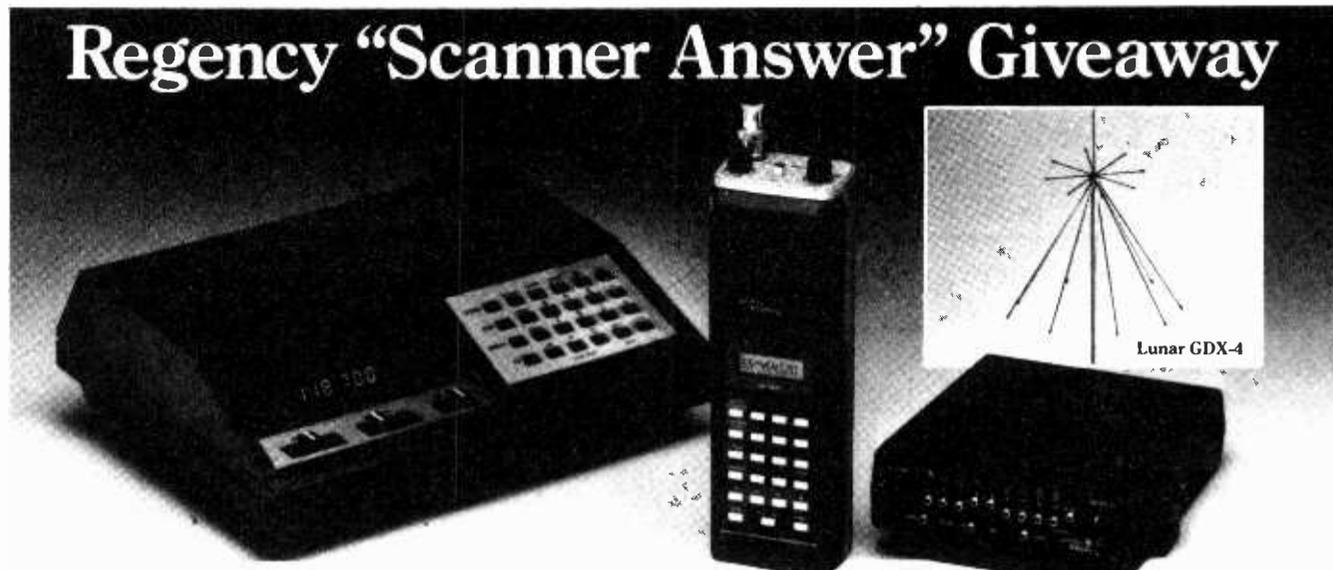
### Learning The Code

Now I teach Morse code and will even venture to say that Morse is easy.

Most of us object to learning Morse code, feeling it's like learning a new language. Not true! Not even close! Morse code consists of just twenty-six letters of the alphabet, ten numbers and four punctuation characters. It is just another way of saying the alphabet. And it's possible for the average person to

learn Morse at five words per minute in just a few hours. It *does* require desire, effort and persistence..

So you see, Morse code is not some antiquated thing of the past. It's not even a chore. What it is, my friends, is fun. ■



Here's your chance to win a complete monitoring package from Regency Electronics and Lunar Antennas. 18 scanners in all will be awarded, including a grand prize of the set-up you see above: the Regency HX1500 handheld, the Z60 base station scanner, the R806 mobile unit, and a Lunar GDX-4 Broadband monitoring/reference antenna.

### 55 Channels to go!

When you're on the go, and you need to stay tuned into the action, take along the Regency HX1500. It's got 55 channels, 4 independent scan banks, a top mounted auxiliary scan control, liquid crystal display, rugged die-cast aluminum chassis, covers ten public service bands including aircraft, and, it's keyboard programmable.

### Compact Mobile

With today's smaller cars and limited installation space in mind, Regency has developed a new compact mobile scanner, the R806. It's the world's first microprocessor controlled crystal scanner. In addition, the R806 features 8 channels, programmable priority, dual scan speed, and bright LED channel indicators.

### Base Station Plus!

Besides covering all the standard public service bands, the Regency Z60 scanner receives FM broadcast, aircraft transmissions, and has a built-in digital quartz clock with an alarm. Other Z60 features include 60

channels, keyboard programming, priority control, digital display and permanent memory.

### Lunar Antenna

Also included in the grand prize is a broadband monitoring/reference antenna from Lunar Electronics. The GDX-4 covers 25 to 1300 MHz, and includes a 6 foot tower.

**Regency** ELECTRONICS INC.  
7707 Records Street  
Indianapolis, IN 46226

- Grand Prize** (1 awarded)  
1—Regency Z60 Base station scanner  
1—Regency HX1500 Handheld scanner  
1—Regency R806 Mobile scanner  
1—Lunar GDX-4 Antenna

- First Prize** (5 awarded)  
1—Regency Z60 Base station scanner  
1—Regency R806 Mobile scanner

- Second Prize** (5 awarded)  
1—Regency HX1500 scanner

**Contest rules:** Just answer the questions on the coupon. (all answers are in the ad copy) fill in your name and address and send the coupon to Regency Electronics, Inc., 7707 Records Street, Indianapolis, IN 46226. Winners will be selected from all correct entries. One entry per person. No purchase necessary. Void where prohibited by law. Contest ends June 30, 1987.

- The Regency Z60 is  
 a digital alarm clock     an FM radio  
 a scanner     all of the above
  - The Regency R806 is the world's first \_\_\_\_\_ controlled crystal scanner.
  - The Regency HX1500 features  
 55 channels     Bank scanning  
 Liquid crystal display     all of the above
  - The Lunar GDX-4 antenna covers \_\_\_\_\_ to \_\_\_\_\_ MHz.
- Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zipcode: \_\_\_\_\_  
I currently own \_\_\_\_\_ scanners.  
Brands owned: \_\_\_\_\_



Send in a photo (like this one of Mike Nikolich and his Regency monitoring station) and receive a free gift from Regency. Be sure to include your name, address and phone number.

### IS IT THAT TIME AGAIN?

Time to renew sneaks up quickly (like summertime)!  
To avoid missing a single issue,  
use the form on page 61.

We wouldn't want to lose you!

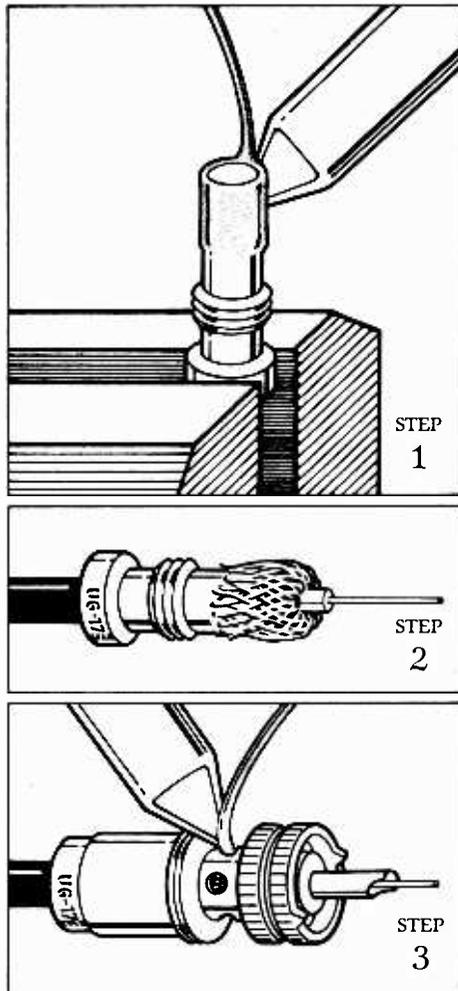
## A Better PL-259 Connection

Here's a way to save time and make a more reliable connection the next time you install a PL-259 connector on RG-58 or RG-59 coax.

Clamp the UG-175/U or UG-176/U adapter in a vise so the end below the threads is exposed. Then with a large soldering iron or torch heat up the adapter and lay a thin layer of solder all around its tip. When it cools, insert the already prepared coax and screw the adapter into the PL-259.

The result? The presoldered portion of the adapter makes it much easier to heat up and solder the shield through the holes in the PL-259.

(Courtesy Larsen Electronics White Plains, NY)



## Use a Converter and Your Scanner at the Same Time

One of the biggest problems with using a converter ahead of a scanner is that the normal frequency ranges of the scanner are disabled while the converter is in line. For example, the scanner can no longer receive normal low, high and UHF bands with an 800 MHz converter hooked up.

MT reader Ron Smith of Birmingham, Alabama, has a solution: a standard TV-type VHF/UHF signal splitter available from Radio Shack and electronic departments of discount chains can combine signals from the converter with normal signals from the outside scanner antenna! Thanks, Ron for this excellent suggestion. The simple technique is shown below.

## Long Play Tape Recorders

We occasionally receive inquiries from both institutional and hobby radio interests inquiring as to the availability of extended play tape recorders for logging communications over considerable numbers of hours.

Commercial and military users employ special (thus, high cost) recording instruments made specifically for that purpose, but where does the user with limited resources come up with a suitable recording instrument?

It is possible to purchase a conventional cassette recorder and slow the transport mechanism down by reducing the voltage, changing pulley diameters, reducing the capstan diameter, or replacing the motor, but it may be easier in the long run to purchase a tape recorder which has already had the conversion done.

Many modern scanner and shortwave receivers are equipped with accessory jacks which will switch on the tape recorder when a signal is present as well as properly present a low level, medium impedance audio line to the recorder.

Modified Panasonic cassette recorders are available from AMC Sales, Inc., 9335 Lubec St., Box 928, Downey, CA 90421 (ph. 213-869-8519). Prices are \$95 and \$159 (plus \$4 shipping) each for 10 hour and 14 hour recorders (5 or 7 hours per side of a conventional TDK DC 180 cassette, supplied).

## More on the PRO-2004

The ability to restore cellular telephone coverage to the popular Realistic PRO-2004 scanner has met eager acceptance in the consumer marketplace. Grove Enterprises has had difficulty in locating enough scanners around the country to satisfy demand.

One additional hint after diode D513 is clipped: press the RESET button to prepare the microprocessor for its new range.

So far none of our PRO-2004 owners has discovered a way to increase frequency coverage any further, including the 66-88 MHz range used in the European market.

Rumors still persist that Radio Shack intends to replace the microprocessor with one which cannot receive the cellular frequencies but, at this writing, such a replacement radio has not yet appeared.

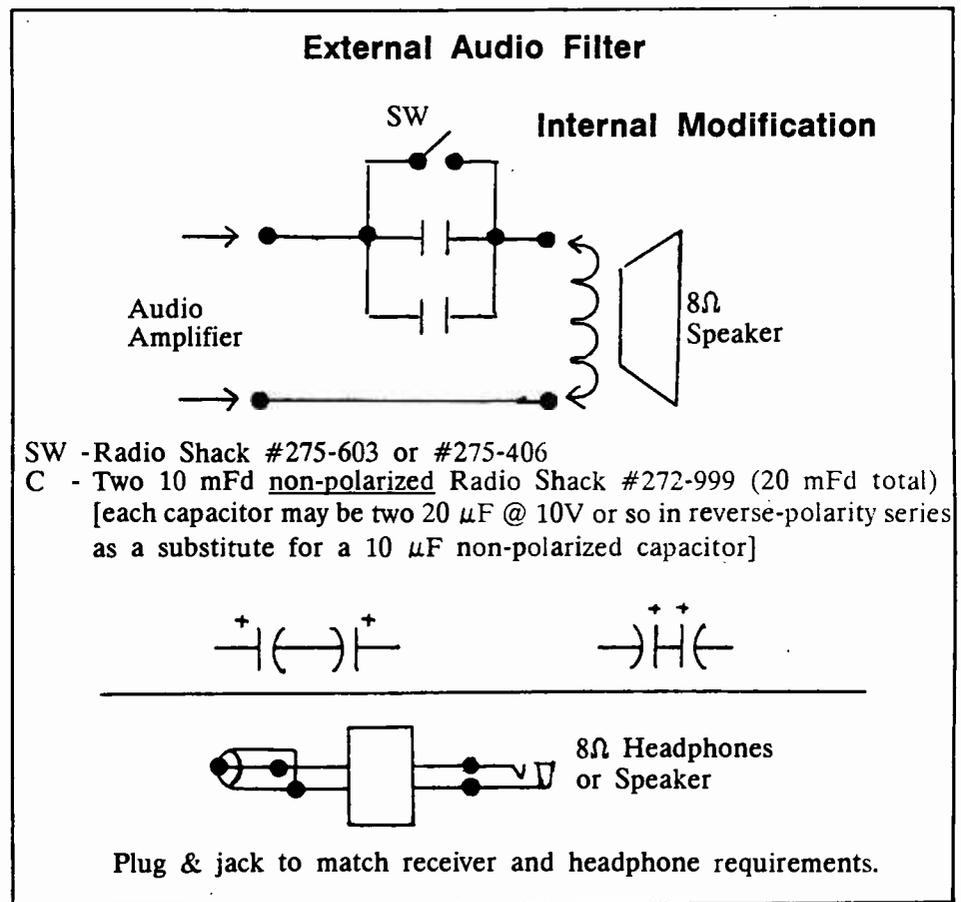
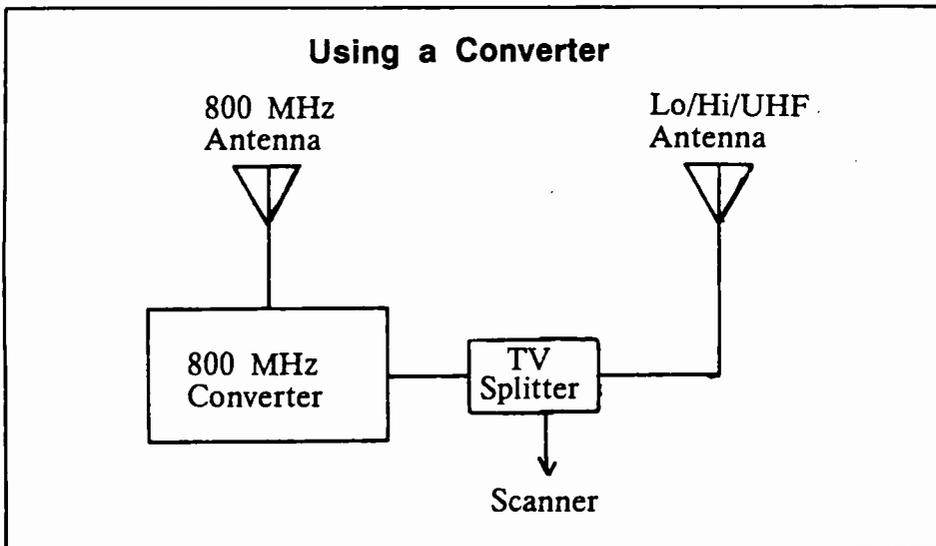
## Add an External Audio Filter

Most of the audio below about 400 Hz contributes nothing at all to the intelligibility of speech. This hi-pass device really clears out the "junk." It can be used with either headphones or a speaker. The capacitor value shown is critical for 8 ohms.

The capacitors and switch can be mounted in a mini-box such as Radio Shack #270-230, requiring no modification of the receiver.

A slight increase in gain setting is required, raising the sibilant range of the audio (the "crispness" of speech).

(Luther Crumbaugh, Prescott, AZ)



## Shipping FRG9600 for Mod Hits Snag

R. Withers Communications (584 Hagley Road West Oldbury, Warley, Birmingham, England B68 0BS) advertises a frequency extension modification for the popular Yaesu FRG9600 scanning VHF/UHF receiver ("100 kHz to 950 MHz in one box"). MT reader Jorge Rodriguez, Southeast Public Safety Editor for RCMA (Radio Communications Monitoring Association), reports a serious problem in attempting to ship his radio to England for the modification.

Federal Express informed him that a radio receiver is a "restricted commodity" which cannot be shipped from the U.S. to England. The British Embassy in Washington, DC, referred Jorge to the British Information Center in New York City who, in turn, referred him to British Customs at London's Heathrow Airport.

Jorge is additionally concerned that there will be import duties both ways if he doesn't get prior approval. All this in addition to the estimated \$150 modification and round-trip shipping! FRG9600 owners considering the modification had better do some homework first.

## Weather Radios Abound

Whether you are looking for an inexpensive portable or a professional rack-mount receiver, NOAA weather broadcast radios are readily available in the marketplace as described in a recent *New York Times* article.

Some of the receivers are equipped to sound an alarm when purposely activated by the NOAA transmitting station in order to alert listeners to impending hazardous conditions. The following list outlines some of the available receivers.

Several Radio Shack models are available at retail outlets around the world, or a catalog may be ordered from their corporate headquarters (2617 West Seventh St., Ft. Worth, TX 76107).

General Electric portable model information is provided by calling toll-free 800-626-2000.

The Uniden (Bearcat) Weather Alert has been a staple for several years; write to them at 6345 Castleway

# NEW! Turbo Scan™ Scanners

Communications Electronics™, the world's largest distributor of radio scanners, introduces new lower prices to celebrate our 16th anniversary.

## NEW! Regency® TS2-MA

Allow 30-120 days for delivery after receipt of order due to the high demand for this product. List price \$499.95/CE price \$319.95  
**12-Band, 75 Channel • Crystalless • AC/DC**  
 Frequency range: 29-54, 118-174, 406-512, 806-950 MHz. The Regency TS2 scanner lets you monitor Military, Space Satellites, Government, Railroad, Justice Department, State Department, Fish & Game, Immigration, Marine, Police and Fire Departments, Aeronautical AM band, Paramedics, Amateur Radio, plus thousands of other radio frequencies most scanners can't pick up. The Regency TS2 features new 40 channel per second Turbo Scan™ so you won't miss any of the action. Model TS1-MA is a 35 channel version of this radio without the 800 MHz. band and costs only \$239.95.

## Regency® Z60-MA

List price \$299.95/CE price \$184.95/SPECIAL  
**8-Band, 60 Channel • No-crystal scanner**  
 Bands: 30-50, 88-108, 118-136, 144-174, 440-512 MHz. The Regency Z60 covers all the public service bands plus aircraft and FM music for a total of eight bands. The Z60 also features an alarm clock and priority control as well as AC/DC operation. Order today.

## Regency® Z45-MA

List price \$259.95/CE price \$159.95/SPECIAL  
**7-Band, 45 Channel • No-crystal scanner**  
 Bands: 30-50, 118-136, 144-174, 440-512 MHz. The Regency Z45 is very similar to the Z60 model listed above however it does not have the commercial FM broadcast band. The Z45, now at a special price from Communications Electronics.

## Regency® RH250B-MA

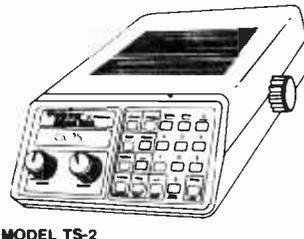
List price \$699.95/CE price \$329.95/SPECIAL  
**10 Channel • 25 Watt Transceiver • Priority**  
 The Regency RH250B is a ten-channel VHF land mobile transceiver designed to cover any frequency between 150 to 162 MHz. Since this radio is synthesized, no expensive crystals are needed to store up to ten frequencies without battery backup. All radios come with CTCSS tone and scanning capabilities. A monitor and night/day switch is also standard. This transceiver even has a priority function. The RH250 makes an ideal radio for any police or fire department volunteer because of its low cost and high performance. A 60 Watt VHF 150-162 MHz. version called the RH600B-MA is available for \$439.95. A UHF 15 watt version of this radio called the RU150B-MA is also available and covers 450-482 MHz. but the cost is \$439.95.

## Bearcat® 50XL-MA

List price \$199.95/CE price \$114.95/SPECIAL  
**10-Band, 10 Channel • Handheld scanner**  
 Bands: 29.7-54, 136-174, 406-512 MHz. The Uniden Bearcat 50XL is an economical, handheld scanner with 10 channels covering ten frequency bands. It features a keyboard lock switch to prevent accidental entry and more. Also order the new double-long life rechargeable battery pack part # BP55 for \$29.95, a plug-in wall charger, part # AD100 for \$14.95, a carrying case part # VC001 for \$14.95 and also order optional cigarette lighter cable part # PS001 for \$14.95.



Regency RH250



MODEL TS-2



MODEL HX 1500

Court, Indianapolis, IN 46250 or call toll-free 800-722-6637.

The Electrolert WeatherAlert Forecaster (\$35) and Storm Alarm (\$55) may be purchased from the company direct at 4949 South 25A, Tipp City, OH 45371 (phone 513-667-2461).

Springfield Instrument's Talking Weather Center (\$55) includes a

## NEW! Scanner Frequency Listings

The new Fox scanner frequency directories will help you find all the action your scanner can listen to. These new listings include police, fire, ambulances & rescue squads, local government, private police agencies, hospitals, emergency medical channels, news media, forestry radio service, railroads, weather stations, radio common carriers, AT&T mobile telephone, utility companies, general mobile radio service, marine radio service, taxi cab companies, tow truck companies, trucking companies, business repeaters, business radio (simplex) federal government, funeral directors, veterinarians, buses, aircraft, space satellites, amateur radio, broadcasters and more. Fox frequency listings feature call letter cross reference as well as alphabetical listing by licensee name, police codes and signals. These Fox directories are \$14.95 each plus \$3.00 shipping. State of Alaska-RL019-1; State of Arizona-RL025-1; Buffalo, NY-PA-RL009-2; Chicago, IL-RL014-1; Cincinnati/Dayton, OH-RL006-2; Cleveland, OH-RL017-1; Columbus, OH-RL003-2; Dallas/Ft. Worth, TX-RL013-1; Denver/Colorado Springs, CO-RL027-1; Detroit, MI/Windsor, ON-RL008-2; Fort Wayne, IN/Lima, OH-RL001-1; Hawaii/Guam-RL015-1; Indianapolis, IN-RL022-1; Kansas City, MO/KS-RL011-2; Long Island, NY-RL026-1; Louisville/Lexington, KY-RL007-1; Milwaukee, WI/Waukegan, IL-RL021-1; Minneapolis/St. Paul, MN-RL010-2; Nevada/E. Central CA-RL028-1; Oklahoma City/Lawton, OK-RL005-2; Orlando/Daytona Beach, FL-RL012-1; Rochester/Syracuse, NY-RL020-1; San Diego, CA-RL018-1; Tampa/St. Petersburg, FL-RL004-2; Toledo, OH-RL002-3. Regional directories which cover police, fire ambulance & rescue squads, local government, forestry, marine radio, mobile phone, aircraft and NOAA weather are available for \$19.95 each. RD001-1 covers AL, AR, FL, GA, LA, MS, NC, PR, SC, TN & VA. RD002-1 covers IL, IN, KY, MI, OH & WI. For an area not shown above call Fox at 800-543-7892 or in Ohio 800-621-2513.

## Regency® HX1500-MA

List price \$369.95/CE price \$218.95  
**11-Band, 55 Channel • Handheld/Portable**  
**Search • Lockout • Priority • Bank Select**  
**Sidelit liquid crystal display • EAROM Memory**  
**Direct Channel Access Feature • Scan delay**  
 Bands: 29-54, 118-136, 144-174, 406-420, 440-512 MHz. The new handheld Regency HX1500 scanner is fully keyboard programmable for the ultimate in versatility. You can scan up to 55 channels at the same time including the AM aircraft band. The LCD display is even sidelit for night use. Includes belt clip, flexible antenna and earphone. Operates on 8 1.2 Volt rechargeable Ni-cad batteries (not included). Be sure to order batteries and battery charger from the accessory list in this ad.

## Bearcat® 100XL-MA

List price \$349.95/CE price \$178.95/SPECIAL  
**9-Band, 16 Channel • Priority • Scan Delay**  
**Search • Limit • Hold • Lockout • AC/DC**  
 Frequency range: 30-50, 118-174, 406-512 MHz. Included in our low CE price is a sturdy carrying case, earphone, battery charger/AC adapter, six AA Ni-cad batteries and flexible antenna. Order your scanner now.

## ★★★ SPECIAL SAVINGS COUPON ★★★

★★★ FREE DURACELL® Batteries Included ★★★  
 ★★★★★ Free local frequency directories ★★★★★  
 Save even more with this special coupon. As long as your order is prepaid by money order, you'll get extra special pricing on items listed in this coupon. In addition, if you order a Bearcat 50XL or Regency HX1500 scanner with this coupon, you'll get a free set of Duracell batteries which we recommend for best performance. If you buy a Regency Z60 or Z45 scanner using this coupon, you'll get a free Fox frequency directory worth \$14.95. This coupon must be included with your prepaid order. Credit cards and quantity discounts are excluded from this offer. Offer valid only on prepaid orders mailed directly to Communications Electronics Inc., P.O. Box 1045 - Dept. M3, Ann Arbor, Michigan 48106-1045 U.S.A. Coupon expires July 31, 1987. Coupon may not be used in conjunction with any other offer from Communications Electronics Inc. Be sure to add shipping & handling fees listed in this ad (add \$3.00 for shipping free books or batteries).

- RH250B-M3 Regency 25 W. VHF Transceiver..... \$299.95
- RH600B-M3 Regency 60 W. VHF Transceiver..... \$388.95
- RU150B-M3 Regency 15 W. UHF Transceiver..... \$399.95
- UC102-M3 Regency 1 W. VHF 2 channel trans..... \$119.95
- HX1500-M3 Regency 55 channel scanner..... \$217.95
- Z60-M3 Regency 60 channel scanner..... \$158.95
- Z45-M3 Regency 45 channel scanner..... \$148.95
- BC100XL-M3 Bearcat 16 channel scanner..... \$177.95
- BC800XL-M3 Bearcat 40 channel scanner..... \$278.95
- INF1-M3 Regency Informant scanner..... \$249.95
- BC210XW-M3 Bearcat 20 channel scanner..... \$168.95
- BC50XL-M3 Bearcat 10 channel scanner..... \$113.95
- RD55-M3 Uniden Radar Detector..... \$97.95

## ★★★ SPECIAL SAVINGS COUPON ★★★

## Bearcat® 800XLT-MA

List price \$499.95/CE price \$289.95/SPECIAL  
**12-Band, 40 Channel • No-crystal scanner**  
**Priority control • Search/Scan • AC/DC**  
 Bands: 29-54, 118-174, 406-512, 806-912 MHz. The Uniden 800XLT receives 40 channels in two banks. Scans 15 channels per second. Size 9 1/4" x 4 1/2" x 1 1/2."

## OTHER RADIOS AND ACCESSORIES

- Panasonic RF-2600-MA Shortwave receiver..... \$179.95
  - RD55-MA Uniden Visor mount Radar Detector..... \$98.95
  - NEW! BC 70XLT-MA Bearcat 20 channel scanner..... \$169.95
  - BC 145XL-MA Bearcat 16 channel scanner..... \$98.95
  - BC 140-MA Bearcat 10 channel scanner..... \$89.95
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The top-of-the-line Gorman-Redlich receiver is intended for audiophiles and blends in with a rack of stereo gear. At \$475 it is available from James T. Gorman, 257 W. Union St., Athens, OH 45701 (614-593-3150). (Item contributed by Ruth Hesch, White Plains, NY)

# Skywire Evolution -- Down on the Old Antenna Farm

Several issues back, I described antennas which I have had over the years with emphasis on the antennas which I have now in the "antenna farm," here at my home in Vermont. Well, as I told you then, "on a farm we grow things," and we know that things which grow often evolve into other forms.

And so it is with my antenna farm: this article will describe the "evolution" of an antenna which I now use to enable me to access a repeater in Burlington, Vermont, about 35 miles away. And, in the process of describing this "evolution," we will also demonstrate some practical differences between the several different types of antennas which were involved in this evolution.

## Some Background

Shortly after I moved to Vermont, my friend, Shamms, took me to a meeting of the Champlain Valley Commodore Users Group. This computer club is a remarkable organization which provides its members with a variety of useful functions such as informative monthly meetings, special interest group meetings, and even free computer repair donated by technician-members! To make a long story short, I was impressed by the club, so I joined and made a number of friends within that organization.

Some of those friends are hams like myself. I enjoy chatting with them at times, but, as I said, I live quite a distance from Burlington area, where the majority of the group members seem to live. And so, between meetings, I don't get in a lot of visiting with my new friends. But, as luck would have it, there is a ham

radio club (BARC) in the Burlington area, which I also joined, and they have a repeater on two meters. I knew it would be easy to chat with my friends "if" I could assess the repeater from home. That "if" was a big "if", as we will see below, and thereby hangs our tale.

## Early Attempts

It was approximately 35 miles from my home QTH to the repeater site. This is not the kind of distance you normally expect to cover with a handheld, especially over hilly terrain as we have around here. But, since I lived on a hill, with a relatively clear path in the direction of the far-away repeater, I thought, why not give it a shot and try to raise the repeater using my handheld transceiver with its 7-inch rubber duckie antenna? Well, reception of the repeater was fine. I could read the signals of other hams nicely with the rubber duckie. I could even read them fairly well with the four-inch stubby duck antenna. But, on transmit, my handheld just would not make it into the repeater using a duckie antenna.

Oh well, I thought, let me just try my quarter-wavelength whip, that may turn the trick. No such luck! Reception was a bit improved using quarterwave, but the trusty old handheld still was unable to key the repeater.

Not to worry, I am the proud owner of a 5/8 wavelength vertical antenna which snaps right onto the handheld, just like the quarterwave and duckie antennas do. So, snap it I did, and with this antenna in place I was actually able to key the repeater. Now the other operators could tell that I was calling in, but they usually couldn't tell what I was saying.

Facing this disappointment, I had to admit that either I get an amplifier, or some serious antenna work was in order. From my past writing in this column, you know that my interests were in the antenna rather than in increased power.

## Hang 'em High!

All you communications buffs have heard the antenna siter's rule: "The higher the better". It is generally a good rule, and was once again verified as I experimented with the next antenna in my search for a workable two-meter antenna. That next design was a J-antenna. Essentially, as I've described in this column in the past, the J is a half-wavelength radiator with a quarter-wavelength matching section attached to its bottom. The matching section can be fed with coax or with twinlead.

I decided to try a design called the "Hotel-Motel" model. Used indoors at ground-level, it performed about the same as the 5/8 wavelength whip which I had tried earlier: the other operators could tell I was calling, but they couldn't understand what I was saying.

So, the old antenna siting rule was invoked, and the J was lashed to a dry wooden pole (small, dead pine tree) about 20 feet in the air. Hooray! At last, my friend Al could read me -- part of the time. We could hold conversations, but there was a lot of repeating to do before I could get my message across.

## Beam Me Up, Scotty!

After the failure of the elevated J-antenna, it was obvious that a beam

was in order. The two designs which appealed to me most were the collinear coaxial (discussed in my recent 2-part VHF-UHF antenna series), and a three-element version of the well-known Yagi-Uda (see figure 1B). The collinear coaxial would concentrate my signal at the horizon, but in an all-around, or omnidirectional manner. On the other hand, the Yagi-Uda would shape most of my signal into a beam more like a flashlight beam, and get more of it into the repeater antenna in Burlington.

And so, out came the books and the beam shown in figure 2 came into being. Tests from inside the house, at my ground-floor operating position, were encouraging. I was able to work my buddy, Al, through the repeater reasonably well. By the way, at that point I had a fully rotatable beam: I just held the beam in my hand and pointed it wherever I wanted. But, unfortunately, the rotor had a high fatigue factor during this test!

And so, with almost-decent communication established, the old antenna rule, mentioned above, came to mind once more. So, back to the old pinetree mast now, and down with the J, up with the Yagi-Uda. This time, the "rotor" stayed on the ground, and the beam was nailed unceremoniously in place at a point about 15 feet up the mast, pointing directly at the Burlington repeater.

## Sweet Smell of Success

Results were as anticipated. The signals from my handheld were now giving solid copy in Burlington. I still didn't have full-quieting on the repeater, but the signal was decent.

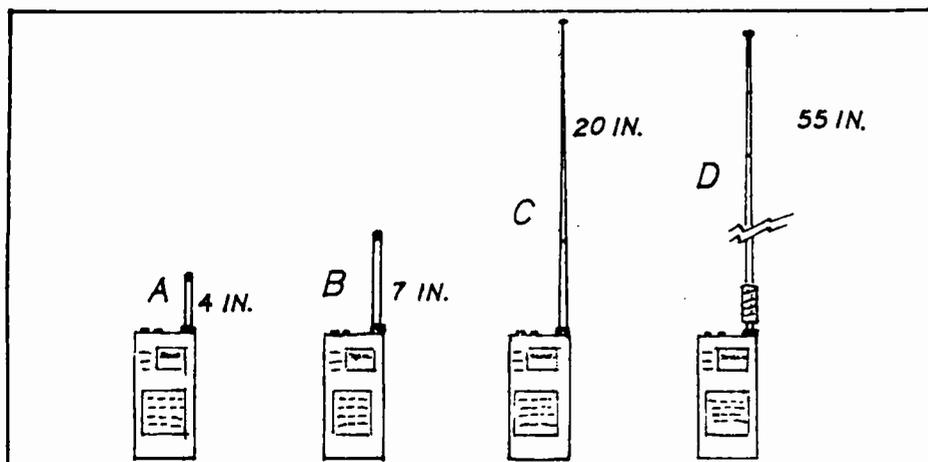


FIG. 1. FOUR ANTENNAS WHICH MOUNT DIRECTLY ON THE HT. A. STUBBY DUCK. B. RUBBER DUCKIE. C. 1/4 WAVE. D. 5/8 WAVE.

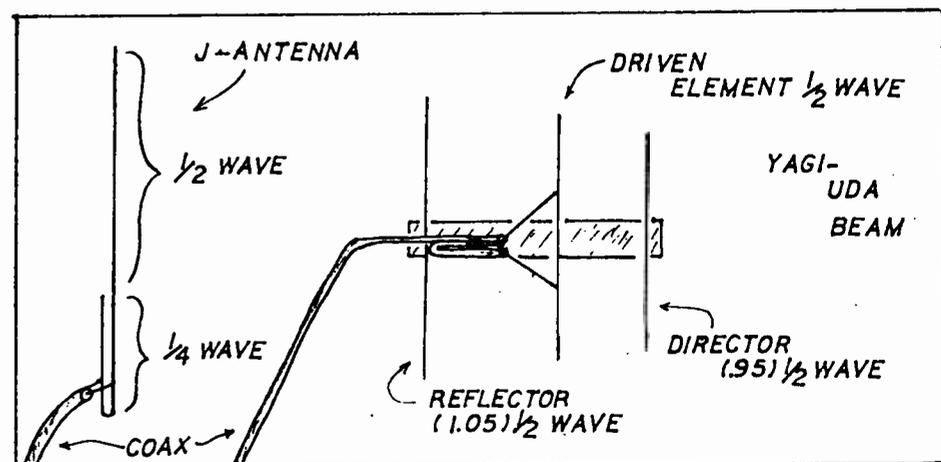


FIG. 2. THE J-ANTENNA AND YAGI-UDA BEAM. BOTH THESE WERE TRIED IN AN ELEVATED POSITION.

So, the long search had led to a pleasant outcome. I could now key the HT and work through the BARC repeater in Burlington. Not a bad feat for a 2.5 watt handheld transceiver over 35 miles of hilly terrain!

With this success making me almost dizzy, I thought I had arrived! But can you believe that two of my friends suggested that perhaps I should shoot for a fully-quieting signal by building some kind of a monster beam! Oh well, some people are never satisfied! But wait, maybe they have a point. Let's see now, what if I put a few more elements on the Yagi-Uda, or just how big must a two-meter corner reflector be? ..... Maybe I should even consider a parabolic-section reflector ... .. Hmmmmm.

### RADIO RIDDLES

**Last Month's Radio Riddle:** With all due apologies to our beloved Heinrich Hertz, last month I asked you what amounted to: "what the heck is a "hertz?" And I promised you an interesting, if not startling, answer. Well, here it is. "Hecto" is a prefix borrowed from the Greek language - it means one hundred. And, "Hertz", as we all know, is the term used by electronic and communications technicians to mean "cycles per second." Just as "kilohertz" means "one thousand cycles per second", "hertz" means "one hundred cycles per second". So, a one kilohertz audio tone would have a frequency of ten hertz, and our 60 Hz powerline current has a frequency of .6 hertz. So, now you know.

**This Month's Riddle:** I recently received a letter from reader, El Charlton, W5MD, asking me if I'd heard of the hydrochloric acid antenna. It seems that the antenna is so-named because its initials are "HCL", the same as the initials for hydrochloric acid. Well, I hadn't heard of it, and I wonder how many of you readers have.

Hint: the "HCL" doesn't refer so much to a specific antenna design, as to some rule-of-thumb factors of good antenna siting. Look for the answer to this mystery in next month's column.

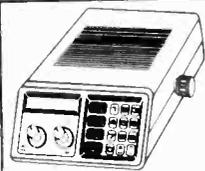
Bye the bye, I have quite a collection of unusual bits of information sent to me by readers of this column. In the near future I will be devoting an entire column to some of this reader input, which is often quite interesting.



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## Regency Z30

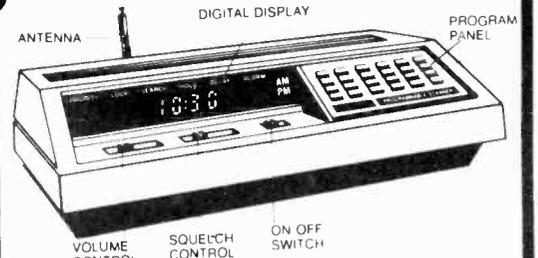
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So, that's it for now. Til next month  
73, DX, and peace. ■

# Technical Topics Revisited

How Does it Work? Don't Bore Me!

I've been drafted to plow some old ground on the shortwave farm. When Liza Minelli was asked to sing "Over the Rainbow", she simply replied, "It's been sung". Indeed. Unlike Ms. Minelli, however, I'm happy to do an encore. But by gosh, I'm going to do it in style!

The thing I've always found missing in this type of endeavor (with the exception of the late and great John T. Frye) is a little humor. As well, authors often assume prior knowledge on the part of the reader -- knowledge that often simply isn't there!

For instance, AM and FM. Most people tie these modes to frequency. Any mode can be used on any frequency. In World War Two, the Germans strung a wire around a large mountain and sent signals at 30 Hz (half our standard AC current rate) for a few years in complete security for the simple reason the Allies didn't have any receivers that tuned that low! Assumptions like that can get you in a lot of trouble and you can find yourself glossing over a whole area of information that

you don't know anything about, whether writer or reader.

The word assume makes an ass/u/me. That's why I never use it in writing or thinking. This may seem haughty but in fact it's humble - a simple realization of the scientific method. If you can't prove it over and over, it simply isn't valid or you don't know what you're doing.

### To Start With...

Any oscillation from one cycle to a billion (light, X-Ray, atomic nuclei) will radiate if given the chance and two different frequencies can be "married" by simply putting them together - they don't "see" each other.<sup>1</sup>

Enter the crystal set, the basic circuit for every amateur radio society from Washington to Moscow (logo minus detector, see fig. 1).

The inverted triangle with the line through it represents the antenna. The "curly cue" is a coil (inductor) and the graduated horizontal lines are the symbol for ground.

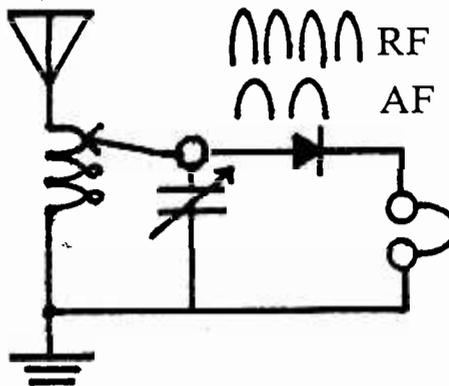


Figure 5

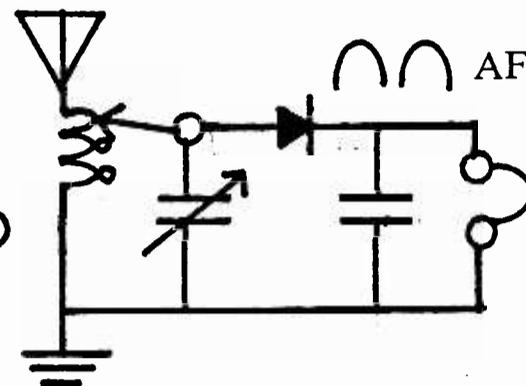


Figure 6

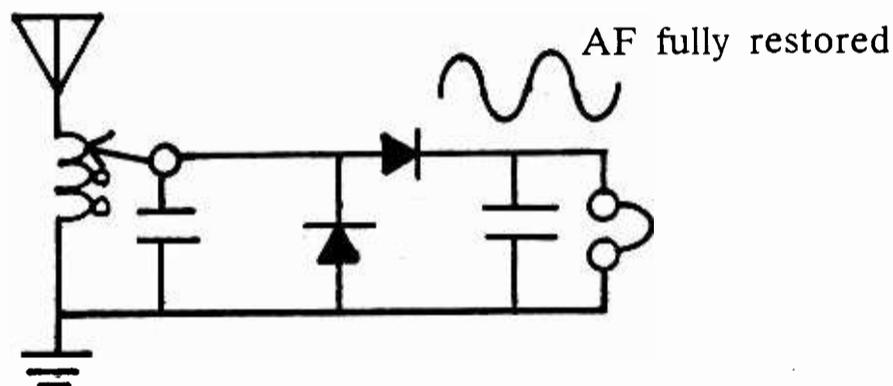


Figure 7

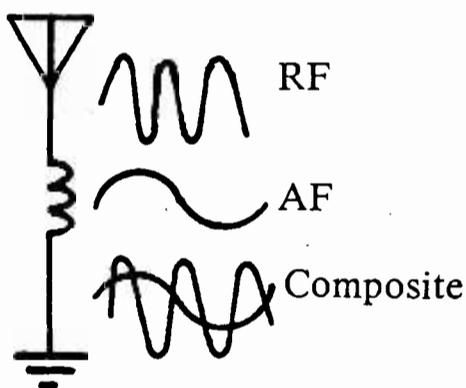


Figure 1

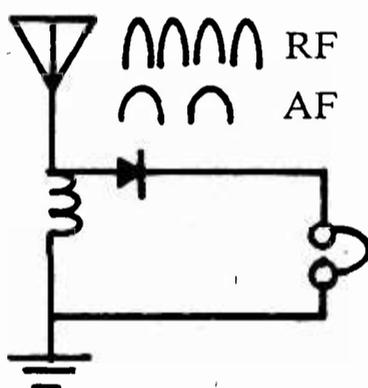


Figure 2

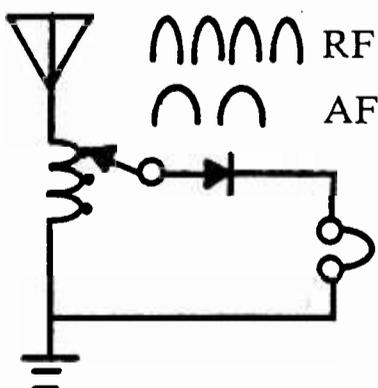


Figure 3

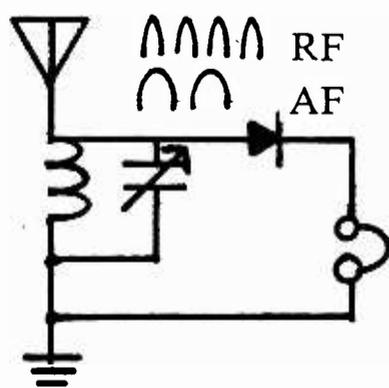


Figure 4

<sup>1</sup>There is a sum and difference, which allows hetrodyning - but that's another story.

<sup>2</sup>The "X of c" is the AC or RF 'resistance' of a capacitor at a given frequency.

## Black Velvet (also revisited)

In 1986 I had the great honor of having two of my previous articles reprinted.

One was in *73 Magazine* from October, 1983, "Defuse RFI" in November and the other was "It's Black Velvet Time" in *International Radio Magazine* in its last issue before being merged with *Monitoring Times*.

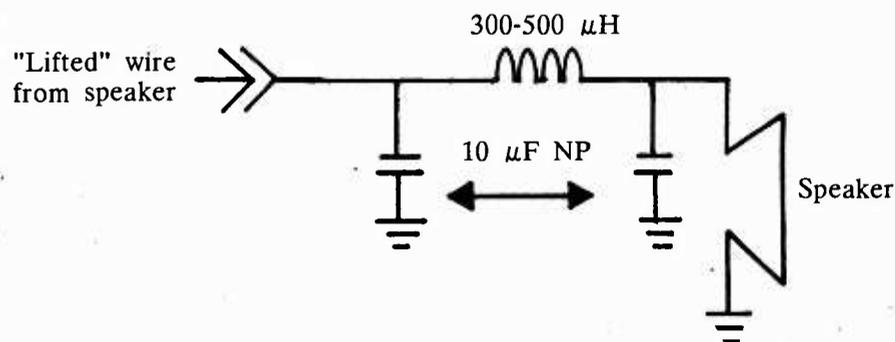
I don't need to tell you how I felt. Even though I was Technical Editor of *International Radio* (I'm now Sr. Tech. Ed. of *MT*, Bob Grove is Chief Ed.), I had no idea they were going to do what they did. It was reader response. Well, there are a few very

noisy receivers out-and-about that the original "Black Velvet" circuit didn't cut. Here's the improved version, for those who need it, that gives an additional 6 dB. of "hiss" attenuation (Twice as much!)

This also may be wired at the headphone jack or assembled in a "hobby box" for headphone operation.

Enjoy.

The 10  $\mu$ F non-polarized cap's are available at Radio Shack. Chokes are also there @ 100  $\mu$ H. You will need to get several if your only source is RS.



This in and of itself won't let you hear anything, but take away any of the three and failure is guaranteed. In figures two through seven, I show the evolution of a "crystal set". In brief (I don't want to bore you), fig. 2 shows the basic circuit working. The problem is, you'll hear only the strongest signal with substantial interference from weaker ones near the resonant frequency. The resonance is established by the inductance of the coil and the distributed capacity between the windings.

Fig. 3 is improved by lengthening or shortening the coil. Fig. 4 is an alternate way to vary resonant frequency with a variable capacitor. Not much difference. In fig. 5, we're starting to build a real radio receiver with variable inductance and capacitance, improving the "Q" or selectivity of the circuit. In fig. 6, a capacitor of very low reactance at the RF frequency is added to "short circuit" the RF component to ground. It isn't really needed but for purists it removes the RF "fur" from the signal. ( $X_c = 1/2rFC$ ) frequency in MHz and capacitance in pico Farads (pF).<sup>2</sup>

Finally, in figure 7, an additional diode, which, as the first, is a device that passes current in only one direction, hence "rectifying" and separating the RF and audio signals, is added to restore the bottom half of the signal for gain and fidelity.

You can make such a set from an oatmeal box, a capacitor from a junked table radio and a couple 1N34A's and have a lot of fun with it - millions have. The headphones have to be wire wound to provide the current return path. If this whets your appetite or bores you to tears, we want to know either way!

Enjoy. Any questions will be answered when an SASE is provided.

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## Mods for the Sony ICF 2010

by John Albert WA9FVP

(NOTE: These modifications are intended to be performed by experienced technicians. Monitoring Times assumes no responsibility for damage or voided warranties resulting from the procedures outlined below.)

I have read several articles on the Sony ICF-2010. Most everyone will comment on the functions or the performance of the radio and a few will hope that Sony will correct these problems in future models. I take a different view; that is, if a radio does not meet my standards I will modify it until it does.

I installed five modifications in my Sony ICF-2010, three of which improve the performance of the SSB mode. Don't do these "mods" if you are not a skilled technician. They Sony 2010 uses the latest "surface mount" technology and you can easily damage the radio. Also, the warranty will be voided if the radio has been altered.

The Sony ICF-2010 Service Manual can be purchased for \$12 plus shipping from Joseph Electronics, 8830 N. Milwaukee Ave, Niles, IL 60648. Phone (312) 297-4200 and ask for the "Sony Parts Man."

### MOD #1: Rechargeable Nickel-Cadmium Batteries

There are two problems when a radio is converted to rechargeable batteries. First, a NiCad battery will only put out 1.2 volts when fully charged; a regular D-size flashlight battery puts out 1.5 volts. You may think this is a small difference but when several batteries are used, the .3 volt difference adds up.

The ICF-2010 was designed to operate on a 3 volt internal supply and the three D batteries will provide 4.5 volts. Three NiCads will only put out 3.6 volts. The radio starts to lose its performance if the batteries drop below 3.2 volts.

Somehow, four NiCads (4.6 volts) will have to be installed. Radio Shack introduced in their '87 catalog called a "sub C" size slightly smaller than the "C" size and, when two "C" and two sub C batteries are stacked, they are almost the same lengths as three "D" cells.

The batteries can be installed in the 2010 battery compartment by shimming them with a foam rubber material. I used foam carpet padding left over from our newly-carpeted living room floor.

Lay down one long, narrow strip on the bottom of the compartment and use short strips to shim the sides of

the "sub C" batteries (the two inner batteries). You can use the Sony power pack when you are near an AC outlet but the NiCads will have to be removed and charged separately. Radio Shack also has the chargers available.

### Better Yet, Add a Charger Jack

Another way to charge the batteries is to install a charger jack and circuit in the 2010. You won't have to remove the batteries and the Sony adapter will power the radio while a 120 AC to 9 V DC adapter restores the NiCads. The parts and AC adapter can also be purchased from RADIO SHACK.

Figure 1 shows how to install the jack and where to connect the 47 ohm resistor on the jack board.

### PARTS LIST

Radio Shack #	Item
1	237-1651 120V AC to 9V DC adapter
1pkg	274-292 Subminiature phone jack
1pkg	271-009 47 ohm 1/2 Watt resistor
1pkg	23-124 C size NiCad batteries
1pkg	23-190 Sub C size NiCads

### Installing the Charger Circuit

**Step 1**  
Write down the frequencies and modes you have stored in memory; when the back of the radio is removed the memory backup batteries will fall out and the radio will lose its memory.

Lay the radio face down on a table or bench using a soft towel to protect the front from scratches. Remove the battery cover and the D batteries, then remove the six screws which hold the rear cover. One of the screws is in the battery compartment.

Remove the back by reaching under the battery compartment and pulling up when the radio is sitting on its face.

**Step 2**  
When the back is removed you will notice two circuit boards, the Main Board and the Jack Board. Look at Figure 1 and then the jack board in the radio. Notice the foils that are shaded in Figure 1. Connect the "mini" jack ground to the "ground

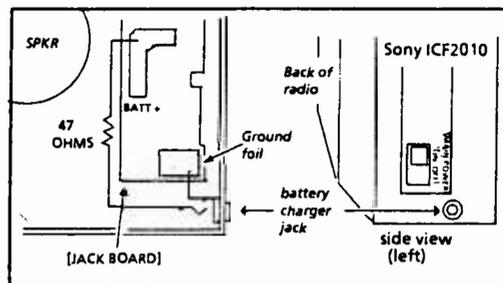


Fig. 1

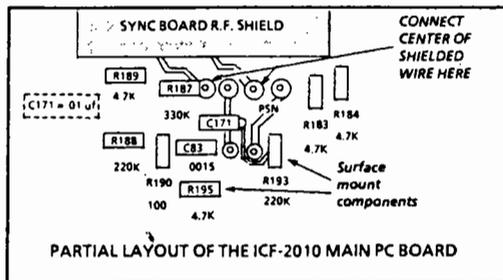


Fig. 3

foil" and the resistor to the "Battery +" foil. Make sure the wires are long enough for the jack to reach the bottom right of the cabinet (looking at the back of the radio).

When you solder the wire to the BATT+ foil, make sure the wire will clear the contact finger which is on the inside of the rear cover. This finger touches the BATT+ foil when the back cover is mounted and you will see the scratch marks on the foil.

**Step 3**  
Place the radio on its back (the rear cover is still off). Get your drill ready. You will need the appropriate size drill bit to mount the jack. The plastic case is too thick for the jack so you will have to use a countersink or a 3/8" drill to taper the hole. After you mount the jack make sure the wires won't get pinched when the back is installed.

**Step 4**  
Install the back of the radio (reverse step 1) if you don't want to do the next "mod." Connect the charger to the radio and let it charge overnight. Remember, you can use the radio normally when the Sony power pack is plugged in. This will disconnect the batteries and the charger from the radio and the batteries won't be drained.

### MOD #2: The Stereo AM Tuner Modification

The Sony ICF-2010 uses a new chip as a "synchronized detector" for AM shortwave reception. As pointed out in October's issue of *MT*<sup>1</sup> the ICF-2010 can receive AM stereo using two radios.

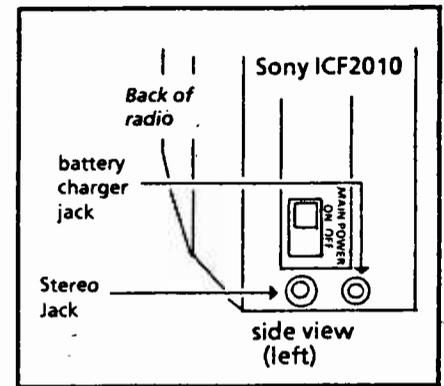


Fig. 2

I have found a way to use the ICF-2010 as a stereo tuner by adding a stereo jack and two pieces of shielded cable. Again, you should be a skilled technician to do any modification on the ICF-2010.

**Step 1**  
With the radio lying face down on the work bench and the radio bottom towards you, carefully examine the main PC board. At the right end of the main board you will see a metal shield. Below the shield you will see a cluster of surface mount components and traces.

By examining Figure 3 and the main board, you will see the two pads to which shielded cable will be connected. Look for the designation "PSN" just below the pads.

**Step 2**  
Prepare two shielded mini-microphone cables with shrink tubing on the braided wire. Connect one end of the cables to the mini stereo jack. Connect the other ends (center conductor) to the points shown in Figure 2. Also solder the braided outer conductor to metal shield which is ground.

**Step 3**  
If you made the battery charger modification, you will have to mount the stereo jack next to the battery charger jack on the left side of the ICF-2010 (Figure 2). Use a 1/4" bit to drill the hole for the stereo jack. Again, a countersink will be needed to taper the hole so the jack will mount on the thick plastic case.

**Step 4**  
Now you can mount the back cover and replace the batteries. Reprogram the memories and tune in a local AM station. Use a mini stereo "Y" adapter (Radio Shack #42-2475) to connect the Sony ICF-2010 to your stereo HiFi amplifier. You will notice that the level is lower than usual; you can compensate for this by using a

<sup>1</sup> "ICF-2010 User Hints," Gary Bourgeois. *Monitoring Times*, Vol.5 No.10, p.28.

higher volume setting. If you have a small monophonic amplifier, you can use it on one channel and the radio's audio for the other channel.

Now switch to SYNC mode and tune up or down to select *upper* or *lower sync*. You should hear stereo on one of the SYNC positions. If you cannot hear what sounds like stereo, tune to another AM station and repeat the process. If you are using a stereo amplifier, just switch to SYNC mode and tune until you hear stereo music.

#### PARTS LIST

RS #	Quantity	Description
274-249	1	Stereo jack
278-752	1	Mini shielded braided wire

### MOD #3: Better Single Sideband Reception

One problem with the 2010 is it does not have a "fast attack, slow release AGC (automatic gain control) circuit. A fast AGC is OK for AM reception, but it causes an unpleasant pumping sound when receiving single sideband. My modification adds a 4.7  $\mu$ f capacitor and transistors which are used for microprocessor control.

The first transistor causes the AGC to rapidly discharge during the first scan cycle. Without it the receiver would miss the weak signals when the scan resumes if the previous signal was very strong. The second transistor disables the slow AGC during the reception of AM or AIR.

Before doing this mod you should purchase the service manual: it will aid you in locating the on-board components. The ICF-2010 is a high-tech receiver using the latest surface mount technology.

Use the proper grounding procedures for static protection. You will be removing some surface mount parts so the proper soldering and desolder removing tools are needed. The tools and parts are listed below.

**Step 1**  
(Same as step 1 in the first mod)

**Step 2**  
Locate surface mount resistor R14 and remove it using a desolder tool. This resistor may break but don't worry, you won't need it anymore. Unsolder diode D6 which is on the component side and let it fall into the radio. Just turn the radio over and shake it until the diode falls out. Diode D6 will be re-used.

**Step 3**  
Prepare a small Vector board and wire it according to the schematic in Figure 4. Diode D6 and all of the components that are marked "NEW" will be mounted on the Vector board.

Make sure the wires going to the Vector board are long enough so that you can tuck the board in a spot just above the speaker. Connect points A, B, C, and D to the main PC board foil side.

You will notice that one end of R15 is not connected and D6 will connect to the other side of R15 (the lead marked "D").

**Step 4**  
Recheck the wiring, assemble the radio and install the batteries. Set the radio to a ham band and receive a strong SSB signal. You should notice that the noise level increases slowly between transmissions. The SSB reception will also be very clear and pleasant to listen to.

Sometimes you will notice a very strong SSB station on the ham bands will cause a very weak station in the QSO to be even weaker because it will take longer for the AGC to recover. You can force the AGC to discharge rapidly by storing the received frequency and by pushing that memory button whenever the weak SSB signal is received. This activates the "quick discharge circuit" and rapidly increases the sensitivity of the radio.

#### PARTS

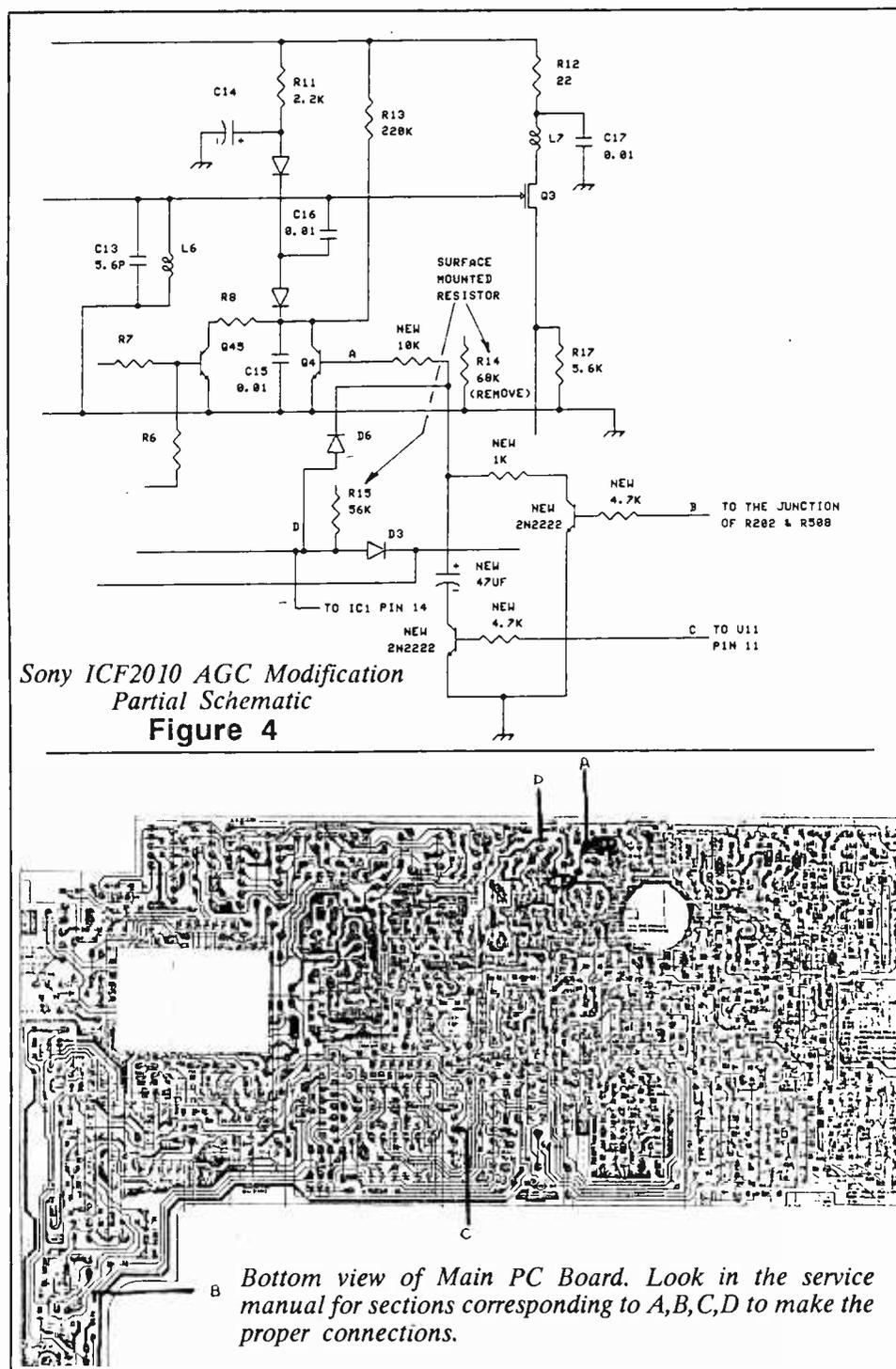
QTY	RS #	Type
2	276-2009	2N2222 transistor
2	271-1330	4.7K resistor
1	271-1335	10K resistor
1	271-1321	1K resistor
1	272-1024	4.7 $\mu$ f capacitor
1	276-148	Predrilled PCB

#### TOOLS

- #2 Phillips screw driver
- Solder remover tool (Radio Shack #64-2098)
- Controlled heat soldering station (like the Weller WTCP series)
- Needle-nose pliers
- Wire cutters

### MOD #4: Add a Better Filter

When I received my Sony ICF-2010 as a Christmas gift in 1985 I already owned an Icom R70 receiver. I had purchased the FL-44 filter and I had



the stock 455 ceramic filter lying in the parts drawer. I thought that maybe this filter would improve the Sony ICF-2010 by providing a narrower IF band pass. So when I finally received the Sony service manual, I proceeded with the task of modifying the Sony. If you have the Icom FL30 filter as a spare, you would need to purchase the Sony service manual (address given above).

**Step 1**  
Proceed as in the original step 1.

**Step 2**  
Prepare the Icom FL30 filter by adding two mini shielded wires about 6 inches long to the ground and input/output pins (See the Icom layout sheet which came with the radio). Properly sleeve the shielded wire with shrink tubing. Connect the appropriate leads to the Sony radio on the main PC board. See the layout

sheet and schematic in the Sony service manual.

**Step 3**  
Test the radio; you should notice a narrower bandpass with the new filter when tuning the ham bands, for example. Tape the filter so it won't short out to anything and stuff it in a spot where it won't jiggle around in the radio. I found a spot at the left near the rod antenna.

**Step 4**  
Reassemble the back and install the batteries.

If everything checks OK, reprogram the memories and enjoy your new radio!

*John Albert (203 York Street, New Lenox, IL 60451), is a Research and Development Technician at Rockwell International. (Please enclose an SASE if a reply is desired.)*

# Computer Logic - Part III

This is the last Computer Corner column. Our recent reader survey did not support its continuation. Perhaps in the future we may re-evaluate our position based upon any change in the interests of our readership.

We would like to thank Clay Ellis for sharing his expertise with MT readers. Clay has indicated that he would be willing to correspond privately with computer hobbyists who enclose an SASE with their questions.

Let's start this month with the corrections to last month's column! We should have gotten a parity check on some of the data, but I missed the proverbial boat somewhere.

Figure 1 is the correction to last month's schematic, giving the omitted output pin numbers for U10. Many of you had probably already grabbed the trusty TTL manual for the missing numbers, but that wouldn't have told you I left out an inverter, as shown by U21.

One last correction before we get on to this month's section of the adapter card. U10 is listed as a 74LS266, and should in fact be a 74LS86. I had changed the original to eliminate pull-up resistors on the outputs, as the 266 is an open collector output and, while the 266 will work, the 86 is the better chip to use. No circuit changes are necessary.

## Adapter Card, Part II

OK, with the last of the egg now wiped off my face, let's get on to Figure 2. This is the balance of the circuitry needed on the adapter card to finish up and check out the operation of the adapter itself. Part numbers are as follows:

Parts	Pins	+5V Gnd
U13, 14	74LS273	20 10
U15,16,17	74LS244	20 10
U18, 20	74LS32	14 7
U19, 21	74LS240	20 10
R 5, 6	470 Ohms, 10% carbon,	
	1/4 W	
R7	2 Kohms, 10% carbon,	
	1/4 W	

Figure 3 shows a suggested mechanical layout. The drawing shows the right two thirds of the prototype card, which is all that is needed for the components.

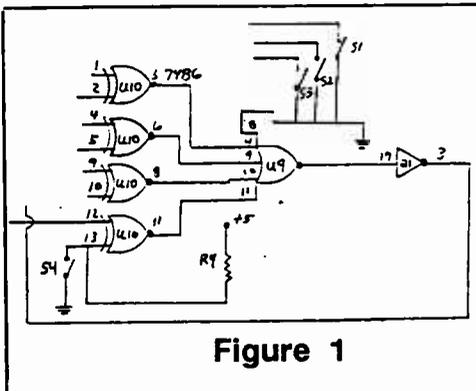


Figure 1

## Theory and Checkout

Referring the Figure 2, data is transferred to U13 (from U1) during a Write A operation. This is an actual write to the PC port that corresponds to the starting address of the adapter card. For example, if 300 (hex) were chosen as the starting address, writing a byte of data to the PC port 300 would result in the data being latched in U13. All data, including device addresses, that is to be transferred from the adapter card to the outboard devices will first be latched in U13.

U14 is written in a similar manner, being gated by a Write B, starting address +1 or, in our example, 301. In normal operation only four values will be written to this register. A 16 (decimal) will perform a device reset, meaning all outboard devices will be reset.

A decimal 32 will set the adapter to read a device register, a 64 will cause a device address write, and a 128 will cause data to be transferred to the selected device. Any other writes to U14 will be performed only for diagnostic purposes.

U15 is a dual purpose input, responding to a Read B, 301 per our example. Normally a Read B will be performed periodically to check bit 0, which will be a logical 1 if an outboard

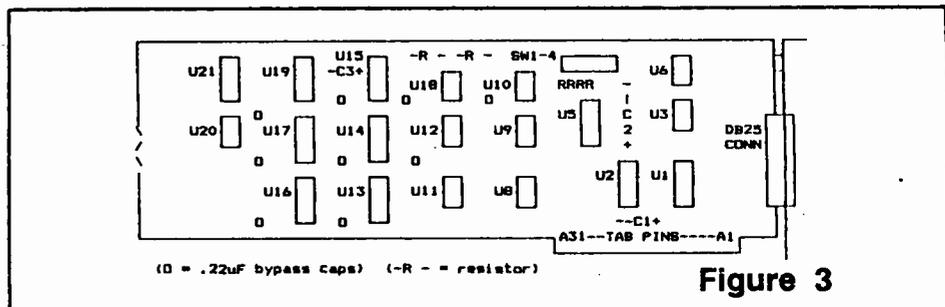


Figure 3

device is signalling for attention. This input on pin 2 of U15 can also be inverted with an open collector inverter and wired to the PC interrupt driven code, but that is beyond what we want to do in terms of complexity. In a diagnostic mode, U15 can read back the contents of U14 to verify what was written to U14.

U16 and U17 work as input and output buffers for the data to be transferred between the adapter and the I/O device, and conversely between I/O and adapter. A Read A operation will allow the PC to read in whatever data is on the I/O device output via U17. U16 merely transfers data from U13 to the I/O device on an address or device write output from U14.

Note that device read and write (and address write) operations are not a direct result of a PC read or writer operation to a port. These operations are accomplished by setting and resetting the appropriate bits in U14.

## Typical Operation

Let's step through a typical read or write operation, assuming our original 300 (hex) starting address. We decide that we want to write a decimal 164 to device 11 on the adapter bus. First we

write a decimal 11 to U13 using a Write A, which is address 300 on the PC bus. This is followed with a decimal 64 written to U14 with a Write B, PC address 301.

This turns on the address write bit, and through U19 and U20 gates U16 on, which puts the decimal 11 latched in U13 out on the adapter to device bus, and also takes the Address Write line to the device low. We now have an address present at all outboard devices, and the Address Write line low.

Next, we do a Write D, which causes U14 to be reset and, as a result, the Address Write line goes + which causes the address to latch in the device address latches. However, only one device out there on the adapter bus will enable itself.

At this point, we have written the address out to the external devices. When U14 is reset, U16 is returned to the tri-state condition, and the data in U13 is no longer gated on the output bus. The inverters and portion of U20 serve to establish timing conditions to insure that data is present on the external device bus prior to the Write address turning on, and is not released until after Write address is reset.

Now that we have the device at address 1 set on, we want to write data from it. It we want to write to it, we follow the same steps as writing the address (writing our desired 164 to address 300) to set the data, except we write a decimal 128 to U14 instead of a decimal 64. This turns on U16 just as the Address Write did, but turns on the Device Write instead of Address Write.

A Write D again resets U14, and terminates the operation. Incidentally, it does not matter what data is written to PC port 303 (Write D), as the data isn't used, just the write pulse itself.

Had we desired to read instead of write, we would have merely written U14 with a 32, which would activate the device read line to the external devices. The external device at address 11 would have responded by putting its data on the device bus, and we could then read this bus with a Read A. U17 would then gate the device data to the PC port 300.

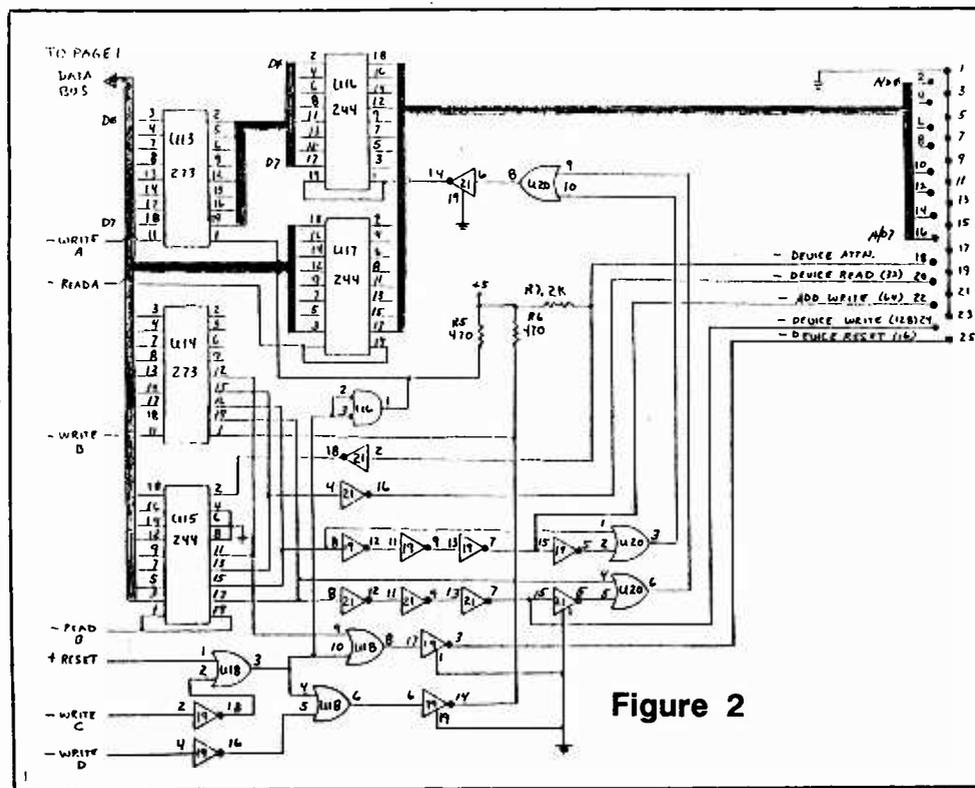


Figure 2

One last write operation can be performed on the adapter, a Write C. Again, the data is of no importance; the Write C pulse will not only reset U14, but also U13 and the external devices. This same reset is performed initially via a power on reset when the PC is first powered on.

Last but not least, the following printout is a basic program that will check out the adapter card once it is wired. It checks about 90% of the card and lists the line number of the error, which makes troubleshooting easier. It also lists the address or data being used at the time of the error. All addresses and data are in decimal. The printout also contains a listing of addresses vs switch settings.

Those of you who don't want to type in all the code can obtain a diskette with

this and some small initial debug programs which I used to debug the first adapter card for \$4.00. The small debug routines are 10- and 15-line programs that are self-explanatory when loaded and listed. Most do such things as find the adapter address, or do repeated writes to one address for scoping, etc.

I have also developed a small PC board (about 4" x 4", 9 ICs) that will act as a simple external device and later be useful as an interface to another device to be controlled by our adapter. This card represents the minimum interfacing required for an external device.

For additional information on this project or any other, please send a self-addressed stamped envelope. Happy computing!

```

5 CLS
6 KEY OFF
12 GOTO 795
13 CLS:LOCATE 2,1
14 LOCATE 4,2: PRINT "CARD ADDRESS = ":LOCATE 4,17:PRINT DREG
15 LOCATE 23,1 : PRINT "BUS CHANNEL DIAGNOSTICS VER. 1.0. CTL-BREAK TO QUIT"
16 LOCATE 2,2:INPUT "ENTER 1 FOR CONTINUOUS RUN OR 0 FOR ONE TIME RUN >> ". MODE
17 PASS = 1
18 SOUND 2100,7 : SOUND 1800,7
19 LOCATE 5,65 : PRINT "PASS = " : LOCATE 5,71 : PRINT PASS
22 LOCATE 4,1
40 CREG = DREG + 1
50 RST = DREG + 2
60 TERM = DREG + 3
70 OUT RST,0
100 D = INP(DREG)
110 CTRL = INP(CREG)
120 IF D = 255 GOTO 130
125 GOTO 2000
130 IF CTRL = 0 GOTO 140
135 GOTO 2010
140 LOCATE 20,2: PRINT "INITIAL POWER TEST CHECK COMPLETE"
150 FOR K = 1 TO 500:NEXT
160 LOCATE 20,2 :PRINT "
165 FOR K=1 TO 300:NEXT
170 LOCATE 20,2: PRINT "INITIAL POWER TEST CHECK COMPLETE"
180 FOR K = 1 TO 500:NEXT
190 LOCATE 20,2 :PRINT "
200 OUT CREG,64
205 OUT DREG,165
210 CTRL = INP(CREG)
220 IF CTRL = 64 GOTO 240
230 GOTO 2020
240 DATA1=INP(DREG)
250 IF DATA1 = 165 GOTO 300
260 GOTO 2030
300 OUT TERM, 0
310 DATA1 = INP(DREG)
320 CTRL = INP(CREG)
330 IF DATA1 = 255 GOTO 350
340 GOTO 2040
350 IF CTRL = 0 GOTO 370
360 GOTO 2050
370 GOTO 400
400 DACT = 0
410 CRGCT = 64
420 OUT CREG, CRGCT
450 OUT DREG, DACT
460 DATA1 = INP(DREG)
470 CTRL = INP(CREG)
480 IF DATA1 = DACT GOTO 492
490 GOTO 3000
492 IF CTRL = 16 GOTO 520
493 IF CTRL = 32 GOTO 520
494 IF CTRL = 48 GOTO 520
495 IF CTRL = 64 GOTO 520
496 IF CTRL = 80 GOTO 520
497 IF CTRL = 96 GOTO 520
498 IF CTRL = 128 GOTO 520
499 IF CTRL = 144 GOTO 520
500 IF CTRL = 160 GOTO 520
501 IF CTRL = 176 GOTO 520
502 IF CTRL = 192 GOTO 520
503 IF CTRL = 208 GOTO 520
504 IF CTRL = 224 GOTO 520
505 IF CTRL = 240 GOTO 520
507 IF CTRL = 208 GOTO 520
510 GOTO 3010
520 IF DACT = 255 GOTO 900
525 DACT = DACT +1: IF DACT >255 GOTO 700
526 LOCATE 12,40 : PRINT "DATA = " :LOCATE 12,48: PRINT DACT
530 CRGCT = CRGCT +1: IF CRGCT >255 THEN CRGCT = 64
532 LOCATE 13,40 : PRINT "CREG = " :LOCATE 13,48 : PRINT CRGCT
534 IF CRGCT = 64 THEN SOUND 1800,7:SOUND 2100,7
540 OUT TERM,0
550 DATA1 = INP(DREG)
560 CTRL = INP(CREG)
570 IF DATA1 = 255 GOTO 590
575 PRINT "", DATA1 : END
580 GOTO 3050
590 IF CTRL = 0 GOTO 610
600 GOTO 3060
610 GOTO 420

```



## From Soup to Nuts...

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```

700 Z= INT(RND*10)
710 DACT = Z
790 GOTO 526
795 LOCATE 23,1 : PRINT "BUS CHANNEL DIAGNOSTICS VER. 1.0. CTL-BREAK TO QUIT"
800 PRINT "SELECT CARD ADDRESS FROM SWITCH POSITION"
801 PRINT "
802 PRINT "DECIMAL    HEX      A4      A3      A2      A1
803 PRINT "ADDRESS    ADDRESS SW 1    SW 2    SW 3    SW 4
804 PRINT " 512          200    CLOSED  CLOSED  CLOSED  CLOSED
805 PRINT " 516          204    CLOSED  CLOSED  OPEN    CLOSED
806 PRINT " 520          208    CLOSED  OPEN    CLOSED  CLOSED
807 PRINT " 524          20C    CLOSED  OPEN    OPEN    CLOSED
808 PRINT " 528          210    OPEN    CLOSED  CLOSED  CLOSED
809 PRINT " 532          214    OPEN    CLOSED  OPEN    CLOSED
810 PRINT " 536          218    OPEN    OPEN    CLOSED  CLOSED
811 PRINT " 540          21C    OPEN    OPEN    OPEN    CLOSED
812 PRINT "
813 PRINT " 768          300    CLOSED  CLOSED  CLOSED  OPEN
814 PRINT " 772          304    CLOSED  CLOSED  OPEN    OPEN
815 PRINT " 776          308    CLOSED  OPEN    CLOSED  OPEN
816 PRINT " 780          30C    CLOSED  OPEN    OPEN    OPEN
817 PRINT " 784          310    OPEN    CLOSED  CLOSED  OPEN
818 PRINT " 788          314    OPEN    CLOSED  OPEN    OPEN
819 PRINT " 792          318    OPEN    OPEN    CLOSED  OPEN
820 PRINT " 796          31C    OPEN    OPEN    OPEN    OPEN
870 INPUT "ENTER 1 TO CONTINUE. 0 TO RETURN TO DOS >> ", ZIP
872 IF ZIP = 0 THEN SYSTEM
874 INPUT "ENTER CARD ADDRESS ", DREG
875 IF ZIP = 1, GOTO 13
900 PASS = PASS +1
902 LOCATE 5,65 : PRINT "PASS = " : LOCATE 5,71 : PRINT PASS
903 SOUND 2100,10 :SOUND 1800,10
908 IF MODE = 1 GOTO 525
910 CLS: LOCATE 5,5
920 PRINT "TESTING COMPLETED" :
930 SYSTEM
2000 LOCATE 20,2: PRINT "ERROR IN DATA REGISTER AT POWER ON. 2000"
2005 END
2010 LOCATE 20,2: PRINT "ERROR IN CONTROL REGISTER AT POWER ON 2010"
2015 END
2020 LOCATE 20,2 : PRINT "ERROR WRITING CONTROL REG. DATA WAS DECIMAL 64. 2020"
2025 END
2030 LOCATE 20,2 :PRINT "ERROR WRITING DATA REG. DATA WAS DECIMAL 165. 2030"
2035 END
2040 LOCATE 20,2 :PRINT "ERROR RESETTING CTRL REG VIA TERMINATE WRITE 2040"
2041 LOCATE 21,2 :PRINT "DATA REG SHOULD HAVE BEEN TRISTATED BY CTRL REG."
2045 END
2050 LOCATE 20,2 :PRINT "ERROR RESETTING CTRL REG VIA TERMINATE WRITE. 2050"
2055 END
3000 LOCATE 20,2
3001 PRINT "ERROR WRITING/READING DATA REG. DATA = DECIMAL ", DATA1
3002 END
3010 LOCATE 20,2 :PRINT "ERROR WRITING/READING CTRL REG, DATA = DECIMAL ".CRGCT
3015 LOCATE 21,2 :PRINT "3010"
3020 END
3050 LOCATE 20,2 : PRINT "ERROR RESETTING DATA REG VIA TERM COMMAND. 3050"
3051 END
3060 LOCATE 20,2 : PRINT "ERROR RESETTING CONTROL REG VIA TERM COMMAND. 3060"
3061 END

```

## Ted Brunner: Pro and Con

I read "DXing Like Most of Us" by Theodore F. Brunner [a rebuttal to editor Larry Miller's series, DXing with the Eck-spurts] in the May issue and I really can't believe this article got printed or Theodore paid. It was a resentful little article and an insult to Mr. Miller, who works many diligent hours trying to increase awareness of shortwave in the United States.

Mark Swarbrick,  
Thorndale, PA

[Mark Swarbrick lives across the street from Larry Miller. Still, it's nice to see someone stick up for him.]

It's about time someone put you [Larry Miller] in your place. After years of having to wade through your vicious sarcasm and cruel sense of humor, I feel satisfied that he finally got yours at the hands of Mr. Brunner. Go get him Theodore! Go get him Bob!

Tony D'Attila  
Washington, D.C.

You [Larry Miller] either have a well-developed sense of humor or Mr. Grove was smitten with an unusual cruel streak to allow publication of Ted Brunner's "DXing Like Most of Us." It's not everyone who will put his editor up to such public humiliation of his skills.

Bill Endered  
Oklahoma City, OK

[Editor's note: Larry Miller selected Mr. Brunner's (he thought) humorous article for publication, proving once and for all that he can "take it" as well as dish it out.]

## Congrats on Terrorism Net

Congratulation to *Monitoring Times* for exposing the existence of a terrorist network in Latin America on 20 meters. Although I have yet to log any transmissions on the frequencies you listed (in the May, 1987 issue), I feel that terrorism from the south is a very real problem; one that America has yet to face up to. Unless dealt with properly, the Sandinista problem in Nicaragua will one day end up on our doorstep. Your work in bringing this threat into the public spotlight will be appreciated some day.

Bill Smith  
Chicago, Illinois

## Keep Politics Out of It

Thank you for including "DXing South Africa" in your April issue. I appreciate the information included in the article.

However, I do not appreciate the editorial comment regarding the policies of the government of the Republic of South Africa.

It is very easy to criticize that country from the comfort of the United States of America. It took America more than 150 years to overcome racial inequities. It is sanctimonious and hypocritical for *Monitoring Times* to comment on the situation in South Africa in an article of this type. This was a straightforward DXing article, not an editorial comment.

The political situation in the Republic of South Africa is grave. I do not personally approve of it. However, the population of that country speaks more than 35 unique languages. This alone makes the situation very complex. Please limit your editorial comments to your areas of expertise.

R.F. Solon  
Toledo, OH

## More on South Africa

Although I consider your publication to be one of the best, I cannot let your "DXing South Africa" article in the April issue to pass without response. *Monitoring Times* does not have to stoop to South Africa-bashing; let other publications do that. Stay away from expressions of "selective indignation."

Peter Berger  
Brevard, NC

[Comments Miller: To keep politics out of a shortwave article is similar to keeping "water" out of "swimming." Even the most cursory spin down the dial shows this to be true. To ignore the politics of South Africa in an article about Radio RSA by simply pointing out the programs about leaping lions and four-star hotels on the plain would be ludicrous.

In this month's article about Bangladesh, we point out that the nation underwent a bloody civil war, famine, corruption, etc. These are the things that give purpose, even character, to the stations and their broadcasts.

I must point out, however, that I did not authorize the "remember Soweto" comment that was placed in front of the Radio RSA staff photo.]

## SW Listeners' Convention?

I have heard whisperings in the wind that Grove Enterprises and some others may be organizing a professional listeners' convention. Any information available?

Martin Fleischman  
Baltimore, Maryland

[Editor's note: Such a possibility is now being studied intently. Bob Grove welcomes your comments on what you'd like to see and when.]

## MT Out of this World?

Why all of the coverage of satellites suddenly? I remember back when *MT* was strictly a scanner publication. Then shortwave. Now satellites. What goes? (No pun intended.) Sorry, I'm just not interested at all in satellite communications and I think you'll find that few are. There's already too many purely satellite magazines out there for those who are interested.

Sgt. Elvery Hanscom  
FPO New York

## Kudos on Magne

Kudos to *Monitoring Times* for its association with Lawrence Magne of *Radio Database International* for his receiver reviews. They are the best written, most thorough and unbiased in the business. I was wondering, though, if Mr. Magne has plans to extend his work to scanners and non-broadcast equipment. It is much needed.

Kenneth Melbourne  
Pittsburgh, PA

## Musical Moscow Chairs

My monitoring observations confirm the difficulty of putting together any reliable chart of frequencies for shortwave broadcast stations. Radio Moscow, one of the biggest, most powerful stations in the world, changes frequencies so often and in such utter disregard to continuous listening, that the VOA need never fear competition. Virtually all of last month's frequencies are now gone, replaced by new ones. And the official schedule is of little help, giving only partial frequencies; i.e., 5.9, 6.1, etc. instead of the whole thing. If this is how communism works, the world is safe for democracy.

Bill Blair,  
Winter Springs, Florida

## SW Gets an A+

You put a couple of nice pieces about our SWL program at Horace Mann School in *Monitoring Times*; an article in November, and a follow-up picture and caption in December. Well, it's my turn for a follow-up.

Our program is turning out rather successfully, I'm happy to report. The equipment is being used on a daily basis -- and some of my kids have begun to get their novice-class amateur radio licenses. We were also featured on KTLA's "News at Ten" the night of April 6. The kids really liked that!

Last fall, I received my third Classroom Teacher Instructional Improvement Program (CTIIP) grant. This time, I asked for some 220MHz equipment in anticipation of "Novice Enhancement."

We bought a Kenwood 3530A transceiver, a Yaesu 109RH handie-talkie, an Astron RS-35M power supply, and an IsoPole 220 antenna.

So far, six kids (and one parent) have received their novice licenses. Three more will soon be ready to be tested. Already, four of the six are planning to upgrade.

Next year, I anticipate further growth and participation (and maybe some more equipment!).

So, Bob, things are working out rather well. We got 'em listening ... and talking.

I appreciate your support, and will certainly let you know of any further developments in our program.

Craig Dible  
Horace Mann School  
8701 Charleville Blvd.  
Beverly Hills, CA 90211

Congratulations, Craig. *MT* will always support quality educational efforts like yours. Keep us posted on your progress!...Bob

## Police Call Replies

This is in reference to a letter in "Mailbag" of May, 1987, from a Larry Dale Anderson. He stated his order for *Police Call* was returned by the post office for failure to include a street address.

His order was probably sent to U.S. Radio Data. As you may know, they are located in the small town of Lebanon, NJ, and for many years all mail addressed "U.S. Radio Data, Lebanon, NJ 08833" was delivered to them.

Suddenly, the Post Office got very tacky and insisted on a street address, returning all mail not so addressed.

The correct address for U.S. Radio Data which will appear on all future material is:

U.S. Radio Data  
239 Deer Hill Road  
Lebanon, NY 08833

The Hollins Co. has had its P.O. Box for 25 years, and the Post Office has never sent any mail back, to our knowledge. Individual orders sent to us are forwarded to a retailer. persons inquiring about buying individual copies are given a list of retail sources.

*POLICE CALL*  
Gene Hughes, Editor

## Business Beware

While I am not specifically aware of the situation with the Hollins company, publisher of *Police Call Radio Guide*, I feel obligated to respond to reader Larry Dale Anderson's comments in last month's *Monitoring Times* Mailbag. It appears that Mr. Anderson placed an order for a book from this company and had it returned by the post office for "insufficient address." In return, Mr. Anderson's wrote a letter, published by *Monitoring Times*, in which he response with a heated "Let the buyer beware! I for one refuse to do any business with this company ever again!"

Does Mr. Anderson actually think the publisher of the book had something to do with the post office returning his letter? As the owner of a medium-size shortwave mail-order firm, I am often horrified by the over-emotional, knee-jerk reaction of many shortwave listeners to simple, everyday problems that occur in the course of doing business.

Wake up! Not everyone in shortwave is out to rip customers off. Quite the contrary. By far, the vast majority of people working in the shortwave industry are in it because they love radio. This is far from a lucrative business to be in. And this automatic lynch mob attitude only serves to diminish the hobby by driving well-intentioned people out of business. Frankly, too, I'm disappointed Mr. Grove would even publish such a comment, knowing that it could well damage the reputation and ability of a colleague to survive in business.

In other words, let me offer my own "Buyer Beware." People who irresponsibly "cry wolf" all the time will eventually make all of us victims. Mr. Anderson's disappointing response to a clearly postal service matter will only serve to hurt someone's probably totally honest attempt at business. It's hard enough to work in shortwave; please think before you react harshly.

Name and Address  
Withheld by Request

## Illegal Gain

I enjoyed reading your thoughts in the May issue about the shooting incident in Canada. I hope they don't outlaw scanners up there, but if their politicians are as dumb as ours, they may have problems.

Your logic was true, as it usually is, except for one slight (apparent) misunderstanding: "Just about as well as outlawing cocaine kept him from dealing" is a fairly common misunderstanding.

If anyone thinks about it, the only reason anybody even can deal in those substances is because they are illegal. Prior to the Harrison Narcotic Act of 1914, the substances were sold in drugstores and not on street corners and in school yards. Their illegal status has made them extremely valuable, and the trade in these substances has created a huge black market with all the attendant social pathologies. The politicians are as realistic about this as they are about the ECPA of 1986!

Richard Sinnott  
Fort Pierce, FL

## 2004 Fix Works!

When I subscribed to *Monitoring Times* in March, I figured, "What the heck - the subscription price is reasonable." With the first issue I received, I think I've already regained my investment.

In February, I bought one of the RS 2004 scanners. I had waited three months for them to be available in my area, because Tandy had decided to delete cellular telephone reception.

I read the clipping about the RS 2004 that appeared in your April *MT* many times. I couldn't believe it could be that easy to regain cellular phone reception. Maybe the article was an April Fools joke or a mistake.

This morning, I hesitantly performed minor surgery on the 2004. It worked!

I won't admit I'm listening to telephone calls on the 2004, but I will say that listening has become more interesting since I pulled out my wire cutters. Thanks, *MT*!

Jeffrey Multer  
Wayne, NJ

## FEC or SITOR?

I found a possible error in your "Reading RTTY" column, p. 37, the "chirp-chirp" is not FEC; it is regular SITOR.

FEC is a continuous warbling sound, not keyed off and on. I use them both every day. If you want to

hear FEC, listen as WLO (Mobile, AL) sends the weather for about 30 minutes using FEC mode, beginning at 1130, 1730 or 2330 UTC on 4350.3 and 8705.3 kHz (includes 1.7 kHz offset).

Bill Edwards K5CN  
Radio Officer  
SS Coastal Manatee

## Saving the Green

A short while ago I asked about a monitor with green screen to replace my black and white screen for easy reading on my eyes. I've had a couple of operations on left eye and it is quite sensitive to bright light.

You quoted a price--then quickly let me know it would be a waste of my time and much money. I was advised to seek green cellophane and cover the monitor. Why I failed to think of it I don't know. It was difficult to find in our one horse town, but for 79 cents total cost, I sure do thank you, sir, very much!

Don Johnson WDX8TEC  
Tecumseh, MI

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COLLINS military surplus cache, R-390 receivers and like equipment, parts, manuals. 35 East Pond Rd., Narragansett, RI 02882; (401) 783-7106.

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Wanted: ICOM 551 6-meter transceiver. WB8HWF, 1575 Ditmore-Stroll, Newark, OH 43055.

Atari P/D software for ham, SWL, and etc. For sale or trade. Jerry Callam, 10 Avalon Rd., Mount Vernon, OH 43050

JOIN a radio listening club. Complete information on major North American clubs and sample newsletter \$1.00. Association of North American Radio Clubs, P.O. Box 462, Northfield, MH 55057

For Sale: 3N140 or 2N3866 transistors 5/\$1. 120pf feedthru caps. 10/\$1. 10k Helitrimms 10/\$1 Postpaid. L. Gardner, 458 Two Mile Creek, Tonawanda, NY 14150

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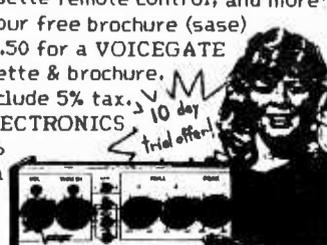
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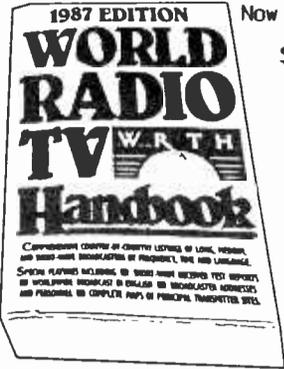
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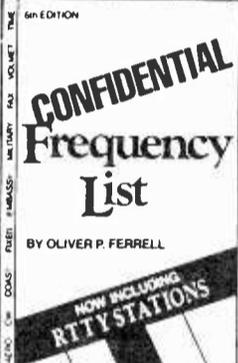
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