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**Inside This Issue:**

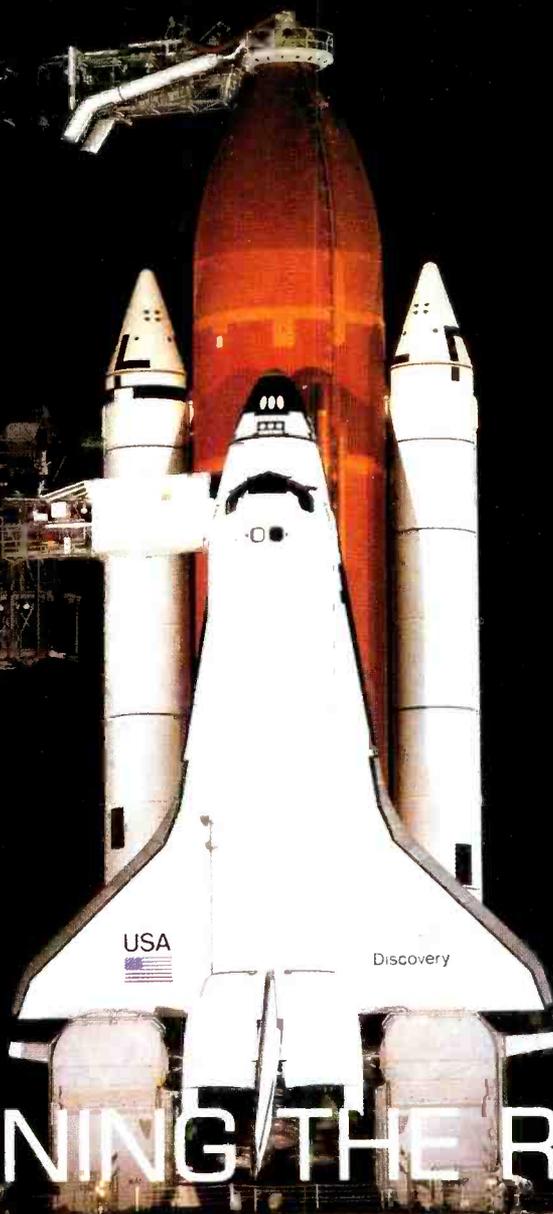
- Nicaraguan Radio Wars
- Trunk-Busting Basics
- Easy-to-build AM Radio
- *Kzapp!* Lightning and Your Radio



CHAGRIN FALLS OH 44028-0198  
31870 HIRSH DRIVE  
GODDARD SPACE CENTER  
\*\*\*\*\* DIAL PRE \*\*\*\*\*

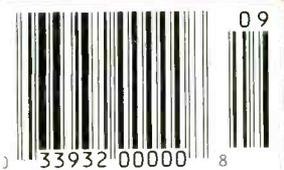
# MONITORING TIMES

A Publication Of  
Grove Enterprises



## REJOINING THE RACE

From liftoff to touchdown, frequencies you can follow



ICOM HF Receivers



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# MONITORING TIMES



Confused over how to monitor a trunked system? We'll turn you into a "trunk buster" - p.10



Radios in the classroom?! A new way to broaden one's education - p.22

Looking for a bargain radio? An "old faithful" might be had for a song - p.88

Build a working AM radio without being an electronic wiz to do it - p.92

Crazy Uncle Skip. He thinks that you should be able to enjoy your hobby without spending a lot of dollars - p.38

**"We Have Liftoff"** by Larry Van Horn 6

*Space. The final frontier. America is once again ready to challenge it. And MT readers are ready to monitor it with the most exhaustive list of frequencies ever published.*

**Trunk Busting Basics** by Bob Kay 10

*Is the new trunked system technology frustrating your scanning? Bob Kay says all is not lost. MT's resident scanning expert has the answers.*

**Radio War in Nicaragua** by Wood and Pedersen 12

*War is fought on many fronts and radio is one of them. Join Radio Sweden's George Wood for a first-hand look at the radio wars of Central America's Sandinista hotspot.*

**Lightning!** by Bob Kay 18

*Kzzzap! Lightning. It's the radio hobbyists biggest enemy. And it's not just a mid-summer phenomenon. MT checks with the experts on nature's power-packed light show.*

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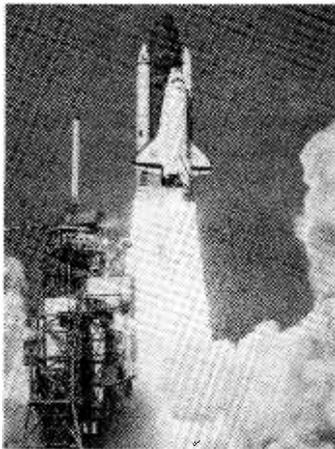
*These elementary students are fortunate to have a teacher who knows the worlds of fun and (sh-h-h) education that may be opened through shortwave radio.*

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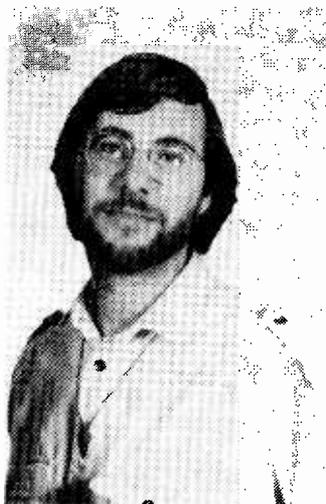
ON THE COVER: The Space Shuttle Discovery sits atop Pad 39B awaiting launch of mission STS-26 -- when? Photo courtesy NASA.



**Inside this Issue** • The problems plaguing America's re-entry into space have undoubtedly caused headaches down at the Kennedy Space Center. Every time a date for the launch of the shuttle is announced, it seems to be postponed. It's been going on for what seems like months. *Monitoring Times'* super-popular utility expert, Larry Van Horn has been sharing those headaches. • You see, even though final preparation of *MT* is completed only three weeks before you receive it, everytime the launch has been re-scheduled, we've had to re-schedule his article on monitoring the space shuttle. • This month, however, we said to heck with it. Let the presses roll! So whether the USA's space-phoenix rises from the ashes of the ill-fated Challenger at the end of

this month or later in the fall, you'll have all of the frequencies -- whether you're a scanner enthusiast living near the Cape in Florida or a shortwave listener on the west coast -- you need to tune in the action.

• From the final frontier to a destination closer to home, Swedish journalist and DX show host **George Wood** (right) travels to Nicaragua to present an unsettling look at broadcasting in that war-torn country. As George says, there's a war going on down there and it's not all being fought with guns. Powerful radio stations ply their political wares even when the shooting stops. You may not agree with George's views but we're certain that you'll find it one of the best pieces of writing we've ever had the opportunity to present to you.



• Back home, a lot of local police and fire services are switching over to something called "Trunked Systems." And it seems to make monitoring impossible. Did someone say impossible? Not *MT's* **Bob Kay**. A former Marine, Kay is not easily frustrated and in this month's issue, he not only explains the system but tells you how to overcome its effects. Kay also checks in with an article on the radio listener's nemesis, lightning, as well as his regular column on scanning. Perhaps we should rename the magazine, *Bob Kay Times* this issue.

• A couple of magazines out there claim to offer "useful, easy-to-build" radio projects. When you look inside, you find that it's something like "Build a 29-30 MHz Receiver Out of a Lawn Mower" -- and that you need a Ph.D in Electrical Engineering before you can even get started. This month, *Monitoring Times* offers two projects that you can build even if you don't know what end of a soldering iron to hold. (Tip: It's the end that stays cold.) • In **Clem Small's** monthly "Antenna Topics" column, Vermonter Small gives you step-by-step instructions on how to construct a simple, low-cost antenna that will work for you. • **Doug DeMaw** really begins to get his new column under way with another project -- a simple crystal radio set. Who says that you have to spend big bucks to go DXing? Not Doug or Clem!

• As if that wasn't enough, *Monitoring Times* offers the entire compliment of regulars -- from Larry Magne's receiver review to Kannon Shanmugam's witty program previews. It's 104 information packed pages again in September!

**Stay tuned** • Next month in a rare turn of events, John Combs shows you how you can get the dirt on your local broadcast stations, unedited and completely in the raw. There's at least a page of great frequencies for you to try. There's also a primer on DXing those abundant yet always elusive Indonesian shortwave stations and another of Wayne Mischler's great radio stories. It's all coming up in the next issue of the world's favorite communications magazine, *Monitoring Times*. Be there or be square!

# MONITORING TIMES

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# LETTERS



## Embassy "All Ears"

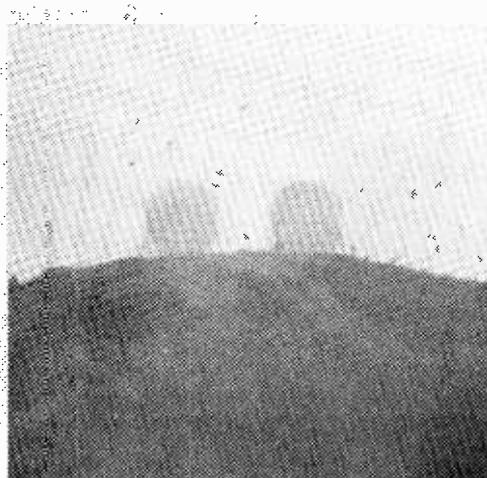
Regarding how Senator Moynihan's allegations on how the Soviets are monitoring Ma Bell's air waves and other radio signals -- we all know that it's true. What we don't talk about is that we Americans do the same thing at our embassies and missions around the world.

I went for several months to the Philippines and as a radio buff I could not believe my eyes at all of the dipoles and other small antennas plus one big microwave tower on the top and in the back of the U.S. embassy in Manila overlooking Manila Bay.

When I began to take photos a car came out of the embassy's front gate and stopped. Two big men came rushing out of the car and quickly walked toward me and asked what I was doing. I showed them my ID card and told them I was a reporter taking file photos of our embassy.

I then looked at their ID cards and they were from the NSA. We know what that is, don't we?

Then I went to do some sight-seeing north of Manila to a part called "Baguio" that's about 5,000 feet above sea level, where I saw the VOA Philippine relay station on one mountain. On another mountain was a large U.S. Navy or Air Force



*U.S. Air Force radar amidst the clouds*

communications station.

The antennas looked like two large, flat solar panels. People who live in the area tell me that it's used to detect low-flying aircraft. So I went as close as I could get and turned on my shortwave radio. All I heard was a loud woodpecker which confirms the report that they gave.

My point is we are always talking about what the Soviets are doing without looking at ourselves.

P.S.: The frequency for the Philippine National Police is 150.36. They are called CAPCOM. And the HQ is called Thunder Base.

David M. Torres  
New York, NY

*[More "Letters" on page 100]*

## On Summertime Listening

You are right. I'm wrong, I admit it. I cut way back on my shortwave listening this summer. Why? Because I kind of assumed that there was nothing to hear. Your article in the July issue [Summer Listening... Summer Not] turned my head around. Shortwave does not die because of high temperatures. It is compatible with outdoor living. Thanks to *Monitoring Times*, I've become a full-time shortwave listener -- not just another foul-weather friend.

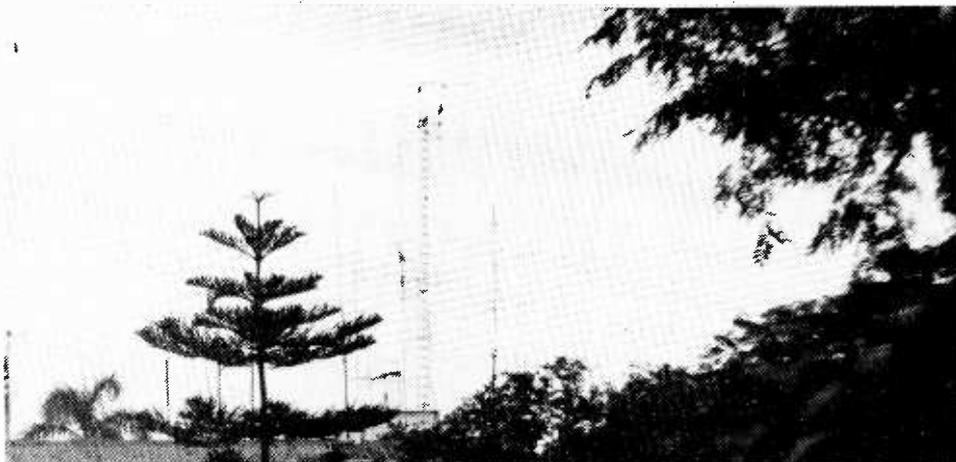
Amos Courtland  
Georgetown, Kentucky

When I first saw your article "Summer Listening...Summer Not," I thought that aside from a cute title, it had little to offer me. I was surprised to find that it was more than hype. The frequency tips were good (even if they were primarily designed for east coast listeners) and there are things to hear!

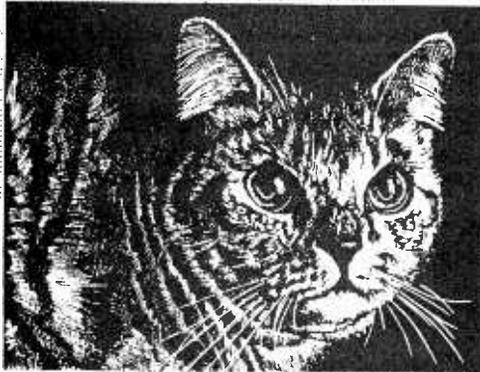
Ken Mytle  
Portland, Oregon

You're right. There are things to hear on shortwave during the summer: every lightning storm between your receiver and a transmitter.

Martin Bryson  
Ft. Lauderdale, Florida



*I was almost stopped for taking this photo of the mass of antennas on top of the U.S. embassy in the Philippines*



*Reason to worry*

## Here, Kitty, Kitty, Kitty

Ken Watson didn't like what he was hearing on KITY, Power 93-FM. Of that, the 29 year old Bulverde, Texas, man was certain. Intent on symbolically making his point to the station, Watson reportedly killed and cut up five cats. Each of the dismembered kitties was then placed in a separate box and set at the front door of the station.

Later arrested and charged with cruelty to animals, the suspect explained himself by saying that he had talked it over with God and that the cats were sick anyway. Said one station official: "It was very upsetting."

## No Protest Here

Air Force Capt. Robert F. Weiland probably didn't have protest on his mind when he piloted his F-16 jet fighter across rural Robeson County, North Carolina, last month. Nonetheless, he ended up knocking WSTS, a 80,000 watt Christian station in Laurinburg, North Carolina, off the air.

According to Dave McMahon, deputy chief of public affairs at Shaw Air Force Base in South Carolina, the multi-billion dollar plane hit WSTS' transmitter after Weiland ejected from the jet. There was no comment from station management; however, the Air Force issued a statement saying it is "always concerned" when a plane crashes. Weiland's F-16 was the

second based at Shaw to crash in two weeks.

## Help Save AFRTS

Several years ago, someone from Radio Canada International called us. What he said shocked us: RCI was to close down its North America service. "If you could get your readers to write enough letters, maybe we could save it," he said.

So many letters were received from our readers that the station's management -- after privately expressing surprise at your response -- went on the air, saying that *it was all a big mistake and that they never really intended to close the service to the U.S.!*

Well, we've done it once. Let's do it again. But hurry. There isn't much time. Armed Forces Radio and TV Service [AFRTS] is scheduled to leave the air at the end of this month.

Write a strong (do not kill any cats) but thoughtful letter on why you want AFRTS to remain on shortwave and make three copies. Send them to:

Charles Z. Wick, Dir.  
U.S. Information Agency  
301 Fourth Street S.W.  
Washington, DC 20546

Lt. Col. Thomas Hansen  
AFIS/AFRTS  
601 N. Fairfax, Suite 360  
Alexandria, VA 22314

The Hon. Clairborn Pell, Chairman  
Senate Foreign Relations  
Committee  
Room SR-335  
U.S. Senate  
Washington, DC 20510

The Hon. Dante B. Fascell,  
Chairman  
House Foreign Affairs Committee  
Room 2354  
U.S. House of Representatives  
Washington, D.C. 20515

All it takes to cast your vote in favor of AFRTS on shortwave is four 25 cent stamps and your time. Isn't it

worth a dollar to have an all news and sports station on shortwave? *You bet.* We sincerely urge you to take a moment of your time to write.



*Volunteers, anyone?*

## Uncle Sam Wants You

Interested in giving Uncle Sam a hand by doing a little monitoring? Well, Captain A.L. Tucker, Program Manager of Special Projects at the Navy's Space and Naval Warfare Systems Command in Washington, DC, is testing out a new type of low frequency antenna. As part of the testing, he'd like to receive reception reports from *Monitoring Times* readers.

Testing of the antenna will run sporadically through October from sites at Bumpass, Virginia and Carroll Island, Maryland. Transmitter output power is 1 kilowatt and the primary operating frequency will be 185 kHz with 175 standing by for secondary usage.

The signal will consist of alternate periods of steady carrier and on-off keyed ten word per minute international Morse Code with the call sign NWA, the word "TEST" and a single alphabetic character related to the current test condition.

In order to qualify for a special, once-in-a-lifetime QSL card, you must identify the time and date, the location of your receiver, a description of the antenna and receiver, the frequency of the signal received, its

quality and the test condition alphabetic character.

Current information on test times and frequencies will be provided on a prerecorded message at area code 703-471-1539.

Send your reports to SPAWAR, NWA Test, Washington, D.C., 20363-5100. Be sure to mention that you read about it in *Monitoring Times*.

## Is the PM a Radio Buff?

Indian Prime Minister Rajiv Gandhi is a DXer. According to *Gentleman* magazine, the PM can often be found behind the dials of his shortwave radio, trying to hear news broadcasts from "important stations" around the world. *Gentleman* says that Gandhi's shortwave listening habit began when combined two of his other past times: running India and being an avid ham operator.

Any truth to the rumor that the PM is also an *MT* subscriber?

## Radio Phony

A man convicted of faking a plane crash and then telling searchers that his three passengers were dead and he was bleeding to death, was sentenced to a year in prison and ordered to undergo psychiatric evaluation. The resulting search, utilizing as many as 100 people, 20 aircraft and six police agencies, reportedly cost some \$50,000.

At Blair's trial, David Webster, a Navy reservist and Delta Airlines pilot, said his crew tracked the voice of a man who talked sporadically and said he was chilled, weak and losing blood. "The people in my plane were screaming and yelling," said Webster. "I got tears in my eyes thinking, 'We're going to get this guy out.'"

U.S. Circuit Judge Hugh Bownes said in sentencing Blair that "It seems obvious to me ... that there is some kind of mental aberration involved for a normal person to set this kind of event in action."



*It never happened*

## No More Radio or TV Stations?

Saying that "Broadcasters are not afraid of competition," the NAB (National Association of Broadcasters) has issued a position paper encouraging restraint in creating new radio and television stations. According to joint board Chairman Wallace Jorgenson, the paper "is not an attack on new technologies; it is not an effort to ask policymakers for a complete halt to any new allocations."

Instead, it is an effort to get policy makers to look at the economic and technical harm which could accrue in an overly congested marketplace. "[We] are afraid of a marketplace so congested with stations that, for technical and economic reasons, no one can compete effectively."

## Government "Shares" HF Spectrum Usage

A new program mandated by the White House and implemented by the National Communications System (NCS) is intended to integrate the intercommunications ability of all federal agencies. The preliminary

manual of participating agencies, personnel and networks is about the size of the Manhattan telephone directory.

The integrated network, code-named "SHARES", will allow virtually every radio-licensed government agency -- FBI, Army Corps of Engineers, FEMA, State Department, Department of Interior, U.S. Navy, Postal Service -- to interface during an emergency. They will also be heard utilizing routine communications to keep the system up.

As a case in point: suppose a Justice Department bureau learns of an impending bank robbery in a remote town across the country. Normal communications are disrupted or otherwise impractical. The Justice official picks up his directory and routes his call through an FAA radio link, thus accessing his remote compatriot.

Eventually, the high-tech system will employ propagation sampling, constantly testing upper and lower frequency limits, selecting optimum links on a continual basis.

The traditional shortwave spectrum, 2-30 MHz, is being "rediscovered" by massive communications organizations. Operation SECURE was organized to provide interstate communications in time of emergency and even the U.S. Postal Service is implementing HF for mobile tracking of suspected mail fraud and other postal infringements.

Rather than falling into disuse, abandoned for satellites, it would appear that shortwave communications are here to stay. Less vulnerable than satellites and less likely to be blacked out by nuclear conflagration, the high frequency spectrum shows great promise, even for emerging technologies. Expect increasing use in the foreseeable future.

Credits: Associated Press via Dave Alpert, NY, *Gentleman Magazine*, *Radio World*.

On p.4, August issue, VOA was incorrectly substituted for AFRTS in the photo caption.

# "WE HAVE LIFTOFF"

## Monitor the Shuttle's leap back into space

by Larry Van Horn

It appears, illuminated by giant one million candlepower arc lamps. The first thing you notice as it begins to leave the vehicle assembly building is the big orange tank in the middle. Flanked on either side of the orange external tank are the gleaming white solid rocket boosters. The mind returns, briefly, to a cold day in January 1986 when one of these rockets caused a tragedy we will remember forever.

Finally, after what seems like an eternity it inches into view. A magnificent black and white winged vehicle named Discovery, destined to carry five astronauts into space sometime this fall.

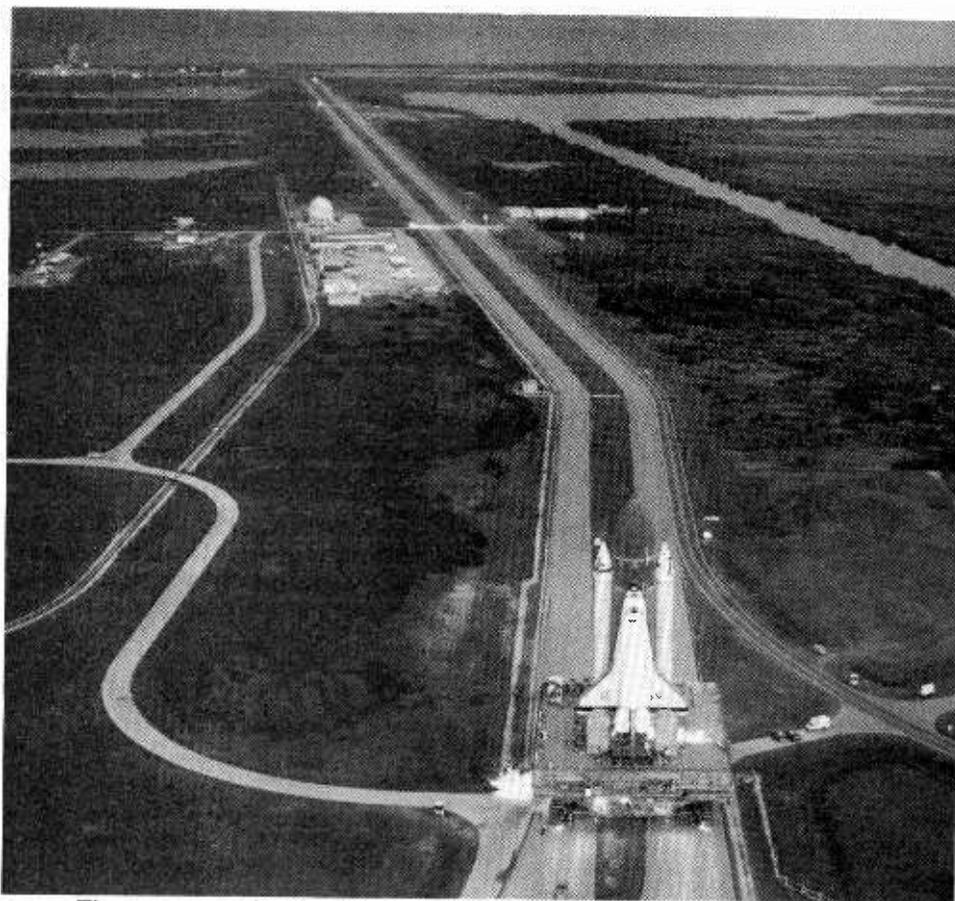
Discovery and its associated hardware took nearly eight hours to make the Fourth of July, 4.2 mile trip to shuttle launch pad 39B this summer. No matter the speed, the rollout of STS-26 represented a milestone on NASA's road to recovery.

The mission will be commanded by Frederick H. Hauck (Captain, USN). Hauck previously commanded mission 51-A in November 1984 and served as pilot on STS-7 in June 1983. Richard O. Covey (Lt. Col., USAF) will be the pilot on this mission. Covey served as pilot on flight 51-I in August 1985.

Mission specialists for STS-26 will be John M. Lounge, who flew as a mission specialist on flight 51-I; George D. Nelson, who served as a mission specialist on flights 41-C in April 1984 and 61-C in January 1986; and David C. Hilmers (Major, USMC), who flew as a mission specialist on flight 51-J in October 1985.

A tracking and data relay satellite (TDRS) will constitute the primary payload for this mission. An identical satellite was destroyed in the Challenger accident over 2-1/2 years ago. The TDRS is used to relay communications from the shuttle spacecraft and earth based orbiting satellites.

Additional cargo to be flown on Discovery's middeck area include five microgravity experiments, life sciences, atmospheric science and infrared communications experiments as well as two student experiments.



The space shuttle begins its slow trek to the launch pad

### Monitoring NASA on HF

Table 1 reflects current NASA/USAF HF networks in use. Listeners must keep in mind that HF frequencies are primarily backup circuits to VHF/UHF terrestrial networks and satellite links; therefore, don't expect a lot of activity on these channels.

Most space launches from the Cape utilize military units and communications to support launches. Three main branches of the military -- the Air Force, Navy and Coast Guard -- are involved with most space launches.

In most cases, countdowns for space launches start about 48 hours prior to liftoff. Usually at this time the mission director will call up all stations involved with the launch and test all communication circuits. This is usually a good

time to get a handle on what frequencies to start monitoring. Monitors must keep in mind that frequency circuits in use will depend on propagation from the Cape to stations in the network, not to the listener's location.

During past missions, the MUX channel on 20192 kHz has carried shuttle mission audio. Check around 20198 kHz in lower sideband. This appears to be coming from either Ascension Island or Patrick AFB, Florida.

The primary radio site for NASA communications is located at Malabar, Florida. This site is maintained and leased from RCA communications. There are 20 transmitters located at this site that can be used for NASA mission support.

The Navy also has a transmitter at Malabar



*The crew of mission STS-25 shuttle Discovery*

with 20 preset channels (see Table 2). Normally operators will establish contact with Navy units involved with the launch via this transmitter and direct them to channels in use from Table 1.

The Coast Guard plays a very large role in any NASA launch. It is the responsibility of Coast Guard units to keep the restricted area off shore from the Cape clear of marine traffic. Table 3 lists the most commonly heard Coast Guard channels on HF used during launches from the Cape.

There are several backup channels that are not in current use. Most government agencies have a hard time getting new frequency allocations from the government's FCC, IRAC (Interagency Radio Advisory Committee). Consequently, agencies are very reluctant to turn in a channel even if they currently aren't using it. Table 4 is a complete list of assigned but dormant NASA/USAF allocations that could be used during future missions.

### **Ham Frequencies Carry Mission Audio**

An added bonus in monitoring shuttle missions is received courtesy of amateur radio operators. Shuttle mission audio can be heard on shortwave radio frequencies. Amateur radio club WA3NAN at the Goddard Space Flight Center has provided this service in the past and indications are that this will continue. Frequencies to watch include: 3860, 7185, 14295, 21390, 28650 kHz and on VHF in the Greenbelt, Maryland, area 145.550 and 147.450 MHz.

In the past, the Johnson Space Center's club W5RRR has carried shuttle audio. Frequencies to watch include: 3940, 7265, 14280, 21365, and 28600 kHz.

Those individuals who go down to the Cape should monitor the 146.820 repeater in Gainesville, Florida. The Gainesville Amateur Radio Club has provided this service during past missions. They relay the audio from the Merritt Island repeater mentioned previously.

Monitors in the Los Angeles area should check 224.04 for mission audio from the Jet Propulsion Lab in Pasadena. Several repeaters in southern California pick up the service and retransmit portions or all that is available during each shuttle mission. Repeaters to check include: 145.6, 145.46, 146.75, on UHF 446.775 and 447.775.

Listeners in other areas of the country not covered above might want to check with local radio amateurs on the availability of shuttle mission audio in their areas. One interesting note -- some hams are even sending shuttle video via amateur fast scan TV. Those of you so equipped might want to check out this possibility with your local amateur TV club or group.

### **NASA on VHF/UHF**

Table 5 reflects VHF/UHF assignments, and usage where known of NASA/USAF sites associated with space shuttle missions. Listeners must keep in mind that these frequencies are line of sight, therefore you

## **TABLE ONE NASA Malabar (Palm Bay) HF Networks**

2405	Data buoys
2622	SRB recovery primary
2664	Backup mission audio-Cape to Houston
2678	ETR range control
2716	Navy harbor ctrl-Port Canaveral
2764	SRB recovery channel
3024	Coast Guard SAR-primary
3187	SRB recovery ships channel
4376	Primary recovery zone SAR
4510	SRB recovery ships channel
4856	Cape radio/leader
4992	Cape radio/coast guard ships
5180	NASA tracking ships
5187	NASA tracking ships
5190	ETR primary night channel
5350	Launch support aircraft
5680	Launch support ships
5810	ETR-secondary night channel
6720	SAR primary Atlantic
6896	Cape radio
6837	Cape radio
7412	SAR comms with Bahamas
7461	Cape radio/launch support A/C
7525	NASA ground tracking net
7676	Launch support aircraft
7765	SRB recovery ships
7919	Data channel
7985	Data channel
9022	Launch support aircraft
9043	Launch support aircraft
9132	Launch support aircraft
10305	Space missile tactical net
10310	Malabar to Ascension Is-MUX
10780	ETR-primary day channel
11104	Launch support ships
11252	Launch support ships
11407	SRB recovery ships
11414	Cape radio
11548	Cape radio
11621	SRB recovery ships
13227	Launch support aircraft
13237	Data channel
13495	Data channel
13600	Malabar to Ascension Is-MUX
13878	Launch support aircraft
14937	Ascension Is to Malabar-MUX
18009	Launch support ships
19303	Launch support ships
19640	Cape radio
19966	Ascension Is to Malabar-MUX
20186	Launch tracking net
20192	Malabar to Ascension Is-MUX
20198	OCC shuttle mission audio
20390	ETR-secondary day channel
22755	Ascension Is to Malabar-MUX
23413	Cape radio
27065	NASA CB radios

must be fairly close to the transmitter sites to hear these frequencies.

Listeners in the Houston area can hear shuttle audio courtesy of JSC's 171.150 channel during missions. It is my understanding that this service is provided for journalists following shuttle missions at the Johnson Space Center.

The frequencies provided in Table 6 are the primary frequencies that should be monitored at the Cape during any shuttle launch. Any additions and corrections to these lists are

most welcome and can be sent to *MT* headquarters in Brasstown. Please mark your envelopes "Attention Project NASA."

### Other Shuttle Comm Opportunities

During most shuttle missions AT&T offers a call in number so people can hear real-time shuttle communications. Charge for the call anywhere in the contiguous U.S. is \$.50 for the first minute and \$.35 for each additional minute. *MT* readers might wish to check with your local Ma Bell operators for the 1-900 telephone number currently in use.

Satellite dish owners also have reception opportunities. NASA provides the NASA Select channel on a C-band satellite. This channel provides video and audio to other NASA sites and contractors, providing not only lift-off to landing coverage but "change of shift" briefings as well.

Shuttle missions aren't the only thing carried on NASA Select. Voyager flybys of Jupiter, Saturn, and Uranus; unmanned launches; Challenger disaster hearings are just some of the more interesting happenings on this channel. NASA Select is currently being viewed on SATCOM F2 transponder 13.

TVRO dish owners should also check network and NASA backhaul channels and AFRTS satellite channels for shuttle video and audio.

Informed sources at the Cape indicate that NASA plans on using military communication satellites during shuttle missions. *MT* readers equipped to monitor FLEETSATCOM and LEASAT channels should check out satellites serving the continental U.S. for possible shuttle launch associated traffic and mission audio.

Shortwave broadcast listeners will be pleased to know that the Voice of America will carry extensive coverage of the launch. According to Richard Firestone of the VOA's special events office, coverage of the launch and landing of Discovery will be carried by at least ten different language services. In addition, regular updates on the mission will be provided on VOA newscasts. This should afford listeners overseas a chance to follow the launch and landing of mission 26. You might also want to listen to other major broadcasters for in-depth coverage of the STS-26 mission.

### The Ultimate Comms

The ultimate in shuttle monitoring is to hear the orbiter communications direct. This is probably easier than you expect, but it does take patience.

The shuttle transmits in the military UHF

range on three different frequencies. 296.8 is the primary shuttle downlink channel. This is a simplex frequency and only one side will be heard (from the crew cabin). 259.7 is also available aboard the shuttle on a secondary basis. 279.0 is probably the most exotic of the three channels. It is used as a link from the astronauts space suits to the orbiter during space walks or EVAs. Good luck on hearing this simplex frequency.

The orbiter does carry the International Military Distress channel of 243.0 MHz; however, this is only used as an emergency backup. These UHF channels are only backups to the primary shuttle frequencies located in the S-band. Below is a summary of shuttle orbiter channels located in the S-band region:

Orbiter FM downlinks:  
2250.0 (FM OI), 2205.0 (FM DFI)  
Orbiter PM downlinks:  
2287.5 (Primary), 2217.5 (Secondary)

DOD USAF PM uplinks:  
1775.7 (Secondary), 1831.8 (Primary)  
NASA PN uplinks:  
2041.9 (Secondary), 2106.4 (Primary)

Mission STS-26 will be by and far the most extensively covered shuttle mission since the first launch of Columbia in April 1981. *MT* readers will have many chances via radio to hear and monitor the launch, mission and landing of the crew aboard the shuttle Discovery. Be sure to tune in and listen to the excitement as NASA announces: "We have liftoff."

*Over the last couple of years, many MT readers have supported our project NASA effort. We thank them. The result is the collection of frequencies printed here, the most comprehensive list of NASA communications ever published outside of the government.*

**TABLE 2  
US Navy Malabar  
Transmitter Presets**

3130	FACSFAC Jacksonville
5718	Atlantic fleet ship
6693	Atlantic (ATL) fleet aircraft
6708	ATL fleet ships/aircraft
6723	Navy ATCOM channel
8779	ATL fleet ships
8972	ATL fleet safety of flight ch
8981	Navy P-3 A/C to NASA ch
9006	ATL fleet A/C duplex w/11205
11205	ATL fleet A/C duplex w/9007
13172	ATL fleet ships/aircraft
15021	ATL fleet ships
15051	ATL fleet ships
15057	ATL fleet ships
15067	ATL fleet ships tactical
16167	Navy fixed net channel
16419	Navy fixed net channel
18019	ATL fleet aircraft
22687	ATL fleet ships
23224	ATL fleet aircraft

Also 6742 and 11252 can be substituted for 3130

**TABLE 3  
NASA Associated  
Coast Guard Channels**

2103	Intra-Coast Guard usage
2182	International distress channel
2261	Air-to-ground channel
2638	Non-sked urgent and safety B/C
2667	Intra-coast guard usage
2670	Sked and non-sked marine info
2691	7th CG district operations
2738	Ship-shore and ship-ship
2830	Ship-shore and ship-ship
3023	Intl SAR channel
3123	Air-to-ground (USN shares channel)
4376	CG SAR channel during STS-51L
5680	Intl SAR channel
5692	Air-to-ground Helo (USN shares)
5696	Air-to-ground, PRI (USN shares)
8984	Air-to-ground, PRI (USN shares)

**TABLE 4  
NASA Reserved Frequencies**

2505	2744	2800	2836	3120	3365	4500	4704	4714
4755	4825	4860	4900	5060	5235	5246	5436	5775
5822	6750	6753	6810	6880	6919	7313		7605
7697	7742	7804	7833	7860	7910	8077	8993	9018
9115	9138	9170	9910	10159	10215	10230	10270	10301
10327	10475	10850	10880	10905	10949	11634	11984	11988
12107	12160	12277	12876	12287	13210	13244	13380	13468
13676	13735	13742	14497	14585	14615	14650	14896	14967
15698	16216	16246	17470	17490	17554	17668		
18022	18051	18196	18310	18331	18354	18434	18700	18769
18801	18990	19126	19143	19371	19390	19928	19963	20266
20272	20475	20690	21810	22683	22990	23035	23281	23325
23479	23485	23661	23840	23940	24240	24512	24530	24780
24914	25130	25161	25198	25245	25597	26356	26389	26515
26684	27720							

## TABLE 5 FREQUENCY PLANS NASA SUPPORT SITES

*All frequencies in MHz.*

### GODDARD SPACE FLIGHT CENTER - GREENBELT, MD

164.175 167.825 167.925 170.025 170.350  
170.400 171.000 171.150 173.660 173.685  
408.150 412.000 167.925 (FEMA)

### HOUSTON SPACE FLIGHT CENTER - HOUSTON, TX

164.200 164.985 168.450 169.000 170.100  
173.685 314.600 382.600  
168.000 (maintenance)  
164.050 (FAA)  
171.150 Shuttle mission audio from JSC.

### MARSHALL SPACE CENTER - HUNTSVILLE, AL

122.850 162.125 164.175 164.200 164.175  
164.975 165.325 166.225 167.875 168.450  
170.100 170.200 170.350 170.400 171.000  
171.150 172.225 173.025 173.610 173.660  
173.685 173.785 314.600 382.600

### DRYDEN RESEARCH CENTER - EDWARDS AFB, CA

49.830 122.850 162.025 162.610 164.100  
165.610 166.225 168.000 169.400 170.350  
170.400 171.000 171.150 240.200 240.600  
241.400 241.600 241.800 259.700 278.900  
296.800 314.600 371.700 382.600 384.800  
38.650<sup>1</sup> 138.050 138.075 138.175 138.250  
138.400 139.800 141.550 148.050 148.550  
148.675 148.900 149.150 149.225 150.150  
150.280 155.280<sup>2</sup> 173.435 228.200 229.600  
235.000 236.000 239.400 245.300 248.600  
251.900 257.000 260.700 262.500 264.600  
266.300 267.900 268.100 272.000 274.200  
278.900 279.900 280.100 284.100 286.400  
286.800 287.200 289.100 290.600 291.800  
294.600 297.400 304.000 308.700 311.000  
311.200 311.400 314.400 315.200 315.900  
319.600 322.700 325.900 337.000 341.600  
349.300 349.600 351.400 358.400 359.200  
378.100 379.700 383.000 384.800<sup>3</sup> 385.900  
395.100 398.100 413.450 235.000<sup>3</sup>

1 AF                      2 NASA                      3 USN  
121.800 Lakebed traffic control  
162.625 Purge VHF network  
168.000 Cooling VHF network  
169.600 TV direction (JSC)  
372.200 Pilot-to-dispatcher  
120.700 Edwards VHF tower  
318.100 Edwards UHF tower  
390.100 Edwards UHF ground control  
375.200 PMSV: Metro weather  
339.900 Army aviation  
38.450 Air-to-ground VHF command  
164.100 Convoy command VHF network  
169.400 PAO release (JSC)  
269.900 Edwards ATIS  
236.600 Edwards UHF tower  
121.800 Edwards VHF ground control  
304.000 Edwards command post (Conform)  
141.100 Army aviation

### KENNEDY SPACE CENTER, FL

Freq	User	Usage
138.450	AF	AM mode channel (shared with CCAFS)
148.455	AF	NASA NET 112 - SRB recovery ops/crawler transportation ops
149.175	AF	NASA NET 113 - SRB recovery ops/crawler transportation ops
162.0125	AF	NASA NET 306 - Marine operations (barge supply)
162.6125	AF	NASA NET 104 - Launch support ops "Alpha control"
163.5375	AF	NASA NET 108 - PAO (Paging)/hurricane operations
164.650	I	Wilson KID717 to KNDYSPCN KID

728	I	Turtland KID768 to KNDYSPCN KID 728
728	I	NSMYRNBC KID767 to KNDYSPCN KID 738
164.750	AF	National Park Service (KSC) KID 728 Wilson KID717
165.0125	AF	NASA NET ??? - Environmental Monitoring (Paging)
165.1875	AF	NASA NET 102 - Telemetrics/MEAS
165.4125	AF	NASA NET 110 - Orbiter operations
165.6125	NASA	NASA NET 202 - Telemetrics/MSBLS
167.850	DOE	Department of Energy (nuc weapons)
168.450	DOE	Department of Energy (nuc weapons)
170.150	AF	NASA NET 107 - Base comms
170.175	AF	NASA NET 206 - GSA Operation/truck and rail support
170.350	AF	NASA NET 308 - Base paging
170.400	AF	NASA NET 106 - GSA supply
171.000	AF	NASA NET 101 - Base utilities
171.150	AF	NASA NET 201 - General maintenance fuels "NOVA"
173.175	AF	NASA NET 203 - Security, tactical 2
171.2625	AF	NASA NET 408 - PAO TV-coordination
173.4375	AF	NASA NET 117 - Hospital-CD net
173.5375	AF	NASA NET 111 - Loan pool
173.5625	AF	NASA NET 116 - Fire and rescue, channel 1
173.6625	AF	NASA NET 105 - Primary pad ops
173.6875	AF	NASA NET 103 - Security prin, channel 2
173.7875	AF	NASA NET 216 - Fire and rescue, tactical channel 2
407.325	AF	NASA UHF 1 - Convoy command Launch complex (LC) 39 ops pool
407.475	AF	NASA UHF 2 - VAB Crand operations LC 39 operations pool
408.150	AF	NASA UHF 3 - Convoy purge control LC 39 operations pool
408.175	AF	NASA UHF 4 - VAB Crane operations LC 39 operations pool
408.800	AF	NASA UHF 5 - LC 39 operations pool
409.050	AF	NASA UHF 6 - VAB Crane operations LC 39 operations pool
409.125	AF	NASA UHF 7 - LC 39 operations pool
409.175	AF	NASA UHF 8 - Convoy cooling control LC 39 operations pool
412.825	AF	UHF 1 - Industrial area pool (O&C)
412.950	AF	UHF 2 - Mobile cranes/rigs
413.025	AF	UHF 3 - Industrial area pool (O&C)
413.075	AF	CC501 Convoy cargo ops
413.125	AF	
413.150	AF	UHF 4 - Industrial area pool (O&C)
413.250	AF	UHF 5 - Industrial area pool (O&C)
413.325	AF	
413.375	AF	UHF 6 - Industrial area pool (O&C)
413.525	AF	UHF 7 - Industrial area pool (O&C)
413.550	AF	UHF 8 - Industrial area pool (O&C)
916.000	AF	NASA crawler moves
929.000	AF	NASA crawler moves
939.000	AF	NASA crawler moves

### SHUTTLE LANDING FACILITY

123.600 Common traffic advisory frequency  
126.300 VHF SLF tower  
284.000 UHF SLF tower  
121.750 VHF SLF ground control

### CAPE CANAVERAL AFS, FL

Freq	User	Usage
40.190	AF	OSI
46.650	AF	
49.620	AF	
40.700	Army	Air operations
138.150	AF	(AM mode)
138.450	AF	(AM mode)
139.050	AF	(AM mode)
139.250	AF	(AM mode)
139.300	AF	Operational loan pool
139.900	AF	Operational loan pool

140.170	AF	
140.200	AF	
140.400	AF	(AM mode)
141.000	Navy	Data transmission
141.300	AF	(AM mode)
142.500	AF	O & C Crane ops
142.860	AF	O & C Crane ops
143.040	AF	O & C Crane ops
143.280	AF/CG	CG air channel
143.430	AF	(AM mode)
143.900	AF	Civil air patrol-repeater in
148.035	AF	NASA TV - pool camera production
148.150	AF	Civil air patrol-repeater out
148.250	AF	Satellite uplink
148.485	AF	ETR-6/photo ops
148.515	AF	Titan III ops
149.150	AF	Titan III ops
149.250	AF	(AM mode)
149.900	AF	Data transmission
150.150	AF	Malabar security
150.195	AF	Cape support
150.250	AF	"687 Base"
163.4625	AF	ETR-D Cape security
163.5125	AF	ETR-B Cape SRO
163.5625	AF	ETR-F Cape fire
163.5875	AF	Paging
164.500	AF	ETR-Y Radiation monitoring
165.0125	AF	Paging
165.0375	AF	
165.1125	AF	Command post-repeater
400.050	AF	Data transmission
403.000	AF	Weather balloons
406.500	AF	Data transmission to Atlantic
416.500	AF	ETR Range safety officer to Atlantic missiles emergency destruct channel
419.150	AF	

### PATRICK AFB, FL

Freq	User	Usage
2.0000	AF	
2.7165	NASA	
3.1830	AFRES	
4.4490	AF TAC	
4.5600	AF SAC	U-2 ops
4.7600	AF TAC	
4.8250	NAVY	
5.2910	AF	
7.9850	NAVY	
9.2530	NAVY	
11.547	AF AFSC	
15.575	AF MAC	
18.990	NAVY	
38.650	AF(KSC)	Air-to-air
40.150	AF AFRES	Air-to-ground
41.950	AF	Air-to-air "TAC OPS"
46.650	AF(KSC)	Air-to-air ARRS
46.850	AF TAC	Air-to-air
49.750	AF MARS	
49.850	AF MARS	
119.250	AF	Approach/departure PAFB ATC, channel 12 (paired with 358.3)
120.950	NAVY	Sealord - PAFB site (paired with 267.5)
121.700	AF	PAFB ground control, channel 01 (paired with 335.8)
125.100	AF	Approach/departure PAFB ATC channel 03 (paired with 340.9)
126.200	AF	PAFB tower channel 02 (paired with 348.4)
126.400	USCG	Air-to-ground channel (zone control)
128.800	AF	PAFB dispatcher/base operations (paired with 372.2)
135.825	NAVY	Sealord secondary channel
138.075	AF CID	OSI channel B
138.175	AF CID	OSI channel A

[continued on page 101]



# Trunk Busting Basics for Scanner Listeners

by Bob Kay

According to a recent newspaper headline, the hobby of scanning was dying. "New Trunked Radio System Prevents Home Monitoring of Police Calls." After reading the article, it was evident that the reporter was not too well informed. Here was a reporter who actually thought that a ten channel, computer-controlled trunked radio system could keep listeners from tuning in their local police and fire departments. Ha! He had obviously never heard of *Monitoring Times'* highly secretive "Trunk Busters" team.

"The 450 MHz scanner is quickly becoming obsolete," said the reporter. And here is my favorite: "Owners of scanner radios may soon be selling them at flea market prices."

Yes, the reporter's findings were incorrect but it is easy to understand why most people believe that trunked monitoring is impossible. Even serious scanner buffs have written to *MT* expressing their frustrations when attempting to monitor local trunked systems.

## Readers Worried

"In my area," one letter began, "the police and fire department, along with the dog catcher and the board of health, are all using the same trunked system. When my scanner pauses on an active channel, it could be any one of the four agencies -- can you help?"

Another reader asked the following questions.

"Can the entire conversation of one agency be followed through a trunked system? If so, can it be accomplished without any special equipment, other than a conventional scanner radio?"

The answer to all the above questions is a resounding yes! Any one agency in a trunked system can be accurately moni-

tored. To discover the secrets of trunked monitoring, we must first learn how the system works. Once the basics are understood, it then becomes much easier to apply a specific listening technique that will allow us to hear all the action.

## Trunk Buster Basics

In a trunked system there are ten channels that may be assigned to both the police and fire department. In some cases, other agencies may also be assigned to the same ten channels.

All of the mobile and base units are programmed to operate on any of the ten channels. Similar to cellular phones, the programming and switching of frequencies is accomplished by the aid of computers. Unlike cellular phones, the trunked system will not switch to another frequency in the middle of a conversation.

In the trunked system, everyone has the ability to communicate simultaneously with all the other units in the system. This feature is primarily useful when police departments must broadcast an "all points bulletin."

When a mobile user presses the microphone button, the radio automatically tunes to an empty channel. At the repeater site, a computer then tunes the base radio to the mobile units channel. If all the channels are busy, a flashing "busy" light will be activated in the mobile unit.

One of the ten channels will be designated as a "signaling channel." Each time the microphone button is pressed, a burst of encoded information is sent to the computer. The computer uses this information to determine the status of the patrol car and to provide the base operator with the vehicle identification number. In an emergency, an officer only has to press a button and the dispatcher will instantly know the

ID of the unit in trouble.

In addition to signaling channels, some trunked systems may also utilize "data channels." These channels are used to transmit the more routine services such as arrivals and departures from an accident scene, in/out service calls and vehicle identification checks. On some systems, officers can instantly access vehicle license plate information from a small console that is mounted within the vehicle.

## Monitoring Conversation Channels

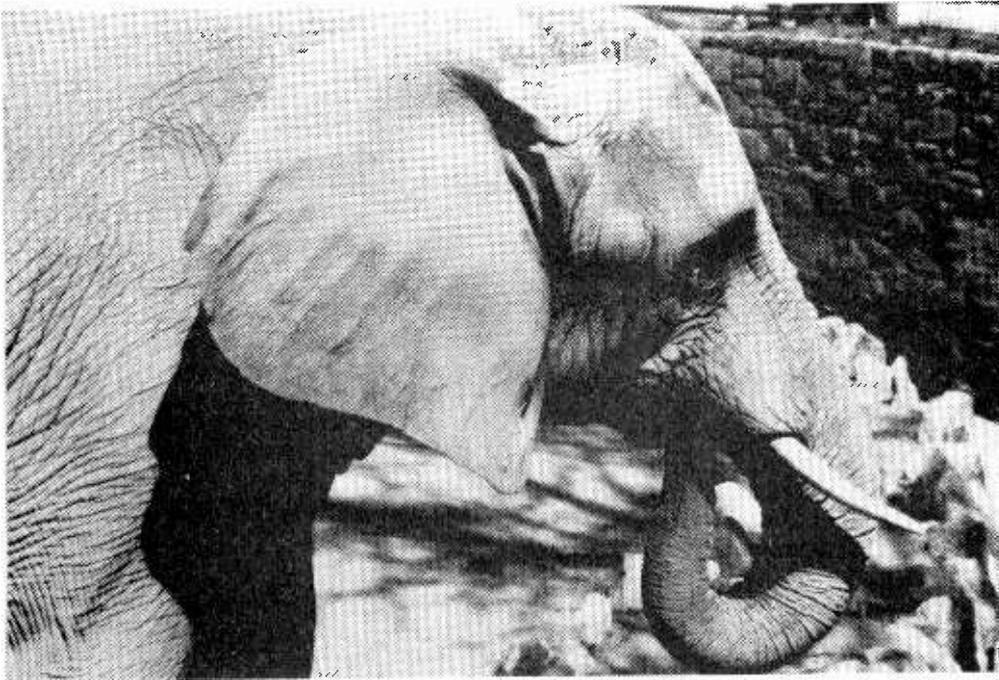
The remaining channels that are not used for signaling or data purposes are called "conversation channels." Since only the conversation channels can be heard on our scanners, the other nonvoice channels should be "locked out."

On some systems, as many as four channels may be used for signaling and data transfer. Once these are locked out, it isn't that difficult to monitor the remaining six voice channels.

However, be advised that both the signaling and data channels will change from day to day. To be successful, the scanner buff must determine the active voice and data channels on a daily basis.

The "delay" feature on your scanner should be deactivated. As mentioned earlier, the trunked system will not switch channels in the middle of a conversation. But it may change channels as soon as the user releases the microphone button. Use of the delay function will not allow the scanner to follow the conversation to the next channel.

In order to hear the entire conversation of one agency, several scanning radios with lightning fast scan rates are needed. Two Regency Turboscan 800s would be ideal. At first, it may be a little confusing, but your



**Trunk busting means the scanner no longer does all the work. We must get actively involved in the process.**

ear will quickly become accustomed to following a single conversation as it is randomly selected between two or more scanners.

### **Active Listening**

Scanning in this manner is rather exciting. But gone are the lazy days of idle listening on just a few channels. Trunked scanning demands that we sit on the edge of our chairs and become actively involved in the scanning process.

When using scanner radios with conventional scanning rates, repeated pressing of the scan buttons may be necessary in order to follow a specific conversation. The first few words of the transmission may be lost, but the main body of the communication will be heard.

Recording the conversations of any one agency would be difficult. Since there is no way of determining what channel the computer may select, accurate recordings would require multiple tape players and some very monotonous editing procedures.

Each manufacturer's trunked system is different. No two systems can operate together. As a result of this, no two systems can be monitored in exactly the same manner. To explain the trunking basics, the Motorola system was described above.

### **Monitor Them All**

In the Johnson trunked system, both the signaling and voice channels occur on the same channel. This is done by transmitting the signaling information on a frequency range just below the speech frequency.

However, don't become discouraged. On a very basic level and in regards to scanning, all the systems can be monitored by using the procedures that have just been explained.

It really doesn't matter what channels are used (if any) for signaling or data transfer. If they are present, lock them out. If they can't be found, simply concentrate on monitoring all ten channels.

In addition to Motorola and Johnson, Midland, Uniden and a long list of other manufacturers have all introduced their own line of trunked systems.

If you are really interested in monitoring locally trunked transmissions, try to discover the type of system being used. It then becomes a simple matter of reviewing the manufacturer's specifications and tailoring your skills to fit the mold.

Prior to the introduction of trunked radio communications, we became accustomed to leisurely enjoying the hobby without physically becoming involved. Most of us scanned alone in a separate room, from

behind closed doors.

### **Aggressive Posture Needed!**

The scanning of trunked communications requires the scanner buff to aggressively attack the system with sharp ears, quick reflexes and with multiple radios that must be manually manipulated.

Very often, when the action gets really hot, it may be a good idea to scan with a friend. Two enthusiasts, listening and controlling several groups of scanner radios, can really get a handle on everything that is happening.

But don't be too eager to share these methods with just anyone. Scanning becomes much more intriguing when the parties involved believe that no one is listening. Don't you agree?



*Editors Note: At this writing, there are no scanning aids that can be purchased to make trunked monitoring any easier. Several electronic engineers are currently attempting to develop a computer program that could analyze, sort and individually list each transmission as rapidly as it is being transmitted. However the concept remains only a theory. If developed, it would require a highly refined, computer compatible scanner radio. Prospects for seeing this on stores shelves in the foreseeable future remains remote.*



An AK47 guards the gate to La Voz de Nicaragua

# THE RADIO WAR IN NICARAGUA

by George Wood  
and Hermod Pedersen

Swedish Cooperative Center, he has helped bring cooperative rural general stores to farmers in more than 100 isolated villages. In 1987 he won the Swedish Development Association's award for the year's best foreign aid project. For his efforts, Bengt Kjeller made the Contra's deathlist.

*The wars in Central America are fought on the airwaves as well as on the ground, and monitors have front row seats. But tuning in on the radio war has had a frightening side as well, for those on the Contras' deathlist.*

*With the Arias peace plan and the negotiations between the Contras and the Nicaraguan authorities, the shooting war seems to be over. But the media war is still just as exciting.*

*Radio Sweden's DX Editor George Wood has visited Nicaragua and Costa Rica, together with Swedish journalist Hermod Pedersen, an expert on Latin American DXing.*

"They read the names of people on their deathlist on the radio," Swedish foreign aid worker Bengt Kjeller told us when we met him in Matagalpa, a town in northern Nicaragua near one of the Contra rebel's operations zones. "My name was one of them."

Bengt Kjeller is a popular man among the farmers of Nicaragua. Representing the

The chilling listening came from Radio 15 de Septiembre, which broadcasts from Honduras. It is one of dozens of foreign radio stations that can be heard in Nicaragua. Many carry programs opposing that country's Sandinista government. Sometimes the propaganda is subtle, but not on Radio 15.

"They try to keep people from participating in projects, which are aimed at helping the poorest," says Father Marcus Lester, a Roman Catholic priest from Kentucky who we met in a small village outside Matagalpa. "They also use the church and try and convince people that the church is on the Contras' side."

## Radio War After Somoza

The radio war escalated soon after the dictator Somoza was driven out by the Sandinist Liberation Front in 1979. The remnants of Somoza's National Guard fled to Honduras and Costa Rica. With a liberal application of CIA money they were reorganized as the Contras. Shortly afterwards, Radio 15 went on the air.

According to *Washington Post* journalist Christopher Dickey, the station, located outside the Honduran capital, Tegucigalpa, also served as a warehouse for CIA weapons -- from rifles and grenades to artillery. Unfortunately, things didn't go exactly as planned. The first station manager stole as much cash as he could get

his hands on, even selling the transmitter tubes, before he disappeared. His successor, Noel Ortiz, had to pawn his watch to get the money to replace the tubes and get the station on the air in 1981.

From the beginning Radio 15 wasn't afraid to abandon the truth. Early broadcasts warned Nicaraguans against the Sandinistas' polio vaccination campaign. The vaccine, Radio 15 warned, would kill the children. When that didn't happen, the station changed its story -- the new line was that the vaccine would turn kids into Commies.

In 1986 the station was joined by La Voz de la UNO, which has a similar message, and a similar format. Whereas Radio 15 is officially the voice of the FDN, the largest Contra group, La Voz de la UNO is supposed to be operated by UNO, the United Nicaraguan Opposition, the organization intended to unite the various Contra groups. But strident anti-Sandinista programming on the two stations has tended to damage credibility.

"You can hear them here," we were told by coffee farmer Ramon Amador in Jinotega in northern Nicaragua. "But very few people listen, since they lie so much."

This lack of credibility has led the Contras to start yet another station, with American help. Radio Liberacion went on the air at the beginning of last year on medium wave 1520 kHz, with a 50 kw transmitter believed to be broadcasting from El Salvador. The money to run the station came from the controversial 100 million in aid to the Contras approved by Congress.

With a powerful signal that can be heard well in Managua, Radio Liberacion is one of the Contras' most important weapons in



the war against the Nicaraguan government. When the Sandinistas overthrew the dictator Somoza in 1979, only 15 percent of the population could read and write. The combined circulation of the country's newspapers before the revolution was less than 60,000. That compares to more than 500,000 radio receivers.

aggression. Especially important are the channels of electronic communication, used so easily to disinform and destabilize."

### VOA: Weapon in American Arsenal

The Voice of America has also become a weapon in the war on Nicaragua. The Reagan administration has allocated two billion dollars to expand the VOA in the

The VOA escalation against Nicaragua has continued as well -- the Honduran government has approved a new VOA relay station in San Lorenzo, just a few miles from the Nicaraguan border.

Perhaps the biggest media threat to Nicaragua comes from Radio Impacto, a legal station operating from a suburb of the Costa Rican capital, San Jose. Radio Impacto was started in 1983 by men who had owned stations in Nicaragua during the Somoza dictatorship. According to the Central American Historical Institute at Georgetown University, the station has had close connections with the Contra movement (ARDE) formerly headed by Eden Pastora. But when we met the current head of the Contras there, Alfredo Cesar, he denied any relationship.

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***"They read the names of people on their deathlist over the radio. My name was one of them."***

*-- Swedish foreign aid worker  
Bengt Kjeller*

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Caribbean basin. The Marnandate-II report prepared by pro-Reagan groups says "the administration has developed and strengthened the Voice of America, realizing that it is an important and effective tool for public U.S. diplomacy that we must use extensively in the war of ideas."

A VOA relay station was installed in 1985 in northern Costa Rica. With an output power of 100 kw, it is one of the most powerful medium wave stations in Central America, and can be easily heard in Nicaragua. To put the station on the air, the VOA circumvented Costa Rican law, which prohibits foreign individuals or organizations from operating radio stations in the country.

The VOA organized a group of sympathetic local business executives and politicians, which officially owns the station. However, 60 percent of broadcasts are VOA relays. The rest are carried in the name of "Radio Costa Rica."

"We have no connection with Radio Impacto or any other radio station in Costa Rica," he told us.

We tried to visit the station several times, but were refused permission.

### Alternative Voices

Radio Impacto tries to be an alternative radio service for Nicaragua. It has professional announcers, and concentrates on current music and round-the-clock news.

"Radio Impacto is our most important competition," we were told by Adrian Roque, who heads the News Department at Nicaragua's major public broadcaster, La Voz de Nicaragua. "We're forced to be better, especially in our news coverage."

Against the battery of propaganda broadcasts from abroad, Nicaragua has 50 radio stations, of which two are religious and another 31 are in private hands. Of the 17 public broadcasters in Nicaragua, only two

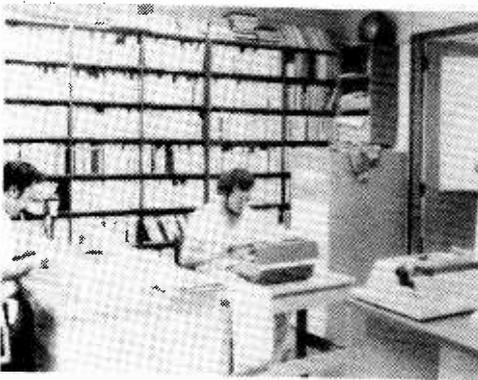


### Many Stations to Choose From

In Nicaragua, radio is the most important means of communications.

But the country's own resources are meager, compared with the inflow from abroad. According to a study by Howard Frederick of Ohio University, in 1985 at least 75 foreign medium wave and FM radio stations could be heard in Nicaragua. Twenty-six of these were in Costa Rica, 18 in Honduras, and four (before the advent of Radio Liberacion) in El Salvador. In addition, there are the shortwave broadcasters - such as Radio 15.

International telecommunications expert Frederick says in his report: "In the U.S. military doctrine of 'low-intensity warfare,' political, economic, and psychological weapons are the primary means of



*Domestic Service Newsroom*



*English language newsroom*



*Voz de Nicaragua master control*

-- Radio Sandino and La Voz de Nicaragua -- even approach national coverage.

Ironically, La Voz de Nicaragua was started by the American Marines in 1931 as Radio Nacional. It was seen as a weapon in the war against Augusto Sandino's guerilla army. The Somoza family ran Radio Nacional until the revolution in 1979, along with 16 other stations.

Most of the smaller stations confiscated from the Somozas have been organized as the Peoples' Radio Broadcasting Corporation, CORADEP.

These small local stations have limited coverage areas, and concentrate on popular music. For example, Radio Paz in Managua plays mostly Easy Listening music, while Radio Tropical has a Caribbean music format.

La Voz de Nicaragua is clearly the most popular station in the country, at least in those parts of the country where it can be heard.

"We try to really be the voice of the people," Adrian Roque says. "We make the programs people want and play the music they like, whether it is cumbia, breakdance, or Michael Jackson."

Contact with listeners is important at La Voz de Nicaragua. The two most popular programs are called *Contacto 620* and *Hablamos*; talk shows where listeners are put live on the air, either from La Voz's jeeps, which travel around the capital, or by calling themselves. The programs specialize in airing complaints about public agencies.

"The listeners can complain about anything they want. Then we call up the responsible authorities, and let them respond to the criticism on the air," says Adrian Roque.

### **Nicaragua Abroad**

La Voz de Nicaragua is also the country's voice abroad, with broadcasts in both

Spanish and English. Both services share one small room. Paula Dobbyn, one of the three members of the English group, came to Nicaragua with a construction brigade. When the brigade returned to the U.S. after a few weeks, she stayed in Nicaragua to pick coffee. Eventually she joined La Voz de Nicaragua. Like the other members of the group, she has no previous experience in radio.



*Barney Romero*

"The biggest problems are the lack of equipment and the lack of experience," she told us. "Besides Barney Romero, the head of the English collective, we've had five or six people from North America or Britain working here. No one had any experience in radio, except for one person who had worked in college radio."

The hour long programs concentrate, as might be expected, on Nicaragua and the situation in Central America.

"We start off with headlines and a main

block of news, about what is happening in Nicaragua or in Latin America. Then we usually put in a song. We try to play Nicaraguan music, but sometimes we use Latin music, or even music from the United States. Then we have *Update*, a series of international stories. After that we have a song or an interview."

"This week I interviewed three U.S. Vietnam vets who are here protesting the United States' policies in Central America. Before that we covered the Hasenfus trial. Each week we try to have an interview in English about what is happening in

---

***"Very few people listen since they lie so much."***

-- Nicaraguan coffee farmer  
*Ramon Amador*

---

Nicaragua."

The second most popular station in Nicaragua today is Radio Sandino, the station operated by the ruling Sandinist Party. It began as an underground broadcaster in the mountains in 1977 during the struggle against Somoza. After the dictator's fall on July 19, 1979, Radio Sandino took over one of the stations operated by the Somoza family, Estacion Equis in Managua. The 1979 edition of the *World Radio TV Handbook*, in fact, listed Anastacio Somoza himself as the station manager.

Today Radio Sandino is the domestic station heard best around Nicaragua. The 50 kw medium wave transmitter on 750 kHz is the country's strongest. The station has two FM transmitters with a wide coverage area. We could even hear them, sounding like locals, in the hills above Matagalpa, 75 miles away.



The problems concerning the Miskito Indians in eastern Nicaragua, and their demands for autonomy, have led to Radio Sandino's introducing special programs for the Caribbean coast.

These programs are carried over all Radio Sandino transmitters, so that the Spanish-speaking residents in the west for the first time have an opportunity to hear news and music from the remote eastern part of the country.

"We have to tell people about what is happening there," explains the head of information at Radio Sandino, Maria Eugenia Urroz.

### Voice of Sandinist Party

Radio Sandino is first and foremost the station of the Sandinist Party. Even the news is affected by the party's priorities. Radio Sandino would never dream of carrying news about the military situation until after

checking first with the military authorities.

"We wait until we have their approval before we carry military news," Radio Sandino News Director Educardo Romero told us. "There is a chance that some items get old, that a station like Radio Impacto will have it first. But we wait anyway until we have it confirmed. We think that's more important than being first."

La Voz de Nicaragua has a different policy. Because it has to compete with Radio Impacto, La Voz doesn't always wait for confirmation from the authorities.

"We try to work with the military," La Voz's News Director, Adrian Roque, says. "But we also have to think of the listeners, and if something important happens we put it on the air without waiting for approval. We try to be independent."

The majority of Nicaragua's radio stations, 33 altogether, are nonpublic, either privately owned or operated by the Roman

Catholic Church. Several are openly critical of the government. Before the Arias peace plan there was a censorship law in Nicaragua, but it was not applied to radio stations (probably because of the difficulty of enforcement).

### Some Stations Closed

Three stations, however, were closed after the Sandinistas came to power in 1979. Radio Amor and Mi Preferida were closed in 1981, accused of having carried false reports that Nicaraguan troops had invaded Honduras.

One of the Catholic Church's two stations, Radio Catolica, was closed in 1986 for failing to follow the radio regulations, by failing to broadcast President Daniel Ortega's State of the Nation speech.

The station said this was due to technical problems and that parts of the speech were in fact broadcast.





Signs of the times: McDonald's vies with Russian Aeroflot, while Sandinista recon planes sit under wraps (clandestine photo)

When we asked President Ortega about the closure of Radio Catolica, he said nothing about his speech, but instead criticized the station's programming: "Radio Catolica supported the attitude that can be found within the church hierarchy in Nicaragua that the revolution can only lead to atheism. For that reason, they believe that any means can be used to destroy the revolution. This we cannot accept."

Under the Arias peace plan, Radio Catolica was allowed to reopen in October, 1987. The Sandinist government also withdrew earlier restrictions on news broadcasts by nonpublic stations.

But in early May, the Nicaraguan government closed Radio Catolica for one week and another opposition station, Radio Corporacion, for one day after the stations had wrongly reported that a trade unionist was dead. On May 20, the government banned four news broadcasts from Radio Catolica for spreading what was called "false information" about the alleged capture of a town by the Contras in the midst of the cease fire.

Despite the controversy over Radio Catolica, radio is alive and well in Nicaragua. The airwaves around the country are filled with news, music, and -- not least -- propaganda. Because much of the radio war is being fought on shortwave, listeners in North America can monitor the struggle from their armchairs. Buen escucho!

*George Wood is the DX editor for Radio Sweden. Photos are courtesy of Susan Merritt.*

## The Radio War in Nicaragua: Stations to Look For

### Nicaraguan Stations:

**LA VOZ DE NICARAGUA** -- Has operated on around 6015 kHz. A new, more powerful transmitter has gone on the air on 6100 kHz. English has been carried at 01:00 and 04:00 hours, most recently 03:00-04:00. Address: Frente Telcor, Villa Panama, Managua, Nicaragua, or Box 248, Managua, Nicaragua.

**RADIO SANDINO** -- 750 kHz. The shortwave transmitter listed on 6160 kHz is off the air because of a lack of parts. Address: Ap. 4776, Managua, Nicaragua, or Paseo Tiscapa, Managua, Nicaragua.

**RADIO ZINICA** -- in Bluefields on Nicaragua's Caribbean coast, uses 6120 kHz. Address: Ap. 25 Bluefields, Nicaragua.

### Contra Stations:

**RADIO 15 DE SEPTIEMBRE** -- has been heard on many frequencies, including 5555, 5565, 5570, 5950, 6130, and 6215 kHz. News in English is reported at 02:00 hours. Address: FDN, 1999 Thomas Jefferson St., Suite 605, Washington, DC 20007, or FDN, Box 16-0953, Miami, FL 33116, USA.

**LA VOZ DE LA UNO** -- Most reported on 5889 kHz, but also 5950. Address: same as above, or possible ARDE, Apartado 348, 1000 San Jose, Costa Rica.

**RADIO MISKUT** -- broadcasts programs in Miskito and Spanish to Nicaragua's Atlantic coast. Reported irregularly from 11:30 hours on 5950 and 5565 kHz, and at 21:00 and 01:30 hours and 6265 kHz. Address: same as above, or Comision Politica MISURA, Ap. Postal 1668, Tegucigalpa, Honduras.

**RADIO MONIMBO** -- 6230 kHz, said to have been founded by the son of the martyred publisher Joaquin Chamorro. Reported irregularly.

**RADIO IMPACTO** -- 6150 kHz, sometimes on 6160 or 6140 kHz, and even reported on 5030 kHz. Address: Ap. 497, San Pedro de Montes de Oca, Costa Rica.

**RADIO LIBERACION** -- 1520 kHz, broadcasts 00:00-12:00 hours.

Mercenaries fighting in Central America have been reported to be using 6593 kHz in SSB around 00:00 hours UTC and 6622.5 kHz around 00:45.



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# LIGHTNING!

An Interview by Bob Kay

**F**aster than a speeding bullet. More powerful than a locomotive. Able to destroy tall buildings in a single flash. Revered by primitive man and captured in early cave drawings, it's the radio listener's nemesis, *lightning!*

Lightning provided our early ancestors with not only a dazzling light show, but with their first encounter with fire. Many years later, in the mid 1700s, lightning attracted the attention of another man, Ben Franklin. A well-known philosopher, statesman and scientist, Franklin announced the invention of his lightning rod in 1753.

He described his invention as being capable of actually discharging a thundercloud. Of course, he also knew that the rod would protect the structure by directing any flashes to the earth, but he considered this ability to be the least important function.

In today's high-tech and fast-paced society, lightning still invokes fear, awe and wonderment. If you've got a radio with an outdoor antenna, however, it's mostly fear that these brilliant slashes evoke. For a well-placed bolt of lightning can turn any

set, regardless of make or model, into a smoldering pile of rubble. In a worst-case scenario, it can kill you and burn down your house.

To keep our readers informed of the more recent developments concerning this phenomenon, *Monitoring Times'* Bob Kay visited the Franklin Institute. Located in center city Philadelphia, the institute is a nationally recognized science museum with a fully operational weather station.

The man in charge of the weather station, Chief Meteorologist Mike Bodner, agreed to sit down with our readers and explain lightning in detail.

## What is it?

**MT:** Dave, to start the ball rolling, can you briefly explain exactly what lightning is?

**Bodner:** Lightning is a visible electric discharge, occurring in the atmosphere in areas highly charged with static electricity.

**MT:** How is this static charge produced?

**Bodner:** Without a very thorough understanding of physics, that's a difficult question to answer. Very simply, lightning is usually associated with the thundercloud, *cumuionimous*. Each thundercloud is actually composed of a number of smaller clouds. These smaller clouds are called cells. Each cell, as a result of powerful air currents, acts like an electric generator. An individual cell can deliver several amperes of current and when combined, they can charge a thundercloud to 50 million volts above earth potential.

## A super charged mass of electricity looking to discharge itself

**MT:** What causes the sudden flash of lightning to the ground?

**Bodner:** First of all, we need to understand the terminology. When we discuss lightning, the terms "flash," "ground flash" and several other terms all have separate meanings.

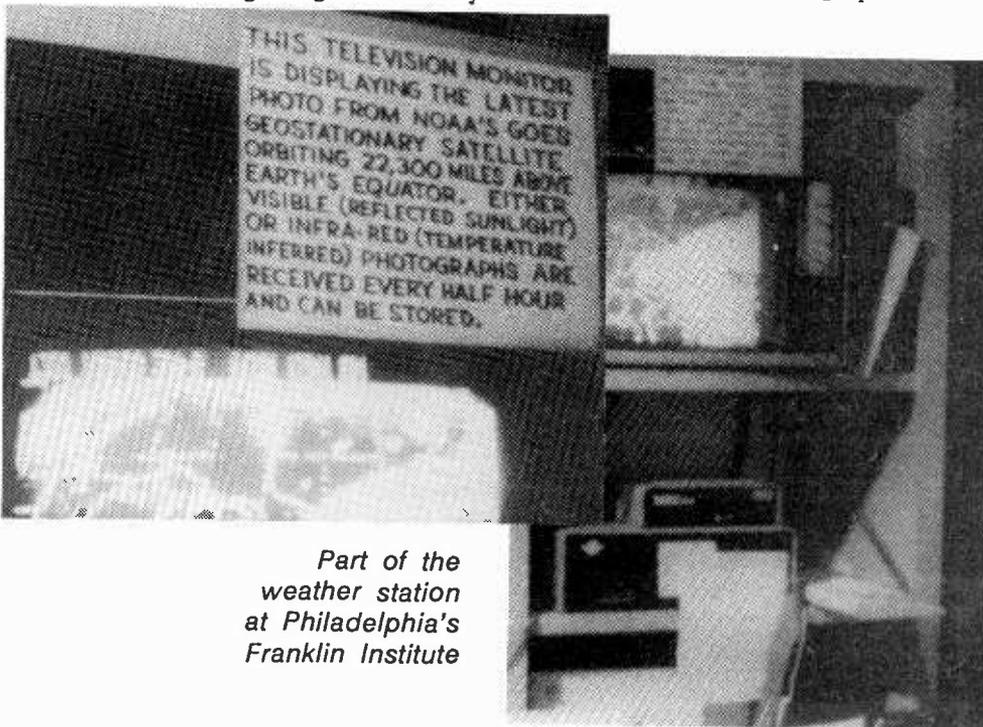
A "flash" of lightning occurs when the charge has increased in the cloud to a point that the insulation of air in the cloud breaks down. This breakdown starts in a very small area, but rapidly spreads upwards and downwards for distances up to a mile.

If lightning strikes the earth, a "ground flash" is the result.

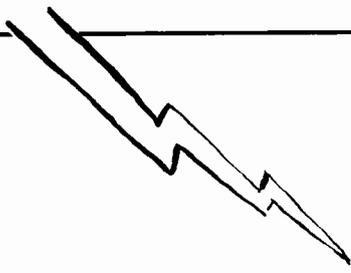
**MT:** If I understand you correctly, cloud to cloud lightning would be considered a flash and cloud to earth lightning would be considered a ground flash?

**Bodner:** That's correct. But a ground flash is not that "big bolt" of lightning that lights up the sky and produces thunder.

Before a ground flash occurs, a "leader" discharge travels downward from the cloud and this leader often displays much forking. The leader moves in a series of steps, each step having a length of about 150 feet. When one of the branches of the leader is about 300 feet above the earth, upward "streamers" rise from the ground to meet it. When a streamer meets a leader, the



Part of the weather station at Philadelphia's Franklin Institute



# A well-placed bolt of lightning can turn any set, regardless of make or model, into a smoldering pile of rubble.

negative charge from the cloud collapses rapidly into the ground.

**MT:** The cloud is a negative charge?

**Bodner:** Yes it is. But it's a "super negative charge." The cloud is so full of electricity that it is sending out leaders seeking to relieve itself.

**MT:** Something like a huge air balloon -- getting bigger all the time.

**Bodner:** That's a good analogy. Remember that while the balloon is filling with air, the cloud is likewise filling with its own internally generated electricity.

**MT:** I'm not quite sure that I understand the cloud as being a negative charge?

**Bodner:** Don't focus on the negative and positive aspect of all this. A thundercloud is a super charged mass of electricity looking to discharge itself into anything that will provide a path of lesser resistance.

**MT:** Now, these streamers that rise from the ground to meet the downward traveling leaders, does that produce the "bolt of lightning" that everyone can see during a thunderstorm?

**Bodner:** As soon as a leader meets a ground streamer, that's when the cloud discharges to the earth. During this leader discharge, there may be a very small amount of thunder, but there will not be any great flashes of light or big thunder claps.

After the cloud discharges to the earth an electrical path from the earth to the cloud is established. This path will only last for a few microseconds but it is long enough for the earth to deliver a return stroke of voltage.

This main discharge, or return stroke, is a pulse of current typically consisting of 20,000 amperes. As a result of the high current, a very bright ground flash is produced. This "earth to cloud" discharge also produces a huge clap of thunder by rapidly heating the air.

**MT:** Can anyone that watches the night sky during a thunderstorm see the forked leaders extending downward?

**Bodner:** Yes, they can.

**MT:** Can we see the ground streamers that rise to meet the leaders?

---

## ***If the return stroke is 20,000 amperes, what sense does it make to ground an antenna?***

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**Bodner:** It is very difficult to see the ground streamer even with ultra high speed photography.

**MT:** When the cloud discharges to the ground, you're saying that's really no big deal. No large flash, no thunder clap, right?

**Bodner:** Not when compared to the return stroke!

**MT:** If the return stroke is typically rated at 20,000 amperes, what sense does it make to ground an antenna? Nothing could survive such a huge surge of current.

**Bodner:** Although the current is great, it is also very short lived. The average return stroke will fall to only a few tenths of an amp within 100 microseconds of its start. Therefore, very little heating or burning occurs even in thin wires.

**MT:** Are you saying that we can ground our antennas with speaker wire?

**Bodner:** Bob, I'm a meteorologist, not an expert in electricity and conductors. But it has been proven that the short life span of the return stroke can be successfully channeled through a very thin conductor.

Here's a good example: Philadelphia Electric is experiencing a very serious problem with mylar balloons shorting out their sub stations. These helium filled party balloons have a one-thousandth of an inch thick aluminum coating. Yet, when they contact an unsheathed cable and then touch something else, a huge voltage transfer takes place in microseconds. The resulting short circuit can place large sections of Philadelphia in complete darkness.

With this fact in mind, the size of a grounded wire should primarily be influenced by

mechanical and common sense considerations, rather than current carrying capacity.

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## ***Are the antennas on our homes the same as lightning rods?***

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**MT:** Can a properly grounded lightning rod prevent a direct strike?

**Bodner:** Since the days of Ben Franklin it was commonly thought that a lightning rod could release a sufficient charge into the atmosphere to prevent a lightning strike.

But we now know that this does not happen.

**MT:** Isn't lightning always attracted to the highest point on or near a structure?

**Bodner:** Not always. Experts have proven that the attractive range of a vertical rod is no greater than that of a horizontal rod. Modern lightning protection codes rarely recommend vertical rods. Very often, horizontal rods placed along the highest ridges of roofs and spaced at intervals along flat roofs are the approved way to protect a structure.

**MT:** What exactly do you mean by the "attractive range?"

**Bodner:** The ability of a lightning rod to conduct a lightning leader is called "the attractive range." The range varies in distance by the amount of charge present on the leader. The higher the charge, the greater the distance.

**MT:** Is there an average attractive distance?

**Bodner:** On buildings about 200 feet high the attractive range is about 100 feet.

**MT:** Since a house is considerably lower to the ground, would the attractive range be less?

**Bodner:** On the average, yes. But don't forget, the higher the charge the greater the distance.

**MT:** Could a lightning rod on my neighbor's house protect mine as well?

**Bodner:** I hardly think that would be possible. The attractive range is not that great.

**MT:** Ok, here's the million dollar question: Are the antennas on our homes the same as lightning rods?

**Bodner:** There is a great deal of controversy surrounding that question. Some experts will agree that they are the same.

**MT:** Personally, how would you relate them?

**Bodner:** I think there is very little difference. If an antenna is on your home, a leader will probably be attracted to it--just like it would be attracted to a lightning rod.

**MT:** You mentioned that vertical and horizontal rods would attract lightning equally. Suppose that I have a long-wire antenna just below the peak of my roof or just below the top of my chimney. Will that antenna have the same lightning attracting potential as a vertical antenna of the same length?

**Bodner:** Again, I'm not an expert in electrical theory. However, if one considers that an antenna and lightning rod are one and the same, then the long-wire antenna would have the same potential for attracting lightning as that of a vertical antenna of the same length.

**MT:** If we were using both a vertical and long-wire antenna, would the lightning leader be attracted to the vertical element first?

**Bodner:** That would depend on the location of the lightning leader. If the long-wire antenna terminated some 50 feet away from the home, the leader may be too far away from the vertical antenna and it would strike the wire.

**MT:** I guess that's where the attractive range comes into play?

**Bodner:** Yes.

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### **Two or more rods are better than one**

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**MT:** What type of earth grounding rod should be used?

**Bodner:** The grounding rod should be at least four feet long. Six feet would be

better. Using two or more rods is better than one.

**MT:** Two or more rods connected to the same ground wire?

**Bodner:** Not only are two or more rods recommended, the ideal rod would have several horizontal elements.

**MT:** Sort of like an umbrella?

**Bodner:** Well, the horizontal elements wouldn't need to be more than six inches or so.

This type of grounding rod requires that a hole be dug, the rod lowered in place and then covered over.

---

### **When a side flash occurs, it causes a large amount of damage**

---

**MT:** What precautions should be taken when running the ground wire down the side of a building?

**Bodner:** Keep the wire on a direct route, sharp bends and kinks are only inviting a "side flash."

**MT:** What is a side flash?

**Bodner:** The earth ground will always offer resistance to the grounding rod. Depending upon the amount of current and the amount of resistance, the entire down lead could possibly pass a current somewhere around one million volts.

Naturally, such a high voltage will always be seeking a path of lesser resistance. When the voltage jumps from the wire to other nearby metallic objects, that is called a side flash.

**MT:** Would aluminum siding on my house cause a side flash?

**Bodner:** Probably not. Side flashes usually occur when there is a wire way or metal pipe inside the structure. Generally, these objects are also earth grounded.

Side flashes occur because the electrons are trying to find a path of least resistance. If a separately grounded cold water pipe is near the down lead, that might produce a path of lesser resistance to the flow of electricity--thus producing a side flash.

When a side flash does occur, it causes a large amount of damage.

**MT:** Can a side flash be prevented?

**Bodner:** Normally grounded objects within close proximity to the grounding wire should all be grounded to the same rod as the antenna or lightning rod. Doing this will cause all the surrounding objects to display the same amount of resistance as the ground wire--thus helping to prevent a side flash.

**MT:** Then it is of vital importance to check the wire connection to the grounding rod?

**Bodner:** Yes it is. If that connection becomes corroded, the resistance raises, and side flashes become eminent.

---

### **Lightning protection hasn't really changed since Franklin invented the lightning rod**

---

**MT:** It would seem that although we know a great deal more about lightning, we remain incapable of predicting where it may strike?

**Bodner:** That's exactly right. We can protect structures from lightning, but we cannot predict strike zones. Sometimes, in spite of our best efforts, a direct strike may occur.

**MT:** It also appears that lightning protection hasn't really changed since Franklin invented the lightning rod?

**Bodner:** I guess you're right. If Ben Franklin visited Philadelphia today, he would easily recognize his 1753 invention on top of buildings everywhere.

**MT:** Can you give us any further hints on protecting our "shacks" from a lightning strike?

**Bodner:** Don't cut corners when erecting an antenna. Do it correctly and ground it properly. When a thunderstorm does threaten the sky, disconnect all antenna lead-in wires and unplug the equipment.

**MT:** Anything further?

**Bodner:** Yes, there is one more suggestion - grab some popcorn and a comfortable chair and enjoy one of the most beautiful and powerful light shows in the universe!



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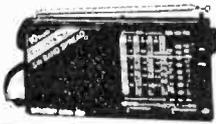
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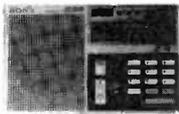
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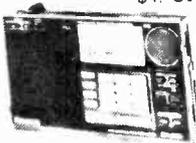
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# Back to School

by Myles Mustoe, Teacher

## The 3 R's: 'Readin', 'Ritin' and 'Radio

In the sixties, when I was in the lower grades, two of the most significant "innovations" in education was color coordinated classrooms and television. Although television broke into education a decade before, it was still an experimental medium for teachers.

I will not forget the day I sat as an elementary student on the hard polished floor of the multi-purpose room watching a screen that visually testified to the fate of John Glenn as he circled the earth. Nor can I forget the black and white images and the sound of drums as President Kennedy was carried to his final resting place. History witnessed on a picture tube was indeed an educational experience.

In those early days of educational television there were many that felt that the medium was the ultimate answer for filling in the creative deficiencies in education. However, did you know that only a short time earlier, educators were saying the same things about radio?

In the 1930s many teachers believed that radio would eventually serve as a substitute for various kinds of teacher instruction. It was used extensively in education. Radio plays and dramas were produced by the thousands by students and programming was developed with educational themes, even on commercial stations.

I mention these early beginnings so that you can easily see that using radio or television in an educational setting is nothing new. But it should also be pointed out how both of these have grown (ironically) stagnant in this modern era of technology and the "information age."

The educational applications of shortwave radio is a good example of this stagnation. Recently, a friend of mine pointed out a newspaper article that touted the satellite television and the potential of some day in the future being able to hear the Russians speaking to us from their own country. Well, every shortwave listener knows that you can hear the U.S.S.R. every day of the week on something much less elaborate and costly than a satellite television.

This vague understanding of shortwave by the public -- and especially by educators -- has severely hindered a potential that already exists for teachers. Using shortwave radio, its programs and its "mechanical" aspects in education should be a natural part of the integration of the information age into the classroom.

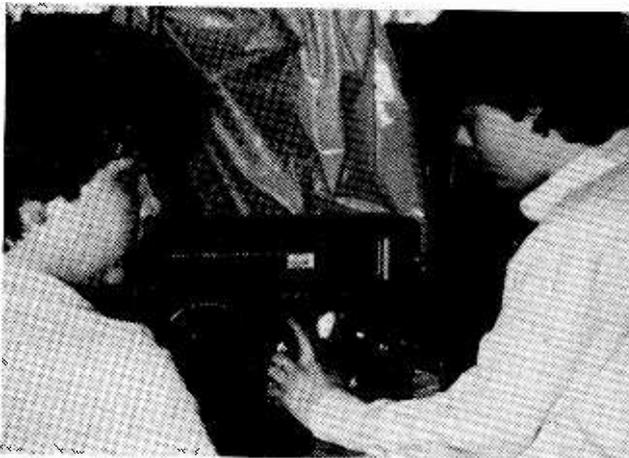
## Learning by Shortwave

For about the last three years I have been working on identifying some of the skills that can be learned and developed from using the shortwave radio. I have been

applying this research to geographic education at all levels.

The shortwave radio is a perfect tool to use along with the textbook. Students that have never traveled to the lands they are studying may find it difficult to relate to information from textbooks on those places. However, in developing a unit on Taiwan, how could it hurt students to listen to the voices of the people of the Republic of China and interact with them through the mail process?

My elementary as well as secondary students have done this. The textbook is not thrown out but it was augmented with assignments from the radio.



*Students thrive on hands-on experiences*

## SW: Students Can Benefit

I have determined that there are three types of students that will be attracted to radio. One is the student that may have a general or specific interest in the programming. In terms of the curriculum, they may be interested in hearing programs from other lands or hearing languages that they are familiar with.

The second group may relate to the technical curriculum which can be derived out of the shortwave experience. These students build antennas, maintain radios and are interested in the technology of radio.

The third group has no interest and usually has no idea what the radio means in terms of an educational experience.

In some respects this third group can find some of the greatest satisfaction academically and personally. For the first time they may begin to see the world through a different perspective. For some this may be the first and only contact they make with a culture outside their own.



*QSL's are a great incentive  
- and the students are  
justifiably proud*



Keeping this in mind, and approaching this group objectively can make the shortwave experience something enjoyable for this student.

### **Learning Center Applications**

The shortwave radio lends itself well to "learning center" type applications. In the learning center a radio is set up with a selection of predetermined tasks for the student. These are usually on cards that contain the task, a little about the background of the task, where the student may need to go for additional materials, and how long the task should take to complete.

The learning center is self-contained. That is, everything that the student needs to complete tasks should be available at the center. QSL cards can be used to decorate the center and students should be encouraged to help design the listening area to their preference.

In addition, the learning center helps the students develop responsibilities. Once it is established, it can help the teacher gain some additional time while having some of the students working individually or in groups at the center.

Tasks at the learning center can be changed to accommodate interests and development of the students. You may have ten tasks with technical problems, ten with questions about listening or developing logs. You may be interested in developing writing skills and thus you would have tasks that dealt with verification of stations, addressing heads of state or writing letters to officials on various topics in a list of current events. The important aspect of all of this is that the radio serves as a resource tool for the student.

The shortwave radio is an excellent motivating tool for elementary students as well. These grades thrive on hands-on experiences and with radios that are simple to use this opens up the world to these students. Element-

tary students are highly possessive of QSL cards. Shortwave listening provides an excellent avenue for introducing maps and globes. Kids can trace signal paths and get an idea about how distance is measured on the map.

### **Don't Be Afraid to Experiment**

If you are a teacher, don't be afraid to experiment. All kinds of possibilities exist with the use of shortwave in the classroom. Even if you do not use the shortwave in your class, you may want to encourage interested students to pursue their listening adventures as an extracurricular activity. Seek the shortwave listening students out and challenge them to contribute to your classes. Be sure to provide incentives.

One of my favorite stories is that of a young lady who was failing her geography class and began listening to the shortwave radio for the first time. She was so impressed by actually hearing the U.S.S.R. she decided to write to them. A little while later she received a call from Moscow, answering her questions in a special program. It was a real thrill for me as well.

She became interested in shortwave and continued to listen. But the best part of the story is that she passed geography and became more familiar with the world in which she lives. That's the way it is supposed to work.

Happy listening and -- learning.



*If you have a story of how radio has played a part in your life or the life of your community, send it to Monitoring Times. If accepted for publication, we'll send you \$50.00. All stories should be real life events. Manuscripts should be approximately 1,000 words and must include at least one clear photograph.*

# Shortwave Broadcasting

Glenn Hauser

Box 1684 - MT

Enid, OK 73702

**Austria:** Add another gun-jumper to the 13-MHz band. Radio Austria International has appeared on 13730 between 0700 and 2000 UTC, especially for tourists in southern Europe and the Canary Islands. (Wolfgang Buschel, W. Germany, *DX Listening Digest*) RAI has been experimenting with modulation improvements such as compression on 9875 from 0000 to 0500 and single-sideband after 0300. (*SW Panorama*)

**Bangladesh:** Radio Bangladesh keeps shifting around. As of July 23, the 1230 to 1300 broadcast in English was on 17710 and 15195 kHz. (Edwin Southwell, England, *SWL Digest*)

**Bhutan:** BBS, Thimpu, has expanded hours on 5-kilowatt 6035; Monday through Saturday 1100 to 1500 with English after 1415 UTC; Sunday 0600 to 1000 with English after 0900. Since the Royal Palace wanted P.O. Box 1, BBS's address has changed to Box 101. Buddhist and Adventist religious programs air on Thursdays. (Supratik Sanatani, Calcutta, North American Shortwave Association) Still a dream for most American listeners, Yunnan PBS, China, is heard on 6035 kHz at 1200 UTC. (John Wilkins, Colorado, *Fine Tuning*)

**Bolivia:** Radio Monteagudo has reactivated 4935, but the ID at 0200 UTC closing is Radio Cordech, La Voz del Desarrollo Chuquisaqueno, Sucre. (Henrik Klemetz, Sweden, *Shortwave Bulletin*)

**Brazil:** Switzerland on 17730 at 0115 to 0300 reported last month is a relay from Radio Bras. Why it lacks the usual 0.3 second satellite delay compared to 12035 kHz has not been explained.

**Burma:** BBS, Rangoon, has been testing a powerful new transmitter on 5040 at 1230 to 1600 and 0100 to 0230, partly in English, parallel 5985 and 7185 respectively. (Supratik Sanatani, India, NASWA)

**Canada:** CBC is re-expanding the program *As It Happens* to a sesquihour. This will cause problems for Radio Canada International's shortwave simulcast scheduling. (*Variety* via Dave Alpert, *DXLD*)

**China:** Honghe PBS is sometimes active around 1200 UTC on 4930 variable, including relays of Yunnan PBS. Bayenhaote, Inner Mongolia, is often active but irregular between 1030 and 1400 on 6025, seeming to ID as Alashan PBS, including relays in Mongolian of Nei Menggu PBS. (Shibuta, Yamanaka, Gima, Suma, Fujita, Asian Broadcasting Institute via NASWA)

**Colombia:** Caracol Bogota is back on 4755, announced along with Neiva on 4945 kHz as a service for Colombians abroad; 24 hours. Radiodifusora Nacional can be expected to shift frequencies every few weeks on 16 meters; it plays lots of classical music, instructional courses, and news relays from abroad. The last two were 17841 and 17838.

**Costa Rica:** In addition to its schedule given last month, Radio for Peace International is starting a Central American service with different programming in Spanish, educational courses for elementary schools, which will be supplied with shortwave radios; on 7375 kHz in the mornings, around 1400 to 1630 UTC. (James Latham, RFPI)

**Denmark:** Look for activity on the 11 meter band this fall, led by Denmark which planned to use 25850 from September 4 at 1200 to 1250 for Asia. (Bob Padula, *Australian DX News*)

**Fiji:** Country-collectors would like to fudge this into broadcasting; suit yourself. The University of the South Pacific feeds lectures to other campuses, Mondays at 0500 to 0700 on 9071 SSB; also uses 12140, 9100, 5350. (Bryan Clark, New Zealand Radio Australia *Communicator*)

**Guatemala:** Conditions are ripe for more and more right-wing evangelical shortwave stations serving various Indian minorities. (Don Moore, *World of Radio*) TGMUA is up to its old tricks. Reactivated 5982 variable puts a clear harmonic on 17945 variable, best after 0000 UTC. (Ernie Behr, Ontario, *World of Radio*)

**Iceland:** Add to last month's schedule: 9863 at 1855 to 1930; Saturday and Sunday 0700 on 13770, 15659. (*Sweden Calling DXers*)

**Indonesia:** Get it while you can: RPDT2 Tapanuli Utara, Balige, Sumatra, plans to shift to mediumwave; until then nominal 3873 varies around 3876 with 500 watts at 0630 to 1600. Radio Republik Indonesia, Jember, has already dropped shortwave 3321. Other RRI news: Surakarta uses two sites, one on 2439 at 1000 to 1700 and 4900 kHz before and after then; another on 4932 at 1100 to 1700. Madiun is on 3286 at 0700 to 1000; Mataram on 3223 at 0900 to 1600; Nabire on 5055 at 0900 to 1300, 6127 at 1300 to 1600; Pontianak on 3345 at 0800 to 1315, 3995 at 1315 to 1515, 3447 after 1515; Tanjung Pinang on 4920 at 0658 to 1215 UTC. (David Foster, *OzDX*)

**Italy:** Radio Earth said it would begin test transmissions in late August via IRRS (Italian Radio Relay Service), Milan, at various times weekends on frequencies in the 7, 9, and 13 MHz bands. (*DXLD*) Using 7.5 or 10 kw transmitters, omni-L dipole. (Noel Green, Danish Shortwave Clubs International)

**Japan:** Last-minute changes to the relays of France: 0930 to 1130 on 15215, 1000 to 1100 on 17705, 2300 to 0030 on 17710. (Toru Yamashita, Radio Nederland *Media Network*) Far East Network is back on 6155 and 15260 kHz after an overhaul. (Rikard Johansson, MN) 9685, not 9665, for Japan via French Guiana at 2200 to 2300. (David Newkirk, *DXLD*)

**Korea, South:** Hearing Radio Korea coverage of the Olympics should provide a different perspective to seeing it via local TV. Newscasts will be lengthened to provide results and special programs, including *Torch of the Orient*,

# Shortwave Broadcasting

September 5-9, and *How Are You, Hodori*, Focusing on athletics, September 10-14. Korean-language service will broadcast the opening and closing ceremonies live. (Lim Kong Jin, Penang, Malaysia) Check 15575 first. English hours are at 2230 on 15575, 0500 on 6060 and 9570, 1300 on 9750. Radio Korea also sends out sheet music to those who would like to sing along in Korean on Fridays. Look for schedule changes, such as a shift to one UTC hour later, once DST ends October 10. (Gerry Bishop, *DXLD*)

**Malaysia:** The frequency section correctly shows that Voice of Malaysia broadcasts at 0555 to 0600, 0600 to 0700, 0700 to 0800 and 0800 to 0825 on 15295 kHz, but it took seven years of trying to hear this transmission before succeeding this summer. (Kirk Allen, OK)

**Norway:** Contrary to an item in June, Radio Norway's Fredrikstad site is still on the schedule this fall, one frequency at a time for 45-minute broadcasts at 0600, 1000, 1200, 1300, 1400, 1600, 1700, 1800, 2000 and 0100 -- including 25730 at 1200 UTC to Africa, keeping Denmark company on the top band. (Bill Dvorak, Don Moore, Kraig Krist, *WOR*)

**Peru:** New stations to chase: Radio Frecuencia Lider, Bambamarca, 1.5 kw on 4418.2 kHz at 2250 to 0505. And Radio Tuman, Chiclayo, 4321.1 at 1140 and 0110, from a sugar cooperative. (Pedro F. Arrunategui, Lima, *DXLD*) The latter must be a third harmonic from mediumwave. (Henrik Klemetz, Sweden, *SW Bulletin*) DST seems to be local-option; some stations give time in UTC-4, others in UTC-5. (Julian Anderson, Arentina, *SWB*)

**Portugal:** Radiodifusao Portuguesa has a new "goodwill" news, political, cultural and touristic program, *Good Morning, Europe*, multilingual including English at 0700 to 0830 on 15225 and via Sines on 9615 kHz. (Wolfgang Buschel, W. Germany, *RCI SWL Digest*)

**Saipan:** For the first time, KYOI is scheduled on five frequencies during its broadcast day, effective the 25th of this month: from 1800 on 9670, 2000 on 9465, 2200 on 15405, 0200 on 17780 and 0800 to 1600 on 11900 kHz. At times it simulcasts WCSN. (George Jacobs & Associates)

**San Martino:** Representatives from the Tele Administration have visited Adventist World Radio in Forli, Italy, asking AWR to propose establishment of an international broadcast station here. (Hans Puff, W. Germany, *SCDX*) Faint aroma of hoax to this, but...?

**Turkey:** What became of sore thumb 14880? It moved to 9460 at 0400 to 2200. (Wolfgang Buschel, *DXLD*) Another oddity logged once: 11385 kHz at 2115 to 2155. (Bill Peek, NC, *DXLD*) Listen for English news during Turkish home service at 0600, 0900, 1400, 1600 and 1900 UTC. (Don Rhodes, Australia, *ADXN*)

**USA:** AFRTS may be abandoning shortwave, but it has been and will continue to be available from International Vacuum on Satcom 2 (FT-2), transponder 22-horizontal, sub-carrier 5.94 MHz. (George S. Thurman, *WOR*) Better than nothing, but lugging a dish along on domestic and overseas travels isn't very practical. AFRTS belatedly started carrying National Public Radio's *Weekend Edition*, Saturday

and Sunday at 1206 to 1359 UTC.

From September 25, KVOH, Los Angeles, plans to use 13695 instead of 9495 after 0100 UTC. (GJ&A)

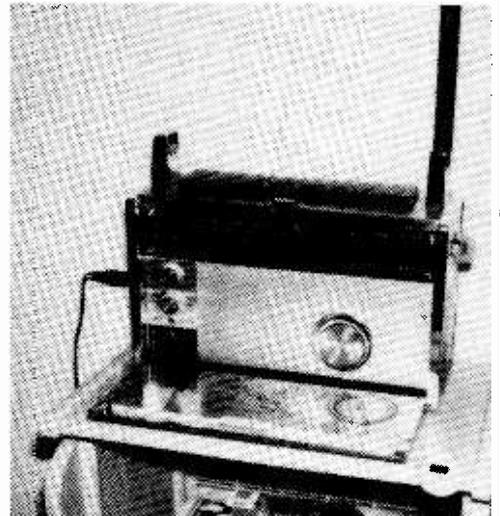
**USSR:** Baku, Azerbaijan, has been heard with fair signals at 0745 UTC on 28710 kHz, the sixth harmonic of 4785. (Mark Hattam, UK, *WDXC Contact*) Hams hardly use 10 meters above 28550 or so; this will stand out if it reaches North America after sunrise.

**Venezuela:** Radio San Cristobal expects to activate 9570 with 1 kw, says the station to the *World Radio TV Handbook*. (DSWCI *Shortwave News*)

**Zaire:** You want a relay here? You can have it, no further discussion necessary, says billionaire President Mobutu to Voice of America director Richard Carlson during a visit to Washington. (Jack Anderson's column)

*BLANDX* is back with a third edition. A full-length parody of a DX club bulletin. For loads of laughs, order one now for \$2 in North America, \$3 or 8 IRCs elsewhere from Don Moore, H-2 1/2 Columbia Avenue, Athens, OH 45701.

From Bob Moore of Lakewood, Colorado: My "listening post." Not much, huh? Let me explain. I bought the 26 year old Zenith at a flea market because it is the same as one I had ripped off in 'Nam back in 1967. The radio was dirty inside and out, but thanks to a repairman in a can, Formula 409 and Armorall, it not only looks great, but pulls like a champ. I have been able to listen to all the powerhouse stations as well as a group of not so powerful stations.



I bought *WRTH* and *Passport to World Band Radio*, both excellent publications, but it was just this past week I found *MT* on sale and bought the April through July issues. What a marvelous magazine -- so much information it takes a couple of days to read and digest each issue! Using the frequency guide and guide to shortwave listening I have had a grand time listening to the world.

An example of the value of the guide was in listening to the RFI recently the signal was the pits. Using the guide I tuned from 11955 to 11670 where the signal was strong as any local.

Needless to say I have subscribed and look forward to each issue. Am also considering buying something newer than the Zenith just to get more bells, whistles and frequency choices.

# Shortwave Broadcasting

## Broadcast Loggings

Let other readers know what you're enjoying.

Send your loggings to **Gayle Van Horn**

160 Lester Drive, Orange Park, FL 32073

English broadcast unless otherwise indicated.

### 0045 UTC on 11715

Spain: Radio Beijing relay. Feature Culture in China on the Yangtze River boatmen. (Bob Fraser, Cohasset, MA)

### 0105 UTC on 11805

Brazil: Radio Globo. Portuguese. The crowd goes wild - in Portuguese! Radio Globo presents a lively comedy show before an exuberant audience. (David Heitzinger, Dover, DE)

### 0114 UTC on 15190

Brazil: Radio Inconfidencia. Portuguese. Station ID with popular Brazilian tunes. (David Heitzinger, Dover, DE)

### 0129 UTC on 17765

Mexico: Radio Mexico International. Spanish. Latin pops, station promotional ID as, "en todo el mundo Radio Mexico XERMX." Signal fading observed. (Guy Atkins, Issaquah, WA)

### 0200 UTC on 4830

Venezuela: Radio Tachira. Spanish. Venezuelan music with station ID at 0215 UTC as, "Radio Tachira." (Frank Mierzwinski, Mt. Penn, PA)

### 0211 UTC on 5889

Clandestine: Radio Liberacion. Spanish. You've read about it in the papers. It's Radio Liberacion, the Contra station. And it broadcasts political commentary on Central America and Spanish music selections. (David Heitzinger, Dover, DE)

### 0215 UTC on 11745

Brazil: Radio Nacional-Brasilia. Feature on the 1960s with discussion on the drug culture, marriage, and music. (David Kammer, Ridgecrest, CA)

### 0230 UTC on 9635

Finland: Radio Finland. Fair to good signal with magazine show. Heard on parallel frequency 11755 kHz with 0255 UTC sign-off. (Richard Albright, Merced, CA)

### 0235 UTC on 15115

Pakistan: Radio Pakistan. Lady announcer reads slow speed English news. Extremely weak during closing announcements and station schedule. Sign-off 0245 UTC. (Rod Pearson, St. Augustine, FL)

### 0236 UTC on 4770

Venezuela: Radio Mundial Bolivar. Spanish. Local commercials and station promotionals with Spanish pop music. (David Heitzinger, Dover, DE)

### 0239 UTC on 9705

Portugal: Radio Portugal. An in-depth discussion of Portugal's folk music. (Harold Frodge, Midland, MI)

### 0250 UTC on 15084

Iran: Voice of the Islamic Republic of Iran. Farsi. Station ID at tune-in with presumed news topics of the Middle East. Persian music with poor audio level. (Craig Hirsh, New Orleans, LA)

### 0255 UTC on 4870

Ecuador: Radio Rio Amazonas. Spanish. Beautiful Ecuadorian ballads to station ID and 0300 sign-off. (Rod Pearson, St. Augustine, FL)

### 0258 UTC on 5045

Brazil: Radio Cultura do Para. Portuguese. Station ID and frequency at 0300, spoken in broken English. Brazilian music monitored past 0304 UTC. (Frank Mierzwinski, Mt. Penn, PA)

### 0305 UTC on 15170

Tahiti: RFO. French. National news of France, Tahiti, and New Caledonia. Station ID with marvelous Tahitian music. Terrific conditions and audible next evening by 0145 UTC. (Larry Van Horn, Orange Park, FL)

### 0310 UTC on 4790

Peru: Radio Atlantida. Spanish. Peruvian ballads and several Atlantida promotionals with city location. Time check and announcer chat.

### 0327 UTC on 3395

Ecuador: Radio Zaracay. Spanish. Musical Coca Cola commercial and tonight's upcoming program notes. Spanish and American pop tunes. (Rod Pearson, St. Augustine, FL)

### 0345 UTC on 4780

Colombia: Radio Super. Spanish. "Super" ID with brassy Columbian music.

Continued Super promotions between each selection. (Michael Houghton, Boston, MA)

### 0350 UTC on 4934

Kenya: Voice of Kenya. (tentative) Weak but fairly audible African music. News reporting format at 0400 UTC and occasional bits of English heard.

### 0410 UTC on 17630

Israel: Kol Israel. U.S. sports report followed by frequency schedule and time tips. French programming begins at 0414 UTC. Heard also on parallel frequencies 12080, 9435, and 9010 kHz. (Larry Van Horn, Orange Park, FL)

### 0417 UTC on 4800

Lesotho: Radio Lesotho. Lesotho. Old-time gospel chorus with religious inspirational message. (Michael Houghton, Boston, MA)

### 0428 UTC on 4920

Ecuador: Radio Quito. Spanish. Lovely harp music with ID as, "Radio Quito, La Voz de la Capital." (Guy Atkins, Issaquah, WA)

### 0435 UTC on 4904

Chad: Radio Nationale Tchadienne. French. Good morning, Chad! The rooster crows and a male announcer offers a "National" ID and gooooo morning greetings. Then into African and French pop music.

### 0435 UTC on 4880

South Africa: Radio Five. Evening disc jockey conducts "win-a-record" contest. Rock music from Dire Straits at 0439 UTC and "Radio Five" ID. (Guy Atkins, Issaquah, WA)

### 0510 UTC on 11685

Saudi Arabia: Broadcasting Service of the Kingdom of Saudi Arabia. Turkish. Male announcer with news script. Audible on parallel frequency 15060 kHz. Station feature a presentation and Turkish folk music.

### 0531 UTC on 4915

Ghana: Ghana Broadcast Corp. African vernaculars. Native African and gospel music. English national news with ID at 0600 UTC. Items of Ghana covered were technology developments, industry projects, and UNICEF's continuing work in villages.

### 0535 UTC on 5020

Niger: La Voix du Sahel. French. Koran recitations and native African music. Station ID and several mentions of Niamey, followed by African flute music. News report at 0600. (Larry Van Horn, Orange Park, FL)

### 0600 UTC on 7265

Germany-FRG: Sudwestfunk. German. National news of Germany and weather forecast report. (David Heitzinger, Dover, DE)

### 0604 UTC on 6100

Nicaragua: La Voz de Nicaragua. Discussion on the U.S. Contra aid package and station ID. (David Kammer, Ridgecrest, CA)

### 0650 UTC on 15335

Romania: Radio Bucharest. Newscast with station ID and request for reception reports. 0715 sign-off. (Ronald Van Campen, Curacao, Netherlands Antilles)

### 0855 UTC on 4945

Colombia: Caracol Nelva. Spanish. Newscaster discusses national news of Colombia and El Salvador. (John Smitherman, Gainesville, FL)

### 0930 UTC on 4796

Bolivia: Radio Nueva America. Spanish. Fair signal and barely audible Bolivian Folk Ballads to 9030 UTC ID. (Rod Pearson, St. Augustine, FL)

### 0948 UTC on 5020

Solomon Islands: Solomon Islands Broadcasting Corp. Sacred choral music and religious message to 1009 UTC newscast. (Harold Frodge, Midland, MI)

### 0952 UTC on 4920

Australia: VLMA-Brisbane. Oldies from the 40-50s music era and 1000 UTC news report. (Harold Frodge, Midland, MI)

### 0952 UTC on 5030

Peru: Radio Los Andes. Spanish. Andean musical variety with ID and a commercial break at 1005 UTC. (Harold Frodge, Midland, MI)

### 1000 UTC on 11900

Mariana Islands-Saipan: KYOI. News service covering Fiji and the Philippines. ID at 1005 and capsule report on Algeria and Israel. (Leslie Edwards, Doylestown, PA)

### 1004 UTC on 4890

Papua New Guinea: NBC-Port Moresby. Announcer chat about current pop music with selections of rock oldies, pop, and country and western. (Harold Frodge, Midland, MI)

### 1010 UTC on 6070

Canada: CFRX-Toronto. Classical music program with "CFRX" ID (Harold

# Shortwave Broadcasting

- Frodge, Midland, MI)
- 1027 UTC on 3325**  
Guatemala: Radio Maya de Barillas. Spanish. "Buenas dias" greeting to listeners in Central America and Mexico. Station ID and Spanish guitar duet.
- 1028 UTC on 5055**  
Ecuador: Radio Catolica Nacional. Spanish. Opening interval signal with "Esta es Radio Nacional de Ecuador transmitiendo desde Quito." Station frequencies, national anthem, and religious service open programming.-ed.
- 1037 UTC on 3385**  
Papua New Guinea: Radio East New Britain. Pidgin. "Island" music to 1040 UTC. Announcer with local Rabaul lime check and 50s rock 'n roll oldies. One more time check and country and western music from group Alabama.
- 1050 UTC on 4990**  
Peru: Radio Ancash. Spanish. Announcer reads local announcements and news items. Peruvian music and station ID. Excessive noise making signal audible until only 1102 UTC. (Larry Van Horn, Orange Park, FL)
- 1100 UTC on 4865**  
Colombia: La Voz del Cinaruco. Spanish. News bits and musical commercials. Time check and 1105 UTC ID. Lovely Spanish ballads and pop Spanish tunes. (Rod Pearson, St. Augustine, FL)
- 1100 UTC on 15435**  
French Guiana: Radio France International relay. French. Newscast to 1120 UTC, and pop vocal music. Spanish programming at 1130. Listed English schedule of 1115-1130 not heard. (Bob Fraser, Cohasset, MA)
- 1130 UTC on 15320**  
Austria: Radio Austria International. Profile program on Austrian painter of modern landscape etchings. (Bob Fraser, Cohasset, MA)
- 1130 UTC on 6120**  
Canada: Radio Japan relay. Interesting feature on Japanese story tellers. (Bob Fraser, Cohasset, MA)
- 1200 UTC on 12015**  
Mongolia: Radio Ulan Bator. (tentative) Sign-on with program schedule and Asian news to 1215 UTC. Chinese music to 1228 sign-off. ID not heard. (Harold Frodger, Midland, MI)
- 1203 UTC on 11800**  
Australia: Radio Australia. International Report with comprehensive editorial on Laos. (Harold Frodger, Midland, MI)
- 1208 UTC on 11865**  
Indonesia: Radio Republik Indonesia-Jakarta. News relay from the Jakarta headquarters. News also heard on parallel frequencies of 4753 (RRI Ujung Pandang), 4607 (RRI Serui), 3215 (RRI Manado), and presumed RRI Ternate on 3345 kHz. (Bruce MacGibbon, Gresham, OR) Look for a primer on Indonesian DX this fall in Monitoring Times. -ed.
- 1220 UTC on 9625**  
Canada: Radio Canada International. Discussion on the Lobster Treaty with the United States. Parallel frequency 11740 kHz fair. (Lance Micklus, Essex Junction, VT)
- 1256 UTC on 3905**  
Papua New Guinea: Radio New Ireland. Pidgin. Very nice Melanesian music with New Ireland announcements. Five musical tones at 1300 with station ID and children's musical chorus. (Guy Atkins, Issaquah, WA)
- 1258 UTC on 4719**  
Indonesia: Radio Republik Indonesia-Ujung Pandang. Indonesian. Musical interval signal, "Song of the Coconut Islands," and brief station break. Five time-tips at 1300 UTC. RRI news promotional as, "Berita-berita ekonomi dan industri." (News, economic, and industry news) Super signal! (Guy Atkins, Issaquah, WA)
- 1338 UTC on 15010**  
Vietnam: Voice of Vietnam. Station editorial to 1348 UTC followed by piano and Vietnamese musical vocals. (Harold Frodger, Midland, MI)
- 1500 UTC on 17575**  
Madagascar: Radio Netherlands relay. Program features on horticulture and astronomy. (Ronald Van Campen, Curacao, Netherlands Antilles)
- 1504 UTC on 17870**  
Vatican City: Vatican Radio. Commentary and interview on the world Food Aid project. Sign-off with ID and interval signal at 1510 UTC. Heard on parallel 15090 kHz. (Rod Pearson, St. Augustine, FL)
- 1530 UTC on 17620**  
France: Radio France International. Musical program of French pop and easy-listening tunes. (Bob Fraser, Cohasset, MA)
- 1537 UTC on 21590**  
South Africa: Radio RSA. Station ID followed by a discussion on the rhinoceros population of Africa. (David Heitzinger, Dover, DE)
- 1600 UTC on 17865**  
United Arab Emirates: UAE Radio Dubai. Dramatic feature on Zionism. Pop music, news, and weather with 1640 sign-off. (Richard Albright, Merced, CA) Also heard on 15435 kHz at 0345. ID and national anthem sign-off at 0355. --ed.
- 1635 UTC on 9820**  
Guam: KTWR-Trans World Radio. Christian music with station ID and 1637 UTC sign-off. (David Kammer, Ridgecrest, CA)
- 1812 UTC on 13715**  
Czechoslovakia: Radio Prague. Light pop music and program schedule. Feature on the Czech recording industry. (Harold Frodger, Midland, MI)
- 1847 UTC on 17845**  
Spain: Radio Exterior Espana. Spanish. IDs and easy-listening Spanish tunes at 1900 UTC. Fanfare and 1901 sign-off. (Guy Atkins, Issaquah, WA)
- 1945 UTC on 11665**  
Kuwait: Radio Kuwait. Feature Studies in a Mosque on the duties of a pilgrimage. (Bob Fraser, Cohasset, MA) Monitored also from 0340-0400 UTC on 15345 and 15495 kHz. --ed.
- 2050 UTC on 15095**  
Syria: Radio Damascus. English news and station identification. Moslem music with program schedule announcement for English service. (Lance Micklus, Essex Junction, VT)
- 2117 UTC on 11830**  
Liberia: ELWA. Gospel choir music and religious sermon. Broadcast noted under WYFR religious station. Station ID at 2130 with ID and mention of Monrovia, Liberia. Fair signal and continued mixing with WYFR. (Joe Blakey, El Paso, TX)
- 2128 UTC on 9770**  
Iraq: Radio Baghdad. Middle Eastern music to 2131 station ID. Rock music of Cindy Lauper and Starship. (Joe Blakey, El Paso, TX)
- 2130 UTC on 9620**  
Yugoslavia: Radio Yugoslavia. French. International newscast and station identification. Italian news and ID at 2145 UTC. (Ronald Van Campen, Curacao, Netherlands Antilles)
- 2133 UTC on 9700**  
Bulgaria: Radio Sofia. News stories on Russian cosmonauts, US/USSR INF Arms Treaty, and Afghanistan. Station ID and commentary on nuclear weapons. (Michael Houghton, Boston, MA)
- 2157 UTC on 9552**  
Equatorial Guinea: Radio Nacional-Malabo. Religious programming and gospel music. ID at 2200 with Malabo and California address. National anthem and 2201 sign-off. (Harold Frodger, Midland, MI)
- 2200 UTC on 13645**  
Lithuanian SSR: Radio Vilnius. Program features with news and music in English. Station sign-off at 2230 UTC. (Richard Albright, Merced, CA)
- 2212 UTC on 11620**  
India: All India Radio-New Delhi. Report on India's trade policy with the Federal Republic of Germany. (David Heitzinger, Dover, DE)
- 2235 UTC on 9735**  
Paraguay: Radio Nacional. Spanish. Paraguayan folk music and station promotional. (Ronald Van Campen, Curacao, Netherlands Antilles)
- 2238 UTC on 15415**  
Libya: Radio Jamahirya. Arabic. Fervent speech followed by Arabic music. Poor signal on parallel frequency 15450 kHz. Both frequencies monitored to 0030 UTC. (Guy Atkins, Issaquah, WA)
- 2248 UTC on 6015**  
Cote D' Ivoire: RDTV Ivoirienne. French. Numerous "Cote Ivoire" IDs with musical variety of U.S. soul, African hi-life and Spanish tropicals. (Harold Frodger, Midland, MI) (also audible on 11900 kHz during 2130-0000 sign-off.-ed.)
- 2300 UTC on 9445**  
Turkey: Voice of Turkey. Turkish. Station sign-on with news and Turkish folk music. English programming began at 0300 UTC with news, program features, and pop music. Station sign-off at 0400. 9445 kHz is a new frequency from former 9560 kHz. (Dave Larson, Harlingen, TX)
- 2330 UTC on 9915**  
United Kingdom: BBC. Music feature Concert Hall with Brahms' 4th Symphony. Heard on parallel frequencies 5975, 6175, 7325, and 9590 kHz. (Bob Fraser, Cohasset, MA)

# Utility World

Larry Van Horn  
160 Lester Drive  
Orange Park, FL 32073

## Better Reception = More to Hear

As this column is being written, sunspot numbers continue to rise. It has now risen high enough to make the 20 meter (14000-14350 kHz) amateur band a 24-hour a day DXer's delight. The increasing sunspot numbers are also responsible for the skip conditions on frequencies above 30 MHz almost on a daily basis.

There are a lot of utility frequencies that have been dormant since the last sunspot cycle peak. These frequencies are now coming alive with activity. As the sunspot numbers continue to climb to a peak sometime between 1989-1993, more and more utility stations will move higher in frequency to avoid the congestion on lower bands.

Now what is all this talk about sunspot numbers, you ask, and what does it mean for me?

For years astronomers have observed darkened areas on the surface of the sun. These darkened areas, called sunspots, have been observed to increase and decrease in numbers on an approximate eleven year cycle. With the advent of radio, it was observed that higher frequencies tended to propagate when the sunspot numbers approached maximum. Thus the assumption, the higher the number of observed sunspots, the higher the maximum useable frequency will be for worldwide radio communication.

## Cycle 21: Where We Have Been

The last sunspot cycle, cycle 21, started in June 1976 with a smooth sunspot count of 12. After the minimum, the numbers rose quickly, reaching a maximum of 165 in December 1979. From then on the numbers slowly decreased until the minimum was reached in September 1986. The smooth number at this point reached 12.4. Since then the count has started to rise, and at this point in time we are well into cycle 22.

## Cycle 22: Where Are We Headed?

Currently there are many predictions for cycle 22 maximum that range from 20 to 200. As to when this takes place, at this stage it could be between 1989-1993. Based on recent developments, 1989-1990 might be more realistic. Smooth numbers around 75 could be occurring by the time you read this.

There is a tradeoff, however. Higher numbers and frequencies also mean more solar disturbances that disrupt shortwave communications. Solar flares will increase, which cause shortwave frequencies to completely fade out. Also more disappearing filaments and coronal holes from the face of the sun mean more geomagnetic storms.

These can all play havoc with shortwave propagation for many days at a time. Over the past year, we have seen a steady increase in geomagnetic activity and solar flares.

It has been about eight years since the higher frequencies were really active. Since most have not listened to the higher bands for some time, Table 1 has been prepared to acquaint newcomers and old-timers alike to the frequency spectrum above 18 MHz.

## U.S. Navy Frequencies

The most active and frequent user of the shortwave spectrum is our own U.S. Navy. While fleet communication satellites have reduced the navy's dependence on HF frequencies over the last several years, the navy still conducts a lot of its operations on shortwave.

Table 2 lists some of the more active channels for navy communications. A lot of work still needs to be done on active channels and usages of these channels. *MT* readers are invited to send in any information you might have on navy HF activity.

Table 1  
Shortwave Band Plan Above 18 MHz

17900.0-17970.0	Aeronautical Mobile (civilian)
17970.0-18030.0	Aeronautical Mobile (military)
18030.0-18068.0	Fixed Service
18068.0-18168.0	Amateur Radio/Fixed Service (shared)
18168.0-18780.0	Fixed Service
18780.0-18900.0	Maritime Mobile/Fixed Service (shared)
18900.0-19680.0	Fixed Service
19680.0-19800.0	Maritime Mobile/Fixed Service (shared)
19800.0-19990.0	Fixed Service
19990.0-20010.0	Standard Frequency, Time Signals and Space Research
20010.0-21000.0	Fixed Service
21000.0-21450.0	Amateur Radio
21450.0-21750.0	International Broadcasting
21750.0-21850.0	International Broadcasting/Fixed Service (shared)
21850.0-21870.0	Fixed Service
21870.0-21924.0	Aeronautical Fixed
21924.0-22000.0	Aeronautical Mobile (civilian)
22000.0-22120.9	Maritime Mobile: Ship Voice Duplex (USB)
22121.0-22139.0	Maritime Mobile: Coast/Ship Simplex
22139.5-22192.0	Maritime Mobile: Ship FAX, Data, Etc.
22192.5-22225.5	Maritime Mobile: Ship RTTY Duplex
22227.0-22247.0	Maritime Mobile: Ship CW Calling
22250.5-22310.0	Maritime Mobile: Ship CW Working
22310.0-22561.0	Maritime Mobile: Coast CW Calling/Working
22561.5-22594.5	Maritime Mobile: Coast RTTY Duplex
22596.0-22716.9	Maritime Mobile: Coast Voice Duplex (USB)
22720.0-22855.0	Maritime Mobile/Fixed Service (shared)
22855.0-23200.0	Fixed Service
23200.0-23350.0	Aeronautical Mobile (military)
23350.0-24000.0	Fixed Service
24000.0-24890.0	Fixed Service/Land Mobile
24890.0-24990.0	Amateur Radio
24990.0-25010.0	Standard Frequency, Time Signals and Space Research
25010.0-25070.0	Fixed/Mobile Service
25070.0-25110.0	Maritime Mobile
25110.0-25210.0	Maritime Mobile/Fixed Service (shared)
25210.0-25550.0	Fixed/Mobile Service
25550.0-25670.0	Radio Astronomy
25670.0-26100.0	International Broadcasting
26100.0-26175.0	Maritime Mobile/Fixed Service (shared)
26175.0-27500.0	Fixed/Mobile Service
27500.0-28000.0	Fixed/Mobile Service/Meteorological Aids (shared)
28000.0-29700.0	Amateur Radio
29700.0-30000.0	Fixed/Mobile Service

Table 2  
Active U.S. Navy HF Voice Freqs

3095, 3265, 4040, 4373, 4376.5, 4400.8, 4416, 4422, 4711, 4737, 4813.5, 5071, 5080, 5718, 5783.5, 6686, 6697, 6701, 6720, 6723, 6746, 6833.6, 6968.5, 7498.6, 7507, 7593.5, 7963.5, 7968.2, 8972, 9002, 9032, 9036, 11191, 11194, 11195, 11198, 11201, 11258, 11267, 12003.5, 12058.5, 13110.1, 13172.1, 13181.0, 13182.8, 13231.0, 13251.0, 13529.0, 15022.5, 18087.5, 23281.0, 23284.0, 23298.0, 23312.0

One of the easier ways to recognize navy activity is by the distinctive tactical call signs that navy units use. These tac calls consist of three alphanumeric characters (Bravo Niner Quebec, Alpha Six Juliett, etc). These tactical calls are changed daily from a large pool of available call signs.

Several *Monitoring Times* readers have written to ask if there is a reference source for identifying navy stations of the Bravo Niner Quebec-type heard on HF. The intent of the navy in using these

**Table 3  
U.S. Navy MARS Afloat**

4007.0, 4013.5, 4041.0, 4470.5, 4818.5, 5158.0, 7300.0, 7358.8, 7363.5, 7368.5, 7391.5, 7493.5, 7684.0, 8031.5, 11538.0, 11653.5, 12047.5, 12122.5, 13378.5, 13483.5, 13528.5, 13538.5, 13643.0, 13826.0, 13974.0, 14383.5, 14670.0, 14470.0, 14477.0, 14483.5, 14818.5, 14838.5, 14934.0, 16298.5, 16386.0, 19186.0, 20678.5, 20936.0, 20987.0, 20997.0, 27962.0, 27974.0

types of callsigns is to deny the enemy knowledge of what unit he is listening to. All reference information on these callsigns is classified and publications relating to these tactical callsigns are not available in the public domain.

## Going Green

Navy units use primarily USB mode. Listeners will occasionally hear references to navy units "going green." This means that they are turning on sophisticated voice scramblers to defeat monitoring. You will then hear either the scrambled voice or noise depending which type of scrambling device is being used. Stations that are heard in the clear are "in the red" meaning they are not scrambling communications.

Navy users that can be heard on shortwave fall into three main categories. These are fleet communication stations (COMSTA), anti-submarine warfare patrol and command aircraft, and of course, ships. All will be heard using the aforementioned three character callsigns. Basically, if you hear these three character callsigns in use, you are tuned into a navy tactical communication frequency.

Another way to hear navy ships and yes, verify them, is to listen to navy MARS Afloat channels. The MARS (Military Affiliate Radio System) uses licensed amateur radio operators to communicate with ships and help pass routine moral traffic ashore. The *Grove Shortwave Frequency Directory* has a comprehensive list of navy MARS callsigns that can aid the monitor in determining which ship is being monitored.

A good frequency to check for activity is the Afloat calling frequency of 14441.5. Ships can be heard checking in on this frequency, then moving to other designated channels to conduct business with the shore station they contact.

All Navy MARS voice activity can be heard using USB mode of transmission and are simplex. Other Navy Afloat MARS channels to monitor are included in Table 3.

Finally, another set of navy channels to monitor that will yield some nontactical communication are the Harbor/Shipyard common channels. As ships pull into and out of port, a HF frequency is used to communicate with a harbor operations center. Most of the ships heard on these channels use the ship's name (USS Forrestal, etc). The base operations center will use the name of the base plus the word "Control" (Mayport Control, Long Beach Shipyard Control, etc.). These transmissions normally use USB mode and are simplex. USN/Shipyard frequencies include: 2150, 2434, 2716, and 2836 kHz, with 2716 being the most actively utilized on both coasts.

## UTILITY REFERENCES

An excellent source of utility station information that no utility listener should be without is the *Guide to Utility Stations* published annually by Joerg Klingenfuss. Joerg's latest edition of this popular by-frequency directory is now in its sixth edition.

The *Guide* contains over 15,802 frequencies which the author personally monitored during 1987. There are additional sections of this book that cover RTTY schedules, FAX schedules, station addresses, ITU HF regulations and many other important sections of useful utility information, charts and maps.

In addition to the forementioned book, Mr. Klingenfuss publishes several other reference guides of use to the utility monitor. Some of these titles from his latest catalog include:

*Radioteletype Code Manual*, 10th edition - released December 1987  
*Magnetic Tape Recording of Modulation Types*, 4th edition - released April 1983  
*Guide to Facsimile Stations*, 7th edition - released May 1987  
*Guide to Former Utility Stations*, 3rd edition - released May 1987  
*Air and Meteo Code Manual*, 9th edition - released December 1986

Joerg has a brochure available giving detail listings of all his utility publications. You can get this brochure by writing the following address: Klingenfuss Publications, Hagenloher Str. 14, D-7400 Tuebingen, Federal Republic of Germany. Be sure to tell Joerg that you saw it in *MT's Utility World* when you write.

## From the Mailbag

Richard Albright reports the mystery is over. Utility Station 7TF which has caused considerable head scratching in the various SWL publications has been identified. The station is Boufakir Radio in Algeria, according to a response from the Algerian Ministry of Posts and Telecommunications.

Boufakir Radio is located at 36N12, 02E43 and runs 10KW of power. The station uses a monocone antenna. Rich has received a prepared card verification from 7TF.

Rich mentions that he has been monitoring utility stations since the 1950s, but the recent availability of frequency and address lists coupled with his recent purchase of a Sony ICF-2010 has renewed his interest.

"I've had 64 verifications to a flurry of reception reports that began over a year ago. Generally Asia/Pacific and Western Europe seem to respond the most, Latin America the least." Rich's choice for best-looking utility verification is a toss-up between JBO-Japan, HEB-Switzerland, and Britain's GKA.

He also included several U.S. Navy MARS callsigns that he could not identify that are included below (hope the IDs help):

NNNOCCE --	Dept. of Commerce ship (name unknown)
NNNOCAC --	USS Mobile Bay
NNNOCAI --	USS Antietam
NNNOCHG --	USS Gary
NNNOCHS --	USS Vincennes

Readers are reminded that a comprehensive list of U.S. Navy MARS callsigns Afloat and Ashore appears in the *Grove Shortwave Directory*. This is available from the folks who publish *MT*. No self-respecting ute listener should be without this valuable reference.

Rich could also use some help identifying the following USAF callsigns: Ironweed, Pep Rally, Fall Fish, Doorknob, Mince Pie, Biometro, Old Salt, Center, or Monarchy? From the looks of the list, Rich, these are probably tac calls that change from time to time making identification of the user difficult. If anybody can help on these, drop me a note.

## Logging Column Ground Rules

I really don't have many of these, but certain items must be included with your loggings. Date, time, frequency (let me know if approximate), callsign (if known), location (if known), and especially if you designate the log as an unknown, some details to work with will help in trying to identify your intercept.

I use UTC/kilohertz for time and frequency. If it is a number station log please include the day of the week-UTC with your logging.

If you want a personal reply please be patient and include a SASE. I am always willing to try to answer questions and will accept frequency lists and other goodies to share with our *MT* readers. I will also accept utility verifications that readers send in. Do not send the originals, clear xerox copies are just fine.

And now on with this month's loggings from the Utility World.

## Utility Loggings

Abbreviations used in this column

All times UTC, frequencies in kilohertz. All voice transmissions are English unless otherwise noted.

AM	Amplitude Modulation	ISB	Independent Sideband
ARQ	Sitor	LSB	Lower Sideband
CW	Morse Code	RTTY	Radioteletype
FAX	Facsimile	UNID	Unidentified
FEC	Forward Error Correction	USB	Upper Sideband
ID	Identification		

1632.0 Monitored random beeps on this frequency around 0439. (Lance Micklus, Essex Junction, VT) This is a Canadian Cubic Argo Radiolocation frequency. Welcome back to the column, Lance. -ed.

1721.5-1725.0 Monitored a beacon that sounded like it was sending the letter "N" in CW. 1721.5 seemed to be sync'd with 1725.0. Heard at 0448. (Lance Micklus, Essex Junction, VT) While I do not have a specific listing, this is probably some sort of radiolocation beacon. -ed.

1746.8 Beacon type signal heard at 0456. Seemed to be sync'd with another weaker signal. (Lance Micklus, Essex Junction, VT) This is another Canadian Cubic Argo Radiolocation channel. -ed.

2598.0 Unknown station giving marine weather in USB at 0518 for the Gulf regions. Station off by 0523. (Lance Micklus, Essex Junction, VT) This is a Canadian Coast Guard channel. Could be a number of stations that operate on the frequency. -ed.

3225.0 Female Spanish numbers station heard at 0340. (David Heitzinger, Dover, DE) Welcome back to the column, David. -ed.

3413.0 Shannon Volmet heard in USB at 0330. The station repeatedly IDed as "Shannon Volmet." Continuous weather conditions such as visibility, runway visibility, temperatures, etc. was given for several airports in Europe. These included Cologne, Bonn, Amsterdam, Manchester, and London's Heathrow. (Gayle Van Horn, Orange Park, FL)

3564.0 781JU-Heard Foxes, Yr's, ID then sign off at 0542. This was an RTTY signal. (Lance Micklus, Essex Junction, VT) This is probably the Spanish Naval Radio at Rota, Spain. They crop up all over the band using these NATO identifiers. -ed.

4125.0 Ohio River boat traffic monitored around 0126 using USB. (Harold Frodge, Midland, MI) Welcome back, Harold. This is a common coast/ship simplex channel. -ed.

4428.7 NMN-U.S. Coast Guard Portsmouth, Virginia, heard at 0400 in USB. Station using a computer generated voice giving weather information for the eastern seaboard marine areas. (Gayle Van Horn, Orange Park, FL)

4470.0 Female Spanish numbers station heard at 0337. (David Heitzinger, Dover, DE)

4722.0 MVU-West Drayton Volmet, England, heard at 0042 in USB. (Harold Frodge, Midland, MI) Heard at 0410 in USB. (Gayle Van Horn, Orange Park, FL)

4725.0 "Artic Fox" heard at 0117 in USB. Male operator sending alpha-numeric characters. (Harold Frodge, Midland, MI) This is SAC channel "Quebec." Harold. Probably an airborne command post. -ed.

5190.0 Cape Radio working Celestial requesting a radio check at 0325 in USB. Cape Radio asked Celestial to contact "Raymond" with negative results. Celestial then tried to contact "Ramrod." Cape Radio said not available until 0415. There was reference to a Soviet freighter after the radio check. (Al Rayment, Nelson, BC, Canada) Interesting, Al. Thanks for the logging, please report often. -ed.

5547.0 Aeroradio ATC-San Francisco, California, working Echo Foxtrot Charlie. Aircraft gave ETA to Honolulu and number of passengers on board in USB at 0225. (Trevor Stanley, Flagstaff, AZ) Welcome back to the column, Trevor. -ed.

5550.0 Aeroradio ATC-New York, New York, working Cubana 474. Aircraft gave a position/altitude report at 0225 in USB. (Trevor Stanley, Flagstaff, AZ)

5598.0 Aeroradio ATC-Gander, Newfoundland, working Iberia 954 at 0230 in USB. Aircraft gave a position report and requested a change of altitude. (Trevor Stanley, Flagstaff, AZ)

5616.0 Aeroradio ATC-New York, New York, working TWA 900 in USB at 0257. Aircraft gave position/altitude report. (Trevor Stanley, Flagstaff, AZ)

5696.0 NMN-USCG COMSTA Portsmouth, Virginia, conducting a radio check with CG aircraft 1494 at 0245 in USB. (Trevor Stanley, Flagstaff, AZ)

6200.0 NMC-USCG COMSTA San Francisco, California, working the coast guard cutter "Fort Point" with a radio check at 0130 in USB. (Trevor Stanley, Flagstaff, AZ)

6326.5 WNU-Slideil Radio, Louisiana, heard at 1224 with a CQ CW marker.

6376.0 WCC-Chatham Radio, Massachusetts at 1235 with a V CW marker.

6386.5 HKC-Buenaventura Radio, Colombia, with a CQ CW marker at 1239. Heard interference from a navy link 11 datalink transmitter.

6389.7 WNU42-Slideil Radio, Louisiana, with a CQ CW marker at 1240.

6428.5 VIX-Royal Australian Navy, Canberra, heard at 1246 with a V CW marker.

6436.8 ZLO-Royal New Zealand Navy, Waiouru, with a AR DE CW marker at 1249.

6491.5 JOS-Nagasaki Radio, Japan, heard at 1300 with a CQ CW marker.

6497.0 VIP-Perth Radio, Australia, at 1304 with an ARQ Idler and callsign only CW marker.

6499.0 WLO-Mobile Radio, Alabama, heard with a DE CW marker and ARQ idler at 1306.

6499.5 WLO-Mobile Radio, Alabama, at 1307 sending a DE CW marker and ARQ Idler.

6501.0 VIS-Sidney Radio, Australia, heard sending a callsign only CW marker and ARQ Idler at 1309.

6501.5 WLO-Mobile Radio, Alabama, heard at 1310 with a DE CW marker and ARQ idler.

6577.0 Aeroradio ATC-New York, New York, working Speedbird 292 (flight from Miami to Heathrow Airport, London). New York assigned primary frequency as 5550 and flight level of 33,000 feet. Heard at 0230 in USB. (Trevor Stanley, Flagstaff, AZ)

6715.0 SAM 27000 working Andrews AFB. (Mark Holmes, College Park, GA) No time and mode given. Please report often, Mark, and welcome to Utility World. -ed.

6750.0 USAF Lajes AB, Azores, heard in USB at 0253. There was an emergency but I missed it by a few minutes. The operator cancelled the emergency and advised all to resume normal traffic. (David Heitzinger, Dover, DE)

6784.0 English male 3/2 digit number station heard at 0114 with a weak signal. (Harold Frodge, Midland, MI)

6812.0 Air Force Two working Andrews AFB. (Mark Holmes, College Park, GA)

7889.0 Female Spanish numbers station heard at 0612. (David Heitzinger, Dover, DE)

8291.0 Exxon Jamestown working KHT-Cedar Rapids, Iowa, in USB at 1858. (Richard Albright, Merced, CA) Welcome back to the column, Richard. -ed.

8438.0 9WH-Kota Kin Radio, Sabah, Malaysia heard at 1151 with a CQ CW marker.

8444.5 KFS-San Francisco Radio, California, at 1203 with a CQ CW marker.

8465.0 NMN-U.S. Coast Guard Portsmouth, Virginia, with a CQ CW marker then ship traffic.

8478.5 FUF-French Naval Radio Fort de France, Martinique, with a V CW marker at 1210.

8525.0 WNU-Slideil Radio, Louisiana, heard with a CQ CW marker at 0945. (Lance Micklus, Essex Junction, VT)

8843.0 Aeroradio ATC-San Francisco, California, working American 10. Aircraft gave fuel on board, outside air temperature and ETA to San Francisco at 0225 in USB. (Trevor Stanley, Flagstaff, AZ)

8846.0 American 699 working New York Aeroradio on USB at 1402 declaring an emergency. At 1407 the flight advised he was losing fuel rapidly due to a massive leak in engine #2. The pilot stated that his aircraft type was an A300 with 103 souls on board and that his ETA for Bermuda was 1451. At 1413 he advised shutting down of #2 engine and told to contact Bermuda on VHF-128.5. No further comms monitored. Never heard anything on the news, so I guess the flight made Bermuda OK with leaking fuel and one engine out. (Garie Haistead, Saint Albans, WV) Just goes to show that utes can be exciting. Welcome back, Garie. -ed.

8864.0 Aeroradio ATC-Gander, Newfoundland, working TWA 64 in USB at 0140. Aircraft was giving a position/altitude report. (Trevor Stanley, Flagstaff, AZ)

8989.0 USAF GCCS MacDill AFB, Florida, working Foxtrot Charlie Echo 313. Aircraft running a phone patch with MacDill Ops giving ETA and requesting clearance to maintenance on landing MacDill. Monitored at 0120 in USB. (Trevor Stanley, Flagstaff, AZ)

9540.0 In USB and RTTY heard COMSTA Bravo, MB6, V5Y, B16 and some others from 1800 on in USB. Sounded like some Army Reserve units. One message was interesting: "We need sodas, lots of sodas." Also wanted phone message to "The Rear" and passed into RTTY. One transmission ended with "Roger, QSL is 2313185A88." (Ken Kuzenski, Jackson, LA) Thanks for the report, Ken Your guess is as good as mine. Please report often. -ed.

11200.0 MVU-West Drayton Volmet, England, with aviation weather at 0146 in USB. (Harold Frodge, Midland, MI) Heard at 0135 (Trevor Stanley, Flagstaff, AZ)

11246.0 USAF GCCS MacDill AFB, Florida, passing a skyking message broadcast at 0200 in USB. (Trevor Stanley, Flagstaff, AZ) Mac 50238 (C-141) working MacDill with a phone patch which included a request for 90,000 pounds of fuel at destination. (Mark Holmes, College Park, GA)

11396.0 Aeroradio ATC-New York, New York, working Speedbird 2 at 0000 in USB. Aircraft was requesting an altitude change. (Trevor Stanley, Flagstaff, AZ)

11530.0 Spanish female numbers station heard at 0104. (David Heitzinger, Dover, DE)

12660.0 WLO-Mobile Radio, Alabama, with a DE CW marker at 1233.

12695.5 KFS-San Francisco Radio, California, at 1248 with a CQ CW marker.

12702.0 NMR-U.S. Coast Guard COMSTA San Juan, Puerto Rico, heard with a V/CQ CW marker at 1250. Heard this 2 kHz higher than most ute lists carry them.

12718.5 CKN-Canadian Forces, Vancouver, BC, heard at 1311 with a DE naws CW marker, weak. Not on any list I have, possible new frequency.

12718.5 NMN-U.S. Coast Guard Portsmouth, Virginia, with a CQ CW marker signal at 1254.

12740.0 ZLB-Awarua Radio, New Zealand, heard at 1304 with a DE CW marker. Noted strong RTTY interference on the frequency.

12745.5 JJC-Tokyo Radio, Japan, in the FAX mode sending a wire service photo at 1319.

12747.5 CBV-DGTMMM Valpariso Radio, Chile, with a CQ CW marker at 1308, weak.

12748.5 JJC-Tokyo Radio, Japan, heard with a weak FAX signal here at 1306, slight interference monitored from an unknown station.

12750.0 NIK-U.S. Coast Guard Boston, heard at 1320 with a V CW marker.

12753.0 CKN-Canadian Forces Radio Vancouver, BC, heard at 1322 with a V CW marker.

12763.5 DAM-Norddeich Radio, West Germany, at 1314 with a V CW marker.

12768.0 PCH-Scheveningen Radio, Denmark, heard with a DE CW marker at 1315.

12781.5 OST-Oostende Radio, Belgium, at 1229 with a CW V marker, weak.

12788.0 JFA-Chuo Gyogyo (Matsudo) Radio, Japan at 1324 with a CQ CW

# Utility World

- marker.
- 12818.0 SAB-Goetenborg Radio, Sweden, monitored with an ARQ idler then traffic at 1220. No CW ID noted.
- 12835.4 GKB-Portishead Radio, England, at 1217 with a CW DE marker. Noted heavy Russian "woodpecker" over-the-horizon radar interference.
- 12844.5 KFS-San Francisco Radio, California, monitored at 1215 with a CQ CW marker.
- 12847.0 WCC-Chatham Radio, Massachusetts, at 1214 with a CQ V marker transmission. Signal was real strong.
- 12869.0 WNU54-Slidell Radio, Louisiana, heard at 1208 with a CW CQ marker.
- 12874.0 VCS-Canadian Coast Guard Halifax, Nova Scotia, with a V/CQ CW marker at 1207.
- 12875.0 FUG-French Naval Radio La Regine, France, at 1205 in CW with a V marker. Noted heavy Russian "woodpecker" over-the-horizon radar interference.
- 12879.5 WSC-Tuckerton Radio, New Jersey, heard with a CW CQ marker at 1202.
- 12880.5 SAG-Goetenborg Radio, Sweden, monitored at 1201 with CW ship traffic.
- 12907.5 VHP-Royal Australian Navy Canberra, Australia, in at 1150 with a CW V marker transmission.
- 12909.0 Y5M-Rugen Radio, East Germany, with a CW V marker at 1152. This is a new frequency for Y5M.
- 12935.0 HLG-Seoul Radio, South Korea, with a real weak signal at 1144 sending a CQ CW marker.
- 12949.9 ZLO-Royal New Zealand Navy Waiouru, at 1142 with an AR DE marker.
- 12952.5 V155-Sydney Radio, Australia, in strong at 1136 with a CW V marker.
- 12952.9 WMH-Baltimore Radio, Maryland, heard at 1135 with a V CW marker signal.
- 12958.5 PPO-Olinda Radio, Brazil, with a V CW marker at 1134.
- 12966.3 A7D-Doha Radio, Qatar, at 1132 with a CW DE marker, weak.
- 12970.5 PKX-Jakarta Radio, Indonesia, with a CQ CW marker at 1331.
- 12975.0 IQX-Trieste Radio, Italy, with a V CW marker at 1130. Signal was chirpy.
- 12994.0 VIP-Perth Radio, Australia, heard with a V CW marker at 1227.
- 13005.0 NMN-U.S. Coast Guard Portsmouth, Virginia, sending a RTTY message at 1345. 175 HZ shift/75 baud speed/reverse sense.
- 13008.0 JOR-Nagasaki Radio, Japan, sending high speed CQ CW marker at 1125.
- 13011.0 WNU44-Slidell Radio, Louisiana, at 1124 with a CQ CW marker, real weak.
- 13019.8 GKC-Portishead Radio, England, with a DE CW marker at 1122, real weak.
- 13020.4 VPS60-Victoria Island, Hong Kong, heard with a DE CW marker at 1121, weak.
- 13025.0 WLO-Mobile Radio, Alabama, at 1119 with a DE CW marker, real weak.
- 13031.2 FUF-French Naval Radio Fort de France, Martinique, at 1116 with a DE CW marker.
- 13038.0 KLC-Galveston Radio, Texas, with a CQ CW marker at 1115, real weak.
- 13054.0 JDC-Choshi Radio, Japan, heard with a high speed CQ CW marker at 1111.
- 13063.0 JDB-Nagasaki Radio, Japan, at 1109 with a high speed CQ CW marker.
- 13067.0 OST-Oostende Radio, Belgium, heard at 1108 with a V CW marker. Interference from an unknown CW station.
- 13069.5 JOS-Nagasaki Radio, Japan, heard at 1106 with a high speed CQ CW marker.
- 13072.0 GKE-Portishead Radio, England, at 1105 with a callsign only CW marker and ARQ idler signal.
- 13073.5 SPB-Szczecin Radio, Poland, in with a nice signal sending a callsign only CW marker and ARQ idler.
- WLO-Mobile Radio, Alabama, monitored at 0104 with an ARQ idler and callsign only CW marker. Could hear WLO under SPB's powerhouse signal.
- 13075.0 HPP-Panama Radio, Panama, with an ARQ idler and callsign only CW marker at 0108.
- 13076.0 VIP-Perth Radio, Australia, heard with a callsign only CW marker and ARQ idler at 1101.
- 13089.5 UFN-Novarossysk Radio, USSR, at 0134 with a DE CW marker and ARQ idler.
- 13093.0 UNID CW marker as follows: "DE CQ R4" followed by a FEC transmission at 2109. (Jim Boehm, San Antonio, TX) This is probably the Russian coastal UFB-Odessa on kth channel. Welcome back to the column. -ed.
- 13095.0 KLC-Galveston Radio, Texas, monitored at 2234 with a CQ CW marker.
- 13095.5 SVB-Athens Radio, Greece, monitored at 2233 with CW callsign only then lone generated carrier.
- 13097.5 FFT64-St. Lys Radio, France, with callsign only marker at 2229.
- 13099.0 GKO-Portishead Radio, England, with an ARQ idler and callsign only CW marker at 2227.
- 13100.0 TIM-Limon Radio, Costa Rica, monitored at 2226 with a CW CQ marker.
- 13113.2 NMO-USCG COMSTA Honolulu, Hawaii, heard at 0345 in USB with marine weather for the Hawaiian Islands. (Trevor Stanley, Flagstaff, AZ)
- 13181.4 U.S. Navy tactical unit Whiskey 6 Zulu sending a coded message at 0230 in USB. (Trevor Stanley, Flagstaff, AZ)
- 13187.6 Cruise ship Rotterdam (at Glacier Bay, Alaska) working KMI-Point Reyes, California, in USB at 0357. (Richard Albright, Merced, CA) This is ship-to-shore channel 1229. The ship side is on 12416.8-ed.
- 13201.0 USAF GCCS McClellan AFB, California, running a phone patch with Aussie 181 in USB at 0140. Aircraft gave arrival time to Norton AFB and requesting wind speed and surface temperature at Norton. (Trevor Stanley, Flagstaff, AZ)
- 13244.0 King 52 (C-130) working MacDill AFB, Florida, with a radio check. (Mark Holmes, College Park, GA)
- 13826.0 NNONWE-Navy MARS Guam working NNONRI-Point Hueneme, California, in USB at 2030. NNONVP-Midway Island working NNONRI at 2200 and NNOICE-McMurdo station, Antarctica, working NNONRI at 0502, all in USB. (Richard Albright, Merced, CA)
- 14356.0 GFL24-Bracknell, England, monitored sending coded weather via RTTY at 1804. 425 HZ shift/50 baud speed/reverse sense. (Lance Micklus, Essex Junction, VT)
- 14467.0 NNONCA-Marcus Island working NNONRI-Point Hueneme, California, at 0315 in USB. (Richard Albright, Merced, CA)
- 14478.3 NNONCE-Kure Island working an unknown station in USB at 2000. (Richard Albright, Merced, CA) Nice catch, Rich, wonder if these guys verify. Not much else to do on that island. I've been there. -ed.
- 14509.0 RIW-Soviet Naval Radio Khiva, USSR, sending CW coded traffic at 1810. (Lance Micklus, Essex Junction, VT)
- 16518.9 Cruise ship Sovereign of the Seas (near Puerto Rico) working WOO-Ocean Gate Radio, New Jersey, at 2030 in USB. (Richard Albright, Merced, CA)
- 16587.1 Merchant ships Columbus Virginia, German Senator and Euro Texas sharing position reports, etc. in German using USB at 21005. Ships somewhere off the west coast. Also monitored the tanker Omi Hudson (KNJL) working KHT-Cedar Rapids, Iowa, in USB at 2100. (Richard Albright, Merced, CA)
- 16590.2 Container ship Sea-Land Mariner (KGJF) working a Tacoma coastal station in USB at 1818. Ship was off the west coast. (Richard Albright, Merced, CA)
- 16932.2 WCC-Chatham Radio, Massachusetts, at 1333 with a CQ CW marker.
- 7TF-Boufakir Radio, Algeria, heard sending traffic then a CQ CW marker at 1334.
- 16948.5 VCS-Canadian Coast Guard Halifax, Nova Scotia, sending weather data in CW at 1338.
- 16954.4 GKC-Portishead Radio, England, sending a DE CW marker at 2209.
- 16960.0 Weak PW. . . Brazilian Naval Radio Station heard here at 2208. Couldn't quite make out the call in all the noise from a solar flare disturbance.
- 16961.0 CLA-Havana Radio, Cuba, at 1347 with a CQ CW marker.
- 16980.4 DAM-Norddeich Radio, West Germany, with V marker at 1350.
- 16181.5 SVG-Athens Radio, Greece, with a high speed CW DE marker at 1351.
- 16987.2 GYU-Royal Naval Radio Gibraltar, heard sending a DE CW marker at 2202.
- 17004.0 HKB-Barranquilla Radio, Colombia, at 1353 with a CQ CW marker. Possible new frequency.
- 17021.6 WLO4-Mobile Radio, Alabama, with a DE then CQ CW marker at 1400.
- 17024.0 SAB-Goetenborg Radio, Sweden, at 2157 with an ARQ idler and CW callsign only marker, weak.
- 17038.0 WNU-Slidell Radio, Louisiana, at 2155 with a CQ CW marker.
- 17074.4 LGX-Rogaland Radio, Norway, in at 2126 with a CQ CW marker.
- 17079.4 SAG-Goetenborg Radio, Sweden, with a CQ CW marker at 2124. Heavy RTTY interference.
- 17088.8 KPH-San Francisco Radio, California, at 1409 with a CW V marker.
- 17094.8 SVA-Athens Radio, Greece, with a DE CW marker at 2120, weak.
- 17104.2 PCH-Scheveningen Radio, Holland, heard at 1409 with a V CW marker.
- 17113.0 GKB-Portishead Radio, England, sending a DE CW marker at 1414.
- 17131.0 UJQ7-Kiev Radio, USSR, working 4RA (?). Told ship to QSX 12 MHz. Transmission in CW at 2050. (Richard Albright, Merced, CA)
- 17132.0 ZSJ6-South African Navy, Capetown, at 1423 with a CW CQ marker.
- 17137.7 GKO6-Portishead Radio, England, with callsign only CW marker and ARQ idler at 1425.
- 17143.6 DAN-Norddeich Radio, West Germany, heard at 1427 with a CW CQ marker.
- 17170.2 UNID CW station sending the following: "K DE W2 CQ SX 8/16 MHz K" then called by an unknown station kat 1536. Answered with a brief Alpha code plus used standard "Q" codes and "OK". Duplex operation, other channel unknown. (Jim Boehm, San Antonio, TX) This is pretty much the norm, Jim. The ships can be heard on their frequencies as follows: 16707.0-16719.5 (ship working), 16720.0-16748.8 (ship calling), and 16754.0-16859.0 (ship working). -ed.
- 17172.4 9MG11-Penang Radio, Malaysia, heard with a CW CQ marker then traffic list at 1530. (Jim Boehm, San Antonio, TX)
- WLO-Mobile Radio, Alabama, heard at 2111 with a DE CW marker.
- 17175.2 VAI-Canadian Coast Guard Vancouver, BC, with a CW CQ marker at 1432.
- 17184.8 KFS-San Francisco Radio, California, with a CQ CW marker at 2108.
- 17194.4 PPR-Rio de Janeiro Radio, Brazil, heard with callsign at 2104, appeared to be sending some sort of traffic.
- 17198.0 SVB6-Athens Radio, Greece, at 1436 with a DE CW marker.
- GKC6-Portishead Radio, England, with an ARQ idler and CW callsign only marker at 1437.
- 17199.5 ULO-Mobile Radio, Alabama, at 1438 with a callsign CW only marker and ARQ idler.
- 17204.5 WLO-Mobile Radio, Alabama with an ARQ idler and CW callsign only marker at 1439.
- 17206.5 ZSC-Capetown Radio, South Africa, at 1441 with a DE CW marker and lone generated carrier.
- 17215.0 GKP6-Portishead Radio, England, sending a CW callsign only marker and ARQ idler at 1444.
- 17221.0 HEC-Berne Radio, Switzerland, sending a callsign only CW marker and ARQ idler at 1446.
- 17228.0 UAT-Moscow Radio, USSR, with an ARQ idler and callsign given several times in CW at 2016.
- 17385.0 5BC84-CTA Nicosia, Cyprus, in USB at 0400. Male operator sending a English voice marker "This is Cyprus Radio and frequency." This was followed by an ID in Greek, heard Nicosia mentioned. Parallel frequency of 16512.0 not heard. (Gayle Van Horn, Orange Park, FL)
- 22530.8 PW. . . Unknown Brazilian Naval Radio (Station heard at 2212 with a V/CQ CW marker. Signal real weak plus high noise level made ID impossible.

# The Scanning Report

**Bob Kay**

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## Highway Secrets

One of our readers from California, who wishes to remain anonymous, recently had an encounter with a disabled armored truck. The armored truck was painted olive green -- every inch of it. Parked in front of the truck was a Ford Bronco with four men sitting inside. Behind the truck was a late model Chrysler with four additional individuals sitting inside. All the men were dressed in casual civilian attire.

Being a concerned citizen, Mr. Anonymous stopped his car to render assistance. Before he could open his door, two of the men approached on either side of his vehicle.

"Can we help you, sir?" one of them asked.

When Mr. Anonymous offered his assistance, he was politely thanked and then asked to depart.

On top of the armored truck were two base loaded three foot whips that would seem to indicate radio operation in the VHF low or high band. There was no mention of the type of antennas (if any) on the two civilian vehicles.

Mr. Anonymous asked in his letter if I or any of *MT's* readers could unravel some of the mystery surrounding the incident.

First of all, let me say this. If anyone sees a disabled truck, regardless of its color, with eight men (no telling how many were actually inside the truck) sitting around it, *just keep on driving*. Don't stop, don't blow your horn, don't wave, just drive. Eight men could have pushed the truck to its destination!

There are escorted trucks that transport uranium, missiles and other sensitive material on our highways. The escorts ride in front and behind the truck. They are government agents, specifically hired to protect the shipment with an arsenal that would easily rival the fire power of a small army field tactical unit.

Since deadly force is authorized, any sort of confrontation, no matter how casual, may have serious complications.

However, the green armored truck with two escorts has me puzzled. I can only speculate on the contents. Anyone care to comment?

## Scanning the Unknown

As a scanning enthusiast, I realize that people living in Los Angeles, California, don't really care about the frequencies being used in Philadelphia, Pennsylvania. The feeling is mutual on either side of the coin. But there is a "trick of the trade" that can be applied to any published frequency -- no matter what the location.

Simply enter the frequency into your scanner and listen. Sure, there are scanner publications that could be researched to determine if the frequency is active in your area. But every active frequency is not listed in a publication. This is especially true for military and federal frequencies.

Here's an example: If you are looking for an elusive state park frequency, look up the state park frequencies for several states and then punch them into your scanner. A

good national reference that lists frequencies by state is *Monitor America* by SMB Publishing, P.O. Box 244, Natick, MA 01760.

## Mystery Reader

From Grand Forks, North Dakota, an anonymous reader who calls himself DXR 102, sent in a ten page computer printout containing hundreds of frequencies. Here are a few of the more interesting loggings.

### Grand Forks Air Force Base

150.150	Missile convoy
150.350	Missile pad security
173.4375	Base hospital
173.5375	Taxi service
173.5875	Fire and crash crews
266.200	Air rescue
228.00	ICBM launch control center
413.025	Commander's frequency
413.450	OSI frequency, possibly 1 of 4 being used
417.200	Nuclear materials handling and protection service

Anyone interested in receiving the complete listing should send a business envelope with 40 cents postage.

## The World of 4th Images

John Dorsey, of Quinton, Virginia, wrote, claiming to hold the world record for 4th order images in the distance department. It seems that John has monitored the 4th image of a television broadcast tower some 80 miles from his home.

Before we give John the world title, we thought that it would only be fair to check with our readers. Is there someone that can shatter the 80 mile limit? Are there any 5th, 6th, or 7th world image holders out there?

## Roof Top Scanning

When you are a dedicated scanning nut, your eyes are always scanning the rooftops. Such was the case during my recent visit to the Washington D.C. area. Of particular interest was the long wire antenna that nearly runs the length of the IRS building.

Is this part of the movement at the White House to integrate all federal government agencies to HF communications? I don't know. Mention the IRS and everyone runs for cover.

Well, I'm not afraid to pick on the IRS. If the situation arises, I'll even pick on Larry Miller!

Does anyone care to take a stab at the IRS antenna? Hello? ...Where did everyone go?

# The Scanning Report



## An Inside Look at Uniden

*Uniden Corporation of America, manufacturer of Bearcat scanners, recently acquired the assets of Regency Electronics's Consumer Electronics Division. To allay the fears of many scanner owners, we are pleased to present this interview between Bob Grove for Monitoring Times and Paul Davis, National Sales Manager for Uniden.*

**MT:** With the acquisition of Regency's Consumer Electronics Division, Uniden now enjoys a stronger competitive edge. What is your anticipated market share and who are your major competitors?

**Davis:** We have a major share, well over 50%, but we don't subscribe to a service so we don't know the actual numbers. Cobra is a major competitor even though we supply them the equipment. AOR is a major competitor as is Radio Shack (to dealers, not us as a manufacturer). The scanner business is not a large industry and we control a lot of the patents.

**MT:** Uniden has recently moved into new corporate offices in Dallas. Won't Radio Shack feel you breathing down their necks?

**Davis:** No, Radio Shack is our biggest customer. We have an even closer relationship with them now and sell them scanners, radars, CBs and ham radios--their version of our new HR2510 ten-meter transceiver is in their fall catalog.

**MT:** Whom do Uniden and Regency product owners contact for warranty and repair now?

**Davis:** Uniden Service Center, 9340 Castlegate Drive, Indianapolis, IN 46256.

**MT:** Will Regency continue as a separate product line or be combined with Uniden?

**Davis:** Regency will continue as a two-step distributor line, sold exclusively by Regency representatives to small retailers, not through mass merchandising chains as Cobra is. The Polaris marine line will be continued and our President CB and radar detectors are being re-introduced in September.

**MT:** With Uniden's strong posture against cellular listening, why are new scanners being introduced with the capability of having their cellular deletion restorable?

**Davis:** When the microprocessors were being designed, the cellular association hadn't met to decide on their official position concerning cellular-capable scanners. I suspect that the option was built in to allow or exclude cellular coverage, depending upon the final decision. I was not involved at that time.

**MT:** What familiar Regency and Bearcat products are being discontinued?

**Davis:** The entire Regency scanner line is being discontinued with the exceptions of the 1070, 1090 and 2060. The Informant series will be re-introduced next year with new engineering. Three new Regency hand-held scanners will replace the discontinued Uniden BC55XL, BC100XL and the new BC200XLT.

**MT:** Whatever became of the high-tech BC1000 scanner that has been on the drawing board for several years?

**Davis:** It is still under development and will probably be introduced next June.

**MT:** What is the growth status of the scanner market?

**Davis:** This has been an exceptional year so far, up 7-10% over last year. We have not seen the familiar summer slump in sales. I believe the scanner market will continue to grow as public awareness of scanners grows.

**MT:** Will Uniden be re-examining the shortwave market in the near future?

**Davis:** No.

**MT:** What is the significance of the introduction of the HR2510 amateur radio transceiver?

**Davis:** If it does well, we will definitely look into other amateur radio equipment.

**MT:** What does the consumer marketplace see as the emerging field and how will this affect Uniden's scanner thrust?

**Davis:** Small mobile scanners like our BC560XLT are becoming increasingly popular among drivers.

**MT:** Any closing comments for MT readers concerning the future of recreational listening?

**Davis:** During the past six months we've seen a real resurgence in scanner business. I attribute this to two things: 1. An older population that gets great enjoyment out of this type of listening; and 2, more people becoming aware of scanners--more than a hobby, they find scanners very useful for information and protection.

# The Scanning Report

## Picking on the Ruskies

Regular readers of this column also realize that I love to pick on the Soviets. I suppose that it has something to do with my six year marriage to the Marine Corps.

The Soviets read this magazine. No doubt that a copy of *MT* finds its way into the Russian Embassy every month.

Here at *Monitoring Times*, we do our best to protect sensitive material by refusing to publish information that may jeopardize national security or the life of a law enforcement officer. But Soviet agents do not expect to find all the answers at one location. They're like squirrels. They run around gathering small tidbits of information from various locations. In their quest for information, Soviet agents have been known to purchase college term papers from students.

After the information is gathered, it is sorted and analyzed. It's a rather unique way to piece together an otherwise unsolvable security puzzle.

So, if you are in college and a stranger offers to buy your term paper, feed him a bag of peanuts.

## Medivac Monitoring

Imagine for a moment that you're at the scene of an accident. The Medivac helicopter lands and then quickly departs with the more seriously injured on board. For the most part, everyone breathes a sigh of relief. It's just naturally assumed that the helicopter will get to the hospital safely. Sometimes, it doesn't.

In 1986 nearly nine percent of the nationwide emergency helicopter services were destroyed or damaged in crashes. Four of the crashes resulted in 13 fatalities.

The crash and injury rate, according to the National Transportation Safety Board, is 1,500 times greater than commercial aviation rates and 100 times greater than general helicopter rates.

However, Medivac flights do save lives. One life flight operation in Houston, Texas, has flown more than 20,000 accident free hours. To help solve the problem, the FAA is proposing set guidelines to regulate Medivac pilot training and to institute minimum visibility requirements.

## Hydroplaning on the Ohio River

Mike Borman of Evansville, Indiana, asked about the frequencies being used by the Unlimited Hydroplane Race Teams on the Ohio River. Mike claims they race once a year, but he just can't seem to discover their frequency.

## Monitoring Near the Roanoke River

Howard Weaver of Roanoke, Virginia, sent along a list of frequencies for his community and asked if we would pass them along. No problem, Howard, and thanks for your encouraging comments.

### Roanoke, Virginia

39.36 County sheriff  
155.790 County sheriff, channel 2  
155.130 City police  
155.490 City police, channel 2

154.319 Fire department  
47.42 Red Cross  
158.150 Water department  
158.820 Street maintenance  
463.950 Roanoke Times newspaper  
167.175 Blue Ridge Parkway main channel  
171.575 Jefferson National Forest

## Ending Radio Horseplay

How many times have you heard horseplay on a radio frequency? From anonymous mike clicks to foul language, many agencies are plagued by employees that just love to clown around on the air.

Control Signal Corporation of Denver, CO 80227, is producing a low cost automatic vehicle identification system. The encoder mounts in the vehicle's radio and automatically transmits an ID number every time the microphone is depressed.

The decoder is a small box that can be placed right next to the dispatcher's radio. It provides the dispatcher with a display and printed copy of vehicle identification, date and time of each call.

Many agencies are installing the units during off hours -- hoping to catch the "clowns" red handed.



And a good time was had by all . . .

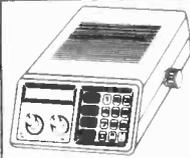
Bob Kay (foreground) at the Northeast Scanning News Picnic (Photos by Larry Miller)

"The Largest Dealer of Scanners in the World"



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**SPECIAL**  
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**MX-3000**

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(\$7.00 shipping)

### 30 CHANNELS—MOBILE/BASE

—SCANNER WORLD EXCLUSIVE—

Features include simple programming of the following frequency ranges: 30-50 MHz, 144-174 MHz, 440-512 MHz. Digital display, priority, search, lockout, delay, dim control, top mounted speaker, one year factory warranty. Includes AC & DC cords, mobile mounting bracket, telescopic antenna. All for only **\$169.99** plus \$7.00 shipping (optional extended warranty: 3 years \$39.99; 2 years \$29.99.) MX3000 Service Manual \$5.00.

### Cobra SR-15

**\$209.99** (\$7.00 shipping)

100 channel pocket sized hand-held scanner (6"Hx1"Dx2 3/4"W), no crystal, portable scanner, 29-54 MHz, 118-174 MHz, 406-512 MHz, bank scanning, backlit LCD display, automatic search, lockout, scan delay, priority, key lock, plus much more. Includes rubber antenna, rechargeable Ni-Cad battery pack, AC adapter, earphone, and carry case, optional cigarette lighter adapter #15MPC \$12.99



## Regency® Z30

### 30 Channel

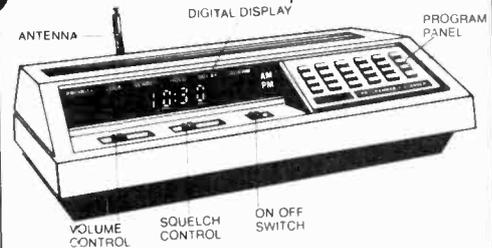
### Automatic Programmable Scanner

#### Scanner World Special

**\$129.99**

(plus \$7.00 shipping each)

**Optional Accessories:**  
Cigarette Lighter Plug RGMP. \$4.95  
Z Mobile Bracket — Special... \$5.99



The Regency Z30 is a compact, programmable 30 channel, multi band, FM monitor receiver for use at home or on the road. It is double conversion, super heterodyne used to receive the narrow band 440-512 MHz. Size 10 3/4"Wx2 7/8"Hx8 3/8"D.

Sophisticated microprocess-controlled circuitry eliminates the need for crystals, instead, the frequency for each channel is programmed through the numbered keyboard similar to the one used on a telephone. A "beep" acknowledges contact each time a key is touched. The Z30 scans approximately 15 channels per second.

Any combination of two to thirty channels can be scanned automatically, or the unit can be set on manual for continuous monitoring of any one channel. In addition, the search function locates unknown frequencies within a band.

Other features include scan delay, priority and a bright/dim switch to control the brightness of the 9-digit Vacuum-Fluorescent display. The Z30 can be operated on either 120 VAC or 12 VDC. Includes one year warranty from Regency Electronics (optional 3 yr extended warranty only \$39.99, gives you a total of 4 yrs complete warranty or 2 yr extended warranty only \$29.99, gives you a total of 3 yrs complete warranty.) Z-30 Service Manual \$5.00.

BEARCAT 100-XLT Hand-Held 100 Channel	\$219.99 (7.00)
BEARCAT 70XLT Programmable Hand-Held	169.99 (6.00)
BEARCAT 50XL Programmable Hand-Held	119.99 (5.00)
AD100U AC Adapter/Charger for 50 XL	12.95 ( )
BP55 Ni-Cad Battery Pack for 50XL	13.99 ( )
VC001 Carry Case for 50XL	11.99 (7.00)
PS001 Cigarette Lighter Adapter for 50XL/100XL	12.95 ( )
BEARCAT 140 AC Programmable Scanner	94.99 (5.00)
BEARCAT 145XL AC Programmable Scanner	99.99 (5.00)
BEARCAT 175XL AC Digital Scanner	159.99 (5.00)
REGENCY TS-1 Turbo Scan AC/DC	239.99 (7.00)
REGENCY TS-2 Turbo Scan 800 AC/DC	339.99 (7.00)
BEARCAT 210XLT AC/DC Digital Scanner	199.99 (7.00)
BEARCAT 800 XLT AC/DC Digital Scanner	279.99 (7.00)
REGENCY HX-1500 Hand-Held Scanner	224.99 (7.00)
REGENCY MA-257 Cigarette Battery for HX1000/1200	10.99 ( )
REGENCY MA-917 Ni-cad Battery for HX1000/1200	24.99 ( )
REGENCY HX-CASE Hwy Leath. case for HX1000/1200	19.99 ( )
REGENCY MA-549 Drop in charger for HX1000/1200	89.99 (5.00)
REGENCY MX-3000 AC/DC Digital Scanner	160.99 (7.00)
REGENCY Z-30 AC/DC Digital Scanner	129.99 (5.50)
REGENCY Z-60 AC/DC Digital Scanner w/Air	139.99 (7.00)
Mobile Mounting Bracket for Z Scanners	5.99 ( )
REGENCY ACT-R-1 AC/DC Crvs. Single Channel	75.99 (4.00)
REGENCY RH-256B High Band Transceiver	359.99 (7.75)
REGENCY UC 102 Hi-VHF Hand Transceiver	119.99 (5.50)
REGENCY RH-600B High Band Transceiver	429.99 (7.75)
REGENCY R806 AC/DC Crystal Scanner	79.99 (5.00)
REGENCY INF-1 Informant Receiver	249.99 (7.00)
REGENCY INF-2 Informant Receiver	324.99 (7.00)
REGENCY INF-3 AC Informant Receiver	249.99 (7.00)
REGENCY INF-5 AC Informant Receiver	199.99 (7.00)
REGENCY R1090 Digital AC Scanner	147.99 (7.00)
COBRA SR12 Digital Hand-Held Scanner	189.99 (6.50)
COBRA SR10 Digital Hand-Held Scanner	129.99 (6.00)
COBRA SR900 AC/DC Digital Scanner	104.99 (5.00)
COBRA SR295 AC/DC Digital Scanner	109.99 (7.00)
Book "Top Secret Registry of Gov't Frequency" 6th	13.99 (3.00)
Book "Covert Intelligence, Electronic Eavesdropping"	8.95 ( )
Book "Betty Bearcat Frequency Directory"	14.95 ( )
Book "Rail Scan Directory"	7.95 ( )
Book "Air Scan Directory"	12.95 ( )
RCD MRP-1 Single Channel Hand-Held	38.99 (3.00)
FANON M8HLU DC Crystal Scanner	89.99 (5.00)
FANON PSK-1 AC Adapted for M8HLU	12.99 ( )
FOX BMP-1060 AC/DC Digital Scanner	129.99 (5.50)
FOX Mounting Bracket for BMP-1060	9.99 ( )
ANT-1 Magnet Mount Mobile Scanner Antenna	29.99 (3.00)
ANT-6 Base Scanner Antenna w/50' cable	29.99 (3.00)
REGENCY RD-ONE Radar Detector	39.99 (4.00)
REGENCY CB-ONE CB Radio	34.99 (5.00)

#### SCANNER WORLD SPECIAL

### COBRA SR-925

**\$109.99**

(plus \$7.00 shipping each)



Digital programmable, 16 channel, AC/DC mobile/base, with raised button keyboard for easy programming of the following frequency ranges: 29.54mhz, 118.174mhz, 406.512mhz. Covering aircraft, marine, police, fire, weather, trains, public service, plus much more. Features include: digital display, priority, scan delay, weather button, channel lockout, search, scan speed, automatic squelch, memory backup, one year factory warranty, external speaker jack. (Extended warranty 2 years extra \$29.99, 3 years extra \$39.99.)



### Bearcat

### BC-600 XLT

**\$249.99** (\$7.00 shipping)

#### Digital Programmable 100 Channel Scanner

BC-600 XLT covers the following frequencies: 29.54 MHz, 118.174 MHz, 406.512 MHz. Features compact size of 6.5 1/6 Wx1 5/8 Hx7 3/8 D. scan delay, priority, memory backup, channel lockout, bank scanning, key lock, AC/DC power cords, telescopic antenna, mounting bracket, supplied one year factory warranty, search, direct channel access, track tuning, service search, including pre-programmed frequencies by pushing a single button for police, fire, emergency, aircraft, weather, and marine services. Plus exclusive optional features never available on any scanner before. First is an RF receive amplifier for boosting weak signals for only \$24.99 plus a CTCSS tone board is available for only \$59.99 to make this the number one scanner available in the USA. Optional cigarette lighter plug #600MPC \$4.99

### BEARCAT BC-950XLT

Same features as BC-600XLT but also receives 800-954mhz.

**\$289.99** (\$7.00 shipping)

### REGENCY Z-60

Same features as Regency Z-30

With the addition of aircraft 118-136mhz and FM broadcast 88-108mhz Z-60 also receives a total of 50 channels.

**ONLY \$139.99**

(plus \$7.00 shipping each)

### BEARCAT 70XLT

20 CHANNEL HAND-HELD SCANNER

Small size 6"Hx1"Dx2 3/4"W, full digital readout, priority, search, channel lockout, scan delay, key lock, Covers following frequencies: 29.54mhz, 136-174mhz, 406.512mhz. Package includes rubber antenna, rechargeable Ni-Cad battery pack, AC adapter/charger, and carry case

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#### ORDERING INFORMATION

Call (518) 436-9606 to place orders by phone or mail orders to **Scanner World**, 10 New Scotland Av., Albany, NY 12208. Orders will be shipped same day received by United Parcel Service. **Scanner World** accepts VISA, MasterCard (COD shipments by United Parcel will be for cash or certified checks only). Mail orders with personal or business checks will be held 4 weeks for bank clearance. Orders with cashiers checks or money orders shipped same day received. Prices, specifications and terms subject to change without prior notice. If items are out of stock we will backorder and notify you of delivery date. All shipments are F.O.B. **Scanner World** warehouse in Albany, NY. We are not responsible for typographical errors. All merchandise carries full manufacturers warranty. Bid Proposals and Purchase orders accepted from Government agencies. Free full line catalogue available upon request. No minimum order. New York State Residents add 7% sales tax. Any claims must be made within 7 days of merchandise receipt.

#### SHIPPING CHARGES

(\*) Add (\$) per scanner, and \$3.00\* for all accessories ordered at same time. C.O.D. shipments will be charged an additional \$3.50 per package. Full insurance is included in shipping charges. All orders are shipped by United Parcel Service. Shipping charges are for continental USA only. Outside of continental USA, ask for shipping charge per scanner.

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The LCD itself offers 22 separate prompting annunciators to aid the user in operating the unit.

Just 12 ounces in weight, the new AR 900 can be put in your pocket or in an optional leather carry case. Suggested retail price is \$299.00 (includes 450 MAH rechargeable battery, AC charger/adaptor, two antennas, and a stainless steel belt clip. For more information, write to ACE Communications, 10707 East 106th Street, Indianapolis, IN 46256 or call (317) 842-7115.

## An Ace in the Hole

It seems like only a couple of months ago that we told you about the first scanner from a firm called "ACE Communications." Then there was two. And now three. But first, a little about ACE.

ACE Communications is a subsidiary of Tokyo-based AOR and the sole North American distributor for AOR scanners. AOR itself gets its name from the ham call sign of one of the founders of the company - JA 1 AOR -- and has been a supplier of radio devices for 18 years. The AR 900 is the third unit introduced by AOR in seven months.

Enough background. What is the AR 900 all about? Well, according to the manufacturer, it's an extremely small (5-3/4 high x 2-1/8 wide by 1-3/4" deep) 100 channel hand held that offers complete public service band coverage.

Twenty-five front panel keys allow programming of five banks of 20 channels. Pairs of upper and lower limits for bands to be searched can be stored in five separate search memory locations. All information is stored in three state-of-the-art permanent memories which, unlike many other units, never lose program information should the batteries be disconnected.

Extra features include first channel priority, keyboard lockout, BNC antenna connector, and an extremely well done blue-green display backlight for night use.

We didn't receive an MFJ-1286 Gray Line DX Advantage to test so we can't tell you how well it works. But we can say that it sounds pretty good. Find out more about this \$29.95 DX tool from MFJ, write P.O. Box 494, Mississippi State, MS 39762 or call toll-free, 1-800-647-1800.

## New MFJ-109 World Time Clock

I knew I had seen the MFJ-109 World Time Clock somewhere before. But where? And then I remembered. There on page 247 of last year's *World Radio TV Handbook* was the same neat looking little gadget, here called the "Azimuth World Time Dual Zone 24 Hour Station/Travel/Alarm Clock." Quite a mouthful. I liked MFJ's name for it better. I also liked MFJ's price better. In the *Handbook* ad, the Azimuth version was \$19.95. MFJ's is just \$18.95.

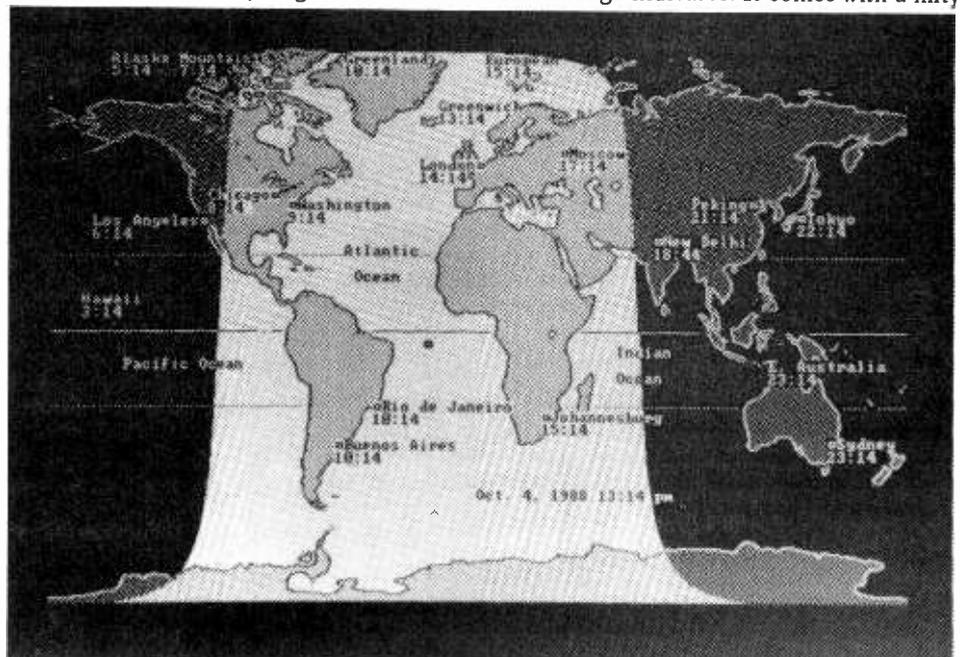
In any case, here's what you get for your twenty dollar bill. A small (2" x 4.5" x 5") little clock with a sliding indicator you can set to any one of 24 international cities that gives you both local and 24 hour time in a 3/8" LCD display.

Packed into this little unit is also an alarm with snooze function, night light, adjustment for daylight saving time and date change indicator. It comes with a nifty

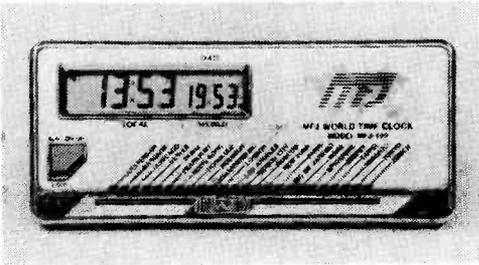
## MFJ-1286 Gray Line DX Advantage

Got an IBM PC/XT/AT or compatible computer? Desire to go hunting for the big DX game? If the answer is yes to both of these questions, check out MFJ's Gray Line DX Advantage for Personal Computers. It predicts DX propagation by giving users instant access to Gray Line positions for any place in the world at any time and date from now until 1990.

Even the casual DXer can work rare DX by knowing exactly when the conditions are best. Included is a high resolution world map that displays the moving Gray Line, UTC times, time zones, sun position over the earth and latitude/longitude markers.



suede-like carrying case. To order, use your charge card and call 1-800-647-1800 or write MFJ at P.O. Box 494, Mississippi State, MS 39762.



## The Essential Radioteletype Frequency List

By Dallas W. Williams

Most first-time listeners to radioteletype (RTTY) are at a loss trying to determine whom they are hearing. Dallas Williams makes the task much easier with his new list of sure-fire frequencies.

Each listing, sorted by frequency--2 through 25 MHz--includes speed and shift, call sign, service and location, as well as time of intercept to give the listener a head start on scheduling his monitoring.

Just as important is the handy list of identifiers at the back of the book. Next time you see "6VU" roll across the screen you will know you have found one of the services from Dakar, Senegal.

With many listeners' references selling from \$12-\$40, this little guide is a bargain. (81 pages, 8-1/2" x 11", staple bound; \$10.95 plus \$2 shipping from Tiare Publications, PO Box 493, Lake Geneva, WI 53147)

## Scanner Master: NY Metro/Northern NJ Guide

Edited by Warren M. Silverman

Of all the scanner frequency directories on the market, it is especially appropriate that the most professionally printed should be for the New York City metropol. Scanner Master has a history of quality in their publications and this newest release is on bond paper stock with glossy cover; maps are sharply drawn and organization of the material is well thought out.



The basic organization of the book is by state and county, with the New York City area getting the largest share, of course. Cities are listed alphabetically, with unit identifiers and special uses as known.

An exhaustive frequency cross-reference allows the listener to identify quickly an unknown station discovered while searching; police and fire dispatch codes are also generously sprinkled throughout the book.

Police and fire agencies, while the greatest interest to scanner buffs, are not the only licensees covered in the directory. A liberal number of hospitals, ambulances, transportation agencies, educational institutions, health agencies, courts, recrea-

Simply the finest scanner handbook ever produced!

## SCANNER MASTER

New York Metro/ Northern New Jersey Guide

3rd Edition



SCANNER MASTER, for over 10 years the publisher of the most comprehensive and detailed communications manuals in the nation, is proud to announce the availability of the 3rd edition New York Metro/Northern New Jersey Guide.

After an exhaustive period of updating and adding to the second edition work SCANNER MASTER has culminated its efforts in the totally re-written and re-designed third edition for the New York Metro region. This latest version is our first full-sized fully typeset manual — beautifully presented with easy to read typefaces — and contains the most up-to-date and accurate public safety listings our firm has ever printed. Close to 500 pages in length, this third edition is also our most thorough and detailed manual yet.

At SCANNER MASTER, we not only verify frequency usage when possible, we also tell you who is using the channel, and in conjunction with what other agencies or as part of which network. We also explain for what purposes radio systems have been designed and how they work for the agencies involved. We discuss the operations and the make-up of important departments, as well as list their radio codes, unit designator numbers and the like. We've added hand-drawn and shaded maps of different departments to better inform you of jurisdiction and unit locations. We've included organizational charts which neatly describe the hierarchy of various agencies. All so you can understand what you're listening to and better appreciate the hobby and art of two-way monitoring.

In the New York Metro area, the most complex two-way radio mecca of our nation, SCANNER MASTER makes monitoring the airwaves easier, more interesting and much more fun.

- 10-codes, maps and descriptions and addresses of state, county, regional and local public safety radio systems.
- New artwork includes 5 New York City Fire maps, New Jersey State Police map, Nassau County Precinct map, and United States Coast Guard map
- Gazetteer (all communities alphabetically cross-referenced)
- Detailed discussions of New York City police, fire, EMS.
- PUBLIC SAFETY FREQUENCY SEQUENCE SORT

All public safety licenses within a 100 mile radius of New York City, sorted by frequency — a superior updated list.

Price \$24.95 + \$1.75 postage (MA & CT residents please add sales tax) Send check or money order to: Scanner Master, P.O. Box 428, Newton Highlands, MA 02161. Or call with your credit card order: (508) 881-8000 — (if you reach our answering machine, leave your number and the best time to call back)

Call or write us for a complete list of all of our scanner titles nationwide!

tional and sporting activities are included as well.

If you are within 100 miles of New York City, this is your scanner guide! (470 pages, 8-1/2" x 11", perfect bound; \$24.95 plus \$1.75 shipping from Scanner Master Company, PO Box 428, Newton Highlands, MA 02160; phone 617-881-8000)

## New from Radio Shack

The 1989 Radio Shack catalog has a number of new products of interest to listening enthusiasts, but few surprises. Carryovers from last year include the leading PRO-2004 scanner as well as models PRO-26, 27, 38, 2010, 2011 and 2021.

New models are the PRO-33 (replaces the PRO-32), PRO-56 (replaces the PRO-55), PRO-57 (programmable 10-channel desktop scanner, \$139.95) and, of special interest to scanner monitors, the PRO-35.

Intended to take on the rival Bearcat 200XLT, the Realistic PRO-35 offers 800 MHz coverage and 200 memory channels; it will sell for \$329.95.

## Guide to Increased Listening

Some of you folks have been following my antics for the last three years in the North American Shortwave Association's bulletin, *FRENDX*. Well, Bob Grove and Larry Miller have given Old Uncle Skip a chance to share his particular brand of radio fun here in the pages of *Monitoring Times*. If we've crossed paths in the past, you probably know that my particular "schtick" is low cost alternatives in a "gold plated" radio hobby. It's my goal to let people know that radio listening can be enjoyed on a paper route budget. So hail to old friends and greetings to new, let's get to it.

I am blessed with what is known in our society as a "Liberal Arts Education." Essentially that means I could never quite figure out what I was going to be when I grew up. But out of this melange I actually learned a few things.

One of those things is something sociologists call THE RUT THEORY. This goes back to the days of horses and buggies. When people came to a fork in the road, over time, they tended toward the path with the deepest ruts because that is the way the pony would go. Over time, the other path would be overgrown through lack of use and disappear from common knowledge.

### Get to the point, Skip!

As I said earlier, my gig is to show you folks how to keep more of your hard-earned cash in your pockets. The best way to save money is not to spend it in the first place. During WWII people were fond of a phrase, "Use it up, wear it out, make do!"

I submit that many of us are in a rut. We have become hooked on listening to only a small portion of what our receivers are capable of hearing. In doing this, we are wasting money, and more importantly, missing out on some very exciting monitoring. So it is time for ... (drum roll please)

### Uncle Skip's Guide to Increased Listening!!

#### Shortwave: So many frequencies, So little time

If you are concentrating your listening on the international shortwave broadcast bands, you are missing out on a whole passel of pleasure, Bunkey. Here you are with a radio that probably tunes continuously from 0 to 30 MHz and you are leaving 50 percent or more

of the bands spread lonely and unexamined. Just take a look at Larry Van Horn's *Utility World* loggings in this issue. All kinds of neat stuff out there in radioland!

I find the U.S. Coast Guard frequencies to be more fun to listen to than my scanner's police and fire frequencies. With increased power to take action upon boarding pleasure craft, it should be exciting listening to be sure. And who can deny the lure of "spy numbers"? Add to that up-to-the-minute weather reports anywhere on the planet and you have got yourself a lot to play with. And guess what? In these days of SW broadcasters cutting down on QSLing, when you QSL a Utc, you might just get a nice personal letter from a real human being; what a novel idea.

On the other hand, if you have been chasing utilities for the last several months I can most assuredly recommend SW broadcast programming over anything the boob tube has to offer. You can learn a great deal about the world around you by giving a good listen to world news broadcasts. You'll learn things you never read in the local newspaper.

Another interesting area is listening to amateur radio stations. You can hear all manner of interesting folks from all over the world all having fun playing radio. QSLing hams is okay; just make sure you make it clear that you are a listener.

One word of caution -- you might want to shy away from using any SWL "call sign" or WDX number. Some hams have the wrong idea about these indicators. Don't forget return postage; most amateurs don't have public relations budgets. You can locate address information on amateur stations via ham radio *Callbooks*. Check your local library, consult with a nearby ham or write Radio Amateur Callbooks, 925 Sherwood Drive, Box 247, Lake Bluff, Illinois, 60044.

#### Citizen's Band: 40 channels, no waiting

I am a survivor of CB '70s. Remember when everyone tried to talk with a southern accent and called everybody "Good Buddy?" Remember those folks who only got on the air to ask for radio checks? Remember all those people stuck in traffic jams asking where "Smokey" was? President Ford's wife had a CB set and the FCC did away with complicated licensing and gave us 40 channels *and everyone still crowded into channel 19!!*

Those days are thankfully gone, leaving a more mature and more exciting hobby. But

most CBers still manage to limit their listening to their "Home Frequency." Old Uncle Skip's advice is to SPIN THE DIAL!! See who else is out there, talk to them, find out what they are using their personal radio privileges for. If you are a gregarious type, why not try to find out about your local REACT group? Contact REACT INTERNATIONAL, INC., 242 Cleveland, Wichita, KS 67214 for more information about this public service group.

#### VHF-UHF: The scanner scene

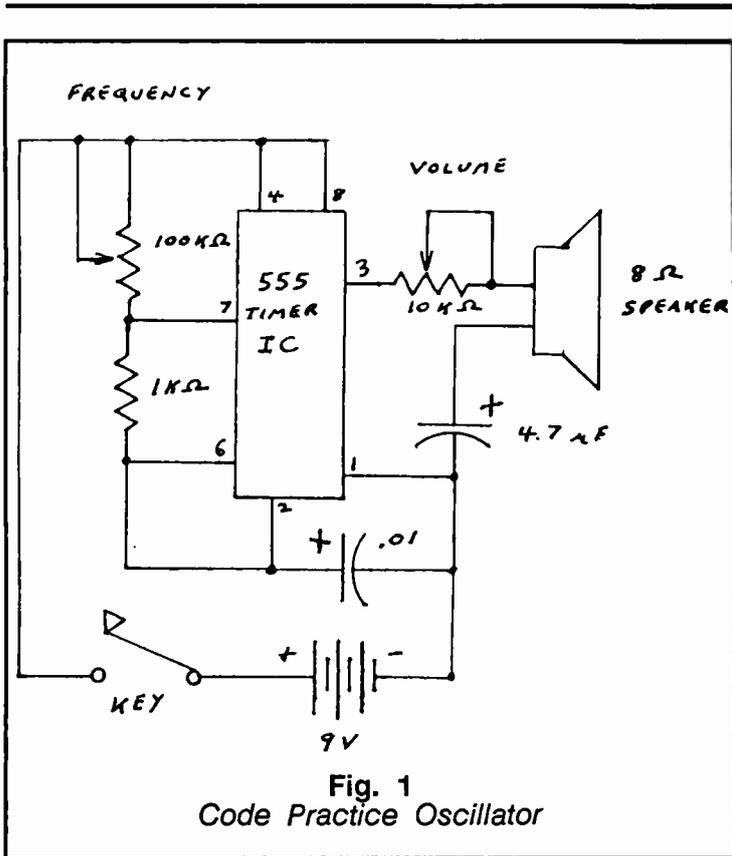
Modern receiver technology has put the synthesized frequency scanner in the hands of almost every listener. Unfortunately, many folks behave like they are still crystal controlled. They punch in the local police and fire frequencies and then stick the scanner on top of the refrigerator. Access to unlimited coverage of several bands of frequencies is no trivial privilege. So okay, you know all the prominent local frequencies. So push the envelope! Try something new! Use the scanner to scan.

See what else is out there in the air. Since handi-talkies have come into being, you can drive along and see many construction crews and survey teams jabbering away. Maybe you could give a listen for such communications in your area. With more and more business and public agencies discovering the practicality of radio it should be worth the trouble to regularly scan those "dead" frequencies. You might be the first in your area to log some new VHF or UHF resource.

#### Medium Wave: Who said AM is dead?

Okay, so you have done your complete day and night bandscan of your local stations. You have dug out most of the clear channel stations across the country. You have caught several powerhouses off the air on early Monday mornings, monitoring the little guys to be found underneath. So now what? Time to go digging in THE GRAVEYARD.

The graveyard frequencies are those set aside for local broadcasters. 1230, 1240, 1340, 1400, 1450, and 1490 kHz are full of stations usually limited to 1000 watts daytime and 250 watts nighttime power levels. It takes a diligent medium wave DXer to wade through the static and slop but many rare and exciting catches can be had if you give a listen to the



graveyard. All of the MW club magazines have special listings of graveyard achievements, rightfully recognizing this aspect of MW broadcast listening as noteworthy.

If you travel during your business day you might try examining the distance you can carry a local station's signal. It's fun to compare your personal findings with those of the published coverage maps that stations use for advertising sales.

You can also go international. Start looking between the standard North American 10 kHz channel spacing to the 9 kHz spacing common to other parts of the world. Spain, Portugal, Peru, Sweden, Belgium, actually most of the countries shortwave listeners go after can be found on the 9 kHz spaces. They are rare, but they are out there.

### Amateur Radio: No excuses

Ham radio operators should never have a reason to gripe. In addition to the opportunity to talk to a myriad of other stations around the world about everything under the sun, hams can participate in many forms of public service and experimentation. Some hams get hung up on one band or mode. I know I'm guilty of forgetting that my shack does contain a code key. And by not utilizing my CW privileges I am probably missing out on a lot of contacts, especially with DX stations.

Even if the day actually comes that the bands are totally dead and you have worked every country and every ham, the dedicated amateur can still have a load of fun. You can take all of your expertise and pass it on. You can go down into the novice portions of the bands and help some newcomer grow into the hobby. If every amateur radio operator made one novice band contact per week I am sure we would see a great deal of growth in the hobby. Helping new hams is the most rewarding aspect of the hobby, worth its weight in DX.

### Some Thoughts on Code

International Code transmission is still a viable form of radio communication. On the HF bands, amateurs and professional users abound. Even VHF monitors can use code to log repeater and beacon

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IDs.

Being able to copy these messages gives you the chance to log something new. Learning the code is simply a matter of practice. But learning it can be pretty boring. Code tapes or monitoring stations like WIAW for code training can put even the most dedicated person to sleep. You will need to practice with these resources if you hope to become proficient, but Old Uncle Skip would like to propose an alternative. This plan will require the cooperation of another interested party, so grab a friend.

Once you have used the tapes and broadcasts to master the basic alphabet and numbers, get hold of a code key and code oscillator. You can build one out of parts available at your local Radio Shack (figure 1). Start sending back and forth with your buddy. You will find that this adds an element of fun to the learning process that sterile code transmissions fail at. As you increase in ability start monitoring amateurs, first in the novice bands and then on the other CW frequencies. You'll be copying at speed in no time and you will be opening up a whole new facet of the listening hobby.

Very few radio listeners utilize all of the frequencies available to them on their respective receivers. Regular trips to uncharted (and unlogged) frequencies will greatly enhance your enjoyment. And you won't even need to run out and spend one thin dime on new equipment. Don't forget to keep reading *Monitoring Times* to keep abreast of all there is to hear. Use it up!!!

If you have any ideas or feelings about enjoying our monitoring hobby on a budget, why not drop me a line at P.O. Box 644, Waterford Works, NJ 08089. This column is a new venture for *Monitoring Times* and we look forward to your input and opinions.



## Monitoring Southern Arizona

Arizona is best known as the Grand Canyon State. A national park of the same name occupies a site in the northern part of the state. In the south, however, it's better known for illegal activities than for tourist attractions. One of these illegal activities is drug smuggling. The other owes to the state's border with Mexico which makes it ideal for aliens making their way into the United States.

The United States government is directly involved with the law enforcement actions pertaining to both issues in southern Arizona with a continually increasing effort being put forth. The United States Air Force is also represented in southern Arizona at Davis-Monthan Air Force Base (DMAFB).

DMAFB is a TAC base whose main activity is the training of Thunderbolt A-10 pilots. It's also the location of the Aircraft Maintenance and Regeneration Center (AMARC) where the government mothballs aircraft in the desert.

The mission of each federal agency and the military are related by the sharing of facilities and resources in southern Arizona. The Federal File will present the monitoring of southern Arizona in two parts. The first part presented this month is the radio operations of CNF, U.S. Border Patrol (BP) and the U.S. Customs Service (USCS). The second part will be presented next month on DMAFB and AMARC.

### Into the Forest

The Coronado National Forest is named after Spanish explorer Don Francisco Vasques de Coronado who set out with an expedition in 1540 from Mexico in search of gold. Instead of gold, the explorer led his men through trails into a vast and empty place filled with grassy hills, cactus, desert wildlife and scattered, rugged mountain ranges.

Today, the CNF is arranged into twelve mountain range units located throughout southern Arizona. The U.S. Forest Service (USFS), an agency of the U.S. Department of Agriculture, administers the CNF and provides law enforcement and fire protection functions. Table 1 lists the standard frequency configuration of base and vehicle (mobile) mounted radios in the CNF net.

The personal portable (hand-held) units have essentially the same configuration with the exception being only fourteen channels instead of sixteen channels. Channels 11 and 12 are user selectable channels for all units. Channels 15 and 16 are user selectable for base and vehicle radios only and channel 7 is user selectable for hand-held units only. The user selectable channels are for radio communications with local area agencies. The channel configuration listed is that used in the Tucson area with optional channels shown.

### Fires and Monitoring

A forest fire started in Mexico and moved northward into Arizona into the CNF while I was in Arizona. It was located to the south of Sierra Vista and required 1,200 personnel and multiple air and ground units to combat the fire. The damage and devastation cannot be fully comprehended from a ground-based view. The Sierra Vista CNF forest fire presented the USFS with an international problem that I learned about through local news media.

The origin of the fire was in Mexico, but by weather and wind predictions it was known that there existed an excellent possibility that the fire would enter the United States into southern Arizona. The USFS is not permitted to cross the imaginary line between the U. S. and Mexico to fight the fire prior to its entering the U.S. without receiving permission first from Washington DC. Washington, in turn, must request permission from the Mexican government. The problem here is, of course, time.

In addition, should the blaze cross the border, it must be treated as two separate fires: the one in Mexico and the one in the U.S. Fortunately, an agreement is under consideration which would permit the attacking of fires before they crossed this imaginary line and without all the red tape.

Table 2 lists the active frequencies monitored during the forest fighting effort. The source of the frequency data was previous



O-2A observation aircraft utilized by border patrol

Table One  
CNF FOREST NET

CH	RECEIVE	TRANSMIT	DESCRIPTION
1	169.600	169.600	CNF Main Operations -- Simplex
2	169.699	170.525	CNF Repeater
3	168.625	168.625	Air Emergency
4	168.200	168.200	BIFC TAC 2
5	168.150	168.150	CNF TAC 1 Simplex
6	168.150	168.675	CNF TAC 1 Repeater
7	168.350	168.350	USFS National Ground Dispatch
8	170.000	170.000	Ground-to-air
9	156.610	156.610	Pima County Sheriff F2
10	155.700	155.700	Pima County Sheriff F3
11	166.350	166.350	Saguaro National Monument
12	154.370	154.370	Rural/Metro Fire
13	154.280	154.280	Arizona State Forestry
14	170.025	170.025	CNF TAC 2
15	155.955	155.955	LEARN

monitoring and the list in the U.S. Government section in *Police Call* radio frequency directory available at Radio Shack.

## Not Always Hot

When the area is not on fire, CNF offers many recreational facilities including the Mount Lemmon ski area northeast of Tucson. Mount Lemmon is the highest point in southern Arizona. As a result, it also acts as the location of a repeater for a number of radio services. The U.S. Government Microfiche lists quite a few radio operations here so I set out one morning in search of the repeater site.

I obtained a map of the Mount Lemmon area and found a service road open to the public. The road quickly deteriorated to a dirt and stone (not gravel) rut which became impassable in my timid little rental car. So small was this road that when I decided to execute a three point turn to go back down the mountain, I found that I was stuck!

The only other alternative (other than calling the rental car people and telling them their car was on the side of a mountain) was to back down the mountain service road for approximately a mile. After some time passed, a point was reached where I could turn the car around and park it. I then hiked the remaining distance with cameras in hand.

What I found was the host site for a multitude of repeaters and translators carrying private, public safety, federal and military radio operations. The microfiche listed services and frequencies from 25 MHz to well into the GHz region!

An accompanying photograph illustrates

*CNF service road to the antenna tower on Mt. Lemmon, highest point in southern Arizona.*



several antennas utilized by government users. Near the bottom of the photograph are three antennas -- the antenna on the left is directional UHF or microwave link for fixed station (FX) use, in the middle is a VHF with four sections, and at the far right is an antenna enclosed in a small radome. In the center of the photograph is a tower with several VHF and UHF omnidirectional antennas mounted with stand-offs from the tower.

It should be noted that quite often the UHF FX stations may be monitored when the VHF counterpart is not even heard.

The Border Patrol and Customs Service are also very active in southern Arizona with large enforcement efforts in place by both agencies. The Border Patrol has a dual role in which they monitor for both illegal aliens and drug smugglers. An effective way to cover this vast area efficiently is by aircraft and both the BP and USCS utilize a variety of air cover units.

## Balloons Stop Drug Flow

The USCS recently launched an "Eye in the Sky" program. A helium-filled aerostat (a blimplike craft) is stationed at Ft. Huachuca near Sierra Vista. It's 245 feet long and 72 feet in diameter and is the first of six to be stationed at 150 mile intervals along the U.S.-Mexican border within the next year.

The tethered blimp contains radar equipment that can track targets up to 250 nautical miles. The data gathered by the aerostat is then relayed by a microwave link to a ground based trailer van. The obvious intent is to track low flying, drug laden aircraft heading north into the U.S. When an aircraft is tracked without a prefiled flight



## Table Two Forest Fire Fighting Freqs

122.850	Heliport Operations at Fire Camp
122.925	AIR TAC Operations (Tankers and Helicopters on Scene)
168.100R	Administrative W.R.T. Fire Fighting Effort
168.200	Bureau of Land Management (BLM): On Scene Units
168.625	AIR NET and AIR DISPATCH
169.600R	Coronado Dispatch to Fire Units
169.600S	Fire Fighting Ground Units -- On Scene
411.525	CNF UHF Link (Often of 169.600 Transmissions)
414.650	Dial Tones Frequently
415.400R	Service Net for Fire Camps

## Table Three Misc Federal Freqs

163.200R	U.S. Marshal Tucson Control
163.725R	"Lemmon" BP Repeater
163.775R	BP Repeater
165.2375R	USCS Repeater
165.7375	USCS Tactical Aircraft Operations
165.850R	BP Tactical Repeater (Generally Car-to-car)
170.675	BP Input to 163.725 Repeater
418.900R	DEA Repeater (Phoenix Units-100s, Tucson-200s)

plan or with its transponder off, the USCS dispatches an air intercept unit. The aerostat is similar to those used off the Florida coast.

The USCS maintains an aviation branch at DMAFB from which aircraft are dispatched. An HF net is also utilized by the USCS aviation branch in addition to the VHF frequencies listed in Table 3. The USCS also utilizes a modified P3 based in Phoenix that can track 2000 airborne targets simultaneously while scanning a 300 degree sector. Once again the intent is to track low flying aircraft from Mexico. The P3 in conjunction with the aerostat can cover the entire southern Arizona border with Mexico.

The BP utilizes observation aircraft such as the O-2A and the O-10. The observation aircraft are low altitude aircraft intended for visual observation and surveillance. The O-2As are being phased out, but some still remain in active use. The observation aircraft can monitor situations from an excellent vantage point and direct ground based units to the subject or target. Other aircraft are in use with some borrowed from the military.

Next month's Federal File will present the operations of DMAFB and discuss the military aspect in southern Arizona.



## SW Frequencies for Californians

(and others with good rigs)



2670	NMC	United States Coast Guard
4125	KJA 504	Chevron Telecommunications
	KOZ	Delta Steamship Lines
	KXZ 684	Oceanic Society
	KZB 861	Collins Marine Corp
4134.3	NMC	United States Coast Guard
4144.6	KMC237	Greenpeace Foundation
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
	WSQ	States Steamship Co
4419.4	KMC237	Greenpeace Foundation
	KZB 861	Collins Marine Corp
4428.7	NMC	United States Coast Guard
4434.9	WHF	Tug Communications
6200	NMC	United States Coast Guard
6210.4	WHF	Tug Communications
6218.4	KJA 504	Chevron Communications
	KMC237	Greenpeace Foundation
	KOZ	Delta Steamship Line
	KXZ 684	Oceanic Society
	KZB 861	Collins Marine Corp
	WSQ	States Steamship Co
6221.6	KMC237	Greenpeace Foundation
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
6506.4	NMC	United States Coast Guard
6521.9	KMC237	Greenpeace Foundation
	KZB 861	Collins Marine Corp
8241.5	NMC	United States Coast Guard
8281.2	WHF	Tug Communications
8284.4	WHF	Tug Communications
8291.1	KOZ	Delta Steamship Line
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
	WSQ	States Steamship co
8294.2	KJA 504	Chevron Telecommunications
	KMC237	Greenpeace Foundation
	KOZ	Delta Steamship Line
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
8765.4	NMC	United States Coast Guard
12342.4	NMC	United States Coast Guard
12421	WHF	Tug Communications
12429.2	KMC237	Greenpeace Foundation
	KOZ	Delta Steamship Line
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
	WSQ	States Steamship Co
12432.3	KMC237	Greenpeace Foundation
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
12435.4	KXA 504	Chevron Telecommunications
	KMC237	Greenpeace Foundation
	KOZ	Delta Steamship Line

On medium and high frequency upper sideband, some of the following frequencies should provide some interesting listening.

2096.5	KXC 684	Oceanic Society
	WHF	Tug Communications
2182	KXC 684	Oceanic Society
	WHF	Tug Communications

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13112.3	KZB 861	Collins Marine Corp
16565	NMC	United States Coast Guard
16587.1	WHF	Tug Communications
	KMC237	Greenpeace Foundation
	KOZ	Delta steamship Line
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
	WSQ	States Steamship Co
15690.2	KMC237	Greenpeace Foundation
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
16593.3	KMC237	Greenpeace Foundation
	KOZ	Delta Steamship Line
	KZB 861	Collins Marine Corp
22124	KMC237	Greenpeace Foundation
	KZB 861	Collins Marine Corp
	WSQ	States Steamship Co
22127.1	KMC237	Greenpeace Foundation
	KOZ	Delta steamship Line
	KZB 861	Collins Marine Corp
22130.2	KMC237	Greenpeace Foundation
	KZB 861	Collins Marine Corp

High frequency CW should have something to offer.

4247	KPH	
6383	NMC	United States Coast Guard
6477.5	KPH	
8574	NMC	United States Coast Guard
8618	KPH	
8642	KPH	
12808.5	KPH	
13002	KPH	
16880.9	NMC	United States Coast Guard
17016.5	KPH	
17016.8	KPH	
22476	KPH	
22557	KPH	

On VHF the following may also prove worth a listen.

156.350	KMC237	Greenpeace Foundation
	KXC 684	Oceanic Society
156.425	KMC237	Greenpeace Foundation
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
	KZH 976	Golden Gate Yacht Club
	WXZ317	Pier 39 Marina
156.450	KZB 861	Collins Marine Corp
	WHF796	Morrison Knudson
156.500	KEA 988	Williams Dimond & Co
	KGW473	Tug Communications
	KPB 505	Drew Chemical Corp
	KZI 702	Transmarine Navigation
	WFA730	Blue and Gold Fleet
	WHD756	Interocean Steamship
	WHF	Tug Communications
	WQB572	Trident Navigation
156.550	KZU 237	Willamette Western
	WSQ	States Steamship Co
156.600	WSQ	States Steamship Co
	KEA 988	Williams Dimond & Co

156.800	NMC	United States Coast Guard
	KMC237	Greenpeace Foundation
	KPB 505	Drew Chemical Corp
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
	KZH 976	Golden Gate Yacht Club
	KZI 702	Transmarine Navigation
	KZU 237	Willamette Western
	WGA730	Blue and Gold Fleet
	WHD754	Interocean Steamship
	WHF796	Morrison Knudson Co
	WHG842	American Navigation
	WQB572	Trident Navigation
	WSQ	States Steamship Co
	WXZ317	Pier 39 Marina
	WXZ339	Royal Charter Marine
156.900	WHG842	American Navigation
157.025	WXZ339	Royal Charter Marine
157.100	NMC	United States Coast Guard

The frequencies used by the U.S. Coast Guard at San Francisco can provide some interesting listening. Since it is a participant in the Automated Mutual Assistance Vessel Rescue System (AMVER) it will receive numerous messages relating to the positions of ships and the sailing routes which they are taking.

Steamship lines will have fairly routine traffic; however, some of the others should provide interesting traffic as well.



## Low Band DX'ing

"September!" Summer is nearly over, fall is right around the corner and with it the low band DX season. While it is possible to work DX on the 160, 80 and 40 meter bands all year long, the summer QRN takes a lot of the fun out of it.

As the northern hemisphere of the earth approaches fall, the southern half of the globe is beginning spring. Conditions for working that VK, ZL or elusive African station is optimum as the static has not begun in the southern hemisphere and it is ending here in the north.

### The Gray Line

The best time to work that station half-a-globe away will be during the hours of darkness. The reason lack of daylight is important to low band DX is that during the hours of daylight there are two densely ionized layers of the ionosphere called the D and E layers. These layers absorb a large portion of the energy your station transmits on 160, 80 and 40 meters. As nighttime approaches these layers rapidly dissipate allowing long range communication.

That portion of the Earth that is in twilight is called the terminator. As the sun progresses from east to west there is always some part of the globe seeing dawn as another sees evening. Now, as daylight wanes, the D and E layers fade away and signals can travel along this band of twilight with ease. The other end of this path will be dawn and the D and E layers have not yet formed.

Consequently we have a period of one half to one hour when low frequency signals easily span the globe! Dawn and evening do not occur at the exact same place and time each day and as a result some new and interesting DX may be waiting for you at any given twilight period.

There are several ways to compute when your twilight periods will be each day and exactly what portion of the earth will share this gray line with you. We will discuss how you can calculate this later.

### Gear Requirements

Gear requirements are the same as the other bands. A decent 100 watt transmitter will be all the power you need to make DXCC on any of the lower bands. The antenna is a somewhat different problem. Normal antenna lengths are longer on the lower frequencies. However, if you have

room for a 20 meter antenna, chances are that you can erect a decent 160 or 80 meter antenna simply by utilizing the tower your other antennas are on, as a vertical.

Many avid low band DX operators use short verticals for 160 through 40. I use a Butternut HF-2V that is only 33 feet long. It is elevated 25 feet and there are 4 radials under it. Using this antenna on 80 meters with 50 watts, I have worked 135 countries in two years.

There are other amateurs using antennas as short as 20 feet to work DX on a regular basis on 80 and 40. To be sure, long high antennas work better. Or, if the room is available, phased verticals or even yagis will make you King of the Hill on these bands. As with any ham band you will be surprised at how well a modest station can *get out!* -- if you are willing to spend some time getting to know the gear and the band.

### Noise

One factor that is difficult for many hams to overcome on 160 and 80 is man-made noise. Since so many of us use vertical antennas for their enhanced DX'ing properties (i.e. low angle of radiation), noise is especially bad because static -- both natural and man made -- are vertically polarized. The best solution to this difficulty is to use a separate receiving antenna. The most popular receiving antennas on these bands are the Beverage and loops.

Small indoor loops with a preamp are extremely effective DX receiving antennas. The loop antenna is quite directional and can null out QRM from local stations nicely too. The loop tends to cancel QRN and produces very good results in most locations.

The Beverage antenna on the other hand is rather large (one wavelength minimum). It is quite low (no more than 5 or 6 feet above ground) and grounded at the end. The normal Beverage is unidirectional although several schemes exist to enable the operator to switch directions. You will be amazed the first time you hear signals on a Beverage antenna. There is almost no noise and signals will be clear and distinct.

### Learn More

It is impossible to give you all the details on working low band DX in one short magazine column. There are several excel-

lent sources of information for low band DX'ing and one which I highly recommend is the book, *Low Band DX'ing* by John Devoldere, ON4UN. This excellent manual takes you by the hand and shows you step-by-step how to set up your station, where to look for the best DX and the best times to work it. In addition, author Devoldere explains propagation in a way that makes it easy for the newest beginner to understand.

Antennas are discussed in great detail as well as methods of matching, grounding, types of antennas, installation techniques, efficiency and bandwidth. It's all there.

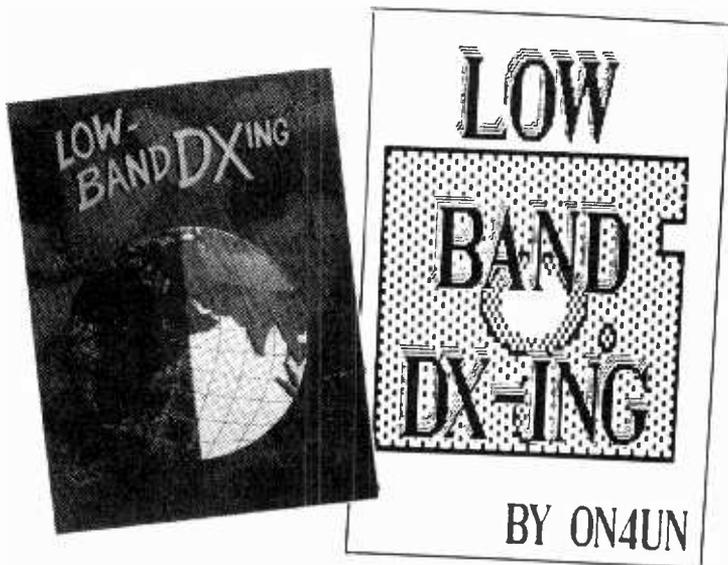
Other chapters detail CW and phone operation, awards and special operating practices. The chapter on DX'ing tools is worth the price of the book by itself. Hats off to ON4UN for this superb manual! *Low Band DX'ing* is available at all amateur stores or direct from the ARRL for \$10.00 plus \$2.50 S&H.

### Computers in Low Band DX'ing

ON4UN describes many computer programs of value to the low band DX'er in his book. In fact, there are thirty different programs described. They can be lumped into four groups, the first being propagation and operational aspects such as sunrise/sunset, great circle direction/distance and grayline programs. The second group consists of technical subjects -- for example, SWR calculations, coil design, RC/RL transformation and parallel impedances. A third group deals with antenna and feedline design, and the fourth group describes methods of designing feed systems for arrays.

These programs are available on disk for those of you who do not wish to create your own from the listings given. They are produced in five versions to cover all of the most popular computers. Cost is \$20.00 plus \$2.50 S&H from the ARRL, 225 Main Street, Newington, Ct. 06111. Order MS-DOS for IBM and compatibles, DOS 3.3 for Apple 2C or 2E, CP/M for Kaypro or Xerox and CB-128 CP/M for the Commodore C-128. There is also a version available for the MacIntosh at a cost of \$25.00 plus S&H.

I have used the IBM, Apple and MacIntosh versions and am extremely pleased with them. The MacIntosh version is superb and utilizes the many user friendly features of this fine machine.



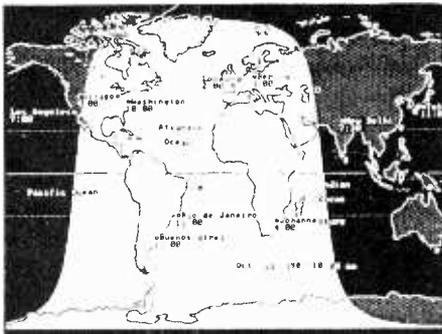
Great low band hints and helps are available through ON4UN's book and computer programs

### More Gray Line Help

Another nifty program for the low band DXer is the MFJ Gray Line DX Advantage (Terminator). This program is available only for the IBM and clones. It puts a map of the earth on your computer screen and shows you the terminator for any given time. You can watch it change as the earth moves on its axis.

If you want to know what countries will be on your gray line next week or next month just speed the program up and it will show you. It's amazing to watch the terminator move across the face of the earth with this neat program. You can also display the time in up to 24 time zones or cities with this software. (Think about this before you place that next overseas phone call!).

The Gray Line DX Advantage is available from MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, Ms, 39762, price is \$29.95 plus postage.



### MFJ GRAY LINE DX ADVANTAGE

#### A Great Idea

The trend in new rigs has been more and more complicated bells and whistles. In fact, most of the folks buying these new rigs

do not make use of half of the available features simply because they do not fully understand how to use them. Perhaps it is too much trouble to put them into effect.

At last, someone has realized that there is a need for a good basic rig -- one that is easy to use and will not intimidate the average operator. That some one is Yaesu and the rig is their new FT-747GX.

This dandy little piece of equipment boasts 100 watts on all bands from 160 through 10 meters, built in CW filter, dual VFO's, noise blanker and split frequency capability. It works CW, SSB and FM (with optional module), has 20 memories and a fantastic receiver that covers 100 kHz through 30 MHz (so you can listen to all the interesting signals on SW. Operation is a snap with just a few easy to use controls.

If you are looking for a new rig, check it out! It doesn't have a jillion knobs and controls, but who the heck needs 'em? This neat little rig is going to take the frustration out of operating for a lot of hams! Try it. You'll like it!



### Special Event Station

The Columbus Amateur Radio Association (Columbus, Ohio) is operating special event station W8TO on October 8 and 9, 1988. The station will be on the air from 1500Z to 0300Z on the 8th and from 1500 to 2400Z on the 9th.

The objective of the operation is to bring worldwide attention to the City of Columbus and the explorer Christopher Columbus and promote friendship between Columbus hams and hams and SWLs worldwide.

Frequencies of operation will be 7.240 MHz, 14.340, 21.375 and 28.500 MHz. All frequencies plus or minus 10 kHz. Mode is SSB only. All stations working W8TO and SWL's reporting W8TO will be eligible for a QSL.

There is also a special certificate issued for working or hearing ten Columbus stations. (Note: working or hearing W8TO is worth six stations. Working or hearing the same station on different bands counts separately.)

Submit an SASE (\$1.00 postage) or return envelope and IRC for QSL and certificate. Send a 9 x 12 envelope if you wish to receive an unfolded certificate. Mail to Roger Dzwonczyk, WB2EIG, 283 East Longview Avenue, Columbus, Ohio, 43202.

The station outside of Columbus who contacts the most stations in the city during the celebration will receive a plaque.





QSL from Paul Williams, Shaw AFB, SC

## Australia:

Northern Territory SW Service, VL8T-(Tennant Creek) 2325 kHz, and VL8A-(Alice Springs) 2310 kHz. Full data QSL on station letterhead for both sites. Verification signer, Karen Kane, Broadcast Production Officer. Received in 18 days for one IRC and an English reception report. Station address: Box 9994, Darwin, Northern Territory, Australia.-ed.

## Brazil:

Radio Marajoara, 4955 kHz. Full data QSL on station letterhead, and multicolored station sticker. Verification signer, Ronaldo Porto, Director Commercial. Received in 22 days for mint stamps and a Portuguese reception report. Station address: Trav. Vileta, 1121-Bloco A-Apto. 207, Pedreira-Belem, Para, Brasil.-ed.

Radio Nacional do Brasil (Radiobras), 11745 kHz. Full data color postcard of Rio's Sugar Loaf Mountain, without verification signer. Received in 24 days for one IRC, and an English reception report. Station address: P.O. Box 04/0340, Brasilia, Distrito Federal, Brazil. (Tom Sullivan, New Orleans, LA)

## Burkina Faso:

Radiodiff.-TV Burkina (Radio Burkina), 4815 kHz. Partial data QSL on station form letter, without verification signer. Received in 100 days for one U.S. dollar, two IRCs and a French reception report. Station address: Boite Postal 7029, Ouagadougou, Burkina Faso, Africa. (Rod Pearson, St. Augustine, FL)

## Central African Republic:

Radiodiff.-TV Centrafricaine, 5034 kHz. Full data African map card. Verification signer, Monsier Michael Bata. Received in 44 days after one IRC, mint stamps, and five French follow-up reception reports. Total time report outstanding was twenty two months. Station address: Boite Postal 940, Bangui, Republique Centrafricaine, Africa.-ed.

## Costa Rica:

Radio For Peace International, 7375 kHz. Full data station logo card, information sheet, and personal letter from verification signer James Latham, Manager. Received in 40 days for one U.S. dollar, and an English reception report. Station address: Universidad de la Paz, Apartado 199, Escazu, Costa Rica, (Harold Frodge, Midland, MI)

## Cuba:

Radio Habana Cuba, 6035 kHz. Partial data postcard of Havana's Lenin Park, without verification signer, and two souvenir postcards. Received in 60 days for an English reception report. Station address: Apartado 7026, La Habana, Cuba. (Rod Pearson, St. Augustine, FL)

## Czechoslovakia:

Radio Prague, 7345 kHz. Full data color postcard of

Kromertz Chateau, without verification signer. Received in 30 days for an English reception report. Station address: Czechoslovak Radio, 12099 Praha 2, Czechoslovakia. (Bill Traister, Covington, TN)

## Dominican Republic:

Radio Amanecer, 6025 kHz. Partial data postcard with personal letter from verification signer, Pastor Fidel Ferrer. Received in 60 days for one U.S. Dollar, and a Spanish reception report. Station address: Apartado 1500, Santo Domingo, Dominican Republic (Joseph A. Johnson, Savannah, GA)

## Greece:

The Voice of Greece, 9395 kHz. Full data color postcard of Historic Landmarks, without verification signer. Received in 27 days for one IRC and an English reception report. Station address: p.p. Box 60019, 15310 Aghia Paraskeve, Athens, Greece. (Rod Pearson, St. Augustine, FL)

## Hungary:

Radio Budapest, 9835 kHz. Full data "DX Club" card, without verification signer, pennant, schedule, and station stickers. Received in 25 days for an English reception report. Station address: P.O. Box 1, H-1800 Budapest, Hungary. (Tom Sullivan, New Orleans, LA)

## India:

Madras Radio VWM Costal Marine Station, 8674.7 kHz. Full data QSL on station letterhead. Verification signer, R. Giopala Kinshnan, Asst. Engineer. Received in 115 days for mint stamps, and an English reception report. Station address: Madras Radio (P&T), Thiruvottiyur, Madras, 600019 India. (Larry Van Horn, Orange Park, FL)

## Kenya:

Voice of Kenya, 6075 kHz. Full data QSL on station letterhead, and personal letter from Chief Engineer. Received in 270 days for one U.S. dollar, mint stamps, and an English reception report. Station address: Box 30456, Nairobi, Kenya, Africa. (Tom Sullivan, New Orleans, LA)

## Mali:

Radiodiff.-TV Malienne, 4783 kHz. Full data African map card without verification signer, and a hand written program schedule. Received in 83 days for one U.S. dollar and an English reception report. Station address: Boite Postal 171, Bamako, Republic of Mali, Africa (Harold Frodge, Midland, MI)

## Mauritania:

Office de Radiodiff.-TV De Mauritanie (ORTM), 4845 kHz. Full data African/station logo card without verification signer. Received in 65 days for mint stamps and one French follow up reception report. Station address Boite Postal 200, Nouakchott, Islamic Republic of Mauritania.-ed.

## Monaco:

Trans World Radio, 7105 kHz. Full data map card, without verification signer, and station pennant. Received in 65 days for one IRC and an English reception report. Station address: Boite Postal 349, Monte Carlo-98007 Monaco. (Joseph A. Johnson, Savannah, GA)

## Mongolia:

Radio Ulan Bator, 12015 kHz. Full data "RUB) station logo card, without verification signer. Received in 240 days for three IRCs and an English reception report. Station address: C.P.O. Box 365, Ulan Bator, People's Republic of Mongolia. (Bill Traister, Covington, TN)

## Morocco:

Radiodiff.-TV Marocaine (RTM), 11920 kHz. Full data large tan station card with coverage map. Verification signer, Tamane M'hammed Jamal Eddine. Received in 75 days for two IRCs and one French follow-up reception report. Station address: Boite Postal 1042, Rabat, Morocco, Africa.-ed.

## New Caledonia:

Radiodiff. Francaise D'Outre Mer (RFO), 7170 kHz. No data map/logo card, without verification signer. Received in 54 days for one U. S. dollar, and an English reception report. Station address: Boite Postal G3, Noumea Cedex, French New Caledonia. (Harold Frodge, Midland, MI)

## Papua New Guinea:

New Guinea Territory-Radio Western Highlands, 3375 kHz. Full data yellow and white map card, and personal letter from verification signer, Paul K. Ray, Acting Station Manager. Received in 90 days for mint stamps and an English reception report. Station address: P.O. Box 311, Mount Hagen, Papua New Guinea.-ed.

## Peru:

Radio Ancash, 4991 kHz. Partial data Peruvian postcard. Verification signer, Armando Moreno Romero-Gerente. Received in 90 days for mint stamps and a Spanish reception report. Station address: Apartado 210, Huaraz, Ancash, Peru. (Tom Sullivan, New Orleans, LA)

## Qatar:

Qatar Public Telecommunications Corp., Doha Radio-A7D, 8743.5 kHz. Full data QSL on station letterhead. Verification signer, Ali Al-Faham, Engineer/Manager. Received in 120 days for mint stamps, and an English report. Station address: P.O. Box 217, Doha, Qatar. (Larry Van Horn, Orange Park, FL)

## Turkey:

Turkish Meteorological Service, 6900 kHz. Full data QSL on station letterhead, brochure, and program schedule. Verification signer, M. Cemil Ozgul, Director-General. Received in 30 days for three IRCs and an English reception report. Station address: P.O. Box 401, Ankara, Turkey. (Rod Pearson, St. Augustine, FL)

## Uganda:

Radio Uganda, 4976 kHz. Full data QSL on station letterhead. Verification signer, L.B. Lubega, Senior Engineer. Received in 82 days for two IRCs and an English reception report. Station address: P.O. Box 2038, Kampala, Uganda, Africa. (Joseph A. Johnson, Savannah, GA)

## United States:

KUSW, 17715 kHz. Full data station logo card, without verification signer, and station information sheet. Received in 42 days for one U.S. mint stamp and an English reception report. Station address: P.O. Box 7040, Salt Lake City, UT 84107 (Harold Frodge, Midland, MI)

WLNE-TV-Channel 6. Full data QSL on station letterhead. Verification signer, Phillip B. Taylor, Chief Engineer. Received in 60 days for one U.S. mint stamp, a self-addressed envelope, and an English reception report. Station address: 430 County St., New Bedford, MA 02741. (Larry Van Horn, Orange Park, FL)

## Glossary of QSL Terms

### Reception Report:

A report of station reception, written by the listener that includes the date, time, frequency, transmission details, and overall quality of reception.

### QSL:

A confirmation by a station in the form of a letter, card, or other document, that constitutes proof that a listener has heard the station's signal.

### Verification Signer:

Signature on QSL by the person at the station that prepared the confirmation.

### Full Data QSL:

A QSL that includes the time, date, and frequency of reception as indicated on the listener's report.

### Partial Data QSL:

Exclusion on the QSL of either time, date, or frequency.

### No Data QSL:

Date, time, and frequency excluded on QSL, and returned to the listener.

### Mint Stamp:

Unused postage stamps included with the reception report -- to be used by the station for the return reply of a QSL.

### IRC:

International-Reply-Coupon included with the reception report and exchanged by the station for return postage. Available at the post office.

### Prepared QSL Card:

A card or form letter of confirmation, prepared by the listener that includes the date, time, and frequency -- the QSL is then signed, stamped, and returned to the listener.

*Please remember: Send information on the QSL cards you have received to Gayle Van Horn at the address above. Send actual QSL cards to "QSL Editor", P.O. Box 98, Brasstown, NC 28902. They will be handled with care and returned promptly.*

## Knowing the Code

Morse code was developed by F.B. Morse in 1844. This code was set up in such a way that it would be possible for a human to communicate using different clicking sounds, because back then, the telephone wasn't invented. This form of communication worked well but there was one drawback. An experienced telegraph operator was needed at each location to send or receive messages. Teletype was invented because the operator only needs to know basic typing skills. The decoding of the beeps or clicks are done in the teleprinter.

The Baudot code is used to transmit the characters over wires or radiowaves. Machines work well with Morse or Baudot, however, in today's fast world of computers

and high speed data, new ways of transmitting characters are needed.

ASCII is the standard code which is used by most computers. It can do more than just send characters of the alphabet. Control codes which are special nonprinted characters, tell the computer what to do or to stop a printer, for example. Teletype machines also had control code. The bell, "Letters" or "Figures" or line feed are good examples. All of this sounds complicated but it is something that you will probably experience some day especially if you are a RTTY listener.

When you turn on the radio today, you will hear more than the familiar sounds of Morse Code. The bands are full of beeps and clicks and with a little experience, you can master the art of tuning in RTTY signals.

Nothing is more rewarding than to get that print-out for the first time. With RTTY, this experience can happen several times because there are other types that can be received. FEC, AMTOR, ASCII, TDM to name a few, are all spin-offs of the old Baudot. Each type of signal has its own characteristics and can be identified just by hearing the sound or reading the print-out. But I will get into that in future issues.

*If "bull boards" are running up your phone bill, try packet radio!*

The newest and most popular form of data communications is packet radio. If you are not a "ham radio" operator and you love to call up "bulletin boards," (I like to call them "bull boards") but your wife or parents are complaining about the high phone bill, packet radio is for you.

Ham radio operators use packet radio on HF or VHF to pass data using a box which is called a "TNC" or terminal node controller. The TNC connects to the computer or a device known as a video terminal

(which is like a computer but you can't play "Pac Man" on it). The other end of the TNC connects to the radio. One cable plugs into the speaker jack and the other into the microphone jack.

This simple hook-up opens up a new world to ham radio. Not only can you exchange data, but now it's error free. This means that a ham radio operator can send a 100 page document to another ham and every single character will be sent correctly. I use packet radio to send my shortwave loggings to a radio bulletin board. Then other hams can check the "board" and then copy or print out my loggings on their own computer.

There are some "All Mode" radio modems (or TNCs) that have packet radio capabilities. If you own a scanner, you can copy VHF packet in your area by connecting the TNC to your scanner and select 146.01, 146.03 or 146.07 which are popular nationwide frequencies. Use the commands: "PACKET" (if it's an all mode unit) or "MONITOR ON" to copy all of the "packets" on the channel.

Of course, you can't communicate with the hams because you don't have a license or the transmit capability on your scanner. But, you will be able to explore the new world of packet radio and maybe this will encourage you to get that ham license.

I have been copying strange signals on 5.0494 which sound like tones that sequentially change pitch. Can anyone identify these signals?

I need loggings! With the new look that *MT* has taken, I would like to add a loggings section to the RTTY column. But I need your help! If you send in your loggings, you will have the joy of seeing it in future issues. That way you will share your hobby with others all over the world. The RTTY column will now appear on a monthly basis. I will include subjects such as FAX, packet radio plus other modes of data communications and, of course, the RTTY loggings.



*George Ford of Houston, Texas, sent in this picture of his completely outfitted listening post. If you're not listening to RTTY, George, you should be!*

*A listing of his equipment: PRO33 scanner, Panasonic DR22, MFJ Versa Tuner II, ICOM IC R7000, MFJ Grand Master keyer, Siltronix 1011D with frequency counter, Allied SX 190 McDymek DP40, Daiwa filter, MFJ Signal Enhancer, Yaesu FT101E and FR101, Bearcat DX1000, Kenwood meter, Morse A Word code reader, Ameco tunable preamp, Commodore 64 computer.*

## The World Satellite Almanac

Those who use their backyard dishes for movies, sports and entertainment need only a concise weekly satellite television guide to find out what's happening on the birds.

For the TVRO experimenter it's different. Information on listening to FM subcarriers, SCPC channels or keeping track of foreign news broadcasts is very hard to come by.

There have been a number of previously published books on the subject of home satellite television but they usually fall into one of two categories: the vaguely generalized book which is largely out of date by the time it's on the bookstore shelf or the highly technical tome designed for engineering professionals.

Author Mark Long has carved a very useful niche between these two with his *World Satellite Almanac* which is subtitled "The Complete Guide to Satellite Transmission and Technology." Published by the Howard W. Sams & Co. and containing 650 pages it sells for \$34.95.

Written in a style that does not require advanced degrees in electronics, the author demystifies the world of satellite communications.

What makes the first part of the book especially valuable for experimenters are chapters 3 (Satellite Voice and Data Transmission Techniques) and 4 (International Satellite Reception Techniques).

In chapter 3 you'll learn about analog and digital transmissions as well as Single Channel Per Carrier reception techniques.

In chapter 4 you'll discover tips on the techniques of international STV including modifying your feedhorn to receive the circularly polarized signals used by international satellites.

In Part II the author goes step by step around the Clarke Belt with everything anyone could want to know about each satellite. For example, page 338 starts a nine page description of Weststar 4. This includes operational history (it was launched 4-5-82 on a Thor Delta 3910 Booster); communications payload (Each transponder can carry 2,400 one way voice circuits on its 7.5 watt output.) and so forth.

Other pages feature foot print charts which show various levels of gain in the different contours of reception in the northern hemisphere. There is also a channel assignment plan which tells you, as of the publication date, who leases which transponder.

Finally, and most importantly to the experimenter, is a listing of all known Single Channel Per Carrier (SCPC) users on the bird. The charts, which in the case of W4 cover nearly four pages, lists the frequencies of the three main methods of accessing SCPC via the second IF loop-out on the back of your satellite receiver. (Don't fret, the world of SCPC will be covered in depth in a future column.)

Part III of the Almanac consists of

appendices including, among other things; intelsat reception parameters, launch schedules, a global directory of satellite delivered TV and radio services and a comprehensive glossary of terms.

*The World Satellite Almanac* is the home dishowner's source book for your questions about these marvelous tin moons 23,000 miles away.

The ESA is available from: The Sky Store 1-800-328-7733 and The STV Bookstore 1-800-234-0021

Incidentally, for those with deep pockets and a monthly need-to-know, Mark Long publishes a monthly newsletter entitled *World Satellite Update* at \$250.00 /year. A catalog of STV books and videos is also available through MLE, Inc. P.O. Box 159, Winter Beach, FL 32971.

### BACK TO BASICS

Last month in this space we did a "site survey" to determine the best location for the installation of a satellite system. Now a brief TVRO primer is in order.

Microwaves from broadcast satellites are raining down in your back yard at this very moment. To make use of them you must gather up as many as you can and concentrate them on one spot. It turns out that a parabolic dish works perfectly to this end.

The microwaves all bounce up from anywhere on the surface of the dish to a little hook-shaped probe (which is the actual antenna) on the feedhorn. This very weak signal (at 4 GHz) is passed through a wave guide and immediately amplified by a Low Noise Block Converter (LNB) which converts 4 GHz to 950-1450 MHz which is fed into the satellite receiver.

Here the receiver processes the baseband or

raw video into 24 channels which is sent out of the receiver via a channel 3 or 4 modulator just like your VCR. Your TV set now becomes a monitor and all functions including channel selection, audio subcarriers, volume, Dolby NR, Narrow/Wide Bandwidth are all controlled from your satellite receiver. It really isn't very complicated.

So, what's the difference between the \$499 system and the \$2,999 system? Much of the price difference has to do with bells and whistles but even more of it has to do with the quality of the components. Let's take a quick look at each main part of the TVRO system.

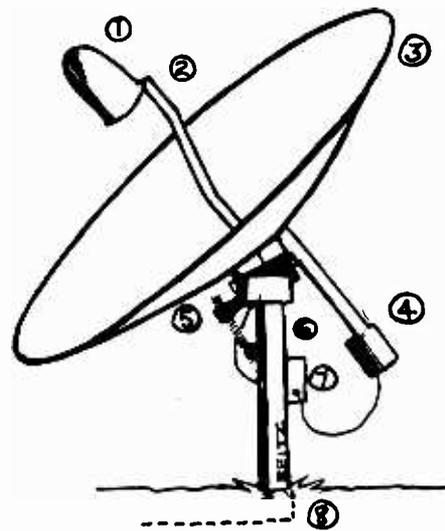
### The Dish

The most important component in your entire system is your dish. It doesn't matter how great your receiver is if your antenna isn't equal to the task, you will not have good video. If you are going to scrimp anywhere in your system don't do it here.

Satellite signals hit the earth in a fairly focused beam called the footprint. Due to the nature of a globe, the signal on the edges of a foot print are weaker than the signal at the center of the footprint. Those living in the center of the footprint could get away with a dish as small as four feet in diameter, whereas, those on the fringes may need a dish as big as twelve feet! In general, excellent signals will be gotten from a 10 foot diameter dish no matter where you are in the footprint.

The most critical thing about a dish is its true parabolic shape. The actual parabolic dish and mount represents a big cost in any system. In order to cut costs some dish manufacturers produced dishes which left quite a lot to be desired. There were fiberglass dishes which were cast in imperfect molds; sectionalized panels that didn't fit together properly; mesh

1. Feedhorn (Probe, servo motor, waveguide, LNA and down-converter) covered by weather protector
2. Feedhorn support
3. Parabolic Reflector (dish)
4. Actuator Motor
5. Polar Mount
6. Mounting Pole
7. Weatherproof Box (contains terminal strip for various connectors)
8. Underground Direct Burial Cable



which disintegrated after a few years; hub and rib assemblies that wouldn't hold a parabolic shape; and other materials which could warp after a few years of intense heat and bitter cold.

There is no substitute for a top quality dish. They are easier to assemble, give better performance, and last longer. An imperfect parabola reduces antenna efficiency, introduces side lobes (a critical problem with 2 or 3 degree spacing between satellites, and turns your "ten footer" into an eight footer or less! Buy the biggest dish you can afford, but try not to buy one less than ten feet in diameter. If you buy a mesh dish make sure the holes are small enough to capture Ku band as well as C band. You'll be watching more Ku band in the next five years.

The best feedhorn/LNA support is a tripod or a quadrapod which allows the feedhorn to remain perfectly stationary (this is particularly critical for Ku reception). The most popular center mount "button hook" feed support is less stable especially in the wind. However, there are guy wire support retro-fit kits which enable you to secure your button hook.

### The Polar Mount

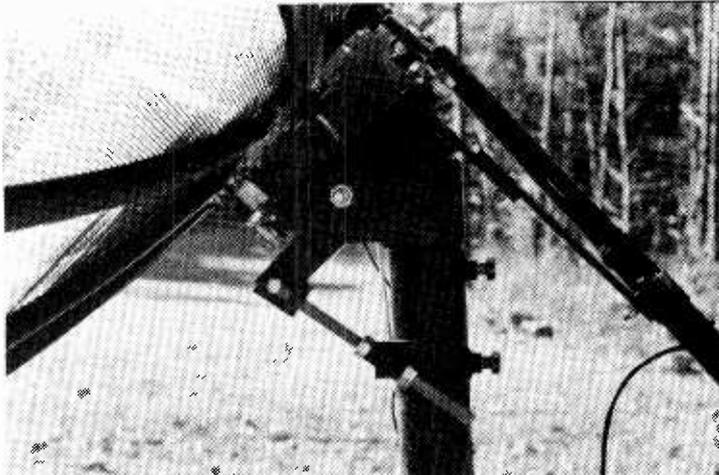
The polar mount is a device which attaches the dish and is set on the mounting pole. There are adjustments you will have to make to the polar mount which allows the dish to accurately track the satellite arc. Each mount will be adjusted according to the precise latitude of the dish location. Avoid all mounts that cannot be adjusted. Look for mounts which can be fine-tuned once the dish is on the pole. Better mounts will have ball bearing collars on the pivot points and grease fittings.

### The Actuator

As with other components the actuator has undergone a drift to standardization. Today's dish drive is typically powered by 36 volts DC. It can be switched among red, hall effect and optical sensors as required by the receiver and has a stroke of 18" which is sufficient length to track Satcom F1 in the west to Spacenet 2 to the east. (Intelsat experimenters still need a 24" stroke and a good view to the easternmost horizon.) The better quality actuator with its linear (extending and contracting) arm has plenty of accuracy even for the demands of Ku band birds.

### Feed Horn Electronics

At a certain distance (the focal length) from the reflector (the dish) the captured microwaves are focused on a small metal hook inside the feedhorn. The hook is rotated 90 degrees by way of a small 9 volt servomotor on command of the receiver and thus changing the polarity of the signal. This allows the satellite to have its channels polarized both horizontally and vertically. As mentioned earlier, the signal is very weak and to be of any use it must be amplified greatly. The trick here is to amplify the signal without introducing anymore extraneous amplifier noise as possible. There's a good reason why they're called Low Noise Ampli-



Detail of polar mount: pivot points, actuator arm connection and adjustment bolts

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fiers!

Noise temperatures in LNAs are rated in terms of degrees Kelvin (<sup>0</sup>K). The lower the noise figure the better the LNA. Only a few years ago the standard was 120<sup>0</sup>K LNA with 100<sup>0</sup>L considered excellent. Now noise temperature in the 55 to 75<sup>0</sup>K range are considered standard with some rates as low as 45<sup>0</sup>K. These are great technological achievements but labels can be deceiving. A 55<sup>0</sup>K Low Noise Amplifier/Down-converter (LNB) price point driven to achieve a lower noise figure may not perform as well as a 75<sup>0</sup>K LNB built with better components and measured at a different point in the circuitry.

### Downconversion

The signal at the feedhorn as it enters the LNA is still at the 4 GHz range on which the satellite transmits. To be useful to the receiver the signal must be converted to a lower frequency. This is called downconversion. A few years ago the 4 GHz signal from the LNA was fed via RG-213 50 ohm coax cable with "n" connectors to the downconverter; usually located in a weatherproof box on the mounting pole.

A more efficient (i.e. less signal loss) way to downconvert would be to do so at the feedhorn. Now the signal is converted to 950-1450 MHz and sent via inexpensive RG6 75 ohm coax cable directly to the receiver. Another advantage for downconverting at the LNB is that the higher conversion can feed two or more independently operated satellite receivers (provided, of course, that both channels being watched are of the same polarity).

**Next month:** Foreign TV news, SCPC feeds, tightening up your dish and a look at satellite receivers.



## David, Goliath, and the peons (*that's us*)

Summer auction and garage sale visits netted me several old console radios at fractional prices, all begging for restoration. Oddly enough, Topeka seems to be a riper hunting ground for old cameras, another of my collecting manias. I still had time for some radio-related activities, however, including some DX.

I've also been trying to follow the continuing saga of the attempted resuscitation of AM radio by various facets of the industry, and, frankly, the picture I get is of various groups pointing at their neighbors and saying, "You do it!"

Some entities, notably the National Association of Broadcasters, seem to be attempting to push manufacturers and broadcasters in what they feel is the right direction, but unfortunately the NAB does not have enough leverage to coalesce the various forces into agreement and action.

Meanwhile, Leonard Kahn continues the role of David against the industry Goliaths, railing against Motorola's attempts to establish its C-QUAM system as the U.S. AM stereo standard system. He is now filing suit against General Motors, claiming patent infringement in distortion reduction technology in Kahn's patents, which cover his AM stereo system.

At the NAB convention in Las Vegas, the improvement of AM radio was one topic of study, and many of the participants seemed to agree that the NRSC preemphasis standard provided an incentive for manufacturers to build better AM radios.

### Only One Good AM Set

Most consumers would agree that except for the unique exception of the GE Superadio II the AM section of receiver combos is an afterthought. I cannot think of a single AM/FM receiver that I could purchase off the shelf today (except for the Superadio) and expect decent AM sound, selectivity, and sensitivity for under \$100, and darned few for over that price. And not very many FM sections for under \$100 give the consumer much quality, either, come to think of it.

We as DXers and listeners can do our part in promoting the improvement of the sound

quality of AM stations and subsequently receivers by contacting our locals and complimenting them on their "improved sound" after they install AM stereo or equipment to help them meet NRSC standards. They'll be pleasantly surprised at your reaction, and after a couple of calls, will be more willing to go out of their way to push manufacturers to produce quality receivers.

In the long run, this complimentary approach will work better than a negative one of complaining to the manufacturers, who react more quickly to other facets of the industry, rather than to the consumer, who buys shoddy equipment right now rather than waiting for better stuff to come along.

I know. I used to sell horrible hundred-dollar compact and component systems and couldn't keep them in stock. The buyers were more worried as to whether or not the system would fit in the room or match the color scheme than in its sound quality.

Nevertheless, we can't simplify the problem to one of simple re-education of the consumer. The advent of earphone radios, such as the Sony Walkman, did that, and a whole generation of listeners found out that FM stations really did sound better than AM stations, whose sound quality had been adjusted to sound best on car radios, not personal portables or home systems. And they abandoned AM in droves, thus helping to create the current crisis in AM broadcasting.

It's up to the broadcasters themselves to insist that manufacturers put decent radios into the hands of the consumers. How long will this process take? Probably longer than some stations can survive, unfortunately, unless they realize that consumers won't accept poor-quality sound any longer, accept the NRSC standards and modify their sound, and then find a broadcasting leader who will give the receiver manufacturers an order that they can't refuse. How about Peter Ueberroth, now that he's free...?

### Crystal Sets

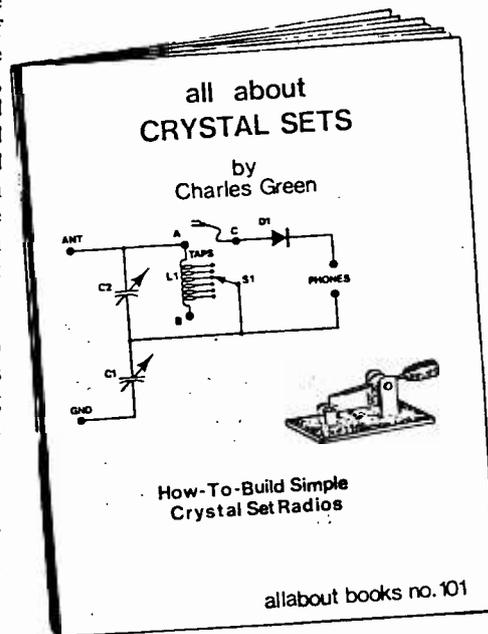
The saga of the crystal radio set continues; I'm still receiving mail on that subject!

Mrs. Leslie Edwards of Doylestown, Pennsylvania, wrote back to say that she had seen crystal radio kits in Radio Shack stores recently.

Bob Zirkelbach of Pleasant Hill, California, tells me that he constructed the crystal radio set from the plans I included in last year's November column, and it works! He was able to pick up all the components (except the galena crystal, the phone condenser, and, I presume, the oatmeal box) from Radio Shack.

"I substituted a germanium diode for the crystal, a 1N34A," Bob writes. "I used 22 gauge solid wire for the coil, and two rotary switches, Cat. No. 275-1385..."

"OK, Paul, my set is all finished. Now for the big test. I hook up the antenna to my SW longwire, and I hook up the ground wire and clip on the old Cannon Ball headset. I start twisting knobs. I have visions of Jack Armstrong, Tom Mix and other great radio shows of 'those thrilling



Another source of crystal plans is this book by Charles Green available from Allabout Books, P.O. Box 4155, Fremont, CA 94539.

days of yesteryear'. Hark! What do I hear? Is it BBC? No, it's KCBC in San Francisco, thirty miles away. Another twist and it's KGO, also in SF. Then KKIS and KSUN locals. I hear what sounds like a ham talking, but alas he is on SSB. This went on into the night. I logged seven stations; works great!!"

Bob also notes that Hope and Allen Publishing Company, who offer *Radios That Work for Free* at \$7.95 plus \$1.25, has a new address: P.O. Box 926, Grant's Pass, Oregon 97526. Has anyone else constructed a crystal radio recently? Let's hear about your results.

Ray Cole, of Cape Girardeau, Missouri, continues monitoring frequency deviations of his local radio stations to document a possible relationship between these deviations and earthquakes. If you'd like more specific information, feel free to write to me and I'll forward your requests to Ray.

### FM/TV DX

J.K. Johnson of Savannah, Georgia, writes to mention that he has received distant FM and TV stations via tropospheric enhance-

ment and E-skip, which he calls "very common down here." His tip to us is that although he may hear a lot of FM stations during E-skip conditions, he doesn't always receive TV DX during the same conditions. That's a good point, and at coastal locations the reflection point for sporadic-E conditions might be in the middle of the ocean or a land area which has no FM or low-band VHF stations.

MT Loggings editor, Gayle Van Horn, generously forwarded to me some loggings from an exotic location by contributor Cliff Goodlet, Chattanooga, Tennessee, who listed some of the stations he heard from the Caymen Islands but complained about the overwhelming number of Cubans audible. On FM, he picked up locals on 105.3 MHz (R. Cayman); 89.9 (R. Cayman, simulcast with 1205 kHz most of the time, but not parallel with 102.25), and 101.1 (R. ICCI-FM, for International College of Cayman Island, all "elevator-type" music).

Look for new day/night AM stations to crop up on several frequencies, including 780 in Springville, UT, with 5 KW days, .45KW nights; 1180 in Claude, TX, 1/.25; 1200 in Sault Ste. Marie, ON, 10/7; 1250 in

Dakota City, NE, across the river from Sioux City, IA, with .5/.7; and graveyarder 1340 in L'Anse, MI, with 1/1. Thanks to NRC's Jerry Starr for these listings.

He also notes these new stations now on: WPBD-640 Atlanta, GA; WWLX-750 Lawrenceburg, TN; WGRR-960 Prichard, AL; WJN-1180 Newburg, IN; and WJRA-1310 Priceville, AL. I've noted the 1030 outlet in Blue Springs, MO, now KBEQ, back on with a very clean sound, simulcasting KBEQ-FM. I've also heard several more stations on past sunset, exercising their new nighttime authorizations by broadcasting play-by-play of local baseball or softball games.

From NRC's *Domestic DX Digest Column* edited by William Hale comes word that KDFT-540 Ferris, TX, is on, programming oldies, and heard by Wally Wawro.

That's about it for this time. Remember, next month we'll publish plans for the best AM loop antenna and award the top prize in our contest. Until next time, 73!



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MT

## The Return of the Comandante

The good news for clandestine monitors is that the Legend is back! In the early 1980s, anti-Castro broadcaster Comandante David (pronounced, "dah VEED") had a large audience. Not only did clandestine enthusiasts tune in his impassioned transmissions, he was said to be the most popular broadcaster as far as Cuban listeners were concerned. He is credited with inspiring a number of acts of sabotage against the Castro regime, and some feel that he was at least indirectly responsible for what turned into the 1980 exodus from the port of Mariel to the United States.

The Comandante later ran into some problems with the FCC, although the man they eventually charged with illegal broadcasting was not he. In any case, Comandante David disappeared, only to surface on the airwaves very briefly a few years ago. Now he appears to be back for an extended effort. If you missed him before, make certain you catch him this time. If you heard him in the past, you will discover the old fire and spirit are still there.

The Comandante is attempting to maintain a regular schedule of Monday-Wednesday-Friday transmissions at 9:00 p.m. Eastern Time (Tuesday-Thursday-Saturday 0100 UTC). Saturday morning transmissions at 9:00 a.m. (1300 UTC) are also supposed to be coming. The frequency is 7050, although you will find this varying somewhat. Broadcasts normally last for about half an hour. The station identifies as Radio Libertad Cubana and Radio Felipe de la Cruz. It is not unusual to hear the Comandante before and after a broadcast conversing with various contacts and sometimes sending encrypted messages.

Just listen and enjoy this one. Forget about attempting to verify it. For very good reasons the Comandante does not disclose his real identity nor provide a mailing address. Hopefully, someday his entire story can be told. It is a fascinating one, but for now it must remain part of the mystery that surrounds a man who became a broadcasting legend in his own time. And Comandante David, wherever you are, welcome back. Your fans salute you!

### Voice CW!

An anonymous Florida reader has sent us

information on one of the most bizarre transmissions we have ever run across. Would you believe voice CW? That is what our contributor heard on 13377.4 kHz in USB at 2100 UTC. The speaker is a man, and the traffic is encrypted in five-letter groups. Why someone would use such an unorthodox communication method and for what purpose both our contributor and this writer would like to know. If you have any information or theories please contact Box 1116.

This same reader also sent along information on a transmission monitored at 2315 on 11130 kHz. Background noise made most of the Spanish unintelligible, but the extensive amount of whistling to alert whomever was to receive the messages is rather typical of smuggling operations. Again, if you can provide any help, let us know.

### The Mark of the Beast?

Not really, but you may find the general vicinity of 6666 kHz a good place to do some monitoring. What may possibly be a Contra network can sometimes be heard in Spanish there. A good time to try is around 0100 UTC, but you may come across it at other times as well. Transmissions are in USB.

And while you are in that neighborhood, an anonymous Maryland reader suggests you

listen for anti-Castro La Voz de Alpha 66 which he is hearing exactly on 6666.6 with what he suspects is a brand new transmitter. Strangely enough, Alpha 66 and Comandante David maintain the same evening schedule. Is there some competition going on here?

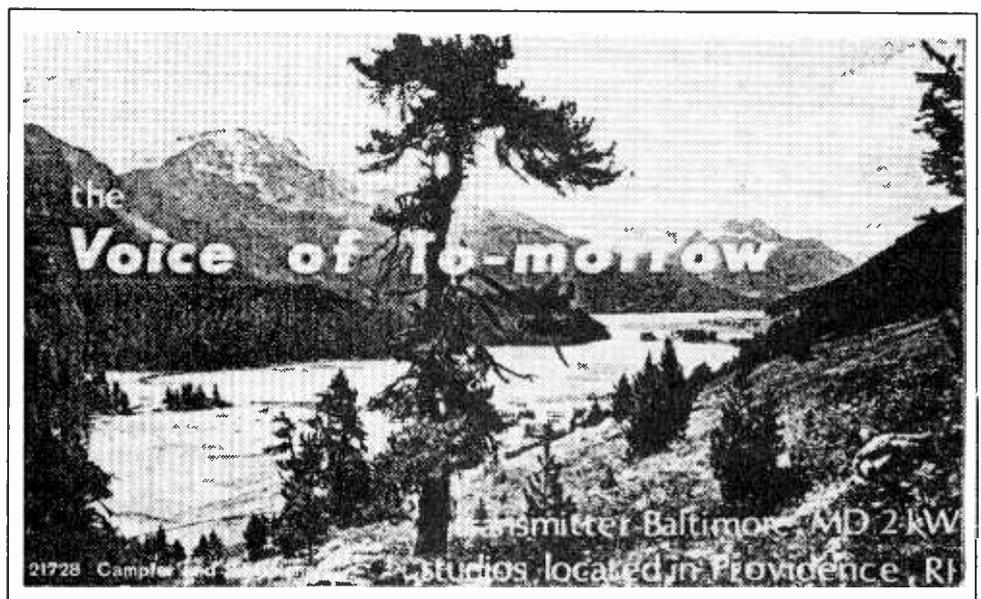
### Those Pirates

Yes, folks, pirates are being heard these days. From New York, Cathy Turner reports Radio Clandestine on 7415 kHz from 0315 to 0405 with a program of music and comedy. This is a classic pirate which has been around for over ten years. On 7410 at 2330 she heard the Voice of Tomorrow with its usual white supremacist philosophy.

Now what are the rest of you hearing? Send those pirate logs and other pirate information to Box 1116!

### Across the Pond

Yes, we do get read in Europe, and it was great to hear recently from two European readers. From Ireland, Derek Lynch reports that despite an apparent easing of the long-standing tension between Col. Muammar Qaddafi's Libya and Chad, he still hears intense Libyan jamming of Chad's government station on 4904.5. Several months ago Chad's army seriously



embarrassed Qaddafi with several surprising and impressive victories over his forces.

From the Netherlands, Ary Boender brings us an update on Radio Caroline. He reports that Caroline has leased its shortwave facilities to World Mission Radio, P.O. Box 3416, Corona, CA 91719. They relay programs of various religious broadcasters. You may want to try for their transmissions on 6210 or 6215. However, Ary says to expect jamming from French and Danish naval stations, as this has happened in the past.

Caroline's regular music programming continues on 558 medium wave from 0500 to 0100 UTC. The 819 kHz transmitter went off the air in December but is expected to return soon. This is leased to the Dutch service known as Radio Monique, which will probably return as Radio 819.

Ary has over 100 cassettes of the offshore pirates from the early 1960s to the present. He will send you a list of what is available for two IRCs. His address is Ary Boender, Lobeliastraat 33B, 3202 HR Spykenisse, The Netherlands.

### Missing Person

Bob Love, please write me again! I lost your address.

### Other News

Costa Rican Radio for Peace International writes that they have raised their power to 7000 watts. Their schedule is now 13660, 1800 to 2100 UTC (a test broadcast); 13660, 2100 to 0000; and 7375, 0100 to 0400 UTC. While not a clandestine broadcaster, clandestine monitors may find much of its programming interesting, and most of it is in English. Reports can be sent to P.O. Box 188, Sweet Home, OR 97386.

We have received several mailings recently from the Free Angola Information Service, which is the American arm of UNITA. UNITA maintains an army which opposes the Marxist government of Angola. UNITA appears to have some hope that under joint American-Soviet backing a settlement to the long, bloody civil war may be reached.

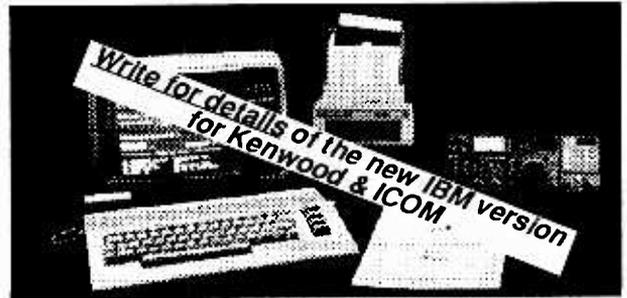
If peace should break out, then UNITA's clandestine Voice of the Resistance of the Black Cockerel may have served its purpose and become part of clandestine history. In the meantime you can still hear its Portuguese broadcasts. Probably the best place and time to try is 4972 kHz around 0330 UTC. The interval signal is a very distinctive rooster crow.

The Free Angola Information Service publishes an informative newsletter, KWACHA NEWS, and on rare occasions will verify taped reception reports. You can reach them at P.O. Box 66463, Washington, DC 20035-5463.

That's it for this month. Thanks for your excellent support.



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Le Directeur des Services Techniques  
de l'Information

DARRIET OU...LBADET



## Going the Distance

A lot of things happen about this time of year. Apples get ripe; footballs are more common than baseballs, and conditions start looking better for low frequency radio listening. If you are a newcomer to the low frequencies, you're just in time for the wonderful season ahead. The thunderstorms of summer and their accompanying static are becoming history and the low frequencies are becoming clear once more. From now until late next spring there will be opportunities to do some great DXing.

Listening on the low end of the radio frequencies requires a little change in thinking about distance. High frequency DXing includes stations from all over the world. We think nothing of hearing Africa, Asia or Australia. Our thrills come from hearing a station on some obscure little island somewhere in the middle of an ocean. Distances aren't that easy to come by in the low frequencies.

### Directional Frequencies

Low frequency signals are very directional. And the skip distances aren't as great as they may be for higher frequencies. Add to that the fact that many transmitters, such as those for aeronautical and marine beacons, are not usually that powerful. When all of

these are combined, it is apparent that long distance reception is not something achieved automatically.

The European and African broadcast stations below 300 kHz are heard occasionally along the East Coast. But these transmitters are generally 500,000 to 1 million kilowatts strong. On high frequency, a 2 million kilowatt station would sound like your local AM broadcast station. Even with this kind of power, they don't penetrate far into the U.S. A midwest reception would be a plum for anyone.

### Distance not Practical

I am not aware of any African or European beacons reported from the United States. To the best of my knowledge, the beacons furthest east that have been reported are the Azores and Ascension Island. These were heard by a couple of the best DXers in the low frequencies.

This doesn't say that distance reception can't occur. A French Polynesian beacon has been heard in the east and Easter Island in the midwest. This reflects a phenomenon of low frequency. Distance reception is better along north/south lines than east/west. It would probably take a scientist to explain why this works in this manner, but it does seem to be so. The distances for the French Polynesian and Easter Island beacons is about 5,000 miles. On an east/west basis, this should produce some reception of European beacons in this country.

What can one expect in terms of distance? During the daytime, a 25 watt beacon can probably be heard about 300-400 miles maximum. At night, the maximum distance increases to about 1000 miles or so. When a beacon is heard from a distance somewhat greater than this, there is suspicion that the power is more than 25 watts.

As power goes up, so does the distance the beacon can be heard. The French Polynesian beacon is 5000 watts and the Easter Island one is 3000. A beacon of 400-500 watts can reach out a couple of thousand miles and at 1000 watts it can be heard as far away as 3000 or more miles away.

The limitation of distance is also seen in the marine band segment of low frequency. Scan the frequencies from 435 to 500 kHz and you will hear various coastal stations transmitting. But, unlike the other marine bands, you will not find the whole world available at various times of the day. Day or night, the stations will remain the same ones; you will hear U.S., Canadian, Mexican, Cuban and other nearby locations.

Every coastal station monitors and uses 500 kHz. This is the frequency for making preliminary announcements of traffic lists, initial contact for working frequency selection upon occasion, and emergency calls. If long range reception were the normal result, this frequency would quickly become cluttered and unusable. Perhaps this is the reason that the universal frequency was originally selected in the low frequency portion of the spectrum.

### Not Necessarily Dull

The lack of distance does not mean that DXing need be dull or boring. There can be a thrill of accomplishment in hearing a beacon from Idaho while you are in Illinois, or a Delaware DXer catching a Texas beacon. No matter where you are located, your chances of hearing 48 states (Alaska and Hawaii are like different countries) are almost impossible. Yet, maybe someday, someone will do it.

A DXer in California, with 3,000 and 4,000 foot antennas hears Australian and New Zealand beacons in modest quantity at certain times of the year. He has also heard beacons well across the country. Another, in Hawaii, hears many U.S. and Canadian beacons well inland from the coast. As equipment and techniques improve, the DXer's equivalent of Worked All States may yet come to pass.

The season is just about starting. Join in and give it a try. You just might be the one to finally accomplish the feat of hearing beacons from all of the states.

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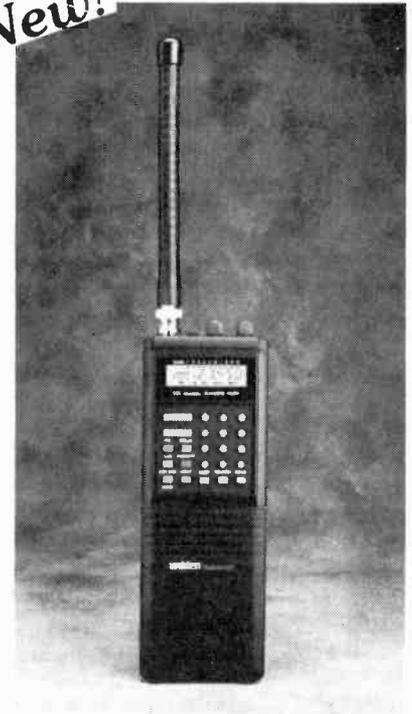
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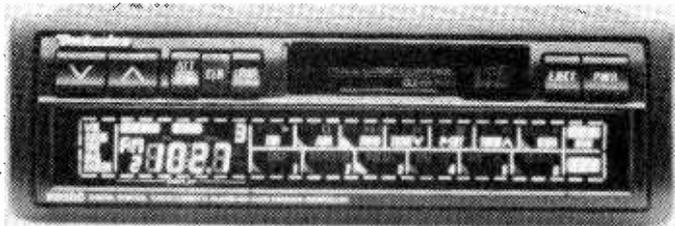
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. . . In which Technics taps, Midland takes sides, young Grove turns to the light side of the force, and the editor gets even . . .



## Technics taps . . .

Technics car audio recently introduced a stereo incorporating a technology that could someday be used in world band receivers, scanners, and other monitoring equipment.

The new Technics CQ-R9550 practically doesn't have any "real" buttons. Instead, it has a touch sensitive LCD face which serves as the control and display panel. Tap the face plate, and it changes to control a digital AM/FM tuner, a full-logic cassette player, or an optional 12-disc CD changer. As each new control face is displayed, the appropriate set of control functions is activated.

This changeable control-and-display panel idea could be pretty interesting on some of the more complicated world band radios. It might even be used to reduce some of the crowding of controls that Larry Magne occasionally complains about. On the other hand, if this touch-and-change capability ever misbehaves, it could make the entire radio useless.

In addition to its innovative control set-up, which includes a palm-size wireless remote control, the Technics CQ-R9550 has all the bells and whistles that you would expect to find on a top quality car stereo, including, of all things, the ability to control the CX-DP11, a 12-disc CD changer with random-access programming. So don't think of your wheels as transportation, think of it as a rolling jukebox! Suggested retail on the CQ-R9550 is \$750; the CX-DP11 is \$850.



## Midland takes sides (bands) . . .

Midland International has introduced a new "professional class" single sideband /AM mobile CB transceiver. The Model 79-265 features 40 channels AM, plus upper and lower sideband with 12 watts PEP output. There's a three-way solid state bar graph "S"/RF/SWR meter; noise blanker and ANL; a crystal filter to reduce adjacent channel interference; an amber digital channel readout; and instant channel 9 access, among other goodies.

Perhaps most interesting on the Model 70-265 is an aluminum FIN heat sink, which Midland rightly claims is usually found only on commercial two-way radios. It's supposed to extend the life of the RF

output transistors and allow maximum power output by providing superior heat dissipation. Maybe so — I've never really found heat buildup to be much of a problem in my sidebanders. But if you get inside the radio and crank up the wattage, maybe then it makes more of a difference...but *MT* readers wouldn't do that, would they? Nah.

Suggested retail on the Model 79-265 is \$289.95. If you want to know more about this new rig, contact Midland International, Consumer Communications Division, 1690 North Topping, Kansas City, MO 64120.

## Young Grove turns to the light side of the force . . .

Bill Grove, son of *MT* publisher Bob Grove, is a self-confessed computer addict whose formative years have been influenced by video games. Certain that a laser in his hands would bring the warlords of the world to their knees — or at least command respect from the senior class at high school — Bill started on his technical odyssey. Although unable to achieve global peace, Bill did make some fascinating discoveries while building and testing his new Heathkit laser.

### Herewith his report:

For several months I had been trying to convince my father that we needed a laser. "What do you want with a laser?" he asked. "I've always wanted one," I replied. I had, indeed, been dreaming of getting a laser and then I saw the one in the Heathkit catalog. The kit included a laser, a receiver and an entire instructional course! It was perfect.

Finally my dad agreed. He also agreed that it might make an interesting topic for review in *MT*. After what seemed like an eternity (actually, about two weeks), there it was: a big box from Heathkit! I tore open the carton to find several boxes which didn't look like a laser, but the instruction manual reassured me that there really was a way to stick all these little parts together to make one.

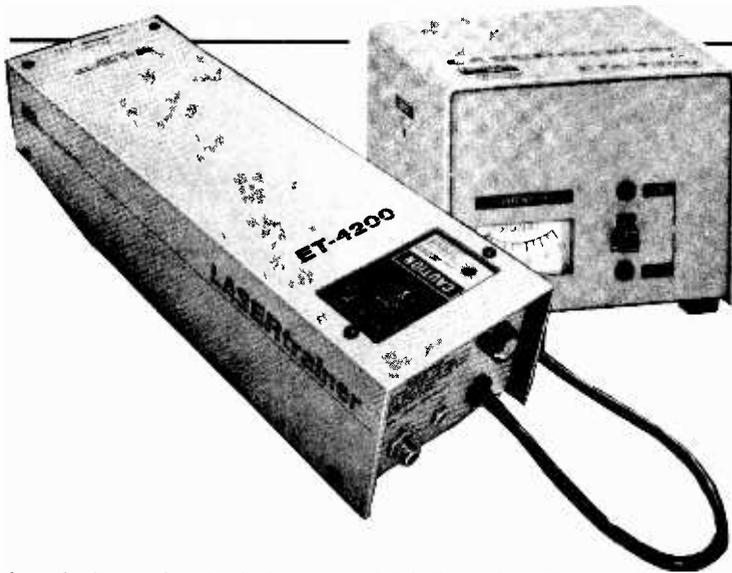
I ran upstairs to the lab, sat down and plugged in a soldering iron. I was ready. "This is only a class 2 Heathkit," (intermediate difficulty level) I assured myself (I had previously built a class 3 frequency counter). Opening the construction manual and finding the same easy-to-follow instructions I had encountered with my previous project, I began.

After six hours of soldering, poking, bending, and using some words my dad had taught me, I was finished. With eager anticipation, I plugged it in, turned it on...and it worked! It was beautiful. A brilliant, ruby-red dot shown on the lab wall. No one can quite describe the feeling you get from building one of these kits.

After a few final adjustments — again, all easy-to-follow steps in the manual — I plugged the laser into the wall socket once again and turned it on for my dad to admire. He was impressed. I explained to him how I could adjust its output between .4 and .9 milliwatts. The laser receiver would have to wait until tomorrow.

The next day I called my best friend and told what I had built. His first words were, "Does it burn holes in things?" Although I found his knowledge of lasers stimulating, I interrupted him and said, "No. This laser is for education, not a Star Wars' project!" Somewhat disappointed, he asked what good it was. I explained to him how when I completed the receiver, I could send wireless transmissions from one place to another and when I completed the trainer book, I could do various experiments with the laser.

That afternoon I started to assemble the receiver. Since it was much smaller than the laser, I expected it to be much simpler to construct; however, because the box is so small, I had difficulty getting



into the box to install the batteries. Aside from that, the assembly went smoothly and in under three hours I was finished and ready to test the whole system.

The receiver comes with all the necessary cords to plug it into an auxiliary audio source. I chose to connect it to my "boom box." I installed a cassette, turned on the laser and pointed the beam into the receiver across the room. Sure enough, the Top Gun Anthem bounded from the speaker! It was incredible.

That night I decided to give the system a real test. With the laser plugged into the house wall socket, I took the portable receiver about 100 feet into the yard. I followed the tell-tale dot from the laser beam which fell on a nearby tree and thrust the receiver into the path of the beam. Immediately, sound from the cassette rushed from the speaker.

#### For Instructions

About a week later the EB-10 Laser Technology Course arrived in the mail. This, too, was fascinating to assemble, follow and use. It had mirrors, lenses, an optical fiber, polarizers, filters and professionally written course materials on lasers, theory and experiments.

Since lasers are used in surgery, industrial processes, consumer labeling, optical encoding and reading, distance measuring and telecommunications, appropriate instructional materials are mandatory. The course includes a student workbook with 15 laboratory experiments covering laser transmission and modulation; an accompanying instructor's guide provides course objectives and outlines, chapter tests with answer keys, and a final exam.

The chapters in the course cover every conceivable area of laser technology and practice, including the nature of light, laser design, applications and laser safety. A prerequisite of basic algebra and electronics is recommended.

For anyone who has an interest in lasers, especially schools and technical training institutions, the kits are easy to assemble, fun and highly instructional. For those who aren't talented in the art of soldering, or simply haven't the time to build a kit, the laser and receiver are also available factory wired at additional cost.

#### Technical Specifications:

Output power	0.4 mW to 0.9 mW
Wavelength	632.8 nm (visible red)
Beam diameter	0.49 mm at 1/ePTS .49 mm.
Beam divergence	1.64 mrad.
Polarization	Random
DHHS Class	II
Modulation bandwidth	300 Hz to 40 kHz +/- 3 dB
Auxiliary Input	1 volt, peak-to-peak
Microphone Input	100 mV for 50 k ohm crystal mike
Power requirements	120 VAC, 60 Hz, 15 watts
Dimensions (laser)	3-1/4" x 3-3/4" x 13-7/8" L
Net weight	2.6 lbs.

#### Some Final Thoughts

Heathkit's quality in packaging their kits is recognized by kit

builders everywhere. The instruction manual is undisputed when it comes to ease of reading and following directions. The parts and accessories are separately packaged according to their order of use in the assembly manual. All delicate components (like the laser tube) are wrapped in foam rubber.

The instruction manual provides everything the newcomer to kit building needs to know -- how to identify the parts, solder, bend resistor leads -- for successful assembly. The thoughtful touches which pervade the ETS-4200 laser trainer kit and matching EE-110 instructional course punctuate the reputation for quality that the name "Heathkit" has earned.

ETS-4200 laser trainer kit, \$279.95 plus shipping; EE-110 laser technology course, \$99.95 plus shipping; combined discount cost, \$349.90 plus shipping. From Heath Company, P.O. Box 1288, Benton Harbor, MI 49022.

## Meanwhile on another side of the galaxy . . .

### The editor gets even

Did you ever get behind a driver who seemed to think that going as fast as the speed limit was some sort of sin? Or how about the fellow who demonstrates total ignorance of the function and use of turn signals? Or the woman who continues to apply makeup long after the light has turned green?

If these things get you just a little steamed, you're not alone. They get to me, too, and my wife was becoming mildly concerned about my vocabulary in such circumstances. So, on Father's Day she gave me a perfect present -- The Revenger. Now I don't get mad, I get even!

The Revenger resembles a radar detector in size and shape. Just like a detector, it can be attached to the dash of your car with velcro. But there, my friends (and beware, my foes!), the resemblance ends, for on the faceplate of the revenger there are push-button controls labeled "death ray," "front machine gun," and "grenade launcher."

Flick the toggle switch on the front of the Revenger, and red, yellow and green lights flash, indicating the weapons systems are armed. Press any of the weapons buttons, and the Revenger makes the appropriate noise: an eerie wail for the death ray, a staccato chatter for the machine gun, and a sound like a bomb dropping and exploding for the grenade launcher. And that's all the Revenger does: it makes weapons noises.

Ah, but what satisfaction! To lob an imaginary audio grenade at the lady fixing her hair while holding up a line of traffic; to machine gun with sound effects the guy who doesn't bother with turn signals; to direct the death ray at the slowpoke (when I'm already late) does me a world of good. It relieves my hostility and does no one else harm (there is even a warning on the side of the package: for fun use only, Do not connect to live weapons). In short, it's fun. And my vocabulary is now rated "PG". About the only thing the Revenger lacks is an indicator for "Missile Lock-on." Just call me "Top Gun."

The Revenger is available in many department stores and is distributed by Express Yourself, Inc., Charlotte, NC. Price: less than \$20.

### A FINAL NOTE

This column is intended to be fun and informative, and you can help. If you have a favorite gadget, a product you hate, something unusual, or anything else to report in the area of Consumer Electronics, please let me know about it by writing to me c/o *Monitoring Times*.



# Program Review

## DX Shows and Alistair Cooke

### COMMUNICATOR - \*\*\*\*

DX programs today fall into two distinct categories. Some are mere recitations of times, frequencies, and stations. Others concentrate on features and ignore breaking DX news. Programs which break these molds and present a mix of the two genres are generally excellent, and *Communicator* is no exception.

*Communicator* offers something for everyone. One recent episode had a feature on small satellites, Indonesian and Central American news, a review of the Sony ICF-SW1, and the propagation forecast. All parts of this episode were done well. Even though the ICF-SW1 has been reviewed and re-reviewed by many, this particular report was insightful.

Roger Broadbent, the host, ties the various parts of the program together well. Mike Bird, the presenter of the propagation forecast on *Communicator* and Radio Netherlands' *Media Network*, is arguably one of the foremost experts on shortwave propagation, and his reports are helpful to everyday DXing.

*Communicator* does not seem to be trying to compete with any of the other DX shows on the air today. Instead, it has carved a unique niche in the field quite nicely.

(Radio Australia, weekly, Sun 0230 rep 0730, 1230, 1730, 2030.)

### DX PARTY LINE - \*\*

HCJB's *DX Party Line* has a long tradition. Hosted by Clayton Howard for many years, it was once one of the most popular shows on the air. Alas, the show has fallen on hard times of late.

The producers of *DX Party Line* have sixty minutes per week to fill -- a burdensome task. Unfortunately, much of the material aired could best be called filler. Station profiles are nothing but rehashes of material which could be found in the World almanac and *Passport to World Band Radio*. Reports from clubs and organizations present news which is often stale by airtime ... and the information is useless if you receive the club bulletins.

Even if you don't, most of the good points in the club reports can be found in your current *Monitoring Times*. Also, the station insists on promoting its religious views in a two or three minute spot entitled "Tip for Real Living." Some listeners may find this offensive. It's hard to find reasoning behind HCJB's decision to run the spot. People tune to religious programming in order to hear religion, not DX shows!

This is not to say that there are no good aspects of *DX Party Line*. BBC Monitoring Service information is often useful. And the presenters' friendly style is a definite plus -- something which is often lacking from DX shows today.

There are many fine DX shows for listeners to choose from: Radio Australia's *Communicator*, Radio Netherlands' *Media Network*, and Glenn Hauser's *World of Radio*. *DX Party Line* does not fall into that group. But if you've never heard the show for yourself, it may be worth your time.

(HCJB, twice weekly; Mon 0930 rep 2130, Tue 0230, 0630; Sat 0930 rep 2130, Sun 0230, 0630.)

### LETTER FROM AMERICA - \*\*\*\*\*

Alistair Cooke. The name conjures up visions of *Masterpiece Theatre* (and assorted documentaries on American history as well) to devoted public television watchers. But the expatriate Briton has his own spot on BBC World Service as well.

*Letter from America* has intrigued listeners for its long run. Cooke skillfully presents insightful commentary on events in the United States.

He also comments on American idiosyncrasies. This is fascinating, especially for those of us here who don't often notice such things. Things which seem trivial to us are Cooke's fuel. He examines motives and analyzes extremely well.

The host carefully avoids throwing in his own opinion on political or social issues; it is his shrewd ability to observe which differentiates his program from others of the same type. This ability makes for a delightful thirteen minutes of listening.

(BBC World Service, weekly; Sat 1015 rep Sun 0545, 1645, 2315.)

If you have comments on a particular program which you've heard on shortwave, we invite you to send them to the program reviewer at the address on page 59. Full reviews are welcome, and should be approximately 150 to 100 words long.

Kannon Shanmugam

# Your Guide to Shortwave Listening in September

## How to Use This Section

This is your daily guide to the programs being broadcast on the international bands. Wherever possible, actual advance program details for the listed stations are included. To use this section, simply look up the day on which you are listening, check the time, and decide which program interests you. Then go to the frequency section in order to locate the frequency of the station/ program on the dial.

All days are in UTC. Keep in mind that the new UTC day begins at 0000 UTC. Therefore, if you are listening to the shortwave at 8:01 PM [EDT] on your local Thursday night, that's equal to 0001 UTC and therefore *Friday* UTC.

We invite readers to submit information and reviews about their favorite programs. These must be in UTC day and time and can be sent to program manager Kannon Shanmugam.

We also invite broadcast stations to submit advance program details for publication in *Monitoring Times*. Copy deadline is the 1st of the month preceding publication [i.e. details for programs to be broadcast in October must be received by Kannon Shanmugam by September 1st. Information can be FAXed via 1-704-837-2216 and should indicate clearly that it is to be submitted to the *Monitoring Times* program guide.

**Program Manager:**  
Kannon Shanmugam  
4412 Turnberry Drive  
Lawrence, KS 66046

### Key to Program Ratings:

- \*\*\*\*\* - outstanding
- \*\*\*\* - excellent
- \*\*\* - good
- \*\* - fair
- \* - don't waste your time

AFRTS - (US) Armed Forces Radio & TV  
BBC - BBC, London, England  
HCJB - HCJB, Quito, Ecuador  
RA - Radio Australia, Melbourne  
RCI - Radio Canada Int'l, Montreal  
RJ - Radio Japan, Tokyo  
RNI - Radio Norway Int'l, Oslo  
VOFC - Voice of Free China, Taiwan  
WCSN - WCSN, Boston, Massachusetts

## Sunday

4th, 11th, 18th, 25th

0000 BBC: World News  
0000 RA: International Report

- 0009 BBC: News About Britain  
0015 BBC: Radio Newsreel  
0030 RA: Anything Goes (music)  
0100 BBC: News Summary  
0100 RA: World and Australian News  
0101 BBC: Play of the Week  
0113 RA: Boomerang (letters)  
0130 RA: At Your Request  
0200 BBC: World News  
0200 RA: International Report  
0209 BBC: British Press Review  
0215 BBC: The Third Policeman (reading) [ex 25th]  
0230 BBC: The Ken Bruce Show (music mix and entertainment news)  
0230 HCJB: DX Party Line (SW radio)  
0230 RA: Communicator (SW radio)  
0230 VOFC: Mailbag Time (letters)  
0300 BBC: World News  
0300 RA: World and Australian News  
0309 BBC: News About Britain  
0313 RA: Music of RA  
0315 BBC: From Our Own Correspondent - \*\*\*\* - Good in-depth news stories.  
0330 BBC: Trivia Test Match (quiz show)  
0400 BBC: Newsdesk  
0430 BBC: English Songsmiths  
0445 BBC: Reflections (religion)  
0450 BBC: Financial Review  
0500 BBC: World News  
0509 BBC: Twenty-Four Hours (news magazine)  
0530 AFRTS: The Source Report  
0545 BBC: Letter from America  
0600 BBC: Newsdesk  
0630 BBC: Five Faces of Jazz  
0700 BBC: World News  
0709 BBC: Twenty-Four Hours (news magazine)  
0730 BBC: From Our Own Correspondent - \*\*\*\* (see Sun 0315)  
0745 BBC: Words  
0750 BBC: Waveguide - \*\* - DX program geared toward neophyte listeners.  
0800 BBC: World News  
0800 RA: International Report  
0809 BBC: Reflections (religion)  
0815 BBC: The Pleasure's Yours (classical music requests)  
0830 RA: Sports Results  
0845 RA: Music of RA  
0900 BBC: World News  
0900 RA: World and Australian News  
0909 BBC: British Press Review  
0913 RA: Book Readings  
0915 BBC: Science In Action  
0925 Radio Japan: DX Corner  
0930 RA: Music Special  
0945 BBC: Whither Wisdom?  
1000 BBC: News Summary  
1000 RA: International Report  
1000 Radio Norway International: Norway Today  
1001 BBC: Short Story  
1015 BBC: Classical Record Review  
1030 BBC: Religious Service  
1030 RA: Bicentennial Feature  
1100 BBC: World News  
1100 RA: World and Australian News  
1109 BBC: News About Britain  
1113 RA: Music of RA  
1115 BBC: From Our Own Correspondent - \*\*\*\* (see Sun 0315)  
1130 RA: International Top Hits  
1200 BBC: News Summary  
1200 RA: International Report  
1201 BBC: Play of the Week  
1230 RA: Communicator (SW radio)  
1300 BBC: World News  
1300 RA: World and Australian News  
1300 Radio Canada International: Sunday Morning  
1300 RNI: Norway Today  
1309 BBC: Twenty-Four Hours (news magazine)  
1313 RA: Smith's Weekly (news features and opinion)  
1330 BBC: Sports Roundup  
1330 RA: Sports Results  
1345 BBC: The Tony Myatt Request Show  
1345 RA: Music of RA  
1400 BBC: News Summary  
1400 RA: International Report  
1400 RNI: Norway Today  
1401 BBC: The Tony Myatt Request Show, continued  
1430 BBC: Trivia Test Match (quiz show)  
1430 RA: Innovations  
1500 BBC: Radio Newsreel  
1525 Radio Japan: DX Corner  
1600 BBC: World News  
1600 RNI: Norway Today  
1609 BBC: News About Britain  
1615 BBC: The Cross and the Crescent (feature on the Crusades)  
1645 BBC: Letter From America  
1700 BBC: World News  
1700 RNI: Norway Today  
1709 BBC: Commentary  
1715 BBC: Five Faces of Jazz  
1745 BBC: Sports Roundup  
1800 BBC: Newsdesk  
1830 BBC: Brain Of Britain 1988 - \*\*\*\* - Immensely entertaining quiz show.  
1900 BBC: News Summary  
1900 RNI: Norway Today  
1901 BBC: Classical Record Review  
2000 BBC: World News  
2000 RNI: Norway Today  
2009 BBC: Twenty-Four Hours (news magazine)  
2030 BBC: Sunday Half-Hour (religious feature)  
2100 BBC: News Summary  
2101 BBC: Short Story  
2115 BBC: The Pleasure's Yours (classical music requests)  
2130 RA: International Top Hits  
2200 BBC: World News  
2200 RNI: Norway Today

# Your Guide to Shortwave Listening in September

2209 BBC: The Third Policeman (reading) [ex 25th]  
 2225 BBC: Book Choice  
 2230 BBC: Financial Review  
 2230 RA: Interaction (exploring Australia)  
 2240 BBC: Reflections (religion)  
 2245 BBC: Sports Roundup  
 2300 BBC: World News  
 2300 RA: World and Australian News  
 2309 BBC: Commentary  
 2313 RA: Music of RA  
 2315 BBC: Letter From America  
 2330 BBC: The Stuarts [ex 25th]  
 2330 RA: Monitor (science)

## Monday

5th, 12th, 19th, 26th

0001 WCSN: News  
 0006 WCSN: News Focus  
 0030 WCSN: News  
 0033 WCSN: Monitor Forum (social commentary and the arts)  
 0045 WCSN: Music Program  
 0101 WCSN: News  
 0106 WCSN: Letterbox  
 0115 WCSN: Kaleidoscope (news features)  
 0130 WCSN: News  
 0135 WCSN: Conversations (discussion)  
 0201 WCSN: News  
 0206 WCSN: News Focus  
 0230 WCSN: News  
 0233 WCSN: Monitor Forum (social commentary and the arts)  
 0245 WCSN: Music Program  
 0301 WCSN: News  
 0306 WCSN: Letterbox  
 0315 WCSN: Kaleidoscope (news features)  
 0330 WCSN: News  
 0335 WCSN: Conversations (discussion)  
 1601 WCSN: News  
 1606 WCSN: News Focus  
 1630 WCSN: News  
 1633 WCSN: Monitor Forum (social commentary and the arts)  
 1645 WCSN: Music Program  
 1701 WCSN: News  
 1706 WCSN: Letterbox  
 1715 WCSN: Kaleidoscope (news features)  
 1730 WCSN: News  
 1735 WCSN: Conversations (discussion)  
 1801 WCSN: News  
 1806 WCSN: News Focus  
 1830 WCSN: News  
 1833 WCSN: Monitor Forum (social commentary and the arts)  
 1845 WCSN: Music Program  
 1901 WCSN: News  
 1906 WCSN: Letterbox  
 1915 WCSN: Kaleidoscope (news features)  
 1930 WCSN: News  
 1935 WCSN: Conversations (discussion)  
 0000 BBC: World News

0000 RA: International Report  
 0009 BBC: News About Britain  
 0015 BBC: Radio Newsreel  
 0030 BBC: Religious Service  
 0030 RA: Music of RA  
 0100 BBC: News Summary  
 0100 RA: World and Australian News  
 0113 RA: Window on Australia  
 0125 RJ: DX Corner  
 0130 RA: This Australia (documentaries)  
 0200 BBC: World News  
 0200 RA: International Report  
 0209 BBC: British Press Review  
 0215 BBC: Peebles' Choice (music)  
 0230 BBC: Science in Action  
 0230 RA: International Country Music  
 0300 BBC: World News  
 0300 RA: World and Australian News  
 0309 BBC: News About Britain  
 0313 RA: Music of RA  
 0315 BBC: Good Books - \*\*\*\* - Detailed opinions on specific books.  
 0325 Radio Japan: DX Corner  
 0330 AFRTS: MonitoRadio (produced by C.S.M.)  
 0330 BBC: Anything Goes  
 0330 BBC: Anything Goes (odd recordings)  
 0330 RA: Sports Results  
 0345 RA: Music of RA  
 0400 BBC: Newsdesk  
 0400 RNI: Norway Today  
 0430 BBC: Where Angels Fear to Tread (reading) [5th, 12th]  
 0445 BBC: Reflections (religion)  
 0450 BBC: Waveguide - \*\* (see Sun 0750)  
 0500 BBC: World News  
 0500 RNI: Norway Today  
 0509 BBC: Twenty-Four Hours (news magazine)  
 0530 BBC: Nature Notebook  
 0545 BBC: Recording Of The Week  
 0600 BBC: Newsdesk  
 0630 BBC: The Stuarts [ex 26th]  
 0700 BBC: World News  
 0709 BBC: Twenty-Four Hours (news magazine)  
 0730 BBC: The Cross and the Crescent (feature on the Crusades)  
 0800 BBC: World News  
 0800 RA: International Report  
 0809 BBC: Reflections (religion)  
 0815 BBC: Where Angels Fear to Tread (reading) [5th, 12th]  
 0825 RA: Stock Exchange Report  
 0827 RA: Propagation Report  
 0830 BBC: Anything Goes (odd recordings)  
 0830 RA: Sports Results  
 0845 RA: Music of RA  
 0900 BBC: World News  
 0900 RA: World and Australian News  
 0909 BBC: British Press Review  
 0913 RA: Music of RA  
 0915 BBC: Good Books - \*\*\*\* (see Mon 0315)

0930 BBC: Financial News  
 0930 RA: Innovations  
 0940 BBC: Sports Roundup  
 0945 BBC: Peebles' Choice (music)  
 1000 BBC: News Summary  
 1000 RA: International Report  
 1001 BBC: The Stuarts [ex 26th]  
 1025 RA: Stock Exchange Report  
 1030 BBC: The Vintage Chart Show  
 1030 RA: Pacific Sunrise (business in the Pacific)  
 1100 BBC: World News  
 1100 RA: World and Australian News  
 1109 BBC: News About Britain  
 1113 RA: Music of RA  
 1115 BBC: Health Matters  
 1130 BBC: The Ken Bruce Show (music mix with entertainment news)  
 1130 RA: Soundabout (contemporary music)  
 1200 BBC: Radio Newsreel  
 1200 RA: International Report  
 1215 BBC: Brain Of Britain 1988 - \*\*\*\*\* (see Sun 1830)  
 1225 RA: Propagation Report  
 1230 RA: Education Issues  
 1245 BBC: Sports Roundup  
 1300 BBC: World News  
 1300 RA: World and Australian News  
 1309 BBC: Twenty-Four Hours (news magazine)  
 1313 RA: Window on Australia  
 1330 BBC: Anything Goes (odd recordings)  
 1330 RA: Sports Results  
 1345 RA: Music of RA  
 1400 BBC: World News  
 1400 RA: International Report  
 1405 BBC: Outlook  
 1425 RA: Stock Exchange Report  
 1430 RA: Music of RA  
 1445 BBC: The Third Policeman (reading) [ex 26th]  
 1500 BBC: Radio Newsreel  
 1515 BBC: The Stuarts [ex 26th]  
 1545 BBC: Classical Music Feature  
 1545 BBC: English Songsmiths  
 1600 BBC: World News  
 1609 BBC: News about Britain  
 1615 BBC: Whither Wisdom?  
 1645 BBC: The World Today (news feature)  
 1700 BBC: World News  
 1709 BBC: Commentary  
 1745 BBC: Sports Roundup  
 1800 BBC: Newsdesk  
 1830 BBC: Multitrack 1: Top 20 - \*\*\*\* - Interesting British pop trends here.  
 1900 BBC: News Summary  
 1901 BBC: Outlook  
 1939 BBC: Stock Market Report  
 1945 BBC: Peebles' Choice (music)  
 2000 BBC: World News  
 2009 BBC: Twenty-Four Hours (news magazine)  
 2030 BBC: Sports International (feature)  
 2100 BBC: News Summary

# Your Guide to Shortwave Listening in September

2101 BBC: Network UK (feature)  
2130 BBC: The Vintage Chart Show  
2130 RA: Soundabout (contemporary music)  
2200 BBC: World News  
2209 BBC: The World Today (news feature)  
2230 BBC: Financial News  
2230 RA: Anything Goes (music)  
2240 BBC: Reflections (religion)  
2245 BBC: Sports Roundup  
2300 BBC: World News  
2300 RA: World and Australian News  
2309 BBC: Commentary  
2313 RA: Window on Australia  
2330 BBC: Multitrack 1: Top 20 - \*\*\*\* (see Mon 1830)  
2330 RA: Arts Roundabout

## Tuesday

6th, 13th, 20th, 27th

0000 BBC: World News  
0000 RA: International Report  
0001 WCSN: News  
0006 WCSN: News Focus  
0009 BBC: News About Britain  
0015 BBC: Radio Newsreel  
0030 BBC: Classical Music Feature  
0030 RA: Music of RA  
0030 WCSN: News  
0033 WCSN: Monitor Forum (social commentary and the arts)  
0045 WCSN: Music Program  
0100 BBC: News Summary  
0100 RA: World and Australian News  
0101 BBC: Outlook  
0101 WCSN: News  
0106 WCSN: Letterbox  
0113 RA: Window on Australia  
0115 WCSN: Kaleidoscope (news features)  
0130 BBC: Short Story  
0130 RA: Education Issues  
0130 WCSN: News  
0135 WCSN: Young Ideas (program for teenagers)  
0200 BBC: World News  
0200 RA: International Report  
0201 WCSN: News  
0206 WCSN: News Focus  
0209 BBC: British Press Review  
0215 BBC: Network UK (feature)  
0230 BBC: Sports International (feature)  
0230 HCJB: DX Party Line (SW radio)  
0230 RA: On Our Selection (magazine)  
0230 WCSN: News  
0233 WCSN: Monitor Forum (social commentary and the arts)  
0245 WCSN: Music Program  
0300 BBC: World News  
0300 RA: World and Australian News  
0301 WCSN: News  
0306 WCSN: Letterbox  
0309 BBC: News About Britain  
0313 RA: Music of RA  
0315 BBC: The World Today (news feature)

0315 WCSN: Kaleidoscope (news features)  
0330 BBC: John Peel (progressive rock music)  
0330 RA: Sports Results  
0330 WCSN: News  
0335 WCSN: Young Ideas (program for teenagers)  
0345 RA: Music of RA  
0400 BBC: Newsdesk  
0401 WCSN: News  
0406 WCSN: News Focus  
0430 WCSN: News  
0433 WCSN: Monitor Forum (social commentary and the arts)  
0445 BBC: Reflections (religion)  
0445 WCSN: Music Program  
0450 BBC: Financial News  
0500 BBC: World News  
0501 WCSN: News  
0506 WCSN: Letterbox  
0509 BBC: Twenty-Four Hours (news magazine)  
0515 WCSN: Kaleidoscope (news features)  
0530 BBC: New Ideas  
0530 WCSN: News  
0535 WCSN: Young Ideas (program for teenagers)  
0540 BBC: Book Choice  
0545 BBC: The World Today (news feature)  
0600 BBC: Newsdesk  
0700 BBC: World News  
0709 BBC: Twenty-Four Hours (news magazine)  
0745 BBC: Network UK (feature)  
0800 BBC: World News  
0800 RA: International Report  
0809 BBC: Reflections (religion)  
0815 BBC: Health Matters  
0827 RA: Propagation Report  
0830 RA: Sports Results  
0845 RA: Music of RA  
0900 BBC: World News  
0900 RA: World and Australian News  
0909 BBC: British Press Review  
0913 RA: Music of RA  
0915 BBC: The World Today (news feature)  
0930 BBC: Financial News  
0930 RA: Country Australia (agriculture)  
0940 BBC: Sports Roundup  
0945 BBC: English Songsmiths  
0945 RA: Music of RA  
1000 BBC: News Summary  
1000 RA: International Report  
1001 BBC: Discovery (science)  
1030 BBC: Sports International (feature)  
1030 RA: Australian Country Style (local country music)  
1100 BBC: World News  
1100 RA: World and Australian News  
1109 BBC: News About Britain  
1113 RA: Music of RA  
1115 BBC: Waveguide - \*\* (see Sun 0750)  
1125 BBC: Book Choice

1130 BBC: Citizens - \*\*\*\* - innovative serial with travails of five fictional Britons.  
1130 RA: Soundabout (contemporary music)  
1200 BBC: Radio Newsreel  
1200 RA: International Report  
1215 BBC: Multitrack 1: Top 20 - \*\*\*\* (see Mon 1830)  
1225 RA: Propagation Report  
1230 RA: Bicentennial Feature  
1245 BBC: Sports Roundup  
1300 BBC: World News  
1300 RA: World and Australian News  
1309 BBC: Twenty-Four Hours (news magazine)  
1313 RA: Window on Australia  
1330 BBC: Network UK (feature)  
1330 RA: Sports Results  
1345 BBC: Recording Of The Week  
1345 RA: Music of RA  
1400 BBC: World News  
1400 RA: International Report  
1405 BBC: Outlook  
1430 RA: Music of RA  
1500 BBC: Radio Newsreel  
1515 BBC: A Jolly Good Show (rock music)  
1600 BBC: World News  
1609 BBC: News About Britain  
1615 BBC: Omnibus (topical feature)  
1645 BBC: The World Today (news feature)  
1700 BBC: World News  
1709 BBC: Commentary  
1715 BBC: Citizens - \*\*\*\* (see Tue 1130)  
1745 BBC: Sports Roundup  
1800 BBC: Newsdesk  
1830 BBC: Development '88  
1900 BBC: News Summary  
1901 BBC: Outlook  
1939 BBC: Stock Market Report  
1945 BBC: Report On Religion - \*\*\*\* - News on modern religion.  
2000 BBC: World News  
2009 BBC: Twenty-Four Hours (news magazine)  
2030 BBC: Meridian (arts feature)  
2100 BBC: News Summary  
2130 BBC: The Cross and the Crescent (feature on the Crusades)  
2130 RA: Soundabout (contemporary music)  
2200 BBC: World News  
2209 BBC: The World Today (news feature)  
2225 BBC: Book Choice  
2230 BBC: Financial News  
2230 RA: Just Out (new music releases)  
2240 BBC: Reflections (religion)  
2245 BBC: Sports Roundup  
2300 BBC: World News  
2300 RA: World and Australian News  
2309 BBC: Commentary  
2313 RA: Window on Australia  
2330 RA: Smith's Weekly (news features and opinion)

# Your Guide to Shortwave Listening in September

2345 RA: Music of RA

## Wednesday

7th, 14th, 21st, 28th

0000 BBC: World News  
0000 RA: International Report  
0009 BBC: News About Britain  
0015 BBC: Radio Newsreel  
0030 BBC: Omnibus (topical feature)  
0030 RA: Music of RA  
0100 BBC: News Summary  
0100 RA: World and Australian News  
0101 BBC: Outlook  
0113 RA: Window on Australia  
0130 BBC: Report On Religion - \*\*\*\*  
(see Tue 1945)  
0130 RA: Bicentennial Feature  
0145 BBC: Country Style - \*\* - British  
country music?  
0200 BBC: World News  
0200 HCJB: Saludos Amigos (letters)  
0200 RA: International Report  
0209 BBC: British Press Review  
0230 BBC: Citizens - \*\*\*\* (see Tue  
1130)  
0230 RA: Anything Goes (music)  
0300 BBC: World News  
0300 RA: World and Australian News  
0309 BBC: News About Britain  
0313 RA: Music of RA  
0315 BBC: The World Today (news  
feature)  
0330 BBC: Discovery (science)  
0330 RA: Sports Results  
0345 RA: Music of RA  
0400 BBC: Newsdesk  
0445 BBC: Reflections (religion)  
0450 BBC: Financial News  
0500 BBC: World News  
0509 BBC: Twenty-Four Hours (news  
magazine)  
0530 BBC: Report On Religion - \*\*\*\*  
(see Tue 1945)  
0545 BBC: The World Today (news  
feature)  
0600 BBC: Newsdesk  
0630 BBC: Meridian (arts feature)  
0700 BBC: World News  
0709 BBC: Twenty-Four Hours (news  
magazine)  
0730 BBC: Development '88  
0800 BBC: World News  
0800 RA: International Report  
0809 BBC: Reflections (religion)  
0815 BBC: Classical Record Review  
0825 RA: Stock Exchange Report  
0827 RA: Propagation Report  
0830 BBC: Brain Of Britain 1988 -  
\*\*\*\*\* (see Sun 1830)  
0830 RA: Sports Results  
0845 RA: Music of RA  
0900 BBC: World News  
0900 RA: World and Australian News  
0909 BBC: British Press Review  
0913 RA: Music of RA  
0915 BBC: The World Today (news  
feature)

0930 BBC: Financial News  
0930 RA: Word of Mouth (oral histories)  
0940 BBC: Sports Roundup  
0945 BBC: Jazz Scene UK [7th, 21st];  
Folk in Britain [14th, 28th]  
0945 RA: Music of RA  
1000 BBC: News Summary  
1000 RA: International Report  
1001 BBC: Omnibus (topical feature)  
1025 RA: Stock Exchange Report  
1030 BBC: Trivia Test Match (quiz  
show)  
1030 RA: At Your Request  
1100 BBC: World News  
1100 RA: World and Australian News  
1109 BBC: News About Britain  
1113 RA: Music of RA  
1130 BBC: Meridian (arts feature)  
1130 RA: Soundabout (contemporary  
music)  
1200 BBC: Radio Newsreel  
1200 RA: International Report  
1215 BBC: Time for Verse  
1225 BBC: The Farming World  
1225 RA: Propagation Report  
1230 RA: Interaction (exploring  
Australia)  
1245 BBC: Sports Roundup  
1300 BBC: World News  
1300 RA: World and Australian News  
1309 BBC: Twenty-Four Hours (news  
magazine)  
1313 RA: Window on Australia  
1330 BBC: Development '88  
1330 RA: Sports Results  
1345 RA: Music of RA  
1400 BBC: World News  
1400 RA: International Report  
1405 BBC: Outlook  
1425 RA: Stock Exchange Report  
1430 RA: Music of RA  
1445 BBC: Report On Religion - \*\*\*\*  
(see Tue 1945)  
1500 BBC: Radio Newsreel  
1600 BBC: World News  
1609 BBC: News About Britain  
1615 BBC: Hitting the High Notes  
1645 BBC: The World Today (news  
feature)  
1700 BBC: World News  
1709 BBC: Commentary  
1715 BBC: Society Today  
1730 BBC: New Ideas  
1740 BBC: Book Choice  
1745 BBC: Sports Roundup  
1800 BBC: Newsdesk  
1830 BBC: Multitrack 2 - \*\*\* - Pop  
music and news.  
1900 BBC: News Summary  
1901 BBC: Outlook  
1939 BBC: Stock Market Report  
1945 BBC: Good Books - \*\*\*\* (see  
Mon 0315)  
2000 BBC: World News  
2009 BBC: Twenty-Four Hours (news  
magazine)  
2030 BBC: Churchill the Historian  
2100 BBC: News Summary

2101 BBC: Network UK (feature)  
2115 BBC: Hitting the High Notes  
2130 RA: Soundabout (contemporary  
music)  
2145 BBC: Recording Of The Week  
2200 BBC: World News  
2209 BBC: The World Today (news  
feature)  
2230 BBC: Financial News  
2230 RA: Australian Country Style (local  
country music)  
2240 BBC: Reflections (religion)  
2245 BBC: Sports Roundup  
2300 BBC: World News  
2300 RA: World and Australian News  
2309 BBC: Commentary  
2313 RA: Window on Australia  
2315 BBC: Write On... (letters)  
2330 BBC: Multitrack 2 - \*\*\* (see Wed  
1830)  
2330 RA: You Asked For It (listeners'  
questions)  
2345 RA: Music of RA

## Thursday

1st, 8th, 15th, 22nd, 29th

0000 BBC: World News  
0000 RA: International Report  
0009 BBC: News About Britain  
0015 BBC: Radio Newsreel  
0030 RA: Music of RA  
0100 BBC: News Summary  
0100 RA: World and Australian News  
0101 BBC: Outlook  
0113 RA: Window on Australia  
0130 BBC: Waveguide - \*\* (see Sun  
0750)  
0130 RA: Interaction (exploring  
Australia)  
0140 BBC: Book Choice  
0145 BBC: Society Today  
0200 BBC: World News  
0200 RA: International Report  
0209 BBC: British Press Review  
0215 BBC: Network UK (feature)  
0230 BBC: Assignment  
0230 HCJB: Ham Radio Today  
0230 RA: Music of RA  
0300 BBC: The Cross and the Crescent  
(feature on the Crusades)  
0300 BBC: World News  
0300 RA: World and Australian News  
0309 BBC: News About Britain  
0313 RA: Music of RA  
0315 BBC: The World Today (news  
feature)  
0330 RA: Sports Results  
0345 RA: Music of RA  
0400 BBC: Newsdesk  
0430 BBC: Classical Record Review  
0445 BBC: Reflections (religion)  
0450 BBC: Financial News  
0500 BBC: World News  
0509 BBC: Twenty-Four Hours (news  
magazine)  
0530 BBC: Peebles' Choice (music)

# Your Guide to Shortwave Listening in September

- 0545 BBC: The World Today (news feature)  
 0600 BBC: Newsdesk  
 0630 BBC: Time for Verse  
 0640 BBC: The Farming World  
 0700 BBC: World News  
 0709 BBC: Twenty-Four Hours (news magazine)  
 0745 BBC: Network UK (feature)  
 0800 BBC: World News  
 0800 RA: International Report  
 0809 BBC: Reflections (religion)  
 0815 BBC: Country Style - \*\* (see Wed 0145)  
 0825 RA: Stock Exchange Report  
 0827 RA: Propagation Report  
 0830 BBC: John Peel (progressive rock music)  
 0830 RA: Sports Results  
 0845 RA: Music of RA  
 0900 BBC: World News  
 0900 RA: World and Australian News  
 0909 BBC: British Press Review  
 0913 RA: Music of RA  
 0915 BBC: The World Today (news feature)  
 0930 BBC: Financial News  
 0930 RA: Matters of Faith (religion in the Pacific)  
 0940 BBC: Sports Roundup  
 0945 BBC: Society Today  
 0945 RA: Music of RA  
 1000 BBC: News Summary  
 1000 RA: International Report  
 1001 BBC: Churchill the Historian  
 1025 RA: Stock Exchange Report  
 1030 RA: Music of RA  
 1100 BBC: World News  
 1100 RA: World and Australian News  
 1109 BBC: News About Britain  
 1113 RA: Music of RA  
 1115 BBC: New Ideas  
 1125 BBC: Book Choice  
 1130 BBC: Citizens - \*\*\*\* (see Tue 1130)  
 1130 RA: Soundabout (contemporary music)  
 1200 BBC: Radio Newsreel  
 1200 RA: International Report  
 1215 BBC: Multitrack 2 - \*\*\* (see Wed 1830)  
 1225 RA: Propagation Report  
 1230 RA: Business Horizons  
 1245 BBC: Sports Roundup  
 1245 RA: Music of RA  
 1300 BBC: World News  
 1300 RA: World and Australian News  
 1309 BBC: Twenty-Four Hours (news magazine)  
 1313 RA: Window on Australia  
 1330 BBC: Network UK (feature)  
 1330 RA: Sports Results  
 1345 BBC: Jazz Scene UK [8th, 22nd]; Folk in Britain [1st, 15th, 29th]  
 1345 RA: Music of RA  
 1400 BBC: World News  
 1400 RA: International Report  
 1405 BBC: Outlook  
 1425 RA: Stock Exchange Report  
 1430 RA: Music of RA  
 1445 BBC: Write On... (letters)  
 1500 BBC: Radio Newsreel  
 1515 BBC: The Pleasure's Yours (classical music requests)  
 1600 BBC: World News  
 1609 BBC: News About Britain  
 1615 BBC: Assignment  
 1645 BBC: The World Today (news feature)  
 1700 BBC: World News  
 1709 BBC: Commentary  
 1715 BBC: Citizens - \*\*\*\* (see Tue 1130)  
 1745 BBC: Sports Roundup  
 1800 BBC: Newsdesk  
 1830 BBC: Discovery (science)  
 1900 BBC: News Summary  
 1901 BBC: Outlook  
 1945 BBC: Here's Humph!  
 2000 BBC: World News  
 2009 BBC: Twenty-Four Hours (news magazine)  
 2030 BBC: Meridian  
 2100 BBC: News Summary  
 2101 BBC: Talking From... (Northern Ireland, Scotland, Wales)  
 2115 BBC: A Jolly Good Show (rock music)  
 2130 RA: Soundabout (contemporary music)  
 2200 BBC: World News  
 2209 BBC: The World Today (news feature)  
 2225 BBC: Book Choice  
 2230 BBC: Financial News  
 2230 RA: International Country Music  
 2240 BBC: Reflections (religion)  
 2245 BBC: Sports Roundup  
 2300 BBC: World News  
 2300 RA: World and Australian News  
 2309 BBC: Commentary  
 2313 RA: Window on Australia  
 2315 BBC: Seven Seas  
 2330 BBC: Time for Verse  
 2330 RA: Book Readings  
 2340 BBC: The Farming World  
 2345 RA: Boomerang (letters)
- Friday**  
**2nd, 9th, 16th, 23rd, 30th**
- 0000 BBC: World News  
 0000 RA: International Report  
 0009 BBC: News About Britain  
 0015 BBC: Radio Newsreel  
 0030 BBC: Music Now (modern classical music)  
 0030 RA: Music of RA  
 0100 BBC: News Summary  
 0100 RA: World and Australian News  
 0101 BBC: Outlook  
 0113 RA: Window on Australia  
 0130 BBC: Jazz Scene UK [9th, 23rd]; Folk in Britain [2nd, 16th, 30th]  
 0130 RA: Monitor (science)  
 0145 BBC: Talking From... (Northern Ireland, Scotland, Wales)  
 0200 BBC: World News  
 0200 RA: International Report  
 0209 BBC: British Press Review  
 0215 BBC: Health Matters  
 0230 BBC: Citizens - \*\*\*\* (see Tue 1130)  
 0230 HCJB: Musical Mailbag  
 0230 RA: Music of RA  
 0300 BBC: World News  
 0300 RA: World and Australian News  
 0309 BBC: News About Britain  
 0313 RA: Music of RA  
 0315 BBC: The World Today (news feature)  
 0330 BBC: The Vintage Chart Show  
 0330 RA: Sports Results  
 0345 RA: Music of RA  
 0400 BBC: Newsdesk  
 0430 BBC: Country Style - \*\* (see Wed 0145)  
 0445 BBC: Reflections (religion)  
 0450 BBC: Financial News  
 0500 BBC: World News  
 0509 BBC: Twenty-Four Hours (news magazine)  
 0545 BBC: The World Today (news feature)  
 0600 BBC: Newsdesk  
 0630 BBC: Meridian (arts feature)  
 0700 BBC: World News  
 0709 BBC: Twenty-Four Hours (news magazine)  
 0730 BBC: Write On... (letters)  
 0745 BBC: Seven Seas  
 0800 BBC: World News  
 0800 RA: International Report  
 0809 BBC: Reflections (religion)  
 0825 RA: Stock Exchange Report  
 0827 RA: Propagation Report  
 0830 BBC: Music Now (modern classical music)  
 0830 RA: Sports Results  
 0845 RA: Music of RA  
 0900 BBC: World News  
 0900 RA: World and Australian News  
 0909 BBC: British Press Review  
 0913 RA: Music of RA  
 0915 BBC: The World Today (news feature)  
 0930 BBC: Financial News  
 0930 RA: Smith's Weekly (news features and opinion)  
 0940 BBC: Sports Roundup  
 0945 RA: Music of RA  
 1000 BBC: News Summary  
 1000 RA: International Report  
 1015 BBC: Seven Seas  
 1025 RA: Stock Exchange Report  
 1030 BBC: Five Faces of Jazz  
 1030 RA: Just Out (new music releases)  
 1100 BBC: World News  
 1100 RA: World and Australian News  
 1109 BBC: News About Britain  
 1113 RA: Music of RA  
 1115 BBC: Talking From... (Northern Ireland, Scotland, Wales)

# Your Guide to Shortwave Listening in September

- 1130 BBC: Meridian (arts feature)  
 1130 RA: International Top Hits  
 1200 BBC: Radio Newsreel  
 1200 RA: International Report  
 1215 BBC: Europe's World  
 1225 RA: Propagation Report  
 1230 BBC: Business Matters  
 1230 RA: Music Special  
 1245 BBC: Sports Roundup  
 1300 BBC: World News  
 1300 RA: World and Australian News  
 1309 BBC: Twenty-Four Hours (news magazine)  
 1313 RA: Window on Australia  
 1330 BBC: John Peel (progressive rock music)  
 1330 RA: Sports Results  
 1345 RA: Music of RA  
 1400 BBC: World News  
 1400 RA: International Report  
 1405 BBC: Outlook  
 1425 RA: Stock Exchange Report  
 1430 RA: Music of RA  
 1445 BBC: Nature Notebook  
 1500 BBC: Radio Newsreel  
 1600 BBC: World News  
 1609 BBC: News About Britain  
 1615 BBC: Science In Action  
 1645 BBC: The World Today (news feature)  
 1700 BBC: World News  
 1709 BBC: Commentary  
 1715 BBC: Music Now (modern classical music)  
 1745 BBC: Sports Roundup  
 1800 BBC: Newsdesk  
 1830 BBC: Multitrack 3 - \*\*\*\* - Sarah Ward presents innovative rock music.  
 1900 BBC: News Summary  
 1901 BBC: Outlook  
 1939 BBC: Stock Market Report  
 1945 BBC: Personal View  
 2000 BBC: World News  
 2009 BBC: Twenty-Four Hours (news magazine)  
 2030 BBC: Science In Action  
 2100 BBC: News Summary  
 2101 BBC: Network UK (feature)  
 2115 BBC: Europe's World  
 2130 BBC: Business Matters  
 2130 RA: International Top Hits  
 2145 BBC: Where Angels Fear to Tread (reading) [ex 23rd, 30th]  
 2200 BBC: World News  
 2209 BBC: The World Today (news feature)  
 2230 BBC: Financial News  
 2230 RA: At Your Request  
 2240 BBC: Reflections (religion)  
 2245 BBC: Sports Roundup  
 2300 BBC: World News  
 2300 RA: World and Australian News  
 2309 BBC: Commentary  
 2313 RA: Window on Australia  
 2315 BBC: From The Weeklies (press review)
- 2330 BBC: Multitrack 3 - \*\*\*\* (see Fri 1830)  
 2330 RA: Bicentennial Feature
- ## Saturday
- 3rd, 10th, 17th, 24th**
- 0000 BBC: World News  
 0000 RA: International Report  
 0009 BBC: News About Britain  
 0015 BBC: Radio Newsreel  
 0030 BBC: Personal View  
 0030 RA: Just Out (new music releases)  
 0045 BBC: Recording of the Week  
 0100 BBC: News Summary  
 0100 RA: World and Australian News  
 0101 BBC: Outlook  
 0113 RA: Book Readings  
 0130 RA: Australian Country Style (local country music)  
 0145 BBC: Nature Notebook  
 0200 BBC: World News  
 0200 RA: International Report  
 0209 BBC: British Press Review  
 0215 BBC: Network UK (feature)  
 0230 BBC: Feature  
 0230 RA: Bicentennial Feature  
 0300 BBC: World News  
 0300 RA: World and Australian News  
 0309 BBC: News About Britain  
 0313 RA: You Asked For It (listeners' questions)  
 0315 BBC: The World Today (news feature)  
 0330 BBC: Europe's World  
 0330 RA: Music of RA  
 0345 BBC: Business Matters  
 0400 BBC: Newsdesk  
 0430 BBC: Here's Humph!  
 0445 BBC: Reflections (religion)  
 0450 BBC: Financial News  
 0500 BBC: World News  
 0509 BBC: Twenty-Four Hours (news magazine)  
 0530 BBC: Personal View  
 0545 BBC: The World Today (news feature)  
 0600 BBC: Newsdesk  
 0630 BBC: Meridian (arts feature)  
 0700 BBC: World News  
 0709 BBC: Twenty-Four Hours (news magazine)  
 0730 BBC: From The Weeklies (press review)  
 0745 BBC: Network UK (feature)  
 0800 BBC: World News  
 0800 RA: International Report  
 0809 BBC: Reflections (religion)  
 0815 BBC: A Jolly Good Show (rock music)  
 0827 RA: Propagation Report  
 0830 RA: Sports Results  
 0845 RA: Music of RA  
 0900 BBC: World News  
 0900 RA: World and Australian News  
 0909 BBC: British Press Review  
 0913 RA: Boomerang (letters)
- 0915 BBC: The World Today (news feature)  
 0930 BBC: Financial News  
 0930 RA: Bicentennial Feature  
 0940 BBC: Sports Roundup  
 0945 BBC: Personal View  
 1000 BBC: News Summary  
 1000 RA: International Report  
 1001 BBC: Here's Humph!  
 1015 BBC: Letter From America  
 1030 BBC: Feature  
 1030 RA: Interaction (exploring Australia)  
 1100 BBC: World News  
 1100 RA: World and Australian News  
 1109 BBC: News About Britain  
 1113 RA: Music of RA  
 1130 BBC: Meridian (arts feature)  
 1130 RA: Soundabout (contemporary music)  
 1200 BBC: Radio Newsreel  
 1200 RA: International Report  
 1215 BBC: Multitrack 3 - \*\*\*\* (see Fri 1830)  
 1225 RA: Propagation Report  
 1230 RA: International Country Music  
 1245 BBC: Sports Roundup  
 1300 BBC: World News  
 1300 RA: World and Australian News  
 1309 BBC: Twenty-Four Hours (news magazine)  
 1313 RA: You Asked For It (listeners' questions)  
 1330 BBC: Network UK (feature)  
 1330 RA: Sports Results  
 1345 BBC: Sportsworld  
 1345 RA: Book Readings  
 1400 BBC: News Summary  
 1400 RA: International Report  
 1401 BBC: Sportsworld  
 1430 RA: Boomerang (letters)  
 1445 RA: Music of RA  
 1500 BBC: Radio Newsreel  
 1515 BBC: Sportsworld  
 1600 BBC: World News  
 1609 BBC: News About Britain  
 1615 BBC: Sportsworld  
 1700 BBC: World News  
 1709 BBC: Words  
 1715 BBC: The Ken Bruce Show (music mix with entertainment news)  
 1745 BBC: Sports Roundup  
 1800 BBC: Newsdesk  
 1900 BBC: News Summary  
 1930 BBC: Feature  
 2000 BBC: World News  
 2009 BBC: Twenty-Four Hours (news magazine)  
 2030 BBC: Meridian (arts feature)  
 2100 BBC: News Summary  
 2101 BBC: Whither Wisdom?  
 2130 RA: Soundabout (contemporary music)  
 2200 BBC: World News  
 2209 BBC: From Our Own Correspondent - \*\*\*\* (see Sun 0315)  
 2225 BBC: Nature Notebook  
 2230 RA: Music Special

# frequency SECTION

## MT Monitoring Team

### EAST COAST:

**Greg Jordan,**  
Frequency Manager

*1855-I Franciscan Terrace  
Winston-Salem, NC 27127*

**Joe Hanlon, PA**

### WEST COAST:

**Bill Brinkley, CA**

**Dave Kammler, CA**

0000 UTC [8:00 PM EDT/5:00 PM PDT]

0000-0015	Voice of Kampuchea, Phnom-Penh	9693	11938				
0000-0030	BBC, London, England	5975	6005	6175	7325		
		9515	9580	9590	9915		
		12095	11955				
0000-0030	Kol Israel, Jerusalem	9435	11605	12080			
0000-0030	Radio Berlin Int'l, East Germany	6080	9730				
0000-0030	Radio Korea, Seoul, South Korea	15575					
0000-0030	M Radio Norway Int'l, Oslo	9620	11840				
0000-0030	S,M WINB, Red Lion, Pennsylvania	15145					
0000-0050	Radio Pyongyang, North Korea	15115	15160				
0000-0055	Radio Beijing, PR China	9770	11715	15455			
0000-0100	(US) Armed Forces Radio and TV	6030	11790	15345			
0000-0100	All India Radio, New Delhi	6055	7215	9535	9910		
		11715	11745	15110			
0000-0100	CBC Northern Quebec Service	6195	9625				
0000-0100	CBN, St. John's, Newfoundland	6160					
0000-0100	CBU, Vancouver, British Columbia	6160					
0000-0100	CFCF, Montreal, Quebec	6005					
0000-0100	CFCN, Calgary, Alberta	6030					
0000-0100	CHNS, Halifax, Nova Scotia	6130					
0000-0100	CKWX, Vancouver, British Columbia	6080					
0000-0100	CFRB, Toronto, Ontario	6070					
0000-0100	FEBC, Manila, Philippines	15445					
0000-0100	(US) Far East Network, Tokyo	3910					
0000-0100	KSDA, Guam	15125					
0000-0100	T-A KVOH, Rancho Simi, California	17775					
0000-0100	KYOI, Saipan	15405					
0000-0100	Radio Australia, Melbourne	15140	15160	15240	15320		
		15395	17750	17795			
0000-0100	Radio Baghdad, Iraq	11775	11810				
0000-0100	S,M Radio Canada Int'l, Montreal	5960	9755				
0000-0100	Radio Havana Cuba	9655					
0000-0100	Radio Luxembourg	6090					
0000-0100	Radio Moscow, USSR	9530	9600	9610	9700		
		9765	9865	11710	11750		
		11780	12060	13605	15245		

0000-0100	Radio Moscow World Service	15405	15425				
		17570	17635	17675	17685		
		17740	17850	17860			
		15150	17705				
0000-0100	Radio New Zealand, Wellington	7375v					
0000-0100	Radio for Peace, Costa Rica	9655	11905				
0000-0100	Radio Thailand, Bangkok	5010	5052	11940			
0000-0100	SBC Radio One, Singapore	9630	11880				
0000-0100	Spanish Foreign Radio, Madrid	15580					
0000-0100	T-S Superpower KUSW, Utah	5995	6130	7170	7200		
0000-0100	Voice of America, Washington	7280	9455	9775	9815		
		11580	11695	11740	15205		
0000-0100	T-A Voice of Nicaragua, Managua	6100					
0000-0100	WCSN, Boston, Massachusetts	9850					
0000-0100	WHRI, Noblesville, Indiana	7400	9495				
0000-0100	WRNO New Orleans, Louisiana	7355					
0000-0100	WYFR, Oakland, California	5950	6085	9680			
0000-0100	T-A WYFR Satellite Net, California	9505					
0030-0045	BBC, London, England*	6195	7235	9570	11820		
		15435					
0030-0100	BBC, London, England	5975	6005	6175	6195		
		7135	7325	9515	9915		
		9590	11955	12095	15435		
		9720	11775	11910	15155		
0030-0100	HCJB, Quito, Ecuador	9875					
0030-0100	Radio Austria Int'l, Vienna	6110	9520	9835	9883		
0030-0100	Radio Budapest, Hungary	11910	15160				
0030-0100	SLBC, Colombo, Sri Lanka	6005	9720				
0030-0100	WINB, Red Lion, Pennsylvania	15145					
0035-0040	All India Radio, New Delhi	3925	4860				

## 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.

- \* [ML] after a frequency indicates a multi-lingual transmission containing English-language programs.
- \* 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. [ML] after a frequency indicates a multi-lingual transmission containing English-language programs.
- \* v after a frequency indicates that it varies
- \* Notations of USB and LSB (upper and lower sideband transmissions) usually refer only to the individual frequency after which they appear.
- \* Listings followed by an asterisk (\*) are for English lessons and do not contain regularly scheduled programming.

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.

## HOW TO USE THE PROPAGATION CHARTS

Propagation charts can be an invaluable aid to the DXer in determining which frequencies are likely to be open at a given time. To use the propagation charts, choose those for your location (the are divided into east coast, midwest and west coast of North America). Then look for the one most closely describing the geographic location of the station you want to hear.

Once you've located the correct charts, look along the horizontal axis of the graph for the time that you are listening. The top line of the graph shows the Maximum Useable Frequency [MUF] and the lower line the Lowest Useable Frequency [LUF] as indicated on the vertical axis of the graph.

While there are exceptions to every rule (especially those regarding shortwave listening), you should find the charts helpful in determining the best times to listen for particular regions of the world. Good luck!

# frequency SECTION

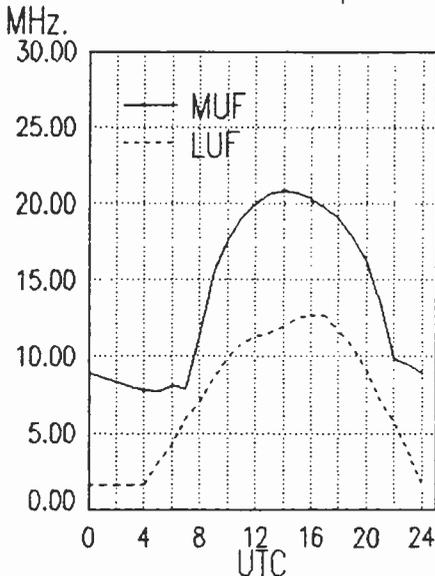
0045-0100 A Radio New Zealand, Wellington 15150 17705  
 0050-0100 Vatican Radio, Vatican City 6150 9605 11780

**0100 UTC [9:00 PM EDT/6:00 PM PDT]**

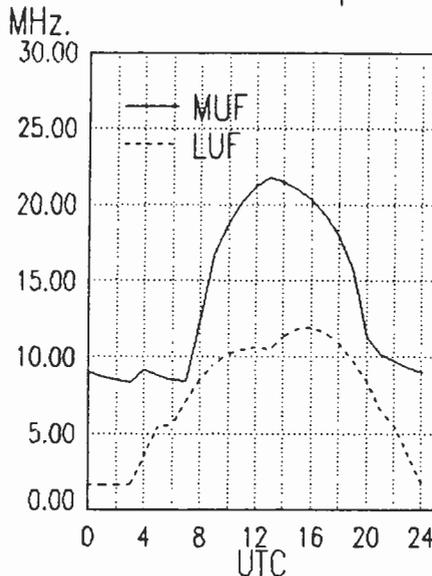
0100-0103 S Port Moresby, Papua New Guinea 3295 4890 5960 5985  
 6020 6040 6080 6140  
 9520  
 0100-0110 Vatican Radio, Vatican City 6150 9605 11780  
 0100-0115 All India Radio, New Delhi 6055 7215 9535 9910  
 11715 11745 15110  
 0100-0120 RAI, Rome, Italy 9575 11800  
 0100-0125 Kol Israel, Jerusalem 9435 11605 12080  
 0100-0130 W,A Radio Budapest, Hungary 6110 9520 9585 9835  
 9883 11910 15160  
 0100-0130 Radio Japan, Tokyo 15280 17810 17835 17845  
 0100-0130 Laotian National Radio 7113v  
 0100-0145 Radio Berlin Int'l, E. Germany 6080 9730  
 0100-0150 Deutsche Welle, West Germany 6040 6085 6145 9565  
 9735 11865  
 0100-0150 Radio Baghdad, Iraq 11775 11810  
 0100-0155 Radio Austria Int'l, Vienna 9875  
 0100-0200 (US) Armed Forces Radio and TV 6030 11790 15345  
 0100-0200 BBC, London, England 5975 6005 6175 7325  
 9515 9590 9915  
 0100-0200 CBC Northern Quebec Service 6195 9625  
 0100-0200 CBN, St. John's, Newfoundland 6160  
 0100-0200 CBU, Vancouver, British Columbia 6160  
 0100-0200 CFCF, Montreal, Quebec 6005  
 0100-0200 CFCN, Calgary, Alberta 6030  
 0100-0200 CHNS, Halifax, Nova Scotia 6130  
 0100-0200 CKWX, Vancouver, British Columbia 6080  
 0100-0200 CFRB, Toronto, Ontario 6070  
 0100-0200 (US) Far East Network, Tokyo 3910  
 0100-0200 FEBC, Manila, Philippines 15445  
 0100-0200 HCJB, Quito, Ecuador 9720 11775 11910 15155  
 0100-0200 T-A KVOH, Rancho Simi, California 17775  
 0100-0200 KYOI, Salpan 15405

0100-0200 Radio Australia, Melbourne 15160 15180 15240 15320  
 15395 17715 17795  
 17750  
 0100-0200 Radio Canada Int'l, Montreal 9535 9755 11845 11940  
 0100-0200 Radio Havana Cuba 9655  
 0100-0200 Radio Japan, Tokyo 5960 11815 17810  
 0100-0200 Radio Luxembourg 6090  
 0100-0200 Radio Moscow, USSR 9530 9600 9610 9700  
 9765 9865 11710 11750  
 12060 13605 15405 15245  
 15425 15455  
 0100-0200 Radio Moscow World Service 17570 17675 17685 17740  
 17850 17860 17880  
 12045 15150  
 0100-0200 Radio New Zealand, Wellington  
 0100-0200 Radio for Peace, Costa Rica 7375v  
 0100-0200 Radio Prague, Czechoslovakia 5930 6055 7345 9540  
 9630 9740 11990  
 0100-0200 Radio Thailand, Bangkok 9655 11905  
 0100-0200 SBC Radio One, Singapore 5010 5052 11940  
 0100-0200 SLBC, Colombo, Sri Lanka 6005 9720 15425  
 0100-0200 Spanish Foreign Radio, Madrid 9630 11880  
 0100-0200 T-S Superpower KUSW, Utah 11695  
 0100-0200 Voice of America, Washington 5995 6125 6130 7170  
 7200 7280 9455 9575  
 9775 9815 11580 11740  
 11900 15160 15205 17735  
 9680 11790  
 0100-0200 Voice of Indonesia, Jakarta 9850  
 0100-0200 WCSN, Boston, Massachusetts 15145  
 0100-0200 WINB, Red Lion, Pennsylvania 7400 9495  
 0100-0200 WHRI, Noblesville, Indiana 7355  
 0100-0200 WRNO, New Orleans, Louisiana 5950 9680 15170  
 0100-0200 WYFR, Oakland, California 9505  
 0100-0200 T-S WYFR Satellite Net, California 7430 9420 11645  
 0130-0140 T-S Voice of Greece, Athens 9520 9835 9883 11910  
 0130-0145 TWFS Radio Budapest, Hungary 15160  
 0130-0155 S Radio Austria Int'l, Vienna 9875  
 0130-0200 Radio Veritas Asia, Philippines 15330 15365  
 0145-0200 Radio Berlin Int'l, E. Germany 6080 9620 9730 11785  
 0145-0200 Radio Korea, Seoul, South Korea 7275 15375

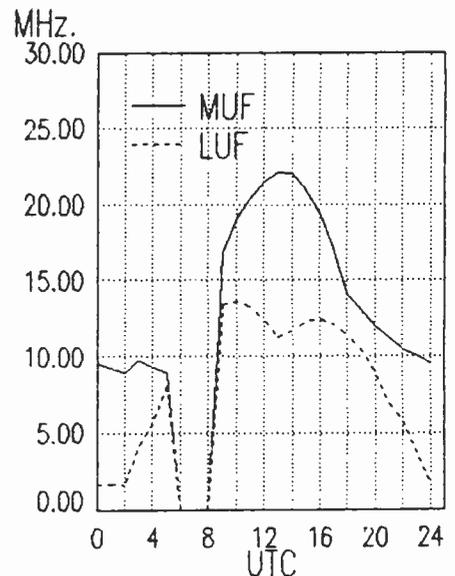
East Coast To  
Western Europe



East Coast To  
Eastern Europe



East Coast To  
Middle East



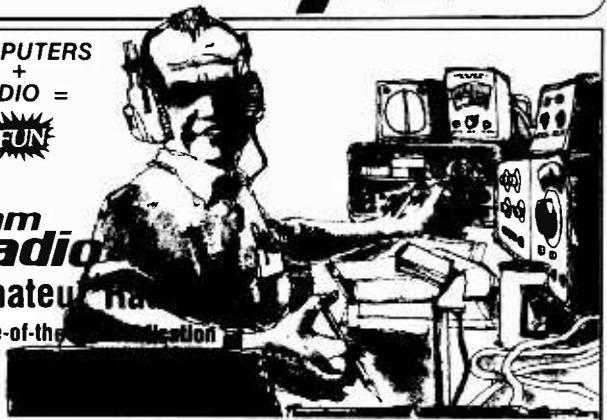
# frequency SECTION

0200 UTC [10:00 PM EDT/7:00 PM PDT]

0200-0215	Vatican Radio, Vatican City	7125	9650		
0200-0230	BBC, London, England	5975	6005	6175	7325
		9410	9515	9590	9915
0200-0230	Burma Bcating Service, Rangoon	7185			
0200-0230	S Radio Austria Int'l, Vienna	9875			
0200-0230	Radio Berlin Int'l, E. Germany	6080	9620	9730	11785
0200-0230	Radio Kiev, Ukrainian SSR	9640	9800	11790	13645
		15180	15455		
0200-0230	Swiss Radio Int'l, Berne	6135	9725	9885	12035
		17730			
0200-0230	WINB, Red Lion, Pennsylvania	15145			
0200-0250	Deutsche Welle, West Germany	6035	7285	9690	11945
0200-0250	Radio Bras, Brasilia, Brazil	11745v			
0200-0255	Radio Bucharest, Romania	5990	6155	9510	9570
		11830	11940		
0200-0255	RAE, Buenos Aires, Argentina	9690	11710		
0200-0300	(US) Armed Forces Radio and TV	6030	11790	15345	
0200-0300	CBC Northern Quebec Service	6195	9625		
0200-0300	CBN, St. John's, Newfoundland	6160			
0200-0300	CBU, Vancouver, British Colombia	6160			
0200-0300	CFCF, Montreal, Quebec	6005			
0200-0300	CFCN, Calgary, Alberta	6030			
0200-0300	CFRB, Toronto, Ontario	6070			
0200-0300	CHNS, Halifax, Nova Scotia	6130			
0200-0300	CKWX, Vancouver, British Colombia	6080			
0200-0300	(US) Far East Network, Tokyo	3910			
0200-0300	HCJB, Quito, Ecuador	9720	11775	15155	
0200-0300	T-A KVOH, Rancho Simi, California	17775			
0200-0300	KSDA, Guam	17865			
0200-0300	Radio Australia, Melbourne	15180	15240	15320	17715
		17750	17795		
0200-0300	Radio Cairo, Egypt	9475	9675		
0200-0300	Radio Havana Cuba	6140	9655		
0200-0300	Radio Korea (South), Seoul	7275	15575		
0200-0300	Radio Luxembourg	6090			
0200-0300	Radio Moscow, USSR	9530	9600	9610	9765

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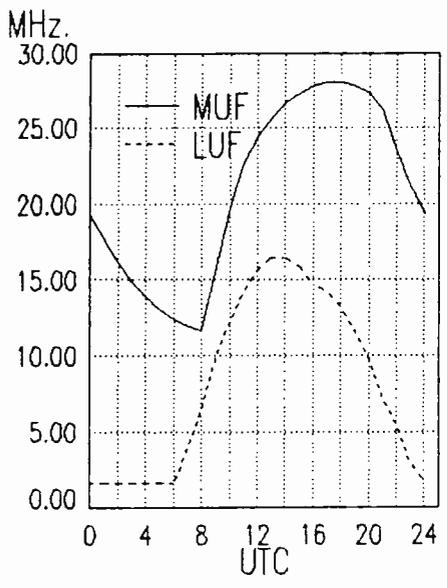
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Address \_\_\_\_\_

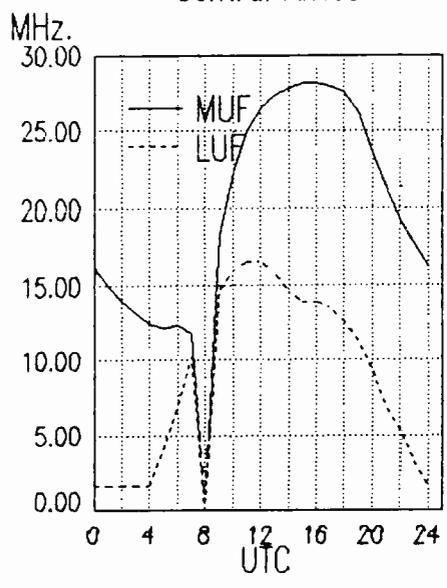
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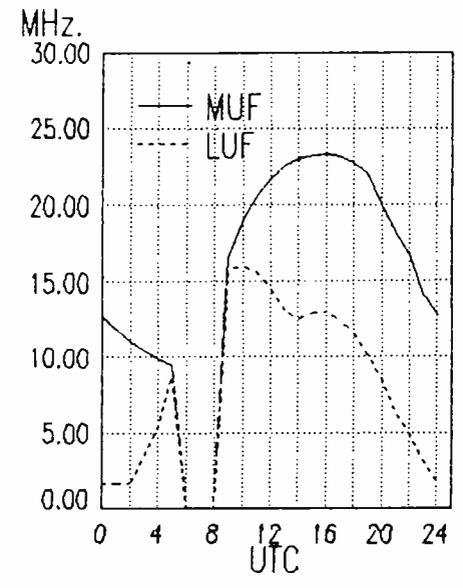
East Coast To  
West Africa



East Coast To  
Central Africa



East Coast To  
East Africa







# frequency SECTION

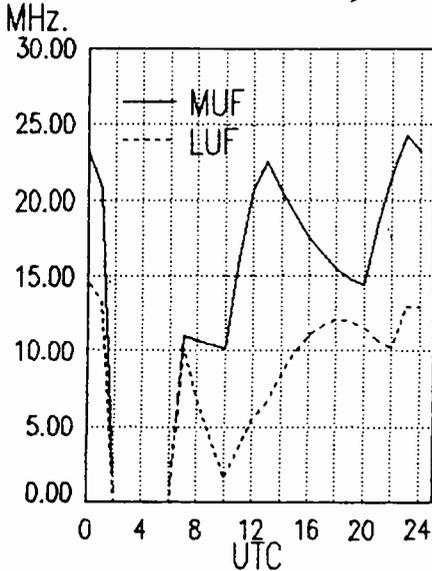
0400-0430	Trans World Radio, Bonaire	9535			
0400-0450	Radio Pyongyang, North Korea	15160	15180		
0400-0455	Radio Beijing, PR China	9645	11980		
0400-0455	RAE, Buenos Aires, Argentina	9690	11710		
0400-0500	(US) Armed Forces Radio and TV	6030	11730	11790	
0400-0500	CBC Northern Quebec Service	6195	9625		
0400-0500	CBN, St. John's, Newfoundland	6160			
0400-0500	CBU, Vancouver, British Columbia	6160			
0400-0500	CFCF, Montreal, Quebec	6005			
0400-0500	CFCN, Calgary, Alberta	6030			
0400-0500	CHNS, Halifax, Nova Scotia	6130			
0400-0500	CKWX, Vancouver, British Columbia	6080			
0400-0500	CFRB, Toronto, Ontario	6070			
0400-0500	(US) Far East Network, Tokyo	3910			
0400-0500	FEBC, Manila, Philippines	11850			
0400-0500	HCJB, Quito, Ecuador	9720	11775	15155	
0400-0500	KYOI, Saipan	17780			
0400-0500	Radio Australia, Melbourne	11910	11945	15160	15240
		15320	17795		
0400-0500	Radio for Peace, Costa Rica	13660			
0400-0500	Radio Havana Cuba	5965	6035	6140	9655
		9770			
0400-0500	Radio Moscow, USSR	9530	9600	9610	9635
		9640	9765	12050	13605
		13645	13665	15180	15320
		15405	15425	15445	15585
		17570	17600	17685	17735
		17850	17860	17880	
0400-0500	Radio New Zealand, Wellington	12045	15150		
0400-0500	SBC Radio One, Singapore	5010	5052	11940	
0400-0500 S	Superpower KUSW, Utah	9815			
0400-0500	Voice of America, Washington	5995	6035	7170	7200
		7280	9525	9575	11835
		11925	15205		
0400-0500	Voice of Kenya, Nairobi	6045			
0400-0500	WCSN, Boston, Massachusetts	9870			
0400-0500	WINB, Red Lion, Pennsylvania	15145			
0400-0500	WHRI, Noblesville, Indiana	7365	7400		
0400-0500 M-A	WMLK, Bethel, Pennsylvania	9455			
0400-0500	WRNO, New Orleans, Louisiana	6185			

0400-0500	WYFR, Okeechobee, Florida	5950	9520		
0425-0440	RAI, Rome, Italy	5980	7275		
0430-0455	Radio Austria Int'l, Vienna	6155	9875	15410	
0430-0500	BBC, London, England	3955	5975	5898	6005
		6195	7120	7185	7210
		9410	9510	9580	9750
		11945	12095	15070	
0430-0500	Deutsche Welle, West Germany	7150	7225	9565	9765
		11765			
0430-0500	Radio Finland, Helsinki	6120	9670	11715	15185
0430-0500	Radio Tirana, Albania	9480	11835		
0430-0500 S,M	Trans World Radio, Bonaire	9535			
0430-0500	Trans World Radio, Swaziland	3205	7205		
0430-0500	Voice of Nigeria, Lagos	7255			

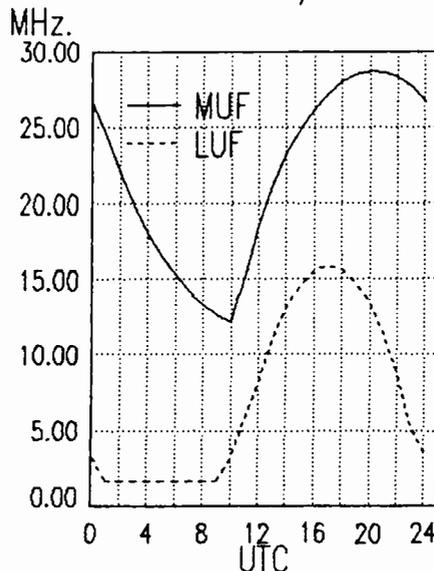
## 0500 UTC [1:00 AM EDT/10:00 PM PDT]

0500-0510	CBC Northern Quebec Service	6195	9625		
0500-0510	Radio Lesotho, Maseru	4800			
0500-0510 M-A	Radio Zambia, Lusaka	3345	6165		
0500-0515	Deutsche Welle, West Germany	7150	7225	9565	9765
		11765			
0500-0515	GBC, Accra, Ghana	4915			
0500-0515	Vatican Radio, Vatican City	9645	11725	15190	
0500-0530 M	Radio Norway Int'l, Oslo	11735	15310		
0500-0530 S,M	Trans World Radio, Bonaire	9535			
0500-0530	Trans World Radio, Swaziland	3205	5055	7210	
0500-0550	Deutsche Welle, West Germany	6045	6120	9635	9700
0500-0555	Radio Beijing, China	9690			
0500-0600	(US) Armed Forces Radio and TV	6030	11730	11790	
0500-0600	BBC, London, England	5898	7105	7160	7185
		9410	9510	9580	12095
		6195	9625		
0500-0600	CBC Northern Quebec Service	6195	9625		
0500-0600	CBU, Vancouver, British Columbia	6160			
0500-0600	CFCF, Montreal, Quebec	6005			
0500-0600	CFCN, Calgary, Alberta	6030			
0500-0600	CHNS, Halifax, Nova Scotia	6130			
0500-0600	CKWX, Vancouver, British Columbia	6080			

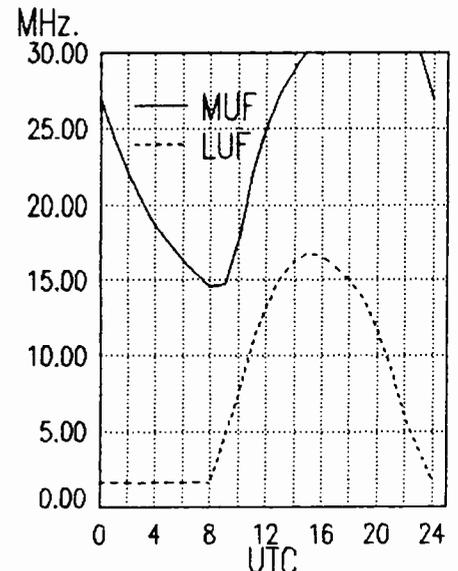
East Coast To  
Australia & Malaysia



East Coast To  
Central America/Caribbean



East Coast To  
South America



# frequency SECTION

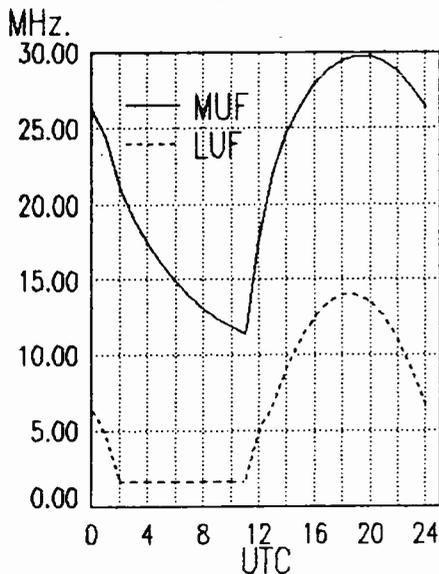
0500-0600	CFRB, Toronto, Ontario	6070
0500-0600	(US) Far East Network, Tokyo	3910
0500-0600	FEBC, Manila, Philippines	11850
0500-0600	HCJB, Quito, Ecuador	6230 9720 11775
0500-0600	Radio Australia, Melbourne	11910 15160 15240 15395
		17715 17750, 17795
0500-0600	Radio for Peace, Cost Rica	13660
0500-0600	Radio Havana Cuba	5965 6035 9655 9770
0500-0600	Radio Japan, Tokyo	11870 17810
0500-0600	Radio Kuwait	15345
0500-0600	Radio Moscow, USSR	9765 9865
0500-0600	Radio New Zealand, Wellington	12045 15150
0500-0600	Radio Thailand, Bangkok	9655 11905
0500-0600	S Radio Zambia, Lusaka	11880
0500-0600	SBC Radio One, Singapore	5010 5052 11940
0500-0600	Spanish Foreign Radio, Madrid	9630
0500-0600	S Superpower KUSW, Utah	6155
0500-0600	S Swaziland Commercial Radio	6155 9705
0500-0600	Voice of America, Washington	5995 7170 7280 9575
0500-0600	Voice of Kenya, Nairobi	6045
0500-0600	Voice of Nicaragua, Managua	6100
0500-0600	Voice of Nigeria, Lagos	7255 15120 15185
0500-0600	WCSN, Boston, Massachusetts	9870
0500-0600	WHRI, Noblesville, Indiana	7365 7400
0500-0600	M-A WMLK, Bethel, Pennsylvania	9455
0500-0600	WRNO, New Orleans, Louisiana	6185
0500-0600	WYFR, Oakland, California	9705 11580
0500-0600	T-S WYFR Satellite Net, California	9520
0510-0520	Radio Botswana, Gaborone	3356 4820 7255
0515-0530	M-F Radio Canada Int'l, Montreal	15245
0530-0545	BBC, London, England*	3990 6050 6140 7210
		9750
0530-0555	Radio Bucharest, Romania	9640 11840 11940 15340
		15380 17720
0530-0600	Radio Netherland, Hilversum	6165 9715
0530-0600	Radio Tirana, Albania	7300
0530-0600	Trans World Radio, Swaziland	5055 7210
0530-0600	UAE Radio, United Arab Emirates	15435 17775 21700
0545-0600	Radio Berlin Int'l, East Germany	15240 17880 21540 21645
0545-0600	M-F Radio Canada Intl, Montreal	15245

0555-0600	Ghana Broadcasting Corp., Accra	4915
0555-0600	Voice of Malaysia, Kuala Lumpur	6175 9750 15295

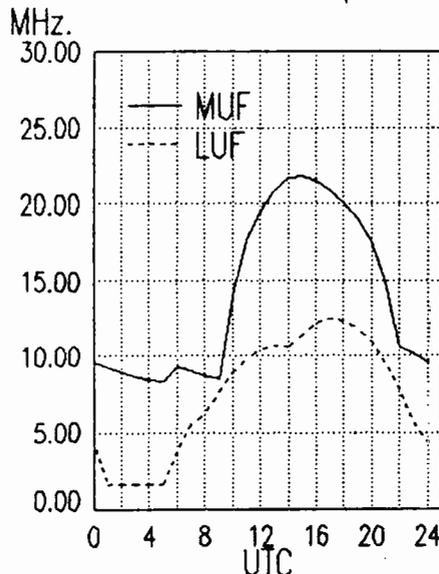
## 0600 UTC [2:00 AM EDT/11:00 PM PDT]

0600-0615	Radio Ghana, Accra	3366 4915
0600-0615	M-A Radio Zambia, Lusaka	6165 7235
0600-0620	Vatican Radio, Vatican City	6185 9645
0600-0625	Radio Netherlands, Hilversum	6165 9715
0600-0630	Laotian National Radio	7113
0600-0630	Radio Australia, Melbourne	11910 11945 15160 15240
		15315 15395 15425 17715
		17750
		17795
0600-0630	Radio Berlin Int'l, East Germany	17880
0600-0630	Trans World Radio, Swaziland	6070
0600-0630	Voice of Kenya, Nairobi	6045
0600-0645	HCJB, Quito, Ecuador	6230 9720 11775
0600-0645	Radio Berlin Int'l, East Germany	5965 11810
0600-0645	S Radio Cameroon, Yaounde	4850
0600-0650	Radio Pyongyang, North Korea	9530 15160 15180
0600-0700	(US) Armed Forces Radio and TV	6030 11730 11790
0600-0700	BBC, London, England	5975 9600 9640 12095
		15280
0600-0700	CBC Northern Quebec Service	6195
0600-0700	CBU, Vancouver, British Columbia	6160
0600-0700	CFCF, Montreal, Quebec	6005
0600-0700	CFCN, Calgary, Alberta	6030
0600-0700	CHNS, Halifax, Nova Scotia	6130
0600-0700	CKWX, Vancouver, British Columbia	6080
0600-0700	CFRB, Toronto, Ontario	6070
0600-0700	(US) Far East Network, Tokyo	3910
0600-0700	F FEBA, Mahe, Seychelles	17855
0600-0700	King of Hope, South Lebanon	6215
0600-0700	KYOI, Saipan	17780
0600-0700	Radio Havana Cuba	9525
0600-0700	Radio Korea, Seoul, South Korea	6060 7275 9570
0600-0700	Radio Kuwait	15345

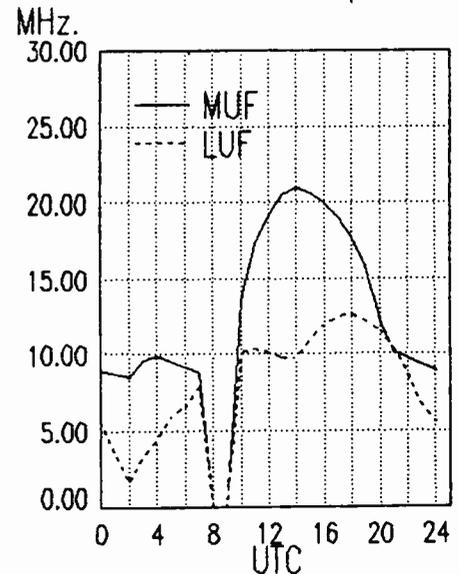
East Coast To  
West Coast



Midwest To  
Western Europe



Midwest To  
Eastern Europe





# frequency SECTION

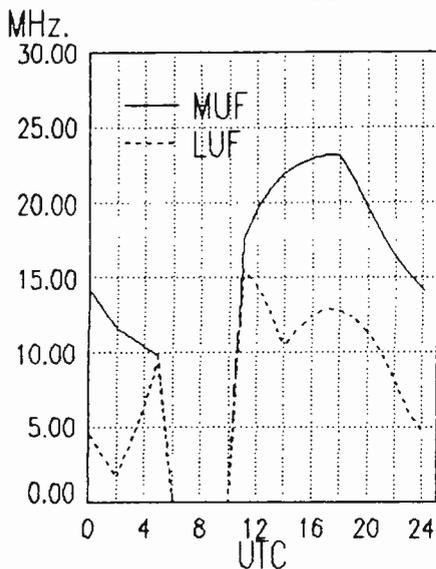
0700-0800	CKWX, Vancouver, British Columbia	6080			
0700-0800	CFRB, Toronto, Ontario	6070			
0700-0800	ELWA, Monrovia, Liberia	11830			
0700-0800	(US) Far East Network, Tokyo	3910			
0700-0800	HCJB, Quito, Ecuador	6130	9610	9745	11835
		11925			
0700-0800	King of Hope, South Lebanon	6215			
0700-0800	KYOI, Saipan	17780			
0700-0800	Radio Ghana, Accra	6130			
0700-0800	Radio Havana Cuba	9525			
0700-0800	Radio Japan, Tokyo	5990	15195	15235	17810
		21695			
0700-0800	Radio Kuwait	15345			
0700-0800	Radio Moscow, USSR	17685	17850	17880	
0700-0800 A,S	Radio Thailand, Bangkok	9655	11905		
0700-0800	SBC-1, Singapore	11940			
0700-0800	Soloman Islands Broadcasting Corp	9545			
0700-0800 S	Superpower KUSW, Utah	6135			
0700-0800	Trans World Radio, Swaziland	6070	9725		
0700-0800	Voice of Free China, Taiwan	5985			
0700-0800 A,S	Voice of Kenya, Nairobi	7270			
0700-0800	Voice of Malaysia, Kuala Lumpur	6175	9750	15295	
0700-0800	Voice of Nigeria, Lagos	15120	15185		
0700-0800	WCSN, Boston, Massachusetts	9495			
0700-0800	WHRI, Noblesville, Indiana	9620			
0700-0800	WYFR, Oakland, California	6065	7365	9620	11580
0715-0800 A,S	Radio Berlin Int'l, East Germany	6040	7185	9730	21465
		21540			
0715-0730 M-A	Vatican Radio, Vatican City	11725	15190		
0715-0735 S	FEBA, Mahe, Seychelles	15115	17785		
0720-0730 M-A	Vatican Radio, Vatican City	6248	9645	11740	
0725-0800	Trans World Radio, Monte Carlo	7105			
0730-0800	ABC, Alice Springs, Australia	2310	[ML]		
0730-0800	ABC, Katherine, Australia	2485			
0730-0800	ABC, Tennant Creek, Australia	2325	[ML]		
0730-0800	Radio Australia, Melbourne	9655	11720		
0730-0735	All India Radio, New Delhi	5990	6010	6020	7110
		7205	9610	9675	11850
		11935	15235	15250	17705
		3975	6010	7230	9915
0730-0745	BBC, London, England*				

0730-0755	Radio Finland, Helsinki	6120	9560	11755	
0730-0800	BBC, London, England	9600	9640	11955	15360
0730-0800	Radio Netherland, Hilversum	9630	9715		
0730-0800	Radio Prague, Czechoslovakia	11685	17840	21705	
0730-0800	Radio Sofia, Bulgaria	9700	11720		
0730-0800	Swiss Radio Int'l, Berne	3985	6165	9535	
0740-0750 W	Radio Free Europe, Munich*	5985	7115	9695	9725
		11895	15355		
0745-0800	Radio Prague, Czechoslovakia	6055	7345	9505	

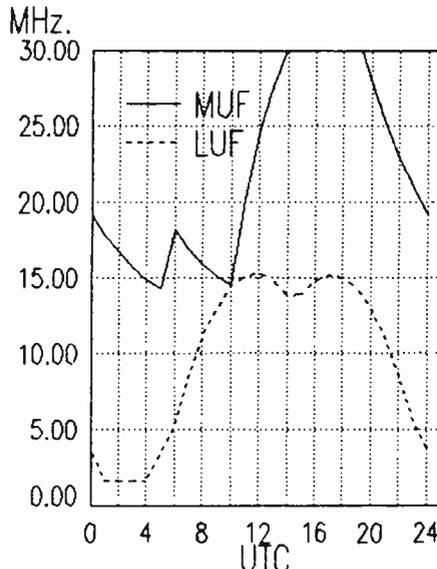
## 0800 UTC [4:00 AM EDT/1:00 AM PDT]

0800-0805 M-F	Port Moresby, Papua New Guinea	3925	4890	5960	5985
		6020	6040	6080	6140
		9520			
0800-0805	Soloman Islands Broadcasting Corp	9545			
0800-0815 M-A	Radio Zambia, Lusaka	6165	7235		
0800-0825 M-F	BRT, Brussels, Belgium	11695	15510		
0800-0825	Radio Netherland, Hilversum	9630	9715		
0800-0825	Voice of Malaysia, Kuala Lumpur	6175	9750	15295	
0800-0830	HCJB, Quito, Ecuador	6130	9610	9745	11835
		11925			
0800-0830	Radio Bangladesh, Dhaka	12030	15525		
0800-0830	Radio Tirana, Albania	9500	11835		
0800-0830	Voice of Islam, Pakistan	15525	17870		
0800-0835 S	FEBA, Mahe, Seychelles	15325	17785		
0800-0835	Trans World Radio, Swaziland	6070	9725		
0800-0850	Radio Pyongyang, North Korea	9530	11830	15160	15180
0800-0900	ABC, Alice Springs, Australia	2310	[ML]		
0800-0900	ABC, Katherine, Australia	2485			
0800-0900	ABC, Tennant Creek, Australia	2325	[ML]		
0800-0900	BBC, London, England	9410	9640	11860	12095
		15070	15360	15400	
0800-0900	CBN, St. John's, Newfoundland	6160			
0800-0900	CBU, Vancouver, British Columbia	6160			
0800-0900	CFCF, Montreal, Quebec	6005			
0800-0900	CFCN, Calgary, Alberta	6030			
0800-0900	CHNS, Halifax, Nova Scotia	6130			

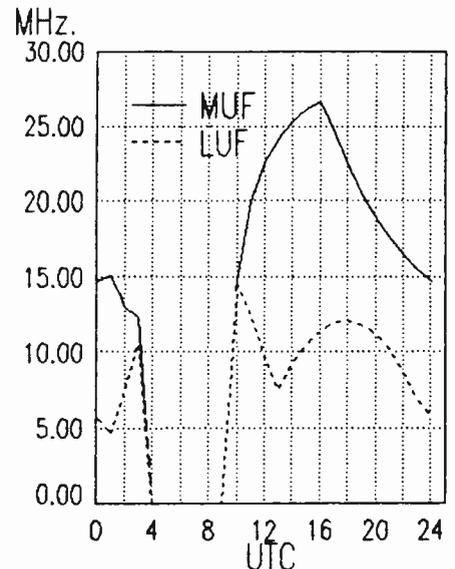
Midwest To  
East Africa



Midwest To  
South Africa



Midwest To  
Indian Ocean



# frequency SECTION

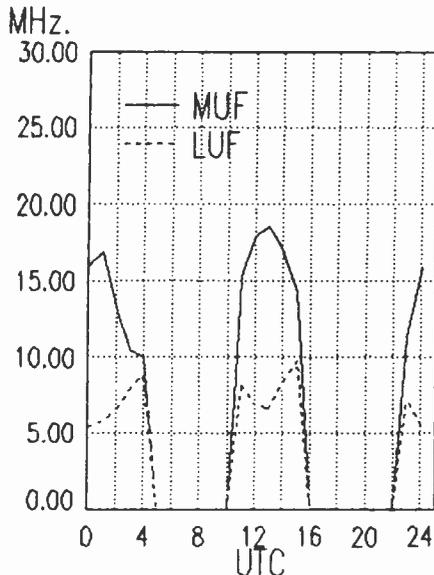
0800-0900	CKWX, Vancouver, British Columbia	6080			
0800-0900	CFRB, Toronto, Ontario	6070			
0800-0900	(US) Far East Network, Tokyo	3910			
0800-0900	King of Hope, South Lebanon	6215			
0800-0900	KNLS, Anchor Point, Alaska	6150			
0800-0900	KTWR, Guam	11805			
0800-0900	KYOI, Saipan	11900			
0800-0900	Radio Australia, Melbourne	5995	6080	9580	9655
		9710	11720		
0800-0900	Radio Korea, Seoul, South Korea	7550			
0800-0900	Radio Moscow, USSR	12055	15295		
0800-0900	SBC Radio One, Singapore	5010	5052	11940	
0800-0900	S Superpower KUSW, Utah	6135			
0800-0900	Trans World Radio, Monte Carlo	7105			
0800-0900	Voice of Indonesia, Jakarta	11790	15105		
0800-0900	A,S Voice of Kenya, Nairobi	7270			
0800-0900	Voice of Nigeria, Lagos	7255	15185		
0800-0900	WHRI, Noblesville, Indiana	7355	9510		
0800-0900	WYFR, Oakland, California	11580	15495		
0815-0830	S Radio Austria Int'l, Vienna	6155	11915	15410	15415
		17870			
0815-0830	Radio Korea, Seoul, South Korea	9570			
0815-0845	M-F Voice of America, Washington DC	7175	9575	9750	11710
		11915	15600	17715	21500
		[ML]			
0830-0840	All India Radio, New Delhi	5960	5990	6010	6020
		6050	6065	6100	6140
		7110	7140	7160	7250
		7280	7295	9610	11850
		15235	15250	17705	
0830-0855	Radio Austria Int'l, Vienna	6155	11915	15410	15415
0830-0855	M-A Radio Netherland, Hilversum	9630			
0830-0900	S Bhutan Bcsting Service, Thimpu	6035			
0830-0900	FEBC, Manila, Philippines	11850	15350		
0830-0900	HCJB, Quito, Ecuador	6130	9745	11925	
0830-0900	Radio Beijing, China	9700	11755	15440	
0830-0900	Radio Finland, Helsinki	15245	17795		
0830-0900	Radio Netherland, Hilversum	9630	21486		
0830-0900	Radio Prague, Czechoslovakia	11685	17840	21705	

0830-0900	Swiss Radio Int'l, Berne	9560	9885	13685	17830
		21695			
0830-0900	Voice of Nigeria, Lagos	15120			
0840-0850	M-A Voice of Greece, Athens	9855	15630		
0845-0900	Radio Berlin Int'l, East Germany	21540			
0845-0900	Radio Prague, Czechoslovakia	6055	7345	9505	
0850-0900	All India Radio, New Delhi	5960	5990	6010	6020
		6050	6065	6100	6140
		7110	7140	7150	7160
		7250	7280	7295	9610
		11850	15235	15250	17705

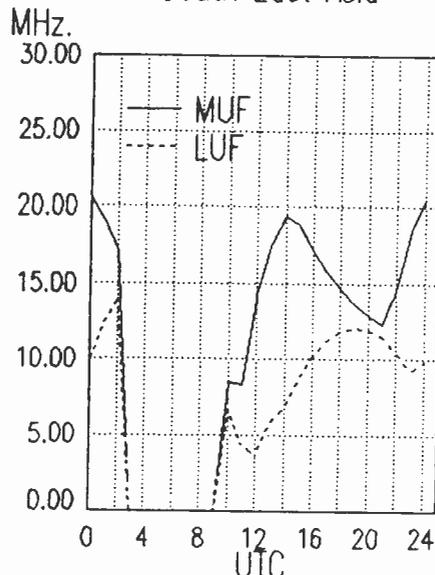
## 0900 UTC [5:00 AM EDT/2:00 AM PDT]

0900-0905	Africa No. 1, Gabon	7200	15200		
0900-0910	All India Radio, New Delhi	5960	5990	6010	6020
		6050	6065	6100	6140
		7110	7140	7150	7160
		7250	7280	7295	9610
		11850	15235	15250	17705
0900-0910	Port Moresby, Papua New Guinea	3295	4890	5960	5985
		6020	6040	6080	6140
		9520			
0900-0910	Voice of Lebanon, Beirut	6548			
0900-0930	FEBC, Manila, Philippines	11850	15350		
0900-0930	KTWR, Agana, Guam	11805			
0900-0930	Nippon Broadcasting Corp.	3925			
0900-0930	Radio Beijing, China	9700	11755	15440	
0900-0930	Radio Netherland, Hilversum	21485			
0900-0930	A,S Radio Prague, Czechoslovakia	11685	17840	21705	
0900-0945	Radio Berlin Int'l, East Germany	9665	21465	21540	
0900-0950	Deutsche Welle, West Germany	9720	15510	17780	21650
		21680			
0900-1000	ABC, Alice Springs, Australia	2310	[ML]		
0900-1000	ABC, Katherine, Australia	2485			
0900-1000	ABC, Tennant Creek, Australia	2325	[ML]		
0900-1000	S Adventist World Radio, Portugal	9670			
0900-1000	(US) Armed Forces Radio and TV	6030	9530	9565	

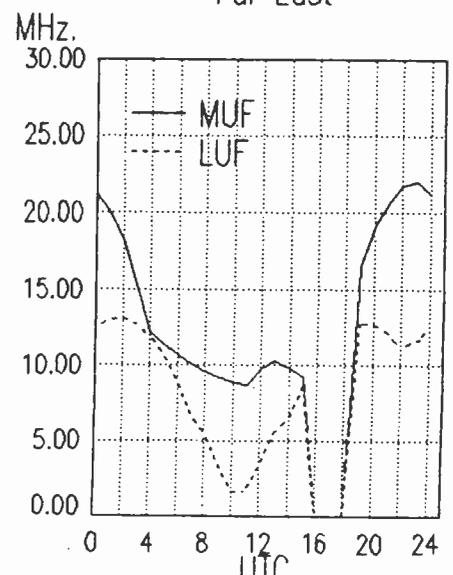
Midwest To  
Central Asia



Midwest To  
South East Asia



Midwest To  
Far East



# frequency SECTION

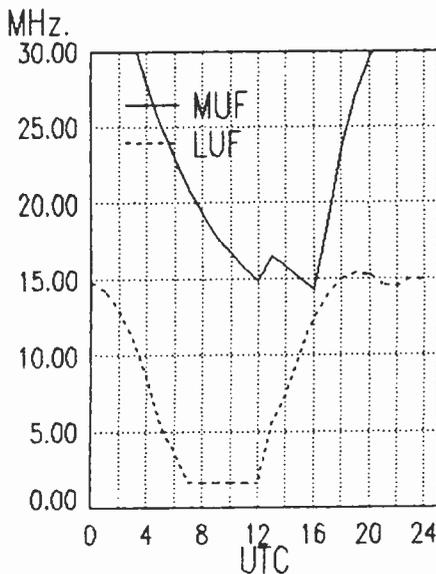
0900-1000	BBC, London, England	9740	11750	11860	11955
		12095	15070	15400	15360
		17790	18080		
0900-1000	CFCF, Montreal, Quebec	6005			
0900-1000	CFCN, Calgary, Alberta	6030			
0900-1000	CHNS, Halifax, Nova Scotia	6130			
0900-1000	CKWX, Vancouver, British Columbia	6080			
0900-1000	CFRB, Toronto, Ontario	6070			
0900-1000	(US) Far East Network, Tokyo	3910			
0900-1000	HCJB, Quito, Ecuador	6130	9745	11925	
0900-1000	King of Hope, South Lebanon	6215			
0900-1000	KNLS, Anchorage, Alaska	6150			
0900-1000	KYOI, Saipan	11900			
0900-1000	S Superpower KUSW, Utah	6135			
0900-1000	Radio Afghanistan, Kabul	4450	6085	15435	17720
0900-1000	Radio Australia, Melbourne	5995	6080	9580	9655
		9710	9760	11720	15415
		11885			
0900-1000	Radio Japan, Tokyo	12010	12055	15135	
0900-1000	Radio Moscow, USSR	6055	7345	9505 [ML]	
0900-1000	S Radio Prague, Czechoslovakia	7165			
0900-1000	Radio Tanzania, Dar es Salaam	5010	5052	11940	
0900-1000	SBC Radio One, Singapore	7105			
0900-1000	Trans World Radio, Monte Carlo	7270			
0900-1000	Voice of Kenya, Nairobi	7255	15120	15185	
0900-1000	Voice of Nigeria, Lagos	7355	9510		
0900-1000	WHRI, Noblesville, Indiana	9615	12015		
0915-0950	M-A Radio Ulan Bator, Mongolia	5960	5990	6010	6020
0930-0935	All India Radio, New Delhi	6050	6065	6100	6140
		7110	7140	7160	7250
		7280	7295	9610	11850
		15235	15250	17705	
0930-0940	M-F Radio Canada Int'l, Montreal	5960	9755		
0930-0945	BBC, London, England*	9725	11955		
0930-1000	CBN, St. John's, Newfoundland	6160			
0930-1000	KTWR, Guam	11805			
0930-1000	Radio Beijing, China	9700	11755	15440	
0930-1000	Radio Sweden Int'l, Stockholm	15390			
0945-1000	BBC, London, England*	5995	7180	9725	11955
0945-1000	S Radio Budapest, Hungary	9585	9835	11910	15160

0945-1000 M-A Radio Prague, Czechoslovakia 6055 7345 9505

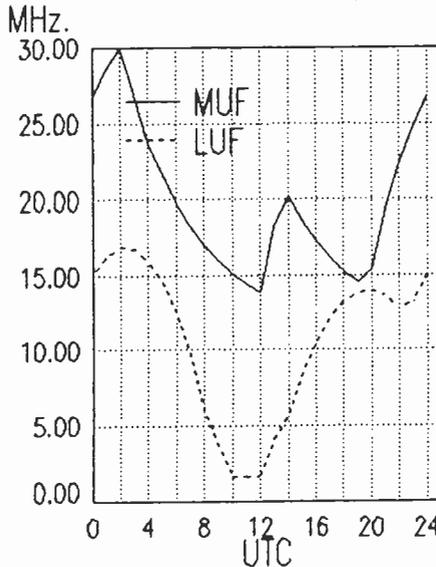
## 1000 UTC [6:00 AM EDT/3:00 AM PDT]

1000-1030	Deutsche Welle, West Germany	9735	11785	17765	21600
1000-1030	HCJB, Quito, Ecuador	6130	9745	11925	
1000-1030	Kol Israel, Jerusalem	9385	11700	15485	15640
		15650	17635	17685	21625
1000-1030	Radio Afghanistan, Kabul	4450	6085	15435	17720
1000-1030	Radio Beijing, China	9700	11755	15440	
1000-1030	S Radio Norway Int'l, Oslo	21705			
1000-1030	Radio Tanzania, Dar es Salaam	7165			
1000-1030	Swiss Radio Int'l, Berne	9560	9885	13685	17830
		21695			
1000-1030	Voice of Ethiopia, Addis Ababa	9560			
1000-1030	Voice of Vietnam, Hanoi	12020	15010		
1000-1055	A Trans World Radio, Monte Carlo	7105			
1000-1100	ABC, Alice Springs, Australia	2310 [ML]			
1000-1100	ABC, Katherine, Australia	2485			
1000-1100	ABC, Tennant Creek, Australia	2325 [ML]			
1000-1100	(US) Armed Forces Radio and TV	6030	9530	9700	
1000-1100	All India Radio, New Delhi	11860	11915	15130	15335
		17387	11785		
1000-1100	BBC, London, England	9740	9750	11750	17790
		12095	15070	15400	18080
1000-1100	CBN, St. John's, Newfoundland	6160			
1000-1100	CFCF, Montreal, Quebec	6005			
1000-1100	CFCN, Calgary, Alberta	6030			
1000-1100	CHNS, Halifax, Nova Scotia	6130			
1000-1100	CKWX, Vancouver, British Columbia	6080			
1000-1100	CFRB, Toronto, Ontario	6070			
1000-1100	(US) Far East Network, Tokyo	3910			
1000-1100	KTWR, Agana, Guam	11805			
1000-1100	KYOI, Saipan	11900			
1000-1100	Radio Afghanistan, Kabul	15435	17720		
1000-1100	Radio Australia, Melbourne	9580	9655	9770	15415
1000-1100	Radio Moscow, USSR	9600	12055	13680	15135
		15150	15225		

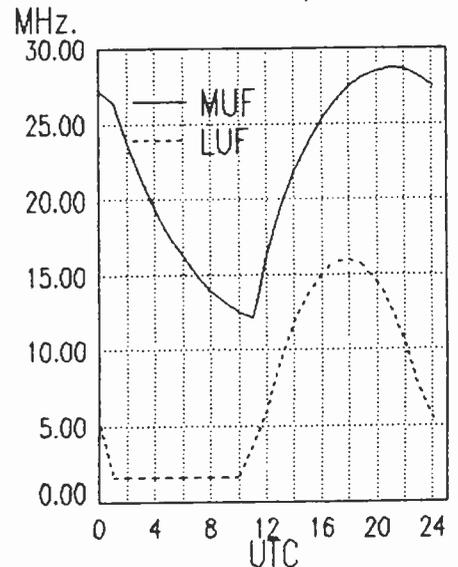
Midwest To Pacific



Midwest To Australia & Malaysia



Midwest To Central America/Caribbean



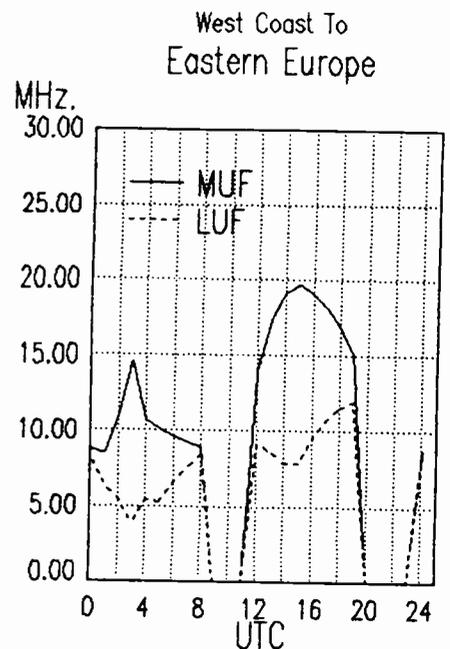
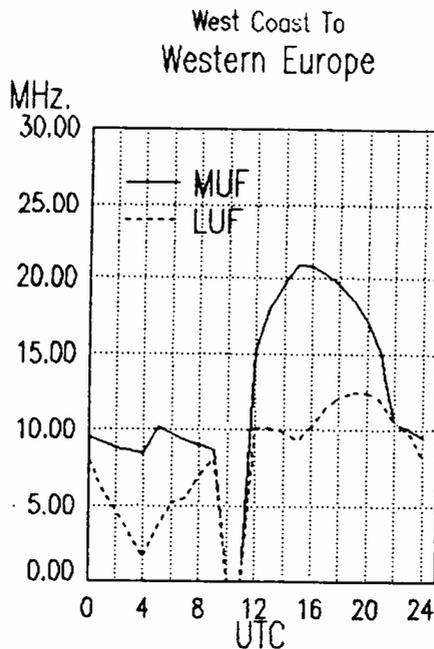
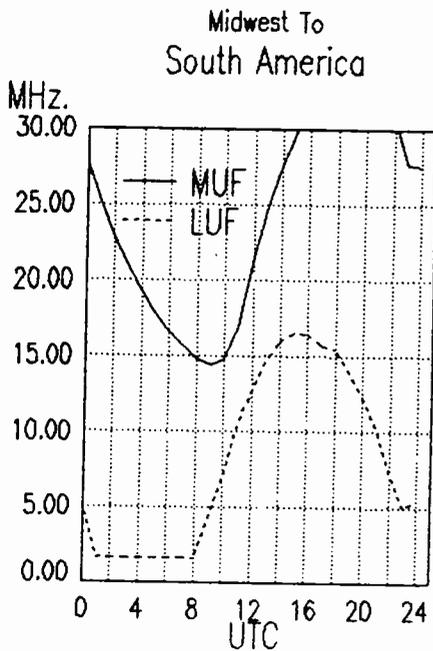
# frequency SECTION

1000-1100	Radio New Zealand, Wellington	6100	9540		
1000-1100	S Radio Prague, Czechoslovakia	6055	7345	9505	[ML]
1000-1100	SBC Radio One, Singapore	5010	5052	11940	
1000-1100	Superpower KUSW, Utah	6135			
1000-1100	Voice of America, Washington	5975	5985	9590	
1000-1100	Voice of Kenya, Nairobi	7270			
1000-1100	Voice of Nigeria, Lagos	7255	15120		
1000-1100	WHRI, Noblesville, Indiana	7355	9510		
1000-1100	WYFR, Oakland, California	5950			
1005-1010	Radio Pakistan, Islamabad	15606	17660		
1015-1030	Radio Korea, Seoul, South Korea	11740			
1030-1040	Voice of Asia, Taiwan	5980			
1030-1100	HCJB, Quito, Ecuador	6130	11925		
1030-1045	A Radio Budapest, Hungary	7220	9835	11910	15220
1030-1100	Radio Netherlands, Hilversum	6020	9675		
1030-1100	A,S Radio Tanzania, Dar es Salaam	7165			
1030-1100	SLBC, Colombo, Sri Lanka	11835	15120	17850	[ML]
1030-1100	UAE Radio, United Arab Emirates	15435	17865	21605	
1040-1050	H Radio Free Europe, Munich*	5985	7115	9695	9725
		11895	15355		
1040-1050	M-A Voice of Greece, Athens	11645	15630		
1045-1100	M-A Radio Prague, Czechoslovakia	6055	7345	9505	
1055-1100	S Trans World Radio, Monte Carlo	7105			

1100-1130	Radio Japan, Tokyo	5990	6120	7210	17810
1100-1130	Radio Mozambique, Maputo	9525	11818	11835	
1100-1130	Radio Sweden Int'l, Stockholm	6065	9630	21690	
1100-1130	SLBC, Colombo, Sri Lanka	11835	15120	17850	[ML]
1100-1130	Swiss Radio Int'l, Berne	13685	15570	17830	
1100-1130	Voice of Vietnam, Hanoi	7430	9732		
1100-1150	Radio Pyongyang, North Korea	6576	9600	11735	
1100-1155	Radio Beijing, China	15455			
1100-1200	ABC, Alice Springs, Australia	2310			[ML]
1100-1200	ABC, Katherine, Australia	2485			
1100-1200	ABC, Perth, Australia	9680			
1100-1200	ABC, Tennant Creek, Australia	2325			[ML]
1100-1200	(US) Armed Forces Radio and TV	6030	9700		
1100-1200	BBC, London, England	5965	6195	9510	9740
		11750	11775	12095	15400
		17790	18080		
1100-1200	CBN, St. John's, Newfoundland	6160			
1100-1200	CFCF, Montreal, Quebec	6005			
1100-1200	CFCN, Calgary, Alberta	6030			
1100-1200	CHNS, Halifax, Nova Scotia	6130			
1100-1200	CKWX, Vancouver, British Columbia	6080			
1100-1200	CFRB, Toronto, Ontario	6070			
1100-1200	(US) Far East Network, Tokyo	3910			
1100-1200	KYOI, Saipan	11900			
1100-1200	Radio Australia, Melbourne	5995	6080	7215	9580
		9645	9710	9770	11800
1100-1200	Radio Korea, Seoul, South Korea	15575			
1100-1200	Radio Moscow, USSR	9600	9795	12055	13680
		15135	15225	15475	
1100-1200	Radio RSA, South Africa	21590			
1100-1200	A,S Radio Tanzania, Dar es Salaam	7165			
1100-1200	S Radio Zambia, Lusaka	11880			[IRR]
1100-1200	S Superpower KUSW, Utah	9850			
1100-1200	Voice of America, Washington	5975	5985	6110	9590
		9760	11715	15160	15425
1100-1200	Voice of Asia, Taiwan	5980	7445		
1100-1200	Voice of Kenya, Nairobi	7270			
1100-1200	Voice of Nigeria, Lagos	7255	15120		
1100-1200	WHRI, Noblesville, Indiana	5995	11790		
1100-1200	WYFR, Oakland, California	5950	7355	9680	

## 1100 UTC [7:00 AM EDT/4:00 AM PDT]

1100-1105	Radio Pakistan, Islamabad	6090	7290		
1100-1105	A Port Moresby, Papua New Guinea	3295	4890	5960	5985
		6020	6040	6080	6140
		9520			
1100-1110	S Port Moresby, Papua New Guinea	3295	4890	5960	5985
		6020	6040	6080	6140
		9520			
1100-1115	Radio New Zealand, Wellington	6100	9540		
1100-1120	Radio Pakistan, Islamabad	15606	17760		
1100-1125	Radio Netherlands, Hilversum	6020	9675		
1100-1130	HCJB, Quito, Ecuador	6130	11925		
1100-1130	Radio Finland	11945	15400		



# frequency SECTION

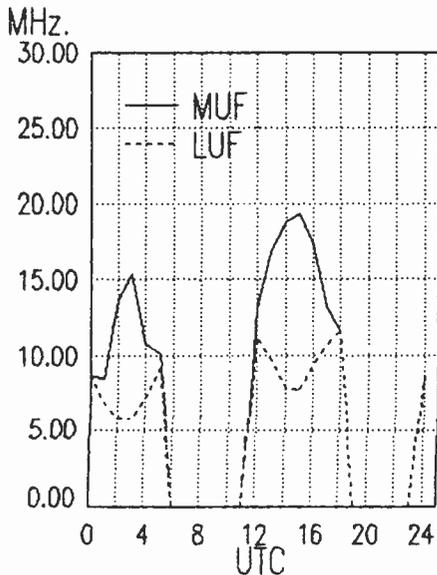
1110-1120	M-F	Radio Botswana, Gaborone	4820	5955	7255
1115-1200		Radio Berlin Int'l, East Germany	15445	17880	21465 21540
1115-1130		Vatican Radio, Vatican City	17840		
1115-1145		Radio Korea, Seoul, South Korea	7275	11740	
1115-1145		Radio Nepal, Kathmandu	5005		
1115-1200		Trans World Radio, Bonaire	11815	15345	
1130-1157		Radio Austria Int'l, Vienna	13730	15320	
1130-1200		Deutsche Welle, West Germany	15410	21600	
1130-1200		HCJB, Quito, Ecuador	11740		
1130-1200		Radio Japan, Tokyo	5990	6120	7210
1130-1200		Radio Netherland, Hilversum	5995	9715	15560 17575
			17605	21480	
1130-1200		Radio Thailand, Bangkok	9655	11905	
1130-1200		Radio Tirana, Albania	9480	11855	
1130-1200		Voice of Islamic Republic Iran	11790		
1135-1140		All India Radio, New Delhi	6065	7110	9610 9675
			11850	15320	
1140-1145	M-A	Vatican Radio, Vatican City	6248	9645	11740
1145-1200		BBC, London, England*	5995	7180	
1145-1200		Radio Bangladesh, Dakha	15255	17740	
1145-1200		Radio Prague, Czechoslovakia	6055	7345	9505

1200-1230		Radio Somalia, Mogadishu	6095		
1200-1230		Radio Tashkent, Uzbek, USSR	5945	7275	9540 9600
			11785		
1200-1230		Radio Thailand, Bangkok	9655	11905	
1200-1230	S	Radio Zambia, Lusaka	11880	[IRR]	
1200-1235	M-A	Radio Ulan Bator, Mongolia	9615	12015	
1200-1236		HCJB, Quito, Ecuador	6075		
1200-1250		Radio Pyongyang, North Korea	9600	9555	11735
1200-1255		Radio Beijing, China	7335	9530	9635 9665
			9770	11600	11715 11755
			2310	[ML]	
1200-1300		ABC, Alice Springs, Australia	2485		
1200-1300		ABC, Katherine, Australia	2325	[ML]	
1200-1300		ABC, Tennant Creek, Australia	17890		
1200-1300	S	Adventist World Radio, Africa	6030	6125	15430
1200-1300		(US) Armed Forces Radio and TV	5995	6195	9510 9700
1200-1300		BBC, London, England	9740	9750	11750 11775
			12095	15070	17790 18080
1200-1300		CBN, St. John's, Newfoundland	6160		
1200-1300		CFCF, Montreal, Quebec	6005		
1200-1300		CFCN, Calgary, Alberta	6030		
1200-1300		CHNS, Halifax, Nova Scotia	6130		
1200-1300		CKWX, Vancouver, British Columbia	6080		
1200-1300		CFRB, Toronto, Ontario	6070		
1200-1300		(US) Far East Network, Tokyo	3910		
1200-1300		HCJB, Quito, Ecuador	11740	15115	17890
1200-1300		KYOI, Saipan	11900		
1200-1300		Radio Australia, Melbourne	5995	6060	6080 7205
			7215	9580	9710 11800
1200-1300		Radio Moscow, USSR	9600	9795	12055 13680
			15135	15225	15595
1200-1300		Radio RSA, South Africa	21590		
1200-1300	A,S	Radio Tanzania, Dar es Salaam	7165		
1200-1300		SBC Radio One, Singapore	5010	5052	11940
1200-1300	S	Superpower KUSW, Utah	9850		
1200-1300		Swiss Radio Int'l, Bern	12030		
1200-1300		Trans World Radio, Bonaire	11815	15345	
1200-1300		Trans World Radio, Sri Lanka	11920		
1200-1300		Voice of America, Washington	6110	9760	11715 15160
			15425		

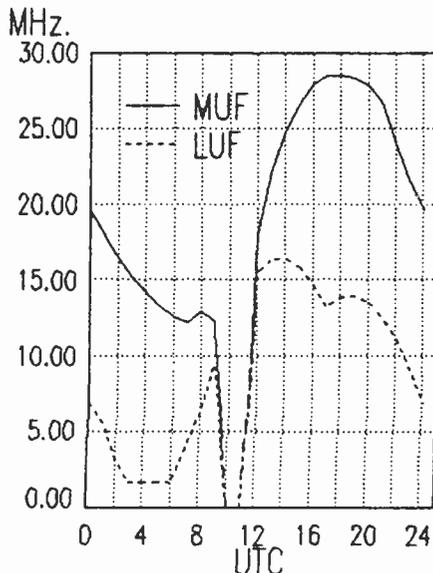
**1200 UTC [8:00 AM EDT/5:00 AM PDT]**

1200-1205	M-A	Port Moresby, Papua New Guinea	3295	4890	5960 6020
			6040	6080	6140 9520
1200-1215		BBC, London, England*	3915	6065	7275
1200-1215		Radio New Zealand, Wellington	6100	9540	
1200-1215		Vatican Radio, Vatican City	15190	17865	
1200-1215		Voice of Kampuchea, Phnom-Penh	9693	11938	
1200-1220		Radio Bucharest, Romania	17720	21665	
1200-1225	M-F	Radio Finland, Helsinki	11945	15400	
1200-1225		Radio Polonia, Warsaw, Poland	6095	7285	
1200-1230	S	Radio Austria Int'l, Vienna	6155	9685	11915 15320
1200-1230		Radio Canada Int'l, Montreal	9625	9650	11855 15385
			15440	17710	17820
1200-1230		Radio Netherland, Hilversum	5995	9715	15560 17575
			17605	21480	

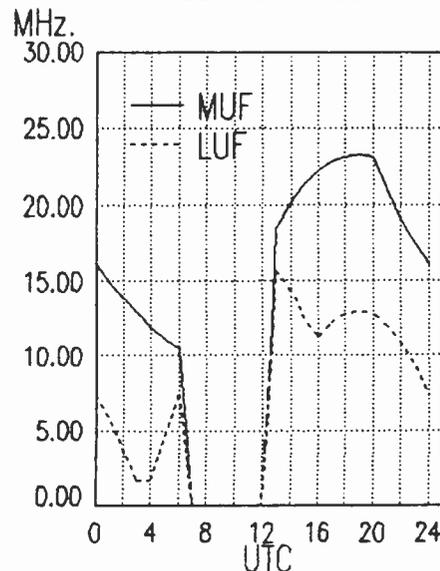
West Coast To Middle East



West Coast To West Africa



West Coast To Central Africa



# frequency SECTION

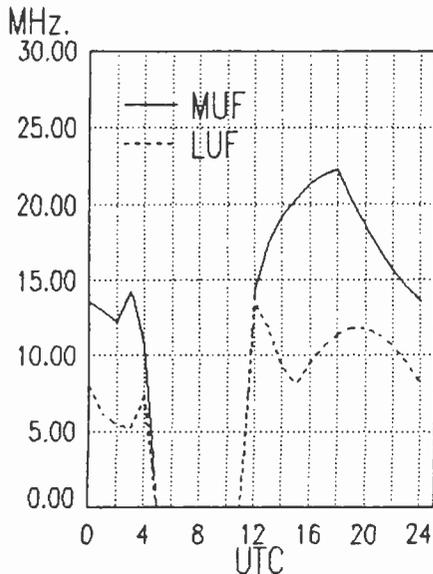
1200-1300	Voice of Kenya, Nairobi	7270			
1200-1300	Voice of Nigeria, Lagos	7255	15120		
1200-1300	WCSN, Boston, Massachusetts	5980			
1200-1300	WHRI, Noblesville, Indiana	5995	11715		
1200-1300	WYFR, Oakland, California	5950	6105		
1200-1300	WYFR Satellite Net, California	13695			
1215-1300	Radio Berlin Int'l, E. Germany	15445	17880	21465	21540
1215-1300	Radio Cairo, Egypt	17595	17675		
1230-1235	All India Radio, New Delhi	3905	4800	4920	7280
		9565	9615	11620	11735
		15120			
1230-1245	Radio Korea, Seoul, South Korea	7275	11740		
1230-1255	Radio Austria Int'l, Vienna	6155	9685	11915	15320
1230-1300	BBC, London, England*	6125	7255	6195	9635
		9660	11780	12040	15270
		15390	15435	17695	
1230-1300	Radio Bangladesh, Dhaka	11750	15525		
1230-1300	Radio Canada Int'l, Montreal	9625	9650	11855	15440
		17820			
1230-1300	Radio Sweden, Stockholm	15190	15430		
1240-1250 M	Radio Free Europe, Munich*	5985	7115	9695	9725
		11895	15355		
1245-1255	Radio France Int'l, Paris	11670	17720		
1245-1300	Radio Berlin Int'l, E. Germany	9665	11705	11785	15170
		15240			

1300-1330	Radio Cairo, Egypt	17595			
1300-1330	Radio Finland, Helsinki	11945	15400		
1300-1330	Radio Ghana, Accra	4915	7295		
1300-1330 S	Radio Norway Int'l, Oslo	15310			
1300-1330	Swiss Radio Int'l, Berne	11965			
1300-1330	Trans World Radio, Sri Lanka	11920			
1300-1330	Voice of Kenya, Nairobi	7270			
1300-1332 A,S	Trans World Radio, Bonaire	11815	15345		
1300-1350	Radio Pyongyang, North Korea	9325	9345	9555	9600
		11735			
1300-1355	Radio Beijing, China	11600	11755	15280	15455
1300-1400	ABC, Alice Springs, Australia	2310	[ML]		
1300-1400	ABC, Katherine, Australia	2485			
1300-1400	ABC, Tennant Creek, Australia	2325	[ML]		
1300-1400	(US) Armed Forces Radio and TV	9700	15330	15430	
1300-1400	CBC Northern Quebec Service	9625	11720		
1300-1400	CBN, St. John's, Newfoundland	6160			
1300-1400	CBU, Vancouver, British Columbia	6160			
1300-1400	CFCF, Montreal, Quebec	6005			
1300-1400	CFCN, Calgary, Alberta	6030			
1300-1400	CHNS, Halifax, Nova Scotia	6130			
1300-1400	CKWX, Vancouver, British Columbia	6080			
1300-1400	CFRB, Toronto, Ontario	6070			
1300-1400 S	ELWA, Monrovia, Liberia	11830			
1300-1400	(US) Far East Network, Tokyo	3910			
1300-1400	FEBC, Manila, Philippines	11850			
1300-1400	HCJB, Quito, Ecuador	11740	15115	17890	
1300-1400 M-A	KYOI, Saipan	11900			
1300-1400	Radio Australia, Melbourne	5995	6060	6080	7205
		9580			
1300-1400 S	Radio Canada Int'l, Montreal	9625	11720	11955	15440
		17820			
1300-1400	Radio Jordan, Amman	9560			
1300-1400	Radio Korea, Seoul	9570	9750	15575	
1300-1400	Radio Moscow, USSR	5920	6167.8 LSB	9655	
		9825	9895	11840	11655
		11900	11930	13680	
1300-1400 A,S	Radio Tanzania, Dar es Salaam	7165			
1300-1400	SBC Radio One, Singapore	5010	5052	11940	
1300-1400 S	Superpower KUSW, Utah	9850			

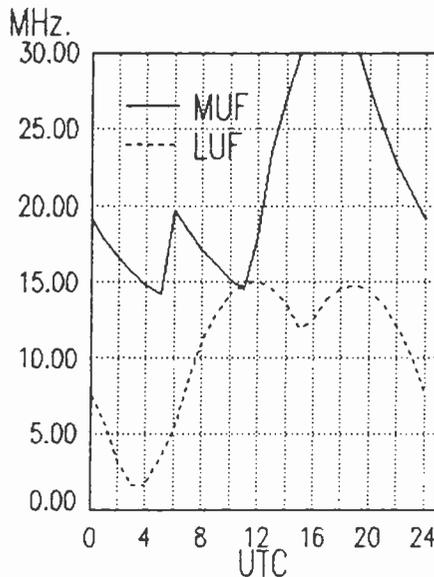
## 1300 UTC [9:00 AM EDT/6:00 AM PDT]

1300-1305	Port Moresby, Papua New Guinea	3295	4890	5960	5980
		6020	6040	6080	6140
		9520			
1300-1315	Radio Berlin Int'l, East Germany	21465	21540		
1300-1325	Radio Bucharest, Romania	9690	11940	15405	17720
1300-1330	BBC, London, England	5995	6195	7180	9510
		9740	9750	11750	11775
		17790			
1305-1330 S	Radio Austria Int'l, Vienna	15320			
1300-1330	Radio Berlin Int'l, E. Germany	9665	11705	11785	15170
		15240			

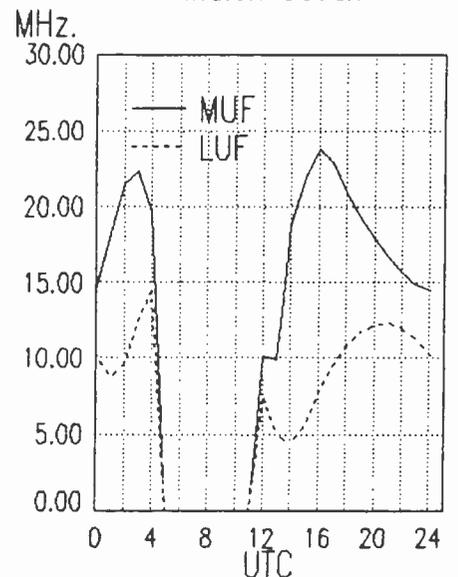
West Coast To East Africa



West Coast To South Africa



West Coast To Indian Ocean

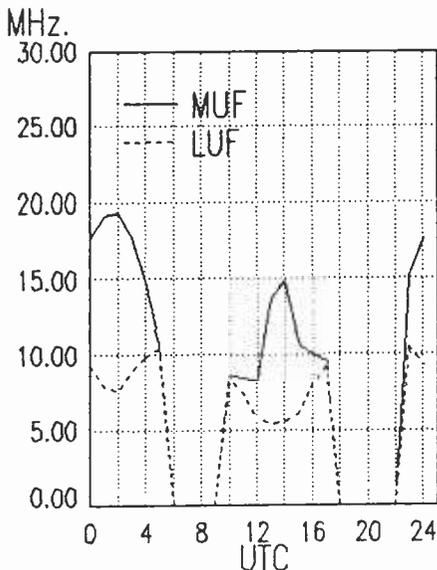


# frequency SECTION

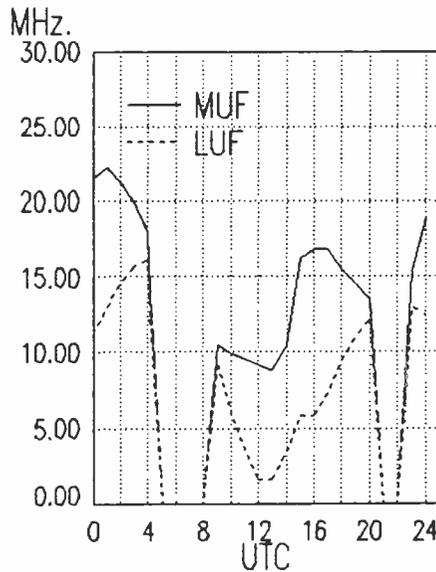
1300-1400	Voice of America, Washington	6110	9760	15160	15425	1400-1430	Radio Finland, Helsinki	11755	15185	17800
1300-1400	Voice of Malaysia	7295				1400-1430	S Radio Norway Int'l, Oslo	21705		
1300-1400	Voice of Nigeria, Lagos	7255	15120			1400-1430	Radio Peace and Progress, USSR	17645	17765	
1300-1400	WCSN, Boston, Massachusetts	5980				1400-1430	Radio Polonia, Warsaw, Poland	6095	7285	
1300-1400	WHRI, Noblesville, Indiana	9455	11790			1400-1430	Radio Sweden, Stockholm	15345	15390	
1300-1400	WYFR, Oakland, California	5950	7355	9565		1400-1430	Radio Tirana, Albania	9500	11985	
1300-1400	WYFR Satellite Net, California	13695	15215			1400-1430	Voice of Ethiopia, Addis Ababa	9550	11710	
1305-1315	Radio France Int'l, Paris	6175	9790	9805	11670	1400-1430	Voice of Republic of Iran	15085		
		11845	15155	15195	15300	1400-1450	T Radio Free Europe, Munich*	5985	7115	7695 9725
		15315	15365	17620	17720			11895	15355	
		17850	21645			1400-1450	Radio Pyongyang, North Korea	6576	11735	
		15510	15590			1400-1455	Radio Beijing, China	11600	15165	
1330-1355	M-A BRT, Brussels, Belgium	15320				1400-1500	ABC, Katherine, Australia	2485		
1330-1355	Radio Austria Int'l, Vienna	5995	6195	7180	9510	1400-1500	ABC, Perth, Australia	9610		
1330-1400	BBC, London, England	9740	11775	12095	15070	1400-1500	Adventist World Radio, Italy	7275		
		21470				1400-1500	All India Radio, New Delhi	9545	11810	15335
						1400-1500	(US) Armed Forces Radio and TV	9700	15330	15430
1330-1400	All India Radio, New Delhi	9545	10330	11810	15335	1400-1500	BBC, London, England	9750	11750	12095 15070
1330-1400	M-A Bhutan Bcasing Service, Thimpu	6035						15260	17705	17790 21710
1330-1400	Laolian National Radio	7113						21470		
1330-1400	Radio Finland, Helsinki	11945	15400			1400-1500	CBN, St. John's, Newfoundland	6160		
1330-1400	Radio Korea, Seoul, South Korea	7275				1400-1500	CBC Northern Quebec Service	9625	11720	
1330-1400	Radio Tashkent, Uzbek, USSR	5945	7275	9540	9600	1400-1500	M-A CBU, Vancouver, British Colombia	6160		
		11785				1400-1500	CFCF, Montreal, Quebec	6005		
1330-1400	Swiss Radio Int'l, Berne	11695	13685	15135	15570	1400-1500	CFCN, Calgary, Alberta	6030		
		17830	21695			1400-1500	CHNS, Halifax, Nova Scotia	6130		
1330-1400	UAE Radio, United Arab Emirates	17865	21605			1400-1500	CKWX, Vancouver, British Colombia	6080		
1330-1400	Voice of Islamic Republic Iran	9525	9685	9770		1400-1500	CFRB, Toronto, Ontario	6070		
1330-1400	Voice of Kenya, Nairobi	6100				1400-1500	S ELWA, Monrovia, Liberia	11830		
1330-1400	Voice of Turkey, Ankara	15255				1400-1500	(US) Far East Network, Tokyo	3910		
						1400-1500	FEBC, Manila, Philippines	9670	11850	
1330-1400	Voice of Vietnam, Hanoi	9840	15010			1400-1500	HCJB, Quito, Ecuador	11740	15115	17890
1332-1400	A Trans World Radio, Bonaire	11815	15345			1400-1500	KNLS, Anchor Point, Alaska	9750		
						1400-1500	KYOI, Saipan	11900		
						1400-1500	Radio Australia, Melbourne	5995	6035	6060 6080
								7205	9580	
						1400-1500	S Radio Canada Int'l, Montreal	11955	17820	
						1400-1500	Radio Japan, Tokyo	9695	11815	
						1400-1500	Radio Jordan, Amman	9560		

1400 UTC [10:00 AM EDT/6:00 AM PDT]

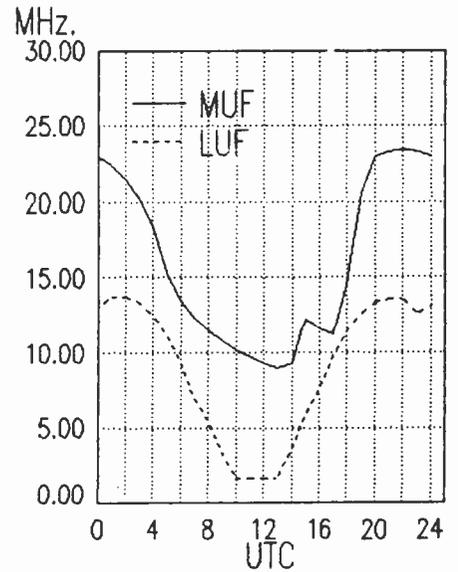
West Coast To  
Central Asia



West Coast To  
South East Asia



West Coast To  
Far East

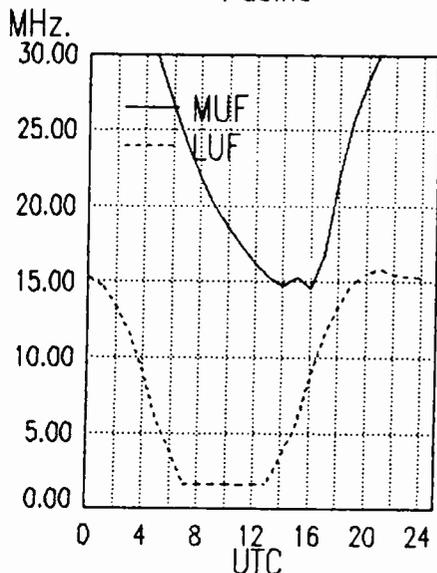


# frequency SECTION

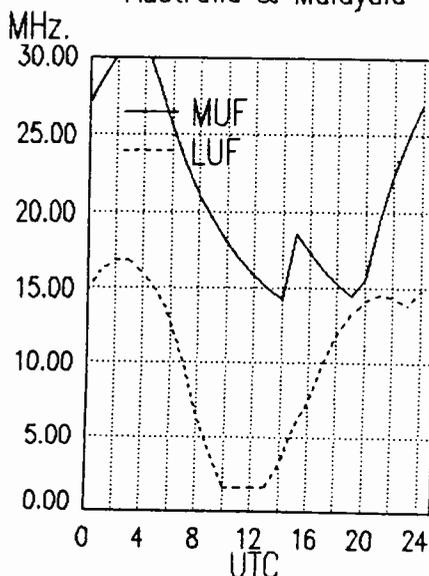
1400-1500	Radio Moscow, USSR	5920 6067.8 LSB 7110 7300 7370 9655 9825 9895 11840 12005 12025 12055 13680 15135
1400-1500	Radio RSA, South Africa	21590
1400-1500 A,S	Radio Tanzania, Dar es Salaam	7165
1400-1500	SBC Radio One, Singapore	5010 5052 11940
1400-1500 S	Superpower KUSW, Utah	9850
1400-1500	Voice of America, Washington	9645 9760 11920 15160 15425
1400-1500	Voice of Kenya, Nairobi	6100
1400-1500	Voice of Malaysia, Kuala Lumpur	4950
1400-1500	Voice of Nigeria, Lagos	7255
1400-1500	WCSN, Boston, Massachusetts	13760
1400-1500	WHRI, Noblesville, Indiana	9455 11790
1400-1500 S	WRNO, New Orleans, Louisiana	11965
1400-1500	WYFR, Oakland, California	5950 9535 11830 15215
1400-1500	WYFR Satellite Net	13695
1415-1420	Radio Nepal, Kathmandu	3230 5005
1415-1500	Radio Berlin Int'l, East Germany	15240 17880
1430-1500 F	ABC, Alice Springs, Australia	2310 [ML]
1430-1500 F	ABC, Tennant Creek, Australia	2325 [ML]
1430-1500	Burma Broadcasting Service	5985
1430-1500	King of Hope, Southern Lebanon	6280
1430-1500	KTWR, Agana, Guam	9780
1430-1500	Radio Australia, Melbourne	6060 9580
1430-1500	Radio Netherland, Hilversum	11740 13770 15560 17575
1430-1500	Radio Prague, Czechoslovakia	9605 11685 13715 15110 15155 17705 21505
1430-1500	Radio Sofia, Bulgaria	7245 9740 11735
1430-1500	Radio Yugoslavia, Belgrade	7240 15240 15415
1430-1500	WYFR, Okeechobee, Florida	15055
1445-1500	Radio Berlin Int'l, East Germany	11785 15170 15255
1445-1500 M-F	Radio Canada Int'l, Montreal	11915 11935 15160 15325 15305 17820
1445-1500 M-A	Radio Ulan Bator, Mongolia	9575 15305

1500 UTC [11:00 AM EDT/7:00 AM PDT]	
1500-1505	Africa No. 1, Gabon 7200 15200
1500-1510	Vatican Radio, Vatican City 11960 15090 17870
1500-1515	FEBA, Mahe, Seychelles 15325
1500-1520	Radio Ulan Bator, Mongolia 9575 15305
1500-1525	Radio Bucharest, Romania 9510 9690 11775 11940 15250 15335
1500-1525	Radio Netherland, Hilversum 11740 13770 15560 17575
1500-1530	Radio Berlin Int'l, East Germany 11785 15170 15255
1500-1530	Radio Sofia Bulgaria 7245 9560 11735 15310
1500-1530 A,S	Radio Tanzania, Dar es Salaam 7165
1500-1530	Radio Veritas Asia, Philippines 9770 15215
1500-1550	Deutsche Welle, West Germany 7225 9735 17765 15135 21600
1500-1550	KTWR, Agana, Guam 9820
1500-1550	Radio Pyongyang, North Korea 6576 9325 9345 9640 9977
1500-1555	Radio Beijing, China 11600 15165
1500-1600 F	ABC, Alice Springs, Australia 2310 [ML]
1500-1600	ABC, Perth, Australia 9610
1500-1600 F	ABC, Tennant Creek, Australia 2325 [ML]
1500-1600	(US) Armed Forces Radio and TV 9700 15330 15430
1500-1600	AWR, Aiajuela, Costa Rica 15460
1500-1600	BBC, London, England 9740 12095 15070 15260 15400 17705 17790 17830 17885
1500-1600	Burma Broadcasting Service 5985
1500-1600	CBC Northern Quebec Service 9625 11720
1500-1600	CBN, St. John's, Newfoundland 6160
1500-1600	CBU, Vancouver, British Columbia 6160
1500-1600	CFCF, Montreal, Quebec 6005
1500-1600	CFCN, Calgary, Alberta 6030
1500-1600	CHNS, Halifax, Nova Scotia 6130
1500-1600	CKWX, Vancouver, British Columbia 6080
1500-1600	CFRB, Toronto, Ontario 6070
1500-1600 S	ELWA, Monrovia, Liberia 11830
1500-1600	(US) Far East Network, Tokyo 3910

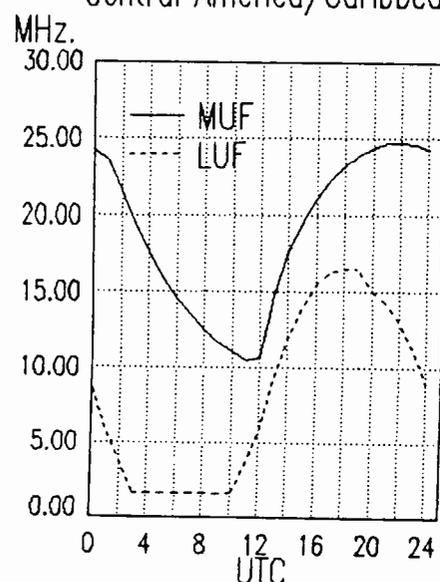
West Coast To Pacific



West Coast To Australia & Malaysia



West Coast To Central America/Caribbean



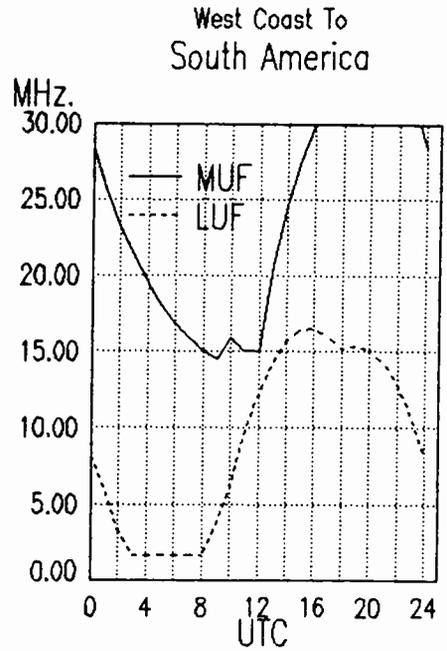
# frequency SECTION

1500-1600	FEBC, Manila, Philippines	11850			
1500-1600	HCJB, Quito, Ecuador	11740	11810	15115	17890
1500-1600	King of Hope, Southern Lebanon	6280			
1500-1600	KNLS, Anchor Point, Alaska	9750			
1500-1600	KSDA, Agat, Guam	11980			
1500-1600	KYOI, Saipan	11900			
1500-1600	Radio Australia, Melbourne	5995	6035	6060	6080
		7205	7215	9580	
1500-1600	S Radio Canada Int'l, Montreal	9555	9625	11720	11915
		11955	15315	15440	17820
1500-1600	Radio Japan, Tokyo	9505	9695	11815	21700
1500-1600	Radio Jordan, Amman	9560			
1500-1600	Radio Moscow, USSR	6067.8 LSB	9655	9825	
		11840	11900	12005	13680
		15135			
1500-1600	Radio RSA, South Africa	9655	15125	17755	21590
1500-1600	SBC Radio One, Singapore	5010	5052	11940	
1500-1600	S Superpower KUSW, Utah	9850			
1500-1600	Voice of America, Washington	9575	9700	9760	15205
1500-1600	Voice of Ethiopia, Addis Ababa	7165	9560		
1500-1600	Voice of Indonesia, Jakarta	11790	15150		
1500-1600	Voice of Kenya, Nairobi	6100			
1500-1600	Voice of Malaysia, Kuala Lumpur	4950			
1500-1600	Voice of Nigeria, Lagos	7255	11770		
1500-1600	WCSN, Boston, Massachusetts	13760			
1500-1600	WHRI, Noblesville, Indiana	15105	21655		
1500-1600	WRNO, New Orleans, Louisiana	11965			
1500-1600	WYFR, Oakland, California	5950	9535	11830	13695
		15215	17612		
1515-1600	Radio Berlin Int'l, East Germany	6115	7295	9730	
1515-1600	FEBA, Mahe, Seychelles	11865	15325		
1530-1545	All India Radio, New Delhi	3905	3925	4860	6160
		7160	7412	9545	9950
1530-1600	Radio Prague, Czechoslovakia	6055	7345	9605	11665
		11685	11990	15110	13715
		17705	21505		
1530-1600	Radio Tanzania, Dar es Salaam	9684			
1530-1600	Radio Tirana, Albania	9480	11835		
1530-1600	Swiss Radio Int'l, Berne	17830	13685	21630	
1530-1600	Voice of Asia, Taiwan	5980	7445		

1530-1600	Voice of Nigeria, Lagos	15120			
1540-1550	M-A Voice of Greece, Athens	9855	11645	15630	
1545-1600	Radio Canada Int'l, Montreal	9555	11915	11935	15315
		15325	17820		
1545-1600	Radio Korea, Seoul, South Korea	7275	9870		
1545-1600	Vatican Radio, Vatican City	11810	15120	17730	
1550-1600	H-S KTWR, Agana, Guam	9780			

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

1600-1610	FEBA, Mahe, Seychelles	11865	15325		
1600-1610	Radio Lesotho, Maseru	4800			
1600-1610	SBC Radio One, Singapore	5010	5052	11940	
1600-1625	Radio Budapest, Hungary	6110	9585	9835	11910
		15160			
1600-1625	Radio Prague, Czechoslovakia	6055	7345	9605	11665
		11685	11990	15110	13715
		15110	17705	21505	
1600-1630	ELWA, Monrovia, Liberia	11830			
1600-1630	S Radio Norway int'l, Oslo	15220	15310		
1600-1630	Radio Pakistan, Islamabad	7365	9465	9785	11615
		11625	15125		
1600-1630	Radio Polonia, Warsaw, Poland	6135	9540		
1600-1630	M-F Radio Portugal, Lisbon	15245			
1600-1630	Radio Sweden, Stockholm	6065	11855		
1600-1630	SLBC, Colombo, Sri Lanka	6075	9720		
1600-1630	Trans World Radio, Swaziland	5055	9525		
1600-1630	Voice of Asia, Taiwan	5980	7445		
1600-1630	Voice of Vietnam, Hanoi	9840	15010		
1600-1645	H-A KTWR, Agana, Guam	9820			
1600-1645	Radio Nacional Angola, Luanda	7245	9535	11955	
1600-1645	UAE Radio, United Arab Emirates	11955	15320	15435	17865
1600-1655	Radio Beijing, China	9570	11600	11715	
1600-1700	F ABC, Alice Springs, Australia	2310	[ML]		
1600-1700	ABC, Perth, Australia	9610			
1600-1700	F ABC, Tennant Creek, Australia	2325	[ML]		
1600-1700	(US) Armed Forces Radio and TV	9700	15330	15430	
1600-1700	AWR, Alajuela, Costa Rica	15460			
1600-1700	BBC, London, England	9740			
		11750	11775	12095	15070
		15260	15400	17880	
1600-1700	CBC Northern Quebec Service	9625	11720		
1600-1700	CBN, St. John's, Newfoundland	6160			
1600-1700	CBU, Vancouver, British Columbia	6160			
1600-1700	CFCF, Montreal, Quebec	6005			
1600-1700	CFCN, Calgary, Alberta	6030			
1600-1700	CHNS, Halifax, Nova Scotia	6130			
1600-1700	CKWX, Vancouver, British Columbia	6080			
1600-1700	CFRB, Toronto, Ontario	6070			
1600-1700	(US) Far East Network, Tokyo	3910			
1600-1700	S KCBI, Dallas, Texas	11735			
1600-1700	Superpower KUSW, Utah	15225			
1600-1700	Radio Australia, Melbourne	5995	6035	6060	6080
		7205	7215	9580	
1600-1700	Radio Beijing, China	15130			
1600-1700	Radio France Int'l, Paris	11705	15360	17620	
1600-1700	Radio Jordan, Amman	9560			
1600-1700	Radio Korea, Seoul, South Korea	5975	9870		
1600-1700	Radio Malawi, Blantyre	3380	5995		
1600-1700	Radio Moscow, USSR	9825	9875	11840	11950
		12005	12015	11995	15135
1600-1700	Radio Riyadh, Saudi Arabia	9705	9720		
1600-1700	Radio RSA, South Africa	11890			
1600-1700	Radio Tanzania, Dar es Salaam	9684			
1600-1700	Voice of America, Washington, DC	9575	9645	9760	11920
		15410	15445	15205	15580
		15560	17820	17785	17870
1600-1700	WCSN, Boston, MA	21640			
1600-1700	WHRI, Noblesville, Indiana	15105	21655		
1600-1700	S WRNO, Louisiana	11965			
1600-1700	WYFR Satellite Net	13695	15566		
1600-1700	WYFR, Okeechobee, Florida	9535	11830	15170	15215



# frequency SECTION

1600-1700	Radio Zambia, Lusaka	9580		
1615-1630	Voice of Vietnam, Hanoi	10011		
1630-1655	M-A BRT, Brussels, Belgium	17595	21810	
1630-1700	Radio Netherlands, Hilversum	6020	9540	
1630-1700	RTM Morocco	17595	17815	

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

1700-1705	Radio Uganda, Kampala	4976	5026		
1700-1715	Kol Israel, Jerusalem	9385	9640	9925	11585
1700-1715	M-A Voice of Namibia (Angola)	11955			
1700-1725	Radio Netherland, Hilversum	6020	9590		
1700-1730	Radio Australia, Melbourne	5995	6060	6080	7205
		9580			
1700-1730	Radio Berlin Int'l, East Germany	6115	7260	9730	
1700-1730	Radio Japan, Tokyo	9505	11705	11815	
1700-1730	S Radio Norway Int'l, Oslo	9655	15220	15310	
1700-1730	Radio Sweden Int'l, Oslo	6065			
1700-1730	Swiss Radio Int'l, Berne	3985	6165	9535	
1700-1745	BBC, London, England	9410	9740	11750	11775
		12095	15070	15260	15400
1700-1750	Radio Pyongyang, North Korea	7290	9325	9640	9977
1700-1755	Radio Beijing, China	9570	11600		
1700-1800	F ABC, Alice Springs, Australia	2310 [ML]			
1700-1800	ABC, Tennant Creek, Australia	2325 [ML]			
1700-1800	(US) Armed Forces Radio and TV	9700	15330	15430	
1700-1800	AWR Africa, Gabon	9625			
1700-1800	CBC Northern Quebec Service	9625	11720		
1700-1800	CBN, St. John's, Newfoundland	6160			
1700-1800	CBU, Vancouver, British Columbia	6160			
1700-1800	CFCF, Montreal, Quebec	6005			
1700-1800	CFCN, Calgary, Alberta	6030			
1700-1800	CHNS, Halifax, Nova Scotia	6130			
1700-1800	CKWX, Vancouver, British Columbia	6080			
1700-1800	CFRB, Toronto, Ontario	6070			
1700-1800	(US) Far East Network, Tokyo	3910			
1700-1800	A,S KCBI, Dallas, Texas	11735			
1700-1800	Radio Havana Cuba	11920			
1700-1800	Radio Jordan, Amman	9560			
1700-1800	M-F Radio Malabo, Equatorial Guinea	9553 [ML]			
1700-1800	Radio Moscow, USSR	9580	9825	9875	11750
		11840	11900	11930	11950
		11995	12005	12030	12050
		15135	15475		
1700-1800	Radio Riyadh, Saudi Arabia	9705	9720		
1700-1800	Radio Tanzania, Dar es Salaam	9684			
1700-1800	Radio Zambia, Lusaka	9580			
1700-1800	RTM Morocco	17815			
1700-1800	SBC Radio One, Singapore	5052	11940		
1700-1800	A,S Swaziland Commercial Radio	6155			
1700-1800	M-A Superpower KUSW, Utah	15225			
1700-1800	Voice of Africa, Egypt	15255			
1700-1800	Voice of America, Washington	9575	11920	15410	15445
		15580	15600	17785	17800
		17870			
1700-1800	Voice of Kenya, Nairobi	6100			
1700-1800	Voice of Nigeria, Lagos	11770			
1700-1800	WCSN, Boston, Massachusetts	21640			
1700-1800	WHRI, Noblesville, Indiana	15105			
1700-1800	WINB, Red Lion, Pennsylvania	15295			
1700-1800	S-F WMLK, Bethel, Pennsylvania	9465			
1700-1800	WRNO, New Orleans, Louisiana	15420			
1700-1800	WYFR, Oakland, California	9535	11830	13695	15215
		15170	15375		
1700-1800	WYFR Satellite Net, California	13760			
1715-1730	Radio Korea, Seoul, South Korea	9870	15575		
1715-1745	BBC, London, England*	3975	6185	7165	
1718-1800	Radio Pakistan, Islamabad	6210	7835		
1725-1740	Radio Suriname Int'l, Paramibo	7835v			
1725-1800	Radio New Zealand, Wellington	11780	15150		
1730-1735	All India Radio, New Delhi	4840	4860	4920	6160
		7412	9950		
1730-1755	BRT Brussels, Belgium	5910	11695		

1730-1800	KNLS, Anchor Point, Alaska	7355			
1730-1755	Radio Bucharest, Romania	7105	9530	9685	11790
		11940			
1730-1800	Radio Australia, Melbourne	5995	6035	6060	6080
		7205	9580		
1730-1800	Radio Berlin Int'l, E. Germany	6115	7260	9730	
1730-1800	Radio Polonia, Warsaw, Poland	6135	9540		
1730-1800	Radio Prague, Czechoslovakia	13715	15165		
1730-1800	Radio Sofia, Bulgaria	7245	9560	11735	15310
1730-1800	Radio Yugoslavia, Belgrade	5980	6100	7240	11735
1730-1800	RAE, Buenos Aires, Argentina	15345			
1734-1800	FEBA, Mahe, Seychelles	11760			
1745-1800	BBC, London, England	9515	9740	15070	15260
		15400			
1745-1800	SLBC, Colombo, Sri Lanka	11800			

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

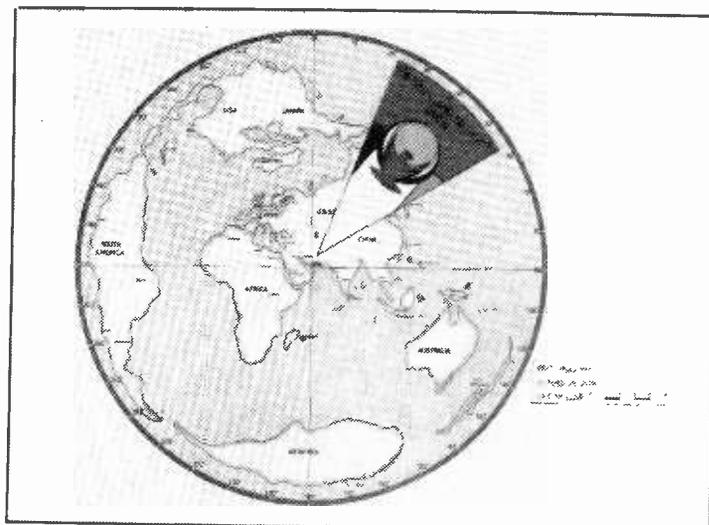
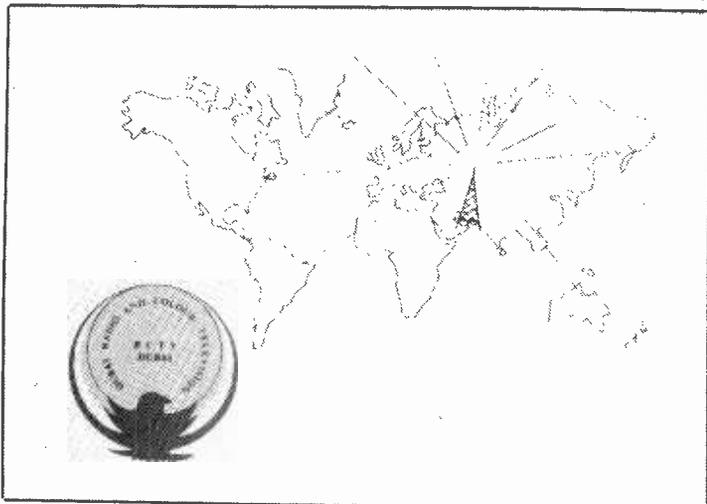
1800-1805	A SBC Radio One, Singapore	11940			
1800-1815	Radio Cameroon, Yaounde	3970	4750	4795	4850
		5010			
1800-1815	SLBC, Colombo, Sri Lanka	11800			
1800-1825	A,S FEBA, Mahe, Seychelles	11760			
1800-1825	Radio Prague, Czechoslovakia	9605	11685	11990	13715
		15110	21505		
1800-1825	RAE, Buenos Aires, Argentina	15345			
1800-1830	BBC, London, England	9740	11750	12095	15070
		15400			
1800-1830	S Radio Bamako, Mali	4835	5995		
1800-1830	Radio Canada Int'l, Montreal	15260	17820		
1800-1830	Radio Mozambique, Maputo	3265	4855	9618	
1800-1830	Radio Prague, Czechoslovakia	5930	7345	13715	
1800-1830	Radio Sofia Bulgaria	7245	7155	9700	
1800-1830	Voice of Africa, Egypt	15255			
1800-1830	Voice of Vietnam, Hanoi	9840	15010		
1800-1845	Radio Abidjan, Ivory Coast	7215			
1800-1845	Trans World Radio, Swaziland	9525			
1800-1850	Deutsche Welle, West Germany	11785	13790	15135	17715
1800-1850	Radio Bras, Brasilia, Brazil	15265			
1800-1856	Radio RSA, South Africa	17880			
1800-1900	F ABC, Alice Springs, Australia	2310 [ML]			
1800-1900	F ABC, Tennant Creek, Australia	2325 [ML]			
1800-1900	All India Radio, New Delhi	11935	15360		
1800-1900	(US) Armed Forces Radio and TV	9700	15330	15430	
1800-1900	CBC Northern Quebec Service	9625	11720		
1800-1900	CBN, St. John's, Newfoundland	6160			
1800-1900	CBU, Vancouver, British Columbia	6160			
1800-1900	CFCF, Montreal, Quebec	6005			
1800-1900	CFCN, Calgary, Alberta	6030			
1800-1900	CHNS, Halifax, Nova Scotia	6130			
1800-1900	CKWX, Vancouver, British Columbia	6080			
1800-1900	CFRB, Toronto, Ontario	6070			
1800-1900	(US) Far East Network, Tokyo	3910			
1800-1900	A,S KCBI, Dallas, Texas	11735			
1800-1900	KNLS, Anchor Point, Alaska	11650			
1800-1900	Radio Australia, Melbourne	5995	6035	6060	6080
		7205	7215	9580	
1800-1900	Radio Jamahiriya, Libya	15450			
1800-1900	Radio Korea, Seoul, South Korea	9870	15575		
1800-1900	Radio Kuwait, Kuwait	11665			
1800-1900	Radio Malabo, Equatorial Guinea	9553v [ML]			
1800-1900	Radio Moscow, USSR	9580	9875	11840	11995
		12030	12050	15135	15475
1800-1900	Radio New Zealand, Wellington	11780	15150		
1800-1900	Radio Riyadh, Saudi Arabia	9705	9720		
1800-1900	Radio Tanzania, Dar es Salaam	9684			
1800-1900	Radio Zambia, Lusaka	9580			
1800-1900	M-A Superpower KUSW, Utah	15225			
1800-1900	A,S Swaziland Commercial Radio	6155			
1800-1900	Voice of America, Washington	9575	11920	15410	15445
		15580	15600	17785	17800
		17870	21485		
1800-1900	Voice of Kenya, Nairobi	6100			

# frequency SECTION

1800-1900	Voice of Nigeria, Lagos	11770	15120	
1800-1900	WCSN, Boston, Massachusetts	15390		
1800-1900	WHRI, Noblesville, Indiana	13760	17830	
1800-1900	WINB, Red Lion, Pennsylvania	15295		
1800-1900 S-F	WMLK, Bethel, Pennsylvania	9465		
1800-1900	WRNO, New Orleans, Louisiana	15420		
1800-1900	WYFR, Oakland, California	15170	15215	15375
1800-1900	WYFR Satellite Net, California	11830	13695	
1815-1900	Radio Bangladesh, Dhaka	6240	7505	
1830-1855	Radio Austria Int'l, Vienna	5945	6155	11825 12015
1830-1855	BRT, Brussels, Belgium	5910	9860	11695
1800-1855	Radio Polonia, Warsaw, Poland	5995	6135	7125 7285
		9525	11840	
1830-1900	BBC, London, England	12095	15070	15400
1830-1900	Radio Budapest, Hungary	6110	7220	9585 9835
		11910	15160	
1830-1900 A.S	Radio Canada Int'l, Montreal	15260	17820	

1830-1900	Radio Finland, Helsinki	6120	9550	11755	15185
1830-1900	Radio Havana Cuba	11800			
1830-1900	Radio Kuwait	11665			
1830-1900 MWF	Radio Mozambique, Maputo	3265	4855	9618	
1830-1900	Radio Netherland, Hilversum	6020	9540	17605	21685
1830-1900	Radio Sofia Bulgaria	9700	11720		
1830-1900	Radio Sweden, Stockholm	15240			
1830-1900	WINB, Red Lion, Pennsylvania	15185			
1840-1850 M-A	Voice of Greece, Athens	11645	12045	15630	
1840-1900	Radio Senegal, Dakar	4950			
1845-1855	Radio Nacional, Conaky, Guinea	4833	4900	7125	
1845-1900	All India Radio, New Delhi	7412	11620		
1855-1900	Africa No. 1, Gabon	4830	15475		

Steve Mindy of East Amherst, New York, sent us this QSL from United Arab Emirates in Dubai, plus a photocopy of their frequencies. Marshall Watson of Ft. Walton Beach, Florida, also has a slightly different version of their QSL (below).



## U. A. E. RADIO & TELEVISION DUBAI.

### FREQUENCY SCHEDULE - EXTERNAL SERVICES - JUNE. 98.

NORTH AMERICA	-	0330 UTC.	11940,	15435,	17890,	21700 KHZ.
FAR EAST AREA.	-	0530 UTC.	15435,	17775,	17830,	21700 KHZ.
EUROPEAN AREA.	-	1030 UTC. & 1330 UTC.				
			11955,	15435,	17865,	21605.KHZ.
			1500 UTC.			
			9550,	11730,	11955,	15300.KHZ.

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# frequency SECTION

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

1900-1903	Africa No. 1, Gabon	15475			
1900-1903	Vatican Radio, Vatican City	6190	7250	9645	
1900-1915	Radio Bangladesh, Dhaka	6240	7505		
1900-1915	Radio Tanzania, Dar es Salaam	9684			
1900-1925	Radio Netherland, Hilversum	6020	15175	17605	21685
1900-1925	Voice of Islamic Republic Iran	9695			
1900-1930	F ABC, Alice Springs, Australia	2310	[ML]		
1900-1930	F ABC, Tennant Creek, Australia	2325	[ML]		
1900-1930	Kol Israel, Jerusalem	11605	13625	15485	15592
1900-1930	Radio Afghanistan, Kabul	7160	9640		
1900-1930	Radio Berlin Int'l, East Germany	9665	11920	15255	
1900-1930	Radio Japan, Tokyo	9505	11705		
1900-1930	Radio Kiev, Ukraine, USSR	6010	6090	6165	7170
1900-1930	S Radio Norway Int'l, Oslo	9590	15220	15310	
1900-1930	M-F Radio Portugal, Lisbon	11870	15250		
1900-1930	Radio Sofia, Bulgaria	7245	9560	11735	15310
1900-1930	Radio Yugoslavia, Belgrade	5980	7240	9620	
1900-1930	Voice of Vietnam, Hanoi	12020	15010		
1900-1955	Radio Beijing, China	6860	9470		
1900-2000	All India Radio, New Delhi	7412	11620	11935	15360
1900-2000	(US) Armed Forces Radio and TV	9700	15330	15430	
1900-2000	BBC, London, England	9410	15400	12095	15070
1900-2000	CBC Northern Quebec Service	9625	11720		
1900-2000	CBN, St. John's, Newfoundland	6160			
1900-2000	CBU, Vancouver, British Columbia	6160			
1900-2000	CFCF, Montreal, Quebec	6005			
1900-2000	CFCN, Calgary, Alberta	6030			
1900-2000	CHNS, Halifax, Nova Scotia	6130			
1900-2000	CKWX, Vancouver, British Columbia	6080			
1900-2000	CFRB, Toronto, Ontario	6070			
1900-2000	(US) Far East Network, Tokyo	3910			
1900-2000	HCJB, Quito, Ecuador	11790	15270	17790	
1900-2000	A,S KCBI, Dallas, Texas	11735			
1900-2000	KNLS, Anchor Point, Alaska	11650			
1900-2000	KYOI, Saipan	9495			
1900-2000	Radio Algiers, Algeria	9509	9685	15215	17745
1900-2000	Radio Australia, Melbourne	6035	6060	6080	7205
		7215	9580		
1900-2000	Radio Ghana, Accra	6130			
1900-2000	Radio Havana Cuba	11800			
1900-2000	Radio Kuwait, Kuwait	11665			
1900-2000	M-A Radio Malabo, Equatorial Guinea	9553	[ML]		
1900-2000	Radio Moscow, USSR	9580	9735	9875	11840
		11950	12030	12050	13605
		15135	15425	15475	
1900-2000	Radio New Zealand, Wellington	11780	15150		
1900-2000	Radio Prague, Czechoslovakia	5930	7345		
1900-2000	Radio Riyadh, Saudi Arabia	9705	9720		
1900-2000	Radio RSA, South Africa	5950	7270	9610	
1900-2000	Radio Zambia, Lusaka	9580			
1900-2000	Spanish Foreign Radio, Madrid	9765	11790	15395	
1900-2000	M-A Superpower KUSW, Utah	15690			
1900-2000	A,S Swaziland Commercial Radio	6155			
1900-2000	Trans World Radio Swaziland	3205			
1900-2000	Voice of America, Washington	9760	11760	15410	15445
		15580	15600	17785	17800
		17870			
1900-2000	Voice of Ethiopia, Addis Ababa	9595			
1900-2000	Voice of Kenya, Nairobi	6100			
1900-2000	Voice of Nigeria, Lagos	7255	11770		
1900-2000	WCSN, Boston, Massachusetts	15390			
1900-2000	WHRI, Noblesville, Indiana	13760	17830		
1900-2000	WINB, Red Lion, Pennsylvania	15295			
1900-2000	S-F WMLK, Bethel, Pennsylvania	9465			
1900-2000	WRNO, New Orleans, Louisiana	15420			
1900-2000	WYFR, Oakland, California	11830	13695	15170	21615
1900-2000	M-A WYFR Satellite Net, California	13695			
1910-1920	Radio Botswana, Gaborone	3356	4820		
1920-1930	M-A Voice of Greece, Athens	7430	9395	9425	
1930-1940	Radio Togo, Lome	5047			
1930-2000	ABC, Katherine, Australia	2485			
1930-2000	Radio Beijing, China	6955	7480	9440	

1930-2000	Radio Bucharest, Romania	7145	9690	9750	11940
1930-2000	M-F Radio Canada Int'l, Montreal	9655	11945	15325	17875
1930-2000	Radio Korea, Seoul, South Korea	15575			
1930-2000	M-F Radio Portugal, Lisbon	9605	11740		
1930-2000	Voice of Republic of Iran	9022	9770		
1935-1955	RAI, Rome, Italy	7275	7290	9575	
1940-2000	M-A Radio Ulan Bator, Mongolia	9575	11870		
1945-2000	All India Radio, New Delhi	9755	11860		
1950-2000	Vatican Radio, Vatican City	6190	7250	9645	

## 2000 UTC [4:00 PM EDT/1:00 PM PDT]

2000-2005	S-F Port Moresby, Papua New Guinea	3295	4890	5960	5985
		6020	6040	6080	6140
		9520			
2000-2005	Radio Zambia, Lusaka	3345	6165		
2000-2010	M-A Vatican Radio, Vatican City	6190	7250		
2000-2010	A Radio Zambia, Lusaka	3345	6165		
2000-2010	Voice of Kenya, Nairobi	6100			
2000-2015	Radio Togo, Lome	3220	5047		
2000-2015	M-A Radio Ulan Bator, Mongolia	9575	11870		
2000-2015	Trans World Radio, Swaziland	3205			
2000-2025	Radio Beijing, China	6955	7480	9440	
2000-2025	Radio Bucharest, Romania	5990	6105	7145	7195
		9690	9750	11940	
2000-2030	KNLS, Anchor Point, Alaska	7355			
2000-2030	Radio Australia, Melbourne	6035	7205	7215	9580
		9620			
2000-2030	Radio Budapest, Hungary	6110	7220	9585	9835
		11910	15160		
2000-2030	Radio Canada Int'l, Montreal	9555	6030	11945	15325
		17820	17875		
2000-2030	Radio Ghana, Nairobi	3366	4915		
2000-2030	Radio Korea, Seoul, South Korea	15575			
2000-2030	Radio Norway International, Oslo	9590	15310		
2000-2030	Radio Polonia, Warsaw, Poland	7125	7145	9525	
2000-2030	Swaziland Commercial Radio	6155			
2000-2030	Voice of Nigeria, Lagos	7255			
2000-2030	Voice of Republic of Iran	9022	9770		
2000-2045	All India Radio, New Delhi	7412	9755	9910	11620
		11860			
2000-2045	WYFR, Oakland, California	11830	13695	15170	15220
		15375	15440	17750	21525
2000-2050	Radio Pyongyang, North Korea	6576	9345	9640	9977
2000-2056	Radio RSA, South Africa	7270	9610		
2000-2100	M-A ABC, Alice Springs, Australia	2310	[ML]		
2000-2100	ABC, Katherine, Australia	2485			
2000-2100	M-A ABC, Tennant Creek, Australia	2325	[ML]		
2000-2100	(US) Armed Forces Radio and TV	9700	15330	15430	
2000-2100	BBC, London, England	5975	6005	6180	9410
		9515	12095	15070	15260
		15400	17760		
2000-2100	CBC Northern Quebec Service	9625	11720		
2000-2100	CBN, St. John's, Newfoundland	6160			
2000-2100	CBU, Vancouver, British Columbia	6160			
2000-2100	CFCF, Montreal, Quebec	6005			
2000-2100	CFCN, Calgary, Alberta	6030			
2000-2100	CHNS, Halifax, Nova Scotia	6130			
2000-2100	CKWX, Vancouver, British Columbia	6080			
2000-2100	CFRB, Toronto, Ontario	6070			
2000-2100	(US) Far East Network, Tokyo	3910			
2000-2100	Radio Kuwait, Kuwait	11665			
2000-2100	King of Hope, Southern Lebanon	6280			
2000-2100	KVOH, Rancho Simi, California	17775			
2000-2100	KYOI, Saipan	9495			
2000-2100	Radio Baghdad, Iraq	15230			
2000-2100	Radio Malabo, Equatorial Guinea	9553v			
2000-2100	Radio Moscow, USSR	11675	11840	11950	12050
		13605	15405	15425	15475
		15535	15560		
2000-2100	Radio New Zealand, Wellington	12050	15150		
2000-2100	Radio Riyadh, Saudi Arabia	9705	9720		
2000-2100	Radio Zambia, Lusaka	9580			



# frequency SECTION

2200-2250	Voice of Turkey, Ankara	21525							
2200-2255	RAE, Buenos Aires, Argentina	7135	7160	9445	17760				
2200-2300	(US) Armed Forces Radio and TV	9690	11710						
2200-2300	BBC, London, England	6030	11790	15345	15430				
		5975	6005	6175	6180				
		7325	9410	9590	9915				
		12095	15070	15260					
2200-2300	CBN, St. John's, Newfoundland	6160							
2200-2300	CBU, Vancouver, British Columbia	6160							
2200-2300	CFCF, Montreal, Quebec	6005							
2200-2300	CFCN, Calgary, Alberta	6030							
2200-2300	CHNS, Halifax, Nova Scotia	6130							
2200-2300	CKWX, Vancouver, British Columbia	6080							
2200-2300	CFRB, Toronto, Ontario	6070							
2200-2300	(US) Far East Network, Tokyo	3910							
2200-2300	King of Hope, Southern Lebanon	6280							
2200-2300	KVOH, Rancho Simi, California	17775							
2200-2300	Radio Australia, Melbourne	15160	15240	15320	15395				
		17795							
2200-2300 M-F	Radio Canada Int'l, Montreal	5960	9755						
2200-2300	Radio For Peace, Costa Rica	13660							
2200-2300	Radio Havana Cuba	7140							
2200-2300	Radio Moscow, USSR	9665	9765	9865	11710				
		11750	11780	11850	12060				
		13605	15245	15425	15440				
		15445	15495	15540					
2200-2300	Radio Moscow World Service	9490							
2200-2300	SBC Radio One, Singapore	5010	5052	11940					
2200-2300	Voice of America, Washington	15120	15185	15290	15305				
		15320	17740	17820					
2200-2300	Voice of Free China, Taiwan	15440	17845						
2200-2300	WCSN, Boston, Massachusetts	15300							
2200-2300	WHRI, Noblesville, Indiana	9770	17830						
2200-2300	WRNO, New Orleans, Louisiana	13760							
2215-2230	BBC, London, England*	11820	15390						
2230-2300 A.S	CBC Northern Quebec Service	9625	11720						
2230-2300	Radio Beijing, China	3985	6165						
2230-2300	Radio Jamahiriya, Libya	11815	15450						
2230-2300	Radio Korea, Seoul, South Korea	15575							
2230-2300	Radio Mediterran, Malta	6110							
2230-2300	Radio Polonia, Warsaw, Poland	5995	6135	7125	7270				
2230-2300	Radio Tirana, Albania	7215	9480						
2245-2300	All India Radio, New Delhi	6055	7215	9535	9910				
		11715	11745						
2248-2300	WINB, Red Lion, Pennsylvania	15145							
<b>2300 UTC [7:00 PM EDT/4:00 PM PDT]</b>									
2300-2315	BBC, London, England	5975	6005	6175	6195				
		7325	9410	9515	9590				
		9915	12095	15070	15435				
2300-2330	Kol Israel, Jerusalem	9435	11605	12080					
2300-2330	Radio Canada Int'l, Montreal	9755	11730						
2300-2330	Radio Mediterran, Malta	6110							
2300-2330	Radio Polonia, Warsaw	5995	6135	7125	7270				
2300-2330	Radio Sofia, Bulgaria	9700	11950						
2300-2330	Radio Sweden, Stockholm	9695	11705						
2300-2345	WINB, Red Lion, Pennsylvania	15145							
2300-0000	All India Radio, New Delhi	6055	7215	9535	9910				
		11715	11745						
2300-0000	(US) Armed Forces Radio and TV	6030	11790	15345					
2300-0000	CBC Northern Quebec Service	6195	9625						
2300-0000	CBN, St. John's, Newfoundland	6160							
2300-0000	CBU, Vancouver, British Columbia	6160							
2300-0000	CFCF, Montreal, Quebec	6005							
2300-0000	CFCN, Calgary, Alberta	6030							
2300-0000	CHNS, Halifax, Nova Scotia	6130							
2300-0000	CKWX, Vancouver, British Columbia	6080							
2300-0000	CFRB, Toronto, Ontario	6070							
2300-0000	(US) Far East Network, Tokyo	3910							
2300-0000 M-A	KUSW, Salt Lake City, Utah	15580							
2300-0000	KVOH, Rancho Simi, California	17775							
2300-0000	Radio Australia, Melbourne	15160	15240	15320	15395				
		17795							
2300-0000	Radio Baghdad, Iraq	6120							
2300-0000	Radio for Peace, Costa Rica	13660							
2300-0000	Radio Jamahiriya, Libya	11815	15450						
2300-0000	Radio Japan, Tokyo	11800	15195	17810					
2300-0000	Radio Moscow, USSR	9530	9765	9865	11710				
		11750	11780	12060	13605				
		15560	17570	17685	17740				
		17850	17860						
		9655	11905						
2300-0000	Radio Thailand, Bangkok	15300							
2300-0000	WCSN, Boston, Massachusetts	9770	17830						
2300-0000	WHRI, Noblesville, Indiana	13760							
2300-0000	WRNO, New Orleans, Louisiana	5950	9505	13695					
2300-0000	WYFR, Oakland, California	11820	15390						
2315-2330	BBC, London, England*	5975	6005	6175	7325				
2315-0000	BBC, London, England	9515	9590	9915	12095				
		15435							
2320-2325 M-A	Radio Prague, Czechoslovakia	6055	9630						
2330-2355 M-A	BRT, Brussels, Belgium	9925	11695						
2330-0000 M-A	Radio Budapest, Hungary	6110	9520	9585	9835				
		11910	15160						
2330-0000	Radio Canada Int'l, Montreal	5960	9755	11730					
2330-0000	Radio Kiev, Ukrainian SSR	9640	9800	11790	13645				
		15180	15455						
2330-0000	Radio Korea, Seoul	15575							
2330-0000	Radio Tirana, Albania	6200	7065	9760V					
2330-0000	Voice of America, Washington, DC	17735	17820						
2330-0000	Voice of Vietnam, Hanoi	9840	12020						
2335-2345 M-A	Voice of Greece, Athens	9395	9425	11645					
2345-0000	BBC, London, England*	3915	6080	7180	9580				
2345-0000	Radio Berlin Int'l, E. Germany	6080	9730						
2348-0000	WINB, Red Lion, Pennsylvania	15145							

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## PANASONIC RF-B600

Panasonic's top-of-the-line world band receiver, the RF-B600, was introduced a while back, but is still quite up-to-date. What makes it particularly interesting just now is that production recently ceased in Japan, but Panasonic's warehouses still have quite a number in stock. This makes it a candidate for heavy discounting, so a window of opportunity for striking a rare bargain may be open during the coming months.

### A Portable That's Like A Tabletop Model

The 'B600 is something of a hybrid between a portable, which it is, and a tabletop receiver. It's designed to lay down flat, with

the controls facing you -- just like any tabletop receiver. But, unlike most tabletop models, the 'B600 runs off not only household current, but also batteries. It's a nice arrangement, because you can use it as a main receiver in the house, but also take it to the back yard or balcony, or even on automobile trips.

The only problem is that any set that qualifies as a tabletop model has to be fairly large and heavy, and the 'B600 is no exception. It's hard to imagine anyone trying to tote such a thing along as carry-on baggage, and if you put it in your suitcase you won't have much room left for anything else.

### Variety of Tuning Features Includes Two Bandwidths

The RF-B600 has the usual range of tuning features: tuning knob, up/down slewing, keypad frequency entry, and programmable channel memories. The tuning is fully synthesized and the digital frequency readout is to the nearest tenth of a kilohertz -- something of a rarity among shortwave portables. It also has a real signal-strength meter, not just a scattering of LED's. This meter also serves as a battery strength indicator. There's a switchable dial light, too, and you can switch the frequency display off to save batteries.

There are two bandwidths -- another rarity in a portable -- and two tone controls to

shape the audio for most pleasant response. And it receives utility and ham single-sideband signals better than do most portables. In fact, it works better than any other Panasonic model we've tested to date at *Passport to World Band Radio*.

### Reasonable Performance...

The set's performance, overall, isn't bad. It's reasonably sensitive and selective, which is fine. But the audio quality isn't quite up to Panasonic's usual high levels, simply because the speaker is rather small for a set of this size. Another problem is that the set's synthesizer is "laggy." It mutes between tuning increments, but takes a moment to come back to life. So, unless you tune very slowly, you get only snippets of sound. In fact, if you tune even at moderate speed, the set mutes and you don't hear a thing, so you have no idea what's on the stations you're passing by.

Another problem is that the set's dynamic range is not equal to what it should be for what amounts to a tabletop model. It overloads fairly easily with an outboard antenna, and in some parts of the world even with the built-in antenna.

### ...At A High List Price

Now, none of this, even when taken together, is all that serious. The problem is that this level of performance comes in a set that lists for \$749.95. You can do at least as well with the Magnavox D2999, which lists for slightly over half as much.

All of which brings me back to the point concerning the discontinuation of the Panasonic RF-B600. This set is well made -- better than the Magnavox offerings -- and comes with a two-year warranty. It is also unusually good at sorting out distant FM signals when the band is crowded. So, if the 'B600 is discounted to around 50-60% of its list price, it may well be worth considering, especially if you're looking for a tabletop model that's fully self-contained.



## GALAXY ELECTRONICS

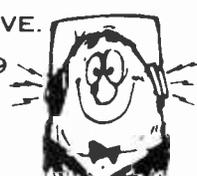
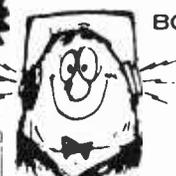
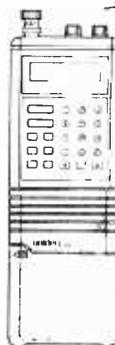
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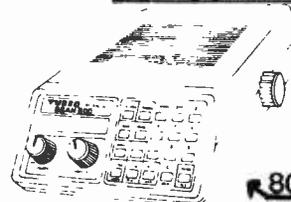


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## Gear up for DX Season!

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## The Cobra SR-15 Handheld 100-Channel Programmable Scanner



One of the newer additions to the ever-growing number of "mega-channel" handheld scanners is the Cobra model SR15. Measuring a scant 2-3/4"W x 6"H, and weighing only 10- 1/4 ounces, this one truly meets the meaning of a "pocket scanner." Its small size, coupled with its 100 channel capability, make the SR 15 quite versatile.

For such a small package, there is no lack of frequency coverage whatsoever. The SR 15 has a range of 29-54 MHz VHF low-band; 108-136 VHF civilian aircraft band, 136-174 VHF high-band, and 406-512 UHF and "T" bands. Scanning speed is a respectable 15 channels per second, and a selectable delay feature allows a programmable 3 second delay to be added to any or all 100 channels. Also, any channel or channels can be locked out should you not want to hear it/them.

### Priority Feature Included

In addition, a "priority" feature is provided. A user-determined frequency of major interest may be programmed into channel 1. When the feature is activated, the scanner will sample radio traffic on channel 1 every three seconds (while scanning other channels). Should any activity take place on channel 1, it takes priority. When the transmission is over, the SR15 then reverts back to its normal scanning function.

Another useful feature is the "search" capability. You can explore any given segment of any of the bands that the SR 15 covers. All you have to do is program the search limits into the scanner and touch the "search" button. Found frequencies may be entered directly into the scanner's memory or written down for future usage.

Search increments are nonadjustable and are factory-programmed into the SR15's internal memory. Also, in addition to automatic searching by this process, the user may also "step-search" manually between two frequency limits with two "up/down" buttons thoughtfully provided by the manufacturer (these buttons, labeled with "arrow" symbols, also double as the "limit" and "hold" buttons).

Separate buttons for "Scan" and "Manual" functions are provided, as well as a keylock button, to prevent accidental entries via the keypad or programming changes as a result of handling the scanner in operation.

### Over 100 Channels

The SR 15 offers 100 user-programmable channels broken down into five selectable banks of 20 each. So, in addition to being able to lockout individual channels at will, the user also may lock out entire banks of channels as well. This allows a lot of versatility in that bank 1 can be filled with police channels, bank 2 with fire departments and so forth. The different banks can be turned on and off at will. So, not only can you quickly lock out entire groups of channels of low interest, but you may also lock out individual channels *within* these banks as well as the banks still being monitored.

### Sidelit Frequency Display

All scanner functions including frequency display and bank indicators are displayed on the LCD on the scanner's face. It's sidelit with two tiny bulbs. A built-in timer automatically shuts the light off after about 20 seconds.

Separate thumbwheel-type controls for volume and squelch are located on the scanner's side, with a separate off/on switch, battery charge indicator LED, and antenna BNC connector on the top of the unit.

Provided with the SR15 are a narrow-duck antenna, wall-mount charger, NiCad battery pack, and a well-made leatherette carrycase and earphone. Jacks are provided on the scanner for the earphone and charger as well. The radio itself is housed in a handsome dark-grey metal-faced cabinet with a rugged plastic casing. All buttons are of soft rubber and are clearly labeled.

### But How Does it Work?

In use, the SR15 is a "mixed blessing." Its small size and rugged construction make it very easy to carry around, and it fits in the palm of the hand so well one is hard pressed to believe it has so many features in such a small package. The internal NiCad batteries take nearly 14 hours to charge completely, but do yield about eight hours listening time per charge.

Though the audio from the unit is clear and crisp but tends to distort slightly at full volume (though not enough to create a real problem). The keypad buttons feel good, but are close together and could be hard for a "big" person to use easily.

### Beep Beep

Though on the small side, the sidelit LCD readout is functional and quite readable in all lighting conditions. When programming data via the SR15's keypad, a "beep" is emitted each time a key is depressed. Though this allows the operator to know an entry has been made, it can also be slightly annoying when entering 100 channels worth of frequencies or each time any key is pressed thereafter.

The SR15 does have very good sensitivity, but the rubber duck antenna furnished with the scanner does not utilize the radio's full capacity. Using it seems to weaken reception. However, replacement with a whip-type extendible antenna or a duck-antenna designed for amateur radio use really wakes the unit up! An improvement here would be welcome.

### Rugged Radio for Rugged Monitors

The radio itself is very rugged, and seems to survive well in harsh environments or with hard handling. Reception on VHF and UHF bands is very good, but lacks slightly on the VHF low band (this, however, was later found to be a result of the antenna problem previously noted, though performance on low VHF was slightly worse than the other bands). However, the civilian aircraft band reception (108-136 MHz) is slightly better than that usually found on other handhelds.

Image rejection is good to fair, though aircraft transmissions do come through on the VHF high band at times. As far as "birdies" (i.e. spurious signals) go, there are about as many as those usually found in most handheld scanners.

For the average scanner user, this radio does well.

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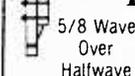
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### Closing Comments

Unfortunately, the SR 15 does not cover the 800 MHz bands. If it did, with its size and features, it would be near ideal. As 800 MHz seems the "band of the future," it seems logical to include it in new monitoring equipment. In its stead, the SR 15 boasts a lot of channel capacity and a lot of coverage. It is well-made, has a lot of usable features, and is very "user-friendly." Operation is simple, with an illustrated booklet of directions in case you forget some manner of programming. At around \$239, it is worth the price.

Finally, for those familiar with the Bearcat 70XLT, the SR15 is nearly identical in appearance, though sports the 100 channel coverage of the recently-discontinued Bearcat 100XL. Gee whiz. I wonder who makes this scanner for Cobra? Those with the correct answer get two gold stars!



## Build a Simple AM Radio

I have a number of experimenter friends who are skilled at circuit construction, but they aren't willing to build anything. They tell me that they would love to become involved with experimenting, but "I can't find the parts I need."

The fact of the matter is the parts are out there if you are willing to look for them. The day of the corner parts store has been gone for a long time so you *must* consider buying some of your components by mail today. I do not find this a hardship, since numerous electronics surplus dealers provide free catalogs. I buy all of my parts by mail, owing to a rural location that is 200 miles from the nearest full-blown supply house.

At the end of this article you will find a list of dealers from whom I buy components. I suggest you send for their catalogs. If Radio Shack doesn't have what you need, shop by mail! Don't overlook ham-radio flea markets as an excellent source of small parts. You will find hamfests listed elsewhere in *Monitoring Times*.

Discarded transistor radios and TV sets contain a wealth of small parts that can be reused. If you take advantage of this approach, your parts larder will grow rapidly.

### Are Precise Values Vital?

You may worry about matching the specified component values when you read an article. Most circuits will work satisfactorily with resistor and capacitor values that are within 25% of the stated value. For example, if the circuit calls for a 430-ohm resistor, you may use a 470-ohm unit. Likewise with capacitors, such as substituting a 0.001uF disc capacitor for a 0.0015uF unit.

In a like manner, if a 100-pf variable capacitor is specified, you may use a 75 or 140-pf unit. The larger capacitor will provide greater tuning range than the 100-pf value, and the 75-pf variable will reduce the tuning range. Also, you may remove some of the rotor and stator plates from the 140-pf capacitor, thereby making it a 100-pf unit. Innovation goes hand in hand with experimenting!

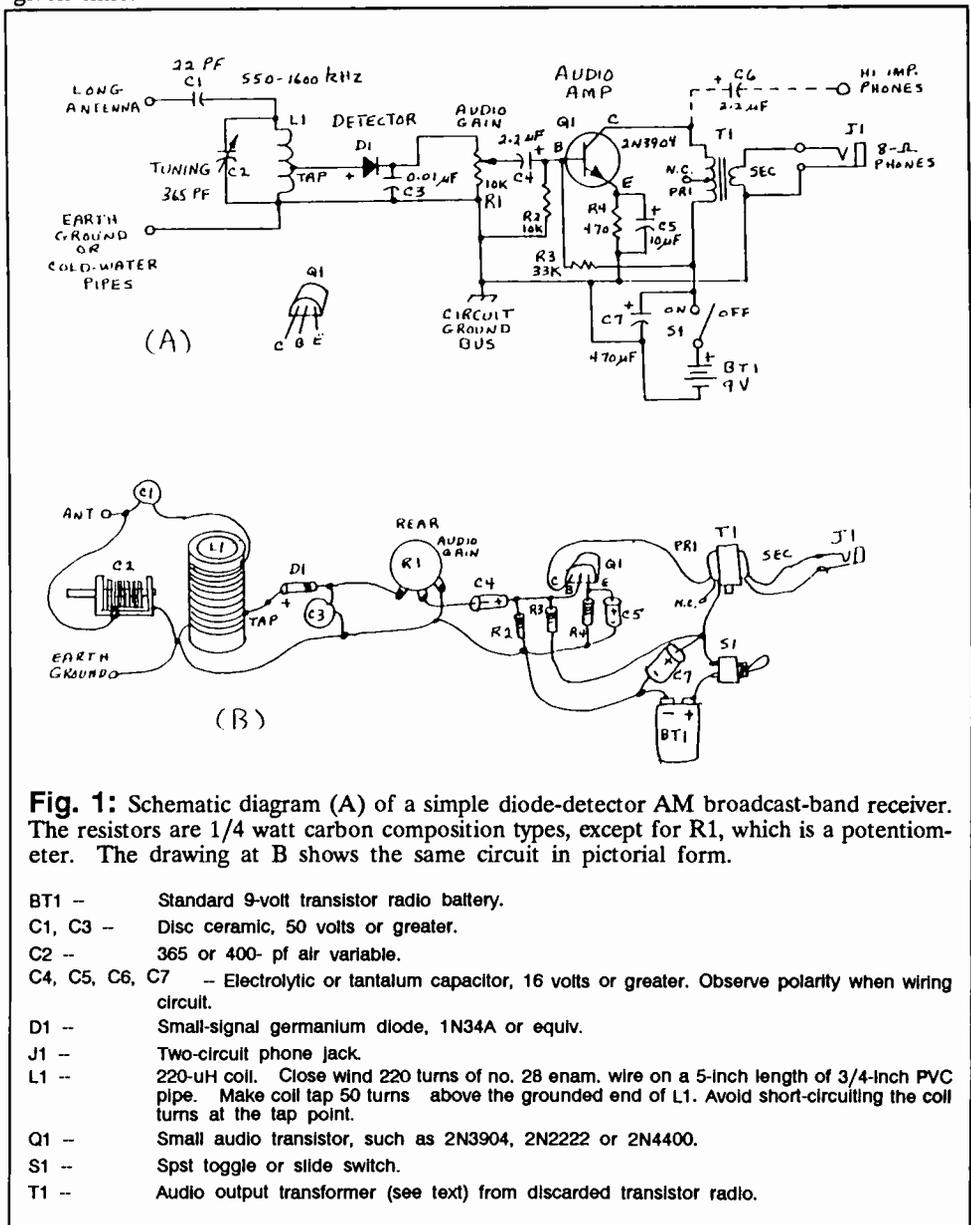
Many transistor substitutions are similarly possible. You should obtain an up-to-date transistor substitution manual. Many circuits may, for example work perfectly when a 2N2222 or 2N4400 is substituted for a 2N3904 transistor, or vice versa. The

important items to consider are: (1) The maximum safe collector-to-emitter voltage rating. (2) The fT (upper frequency specification). (3) Maximum continuous collector current. (4) The dc or ac beta (gain).

I would be lost without my *Motorola Small f-Signal Transistor Data* book (available from Motorola in Phoenix, AZ). I am able to compare the transistor electrical characteristics when I need to make a substitution. This enables me to use the transistors I may have on hand at a given time.

If the project you're duplicating calls for 1/4 watt carbon resistors, you may use 1/2-watt units. They occupy slightly more space in your circuit, but they will work fine. If resistor substitutions must be made, always use the next higher wattage rating.

When working with coils don't be hesitant to use, for example, no. 24 enamel wire in place of no. 22 enamel wire. The length of the coil winding will be shorter, but the performance will be approximately the same. In a similar vein, if the coil form is supposed to be 1 1/4 inch OD, don't hes-



itate to use one that has a 1-inch OD. You may need to add a couple of extra coil turns in order to obtain the specified inductance, but it is not a major problem.

## A Simple Project You can Build

Let's put something ordinary up on the workbench this month. It'll help familiarize you with circuit diagrams and how they relate to the hookup of the components. In order to simplify matters I am presenting schematic and pictorial diagrams of the project.

The circuit in Fig. 1 is for a crystal-detector AM radio which has a one-stage headphone amplifier. A 9-volt transistor-radio battery provides the power to operate the amplifier. The signal from the antenna is fed to coil L1. Tuning capacitor C2 is adjusted to resonate L1 at the desired signal frequency. This provides maximum output in the headphones. It also helps to reject unwanted AM broadcast signals that are higher and lower in frequency than the desired one. This is known as *selectivity* -- selecting only the desired signal frequency.

Detector diode D1 is tapped near the grounded end of L1. If it were connected to the top of the coil it would spoil the selectivity or sharpness of the tuning when C2 was adjusted to resonate L1. This is called *loading* of the tuned circuit. The diode is a low-impedance device, so it must be tapped at a low-impedance point on the tuned circuit, as shown.

Radio-frequency energy passes through D1 and is changed (rectified) to pulsating dc. These pulses are audible in headphones, and appear as voice energy or music. However, the rectified signal level may be too low to properly excite a pair of phones, so we have added the audio amplifier, Q1. It boosts the audio signal that comes from D1. The stage gain is on the order of 15 db.

Q1 operates as a Class A amplifier. Forward bias for Q1 is provided by resistive divider R2 and R3. A class A amplifier operates linearly, and this ensures low distortion. Output from Q1 is routed to transformer T1. It steps the Q1 collector impedance from a few thousand ohms down to 8 ohms for the headphones. This impedance transformation is necessary if we are to obtain maximum headphone volume. The greater the mismatch the worse the signal-power transfer: Maximum power transfer takes place when two unlike impedances are matched.

The transformer you use for T1 is not critical. I suggest you remove the output transformer from a discarded transistor radio. It will probably have a center-tap

wire on the primary side. If so, ignore this lead as shown in Fig. 1. If you know where to buy a new miniature audio-output transformer, choose one that has a 1000- or 2000 ohm - primary impedance. The secondary should be designed to connect to an 8-ohm load.

C6 is shown with dashed lines in Fig. 1. You may add this component if you have high-impedance headphones. The T1 secondary winding is not used if this modification is made. Also, you may replace T1 with a 4700-ohm resistor if you use the C6 modification.

C7 is used from the +9-volt line to ground in order to overcome the internal resistance of the battery. C7 ensures that a proper ac ground is provided for Q1. Without C7 in the circuit it is possible for Q1 to self-oscillate and ruin the quality of the received signal.

A pictorial diagram of the circuit seen in fig. 1A is presented at B of Fig. 1. Study both diagrams to learn how the schematic diagram relates to the actual hookup of the circuit.

## Construction and Use

You can build this simple radio on a piece of wood or perforated board. Keep the leads short, as mentioned last month. If you decide to build this project on a wooden base, you may use multilug terminal strips for component tie points. They may be attached to the wooden base with small wood screws.

Your antenna should be long, single wire. Make it as long as practical. The greater the wire length the stronger the

received signal. I suggest a length no shorter than 50 feet for urban dwellers. If you live some distance from AM broadcast stations, try to use 100 to 200 feet of wire. A proper earth ground is essential to good performance. Generally, the cold-water pipes in your home will provide an adequate earth ground for the receiver.

Connect an antenna and ground to the receiver. Attach the headphones and turn on the power. Adjust C2 until you hear a radio signal. Use R1 to provide comfortable headphone levels during reception. You will be amazed at how clean and clear the audio from this receiver is. It can be fun to plug the output of the receiver into your Hi-Fi system and hear the music at room level.

If you have two or more AM stations in your immediate area that are close together in frequency, you will find that they tend to interfere with one another. This is one of the tradeoffs when you use a crystal-detector radio: The input circuit of the radio is not selective enough to separate these loud stations.

## Final Comments

I have attempted to walk you through the preliminary steps toward becoming an experimenter. I hope you have found this article interesting and helpful. Our *Monitoring Times* series will follow this approach in the months ahead. We will be discussing a variety of simple projects that you can build as you learn more about electronics. Meanwhile, have fun with the circuit in Fig. 1!



## Mail-Order Component Suppliers

Surplus sales of Nebraska	1315 Jones St., Omaha, Nebraska, 68102 (402) 346-4750
DIGI-KEY Corp., Small Parts Center	701 Brooks Ave. South, P.O. Box 677, Thief River Falls, MN 56701
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BCD Electro	P.O. Box 12685, Lake Park, FL 33403-0685 (407) 848-8236.
Circuit Specialists	P.O. Box 830119, Richardson, TX 75083-0119, 1-800-456-2233 (order line). Send \$1.00 for catalog.
John J. Meshna, Jr.	P.O. Box 3047, Scottsdale, AZ 85257.
Fair Radio sales	19 Allerton St., Lynn, MA 01904 (617) 595-2275/
R & D Electronics	P.O. Box 1105, 1016 Eureka St., Lima, OH 45802.
Hosfelt Electronics	1202H Pine Island Rd., Dape Coral, FL 33909 (813) 772-1441
All Electronics Corp	2700 Sunset Blvd., Steubenville, OH 43952, 1-800-524-6464.
Oak Hills Research catalog)	P.O. Box 567, Van Nuys, CA 91408. 1-800-826-5432.
Amidon Assoc. Inc.	P.O. Box 250 Luther, MI 49656 (small parts and QRP transmitter kits. (SASE for catalog).
Diamondback Electronics Co.	12033 Otsego St., N. Hollywood, CA 91607. IToroid cores, pot cores and ferrite rods.
Jan Crystals	P.O. Box 12095, Sarasota, FL 34239. (813) 953-2829.
	2400 Crystal Drive, Fort Myers, FL 33907.

## Simple and Effective

# Antenna Ideas for the Sony 2010

by D.A. Michael, W3TS

I really like my Sony '2010 and I use it to listen to the ham bands most of the time. Because hams don't have megawatt transmitters like the shortwave broadcast stations, some of them are rather weak when using only the whip antenna on the Sony.

After thinking about using an outside antenna, I decided to try a few indoor wires first. I tried using the Sony wire antenna that is included with the radio but performance was not much better than with the whip. After looking at the schematic of the 2010 I saw why. Sony bypasses the RF Amplifier section when the external antenna is plugged in.

Now this is a good idea if you are plugging in a large antenna or a good long wire. But if you only use 10 or 20 feet of wire strung around the room, it is not any better than the whip with the RF amplifier operating.

### A Better Ground

My first idea was to hook a better ground to the radio. This is a bit of a problem with the Sony as there is no ground connection of any kind. Checking the schematic again I saw the antenna jack was hooked to the radio ground. But if you use the required plug it will open the RF amplifier.

I tried to push a small plug in part way but it did not stay in very well. Then I ground down a banana plug on a grinding wheel to 1/8th inch diameter, and connected four feet of wire and a alligator clip to the banana plug. Push the banana plug in far enough to make connection to ground and hook the alligator clip to a good ground such as a cold water pipe. Now the Sony really plays.

### More Success?

After this success I still wanted a bit better antenna than the whip. I knew that any antenna that I used would have to connect to the whip, otherwise the RF amplifier would be switched out.

I used a large croc clip and it worked fine but it mars up the whip. To avoid this I used a fuse clip, the kind of fuse clip that is made to mount onto a printed circuit board and accept a 3AG type fuse (see photo 3). This is a very good fit over the second section of the whip.

To this clip I attached 16 feet of wire. I chose 16 feet because it is a easy length to use indoors and it is a quarter wavelength on 20 meters. On the other end of the wire I attached a clamp-type clothes pin so the antenna can be clipped to a curtain or some other convenient point.

### Yes! Success!

Now the Sony really plays on the ham bands. With the ground and 16 foot antenna hooked up, I receive many ham signals that are almost full scale on the LED S-meter. Sometimes it is necessary to turn on the attenuator to prevent overload!

Because the antenna and ground are small and the '2010 very compact, I can slip the whole works into my suitcase whenever I travel and keep up with the activity on the ham bands as well as all the interesting SWBC stations.

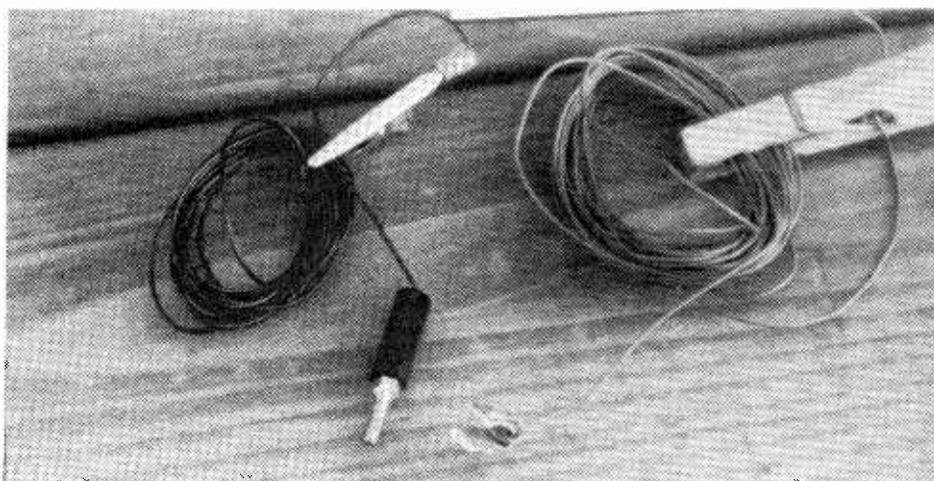


Fig.1: 2010 ground wire (left) and antenna wire (right)

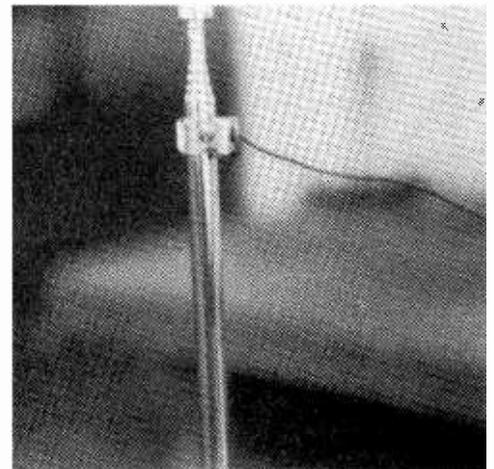


Fig.2: P.C. fuse clip used to hook onto 2010 antenna rod

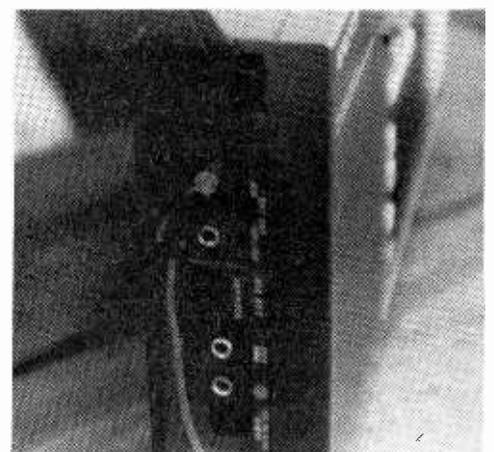


Fig.3: Modified 2010 ground plugged in

# Improving Selectivity on any 455 kHz Receiver

by Pete Haas

The following modification is electrically compatible with any HF shortwave receiver or scanner having a 455 kHz IF strip. It will greatly improve its selectivity. As an added bonus, it will simultaneously increase receiver sensitivity.

Because of physical variations in the receiver internals (the new filter and support circuitry will be larger than the filter being replaced) placement of the project is up to the ingenuity of the constructor. The filter and amplifier can usually be mounted in an open area inside the receiver cabinet and connected with shielded cable.

The 455 kHz filters are available from Fox-Tango Corp., Box 15944, West Palm Beach, FL 33406 (about \$60.00 each). Collins filters are available from Universal Shortwave, 1280 Aida Drive Reynoldsburg, Ohio 43068 (about \$150.00 each).

Collins filters display the following characteristics.

- 1.2 kHz. Ultra tight SSB filter.
- 1.9 kHz. Very tight SSB filter.
- 3.8 kHz. Super tight AM filter (also works on narrow band FM with a bit of distortion).
- 5.8 kHz. Very tight AM filter.

## Construction

Figure 1 shows the schematic for the filter/amplifier combination. It can be constructed on a small piece of perfboard

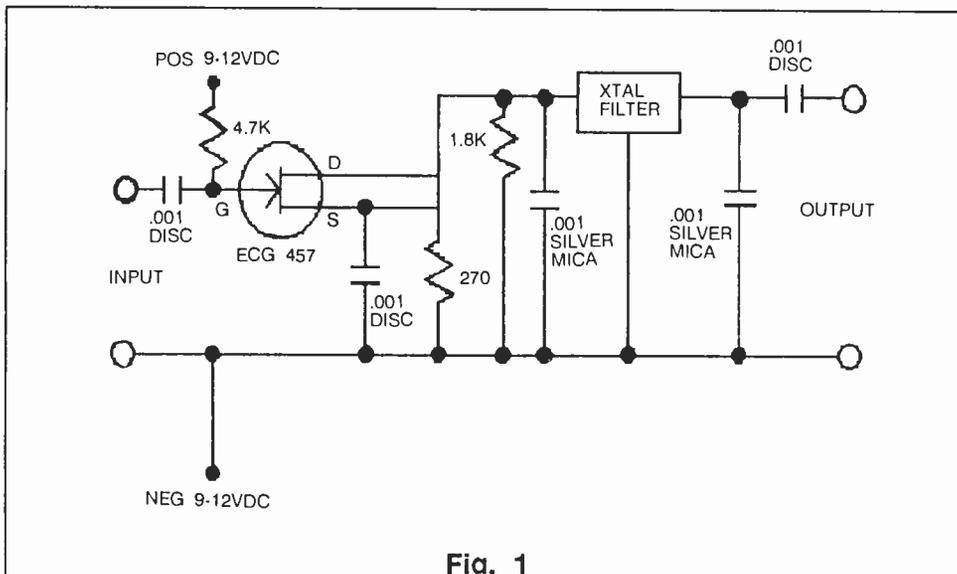


Fig. 1

and powered from the receiver's 9 - 12 volt supply. The photographs show typical stock IF filters. They're roughly 1/2 inch gray or black plastic cubes and usually have 455 stamped or imprinted on the top -- that's how you know you've located the IF filter. As you read the imprinting from left to right, the input lead is on the left, output on the right and ground in the middle.

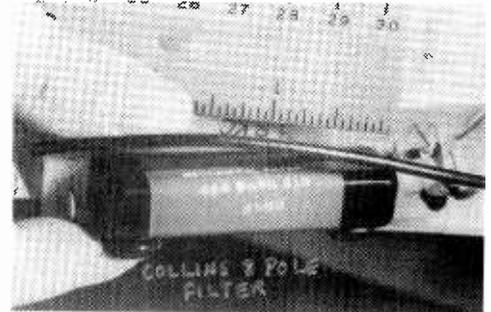
It helps to have a schematic diagram handy to identify the receiver circuit board holes after pulling the stock filter. Cut a pair of shielded cables and attach the new filter to the appropriate holes. Hook up the power leads and away you go.

The crystal filter circuit board is light in weight and can be mounted with a dab of glue or double sided tape.

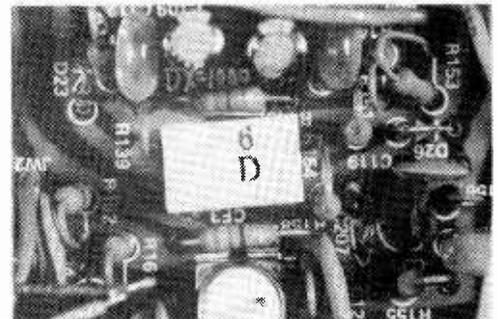
## What to Expect

Depending on which filter(s) you chose, selectivity and adjacent channel rejection can be vastly improved. The Collins filters in particular are of very high quality with response graphs that look like torpedoes. The 3.8 kHz. filter is best for AM although music fidelity, while clear, will be limited in high frequency response.

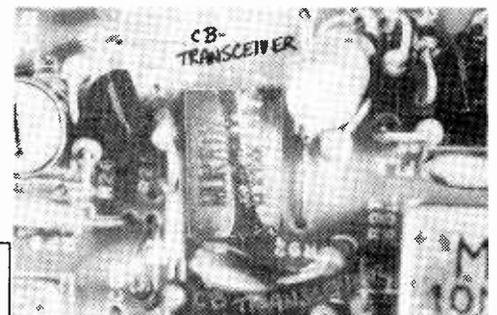
For SSB reception, the 1.2 and 1.9 kHz filters are like the difference between night and day compared to most stock filters. And as a nice bonus, no matter which filter is chosen, the amplifier circuit actually boosts the IF signal more than the filter attenuates it -- which is about 6 to 10 dB.



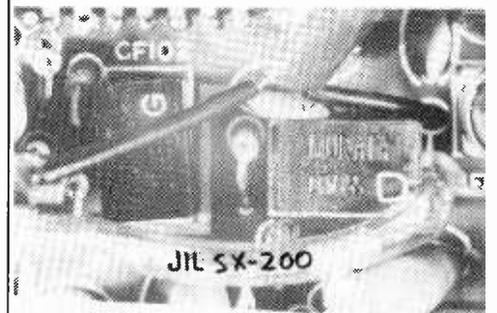
Collins 8 Pole Filter



Typical Stock IF Filter installed in a Bearcat DX-1000



Stock filter installed in a CB transceiver



Typical stock IF filters in a JIL SX-200

## A Simple Random-Wire Antenna

This month, we're going to feature the "Random Length" antenna. It's a good, all-around monitoring antenna. And, just incidentally, if you make this antenna high enough and of a particular long length, it can function as a Marconi inverted-L antenna. Make it low and very long and it can be a Beverage wave-antenna!

The random-length antenna is possibly the easiest antenna of all to make and to erect. That's because, as you can see in figure 1, this antenna -- including its lead-in, is just one continuous piece of wire. It's suspended in the air by two insulators attached to poles, trees, buildings, or some other high point.

### Excellent All-Rounder

When made very high and long, these antennas offer excellent performance for all-around monitoring. But even if you don't have too much space to use for the antenna, it's still likely to perform satisfactorily. Over the years, I've found random-length antennas to offer good signal output and relatively little problem with directional nodes. Wherever I go, I put one up, in addition to whatever else I may tie to the sky.

### How Big Is Up To You

The length of wire you use for this antenna is limited only by your space and how much wire you have available. You may use just about any wire you have available. Soft copper will eventually break if the antenna is long. Hard-drawn copper is better, as is commercial antenna wire. Wire as small as number 20, or even 30 will work, but, like soft copper wire, is likely to break in time. Go instead for number 12, 14, or 16 wire. It's more appropriate. I have used copper, iron, and steel, all with good results.

Readers of this column may remember my writing on the use of a steel cable dog-run as a random-length antenna at my previous home. I sometimes talk on 75 meter phone to a ham in Maine, Amos, W1EBJ. Amos swears that that dog-wire put the best signal into Maine that I have shown him so far!

### Higher and Longer is Better

The higher and longer you make this antenna, the better your reception should be. I usually use plastic or nylon rope or cord to support the insulators. Just make the antenna long enough to fill whatever length of space you have. The insulators can be purchased commercially, or made of plastic as shown.

Use an antenna tuner with this antenna if you wish, but in most cases it really won't improve the readability of the signals. Tuners tend to peak the noise along with the signal, and readability usually isn't helped by that.

So have fun. It's a simple project and one that works. Before we get into the cold weather, make time some weekend to hook up a random wire. You'll thank yourself during those cold, snowy nights by the radio.

### RADIO RIDDLES

#### Last Month's Radio Riddle:

Last month I referred to the fact that there is at least one antenna design in which an antenna seems to be constructed out of nothing! What guess did you come up with? The space-vehicle plasma-antenna might have come to mind, as the streams of plasma which serve as the radiating

elements are a next-to-nothing gas. Some may have thought of the "image antenna," the mirror reflection-type action in the ground beneath the Marconi quarterwave antenna. Both of those guesses would seem to be fairly reasonable answers, but neither is what I had in mind when I asked the riddle.

The best answer that I can come up with is the "slot antenna." To make a slot antenna, a slot is cut in a conducting surface, such as a sheet of metal, and a feed-line is run to the slot in the conductor and attached to the edges of the metal slot. Taking out metal and leaving a hole makes an antenna! Slot antennas are much used on aircraft, where the slot is filled-in with an insulator, and the flat surface of the antenna then presents no wind resistance. Although this is an old design, I'm tempted to say "What won't they think of next?"

#### This Month's Radio Riddle:

Old timers and antenna buffs often categorize popular non-beam antenna designs into two groups. Each group is named for the man who devised the basic prototype of the antennas in that group. Marconi is one of these men. Who was the other, and what basic design got him that honor? You can find the answer right here, next month.

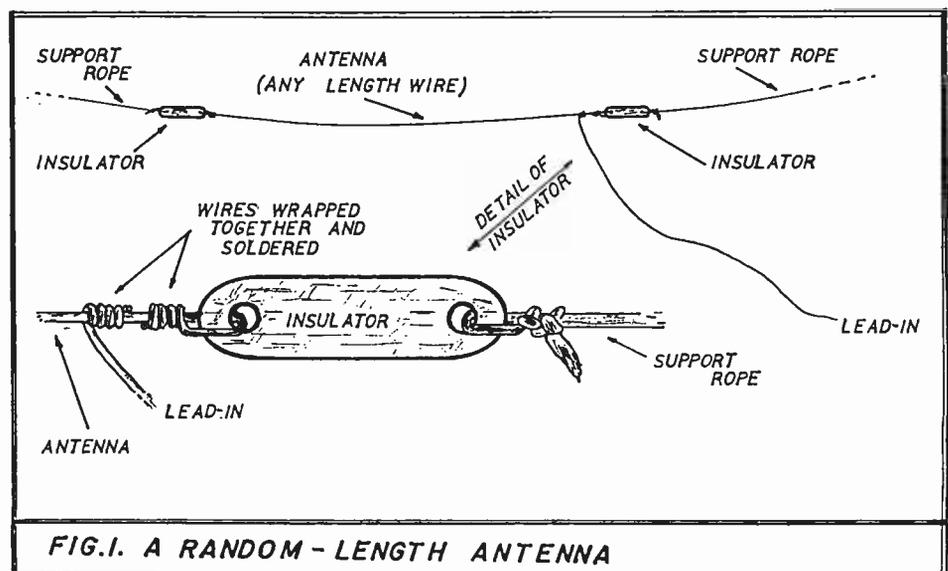


FIG. 1. A RANDOM-LENGTH ANTENNA

**"I'D LIKE TO STOP  
PUBLIC LAND ABUSE BY MYSELF.  
BUT THE BOTTOM LINE  
IS THAT I NEED YOUR HELP."**



Some individuals, either through ignorance or spite, are defacing our recreation areas, killing our wildlife, and destroying our history. It's more than a shame. It's a crime.

And we need your help to stop it.

Right now, in your area, there are good guys--businesses and corporations--who are dedicated to saving our public lands.

If you write to us, we'll tell you how your organization can join them

to help stop this senseless abuse. Let's keep public lands something the public can be proud of.



Write:  
Take Pride in America  
P.O. Box 1339-B  
Jessup, MD 20794



**BAD GUYS ABUSE PUBLIC LAND. GOOD GUYS SAVE IT.**

**Q.** Is it all right to use the power adaptor that came with my Sangean ATS-803 in a country with "110-130 VAC, 50 Hz" power? (Brian Jones, San Antonio, TX)

**A.** Yes. The important specification is the voltage which should be within about 10% of the power specification. A 60 Hz power supply may run a little warmer at 50 Hz, but should not get hot. If it does, switch to battery operation or get an appropriate adaptor.

**Q.** My Grove TUN-3 MiniTuner works best on some frequencies and my Yaesu FRT-7700 better on others. Why? (Brian Jones, San Antonio, TX)

**A.** The MiniTuner is a passive preselector, not an impedance matcher. It allows only a narrow swath of spectrum to be received at any one setting to prevent overload and desensitization from intermod, images and dynamic compression.

The FRT-7700 is an impedance matcher ("antenna tuner" or "transmatch"); its purpose is to assure the most efficient transfer of all signals from the antenna cable to the receiver.

On those frequencies on which an antenna is naturally matched, a transmatch may offer little help, while a preselector will always sharpen the front-end selectivity of the receiver to resist strong-signal overload from

out-of-band powerhouses.

**Q.** What percentage of RTTY (radioteletype) signals can be monitored with conventional demodulators, and how many can be identified? (Brian Jones, San Antonio, TX)

**A.** Roughly 30-50% can be monitored, depending upon the capabilities of the equipment, and virtually all of them will eventually send an identifier. Several RTTY directories (Klingenfuss, Grove, others) which can help in identification are available from MT advertisers

**Q.** Is it possible to plan a shortwave antenna to receive a specific target area? I have been unsuccessful in hearing several stations from South Africa. (Alex Magqwala, Ottawa, Ont.)

**A.** Yes, but first ask yourself: Are the stations putting out enough power to be heard here? Are they beaming their programs in this direction? Are you listening to the right frequencies for the time of day (typically above 11 MHz during daylight hours, below 16 MHz for nighttime)?

Assuming that conditions for reception are favorable, then consider the following typical antenna plan for hearing Radio South Africa at 0200 UTC (10 p.m. EST) on 9580 kHz.

Using the formula: 468 divided by the frequency in MHz (9.58) equals the length in feet of a half-wave dipole, your ideal antenna would be 49 feet long, fed in the middle with any length of 50 ohm coaxial cable (RG-58/U or RG-8/U). The higher the frequency, the shorter the antenna.

Consulting a world globe, hold a piece of thread or string tightly against the globe, stretched between your location and your target area. This shows the signal path which should arrive broadside to your wire antenna (at right angles to the axis of the wire).

For example, if the shortest signal path is southeast, then the ends of the wire should point southwest and northeast so that the signal will arrive broadside to the wire.

On higher frequencies where the wire is now more than one wavelength, the pattern is a four-leaf clover; you may wish to consider this when you plan your ideal antenna installation.

Some listeners erect two wire antennas at right angles to each other, switching between the coax lines at the radio position by a common CB radio antenna switch or even a video game or TV/VCR "AB" switch. This allows trial listening for the best signal and may even allow rejection of some interference paths.

**Q.** Are there any frequencies which can be programmed into a scanner which can either detect or cancel out radar speed detecting equipment? (Stephen Wilson, Statesville, NC)

## BC200XLT MEMORY LOSS, 800 MHZ SENSITIVITY, CELLULAR RECEPTION

The scanner industry's most popular handheld, the Uniden BC200XLT, was worth waiting for. Two occasional problems reported to MT have been checked out with the factory.

Even though an internal backup battery is supposed to retain memory for up to thirty minutes with the battery pack disconnected, some users note that when the batteries are low, all memorized frequencies may be lost, especially during the process of plugging in or unplugging the AC wall charger. Uniden suspects that a low voltage spike commands the microprocessor to erase all memories.

All production units now have a filter capacitor installed in the battery pack to eliminate the problem. BC200XLT owners who experience this low-charge

memory loss should return the unit (even if cellular-restored) to the factory for free warranty repair: Uniden Customer Service, 6345 Castlegate Drive, Indianapolis, IN 46250.

Rubber duckies are flexible and unobtrusive, but poor antennas. They are designed for high signal levels. At 800 MHz, signals are notoriously weak and inefficient antennas make matters worse.

If a good outdoor, indoor or mobile antenna is out of the question, replace the rubber duckie with an adjustable telescoping antenna like the Grove ANT-8 for substantial signal improvement.

While the restoration of cellular telephone frequencies in the BC200XLT is a relatively simple procedure, it may void the owner's warranty. Still, 800 MHz scan-

ners have notoriously poor image rejection, and cellular bases are easily heard by simply adding 21.7 MHz to the cellular frequency which has been deleted.

This works, however, only if the sum of the two frequencies does not result in a frequency still within the disabled 869-894 MHz band. For example, a signal appearing on 870.03 MHz could be received on the Bearcat image frequency of 891.73 MHz; unfortunately, this frequency is also within the deactivated range.

On the other hand, a frequency slightly higher, say, 872.43 MHz, would have an image on 894.13 MHz, back in the receivable range on the BC200XLT. With cellular restoration, however, the entire 806-950 MHz range may be received without gaps -- at the risk of a voided warranty.

**A.** No. Radar speed detectors use 10,525 MHz and above; no scanner is capable of operation above approximately 1300 MHz. Even the ICOM R7000 tunes to only 2000 MHz maximum.

**Q.** My general coverage short-wave receiver has an FM mode. Who uses FM between 100 kHz and 30 MHz? (Doug Chalmers, Palo Alto, CA)

**A.** Wireless intercoms (160-190 kHz), old style cordless telephones (1.6-1.8 MHz), petroleum exploration and broadcast remotes (25-26 MHz), illegal CBers (26-28 MHz), hams (29-29.7 MHz) and conservation agencies (29.7-30 MHz). Foreign FM skip will also be heard above 29.7 MHz.

**Q.** I know what MUF (maximum usable frequency) is, but how is LUF (lowest usable frequency) calculated? (Brian Jones, San Antonio, TX)

**A.** Just as our eyes are frequency sensitive to the visible light portion of the electromagnetic spectrum, the ionosphere (electrically charged portion of the upper atmosphere) is sensitive to the radio ranges of the electromagnetic spectrum.

Radio waves may be bent (refracted), reflected or absorbed, depending upon the degree of electrical activity in the ionosphere and the frequency of the signal. The sun is the greatest influence on signal path propagation.

At any given time, radio waves above a certain frequency may penetrate the ionosphere and be lost to space; below a certain frequency range they may be absorbed and won't return. These two frequencies are the MUF and LUF.

LUF is usually about 25% of MUF during daylight hours, dropping to below 2 MHz at night. Influences such as lightning static and interference are not considered in computing propagation parameters.

**Q.** Are there any pocket calculators which provide time readouts for various parts of the world? Seems this would make a good SWL item. (Harry Simpson, Jr., Kansas City, KS)

**A.** Not that we've been able to determine. There are small clocks which can be queried for key cities' times, but not a calculator with alphanumeric capability for typing in a city and getting a reading or one with prearranged keys.

Casio has a "World Time" wristwatch with 29 time zones which, when stepped through by a pushbutton, moves a cursor line sequentially through a map showing the world time zones, displaying the number of hours difference between each zone and your local time.

**Q.** I'm new to the hobby and have trouble understanding the difference between kilohertz and megahertz, especially when I see frequency listings in MT and then look at my radio. Can you help solve the mystery? (Robert Gobar, San Francisco, CA)

**A.** Sure; no question is too fundamental to ask. We all learn by asking questions and that's why this column is here.

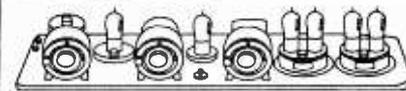
Radio waves have both electric and magnetic properties, oscillating (vibrating) back and forth at incredible speeds. The basic unit of vibration is called the hertz (formerly cycles per second).

Because these vibrations at radio frequencies are in the millions or even billions per second, we use prefixes as multipliers, "kilo" meaning 1000 times and "mega" meaning 1,000,000 times.

For example, the radio waves which reach your AM car radio vibrate about 1,000,000 times per second (or 1 megahertz, abbreviated 1 MHz; or 1000 kilohertz, abbreviated 1000 kHz); those which are received by your TV or scanner are hundreds of megahertz in frequency.

By convention, frequencies below 30 MHz are usually, but not always, expressed in kilohertz; thus, your shortwave dial may read 11760 (kHz) or 11.760 (MHz). Note that there will always be three decimal places difference between kHz and MHz.

Another example: our local police frequency is 154.875 MHz; this could also be expressed as 154,875 kHz, a rather large number. Even larger would be an expression of this frequency in the original basic unit: 154,875,000 hertz (Hz).



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A.R.C., P.O. Box 2-P4, Carlisle, MA 01741

**Q.** How has the dynamic range of an inexpensive receiver like the Sangean ATS-803A been so improved that a wire antenna can be clipped to it without using a preselector or tuner? (Brian Jones, San Antonio, TX)

**A.** It hasn't. Use a preselector if the wire is more than about ten feet long.

**Q.** I was told that MT had a note about a publication which specializes in Morse code, its history and stories. How can I get it?

**A.** For a subscription to Morsum Magnificat, send an international check or postal money order in the amount of 7 pounds sterling to Tony Smith, G4FAI, 1 Tash Place, London, England N11 1PA.

**Sharp AM selectivity on a receiver does not necessarily mean muffled audio. Doug Ferrell of Tallahassee, Florida, wrote to remind us that if the tuning dial is slightly moved up or down from center frequency, audio crispness may be enhanced once again even though the selectivity switch is in the narrow position.**

**Questions or suggestions sent to MT are printed in this column as space permits. If you prefer an answer by return mail, you must include a self-addressed, stamped envelope.**

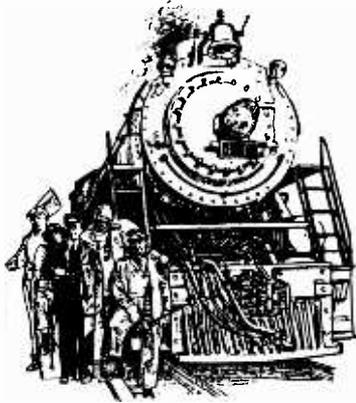
# LETTERS

continued from page 3

## Defective Puzzle

If you are going to publish puzzles, please make sure that they are not defective. A case in point is the "Ham Convention Hotel" by Joe Strolin on page 41 of the July issue. The first paragraph says that "ten" sought shelter, the fifth paragraph says "two" men placed in room 'A'. The seventh paragraph says that the "tenth and last" was taken from room 'A'. This is impossible as the tenth and last person was left in the lobby waiting to check in. The person taken from room 'A' was number one or two.

Richard Ferch  
Bricktown, New Jersey



## "Engineer" Bob Grove

Out of all the frequencies you published for railroads in your July issue, which ones are correct for my area? That's a lot of frequencies for me to have to guess.

Guy DeMarcio  
Philadelphia, Pennsylvania

The process is simple. Railroad radio in the U.S. and Canada is located between 106 and 162 MHz. Simply set your scanner to search and wait for some action. We forgot to mention one other railroad frequency guide: Tom Kneitel's "Rail Scan." It's indexed by railroad name. I don't know the price of the book or even if it's still in print, so you might want to contact the publisher, CRB Research, at Box 56, Commack, NY 11725. --Ed.

I have been an avid model train enthusiast for the past 30 of my 75 years. Naturally, I receive all the various train magazines, but I can't ever remember seeing *Monitoring Trains* at my local news stand. Are you a new publication?

Your July issue was noteworthy. The cover page of the old 1218 certainly brought back some fond memories of the steam era for me. And Mr. Grove's misty-eyed article about the engine that said, "I think I can" simply delighted my wife -- she claims that sexually, the expression fits me to a "T".

Well, keep up the good work and I can't wait to see what trains Mr. Grove will monitor next month!

C.C. Charlie  
Philadelphia, Pennsylvania

## The Elusive WCSN

I've heard a lot about WCSN, the World Service of the *Christian Science Monitor* but I have been unable to hear it. Can you tip me off?

Sure. The new schedule, official as of press time and scheduled to take effect on September 25, is as follows:

0000-0200	9850 to West Africa
0200-0400	9870 to E. Africa
0400-0600	9870 to W. Africa
0600-0800	7365 to Europe
0800-1200	Off
1200-1400	5980 to E. Canada
1400-1600	13760 to E. Canada/ Europe
1600-1800	21640 to S. Africa
1800-2000	21640 to E. Africa
2000-2200	9495 to Europe
2200-2400	9495 to W. Africa

That courtesy of Ann Case of George Jacobs and Associates, the station's frequency consultant. -- Ed.

## Domestic Broadcasting

I'm a broadcast band DXer of some 15 years and need some help. Where can I get more information on what's going on in the world of AM

radio in this country.

Ed Caney,  
Cedar City, Utah

Right here in *Monitoring Times*. Current Domestic Broadcasting columnist Paul Swearingen, who said in a recent issue of the hobby club bulletin "DX News" that he hadn't been DXing seriously or consistently "since 1982" is retiring. And we're taking the opportunity to revamp the column and make it more useful to active AM, FM and TV listeners. Watch for it! --Ed.

## Shuttle Mania

I enjoyed Ken Reitz's article on DXing NASA and the Space Shuttle. But I seem to remember that you once published frequencies for radio monitors as well. Is there a chance I can get a reprint of that article?

We'll do you one better. Although we don't know exactly when the shuttle will be launched, you'll find a complete and fully updated list of frequencies in this issue. Be sure to check out the shortwave frequencies that relay shuttle audio and have a chuckle to yourself. People without shortwave radios will have to pay to call one of those "976" numbers to hear the same thing we're giving you for free! -- Ed.

Letters should be addressed to **Letters to the Editor**, *Monitoring Times*, P.O. Box 98, Brasstown, NC 28902 and should include the sender's address and telephone number. Not all letters can be used. Those that are will often be edited and excerpted. Because of the volume of mail received, personal replies are not always possible.

## Credit Due

We haven't given credit where it's due -- The photos used in July's "Summer Listening, Summer Not," and in "Confessions of a Scanner Collector" in the August issue were all taken for MT by Harry Baughn.

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**To subscribe to MT  
please see page 87.**

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# "We Have Liftoff"

## TABLE 5

cont'd from page 9

138.300	AF	Command post channel 19 (paired with 383.0)
138.350	AF	
138.400	AF	Air-to-air alert 1
139.650	AF	
139.700	AF	ARRS Air-to-air
141.300	AF	NASA Variety net
141.600	AF	OV-10 air-to-air data
141.700	AF	OV-10 aircraft
142.155	AF	MARS Repeater out
142.300	AF	A-7 aircraft
143.450	AF	MARS Repeater in
148.065	AF	Command net repeater in
149.095	AF	Runway operations
148.185	AF	Radio shop
148.225	AF	Net maintenance
148.265	AF	Base supply
148.275	AF	Page-base net only
149.265	AF	
149.535	AF	Command net repeater out-phone-page
150.225	AF	SAC operations
163.4875	AF	
163.5125	AF	NASA ETR
165.1375	AF	Transportation
165.1625	AF	Fuels
173.0250	AF	Security-tactical 1
173.1250	AF	Command post-tower
173.1750	AF	Security-tactical 2
173.4125	AF	Civil engineering net
173.4375	AF	Hospital-CD net
173.5875	AF	Fire-tactical 1
228.8000	AF	NORAD
228.9000	AF	AR655 secondary refueling channel
234.7000	AF	NORAD
238.5000	AF	NORAD
251.0000	AF	NORAD
251.9000	AF	ARRS PAFB jolly ops channel
252.8000	AF	ARRS/training/TAC
256.6000	AF	NORAD
260.2000	AF	AR655 primary refueling channel
263.2000	AF	NORAD
263.8000	USCG	
264.8000	AF-NASA	Thinker A/C net
267.5000	NAVY	Sealord PAFB site (paired with 120.950)
270.4000	AF	NORAD
273.5000	AF	PAFB ATIS 1200-0400Z
275.0000	AF	NORAD
278.6000	AF	NORAD
282.0000	USCG	
282.8000	USCG	SAR operations eastern test range
287.8000	AF	NORAD
289.4000	AF	PAFB Clearance delivery (departing A/C only)
290.8000	AF	Approach/departure PAFB ATC channel 13
292.7000	AF	NORAD
294.6000	AF	Variety network channel
297.2000	AF	PAFB radar channel 14 (GCA discrete)
298.5000	AF	NORAD
302.4000	AF	NORAD
306.4000	AF	NORAD
311.0000	AF	SAC Primary channel
312.0000	AF	SAC U-2 operations
322.8000	AF	AR655 primary refueling
324.7000	NASA	T-38 A/C
325.5000	AF	NORAD
335.8000	AF	PAFB ground control channel 01 (paired with 121.700)

338.4000	AF	NORAD
340.8000	AF	Air-to-air OV-10 A/C
340.9000	AF	Approach/departure PAFB ATC channel 03 (paired with 125.1)
343.0000	AF	Net operations
344.0000	AF	NORAD
344.6000	AF	PAFB Metro: weather info
348.8000	AF	PAFB tower channel 02 (paired with 126.2)
351.0000	AF	Air-to-air A-7 A/C
351.2000	AF	
356.0000	AF	NORAD
358.3000	AF	Approach/departure PAFB ATC channel 12 (paired with 119.250)
363.9000	AF	Air-to-ground OV-10 ch 11
364.2000	AF	NORAD
366.3000	AF	AR655 secondary refueling
369.2000	AF	PAFB radar channel 15 (GCA discrete)
369.9000	NAVY	Sealord secondary channel (paired with 135.825)
372.2000	AF	PAFB dispatcher/base operations (paired with 128.8)
372.8000	AF	PAFB radar channel 16 DEC FEQ ETR (GCA discrete)
375.1000	AF	NORAD
378.8000	AF	PAFB radar area 7 TAC (GCA discrete)
381.8000	USCG	Air-to-ground
383.0000	AF	PAFB command post channel 19 (paired with 138.3)
383.2000	AF	Raven operations
383.3000	AF	
385.7000	AF	
386.2000	AF	NORAD
392.8000	AF	NORAD
395.1000	AF	
396.9000	AF	SAC
407.8500	USSS-NSA	Echo PAFB site TX
413.1000	AF	Marine operation
413.2750	AF	AFSC Security
413.4000	AF	MAC
415.7000	USSS-NSA	Foxtrot PAFB site RX
420.0000	AF	PAVE PAWS: Surveillance radar

## TABLE 6 KENNEDY SPACE CENTER

### Primary launch channels

101	171.0000	Utilities
102	165.1875	Telemetrics/meas
103	173.6875	Security pri ch1
104	162.6125	Launch support
105	173.6625	Pri pad ops
106	170.4000	GSA supply
107	170.1500	Base comm/press sup
108	163.5375	Pad/paging
110	165.4125	Orbiter ops
111	173.5375	Loan pool
112	148.4550	SRB recovery ops
113	149.1750	SRB recovery ops
116	173.5625	KSC fire pri ch1
117	173.4375	Hospital-CD net

### Secondary launch channels

201	171.1500	General main/fuels
202	165.6125	Telemetrics/MSBLS
203	173.1750	Security tac ch2
205	In use, freq unknown	
206	170.1750	GSA truck/rail sup.
208	155.7150	Link to Brevard Edc
216	173.7875	KSC fire tac ch2

### Tertiary launch channels

303	155.3700	Florida intercity
306	162.0125	GSA marine ops
308	170.3500	Base paging
316	154.160	link to Brev. city fire

### Backup tertiary launch channels

408	171.2625	Pad TV-coord direct
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## MAGAZINE COLLECTORS' DELIGHT

A loyal *MT* reader and listening hobbyist, Richard Hackney of Nashville, Tennessee, has magnanimously donated hundreds of magazines and books to be shared with fellow radio enthusiasts. They are available from *MT* at no charge except for shipping and handling. First come, first serve at only \$15 per box.

- BOX 1: 93 issues *Electronics Illustrated*, *Popular Electronics* '64-'72
- BOX 2: 75 issues *Popular Electronics*, *Elementary Electronics* '72-'81
- BOX 3: 82 issues *Popular Electronics* '74-'77, *Popular Electronics* '78-'82
- BOX 4: 93 issues *Radio Electronics* '76-'81, *Computers and Electronics* '82-'85
- BOX 5: 15 various books on electronics, shortwave, testing
- BOX 6: 180 issues *SPEEDX* '78-'87 complete **SOLD** *Communications* '83-'87 complete
- BOX 7: 66 issues *Radio Electronics* '84-'87, *Communications Handbook* '69-'78, *Communications World* '73-'79, several SWL books

We appreciate Richard's thoughtful gesture and know that there will be some happy *MT* readers benefiting from this windfall of literature.

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# STOCK EXCHANGE

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For Sale: INFO-TECH M6000, like new condition, used VERY little. With cable, manual, ref. books, etc. I pay shipping: \$635. Vernon [601] 896-6639.

For Sale: ICOM R7000 in mint condition with original box, manual and packing. Also includes remote control, 12VDC power kit, and F to N adapter, \$935. Also, REGENCY MX-5000 which has had Grove scan speed enhancement, \$235, and BEARCAT 300 with original box, \$185. Will consider trade for programmable handheld for the BC-300. Call Harry McCabe at [703] 680-6345 after 6 pm, or send CASHIER'S CHECK OR MONEY ORDER ONLY to 4688 Joanna Court, Woodbridge, VA 22193.

Wanted: SONY CRF-320A and ZENITH transistor "Oceanic" radio 11 or 12 band, complete or parts. Wade, 657 14th Ave, Prospect Park, PA 19076.

SWLTEXT cartridge for C64 \$35; MFJ 1200 CW computer interface \$22; RADIO SHACK PRO47 scanner \$35; LAFAYETTE solid state VHF high & low FM receiver \$35; two DRAKE 85° LNB's \$25 each. WANTED: 1" & 2" scope tubes, AUTECH QF1A audio filter, FL44A SSB filter SP3, SP230, SP820 or SP180 speakers. David, Box 6463, Mobile, AL 36660 [205] 478-8823.

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Wanted: BEARCAT 250 scanner, excellent condition. [518] 274-8495 after 5pm. 150 Oakwood Ave., Troy, NY 12180.

REGENCY HX2000 hand-held portable 118-136, 144-174, 440-512, 800-950 MHz. With Nicads, charger, 2 antennas, carrying case, instruction manual. Absolutely complete and in perfect condition. Will ship prepaid UPS. \$125. Mark Nelson, 1105 Kelden Ridge, Marietta, GA 30068. [404] 594-9340.

Want info on Camp George West in Golden, Colorado. Have many Colorado frequencies to exchange. Call Jerry [303] 433-1003.

Interested in clandestine, religious and pirate address lists or in pirate radio tapes and CBM-64 DX-software? Send 2 IRC's for a detailed list to Ary Boender, Lobeliastraat 33-B, 3202HR Spykenisse, The Netherlands.

Wanted: DRAKE R4-E receiver in very good condition with broadcast crystals. Jefferson Rice, Bon Air Apts #315, 2101 Walton Way, Augusta, GA 30904.

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## CONVENTION CALENDAR

Date	Location	Club/Contact Person
Sep 3-4	Alamogordo, NM	Alamogordo ARC/ Larry Moore 1830 Corle Del Ranchero, Alamogordo, NM 87107
Sep 3-4	Shelby, NC	Shelby ARC/ Dale Mauney WA4BBN 1158 E. Marion St., Shelby, NC 28150
Sep 9-10	Portland, OR	ARRL National Conv/ Al Berg WB7SIC 2256 SE Oak Crest, Hillsboro, OR 97123
Sep 10	Windsor, ME	Augusta Emergency ARU/ Arnold Smith KA1KPW RR #1 Box 475, Augusta, ME 04330
Sep 10	Ballston, NY	Saratoga Co RACES/ David Atwell N2FEP Rd 5 Box D-15, Ballston Spa, NY 12020
Sep 10	Niagara Falls, NY	ARA/ Robert Cade WA7VKF 2681 Staley Rd, Grand Island, NY 14072
Sep 10-11	Louisville, KY	Gtr Louisville ARC/ Patsy Karr KA4ISJ Rt 5 Forest Hill Rd, Shepherdsville, KY 40165
Sep 10-11	Melbourne, FL	Platinum Coast ARS/ George Livingston 720 Van Buren Dr., Melbourne, FL 32935
Sep 10-11	Mobile, AL	Mobile ARC/ Murray Flanders K4RQQ 9075 Howells Ferry Rd., Semmes, AL 36575
Sep 11	Findlay, OH	Findlay RC/ Mark Rice N8GVF 521 Park St., Findlay, OH 45840
Sep 11	Harrisburg, IL	Shawnee ARA/ Mike Hoshiko W9CJW 707 S. James St, Carbondale, IL 62901
Sep 11	Marshall, MO	Indian Foothills ARC/ Randy Ebers KE0MV 125 Lakeview, Marshall, MO 65340
Sep 11	Gaithersburg, MD	Fdn for Am. Radio/ Robert Moore N3CKD 9449 Mayflower Ct, Laurel, MD 20707
Sep 11	Monett, MO	Ozarks ARC/ Carl Adcock WB0RSZ Rt 1 Box 247, Aurora, MO 65605
Sep 11	Butler, PA	Butler Co. ARA/ John Varljen K3JHH 174 Oak Hills Hts, Butler, PA 16001
Sep 11	Joliet, IL	Bowling Brook ARC/ Ed Weinstein WD9AYR 7511 Walnut Ave, Woodbridge, IL 60432
Sep 17	Wichita Falls, TX	Wichita Falls ARS/ Steve Guerra WB5LCN 218 Indiana Ave, Wichita Falls, TX 76301
Sep 17-18	Peoria, IL	Peoria Area ARC/ Richard Waldmeier KA9JPT 2015 Alhambra Ct, Pekin, IL 61554 Talk-in 146.6/76 W9UVI or 146.52 simplex
Sep 17-18	Va Beach, VA	Roanoke Div Conv/ Art Thiemens AA4AT 2836 Greenwood Rd, Chesapeake, VA 23321
Sep 18	Old Westbury, NY	Long Is Mobile ARC/ Mark Nadel NK2T 22 Springtime Lane East, Levittown, NY 11756
Sep 18	Cincinnati, OH	Gtr Cinci ARA/ John Haungs WA8STX 10615 Thornview Dr, Cincinnati, OH 45241
Sep 18	Pennsauken, NJ	S. Jersey RA/ Walter Schmidt W2EA 709 E. Graisbury Ave, Haddonfield, NJ 08033
Sep 18	Danbury, CT	Candlewood ARA/ Raymond James K1EDU 52 Obluse Rd S., Brookfield, CT 06804
Sep 18	Mt Clements, MI	L'Anse Creuse ARC/ Ralph Wilcox KA8YOJ 39610 Charl, Mt Clements, MI 48045
Sep 24	Sprucepine, NC	Mayland ARC/ David McCarty KK4PW Rt 2 Box 73A, Greenmountain, NC 28740
Sep 24	Goshen, NY	Orange Co RC/ Barbara Christopher N2AWI Rd 1 Box 447, Wallkill, NY 12589
Sep 24-25	Walla Walla, WA	Walla Walla Vily ARC/ Paul Hamon KA7UHL 1412 Walla Walla, Walla Walla, WA 99362
Sep 25	Berea, OH	Cleveland Hamfest Assoc/ Glenn Williams AF8C 513 Kenilworth Rd, Bay Village, OH 44140
Sep 25	Adrian, MI	Adrian ARC/ Mark Hinkleman NU8Z 108 E. Kilbuck, Tecumseh, MI 49286
Sep 25	Gainesville, GA	Lanierland ARC/ Eddie Keith KK4IG 3137 Lake Ranch Circle, Gainesville, GA 30506
Sep 25	Willimantic, CT	Natchaug ARA/ Ken Carvell KC1EW P.O. Box 19, Coventry, CT 06238
Oct 1	Huntington, WV	Tri-State ARA/ Jim Baker K8KVX P.O. Box 19, Coventry, CT 06238
Oct 1-2	Boxboro, MA	New England Div/ Eugene Hastings W1VRK 18 Churchill Rd, Marblehead, MA 01945
Oct 1-2	Biloxi, MS	Miss.State Convention/ Wayne Spearman K4JHE 133 Baywood Dr, Biloxi, MS 39532
Oct 2	Rockford, IL	Ill.State Convention/ James Miller W4JR 5581 Elnor Ave, Rockford, IL 61108
Oct 2	Yonkers, IL	Yonkers ARC/ John Costa WB2AUL 195 Woodlands Ave, Yonkers, NY 10703
Oct 2	W. Liberty, IA	Muscatine & IA City ARC/ Thomas Krmer KE0Y 905 Leroy, Muscatine, IA 52761
Oct 2	Springfield, OH	Springfield IRA/ Stephen Klipfel KA8QCS 825 S. Tecumseh Rd, Springfield, OH 45506
Oct 2	Ellicott City, MD	Columbia ARA/ Art Goodman WA3CVG 5071 Beatrice Way, Columbia, MD 21044
Oct 7-8	Warner Rbns, GA	Central GA ARC/ Jesse Kirkham WB4KQA 110 Brown Dr, Warner Robins, GA 31093
Oct 8-9	Falls Ch., VA	DXPO 88/ John Kanode N4MM RFD 1 Box 73-A, Boyce, VA 22620
Oct 8-9	Memphis, TN	Delta Div Conv/ James Alexander 2969 Iroquois, Memphis, TN 38111
Oct 9	Queens, NY	Hall of Sci ARC/ Stephen Greenbaum 85-10 34th Ave, Jackson Hts, New York, NY 11372
Oct 14-16	Houston, TX	Talk-in 144.300, 146.52 simplex S Texas Section Conv/ Alan Cross WA5UZZ 13918 Lillja Rd, Houston, TX 77037
Oct 15	Syracuse, NY	RA of Gtr Syracuse/ Vivian Douglas Box 88, Liverpool, NY 13088
Oct 15	Gray, TN	Tri-Cities ARC/ Wendell Messimer K4ZHK 512 W. Poplar St., Johnson City, TN 37604
Oct 15-16	W Palm Bch, FL	Palm Bch Rptr Assoc/ James Schoech WD4LHF 129 Dayton Rd, Lake Worth, FL 33467
Oct 22-23	Augusta, GA	ARC of Augusta/ James Abercrombie, JR N4JA PO Box 5543, Augusta, GA 30906
Oct 28-30	Kingston, OK	Oklahoma State/ Dave Cox NB5N 1812 S. Umbrella Ct, Broken Arrow, OK 74012
Oct 29-30	Chattanooga, TN	Chattanooga ARC/ Lane Wyse N4OM 4813 Shorewood Dr, Chattanooga, TN 37416
Oct 30	Shelby, MI	Utica-Shelby Emerg Com Assoc/ Harold Henry 53062 Tundra Dr, Rochester, MI 48064

*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, Brassstown, NC 28902.*

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## Publishing Sensitive Frequencies

### *A continuing controversy*

In the past -- as long-time readers will remember -- we judiciously refrained from publishing radio frequencies used by federal law enforcement agencies. There were several reasons, not the least of which was that we would not want to provide any advantage to criminal elements who would use such information for their nefarious purposes.

Additionally, the more we draw attention to the fact that agencies are being casually monitored, the more these agencies are likely to scramble their communications -- and the more likely that additional legislation could be enacted to outlaw further our hobby interests. The prolific dissemination of sensitive frequency lists only adds fuel to the fire of federal retribution.

What if the government decided that the information being published was sensitive enough to justify their investigation of publications and publishers or even to subpoena their subscriber lists? Sure, you could holler "selective enforcement" until you were blue in the face, but they would still have you in court. Could you afford to pay the price of vindication?

### *But times have changed*

Frequency directories abound. Identifications of licensees heard on the air are readily deduced by listening lawfully to their transmissions. Agencies involved in sensitive communications are equipped with scramblers (but often choose not to use them because of clarity, reduced range or just plain apathy).

There are monitoring laws: First, you cannot divulge to anyone else what you heard, nor can you use the information for personal gain (1934 Communications Act, section 705). If it is encrypted, a mobile telephone or a broadcast studio remote link, you aren't even allowed to listen (Electronic Communications Privacy Act, 1986).

While ECPA '86 is admittedly rife with contradictions, errors of omission and is totally unenforceable, it does specifically allow the monitoring of federal, military and law enforcement communications. No distinction is made regarding sensitive or non-sensitive frequencies.

In 1982, Bob Cutts, Chief of the FCC's Spectrum Management Division, responded to

a letter from the Radio Communications Monitoring Association (RCMA), a club composed primarily of scanner enthusiasts, concerning publication of sensitive frequencies.

In his letter, Cutts asserted that the Justice Department would take action against anyone who willingly publishes classified information. At that time, only certain frequencies of specific agencies (like Justice and Treasury) were classified.

While it may appear obvious to you and me that information that has been in the public domain for decades can hardly be classified, in 1982, by Presidential proclamation, all the previously-unclassified files of the Interdepartment Radio Advisory Committee (IRAC), custodian of federal and military frequencies, were classified in total -- Commerce, Agriculture, NOAA and all the rest.

Does this mean that a simple listing like an FAA frequency is a violation of law? How about a CIA frequency?

We posed this question to a long-time spokesman at IRAC who reassured us that publication of such frequencies -- even lists of frequencies -- are of no concern to the government. It is the context in which they are used. Do the lists contain additional information that would be a threat to national security? If the answer is "no," publish to your heart's content.

In fact, as of this date, neither Tom Kneitel (editor of *Popular Communications* and author of the best selling *Top Secret Registry of U.S. Government Radio Frequencies*) nor I have ever been contacted by any agency concerning our publications.

Still, one lingering dilemma remains. What about publishing undercover frequencies used by field agents whose lives are on the line if their identities are discovered? This may not be a matter of law, but it is a matter of conscience. There is no easy answer to this one. It is a judgment call.

It shall be the general policy of *Monitoring Times* to publish all frequencies of interest to our readers, while exercising the obligation to avoid divulging any previously-unpublished listing which, by its disclosure, might endanger the life of a law enforcement agent.

Bob Grove  
Publisher



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