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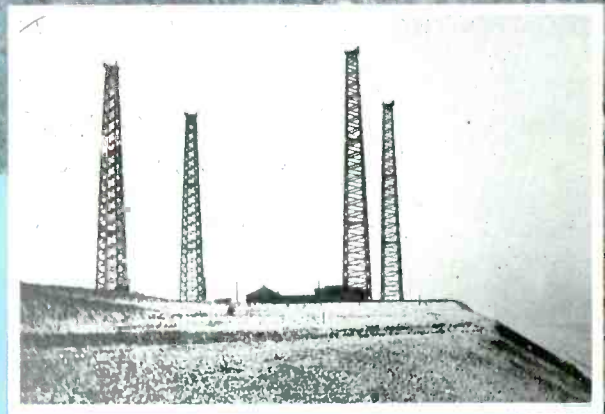
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MONITORING TIMES

A Publication Of
Grove Enterprises

Inside This Issue:

- World War III: The Last Radio You'll Ever Hear
- A Visit to All India Radio
- Audio Processing: Sound Advice
- Underwater Ham Station
- Review: The Sangean MS-101 and 103



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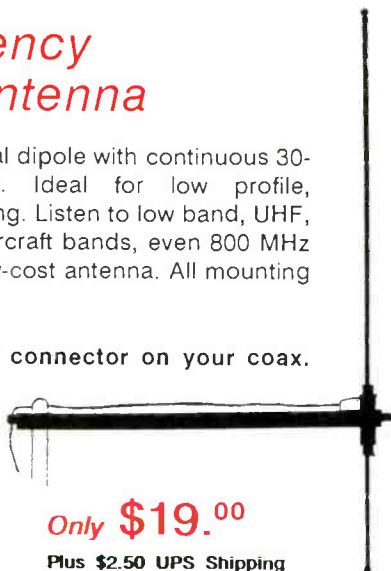
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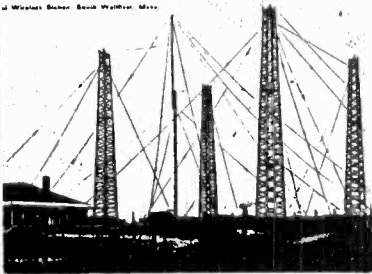
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MONITORING TIMES



A portion of "Old CC's" QSL card testifies to the ambitious dream achieved by Marconi - p.10



Hamming under water?! Sounds crazy, but these guys are crazy enough to do it - p.22

Uncle Skip hearkens back to hollowstate and admits his fondness for a radio tube! - p.38

Magne reviews the mini -- the mini-portable Sangeans, that is! - p.88

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It's a World War II scenario ... In a nuclear holocaust, what radio frequencies will suddenly come alive, some for the first and last time?

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The original Marconi station, "Old CC," sent the first transatlantic wireless message, convincing the world that radio was the wave of the future.

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All India Radio's most important shortwave relay has overcome many obstacles in its efforts to reach beyond India's boundaries, but life still has its adventures!

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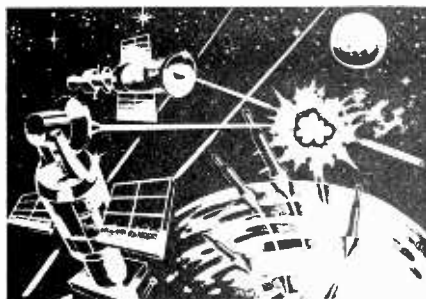
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ON THE COVER: Visitors to this desolate New Jersey coast gaze across the Atlantic -- perhaps replaying with their own eyes the first historic transatlantic transmission. A few posts mark the transmitter house floor; the tower site is now under water (*National Park Service*)

Inside this Issue • It all started one Sunday afternoon when my friend Mark called me up and suggested that I turn on my radio. "There's all kinds of military activity," he said. "Strategic Air Command frequencies are all lit up and Air Force One just went airborne. Something's going on." I wondered if I should grab a couple of boxes of Saltines from the kitchen, pack the kids up and head for the basement. • I later found that all the excitement was caused when U.S. forces stepped up their level of "alertness" after two Libyan fighters were downed in the Mediterranean. The whole thing was pretty unnerving. By listening to shortwave, you can get a *very* inside look at how nervous the people who have their fingers on the button are. Larry Van Horn explores the idea of listening to radio at what could be the end of the world.



• Ev Slosman joins the *Monitoring Times* team with his first contribution. In this month's issue, he traces the history of Old CC, the original Marconi station. There's a National Park site there now and the antenna pads are now under water, but the mystique of this pioneering radio installation survives the pounding surf. Read all about it.

• Also new to the pages of *MT* is Rich Arland, a well-known super-DXer who checks in with a piece on audio. Ironically, no matter how hi-tech your receiver, if that speaker isn't up to par, you're not going to get the most out of your time behind the dial. Rich has a number of suggestions on how to improve this end of your radio.

• Sitting on the front burner and going at high heat is the debate over a no-code license as a way of attracting new hams to the ranks. Novice enhancement, in which code remained mandatory but which gave newcomers some attractive new privileges, brought in some new blood but apparently not enough. In his ham bands column, Ike Kerschner takes a stand for no code. He even goes so far as to say it'll be good for the country.

• The Ohio Underwater Research Association is a non-profit organization dedicated to the exploration, conservation and documentation of Ohio's vast water resources. They're on call with over 30 northeast Ohio police and fire departments and boast an impressive 95% body and felony evidence recovery record. • When you have that kind of record, it's not easy to come up with new challenges. But somehow, Paul Buescher and his friends at OURA did. They decided to try and run a ham station underwater. So you think you had problems setting up the shack in your bedroom? Paul tells the story of hamming in scuba gear.



• There's more of course. Larry Magne reviews a piece of shortwave equipment. Jack Albert explores the world of RTTY and FAX. Glenn Hauser handles the latest DX news. Bob Kay's got the scanner world covered and there is, as we say, "much, much, more." Check it out and see why *MT* has become America's favorite monitoring magazine!

MONITORING TIMES

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Magne Tests...

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Shortwave Broadcast Loggings

QSL Corner

Gayle Van Horn

Utility World

Larry Van Horn

Below 500 kHz

Joe Woodlock

LETTERS

Scott Westerman, N8EOR, checks in with a great radio story.

When he moved to Pekin, Illinois, recently, one of Scott's first tasks was to look for a quiet two meter frequency where he could set up communication without all the activity usually found on local repeaters. He thought he had found one at 145.550 MHz. Then strange voices began coming out of Scott's Yaesu FT208-R during the wee hours of the morning.

After being awakened "once too often," he went to find out who in their right mind would set up a schedule in the middle of the night. Scott was surprised to find that the S9 signal was coming from an amateur radio station aboard the Soviet Mir space station.

You don't need a monster antenna or "superpower" to talk with U2MIR. "My scanner and Grove outdoor antenna bring it in loud and clear," he says, "and Mir doesn't even overfly Pekin, Illinois." Despite this fascinating development, Scott adds that he's "still trying to find a quiet simplex frequency."

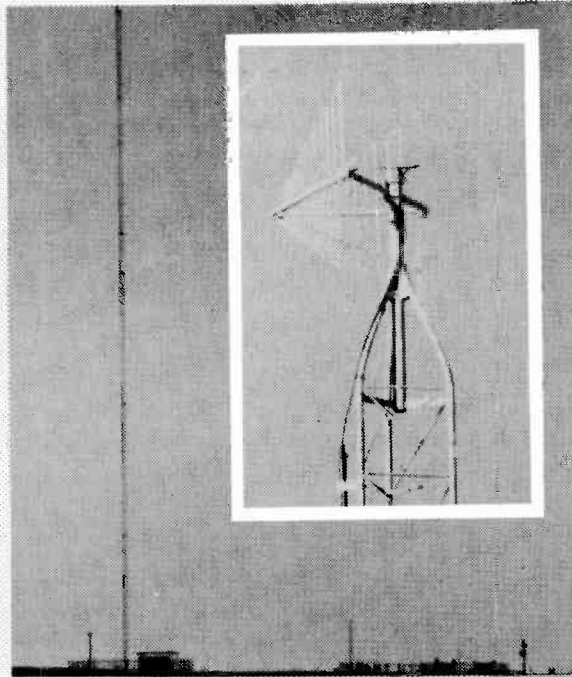
Soviet Contact

Back during the fall, Don Moman of Canada had a similar experience. Don told the story in a recent CIDX bulletin.

"I had just finished a chat with fellow club member Ray Nadeau, VE6SF. The quiet of the radio room was broken by a distinctively accented voice saying 'I am U2MIR. It is the Soviet space station Mir.'" The frequency was 145.555 MHz.

"I quickly called U2MIR and he repeated my call several times but was fading fast. Since I had no idea where his position was, I wasn't able to track him with my rotatable beam [antenna].

"On his next orbit [ninety-one



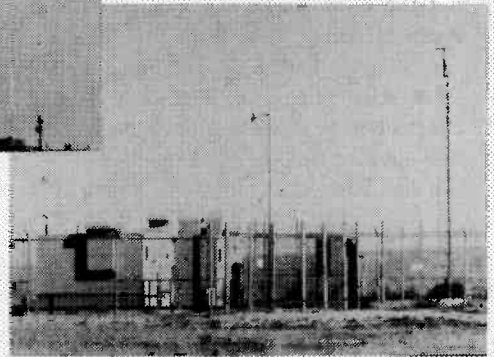
Superimposed on this distant view of the Aurora, CO, GWEN site is a closer view of the log-periodic vhf/uhf control link antenna. Note coax cable entering EMP in-line suppression device. Below, GWEN equipment area - vlf receive antenna on left and vhf/uhf control antenna on right

minutes later], he came into range with an excellent signal. He was calling CQ and getting no answers, so I was fortunate enough to have a long talk with him."

Don's talk with U2MIR led to what he calls "a considerable amount of publicity." It started off with interviews on the two local radio stations, CFRN and CHQT, followed by a call from the CBC to appear on *As It Happens*, then National Public Radio, newspapers and other local radio stations.

We concur with Don's observation. "It just goes to show that if you listen enough, once in a while you're going to be in the right place at the right time!"

Now that U2MIR is back on earth, look for U3MIR. The primary frequency is 145.550 with some operations taking place on 145.525 or 145.575 MHz. And it is easily audible. I'm listening to him right now on my trusty little AOR AR800. In Europe, the frequency is supposedly 145.500 MHz.



Right On

"The article you ran on the G.W.E.N. system was excellent!" says Patrick Griffith of Denver, Colorado. GWEN is short for Ground Wave Emergency Network and is designed to provide nuclear blast survivable communications below 540 kHz. "As you can see from the enclosed photos, the author's [Dave Jones] descriptions were quite accurate. Keep up the good work."

The photos are of the Aurora, Colorado G.W.E.N. site. "I won't reveal the exact location," says Patrick, "but I will say that it is within a 25 miles radius of metro Denver and quite easily accessible from public roadways."

[More "Letters" on p.100]

Marconi's Floating Lab Recreated in Italy

Construction of a replica of the yacht *Elettra*, which served in the 1920s and 30s as Guglielmo Marconi's floating laboratory, should now be underway in Italy, says *Chemical & Engineering News*. The boat, which will be berthed in the Italian port of La Spezia in Liguria, is to be a floating museum on the inventor's life.

Marconi, born in 1874, was a life-long tinkerer. As a youth at his father's estate, Villa Grifone, he made devices such as an electric bell and a working still. The idea of wireless telegraphy using Hertzian waves popped into his head in 1894, he later said, after reading Hertz' obituary.

In 1919, Marconi bought the yacht *Rovenska*, refitted her, and named her *Elettra*. Thereafter he used the vessel as a combination radiofrequency laboratory and seagoing home.

The non-profit foundation Elettra Seconda plans to sail the 235 foot steamer into New York Harbor in 1992. In a forthcoming exhibit on the Information Age at the Smithsonian Institute, visitors will be able to contact the boat via shortwave, which Marconi helped to pioneer.



The Smithsonian offers a memorable chance to communicate with a replica of Marconi's floating workshop. Picture yourself a pioneer of shortwave ...

U.S.-Canadian Radio Link Needed

According to police, John James Nine, 19, led Canadian police on a high speed chase along Vancouver's Marine Drive, got on Highway 99 and headed south. The vehicle, said Canadian police, closely matched a vehicle wanted in connection with a recent shooting. So when the car crossed the median and entered the U.S. through a Canadian border post, Vancouver police chief Bob Stewart ordered his men to pursue the suspect into the U.S.

According to Stewart, phone calls to the U.S. border crossing were met with busy signals. And while U.S. officials were advised of the situation, the briefing had to wait until a conference call could be arranged on the telephone. There is, surprisingly, no radio link between Canadian and U.S. authorities.

Said Stewart, the incident underscores the need for a regional police force "which would have allowed us to have radio contact with American authorities."



"I'm sorry, sir. The line is still busy ..."

Renewals for FCC General Radiotelephone License

The International Society of Certified Electronic Technicians (ISCET) is now issuing renewals for the FCC General Radiotelephone license. Applicants with proof of previous First Class license and/or Radar endorsement will have those endorsements included on their license.

Says *Monitoring Times'* Clem Small, "The satisfaction of having current validation of the fact that we once held that legendary "First Phone" license is considerable to many of us old timers." The First Phone license was retired by the FCC some years ago.

ISCET certifications are available as wallet-sized cards and larger, suitable for framing certificates. For more information, contact the International Society of Certified Electronics Technicians, 2708 West Berry Street, Fort Worth, Texas 76109.

American Zaps Danish News

When Denmark opened its first commercial TV network, TV2, last October, the channel hoped to build

its audience through several daily hours of locally-produced news programming. The competition, state-owned TV1, which had long been bringing Danes news material from East and West Germany, Sweden, the BBC, and satellite networks like CNN and Sky Television, proved harder to knock off than expected. That's when New York-based speech coach Lilyan Wilder was brought into the picture.

According to Wilder, who has coached such notables as Charles Osgood and Oprah Winfrey, Danish on-air reporters are known for "remaining almost faceless, reading the news into a microphone with one stationary camera for long, uninterrupted segments."

Wilder coached 20 to 30 reporters and five anchors at the news network, training the broadcasters to make the transition from "talking automations to being real people sharing information." But don't expect to see the high-energy hype associated with U.S. news on Danish TV anytime soon. Says Wilder, "The Danes don't like to have their coffee cups rattled by the news."



"Find something moderately interesting, dear ..."

Bad DX

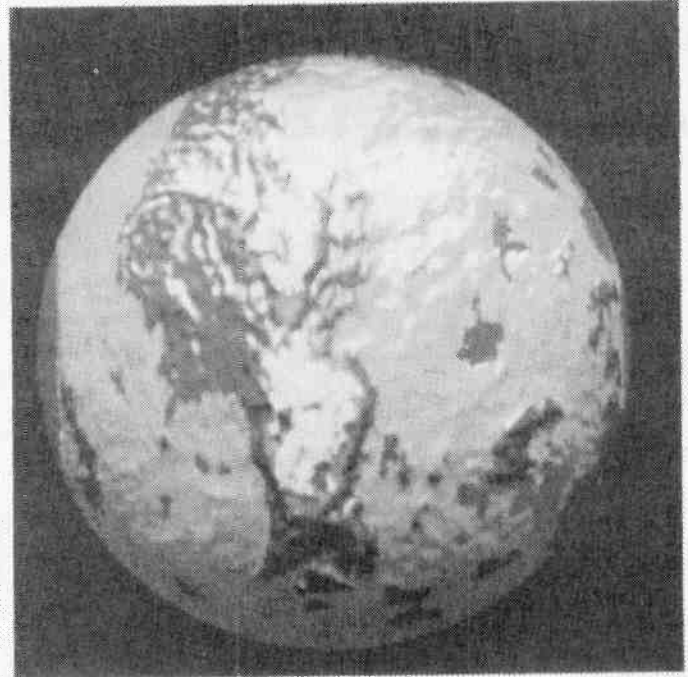
Pioneer, the orbiting spacecraft, has just celebrated its tenth year circling the earth's cloud-shrouded twin, Venus. During those ten years, Pioneer has continuously returned pictures and data on the planet (some 10 trillion bits of data). Yet despite the mass of information that even today continues to pour into NASA's Ames Research Center in Mountain View, California, a number of mysteries remain:

Does Venus' hot, super-dense atmosphere (100 times as dense as earth's) have huge lightning discharges? How does the planet's atmosphere, slowly moving at the surface, get sped up and transmitted to the fast-moving cloud tops, about 40 miles above the surface? These clouds, it seems, race around the planet once every four days.

And even stranger, what chemical or electrical phenomenon in the atmosphere disrupted instrument sensors on all four Pioneer probes, 5.4 miles above the planet's surface? While there are no answers to these questions, one thing is clear: Venus is no place for decent DX.

Propagation

Conditions here on earth have been wild with sunspot numbers ranging over 200 at times. Ten and six



Venus, which is hidden by a permanent cloud cover, is revealed in this computer-generated picture based on data from Pioneer's ten years of orbiting the planet (NASA)

meter contacts have been super during periods of high activity. Tune WWV at 18 minutes after the hour for latest sunspot activity and A index. Remember, the lower the A index, the better the bands. Expect continued high activity for the next two or three years.

Philips High-definition TV

North American Philips has recently demonstrated new hardware for satellite delivery of its HDS-NA (High definition TV system for North America) at its Briarcliff, New York, lab. Pictures on screen sizes from 31 inches to 120 inches were shown. The hardware is designed to deliver high-definition TV for network feeds to broadcast affiliates as well as by direct broadcast satellites for home use.

Credits: *Broadcasting* (via Ken Freks, Boston, Massachusetts), *Chemical & Engineering News* (via Henry Gates, Salt Lake City, UT), NASA, Clem Small, Vancouver Sun (via James McPherson), Ike Kerschner

Radio at the End

by Larry Van Horn

"Look to space and pray."

--James Canan, *War in Space*

At thousands of locations around the world, nuclear missiles sit patiently in their silos. Bathed in the hum of fluorescent lights, the well-trained men that attend them await their orders -- orders of unthinkable consequences. Above ground, it may be Spring Break in sunny Ft. Lauderdale, harvest in Boone, Iowa, or the concert season in Los Angeles, but to these men, *this* is the day that the world ends. Theirs is a high-tension world in which there are no drills. Everyone is on a hair trigger.

This is "a world that's only nominally at peace," explains Admiral James Watkins, former Chief of Naval Operations. "Peace, crisis, conflict," he told Congress in 1984, "in today's world there are [often] no clear demarcations." If this is true for the military, then certainly the average civilian cannot be aware of how close to war we constantly are.

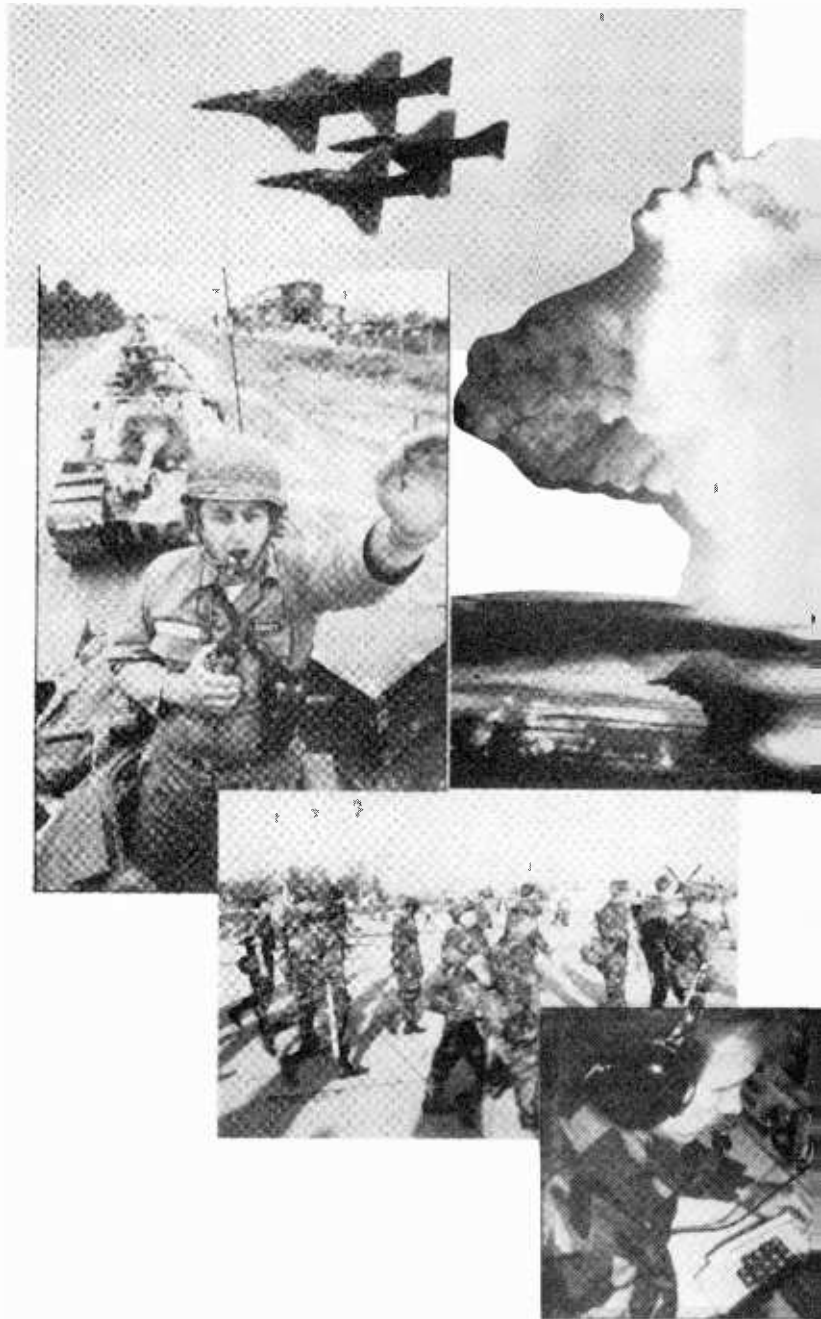
Every day, for example, U.S. military radars and command centers must catalogue some 1,800 flights that enter and leave U.S. air space. Each must be confirmed as civilian, or at least nonhostile. Should there be a difference of 25 minutes or 5 miles between radar contacts and flight plans, a jet interceptor will be scrambled to investigate.

In a typical year, too, there are hundreds of rockets -- 300 from the Soviet Union alone -- leaving the surface of the planet for destinations unknown. Each time, officers of the North American Air Defense Command (NORAD) must decide whether they're watching a routine satellite launch or the beginning of World War III. Here also, there is no such thing as a drill. Every event is treated as a nuclear attack. The finger twitches momentarily on the trigger and is relaxed, just in time.

During the moments, perhaps even days or weeks, leading up to an event, communications play an important role. In time of an actual attack, radio frequencies from the basement of the spectrum to laser light, in all modes and frequencies, will be used to pass the word: the time has come and it is now.

Radio at the End

Radio hobbyists know a great deal about military communications in peacetime, even periods of high international drama. But no one knows exactly how things will play out during the opening and



closing moments of World War III.

Indeed, a veil of secrecy cloaks even the most routine, day-to-day communications structure of our nuclear forces. Normal communications do, however, remain mostly in the clear. Tactical call signs and coded message traffic are the rule but listeners encounter very little scrambling of routine nuclear force communications.

Strategic Air Command foxtrot broadcasts (technically called "Emergency Action Messages" or EAMs), for example, are commonly heard. These are believed to be the method by which nuclear go-codes are broadcast to SAC and Navy nuclear-capable units. The broadcasts use a phonetic alphabet (see Table One) with the transmissions ranging in size from a half dozen to 70 or 80 characters. No one knows exactly what is contained in these messages but the prevailing school of thought among radio hobbyists is that if you hear a SAC foxtrot broadcast repeated three times within the same transmission, something very serious is going on. And while there's no official verification of this "old wife's tale," experience has shown that this is no myth.



neously carried not only on SAC's HF frequencies but also on Navy Hicom HF, DOD Fleetsatcom and Leasat channels, several low frequency systems and even select UHF military aircraft channels.

Should a major event occur, SAC frequencies often sound like the radio equivalent of rush hour in Manhattan. Aircrews will literally be tripping over each other trying to communicate with ground and airbase command posts. This type of activity has already been heard many times during SAC alerts.

Within a very short period of time, the military's defense readiness condition (DEFCON) will go from 5 to 1. DEFCONs are a uniform system of progressive alert postures for use between the Joint Chiefs of Staff (JCS) and the commanders of unified and specific commands, and for use by the services. They range from DEFCON 5 (peacetime) to DEFCON 1 (war).

Although unconfirmed, it is reported by reliable sources that in the event of a nuclear retaliation, SAC channels will pop up in unexpected areas all over the HF spectrum. Don't be surprised to find them hiding in such areas as the HF marine band or even within the commercial aeronautical channels.

Let It Begin

While the United States is in a position to launch a retaliation with its full might against an aggressor, not one piece of this country's impressive nuclear arsenal can be used without someone to give the order. That is the job of the National Command Authority (NCA) through the JCS. The NCA consists of the President and the Secretary of Defense or their duly deputized alternates or successors.

Since we have to assume that SAC's underground command post will be eliminated by the enemy, we must also assume that Washington, DC, would also be a target. Therefore, the U.S. must have some provision to assure that the NCA would be in a position to direct the retaliatory efforts.

This is the function of the National Emergency Airborne Command Post (NEACP, pronounced "kneecap"). These E-4 aircraft fall under the control of SAC. In addition to military circuits such as AUTOVON, NEACP aircraft can also tie into commercial telephone and radio networks. They can also be used for radio broadcasts to the civilian population.

Communications from the NEACP can also be established with SAC's Airborne Command Post (commonly referred to as "Looking Glass"), ships at sea, submarines, surveillance and fighter aircraft, and with the National Military Command Centers.

One item that NEACP does not contain is equipment to launch missiles. This is not a function of NEACP. While NEACP is designed to authorize the launching of missiles, it is not capable of carrying out the launch. Only SAC's Airborne Command Post have the authority once the NEACP's pass the proper go-codes.

Table 1
English Phonetic Alphabet

A = Alpha	N = November
B = Bravo	O = Oscar
C = Charlie	P = Papa
D = Delta	Q = Quebec
E = Echo	R = Romeo
F = Foxtrot	S = Sierra
G = Golf	T = Tango
H = Hotel	U = Uniform
I = India	V = Victor
J = Juliet	W = Whiskey
K = Kilo	X = X-ray
L = Lima	Y = Yankee
M = Mike	Z = Zulu

Once a foxtrot broadcast is made, bombers and missiles can be released past their "fail safe" points to conduct a counter-attack on the enemy. So important are the broadcasts that they are simulta-

One system, the details of which are highly classified, provides for those who are designated to be aboard NEACP's. This plan calls for the President or his deputy, the Secretary of State and the JCS,



Displayed in front of SAC headquarters at Offutt AFB stands a Minuteman missile. The Underground Command Post is located under the trees directly behind the missile (SAC photo)

to be transported to the nearest NEACP in the event of imminent threat. One of the E-4 aircraft is always in the vicinity of the President. They can often be heard in flight when the President is aboard Air Force One.

A good place to check for this kind of activity is on the U.S. Air Force's Mystic Star network. There are over 400 different channels scattered throughout the HF spectrum in this network.

As the attack progresses, one can only assume that the Federal

Emergency Management Agency (FEMA) and Federal Highway Administration (FHWA) channels will become very active. FEMA is the government agency responsible for implementing Presidential Directive 58, signed by Jimmy Carter in June 1980. Entitled "Continuity of Government," it outlines plans to evacuate selected government personnel in event of a nuclear attack in order to ensure continuity and survival of the U.S. government.

FEMA, using the Joint Emergency Evacuation Plan (JEEP), will use helicopters to transfer 258 DOD and FEMA personnel from the Pentagon and downtown Washington DC. These lucky few will be transported to Mount Weather (Berryville, VA), the alternative National Military Command Center (Site R, Ft. Richie, MD), NEACP aircraft, Andrews AFB and other classified sites as well.

Simultaneously, Joint Air Transportation Service (JATS) aircraft will transport key Executive branch officials and vital documents to classified sites. One program FEMA has been studying over the last several years was a plan designed to evacuate major U.S. cities during an attack. This program uses the interstate highway system for the evacuation. Thus, FHWA channels can be expected to be active during a nuclear attack.

Finally, as the enemy missiles hit their targets, our bombers should be closing in on our "Fail Safe" points. These geographic points are where the bombers will orbit until the final approval arrives from the NCA to conduct the attack on the attacking enemy.

At this point, Nuclear Winter will have arrived. The enemy's missiles will have done their damage. It must be remembered that the first strike will come from the enemy. None of the systems of the Strategic Air Command or the United States Navy is designed to wage war. Every system is designed, instead, to assure that in case of "an event" the United States would be in a position to retaliate. And the whole point of an assured and credible retaliation plan is *deterrence*.

"We are just the opposite of a first-strike weapon," one SAC officer said. "We wouldn't need an Airborne Command Post if we intended to attack. As a matter of fact, the Soviets have nothing like it."

As General Bennie L. Davis, Commander-in-Chief of SAC puts it, "What deters the Soviets is the knowledge that they could not gain enough by initiating a nuclear exchange to make their resultant losses worthwhile."

So for now, we can hope that General Davis' deterrent keeps the fingers off the trigger and that radio hobbyist never get the chance to monitor the war that should never be fought and cannot be won.

3032	3046	3067	3071	3116
3144	4721	4731	4742	4760
5688	5700	5710	5760	5800
5820	6683	6715	6738	6756
6757	6760	6790	6812	6817
6830	6918	6927	6993	7316
7690	7735	7765	7813	7858
7997	8040	8060	8162	8170
8967	8992	8993	9007	9014
9017	9018	9020	9023	9026
9043	9120	9158	9180	9270
9320	9958	9991	10112	10427
10530	10583	10881	11035	11055
11118	11176	11180	11210	11226
11249	11407	11413	11441	11460
11466	11484	11488	11498	11545
11596	11615	11627	12324	12317
13201	13204	13214	13215	13241
13247	13412	13440	13455	13457
13485	13585	13710	13823	13960
14715	14902	14913	15015	15036
15048	15091	15687	16080	16117
16320	16407	17385	17480	17972
17993	18027	18218	19047	20016
20053	20154	20313	22723	23265
25578	26471			

5297	9023	9793
11441	14894	20855

**Table Three
More Frequencies for the End**

Freq	Channel Designator	Usage
3113	Floating Designators	Airborne Command Post Intercommunication
3292	Floating Designators	
3295	Alpha Mike	
3369	Alpha Sierra	
4492	Floating Designator	
4495	Echo	Airborne Command Post Intercommunication
4725	Victor	Primary Air-to-ground Channel/AF Refuel
4896	Floating Designator	
5020	Foxtrot (See note 1)	Airborne Command Post Intercommunication
*5026	Foxtrot (See note 1)	Airborne Command Post Intercommunication
5110	Floating Designator	
5171	Two Letter Designator	Changes Every Three Months
5215	Floating Designator	
*5243	No Designator Known	Airborne Command Post Intercommunication
5328	Floating Designator	
5684	Foxtrot Quebec	
*5700	Bravo Quebec	Airborne Command Post Intercommunication
5826	Bravo Uniform	Airborne Command Post Intercommunication
6680	Foxtrot Xray	
#6712	Floating Designators	Also Alpha Two in PACAF
6761	Quebec	Primary Air-to-ground Channel, Pri Night
6826	Golf	
6840	No Designator Known	Note: Popular Number Station Channel!!
6863	Oscar	
6870	Kilo+ (See note 2)	Airborne Command Post Intercommunication
6886	No Known Designators	
7330	Yankee/Xray	Channel uses both designators-alternates
7983	Foxtrot Charlie	
8101	Alpha Papa	Airborne Command Post Intercommunication
*9023	No Known Designators	SAC/NORAD Intercommunications/AWACS A/C
9027	Romeo	Primary Air-to-ground Channel
9057	Papa	Airborne Command Post Intercommunication
9220	Floating Designators	
9234	Floating Designators	Possible NORAD/SAC Intercommunication
#10452	OSCAR (PACAF Designator)	
#10510	No Known Designator	Possible PACAF Channel
11100	Alpha Twenty-one	
*11118	No Designator Known	Airborne Command Post Intercommunication
11220	Bravo	
11243	Alpha One	Primary Air-to-ground Channel, Pri Day
11408	Yankee Quebec	Data Channel
11494	Lima	Training Frequency-Practice Messages
11607	Alpha Zulu	
13205	Called <FAX>	SAC Special Operations Channel
13211	Bravo Whiskey	Airborne Command Post Intercommunication
*13241	Sierra	Primary Air-to-ground Channel

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13547	Floating Designator	
13907	Alpha Charlie	
14716	Sierra Echo	
14744	Alpha Tango	
14775	Floating Designators	Also Mike in PACAF
14955	Charlie	
15035	Charlie Quebec	Canadian Forces Channel (shared)
15041	Mike	Primary Air-to-ground Channel
15091	Bravo Xray	Tac-to-SAC Intercommunication?
15544	No Known Designators	Possible AC Point-to-Point Channel
15962	India	
17617	Bravo Hotel	
17975	Tango	Primary Air-to-ground Channel
#18005	Tango (PACAF Designator)	
18046	Juliett	
18594	Zulu One	
20631	Whiskey	Primary Air-to-ground Channel
#20737	No Known Designator	Possible PACAF Channel
#20740	Lima (PACAF Designator)	
20846	Charlie Alpha	SAC-to-CAP Intercommunication
20890	Delta	
21815	Foxtrot Sierra	Possible Floating Designators on this Freq
23337	Uniform	
23419	No Known Designator	Possible SAC-NORAD Intercommunications
27870	Delta Quebec	

* Indicates a Mystic Star Network Channel
Indicates a PACAF Channel

- Note 1: Foxtrot designator rotates between these two channels. When not designated Foxtrot, the frequency uses two letter channel that end with the letters 'A/B/C or S'.
- Note 2: Frequency uses a two letter designator beginning with Kilo + one other letter that rotates periodically.
- Note 3: Other previous designators noted on this channel include: November Alpha and India Alpha.



At the overlook shelter stands a bust of Marconi: "Guglielmo Marconi -- pioneer of wireless communications -- son of Italy -- citizen of the world. Born in Bologna, April 25, 1874. Died in Rome July 20, 1937."

All that remain are a couple of deadman anchors, a concrete slab, and some rusty chain. During February, only the cold Atlantic wind inhabits this place, blowing gales of sand into drifting dunes. The few visitors who come here often call the place "desolate."

This place was not always so lonely. At one time, blue sparks danced along hundreds of feet of antenna wire while an enormous spark gap generator kept beat. Its tune could be heard five miles away. This was once "Old CC," the South Wellfleet wireless facility and it was this station that sent the first transatlantic radio communication. Its destination: England.

It was January 18, 1903, when this message was keyed to Glace Bay, Nova Scotia.

"His Majesty, Edward VII. London, Eng. In taking advantage of the wonderful triumph of scientific research and ingenuity which has been achieved in perfecting a system of wireless telegraphy, I extend on behalf of the American people most cordial greetings and good wishes to you and all the people of the British Empire. Theodore Roosevelt. Wellfleet, Mass., Jan. 19, 1903."

The process leading up to this historic transmission began in 1895, when Guglielmo Marconi proved a signal could be sent to a receiver hidden behind a hill. The Italian government was not interested in his experiments, so with his family's encouragement, he went to England.

There he made considerable progress

Old CC Calling

by Everett L. Slosman

and gained the support of George Kemp, an electrical engineer, and Sir William Preece, a ranking post office official. Marconi's first wireless patent was issued shortly thereafter.

Marconi's work had an immediate impact. Kingston Yacht regatta results were flashed to Fleet Street, beating newspaper telegraphers to the punch. Soon, the first "Marconigram" went out from the Isle of Wight to London.

Wireless soon began to expand its reach. On March 27, 1899, Marconi transmitted across the channel to France. That was followed by the April 28 East Goodwind Sands Lightship rescue; the first broadcast "CQD" distress call. Another one went out three months later and again, lifeboats responded. Wireless was proving to be an effective lifesaving tool.

Meanwhile, in America, officials of the New York *Herald* heard about these demonstrations from their English correspondent. By fall, Marconi was on his way to the United States.

Once in the U.S., the inventor transmitted the results of the America's Cup Race between Sir Thomas Lipton's *Shamrock* and J.P. Morgan's *Columbia II*.

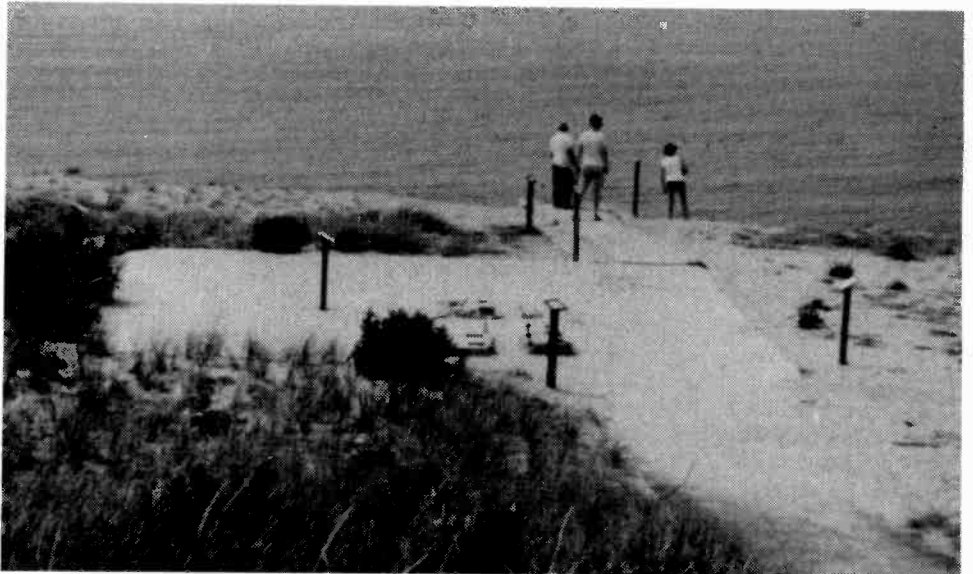
The *Herald* loved it. They beat other newspapers and reaped the credit.

Next, Marconi outfitted the battleship *Massachusetts* and the cruiser *New York*. During sea trials, they communicated over a distance of 36 miles.

The demonstrations had been so successful that Marconi and his English backers felt they needed a company in the United States to oversee these operations. So, Marconi Wireless Telegraph Company of America was established.

Up to this time, conventional scientific wisdom said it would be impossible to broadcast beyond the earth's curvature. And, in fact, all the experiments to date seemed to limit reception to line-of-sight. But Marconi's experiments had shown differently. He was convinced that signals could be skipped off the ionosphere. Armed with British patent 7777 for a tuned antenna, Marconi set out to prove his case.

He built a transmitter at Poldhu and soon transmitted 150 miles. When they succeeded in boosting power a hundred-fold, Marconi decided to try to reach the United States.



All that remains to be seen by the few visitors who visit this desolate spot today are a concrete slab indicating the location of the transmitter house (National Park Service)

The U.S. Target

Geography made Cape Cod ideal. The beach offered unobstructed access to the Atlantic and a clear slot at Poldhu. Marconi Wireless bought eight acres of a South Wellfleet bluff for \$250. Equipment and supplies were hauled by wagon to the isolated site.

H. Pigeon & Fraser Hollow Spar Company, Boston, was contracted to build 200 masts to hold the antenna array. Positioned in a circle, they stood 165 feet back from the cliff. Unfortunately, before the Cape Cod station could become operational, the Poldhu antenna went down in a storm. It was replaced by a V anchored between two 150 foot masts.

Inexplicably, Marconi did not order a similar arrangement for Cape Cod. When a heavy gale hit on November 25, the Pigeon & Fraser masts also toppled.

New Base

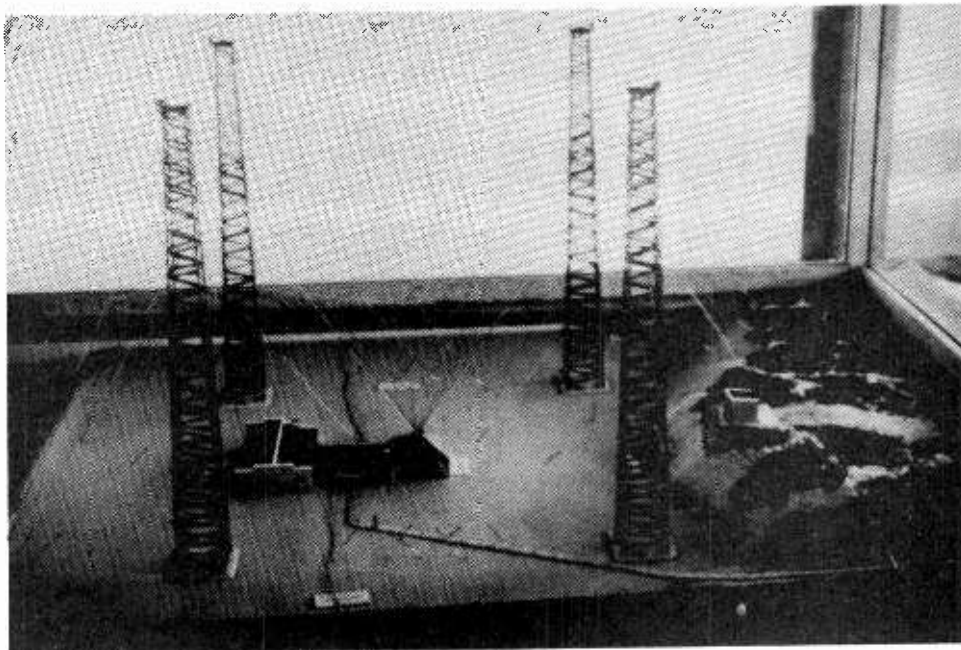
Marconi shifted operations to Saint Johns, Newfoundland, where the equipment would be better protected from Atlantic storms. A deal was made with the government and he set up shop on Signal Hill, overlooking the harbor.

Meanwhile, using the V, Poldhu was now transmitting over 200 miles to Crookshaven, Ireland. The next step was to test St. Johns.

There was not enough time to order masts for the facility so they decided to fly a long wire antenna, using a canvas kite. It was a lash-up arrangement that, if successful, would put the experiments back on schedule. The kite took the antenna 600 feet above the hill. On December 12, it picked up a faint signal from Poldhu.

Success did have its price. The rival Anglo-American Cable Company held exclusive rights to all transatlantic messages, including wireless. Four days later, they slapped Marconi with an injunction, hoping to close him down. What Anglo-American Cable hadn't realized was that not only was Newfoundland (at that time) a separate country, but the injunction had no effect in Canada. Unfazed, the Canadians offered Marconi the use of Glace Bay as an alternative. Marconi soon moved his equipment there.

This time, Marconi planned a three



Model of the transmitter site, now on display at the Marconi Beach Site Visitor's Center (courtesy National Park Service)

station relay: Polhu to Glace Bay to Cape Cod. This made sense -- Glace Bay was 1,300 miles closer to Polhu than South Wellfleet. A year later on December 17, Glace Bay sent and received the first round trip transatlantic test. The next step was to check the South Wellfleet link.

Marconi and three engineers, R.V. Vyvyan, G.S. Kemp, and Carl Taylor, went to Cape Cod to conduct the new experiment. Roosevelt's message was scheduled only for Glace Bay. But atmospheric conditions were good and Poldhu copied directly. The four men were shocked and elated when the unexpected answer came back.

"Sandringham, Jan. 19, 1903. The President, White House, Washington, America. I thank you most sincerely for the kind message which I have just received from you through Marconi's transatlantic wireless telegraphy. I sincerely reciprocate in the name of the people of the British Empire the cordial greetings and friendly sentiment expressed by you on

behalf of the American Nation, and I heartily wish you and your country every possible prosperity. Edward R. and I."

The next day, both messages were front page news in Boston and New York City. Congratulations poured in, ironically

including one from Italian King Victor Emmanuel.

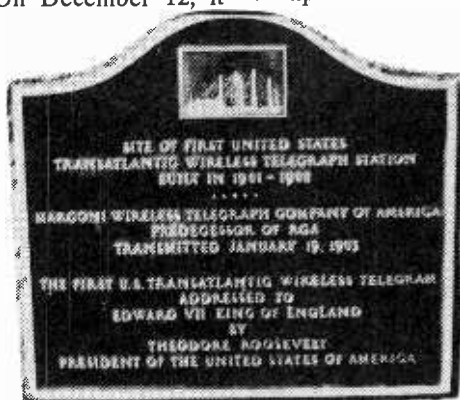
Since the station had no direct link with the outside world, telegrams were phoned to a small general store in South Wellfleet. From there, they were brought to the site via horseback. The old-fashioned methods were still more practical than the new-fangled spark gap transmitter.

The operations crew lived in splendid isolation. There they were treated to a bungalow complete with pot-bellied stoves, well stocked kitchen, and impressive furnishings.

The transmitter building had two rooms. One contained the oscillation transformer, transmitter coil, rotary spark generator, and 33 glass and metal oil bath condensers. Equipment was open and there were few safeguards to protect operators from the high voltages. Surprisingly, accidents were rare and there were no fatalities.

The rotor was three feet wide and consisted of 16 studs. At 2100 rpm, it put out 35 KW RF. Compressed air helped break the spark and cool the electrodes. Heat generated by the spark electrodes limited transmissions to 45 minutes on, 15 off.

Operators sat on a stool in the other room and keyed messages at 15 words per minute (WPM) by using a pump handle to break the spark. Eventually, a line was run between the transmitter and the bungalow and they were able to work in relative comfort. Nonetheless, it was a slow process, so Marconi installed a Wheatstone Morse tape printer and Profolover tape puncher. These units sped up the process and smoothed out the variations caused by each



The plaque dedicated at Wireless Road, 1953; moved to present site in 1963 (National Park Service)

WCC

originally located at Marconi Beach, was relocated to Chatham, Massachusetts, in 1914, because erosion had made the original site unusable.

During World War I, it was operated by the U.S. Navy. It was returned to civilian operations on August 12, 1919. At this same time, Radio Corporation of America succeeded Marconi Wireless.

The station was the busiest east coast utility during World War II, handling thousands of ship-to-shore transmissions. After the war, RCA Global expanded the Chatham operations to include shortwave.

RCA Global was acquired by General Electric on June 9, 1986. They sold the station to MCI International on May 16, 1988. WCC is still the premier marine utility serving the Atlantic and Caribbean shipping.

These are the current Chatham radio/WCC operating frequencies (all kHz) courtesy of MCI International, Inc.:

CW:

436/500 4331 6376 8586 8630
12847 12925.5 13033.5 16933.2
16972 22518

Ship Calling Channels:

4181.0 4181.8 4182.2 6271.5
6271.7 6271.3 8362.0 8363.6 8364.4
12543.0 12545.4 12546.6 16724.0
16727.2 16728.8 22228.0 22232
22234

Radiotelex (SITOR) Selcal # 1092:

WCC	SHIP
4356.5	4177.0
6504.5	6266.5
8712.5	8351.5
8715.0	8354.0
13081.5	12501.5
13090.0	12510.0
17207.5	16670.5
17216.0	16679.0
22571.5	22202.5

A.R.A. Press (Sundays 1800 UTC):

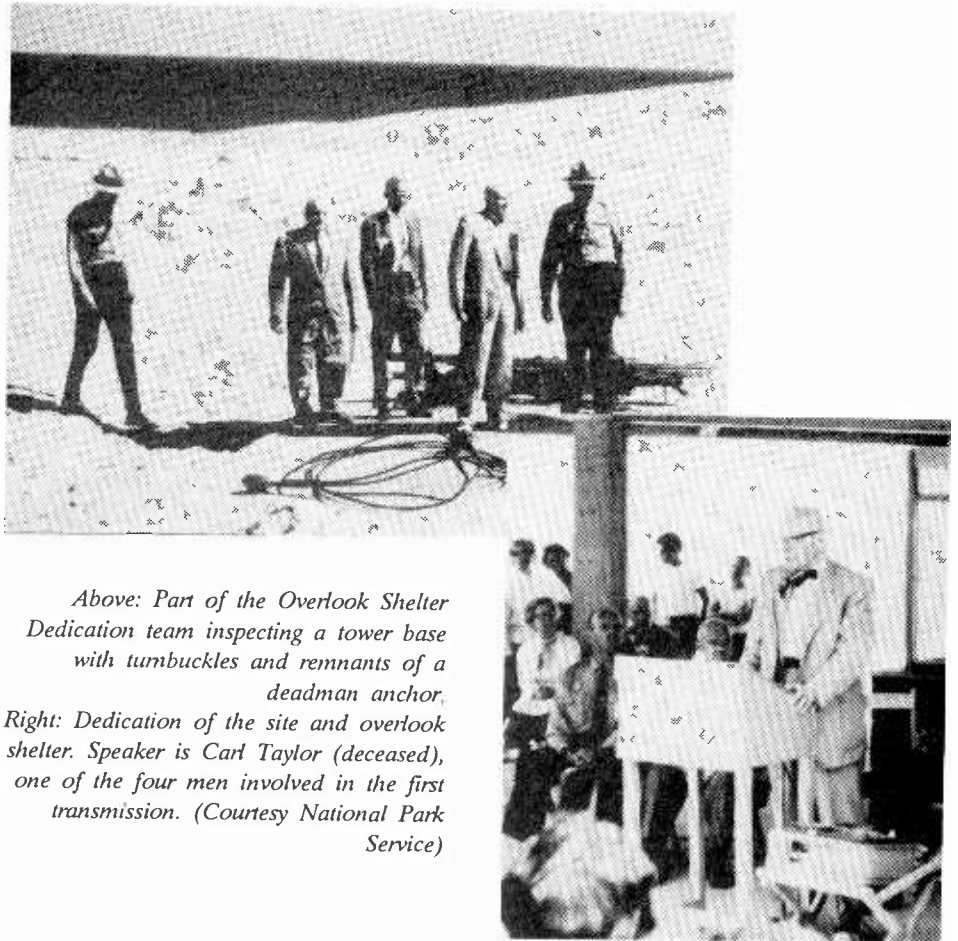
6376 8586 12847 16972.5

Chathamradio/WCC will QSL via a signed computer generated letter. Address reception reports to : Chathamradio/WCC, P.O. Box 397, North Chatham, MA 02650-0397.

individual's keying technique.

The four towers sat in a 200 foot square on thick cement slabs. Each was supported by guywires attached to deadman anchors buried in the sand. The antenna consisted of 200 vertical wires gathered in the center and fed by a transmission line.

A major concern of those working the equipment was lightning. One strike hit a chair the manager had just vacated. Another welded a coal hod to the stove and



Above: Part of the Overlook Shelter Dedication team inspecting a tower base with tumbuckles and remnants of a deadman anchor.

Right: Dedication of the site and overlook shelter. Speaker is Carl Taylor (deceased), one of the four men involved in the first transmission. (Courtesy National Park Service)

knocked a crewman right out of his shoes.

Because Cape Cod was in an excellent position to control east coast wireless traffic, Glace Bay became the primary transatlantic station. Cape Cod became the major ship-to-shore facility. When the Cunard liner Lusania became the first passenger ship to install wireless equipment, CC sent them "Nightly News." This was reprinted in the ship's daily newspaper.

Again, success followed success and other ships soon installed wireless equipment. The captain could have access to weather, shipping news, and emergency help, while the passengers could help pay for the equipment by sending Marconigrams. At 50 cents a word, they were an inexpensive way of bragging about a cruise. Sending one quickly became a status symbol.

Toward the End

Ever since the glaciers that formed Cape Cod retreated, the sea has been relentlessly eroding the land. Engineers warned Marconi that the eastern tower bases were in danger. So, WCC was moved to nearby Chatham and more stable ground.

Soon, Marconi Wireless became part of RCA Global Communications. By 1920, South Wellfleet was dismantled and most of the equipment was scrapped. "Old CC" fell

victim to the new DeForest vacuum tube technology, and spark gap became obsolete. All that was left at the site were a couple of building slabs, some guying cables and memories.

The site has become Marconi Beach. Waves still pound the shoreline. But today the antenna bases are 65 feet out, underwater. An overlook shelter was built on the site by the National Park Service and dedicated in 1963. It contains a bronze plaque, a metal bust of Marconi, and a model of the original station. Other artifacts can be found at the Salt Pond Visitor's Center.

Marconi Beach is on US 6, five miles north of Eastham. Visit in the spring or fall, when there are fewer tourists and the accommodations are reasonable.

For more information, call the Visitor's Center at 508-255-3421 or the Cape Cod Chamber of Commerce at 508-888-2438.

And while you're there, buy a quart of real New England Clam Chowder, take your portable and set up a DX session on a picnic table at the site. You may just be able to hear the spark gap whirling or a "fist" keying that long ago call, "CQ, CQ...dah dit dah dit, dah dit, dah dit, CC calling."



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Audio Processing Techniques for the Shortwave DXer

Sound Advice from

Rich Arland K7YHA

While many of today's worldband radios are nothing short of technological miracles, they do have one major fault: bad audio.

Take the popular Sony ICF-2010, for example. Here's a radio that can do everything short of hand stands and it comes with a speaker only three inches in diameter. It's not just the Sony '2010, either. The truth is that the internal speakers on most communications receivers are included more as an afterthought than to be used by the serious DXer. Seldom do they have sufficiently heavy magnets or the quality of construction necessary to faithfully reproduce the output from the receiver's audio amplifier.

Speaker enclosures make a tremendous difference in audio reproduction quality, too. Needless to say, a plastic or metal radio cabinet isn't the best environment for good audio.

Today's communications receivers also suffer from such problems as non-linear audio amplifiers and poorly shaped audio passbands. In short, in this era of "hi-fi" it seems that manufacturers have forgotten that communications audio only needs to extend from 500 to 2500 Hz to be effective. Anything under 500 Hz produces a bassy response (responding well to atmospheric noise), while anything above 2500 Hz will reproduce hiss or splatter to ruin our reception of that rare station.

Bad audio is not always the fault of the receiver, though. One of the problems that continually crops up while DXing the tropical bands, for example, is the poor modulation quality of the stations. This results from a combination of things: poor transmitter maintenance, undermodulating the transmitter to extend tube life, antiquated

studio audio equipment, poor quality of tape recordings or re-recording the same tapes over and over again without proper cleaning and demagnetizing.

Propagation does some strange things to the audio quality of the received signal, as well. Couple all this together and you can see why shortwave listening is not for the faint of heart!

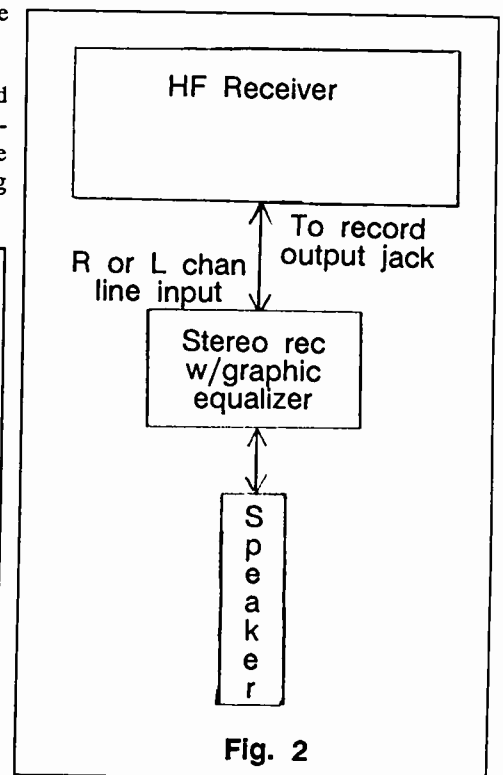
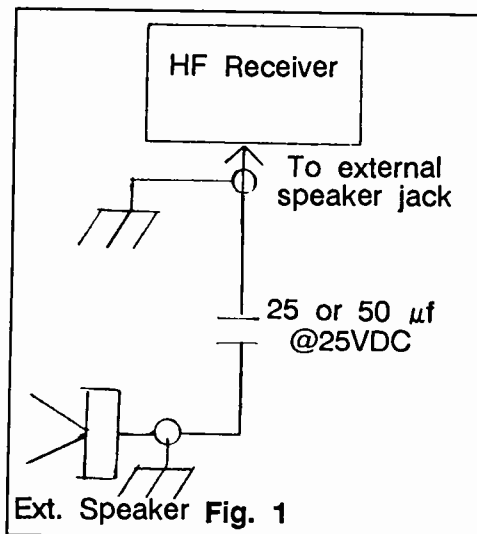
Over the last 40 plus years, many means have been devised to deal with the poor or inadequate audio that shortwave receivers pour into our suffering ears. Back in the 1950s and '60s, something called 88mH toroidal inductors were the rage. Passive high and lowpass filters could be built using these telephone company cast-offs, making Morse code (CW) and single sideband (SSB) reception more tolerable on receivers originally designed only to receive AM.

The 1970s saw the advent of the integrated circuit (IC) and something called "operational amplifiers" (op-amps) which could be configured as active filters by placing several in series with each other.

Such mechanations are no longer necessary. Today's generation of active filters not only incorporate such exotic features as multi-pole filter sections but tunable notch filters, peak filters, auto-tune notch filters and tuneable passband filters.

If that sounds Greek to you, don't worry. The translation is simple and it's good news: today's active audio filters make it possible to modify the receiver's audio output (which is poor to lousy, in most cases) to suit your own tastes. No longer do you have to suffer from extreme "bassyness" or background "hisssss" that is not only tiresome but masks the target station's modulation.

Proper modification of the audio passband will greatly enhance the receiver's audio



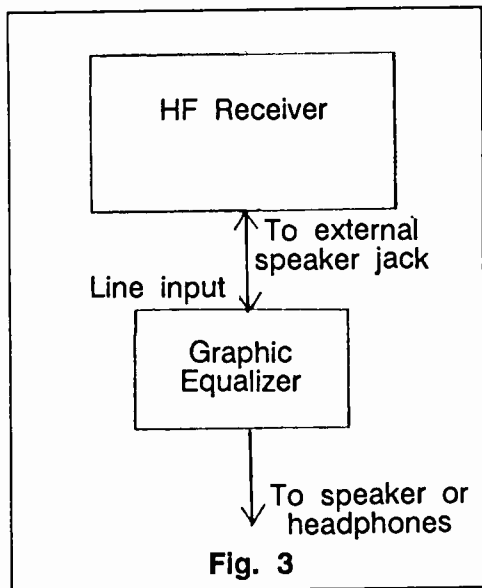


Fig. 3

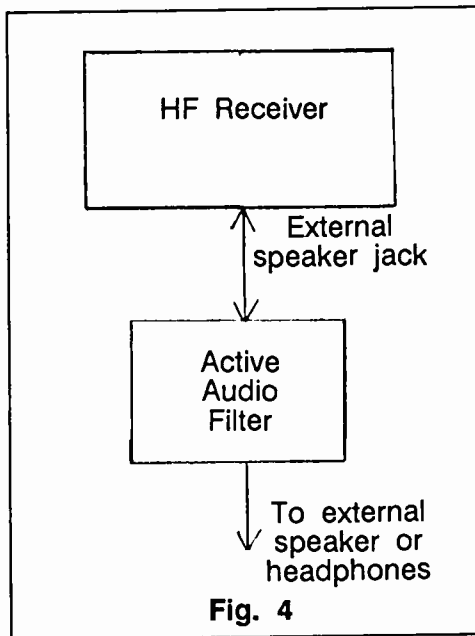


Fig. 4

and make your listening sessions much less tiring. The methods listed in this article have been used over the last 30 years of shortwave DXing. While there are no magic cures which will allow you to pull the Voice of Nibi-Nibi out of the muck, you can definitely improve your chances by using some of the following techniques.

Receiver Mods

There are a couple of things that can be done to the receiver audio at modest cost which will improve the overall effect. First, there is the old trick of putting a capacitor (or two) in series with the speaker to reshape the audio response (figure 1). This is the cheapest way to improve your receiver's low frequency audio response. By experimenting with the values of one or more series capacitors, you can achieve good low frequency roll off. This will reduce the atmospheric noise and low frequency rumble you hear while DXing.

If you have a "boom-box" or stereo receiver that has a built in graphic equalizer, you can take the receiver audio from the record jack (where the audio has not yet been amplified) and feed it into one channel of the receiver (figure 2). By adjusting the graphic equalizer to cut off the low and high frequency responses in the passband at 500 Hz and 2500 Hz respectively and accentuating the frequencies between these two limits, you will notice a dramatic improvement in the overall audio quality.

What you've basically done is to reshape the audio passband to only include voice frequencies. Hiss, splatter and atmospheric noise are now being attenuated, greatly

reducing ear strain. In addition, the resultant audio is now being amplified by the *real* linear audio amplifier in the boom box.

If you don't have a stereo with graphic equalization, not to worry; Radio Shack sells several equalizers which will work with varying degrees of success. These range in price from about \$40 to \$130. You will need to connect these equalizers to your receiver's external speaker jack or phone jack as they do not have built in audio amplifiers (figure 3).

Although the audio will be amplified by the receiver's less-than-linear audio amplifier, with prudent tweaking of the graphic equalizer controls, you will still realize a dramatic difference in the quality of what you are hearing.

Active Audio Filters

Active filters are several steps above the graphic equalizers when it comes to versatility. While equalizers can notch or

peak a certain band of frequencies (within a limited range of about plus/minus 12dB), a good active audio filter can do both simultaneously (with the notch depth of up to 70dB) while still providing a tunable audio passband, movable notch/peak filters, etc.

Active audio filters can be placed in one of two signal paths in a receiver. The most popular placement is on the output of the receiver audio amplifier, either at the external speaker or headphone jack (figure 4). This provides adequate signal levels for the amplifier to work with and also will drive an external speaker or headphones which are plugged into the output of the filter.

If possible, the best place to install the filter is in the AGC loop of the receiver's IF strip (figure 5). This provides unamplified audio (far less distortion) and will not degrade the performance of the receiver. Few of us want to pop the top of our main station receiver, whip out the old soldering gun and begin to modify and expensive radio. Therefore, most of us opt for the former placement of the filter.

Once the filter is in place, it becomes a trial and error exercise to find the correct control settings to enhance the audio to suit personal taste. Due to different conditions in propagation, target station modulation, and so forth, these settings never remain static. Rather, they are constantly being changed, to ensure the best possible audio quality is available. So, the name of the game here is to "twiddle and fiddle."

There are several active audio filters which will greatly enhance your receiver. At this time I'd like to briefly review two of them which I have personally used.

The Cadillac of all active audio filters is the Datong FL-3 made by Datong Electronics

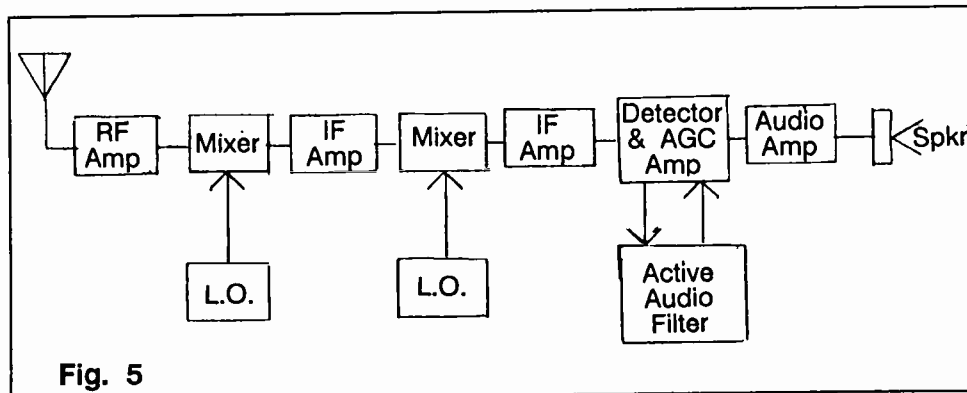


Fig. 5

in England and imported by Gilfer Short-wave in Park Ridge, New Jersey. The FL-3 contains four very complex and independent active audio filters. Each is tuned by a control voltage and the linear frequency versus voltage curves are accurately matched to allow ganged operation.

The four filters are: a five-pole elliptic-function highpass filter, a two pole filter with independent peak and notch modes, and a tunable notch filter which works automatically and independently from the first notch filter. The high? Low pass and

manual notch filters cover 200-3500 Hz. Depth of the manual notch filter is about 30 dB.

These three filters can be ganged together into a 12 pole filter with superb skirt selectivity with non-interacting center frequency and bandwidth controls. This filter is an exceptional performer on CW, AM, SSB or RTTY (including AMTOR and Packet). Fig 6 shows the various frequency response curves which have been computer generated. These curves are right off the FL-3 literature and show what a fantastic

performer this filter really is.

The FL-3 auto-notch filter is the result of Datong marrying their FL-1 and FL-2 filters together to produce a filter with terrific flexibility and a tuneable auto-notch function. This phase locked loop auto-notch continually scans the audio passband (200-4000 Hz) looking for a steady heterodyne type signal. Once it finds the signal, the notch locks onto it and reduces it by 40 dB or more, all within about 1 second! This auto-notch is so good that if you tune in WWV and fire up the auto-notch function, the once-per-second time tones disappear!

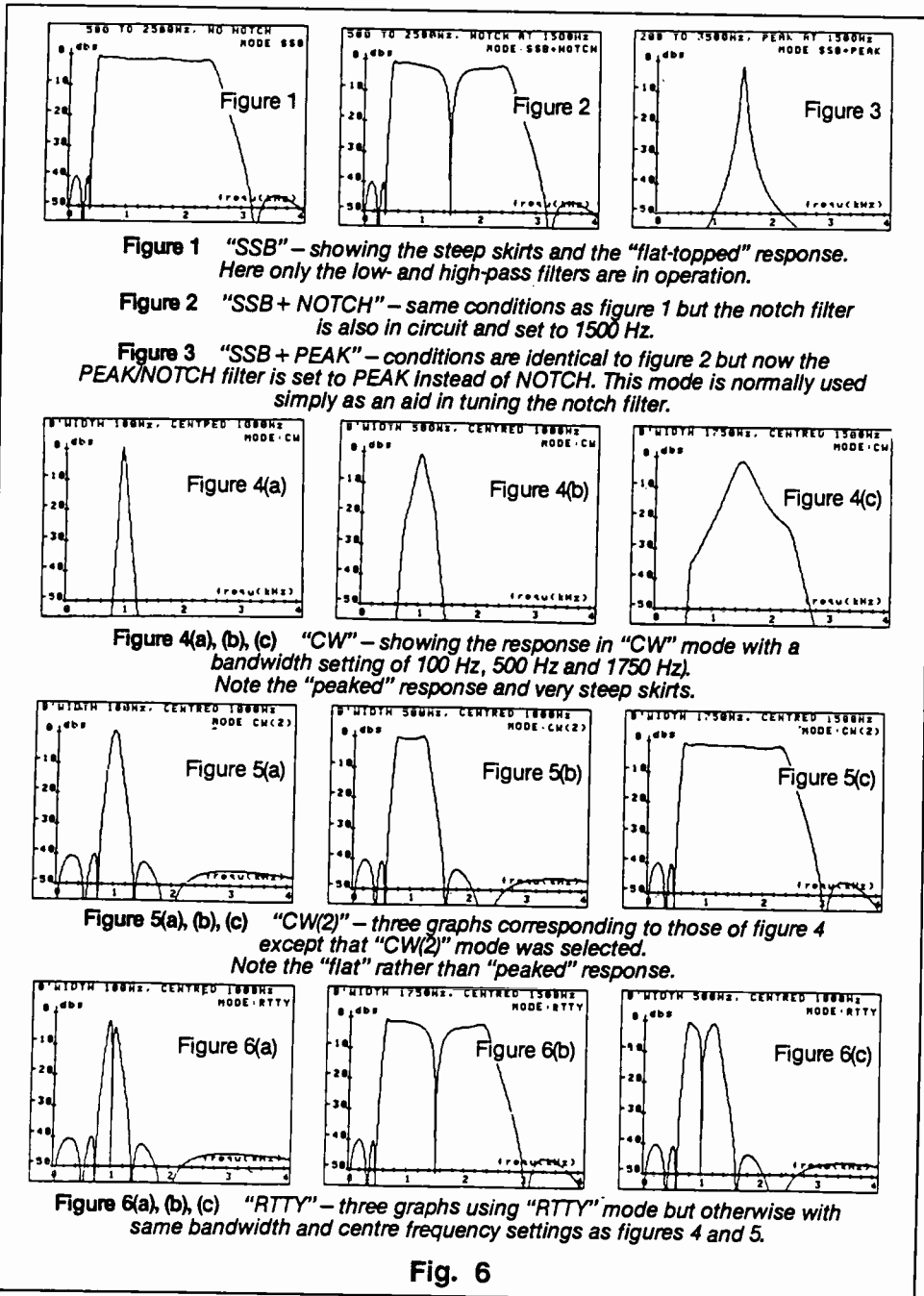
The application for the serious DXer is obvious: the auto-notch filter, coupled with the three other filters in the FL-3 can really clean up a signal! The FL-3 requires 10 - 15 VDC @ 400 ma to operate and has unity gain, ensuring no insertion loss. In addition, there is a recorder output jack on the back panel which allows you to record off the filter output. The obvious advantage here is that the tape recordings of your DXing sessions will have the same audio processing as when you actually listened.

The MFJ Signal Enhancer II is another fine performer. MFJ originally started manufacturing active audio filters for CW and SSB back in the early 1970s. Their fine CWF-2 and CWF-3 filters have been used in many of the direct conversion receivers that I have made over the years. In addition, I have also included them in each of the five (that's right, 5) Ten-Tec Argonaut QRP (low power) transceivers that I've owned.

The Signal Enhancer II is well suited to CW, AM, SSB or RTTY reception. It lacks the sophistication of the Datong FL-3, but it costs less than half the price. Quite frankly, it performs very well and allows the user to tailor the receiver audio to his/her liking. The two 70 dB notch/peak filters are manually tunable through the 300-3000 Hz passband.

When using the notch function, it is easier to first peak the offending signal and then switch to the notch mode to eliminate the unwanted signal. The primary and auxiliary filters can be used in combination with each other to radically alter the audio passband. The bandwidth can be continuously varied between 40 and 3000 Hz.

Some ringing does occur when using the SE-II in extremely narrow bandwidth



modes. This is caused by the high gain of the filters coupled with the narrow audio passband. The cure is to increase the bandwidth slightly until the ringing stops. The back panel has a dual input phono jack that allows the use of two receivers. The SE-II requires between 9 and 18 volts DC @ 300 ma to operate, and has a unity gain, so there is no insertion loss. There is no record output on this filter, but all is not lost!!

While the MFJ SE-II does not have a record output, you can still salvage the situation. I discovered this method while trying to clean up a tape of the BBC Hong Kong relay tests last August on 15230 KHz. Propagation was not good, and interference from Radio Beijing was playing havoc with my attempts to get the BBC test transmissions in the old logbook.

After recording about ten minutes of real garbage from the BBC, with Beijing tap dancing all over them, I decided to try playing the recorded signals back through the MFJ SE-II. Viola! A little twiddle here and a little fiddle there resulted in a relatively clean rendition of what the BBC was saying. Did I get the QSL? Sort of. It was a typical BBC "no data" card, but I like to think of it as proof positive that I did hear the BBC HK tests.

Make the best of your recordings

Now a word about recording your DXing sessions. First of all, use high quality tapes. Don't be tempted to use the bargain basement tapes that sell for pennies. Second, use a good quality tape recorder that has adjustable recording bias (to take advantage of your higher quality tapes). If you use the FL-3, you can record the target stations exactly as you hear them with processed audio. This has an additional advantage of allowing you to replay the tape through the FL-3 to further modify the audio for those really tough cases.

Finally a word about headphones. Serious DXers use headphones for several reasons. Headphones isolate you from your surrounding environment and this enhances concentration on the tasks at hand. Nearby background noise from TV, kids, dogs and so forth can be distracting at a critical time (like during an ID). Stereo headphones are comfortable and, if used with one or more of the methods discussed previously, will enable the you to further enjoy your listening hobby without bothering the rest

of the family.

A combination of passive L/C networks, graphic equalization and active audio filtration will make life on the shortwave bands a lot easier. It takes a lot of effort to dig some of these stations out of the muck that exists on the bands, but intelligent use of active and passive audio processing techniques will definitely make the difference in a lot of cases. Not only will your listening sessions become more enjoyable and a lot less tiring, you should definitely increase your country totals.

Good luck and good listening.



The MFJ Signal Enhancer-II (MFJ-753C) is available for \$99.95 plus shipping from MFJ Enterprises, P.O. Box 494, Mississippi State, MS. 39762.

The Datong FL-3 is available from Gilfer Shortwave, 52 Park Ave, Park Ridge, NJ for \$230.00 plus shipping.



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A Visit to The Aligarh Relay of All India Radio Overseas Services

by Supratik Sanatani

Situated in the outskirts of Aligarh, about 150 kms southeast of New Delhi, is the "high power transmitting station" of All India Radio's (AIR) overseas services. Built in 1971 on 823 acres of land, it is home to four 250 kW Brown Boveri transmitters. There are 11 transmitters at New Delhi, all of them are of 100 kW or 50 kW only. Thus, Aligarh has the distinction of being All India Radio's "high power transmitting station" and AIR's most important shortwave relay.

Construction at Aligarh began in an effort to decentralize overseas transmissions from New Delhi. At the main transmitter site, programs were often disrupted due to erratic power supply and atmospheric disturbances. Aligarh, on the other hand, was close to New Delhi, the land was available and electricity ensured from the adjacent Haridwar Thermal Power Station of the Uttar Pradesh State Electricity Board. Construction of the station was done by the Civil Engineering Department of All India Radio.

Transmitter Building

As one approaches the relay site, imposing antenna masts fill the horizon. The transmitter building appears as a mere matchbox as one drives to the entrance of the station. The compound has a few other buildings

scattered about to house the security guards, antenna feeding systems, warehouses, and the electricity substation. Security is visibly active in the complex with a picket at the entrance to the station as well as an armed guard at the door of the transmitter building.

In front of the building is a TVRO dish antenna which receives programs from Akashvani Bhawan studios at New Delhi, via INSAT 1B. One channel on this satellite is used by AIR mainly to feed All India Radio programs to the remote AIR stations such as in the northeast or in the Andaman Islands. Another link is via microwave to Agra, by coaxial cable to Aligarh city, and then by telephone cable.

On entering the transmitter building, visitors are greeted by an azimuthal map showing the antenna beams. The building has two wings housing two transmitters on each side. Situated opposite to the entrance and between the two wings is the antenna hall which feeds transmitter output to any four of the 39 antennas, and antenna feeders go out of this hall in various directions.

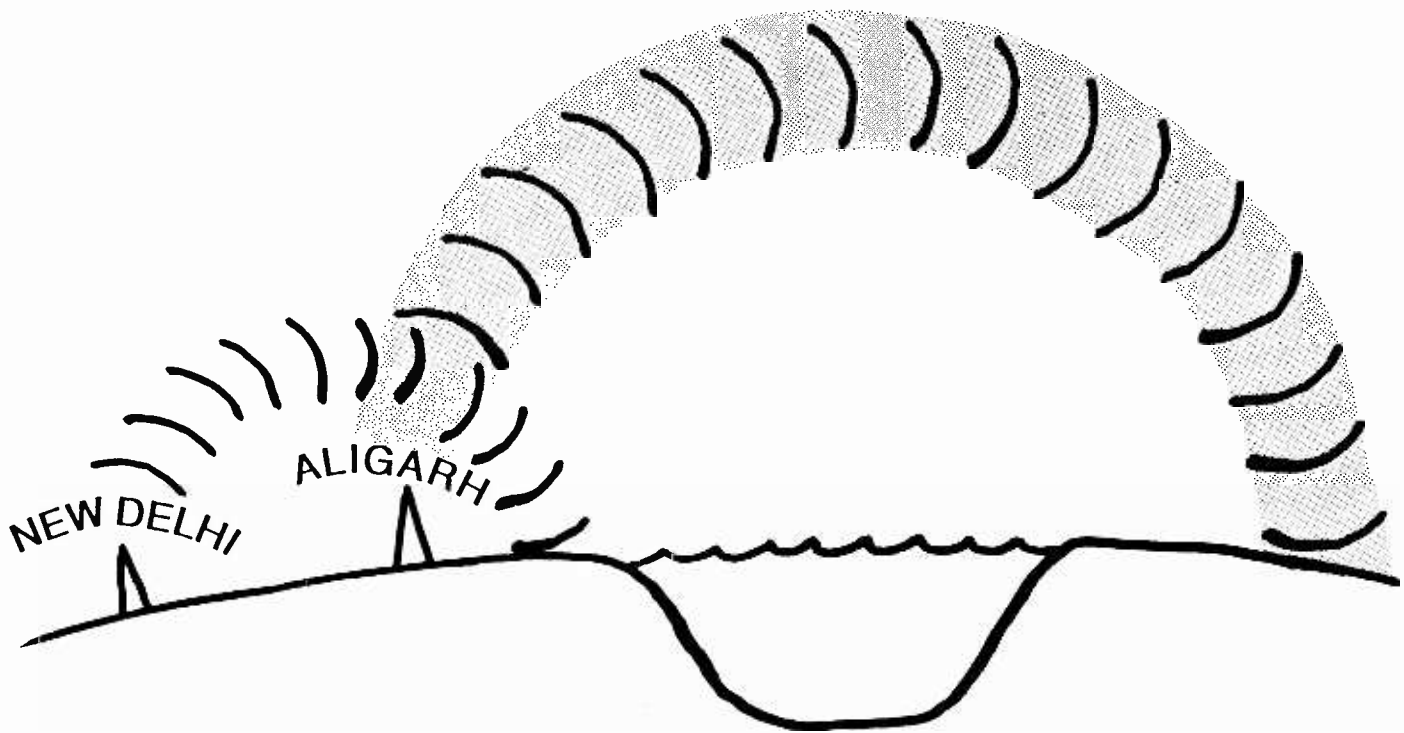
The offices occupy the front row of the two wings. There are 40 technical personnel working here, of whom 25 are engineers. Each wing has an air conditioning unit and a small workshop. There are no announcers or programming staff but there is a small

studio which can be used by artists and announcers brought from New Delhi in case there is a major breakdown in the studio link.

All the antennas are dipole arrays giving a gain of around 23 dB. The beam of the antennas (80°, 65°, 102°, and 132°) are reversed by changing the connection of the driven element and the reflectors. At present this is being done manually, but a remote controlled unit is being tried out by the engineers. Along each antenna beam direction there are several antennas for different meter bands, bringing the total number to 39.

Station Engineer Mr. Bajaj was very enthusiastic in pointing out that the design and erection of the antennas were done by AIR engineers. One modification made by the AIR engineers was to substitute aluminum instead of copper for the antenna and feeders. There are about 24 kms of feeder wire alone, and copper has the problem of pilferage. Each limb of the feeder consists of two parallel aluminum conductors in order to match the electrical and RF properties of copper.

All the insulators are of steatite and this, too, is indigenously manufactured. For its manufacture, furnaces with high temperature but accurate control are required. This is available only at Bangalore. A successful trial of a multiband antenna which can



function in two adjacent bands has been carried out here.

Inside the Transmitter

The right-hand wing of the building houses the older transmitters marked A-I and A-II. They are of 1965 design and were commissioned in 1971, hence outdated by present standards. Inside the spacious transmitter hall the instrument panels line one side and the operators sit at two tables in the middle. Two large drawing-room type speakers act as monitors.

While I was taken round the transmitters, it was maintenance time and I saw panels being opened. My guide was Mr. Kumar, an engineer who has been in the center for 17 years since its inception, and who was to proceed in seven days time to AIR Rampur as station engineer.

Each section was explained to me in detail, and Mr. Kumar appeared very satisfied with the BBC transmitters. To enter the compartment housing with the main power valve [tube], there are elaborate safety precautions: one has to switch off the power with a key and then open the door with it, while another switch goes off on opening the door and finally the tube is grounded. I promptly touched the tube like the pilgrim taking the holy touch!

The newer transmitters marked A-III and A-IV, which are housed in the left hand

wing, have a lot more solid state components; being of 1980 design they are thus half the size of the former. The engineers are continually trying to indigenize the spare parts such as the cooler tube of the power valves which is made by Borosil. A Calcutta firm fits the metal collar. This costs Rs 400 -- in place of Rs 4000 for the original.

The transmitters are off for maintenance from 0500-0800 UTC and during this time they are occasionally tested with pure tone audio. "Trapezoidal" pattern modulation is used and during the speech portion of the broadcast (e.g., during news) more audio power is put in, which introduces 3-4 percent distortion. According to Mr. Kumar, the human ear cannot detect distortion less than 7 percent, but I felt that this could account for the "rough" audio tone of AIR broadcasts during news.

In the Dark

Monitoring of external service broadcasts in foreign countries is done from the Indian embassies by their radio operators. There is also a monitoring station at New Delhi, which comments on transmission quality from time to time -- much to the displeasure of the officials here who justifiably argue that most of what you can receive at Delhi is the back lobe radiation only.

The engineers are also frustrated over the fact that they do not have any access to the reception reports sent to Delhi by listeners or from the embassies. However, official moves are underway to change this practice.

Break in Transmission

While I was visiting the station, Aligarh was in the grip of a power crisis. One of the transformers had burnt out and the station was being supplied at 28 KVA instead of the required 33 KVA. As a result, some of the transmitters could not run and those which did were running at 150 kW instead of 250 kW. The air conditioning unit could not be run and with the summer heat soaring to 44° plus there were frequent trippings of transmitters the moment the slightest sparking took place.

Didn't they have a stand-by generator? Their power requirement is 3 mVa and for that a "power house" will be required and with this power one could light up a whole city. Incidentally, AIR is the largest consumer of electricity in the whole of Aligarh district and their monthly power bill runs up to Rs 7 lacs. It was to avoid this type of situation that the AIR relays were being decentralized.

This morning, Swahili to East Africa could not be aired from here and only a 100 kW transmitter from Delhi was carrying it. For

transmitter shutdown with prior notification, alternative frequencies from other sites are activated, but for unexpected breaks of this type, one frequency has to be sacrificed.

The engineers were busy writing a message to inform Delhi about their predicament. It was to go by telegram because the phone lines were dead, too. Why doesn't the station have its own radio link with New Delhi for emergencies of this type? "The Post & Telegraph Department is respon-

that the studio link has given away for one of the transmitters.

Weather also plays a part in disrupting programs by playing havoc with the antennas. A dust storm ("Aandhi") a week ago had wrecked the weight supports and the next day transmitters had to be aired via makeshift antennas. Even at such large dimensions, the antenna measurements are critical and the slightest sagging will "trip" them off.



What more appropriate symbol for All India Radio's QSL than this imposing white tiger? (courtesy Gayle Van Horn)

sible for that," was the reply.

This is bureaucracy -- the most important of all the AIR relays depending on unreliable phone lines for talking to New Delhi. But I realize that the government did view this type of power crisis seriously because one week later in press conference the Secretary of Information and Broadcasting was asking respective State Governments to ensure power supply to AIR and Doordarshan installations.

For the short breaks in studio links, the station has music "fillers." Besides, it has sets of prerecorded programs in each language covering each segment. In case of major breaks in the studio link, these alternative programs are aired. In case you hear two different AIR programs on two different frequencies, you can be assured

Wild Life

Transmitters, antennas, guards -- that doesn't quite account for all the occupants of the complex.

Herds of nilgais (short-horned Indian antelopes) roam fearlessly amongst the stubby bushes dotting the antenna fields. It's a peaceful coexistence except when a male charges at the antenna technician or the unfortunate one runs into the live antenna feeder and trips the transmitter.

For the listener at the other end, it is just another "break in transmission." Little is he aware of the charging nilgai, transformer burnouts, or dust storms thousands of kilometers away.



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The Ohio Underwater Research Association OURA, INC.

The Ohio Underwater Research Association was formed in 1981 and is a nonprofit corporation of Ohio and is dedicated to the exploration, conservation, and documentation of Ohio's vast water resources. Additionally, OURA maintains a separate and highly trained and experienced volunteer underwater recovery team (URT) that is on call with over thirty northeast Ohio police and fire departments. The URT maintains an impressive 95 percent body and felony evidence recovery record.

OURA, its activities and its members have been the subject of over 100 local, regional, and national/international newspaper and magazine articles. The group has also appeared in over 50 television broadcasts including all three commercial network newscasts, CNN, PM Magazine, AM Cleveland, Live on Five, local cable programs, and a half hour regional NBC (WKYC TV-3) special on the Lake Erie shipwrecks titled "Dark Water -- Deep Secrets."

In August 1985, a grueling four day effort broke a world record by keeping fellow member Jack Wade submerged on scuba with no break for 80 hours 4 minutes. The previous record of 78 hours 2 minutes was held in the United Kingdom.

OURA continues to strive towards unique projects with the most recent being the successful design and operation of an underwater amateur "Ham" radio station that contacted 40 states and 11 countries.

Underwater Amateur Station!?

by Paul Buescher N8HHG

Every radio enthusiast knows the challenges of putting an amateur radio station on the air, but to do so underwater while using scuba gear is a whole new ballgame!

In August of 1987, members of the Ohio Underwater Research Association (OURA), based in Twinsburg, Ohio, began planning such a station as the result of a joking remark by one of the members.

During a scuba diving venture last year, I took along my HF rig to operate in the evening. It was during one of these evening sessions that a fellow OURA member kindly suggested that I take my noisy radios along with my scuba gear and go for a nice long dive. Well, it took almost a year, but I

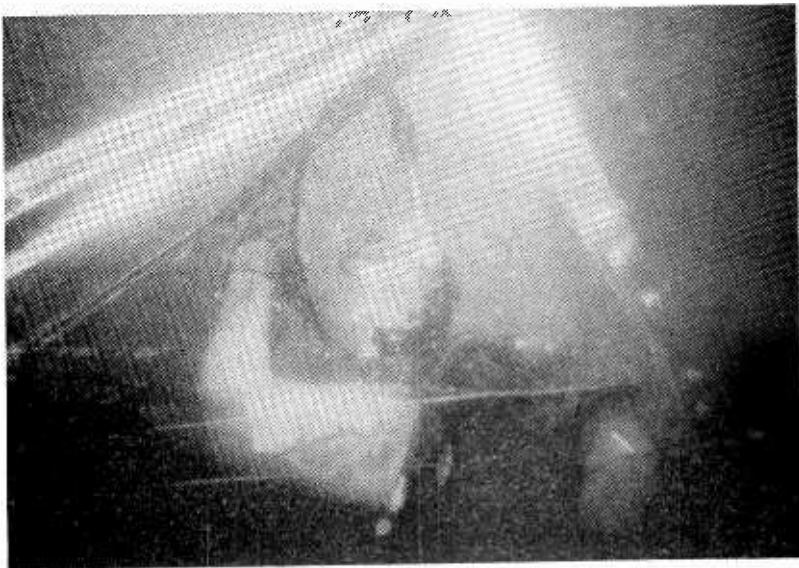
finally made that dive.

On Monday, June 27, at 2015 UTC, I entered the clear cool water of the East Quarry at Kelley's Island (Ohio) State Park and descended to an anchored four foot by three foot plastic pup-tent (we call it a comm-chamber) and popped up inside to a breathable 18 cubic foot atmosphere.

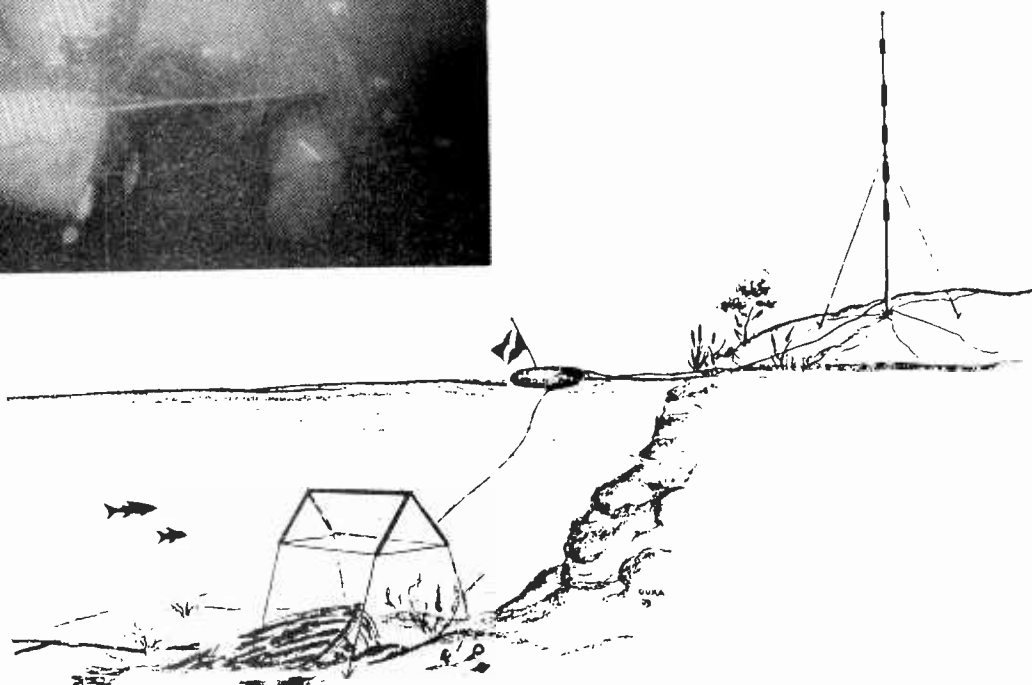
For the next half hour, fellow OURA divers brought an assortment of electronic gear to me in Tupperware-type waterproof containers -- one of which had an umbilical cable to the surface with the antenna and intercom attached to it. Eventually all the gear was assembled and even after accidentally dropping the Radio Shack intercom and Kenwood microphone into the water (both survived), submerged marine portable N8HHG was on-the-air.



Following a suggestion to 'take his noisy radios and go for a nice long dive,' amateur Buescher made radio history (photos and artist's rendering by OURA)



With 900 lbs of lift, the comm-chamber had to be firmly anchored to the floor. Amidst floating Tupperware and other paraphernalia, quarters were cramped -- but he'd do it again!



At 2045 UTC, two-meter contact was established with fellow OURA member Donna Burroughs, KB8YS, in Macedonia, Ohio, followed by numerous contacts in the northeast Ohio area.

During the following four days, the comm-chamber was moved to different sites within the vicinity of Kelley's Island. The brief stays inside the chamber eventually led to HF contacts in 40 states and 11 countries.

Problems involved in the operation of the station ranged from tolerable to down-right aggravating. Foremost in consideration was the fact that we had to secure the comm-chamber to a convenient shipwreck, boulder, or other immovable object to offset over 900 pounds of lift that the fully inflated chamber presented. Next was the relatively cold (69 degree) water that had to be dealt with. Even after an hour of submersion with a wet suit, the chills and shivers set in. Then there was the difficulty of keeping fresh air in the chamber.

The "old" air had to be released to the outside while fresh air was injected inside from scuba tanks -- all done quietly so as not to disturb the radio operations. Log keeping presented yet another problem. Keeping the log on underwater slates seemed quite simple at first but then came the "pile-ups." I found that working a different station every 30 seconds or so became overwhelming, so the log keeping was quickly transferred to Tom Wayne, WB8N, and Casey Nowakowski, N8FCQ, on the surface.

Bear in mind the fact that there I was, ten feet or so underwater, kneeling on a hard surface with water almost up to my neck, with my head inside this little "tent," talking with a mike in one hand and an intercom in the other, trying to write on slates and regulate the air between transmissions -- not exactly your everyday amateur radio operation. The whole project sounds like something we would never want to do again, right? Wrong!

The rewards and satisfaction that our 12-person crew shared between ourselves and the amateurs and SWLs worldwide, who talked to us or just heard us, was more than worth the "sacrifice" -- it was a labor of love. We are already planning our next unique scuba/radio adventure. We recently heard about a sunken aircraft beneath the surface of Lake Erie. I can see it now, a submerged aeronautical portable -- now that would raise a few eyebrows.



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 true, 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

ARMENIA We hope you didn't overlook the one-line entry on page 69 of the December *Monitoring Times*, and knew as soon as the earthquake hit that Radio Yerevan does broadcast to us in English, even though at a record-setting minimum rate of five minutes per day. For about a week after the quake, however, the English segment was suspended as broadcasts in Armenian were expanded to carry memorial services and somber music. We wonder how many Armenian-Americans know they can hear the homeland at 0330-0400 UTC on 13645, 15180, and 15455 kHz via transmitters in the Soviet Far East (one hour earlier April through September).

AUSTRALIA After the U.S. AM band expands to 1700 kHz in a few years, it's doubtful anyone will still think of frequencies down to 1600 as "shortwave." But for now, Radio for Print Handicapped stations, with only 500 watts on 1620 and 1629 kHz, enjoy "clear channels." Gene Martin in Denver says they sound like 50 kilowatts every morning from 0900 UTC until an hour after sunrise.

On 1629, the only problem is 2RPH Sydney and 3RPH Melbourne interfering with each other. They should be easy catches even in eastern North America (IRCA *DX Monitor*). As Australian commercial stations move from AM to FM, it's expected the RPH outlets will get "better" frequencies below 1600, another reason not to delay in DXing them now. (Ian Stanley, *The DX Press*)

BURMA Government-owned radio stations were to resume ads after a 26-year break following nationalization of private stations (The *Telegraph*, via *DX Grapevine*)

CAPE VERDE A former director of Radio France International, Herve Bourges, has decided to go into the shortwave business himself. An agreement has been signed with Cape Verde to install three high-power transmitters for broadcasting to Latin America and Africa. Stations wanting to use this relay will have to compete for it. (BBC Monitoring Service)

CHINA The Radio Beijing relay from Spain continues, with English at 0300, but on 9690 where it's co-channel Havana and Buenos Aires. (Ernie Behr, Ontario, *DX Listening Digest*)

COLOMBIA Radio Patria Libre, the Marxist clandestine, has become an easy catch nightly in North America, 0025-0110 UTC on 6760 plus or minus five kHz (Ernie Behr, *DXLD*). The transmitter site is between Guamalito and Pelayo in the departments of Cesar and Norte de Santander, where commandos of the Union Camilista of the National Liberation Army operate, that is in the mountains of the Sierra del Perija near the Venezuelan border. (*La Prensa*, Bogota, via Richard Stoller, *Review of International Broadcasting*)

COSTA RICA Radio for Peace International has a new higher-powered transmitter of 5 kilowatts. It should provide stronger, more reliable signals, and could allow RFPI to use two frequencies at once, though the old transmitter sounded like it should be retired. Check 21555-21560, 13660-13663, 7375 kHz.

A very weak station with vocal music has been heard at 1121-1145 on 5119.2 kHz. (Kirk Allen, OK, *Fine Tuning*) Also

threshold level here, identified as Radio Alajuela, so it's the fourth harmonic of 1280. (Don Moore, OH and PA, *DXLD*)

FALKLAND ISLANDS At a conference on the future of shortwave held at VOA, Ian Davey of BBC implied a relay transmitter might be set up here, as South America is an important area. (RIB) Hard to see how this would be better than lower-latitude Ascension.

GUAM KSDA dropped the 2100 broadcast in English when its Micronesian program was scheduled. English hours are now: 1000 UTC on 9465, 1600 on 11980, 0000 on 15125, and Saturday/Sunday only at 0200 on 17865. (via Hank Michalenka, RI, *NASWA Listeners Notebook*)

INDIA Due to "limited hardware capabilities," All India Radio rules out any shortwave service to the U.S. and Canada. (BBCMS) That makes sense. Direct broadcasts over pole cannot be reliable, but here's a country ripe for relays.

All India Radio transmitters are sometimes used for diplomatic messages; for example, 7240 at 0940 UTC claiming to be Lucknow but actually Delhi, while President Venkatratnam was visiting Bhutan: "We would like to tell you, listener, that we have not received any information." (Supratik Sanatani, *OzDX*)

IRAN A printed schedule from IRIB, Tehran, shows "eastern part of American continent" as the target for 15084 kHz, including a Turkish broadcast at 0400-0500. But that is not the case for any English frequency. So it seems the Ayatollah would rather speak to the few Turkish-speakers in America than to the masses in English. (*DXLD*)

ITALY Radio Europe is another private/pirate station in Milan, testing Saturday/Sunday 0800-1100 on 7295 (alternate: 7280); has been playing tapes from FM stations in California, and WYFR in Italian. Report c/o Play DX, via Davanzati 8, 20158 Milano (*DXLD*) Last month's 11195 should have read 11995.

JAPAN Far East Network, an AFRTS affiliate, abolished shortwave at the end of September, but continues on MW 810 only (My Wave of Japan BCL Federation via Koichiro Sasaki)

JORDAN There's very little indigenous music on the 500 KW English service on 9560 kHz, and only a few minutes of news on the hour. (Chris Bagge Jr., MA, *RIB*) Except for a major newscast at 1700-1725. (Ernie Behr, *DXLD*)

LAOS An Indochinese station on 4986 turns out to be Xieng Khouang, with classical music at 1110 UTC and Vientiane news relay at 1200 (Craig Seager, Australia, *ADXN*)

NETHERLANDS A first in international SW radio is a monthly feature "The Gay Front," (toned down from the original working title, "The Gay Force), on Radio Netherlands' *Rembrandt Express*, one Friday a month (the third in November and December, the fourth in January), but not on broadcasts to Asia and Africa, which have alternatives that day.

Homosexuality is accepted as an alternative lifestyle in Holland, especially Amsterdam, and this program will not treat it as a problem. We doubt this ten percent of the population enjoys a single other shortwave program, and precious little on

domestic radio.

PERU A hill near Chota gives its name to Radio Waira (note spelling; Quechua for "wind"), on 4700 kHz, according to a letter from the station. (Henry Lazarus, LA, FT)

A new station is Radio Estrella, Huanuco, on 5146.8 kHz, announcing 5175, until closing around 0300 UTC. (Julian Anderson, Argentina, *Onda Corta*)

SAINT MARTIN Last month's 9580 station is definitely an imagination figment since it sent an unsolicited verification to co-columnist Gayle Van Horn, who never reported it. Some people have all the luck!

SOMALIA Radio Hargeisa can be heard at 0400-0600 and 1000 past 1730 on 21360, the third harmonic of 7120; also audible on second harmonic 14240 (Sarath Weerakoon, Sri Lanka, Radio Australia *Communicator*)

SOUTH AMERICA It's stupid to broadcast on 11 meters in the middle of the night, right? Take a look at the *MT* propagation charts starting on page 66, off the scale between South Africa and the midwest during the day, and still above 26 MHz at 2230 when we heard Radio RSA testing once for a few minutes with English news from Radio One. Rising solar cycle, minimum midsummer darkness, and high power made it work; at the same time not a single broadcast signal was to be heard on the 21 MHz band -- the band wasn't closed; no one was using it.

UNITED ARAB EMIRATES After a few weeks on 25900, Abu Dhabi dropped it, ending another interesting propagation experiment.

USA Despite previous assurances, WWCR in Nashville won't be on the air before April or May. (Bruce MacGibbon, *DX Spread*) They've been shopping for a less efficient and cheaper rhombic antenna instead of the usual curtains new US stations employ.

WRNO dropped 13760, and extended 15420 all the way from 1600 to 0000 UTC. This affects the Sunday 2130 broadcast of *World of Radio*, unless it's delayed by ball games past 0000 UTC Monday when 7355 kHz is on. Best to catch earlier airings, scheduled Thursday 1630 on 15420, UTC Friday at 0000 on 7355 (the repeat at 0130 seems gone), UTC Saturday 0400 on 6185 and UTC Sunday at 0030 on 7355 kHz.

Under US government control, Radio Marti has always seemed too tame to the anti-Castro Cubans. Now the same group which lobbied for Radio Marti, the Cuban-American National Foundation, was expected to apply to the FCC for a private shortwave station to broadcast to Cuba. (*Broadcasting Magazine*). They wanted to use 3 or 4 MHz from Florida, not likely to be approved by the FCC, so a site further away is being sought, where a minimum of 6 MHz will get through. How about Opelika, Alabama? (*World of Radio*)

An Atlanta FM station, WAPW, "Power 99" has been testing a 20 or 100 watt unit on 26130 kHz around 1500-1800 UTC some days, as the engineer drives around town to test its range. DX reports are also welcome and will be QSLed, so it can hardly be a crime to listen. To be safe, though, better do it from Montreal, where the skip distance is ideal, and Sheldon Harvey discovered this. No luck now? Ask him to try it again: Vic Jester, WAPW, 3405 Piedmont Rd., Suite 500, Atlanta, GA 30305 (*WOR* and *RCI SWLD*)



Radio Marti too tame for anti-Castro Cubans

USSR Radio Moscow's external broadcasts in Russian are mostly domestic services relayed, or programs specifically for seamen, expatriates. But Moscow announced it would begin a "World Service" in Russian, with the North American portion starting at 2330 UTC. (Tim Hendel, Miami FL, *WOR*) Frequencies include 62 meters (probably the Cuban relay varying around 4765) and mediumwave. (Christos Rigas, Chicago, *DXLD*) No doubt national pride plays a part in this; Moscow feels there are enough Russian-speakers abroad to justify this. It sure beats jamming!

Moscow has also said it will start carrying advertising on shortwave! Radio Pacific Ocean, Vladivostok has a brief English newscast around 0745 including an ad for Calcium Boron, on 6035, 7210, 7260, best on 7270. (Bruce MacGibbon, OR, *DXS*) See also "Armenia."

VENEZUELA Stations here like to play state anthems as well as the stirring national anthem. The new Radio Continental, 4939, ran the Barinas anthem around 0912 UTC, then great folk music, lottery numbers, and a program for husbands (or married couples), on an excellent signal. (Don Moore, Dunlo PA) Make that 4939.57, heard from 1030 to fade at 1115. And back after a long absence is Radio Mundial, Caracas on 5049.1, with tropical music from 0230 past 0500. (Ernie Behr, Ontario, *SWLD*)

While being interviewed for a sesquihour on Radio Barquisimeto, I learned that this is the only major city in Latin America where all the radio stations are together in one building, behind glass so the public can watch. (Jeff White, *WOR*)

ZAMBIA ZBS, Lusaka, reactivated on 4909.8 with "Call of the Fish Eagle" every five minutes from 0340, English news at 0400 (Bob Brown, PA, *DXS*)

Keep up with shortwave and other DX and media news between *MT* issues by tuning in Glenn Hauser on *World of Radio* (See WRNO, above) and a separate weekly DX report on Radio Canada International, about 15 minutes after: Saturday 2137 on 17820, 15150, 11880; Saturday 2207 on 11945, 9760 (longer report on this airing only); UTC Sunday 0107 on 9755, 5960; Sunday 0136 on 11940, 11845, 9535; Sunday 2307 on 11730, 9755, 930; Tuesday 1333 on 17820, 11855, 9635; Tuesday 1907 on 17820, 15260.

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 noted.

0030 UTC on 9630

Spain: Spanish Foreign Radio. Panorama feature on the external struggle for Spain's petroleum industry. Monitored on parallel frequency 11880 kHz. (Bob Fraser, Cohasset, MA)

0031 UTC on 7400

USSR: Radio Kiev. News topics on the West Bank Gaza Strip and Afghanistan. DX program, ID, and frequency schedule for North American service. (Leslie Edwards, Doylestown, PA) Monitored at 0300 UTC (Harold Frodge, Midland, MI)

0047 UTC on 15580

United States: KUSW. Musical selection of "Killing Me Softly" followed by station ID. News topics on NASA and the USSR. Frequency move to 11695 kHz at 0100 UTC, with poor signal quality. (Jacques Ahouansou, Abidjan, Cote d'Ivoire) Thanks for the logs, Jacques!—ed.

0100 UTC on 9660

Yugoslavia: Radio Yugoslavia. Sign-on routine with frequencies. International news and discussion on the unrest among citizens of Albanian descent, in the southern province of the country. (Jim Boehm, San Antonio, TX)

0100 UTC on 5960

Japan: Radio Japan. Tokyo Stock Market report and discussion on national education. Japanese language lesson at 0145 UTC. (Ronald Van Campen, Curacao, Netherlands Antilles) Monitored on 21595 kHz from 0758-0900 UTC in English and Japanese. (Jacques Ahouansou, Abidjan, Cote d'Ivoire)

0100 UTC on 9515

Iraq: Radio Baghdad. Sign-on with frequency schedules for North America and Asia. Near Eastern music to Iraqi and international news topics. Musical selections of adult contemporary and big band. (Jim Boehm, San Antonio, TX)

0100 UTC on 9575

Italy: RAI. News coverage of state visit, from former leader of Czechoslovakia. Parallel frequency monitored on 11800 kHz. (Bob Fraser, Cohasset, MA)

0109 UTC on 9910

India: All India Radio. Closing political commentary at tune-in. Frequency and programming schedule, followed by an abrupt sign-off, without an ID. Some interference from BBC on 9915 kHz. (Guy Atkins, Issaquah, WA) Audible on 11620 kHz at 1850 UTC, with news on the PLO. (Jacques Ahouansou, Abidjan, Cote d'Ivoire)

0116 UTC on 5995

United States: Voice of America. Informative program on the research and study of lightning. Program delved into the nature of lightning, its effects on aircraft and space vehicles. Monitored on parallel frequencies 6130, 9455, 9775, 9815, 11580, 11740, and 15205 kHz. (Leslie Edwards, Doylestown, PA)

0130 UTC on 9420

Greece: Voice of Greece. Station sign-on and Greek folk music. Evening news of Greece, Turkey, and the United States. (Mark Selden, Coral Gables, FL)

0145 UTC on 11805

Brazil: Radio Globo. Portuguese. Local announcements from DJ, with occasional ID breaks as "Radio Globo." Clear signal until WYFR interval signal at 0155 UTC. (Guy Atkins, Issaquah, WA)

0204 UTC on 3300

Guatemala: Radio Cultura. Spanish/English. Classical music with introductions. Multilingual IDs and English religious programming. (Frank Mierzwinski, Mt. Penn, PA)

0230 UTC on 9615

South Africa: Radio RSA. African orchestra plays American jazz. Program interview with producer of series, "Shaka Zulu." (Ronald Van Campen, Curacao, Netherlands Antilles) Monitored on 25790 kHz at 1415 UTC in English. (Leslie Edwards, Doylestown, PA)

0239 UTC on 21700

United Arab Emirates: Radio Dubai. Arabic. Koranic chanting to 0303 UTC. ID mentioned as "Idha'atu l imarat al'arabiyya al muttahida min dubayy." Very good signal. Program still in progress at 0415 UTC recheck. (Guy Atkins, Issaquah, WA)

0247 UTC on 4835

Guatemala: Radio Tezulutlan. Spanish. Lively marimba music with frequent chat and "Radio Tezulutlan" ID. (Guy Atkins, Issaquah, WA)

0250 UTC on 3250

Honduras: Radio Luz y Vida. Spanish. Religious hymns and discussion. ID at 0255 UTC as "Radio Luz y Vida." (Aboe Thallep, Batang, Central Java, Indonesia)

0255 UTC on 5030

Costa Rica: Radio Impacto. Spanish. Excellent South American music to station ID at 0301 UTC, and news topics. (Frank Mierzwinski, Mt. Penn, PA)

0312 UTC on 9960

Ciandestine: Radio Calman. Spanish. Latin music, station ID, and political commentary on Angola and Cuba. (George Neff, Tampa, FL)

0317 UTC on 4895

Colombia: La Voz del Rio Arauca. Spanish. Colombian music program of lovely tropicales. Public service announcement for several local cities. (Harold Frodge, Midland, MI)

0325 UTC on 5005

Suriname: Radio Apintle. Dutch. Instrumental music with flutes and strings. Drum interval signal at 0357, national anthem, and 0359 sign-off. (Doug Waller, Bay Village, OH)

0330 UTC on 4880

South Africa: Radio Five. Cigarette ad with local contest offer, and station ID. Pop music suffering from Brazilian station interference on 4884 kHz. (Harold Frodge, Midland, MI)

0400 UTC on 7115

Bulgaria: Radio Sofia. Station ID and sign-on with frequency schedule. News and ecological discussion on the Balkans. (Mark Selden, Coral Gables, FL) Audible in English on 15315 kHz at 1831 UTC, with fair reception. (Jacques Ahouansou, Abidjan, Cote d'Ivoire)

0410 UTC 6549

Lebanon: Voice of Lebanon. Arabic. Distinctive interval signal of "Bridge Over the River Kwai." Lady announcer with programming announcements. (Doug Waller, Bay Village, OH)

0440 UTC on 6215

Pirate: Radio Caroline. Pop music to announcement of "World Mission Radio, California, U.S.A." at 0440 UTC. (Doug Waller, Bay Village, OH)

0440 UTC on 5965

Cuba: Radio Havana. DX Unlimited* program. discussion on shortwave antennas, closing with listeners' letters. Philately program at 0445 UTC and news at 0500 UTC. (Mark Selden, Coral Gables, FL)

0442 UTC on 9800

French Guiana: Radio France International relay. English news report and ID, to French programming at 0453 UTC. (Aboe Thallep, Batang, Central Java, Indonesia)

0500 UTC on 6900

Turkey: Turkish State Meteorological Service. Turkish. Sign-on with national anthem. Programming announcements and local items on Ankara. Beautiful Turkish instrumentals and vocals to 0532 UTC. (Aboe Thallep, Batang, Central Java, Indonesia)

0510 UTC on 4830

Gabon: Africa Numero Un. French. African and pop music program, with ID break at 0512 UTC. (Aboe Thallep, Batang, Central Java, Indonesia)

0530 UTC on 7255

Nigeria: Voice of Nigeria. Feature discussion on the Pan American news Agency, and improving the image of African countries. Nigerian national news to 0600 UTC sign-off. (Mark Selden, Coral Gables, FL)

0620 UTC on 6005

Germany-GFR: RIAS. German. American country and western, and German pop/rock tunes. Announcer ID as "Hier ist RIAS." Good signal despite adjacent channel interference after 0646 UTC. (Aboe Thallep, Batang, Central Java, Indonesia)

0645 UTC on 11760

Cook Islands: Radio Cook Islands. My old favorite with a great signal! Lady

announcer in dual languages, (English/Maori) with local merchant commercials, and a musical variety program. (Doug Waller, Bay Village, OH)

1030 UTC on 6020

Netherlands: Radio Netherlands. Happy Station program on hospital radio. Audible on parallel frequency 9505 kHz. (Bob Fraser, Cohasset, MA) Monitored on 15560 kHz at 2030 UTC. -ed.

1045 UTC on 6005

Canada: CFCX. Disney sound track from film, "The Rescuers." ID as "CFCF Radio 600" and CFCF shortwave radio of Canada." (Bob Fraser, Cohasset, MA)

1105 UTC on 2410

Papua New Guinea: (New Guinea) Radio Enga. English/Pidgin. News topics and regional news in English. Signal fading by 1120 UTC, but audible to 1145 UTC. (Aboe Thallep, Batang, Central Java, Indonesia)

1110 UTC on 3232

Indonesia: (Sumatera) Radio Republik Indonesia-Bukittinggi. Indonesian. Pop music to Koran recitations at 1115 UTC. Signal fading by 1125 UTC. (Aboe Thallep, Batang, Central Java, Indonesia)

1113 UTC on 6120

Switzerland: Swiss Radio International. News bulletin and Shortwave Merry-Go-Round show until 1130 UTC. (Lance Micklus, Essex Junction, VT) Dateline program monitored on 21695 kHz from 1530, with French service beginning at 1600 UTC. (Guy Atkins, Issaquah, WA)

1115 UTC on 2310

Australia: VLBA Alice Springs. Rock and Aussie folk tunes. Music titles and ID. Parallel frequencies 2325 kHz (Tennant Creek), and 2485 kHz (Katherine) suffering from poor signal quality. (Aboe Thallep, Batang, Central Java, Indonesia)

1120 UTC on 3200

China: Voice of the Strait. Chinese. Chat among announcers during oriental music breaks, audible to 1130 UTC. (Aboe Thallep, Batang, Central Java, Indonesia)

1120 UTC on 11735

North Korea: Radio Pyongyang. News on hopes for peaceful reunification of the fatherland, and the crimes of South Korea against the Korean people. Station ID and Asian music. (George Neff, Tampa, FL)

1121 UTC on 3220

Papua New Guinea: (New Guinea) Radio Morobe. Pidgin. Native island music of drums, flutes and vocals. Easy listening tunes at 1130 UTC with station ID. PNG stations also audible on 3260, 3335, 3375, and 3905 kHz. (Rod Pearson, St. Augustine, FL)

1135 UTC on 11815

Bonale: Trans World Radio. Religious radio drama and station ID. Parallel frequency 15340 kHz, suffering from audio hum and interference. (Lance Micklus, Essex Junction, VT)

1135 UTC on 3905

Papua New Guinea: (New Ireland) Radio New Ireland. Pidgin. Island choral music and American country and western. Station ID at 1145 UTC with repeat ID and chimes on the hour. (Rod Pearson, St. Augustine, FL)

1200 UTC on 15050

Turkey: Voice of Turkey. Turkish. National music program to station ID as "burasi Turklyenin sesi Radyosu." News topics and Turkish music continuing. (Stephen Price, Conemaugh, PA)

1245 UTC on 21690

Sweden: Radio Sweden International. Sports roundup scores, IDs and frequency schedules for North Africa and the Middle East. Swedish programming at 1300 UTC. (Frank Mierzwinski, Mt. Penn, PA) Monitored at 0230 UTC on 9695 kHz, with political commentary. (Mark Seiden, Coral Gables, FL)

1250 UTC on 15195

Bangladesh: Radio Bangladesh. Awful music program! Lady announces end of English programming at 1300 UTC. Monitored on parallel frequency 17710 kHz. (Doug Waller, Bay Village, OH)

1330 UTC on 3915

Singapore: BBC relay. Indonesian. Station time-pips at tune-in. Station ID and international news items. English ID and promotional for their Burmese language program. (Guy Atkins, Issaquah, WA)

1403 UTC on 4931

Indonesia: (Java) Radio Republik Indonesia-Surakarta. Indonesian. Marvelous signal at tune-in. Jakarta network news and station ID. Brief

political news item to gamelan music. (Guy Atkins, Issaquah, WA)

1433 UTC on 25750

United Kingdom: BBC. Sports report covering scores of golf, rugby, tennis, and Suffolk horse races. Station ID at 1500 UTC. (Jim Boehm, San Antonio, TX)

1435 UTC on 15235

Libya: Voice of the Great Homeland. Arabic. Children's programming monitored to 1530 UTC. Reception good to recheck at 2330 UTC.

1545 UTC on 5985

Burma: Burma Broadcasting Service. Nice signal without the usual interference from Radio Japan on 5990 kHz. ID noted at 1558 UTC as "This is the Burma Broadcasting Service, with the end of our final transmission for the day. Good evening." National anthem at 1600 with sign-off. Frequency 4725 kHz, monitored at 1430 UTC. (Guy Atkins, Issaquah, WA)

1635 UTC on 17620

France: Radio France International. "Paris Calling Africa" program with report on life with a tame gorilla. (Bob Fraser, Cohasset, MA) Monitored at 1245 UTC on 21645 kHz with Focus on France and parallel 17720 kHz. (Mark Seiden, Coral Gables, FL)

1703 UTC on 11734

Zanzibar: Radio Tanzania. Swahili. News datelines on Rangoon and Korea. Brief 60's music from the Ventures. Station ID at 1715 UTC as "Radio Tanzania Zanzibar." (Guy Atkins, Issaquah, WA)

1740 UTC on 7505

Bangladesh: Radio Bangladesh. English newscast in progress at tune-in, amid poor signal quality. Asian music with Bengali announcements and ID as "Dhaka Bangladesh." Station sign-off at 1800 UTC. (Jacques Ahouansou, Abidjan, Republique de Cote d'Ivoire)

2007 UTC on 9690

Romania: Radio Bucharest. News on the Romanian automobile industry and listener's letters answered. (Mark Seiden, Coral Gables, FL)

2030 UTC on 15095

Syria: Radio Damascus. Beautiful Syrian music with ID. News bulletin on Israel, and 2104 UTC sign-off with national anthem. Interference on parallel frequency 12085 kHz. (Ronald Van Campen, Curacao, Netherlands Antilles)

2200 UTC on 9925

Belgium: BRT. News and commentary on the whaling industry. Political views on liberalism in Belgium. Station sign-off at 2225 UTC. (Mark Seiden, Coral Gables, FL)

2225 UTC on 7125

Poland: Radio Polonia. Distorted signal during closing of commentary. Brief Polish music and 2300 UTC sign-off. (Mark Seiden, Coral Gables, FL) Audible on 7270 kHz from 2350-0000 UTC, in English. (Stephen Price, Conemaugh, PA)

2235 UTC on 15345

Argentina: RAE. Argentine tangos program. Two station IDs, film review, and sign-off at 2330 UTC. Weak signal suffering from interferences. (Mark Seiden, Coral Gables, FL)

2326 UTC on 15575

South Korea: Radio Korea. Station ID for the international service. National music and news, with a report on Korean president addressing the United Nations. Korean vocals to 2345 UTC ID. Excellent reception to 2350 UTC. (Leslie Edwards, Doylestown, PA)

2345 UTC on 7195

USSR: Radio Moscow. DX program with comments on Soviet FM radio, and use of IRCs in correspondence. Rock music selections between subjects. (Bob Fraser, Cohasset, MA)

2349 UTC on 15205

Algeria: RTV Algerienne. French. American pop music to newscast at 0000 UTC. National Algerian anthem to 0005 UTC sign-off. Poor reception noted for broadcast. (Jacques Ahouansou, Abidjan, Cote d'Ivoire) Monitored at 0705 UTC on 9534 kHz, with French news and Arabic music. Apparently, this channel alternates with the more commonly used 9509 kHz. (Aboe Thallep, Batang, Central Java, Indonesia)

2350 UTC on 9755

Canada: Radio Canada International. As It Happens program. Tonight's show included news item that Switzerland plans to ban yodelling--as it is considered noise pollution! (Bob Fraser, Cohasset, MA) Are they kidding?-ed.

Utility World

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MONITORING THE BRITISH MILITARY

The fifth largest air force in the world is the Royal Air Force (RAF) of the United Kingdom. While not as large as the U.S. Air Force or that of the Soviet Union, with 550 combat aircraft the RAF depends on a large HF communications system for command and control of its aircraft.

First organized as the Royal Flying Corps (RFC) in 1912, the RAF officially came into being in 1918. The RAF's airpower is divided into RAF Germany and Strike Command.

Strike Command's primary responsibility is for home defense. It is comprised of four primary groups of squadrons as well as the "Queen's Flight," RAF Transports, and Squadron 32.

RAF Benson, Oxfordshire, is the home of the Queen's Flight. There are three Andover CC.2 aircraft for VIP support based at Benson. Three callsigns have been heard from these aircraft over the years: Rainbow, Unicorn, and Kittyhawk. It is not clear at this point whether these callsigns are associated with the aircraft or VIPs that fly in them.

Squadron 32 which is also a VIP transport and government communications squadron is located at RAF Northolt, Middlesex. There are four Andover CC.2 and six HS.125 aircraft stationed at this base.

Another frequently heard callsign on HF is "Ascot." This callsign is associated with RAF transport aircraft. These aircraft are based at RAF Brize Norton, Oxfordshire.

Brize Norton also has another claim to British fame. It is the home of Group 38, the British "Rapid Deployment Force" refueling tankers. Squadron 101 consists of nine VC-10 k.2/3 aerial refueling tankers. Also six Lockheed L-1011 Tristars used for refueling are based here.

Three squadrons (6/41/54) stationed at RAF Coltishall, Norfolk, are part of Group 38. These squadrons are flying the Jaguar GR.1 aircraft.

Group 38 also consists of one squadron of Harriers and squadrons 63, 79, and 234 which fly the Hawk T.1 light interceptor aircraft.

Royal Navy Air Station Yedvilton, Ilchester, Somerset, is the home to four Royal Navy squadrons of Sea Harrier aircraft. Squadrons 800, 801, and 809 fly the Sea Harrier FRS.1 aircraft. There is a Training Squadron (No. 899) also located at Yedvilton.

Bomber Group No. 1 consists of several units. RAF Wyton, Huntingdon, Cambridgeshire, is the home base of Squadron 51. Squadron 51 is a British Strategic reconnaissance arm of the military flying three Nimrod R.1 aircraft. Also stationed at Wyton is the No. 1 photo recon unit (flying four Canberra PR.9 aircraft), and Electronics Warfare Avionics Unit One. They fly the Andover C.1 aircraft.

Several units of K.2 tankers, Buccaneer S.2B and Tornado GR.1 aircraft scattered throughout the UK are also a part of Bomber Group No. 1.

Group 18 consists of several squadrons of Nimrod MR.2 ASW aircraft and several ASW helo squadrons. Group 18's primary mission is Antisubmarine warfare (ASW).

The last members of the UK's Strike Command are the Fighter groups. There are two fighter groups: No. 1 and 5, with squadrons located throughout the UK.

RAF Germany is a major element of the 2nd Allied Tactical Air Force, NATO. Several RAF squadrons are stationed at

Table 1
Strike Command Integrated Communications System

Freq	Hours of Operation	Frequency Designator
	Continuous	Sierra Tango *ST*
4540	Continuous	Uniform Tango *UT*
4742*	Continuous	Foxtrot Sierra *FS*
5729*	Continuous	Romeo Delta *RD*
6738*	Continuous	Bravo *B*
8190	Continuous	Romeo Alpha *RA*
9032*	Continuous	Delta Whiskey *DW*
11204*	Continuous	Alpha *A*
11234	Continuous	Hotel Whiskey *HW*
13257	0800-1900	Foxtrot *F*

three bases in West Germany. Squadrons 2, 14, 17, 20, and 31 flying the Tornado GR.1 aircraft are stationed at RAF Brueggen. RAF Gutersloh is the home of two Harrier GR.5 squadrons (3 and 4). Finally, RAF Loarbruch has two squadrons (15 and 16) of Tornado GR.1 aircraft. As this is being written, the RAF will transfer another Tornado aircraft squadron as well as a Tornado Recon squadron to Loarbruch.

As you can see, there are lots of aircraft and squadrons to coordinate. Responsibility for communication falls to the Strike Command Integrated Communications System (STCICS). Main transmitter sites for the system are located at RAF Chelveston, Cambridgeshire, and RAF Milltown, Moray, in Scotland.

Receivers for the system are located at RAF Bampton Castle, Oxfordshire, and RAF Kinloss, Moray. The system uses the general voice callsign: "Architect" and a CW callsign of "MLP."

Calling frequencies for the STCICS are listed in Table 1.

The * denotes a broadcast at H+00 minutes with altimeter settings for major RAF airfields (last three figures in millibars only). It also denotes frequencies that have an Airfield color state weather broadcast at H+30 minutes after the hour. These use the standard NATO weather codes shown in Table 2.

There are several other RAF ground stations in the STCICS that are scattered around the world and these include the following:

ASCENSION

Callsign is "Haven"

4742 2000-0800

9032 0800-2000

11234 Continuous

Broadcast on all frequencies at H+45 minutes.

CYPRUS

Callsign is "Cyprus"

4730 Continuous

9032 1600-0500

11234 Continuous

18018 0500-1600

Weather broadcast at H+15 minutes

GIBRALTAR (Forward Relay)

Callsign is "Gibraltar"

4742 2000-0700

11234 0700-2000

Table 2
NATO Color Coded Weather Conditions

Color	Base of lowest cloud layer of 3/8 or more	Surface visibility
Blue	2500 ft AGL	8 km (4.3 nm)
White	1500 ft AGL	5 km (2.7 nm)
Green	700 ft AGL	3.7 km (2 nm)
Yellow	300 ft AGL	1.8 km (1 nm)
Amber	200 ft AGL	0.9 km (0.5 nm)
Red	Below 200 ft AGL	Less than 0.9 km (0.5 nm)
Black	Airfield not usable for other reasons than cloud and/or visibility minima. BLACK, when used, will precede weather color code.	

Table 3
RAF/UKADGE Discrete Channels

4464 Kilo Romeo "KR"	5721 Foxtrot Whiskey "FW"
4707 Delta "D"	6690 Juliett Tango "JT"
4710 Tango Whiskey "TW"	6715 Papa Oscar "PO"
4717 Echo Tango "ET"	6748 Alpha Lima "AL"
4739 Quebec Victor "QV"	6760 Alpha November "AN"
5095 Papa Kilo "PK"	8790 Quebec Romeo "QR"
5462 Romeo Mike "RM"	9011 Alpha Delta "AD"
5470 Uniform Alpha "UA"	

MOUNT PLEASANT (Falkland Islands)

Callsign is "Viper"

4742 2000-0800

9032 0800-2000

11234 Continuous

Broadcast at H+15

"Architect" can be heard using many discrete frequencies, mainly below 22 MHz. Commonly heard on these frequencies are aircraft and ships on exercises passing information to the UK Air Defense radars. This air defense system is known as the United Kingdom Air Defense Ground Environment (UKADGE). Information on aircraft tracks, often in the GEOREF format is passed.

These radar stations are somewhat like our own NORAD dewline stations. They include the following locations: Buchan, Boulmer, Saxa Vord-Shetland Is., Neatishead, Benbecula, and Portreath. The most frequently heard channels are listed in Table 3.

RAF squadrons in Germany have access to "Architect" and frequently use their channels. Their callsigns include: TI4H, 7PMTA, 7PMTB, and 7PMTC.

A training base at RAF Finningley in Yorkshire which has Dominie jet aircraft uses their own HF system. The callsign to listen for is "BT9P." They use the frequencies of 4749, 5685, 9024, and 11250 kHz regularly.

The RAF Alconbury net is not used by the RAF, but is used by the USAF. It uses a frequency of 6741 kHz. This frequency was very active when the 19th TRW was based there with the RF-4C Phantom aircraft. Now that they are gone and all that is left is A-10 (which don't carry HF gear) and TR-1 aircraft, this net has grown very quiet. Other frequencies listed for this net but never used are 3109, 9025, and 11257.

Another net operated by the RAF is known as the Maritime Telecommunications Organization (MARTELO). Other NATO forces also operate on this net and have their own frequencies. They use European Common channels also. RAF Northwood, headquarters for RAF group 18 which has the responsibility for ASW, uses the following frequencies for this operation: 2428,

3935, 4730, 5441, 6697, 8987, 9036, 11212, 13237, 15039, and 23236. "MKL" is the callsign associated with these operations.

The Royal Air Force also utilizes some of their teletype HF frequencies for routine telephone calls (nonsecure) between their principal overseas bases and London. Normally the teletype is on USB and the voice traffic is on lower sideband. They also use some Royal Navy communication facilities located in Gibraltar and London. These stations mentioned above use the callsigns:

MKD - Akrotiri, Cyprus

GYU - Gibraltar

GY* and MKG - London

Another base utilized for RAF is located in Decimomannu, Italy. This base is primarily used as an air-to-ground bombing range.

All the frequencies used by the stations are listed in the *Klingenfuss Guide to Utility Stations* and have "comb" listed as the mode of operation. There are several hundred frequencies listed for these stations, so I will not bother repeating them in this column. Only about a dozen or so are in use at any one time.

Royal Naval aircraft do not use HF much for voice traffic except within about 200 miles from the coast. Royal Navy Air Service frequencies include:

RN Culldrose Operations 3885

RN Portland Operations 8993

RN Prestwick Operations 9014

RN Yeovilton Operations 5450 8977

I would like to extend my personal thanks to Mr. U.K. for his assistance in preparing this feature on monitoring the British military in this month's *Utility World*.

Mailbag

Recently in the loggings section of *Ute World*, we said that *NAWS* stood for "Naval Aviation Weather Service." Wrong, says A. Norman in Vancouver. "NAWS" is a collective callsign meaning "Any or all Allied warships." Mr. Norman also passed along some information about C13E and C13L circuit designators heard over CKN and CFH CW broadcasts respectively.

The C13E broadcast service area is east of 180 degrees west to the west coast of North America, then southward to the equator. An on-line RTTY broadcast designated C11E on 76.2 and 4286 kHz, plus several other HF frequencies serve a similar area.

C13E broadcasts NAVAREA XII's, Hydropacs, British Columbia coastal weather and single operator periods. At this time, the greatest users of C13E are the PBL's stationed at CFB Esquimalt. Two auxiliary vessels also utilize C13E for operational traffic. The C13E transmitters are also used to broadcast FAX from the Met office at CFB Esquimalt. Thanks for the background, Mr. Norman, and feel free to check in often.

Terry Colgan of Austin, Texas, has heard some TAC channels recently while monitoring 5703 kHz USB. He heard "Portable" working "Doorstop." They referred to their frequency as "Quebec" channel. Later in that evening, "Doorstop" requested that they moved to "Yankee Quebec" channel. Terry said he checked out other TAC channels listed in the *Grove Shortwave Directory*, but no joy. If any of our readers knows the TAC channelization plan, how about dropping me a note, and sharing it with all of our *MT* readers.

Another mystery from Terry centers around the callsign "Guardian" heard on another TAC channel 11214. "Guardian" was working "Bandsaw Gulf." Terry would like to know who or

where "Guardian" is.

Finally, this month, Chris Hulse has yet another mystery. While monitoring 8989 around 0710 UTC, he heard a conversation between two Aussie males that sounded like a air-to-ground phone patch. Although faint, he finally heard that Rescue 161 was talking to an unidentified party through Sydney. (The call concerned replacement of some aircraft parts. A Mr. Erwin, the

High Commissioner, was mentioned.) Have the Aussies a new channel for the RAAF or is this a tactical channel as I suspect? Any of our readers down under care to take a stab at this one??

Well, until next month, best of DX and now on to your 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		

- 2700.0 5BA-Cyprus Radio, Nicosia, Cyprus, with a voice marker in USB at 0325. (FrankMierzwinski, Mt. Penn, PA)
- 3253.0 USCGC Point Wells (WYTL-65604) working Group Moriches, NY, at 2057 in USB. (Bill Battles, East Kingston, NH) 1st CG District secondary frequency.-ed.
- 3485.0 New York Volmet with aviation weather forecast at 0350 in USB. (Mierzwinski, PA)
- 4035.0 Army MARS net with AAR2GO, AAR2IW, AAR2DV, AAR2FN in LSB at 0132. (Page Pyne, Williamsport, MD)
- 4063.0 WTK7449 Factory ship Northern Enterprise heard at 1643 with traffic to KMI in USB. (A.W. "Doc" Blair, San Francisco, CA) Welcome to the column, Doc, please report often.-ed.
- 4196.0 75EGZ De 750RC 23 RW V sent in CW at 0147. (Pyne, MD) Another one of those 2 x 3 callsigns.-ed.
- 4244.0 PPR-Rio de Janeiro Radio, Brazil, with a CW V marker at 0158. (Pyne, MD)
- 4251.7 GKC-Portishead Radio, England, with a CW DE marker at 0203. (Pyne, MD)
- 4298.0 PPO-Oilinda Radio, Brazil, heard with a CW V marker at 2337. (Pugh, PA)
- 4328.2 FFL2/3/4-St Lys Radio, France, with a CW CQ marker at 0219. (Pyne, MD)
- 4518.5 FDY-French AF Orleans, France, in CW with a V marker at 0248. (Pyne, MD)
- 4525.0 RPN75-Kiev Meteo, USSR, sending FAX weather maps at 0140. Some CW interference. 120/576. (Tom Sundstrom, Vincentown, NJ)
- 4800.0 8 Foxtrot working 1 Foxtrot in the clear (USB) then DVP at 2243. (Battles, NH)
- 4856.0 Halifax Military, NS, working Fort St. Louis at 2117 in USB. (Bob Doyle, Shelton, CT) Interesting, Bob, I don't have a listing for this one.-ed.
- 5093.3 LZJ2-Sofia Meteo, Bulgaria, heard at 0420 with a weak FAX signal transmitting weather maps. Off listed 5092.5. 120/576. (Sundstrom, NJ)
- 5123.5 FDY-French AF Orleans with a CW V marker at 0432. (Pugh, PA)
- 5185.0 LRO69-Buenos Aires Air, Argentina, at 2250 with FAX weather maps. 120/576. (Sundstrom, NJ)
- 5604.0 Rainbow Radio (Canada) working LTU 1551 in USB at 0503. (Battles, NH) Anybody provide any additional info on these Canadian Rainbow stations? -ed.
- 6390.3 IDQ-Italian Naval Radio, Rome, with a CW DE marker at 0010. (Jack Dix, Yonkers, NY)
- 6456.0 KKN-Canadian Forces Radio Vancouver, BC, heard at 0441 with a V CW marker (C13E circuit designator). (Pugh, PA)

- 6600.0 Several tactical units using Navy/Coast Guard type calls heard here settling up a possible medical net. Mentioned several times for roll calls including 0800/1400/2000. Anybody have anything on this net? (Bob Grove, Brasstown, NC) Not on this end, Bob. Any help from our readers.-ed.
- 6683.0 SAM 24127 working Andrews AFB, MD, in LSB at 1258. (Battles, NH)
- 6824.0 GHH-Jamestown Meteo, St. Helena heard at 0203 with RTTY RYs and coded weather. 425/50N. (Sundstrom, NJ)
- 6950.0 RBQ74-Alma Alta Meteo, USSR heard at 0350 with a good FAX signal sending weather maps. 120/576. (Sundstrom, NJ)
- 7315.0 Army MARS net meets daily in LSB at 1900 including calls AAAOUSA, AAR(USB, and AAR9USV. (Rick Albright, Merced, CA)
- 7504.5 GXH-U.S. Navy subbase, Thurso, Scotland, with CW multi-marker CQ CQ CQ DE NMN/NAM/NAR/NGR/NRK/GXH/AOK DRILL QRU at 0202. (Jim Boehm, San Antonio, TX)
- 7960.0 EPD5-IRNA Tehran, Iran, transmitting RTTY English news from 2200-2208 with some interference. 425/50N. (Sundstrom, NJ)
- 8241.5 NODX USCG Sweetbrier heard at 1615 with traffic to NOJ on USB. (Blair, CA)
- 8445.0 9PA-Banana Radio, Zaire, heard at 0157 with a V CW marker. (Dix-NY) Nice catch, Jack, not reported very often.-ed.
- 8471.0 NMN-USCG Comsta, Portsmouth, VA, with CW bulletin, NEW 22 MHz A1 from 1100-2300 GMT QSW 22545 kHz QSX CH 3/4 BT at 0120. (Boehm, TX)
- 8525.0 9KK-Kuwait Radio, Kuwait with a CQ CW marker at 0329. (Dic, NY)
- 8710.5 NRV-Barrigada, Guam heard at 1513 with weather broadcast in FEC. (Blair, CA)
- 8861.0 Dakar Radio, Senegal, working Springbok 235 at 0125 in USB. (Doyle, CT) This is Africa-1. -ed.
- 8891.0 Iceland Aeroradio working Canadian 469/Lufthansa 703 at 0040 in USB. (Doyle, CT) This is aero area NAT-D. -ed.
- 8912.0 Ambush working Omaha 17 at 0041 in USB in reference to landing for realignment. (Doyle, CT) This is a U.S. Customs channel.-ed.)
- 8933.0 Durban LDOC, South Africa (South African Always???) -ed. Heard at 0111 working Springbok 238 in USB. (Doyle, CT)
- 8992.5 6WW French Naval Radio, Dakar, Senegal, with a V CW marker at 0539. (Pugh, PA)9044.0
- 9044.0 GHH-Jamestown Meteo, St. Helena transmitting coded RTTY weather between 0210-0225. 425/50N. (Sundstrom, NJ) Twice in the same UTE logging report, Tom. Not bad.-ed.
- 9144.0 TUH-AFTN Abidjan, Ivory Coast in RTTY with RYs at 0050. 470/50. (David Kimpton, Thunder Bay, Ontario)
- 9226.2 TJK-AFTN Douala, Cameroon at 0125 with RTTY RYs. 431/50. (Kimpton, Ontario)
- 9242.5 AJE-USAF/AFRTS Wolvey, England, transmitting on the LSB of their MUX signal with a football game in progress. (AFRTS feeder). (Sundstrom, NJ) Just about the only way to hear AFRTS any more. SW broadcast buffs and AFRTS fans note this log. I will try to get their complete frequency list together.-ed.
- 9402.5 OST-Oestende Radio, Belgium, with a CW callsign only marker then ARQ Idler at 0140. (Kimpton, Ohio)
- 10014.0 LOMA 21 and LOMA 22 in comms at 1800 in USB. Also heard the same on 9014. (Battles, NH) 9014 is listed as a USAF TAC air channel, wonder if 10014 is the same. ed.
- 10291.0 Portishead Aeroradio working British Island Mike Golf on ground in Portugal at 0142 in USB. Talked about repairs to a leaking pump. Running phone patch to maintenance ops. (Doyle, CT) Who is this, Bob.-ed.
- 10292.0 ?KW-US Naval Radio, Diego Garcia, sending weather FAX maps at

1810. 120/576. (Sundstrom, NJ) Nice catch, Tom.-ed.
- 10635.0 SUC-AFTN Cairo, Egypt, with a 871/50 RTTY RY marker at 0020. (Kimpton, Ontario)
- 10865.0 NAM-Naval Radio Norfolk, Virginia, with a FAX signal sending weather maps at 2305. 120/576. (Sundstrom, NJ)
- 11013.0 LRN-DYN Press Buenos Aires, Argentina, Spanish press broadcast at 0007. 900/75. (Kimpton, Ontario)
- 11027.5 9RL310-AFTN Kinshasa, Zaire, with RTTY aero traffic at 0245. 438/50R. (Kimpton, Ontario)
- 11061.5 STK-AFTN Khartoum, Sudan, with RTTY aero traffic at 2336. 447/50N. (Kimpton, Ontario)
- 11118.0 KAWN? USAF Carswell AFB, Texas, seen sending FAX weather maps of the USA and USDOC radar summaries at 2048. 120/576. (Sundstrom, NJ) I see this one very strong during the daylight hours here in the New Orleans area. This looks like a new station as I have not seen this one listed before.-ed.
- 11121.2 KAWN? USAF Carswell AFB, Texas heard at 0007 with coded weather messages in RTTY. 175/75N. (Blair, CA) Heard at 2022 with coded weather summaries for NKX/NLC/NMN and more on RTTY. (Sundstrom, NJ)
- 11204.0 Architect (RAF Strike Command) heard in USB with aero weather at 2100. (Battles, NH)
- 11205.0 Tactical net, call signs WKZ-51 and Y5N passing traffic in USB at 1844. (Battles, NH) Probably a couple of units associated with a NASA launch.-ed.
- 11249.0 SAM 31682 working Andrews AFB, Maryland, in USB at 2350. Had used Air Force 2 call earlier. (Battles, NH) Interesting, Bill, plane problems, I wonder. -ed.
- 11290.0 85BOQ sending repeated CW IDs around 2340. (M.J. Stutterheim, Odessa, TX) Another one of those two number, three letter call signs.-ed.
- 11494.0 Aroostock 99 working Cognizant with a phone patch to Aroostock Control. Heard challenges and authentication then asked permission to join the net at 1728 in USB. (Battles, NH) This is SAC Lima channel. -ed.
- 11525.0 RWZ77-Moscow Meteo, USSR, sending FAX weather charts at 0315 with a good signal. 120/576. (Sundstrom, NJ)
- 12336.2 WSF4623 Supply ship Alaskan Victory heard at 1809 with traffic to KMI in USB. (Blair, CA)
- 12660.0 9PA-Banana Radio, Zaire, heard at 2221 with a V CW marker. (Dix, NY)
- 12691.0 GXH-U.S. Navy subbase, Thurso, Scotland, heard with CW multi-marker, CQ CQ CQ DE NMN/NAM/NAR/NGR/NRK/GXH/AOK VVV VVV VVV at 1334. (Boehm, TX)
- 12728.0 J2A9-Djibouti Radio, Djibouti, with a CQ CW marker at 1240. QRM from CFH. (Dix, NY)
- 12793.0 RNO-Russian Naval Radio, Moscow, heard at 1132 with a CQ CW marker. (Dix, NY)
- 12805.0 YQI-Constanta Radio, Romania heard calling an unknown station in CW at 0308. (Dix, NY) Very nice catch, Jack. I don't even have it on any of my lists as being active on this channel.-ed.
- 12955.0 UFL-Vladivostok Radio, USSR, heard at 0110 with traffic list in CW. (Blair, CA)
- 13074.5 FFT61-Saint Lys Radio, France, heard at 1503 with traffic list in FEC. (Blair, CA)
- 13093.0 ZSC63-Capetown Radio, South Africa, heard at 1733 with weather broadcast in FEC mode. (Blair, CA)
- 13214.0 USAF GCCS Incirlik AB, Turkey, heard at 1925 with a EAM USB broadcast. (Battles, NH) Nice catch, Bill, not reported often.-ed.
- 13247.0 SAM 24126 working Andrews AFB, Maryland, at 1506 in USB. Also heard Calibre working Andrews with a phone patch with Dependent at 2107 in USB. Requested to do some pepsi testing. (Battles, NH) Interesting, Bill, did Coke win, hi.-ed.
- 13530.0 UMS-Moscow Meteo, USSR< heard at 0028 with a coded weather broadcast in RTTY. 1000/50R. (Blair, CA)
- 13826.0 NNNONYA-Yap Island and NNNOMOF-Okinawa, working NNNONRI in USB at 1644 and 1907 respectively. (Ablright, CA)
- 13974.0 NNNONPA-Palmer Station, Antarctica, with NNNOABQ in USB at 0815. (Ablright, CA)
- 14367.0 BAF8-Beijing Meteo, PRC sending FAX weather maps at 2158. Noise on signal/picture. 120/576. (Sundstrom, NJ)
- 14401.0 AEM1QF-Berlin, West Germany, in USB with AAT3USS and AEM1AGG at 1720. (Ablright, CA)
- 14532.8 AFB6CC-USAF MARS station. Packet Bulletin Board operated by USAF MARS in use by AFA5ET at 0045. (Sundstrom, NJ)
- 14737.0 RXO72-Khabarovsk Meteo, USSR, FAX weather maps at 0255 with a good signal. (Sundstrom, NJ)
- 14800.0 Y2V9-ADN Berlin, GDR heard at 1948 with the following RTTY marker: QRA DE Y2V9 ADN-BERLIN-GERMAN DEMOCRATIC REPUBLIC RYRY. 414/50R. (Kimpton, Ontario)
- 15052.0 4XZ-Israeli Naval Radio, Haifa, with a CW V marker at 2317. (Pugh, PA)
- 15693.5 ISX56-ANSA press Rome, Italy, with a RTTY QRA/RY marker at 1436. 370/50R. (Kimpton, Ontario)
- 15911.0 Y7A61-ADN/Embassy Berlin, GDR, station heard at 1400 with the following RTTY message Y7A37/49/61/Y7K33 then RYs followed by 5-letter groups. 582/100R. (Kimpton, Ontario)
- 16025.0 BAF9-Beijing Meteo, PRC sending a East Asia FAX weather map at 0045 with a very good signal. 120/576. (Sundstrom, NJ)
- 16270.0 9VF207-Kyodo Press Service, Singapore, sending FAX test at 1718. Very weak signal, poor printing. 60/576. (Sundstrom, NJ)
- 16340.0 ZKLF-Auckland Meteo, New Zealand, transmitting a weather map of Asia at 1115. 120/576. (Sundstrom, NJ)
- 16587.0 West German merchant ships Columbus Neuseeland, Columbus America, Ocean Star, ACT-12 and Liverpool Express in USB (German) giving position reports daily at 2000 (also at 1900 on 16593). (Blair, CA)
- 16975.0 VWM-Madras Radio, India, heard at 1222 with a CQ CW marker. (Dix, NY)
- 17005.0 IAR-Rome Radio, Italy, heard at 1752 with a CW V marker. (Pugh, PA)
- 17169.5 WPD-Tampa Radio, Florida, in CW calling the Pacific Princess at 1521. (Stutterheim, TX)
- 17218.0 GKY6-Portlisshead Radio, England, with call sign only marker and ARQ idler at 1811. (Pugh, PA)
- 17225.5 WNU-Slidell Radio, Louisiana, with CW CQ marker at 1633. (Stutterheim, TX)
- 17434.8 Y2V37-ADN Berlin, GDR, heard at 1704 with ADN news in English in the RTTY mode. 425/50N. (Blair, CA)
- 18027.0 Air Force Two working Andrews AFB, Maryland, in LSB at 2337. (Battles, NH)
- 18785.0 FTS78-Diplo Paris, France, heard at 1800 to 1812 sign-off, with Diplo news in French in the RTTY mode. 350/50N. (Blair, CA)
- 19455.4 CLP1-Havana, Cuba, heard at 1839 with Prensa Minrex news in Spanish using RTTY. 425/50N. (Blair, CA)
- 19970.0 PBC319-Dutch Naval Radio, Goeree Island, heard at 0105 with a CW V marker. (Sundstrom, NJ)
- 20225.0 NAM-US Naval Radio, Norfolk, Virginia, heard at 2130 in CW with CQ V marker including CQ/ARQ transmission schedules. (Sundstrom, NJ)
- 22327.5 SVG7-Athens Radio, Greece, heard with a DE CW marker at 1828. (Sundstrom, NJ)
- 22400.0 OXZ92-Lyngby Radio, Denmark, monitored at 1849 with a CQ CW marker. (Sundstrom, NJ)
- 22410.8 SVB5-Athens Radio, Greece, with a high speed CW DE marker at 1853. (Sundstrom, NJ)
- 22431.0 WNU36-Slidell Radio, Louisiana, transmitting schedule and frequencies in CW at 2044. (Sundstrom, NJ)
- 22562.0 GKE7-Portlisshead Radio, England, with a CW call sign only ID and ARQ idler at 1645. (Sundstrom, NJ)
- 22566.5 HEC52-Berne Radio, Switzerland heard at 1655 with a CW call sign only marker. (Sundstrom, NJ)
- 22578.0 GKP7-Portlisshead Radio, England, transmitting a CW call sign only marker at 1706 then a ARQ idler. (Sundstrom, NJ)
- 25308.0 LFR-Rogaland Radio, Norway, with CW multi-marker. QSX 4/8/12/16/22 plus specific frequencies of 16740.8 and 25112.0 at 1443. (Boehm, TX)
- 26725.0 NAR-U.S. Navy Radio Station, Key West, Florida with CW hydrolant marker CQ CQ DE NMN/NAM/NAR/NGR/NRK/GXH/AOK HYDROLANT QRU at 1602. (Boehm, TX)

The Scanning Report

Bob Kay
P.O. Box 173
Prospect Park, PA 19076

Frequency Counters: Still a Miracle

To the scanner buff they are the most important thing in the world. They are the reason for our very existence. We live to hunt, capture, enslave, and trade them.

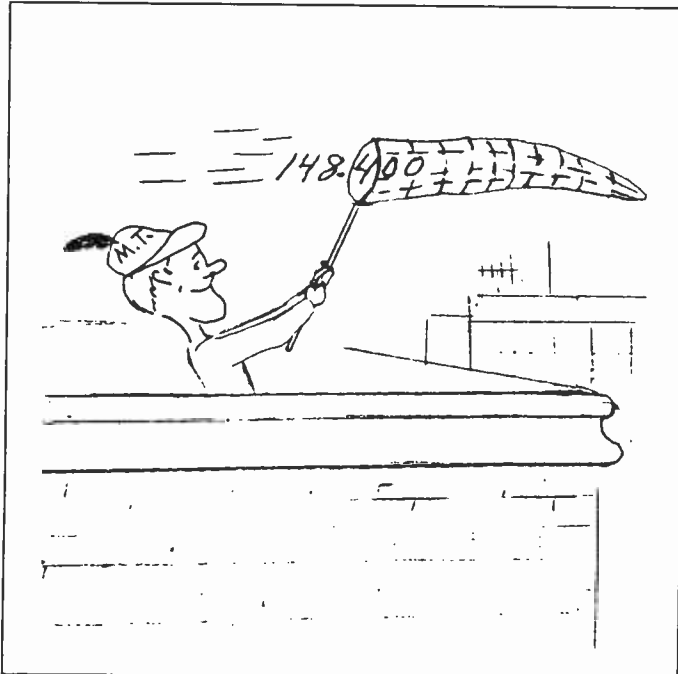
Traveling near the speed of light, they are silent, short-lived, fragile, and invisible. They bounce off buildings, become lost in space, and can travel half way around the world.

At times they are more elusive than the fabled unicorn. Yet, unlike the unicorn, they are very real. They are frequencies!

At this moment, thousands of them are passing through our bodies, invading our homes, and daring us to capture their hidden secrets -- a tantalizing dare that we cannot resist.

To find these frequencies, we programmed our scanners to search broad ranges of the radio spectrum on our scanners. It took time -- even with the fastest scanning radio -- but there they were, yanked from the air, displayed on a small readout, and then fed to our waiting ears.

But then we heard about a gadget called a "frequency counter." Now, we were told, we could immediately find the frequency of any transmitter merely by holding a frequency counter downwind of an antenna tower. No more long, laborious searches on our scanners. Simply sit in our chairs, point the frequency counter in the direction of some distant transmitter and presto, the unit tells us exactly what



"Gotcha!"

frequency it's transmitting on. It was a scanning miracle and thousands accepted this version of facts unquestioningly. Most, however, were quickly disappointed.

Stories about frequency counters, you see, turned out to be like stories about unicorns. In the back of your mind you know they're not true but it's such a nice story that you *want* to believe it. The problem was that no one ever said that frequency counters would perform like scanners. Before too long, people were expressing disappointment when they found out that there were no unicorns.

The real test of the frequency counter's ability to capture a transmission belongs in the field and not in the radio room. The ultimate adventure would be frequency hunting from the privacy of our cars. Imagine pulling alongside a police car, taxi, or delivery truck and watching as the counter locked onto the transmitting frequency. Once the frequency was displayed, we could then punch it into our mobile scanner radios and hear the excitement.

Was it possible? There was only one way to find out. After canvassing the ads of several magazines, it was evident that both Opto Electronics and Ramsey Electronics were promoting the use of frequency counters by the scanning hobbyist. For the field test, Opto Electronics provided their model #1300H/A. According to Opto, this particular model had a built in preamp that helped to improve sensitivity.

Ramsey sent their model #CT-125. The Ramsey unit didn't have a built in preamp, so Ramsey provided their own PR-2 external preamp.

The final problem was the mobile antenna. It had to be sensitive, well constructed, and capable of covering everything between 25 and 1000 MHz. The Antenna Specialists answered my request by providing their MON-52 mobile scanning antenna. The MON-52 came with its own coaxial cable but the factory installed phono plug was replaced with a BNC connector.

For my first adventure I chose a nearby cellular car phone tower. Although I parked within 20 feet of the antenna site, both counters failed to display a frequency. My second choice and second failure came when I tried to lock onto a frequency at the local TV broadcasting tower.

With two strikes against me, I decided to try something a little easier. McDonald's order kiosk became the next target. I pulled in the parking lot and patiently waited for my first victim. It wasn't long before a hungry patron drove in and placed an order. The Opto counter immediately displayed the frequency of 30.84 Megahertz. The Ramsey unit displayed a random sampling of frequencies on 30 MHz but it failed to capture the confirmed operating frequency.

While sitting in the car and satisfying my own appetite, both counters suddenly displayed 27.175 MHz. (CB channel



Antenna Specialists' MON-52 800 MHz-enhanced antenna really pulled in the cellular signals (for purposes of research, of course!)

Photo by Larry Wiland

18). Looking around, a van had parked two spaces away and the operator could be seen talking into his microphone.

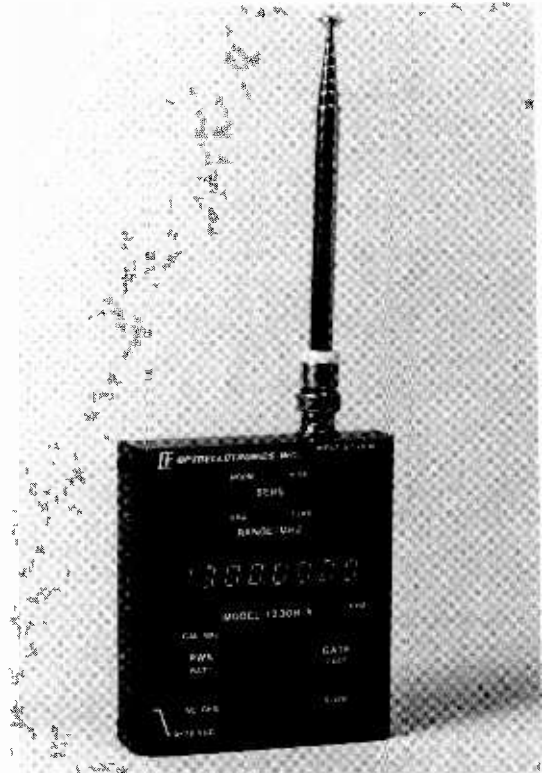
OK, I was feeling better. With two confirmed kills under my belt, I drove into Philadelphia and followed the first police car that crossed my path. After a few blocks, the officer stopped at a minor accident and as he pressed his mike button, the Opto counter was the first to display 453.3 MHz. The Ramsey counter also captured the frequency, but only after I had nearly touched the police car with my bumper.

Stopping at a red light, the Ramsey counter suddenly displayed a cellular frequency. As soon as I manually switched the Opto unit to its higher frequency setting, it displayed the same. However, I couldn't see anyone using a cellular phone. As the light turned green, I pulled away and lost the frequency. Circling the block, I came around again and spotted the transmitter. It was a guy, parked at the curb, merrily chatting away on his car phone. As I stopped alongside him, both counters captured the operating frequency. To confirm the kill, I punched it into my Pro-2004 and watched his lips form the words that were coming out of my speaker.

For the next few hours, I drove around the city and captured signals from CBs, city tow trucks, utility repair trucks, and police cars. While both counters performed well, I was partial to the Opto unit. It seemed to be a little more sensitive than the Ramsey unit and it was smaller, had a built-in preamp, and came with its own protective case.

If the folks at Ramsey had added a mobile mounting bracket along with a built-in preamp, I probably would have given them first choice. There was one feature on the Ramsey unit that I particularly liked -- a hold feature that locked the captured frequency on the display.

Over all, capturing frequencies was a lot of fun. The distance from the transmitter seemed to be the number one factor. Anything more distant than two car lengths failed to activate the counters. At first glance, that may not seem very impressive, but when you are sitting in the privacy of your vehicle, knowing what's happening two cars ahead can be mighty interesting. Especially if you are riding on a mili-



It was hard to choose between the two counters -- all in all, I was probably partial to the Opto unit.

tary installation with a visitor pass and a mobile frequency counter. (Just thought I'd give you an idea.)

Here's the mailing address of both manufacturers: Opto Electronics, 5821 N.E. 14th Avenue, Ft. Lauderdale, Florida, 33334 (305-771-2050); and Ramsey Electronics, 2575 Baird Road, Penfield, New York, 14526 (716-586-3950).

The interesting thing about the MON-52 is that it featured "Enhanced 800 MHz Reception." After I grew tired of frequency hunting, I punched in the cellular bands (for experimental reasons only) and the MON 52 certainly performed as advertised. Have fun!

Back Stage Scanning

A few months ago we covered the monitoring of cordless microphones used in live theater performances. Although the mention was brief, it inspired Tad Cook of Seattle, Washington, to write a two page letter about the subject. While working as an "extra" with the Seattle Opera and Pacific Northwest Ballet, Tad noticed that the lighting technicians and stage hands were communicating with wireless headsets.

While standing by the sound equipment cage, Tad also noticed a small flashing LED. When he investigated the blinking light, he found that it was a small FM repeater. On the rear of the repeater, a tag indicated four input frequencies between 72 and 76 MHz and an output

frequency of 173.225 MHz.

The repeater was connected to a Larsen mag-mount antenna mounted high above the stage. After programming the output frequency into his scanner, Tad was able to monitor the stage crew several miles from the theater.

Tad further explained that most actors don't realize that their off-stage remarks are being transmitted on a VHF frequency that can be monitored.

Hmmm, seems to me that back stage monitoring deserves more attention. But hurry. If Tad is reading *MT*, I wonder how many other actors are doing the same?

Moving Up with New Jersey

The state of New Jersey has upgraded to 800 MHz. Mike Divito of Blackwood asked if we had the new frequencies. Right behind Mike's letter was an anonymous submission containing the following New Jersey frequencies:

5 Channel Patrol Use	3 Channel Detective Use
856.9625	858.4625
857.9625	859.4625
858.9625	860.4625
859.9625	
860.9625	

DVP And The Presidency

During the past election, a lot of your letters indicated the wide use of voice protection by Secret Service Agents. My own personal monitoring revealed much of the same. However, there was one humorous transmission that I would like to share.

While monitoring the Secret Service in Philadelphia, an agent was heard using Motorola DVP to transmit directions to the presidential motorcade. The agent receiving the message was verifying the directions by repeating them back to the sender. However, the second agent was retransmitting the directions in clear voice...! So much for technology.

Cookies, Anyone?

In Akron, Ohio, some concerned citizens had a bake sale, but not for a church, the Little League or a school band. This bake sale was held for the police. To raise funds for 9MM semi-automatic weapons. Police in Akron say their present weapons are no match for the drug dealers and other criminals they face. So reads last month's issue of *American Scannergram*.

Frequency Help Needed

Anyone have the frequencies for the city of St. Croix? Mr. Harry Abery Jr., of Hartford, Connecticut, is planning to vacation in the Virgin Islands and he wants the listing for police, fire, and government agencies.

Attention Toledo Ohio Scanner Buffs

On March 16 there will be a meeting of other scanner listeners at 7 pm at Frish's Big Boy Restaurant, 6609 Airport Highway, Holland, Ohio. For more information or to verify the date, contact Mr. Ernie Dellinger, 6629 Sue Lane, Maumee, Ohio, 43537.

More Club Info

In the November issue, Robert Baetke of Portland, Oregon, asked for information on scanning clubs in his area. Kenneth Macleod, of Friday Harbor, Washington, wrote to tell Bob Baetke that U.S. Scanner News, P.O. Box 1103, Vancouver, Washington, 98666, covers the states of Oregon, Washington, and British Columbia. The monthly publication costs \$15.00 per year.

Soviet Space Shuttle

Did you notice any resemblance between the Soviet shuttle and ours? Ever wonder how they manage to steal our technology? Here's a brief look into how the Soviets do it.

Currently the Soviets have 5,000 research projects that need "know-how" from the free world. The Military Industrial Commission (VPK) coordinates the production and development of military systems. It constantly seeks military and dual-use hardware, documents, blueprints, and test gear to improve the technical level of Soviet weapons.

The VPK operates by using espionage accomplished by the KGB and GRU. By obtaining documentation on the U.S. F-18 Fighter, Soviet industry saved over 60 million dollars of developmental costs. The documentation of the F-18 also provided the technical guidance for the new engagement radars for Soviet fighters.

Care to guess the location of the largest Soviet intelligence collection facility? At Lourdes, near Havana, Cuba. It's the largest facility outside the USSR. From Lourdes, the Soviets monitor sensitive military, space, and telephone conversations in the U.S.

I could go on, but no doubt you're beginning to realize why the Soviet shuttle so closely resembles ours.

Phone Privacy or Descrambling

Want to talk to someone over your cordless phone in complete privacy? Ramsey Electronics is marketing a frequency inversion scrambler kit. Retailing for \$29.95, the kit can also be used to descramble communications using frequency inversion. (Ramsey's complete address has already been given in this column.)

Here We Go Again

For all you frequency nuts out there I've got another one! An anonymous contributor named "John" sent in three typed pages of federal and military frequencies for New York and Connecticut. Here's a peek at what I have:

AR900 Update from Grove

Several months back *MT* reviewed the new AR900 hand-held scanner with some specific criticisms. We are pleased to note that most of these have now been corrected.

Wandering "birdies" -- self-generated signals which interfered with the reception of legitimate signals -- have been eliminated through the application of internal shielding. Speaker volume has been considerably improved through a change in speaker and enclosure acoustics. Erratic squelch operation has been smoothed as well.

Although the scan delay is still too long (six seconds) and scan/search speed is still slow (10 per second), its small size, wide frequency coverage (including cellular without modification), 100 channel memory, high sensitivity without strong signal overload, selectable search increments and AM/FM mode selection make it a popular choice.

Because of its substantial improvements, Grove Enterprises now carries the AR900 pocket portable scanner in its new catalog (\$255 plus \$5 shipping).

Grove Enterprises
140 Dog Branch Rd.
Brasstown, NC 28902
1-704-837-9200 or
1-800-438-8155 for
credit card orders

162.635	FBI New York
162.76	FBI New York
163.20	U.S. Marshals New York
163.86	FBI Channel 7 New Haven, Connecticut
164.125	FBI Long Island, New York
165.71	State Department, New York
167.425	FBI (Primary) KES-600 New Haven, Connecticut
169.85	Postal Inspectors New Haven, Connecticut
305.8	Sikorsky helicopters/tower
321.7	Army aviation West Point, New York
383.3	Rhode Island National Guard

Feeling Left Out?



Super Converter™ 8001

Have your favorite communications (Police, Fire, etc) moved to the 800 MHz band? Are the scanners available which access this band too expensive? If you are like many scanning enthusiasts, this can be a real dilemma.

*Introducing the **Super Converter™ 8001** from **GRE America, Inc.** The **Super Converter™ 8001** once attached allows any UHF scanning or monitoring receiver to receive the 810 to 912 MHz band.*

For more information or a dealer near you please contact:

GRE GRE America, Inc.

GRE America, Inc.
425 Harbor Blvd.
Belmont, California 94002

Telephone (415) 591-1400
Outside CA: (800) 233-5973
Telex: GRE BLMT 17-2069
Fax: (415) 591-2001

According to "John" the frequencies have all been confirmed on a Pro-2004 with a Channel Master antenna. To receive the complete list, send me a self-addressed envelope with a buck. I'll copy the list, buy the stamp and lick it. Heck, I must be crazy. Hurry, before I change my mind.

More Than Just Words

There are more than 160,000 words in the English language. Most of us only use about 2,000 of them. Right now, I only have need of two words to express my gratitude to all of you who have supported this column with your advice, questions, and frequency lists -- Thank you. And keep those letters comin'.

what's new?

Monitoring for Survival

Virtually all scanner owners and those short-wave listeners who enjoy utility monitoring have considered the question, "Where would I listen in a disaster?" Ranging from the unthinkable nuclear holocaust to major weather disruptions, disasters comes in all shapes and sizes.

Earthquakes, tornadoes, explosions, fires, airline accidents, hurricanes and nuclear power plant incidents are probably the most familiar disasters to our nation's citizens and radio hobbyists alike. But to tune in on emergency communications, what do we need and where do we listen?

Mark Johnson's book, *Crisis Communications*, is essentially divided into three themes: equipment, services and frequency lists. The seven chapter titles reflect these elements. A basic orientation of scanners, short-wave receivers and antennas are provided for the newcomer, but serves as a refresher for the veteran listener as well.

Frequency assignment blocks for agencies likely to be involved in disaster communications are listed, with primary emphasis on the VHF/UHF scanner frequencies (some military and government HF is listed as well).

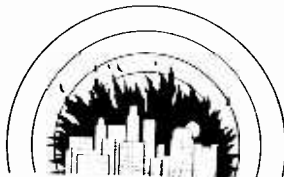
An interesting book to keep on a handy shelf — just in case. *Crisis Communications* (84 pages) is available for \$10.95 plus \$1.25 shipping from Tiare Publications, PO Box 493,

To have your new product or book considered for review in *Monitoring Times*, send it to Editor, 140 Dog Branch Road, Brasstown, NC 28902.

CRISIS COMMUNICATIONS

A HANDBOOK FOR
EMERGENCY AND SURVIVAL
RADIO MONITORING

by
Mark W. Johnson



TIARE PUBLICATIONS

Lake Geneva, WI 53147.

Railroad Frequencies

Anyone who doubts that there is no interest in monitoring the trains should have seen the number of letters which poured in praising the cover story in our July 1988 issue! As further proof, several railroad frequency guides are available, the most recent and comprehensive of which is the new *Compendium of American Railroad Frequencies* by Gary L. Sturm and Mark J. Landgraf.

Even the newcomer to railroad monitoring can learn a lot from the *Compendium*: A concise introductory chapter explains the roles of dispatchers; defines railroad terminology like "hump", "locotrol", "crew caller" and "trucking"; and describes radio systems for communications, telemetry and hot-box detection.

Details for conventional railway systems, industrial railways and transit systems are listed alphabetically by license, and include such information as headquarters location, operating states, assigned frequencies and their uses. There is even a

separate listing of foreign railways and their radio systems!

If railroad monitoring sounds like your idea of fun, there isn't a better way to start than with the latest edition of the 59-page *Compendium*.

Send \$9 (includes first class shipping) to Gary L. Sturm, 7629 Westford Ct., Fort Wayne, IN 46835.

Decoding Soviet RTTY

Are you into radioteletype? Ever wonder why you seem to get perfect copy, yet the words don't make any sense? Maybe it's because the major user of HF RTTY is the Russian maritime fleet!

Reading like a Berlitz for Russian RTTY, *The Soviet Maritime Radioteletype Dictionary* by Gary Gorka is printed in large type and includes over 1600 common words and phrases in Latin RTTY and third shift Cyrillic. A transliteration table is provided.

An explanation of the Soviet maritime telex format is presented along with tables of Russian given names (including diminutive and familiar), holidays, days and months, numerals and even a

list of commonly heard ships and land stations.

For dyed-in-the-wool RTTY enthusiasts, this 102-page dictionary is a welcome addition to the library.

To order, send \$11.95 plus \$1 shipping to Universal Radio, 1280 Aida Drive, Reynoldsburg, OH 43068.

A Tubular History

One of the nice things (and there are many) about the radio hobby is that there is no scarcity of chroniclers, those stalwart souls who find reverence in the past and pay homage via the pen and camera. Raymond S. Moore's delightful photoessay, *Communications Receivers: The Vacuum Tube Era 1932-1981*, is no exception.

Not a mere catalog of past receivers, Moore's album presents an historical chronology of the evolution of commercial receivers, including marketing strategy, beginning with names familiar to us "old timers" like McMurdo Silver and E.H. Scott.

While the photos and descriptions are interesting in their own respect, the insight into the companies themselves is fascinating. Did you know that Art Collins (who passed away last year) began manufacturing transmitters in his basement in 1931 and that the publicity generated

THE SOVIET MARITIME RADIOTELETYPE DICTIONARY

СЛОВАРЬ СОВЕТСКИХ МОРСКИХ РАДИОТЕЛЕТАЙПНЫХ ПЕРЕДАЧ



A concise guide to the fascinating world of Soviet maritime communications.
• Over 1,600 words and common phrases in and out of Latin RTTY and Third Shift Cyrillic.
• Special tables of Russian names and families.
• Quick reference table of Russian numbers.
• Message format explained.
• Soviet maritime RTTY frequency list.
• Catalog table of commonly heard Soviet ships.

Edited by
Gary Gorka

Universal Radio Research
1280 Aida Drive
Reynoldsburg, Ohio 43068



by his transmitter being used by the Byrd polar expedition in 1933 enabled his company to survive the Great Depression?

Featuring 51 companies and 700 receivers, this 112-page book is

must reading for radio historians.

You can order it for \$14.95 plus \$2 shipping from RSM Communications, PO Box 218, Norwood, MA 02062.

[turn to page 56 for more new products]



An MT Review: MFJ 986 Transmatch

Hams will find antenna system matching efficient and simple with this transmatch from MFJ Enterprises. Built to withstand power levels of 3 KW PEP, the 986 employs an infinitely-resolvable roller inductance configured in a differential-T circuit for superb impedance matching.

Featuring a cross-needle watt/SWR meter and a turns-counting spinner knob, precise impedance control is easily settable, as revealed by the simultaneous high output reading and low VSWR indication.

A ceramic rotary switch allows the operator to choose between two coaxial antenna lines, a balanced feedline, an external dummy load (not supplied) for transmitter adjustments, through the tuner or direct (tuner bypassed).

The indicator may be switched to show low or high power, average or peak power, all on a backlighted (12 V required), directional-coupled analog meter. An internal current balun is provided to help reduce feedline radiation ("RF in

the shack").

High quality is assured with this transmatch. The roller inductor is silver plated for highest Q and maximum conductivity; the differential tuning capacitor is wide-spaced to reduce arcing, even at full power.

Our Test

The 986 was connected between a Kenwood TS440S transceiver and the coax feedline of a multiband (Windom feedpoint) antenna. Factory-suggested presets were adjusted for initial tuneup. The rig was keyed in the AM and CW modes for full carrier and meter readings were taken as panel adjustments on the 986 were made.

Since a multiband antenna displays a wide range of complex inductive and reactive impedances, some frequency ranges were previously unusable. With the 986, however, they tamed down beautifully. And with the differential tuning method, the repetitious tune/retune chore of three-control pi networks is eliminated.

Following the simple steps in the manual, remarkably low VSWR and simultaneous maximum output were easily achieved. But what did this mean in terms of received and transmitted

signal strengths?

Variations in received signal strengths ranged from inconsequential on those frequencies on which the antenna showed natural resonance, to considerable on those poorly-matched frequencies. Since the transmatch is continuously adjustable from 1.8-30 MHz, no frequency remained unsalvageable.

For transmitting, the 986 proved its mettle. Distant stations all reported higher S-meter readings when the tuner was switched in, even though the transceiver's own SWR meter showed reasonable match—quite an unexpected revelation.

The Bottom Line

Should shortwave receivers expect better reception with a transmatch like the 986? No; while better matching will give higher S-meter readings, background noise comes up proportionately, so there is no real signal-to-noise improvement.

Should transceivers and transmitters expect better signal reports when using a quality transmatch like the 986? Absolutely. Even when our transceiver's meter showed a fairly good match into the antenna system, signal reports improved substantially, as much as 2-3 S units, when the tuner was inserted into the line.

The MFJ-986 Tuner is available for \$239.95 plus \$10 UPS shipping from MFJ Enterprises, PO Box 494, Mississippi State, MS 39762. Call 1-800-647-1800 for dealers in your area.

GILFER SHORTWAVE

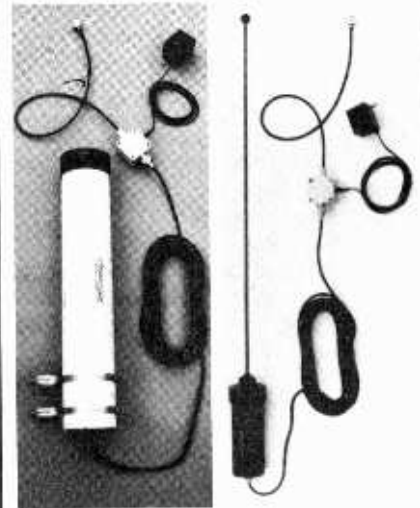
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Hearkening Back to Hollowstate

Most of us have a certain fascination with antiquity. Somewhere in the life of even the most high-tech person is a collection of old something-or-others. The further we delve into the world of tomorrow, the more important these goodies seem to be to us. They're a kind of security blanket as we walk the pathways of the unknown future.

For example, I tend to be able to walk through any flea market or hamfest with a smug look on my face. In my experience I know there cannot possibly be any cast off radioware that could interest me. I would not give any of my money up to the folks behind the tables. That is, until I come across little boxes with the words Sylvania, Silvertone, Delco, Tung-sol, RCA, or National Union on them. Well, then Old Uncle Skip just goes all weak in the knees, my palms start to sweat, my nose starts to twitch, and the next thing you know I am spending whatever is in my wallet to satisfy my addiction to tubes!

So what's the point, Uncle Skip?

Yes, I am a vacuum tube freak!!! In a world where Integrated Circuits are taking the place of transistors, it may seem hard to believe that folks can get excited about tube technology. But I am here to report that there are many good and even some great pieces of radio gear out there that depend on little glass bottle power. Also, for those with little pocket money and a strong desire to learn all they can about radio communications, tubes and tube gear can bring a lot of bang for the buck.

So without further delay, let us take a gander at...

Uncle Skip's Guide to Hollowstate Technology

Okay, so what's so great about tubes? Why would anyone want to waste their time toying around with obsolete technology?

Well, right off the bat, the basic technology is far from obsolete. Modern RF amplification circuitry depends heavily on tube design to generate high levels of output power. Anyone looking to play in the realm of the kilowatts had better come to terms with vacuum tubes and their idiosyncrasies.

This brings up an important point for the beginning experimenter.

Very Forgiving Circuitry

In a world where the static electricity on one's hands can zap an expensive inte-

grated circuit, it might just be a good idea to cut your teeth on projects that don't fry the first time you move a little too much voltage down the wrong pathway.

Uncle Skip's first home-brew transmitter was a little two tube CW job that I could have sworn up and down I had built right out of the book. Well, things don't go that way and I found that, the first time I tried to load this little puppy into an antenna, the final took on a cherry red glow. No big thing, a quick resoldering and a re-reading of the part of the instructions that explained loading procedures and I was up and running, making my first 40 meter novice contacts. Had I built a solid-state rig, I could have had a month's allowance wiped out in a milli-second.

Tube circuitry is very straightforward, fairly easy to learn and you can translate the knowledge into more modern circuits via a quick study of Field Effect Transistors.

Another factor in favor of teaching electronics

through tubes is that everything in the circuit is big enough to see! Sure, it's neat that they can cram a zillion transistors into one LSI chip, but try to get a ten year old to trace the circuit!

Low Cost Ham Radio

One of the things that troubles Old Uncle Skip is that the cheapest

commercially produced amateur transceiver is around \$200, and that will only get you about four watts of power. Yet you can still scrounge an old TV set and build yourself a dandy little 50 watt CW transmitter. Anybody can "work the world" with enough money. But think of the fun of letting the guy on the other end of the QSO know that you are sending via a "free" transmitter.

Pick up a simple tube receiver, say, maybe a Hallicrafters S-120 for around \$25 bucks at a hamfest (I have yet to go to a hamfest that

didn't have at least one or two) and you are enjoying ham radio for next to nothing. Plus, you are going to learn a whole lot more about radio than your high buck buddy. Amateur radio has a long tradition of home-brew design. Check your local library or neighborhood ham for old editions of the *Radio Amateurs Handbook*. You will find useful tube circuits in editions that date prior to 1979. Rumor has it that Ike Kerschner will soon be releasing a book of tube circuits. Watch for it.

Great Deals in Tube Equipment

You will be able to find used tube technology in just about any price range, from the \$25 S-120 up through equipment (and prices) that rival many modern pieces. However, two particular receivers stand out from the pack in that they are still sought out by experienced listeners.

The Hammarlund HQ-180A is a triple conversion general coverage receiver with excellent selectivity and sensitivity. It has multiple bandwidth positions and a slot filter. This radio remains the preferred receiver by many experienced Broadcast Band DXers. It also serves as a high quality general coverage

receiver with features that support its use for ham radio.

What is most interesting is that this radio is somewhat hard to find -- not because they are particularly rare, but few folks who own them choose to part with them. Even if they shift their loyalty to a more modern rig, they keep the trusty HQ around as a backup "just in case." Fatalists and Survivalists should be reminded that

tube technology is not affected by Electro-Magnetic Pulses (EMP) should anyone ever "drop the big one."

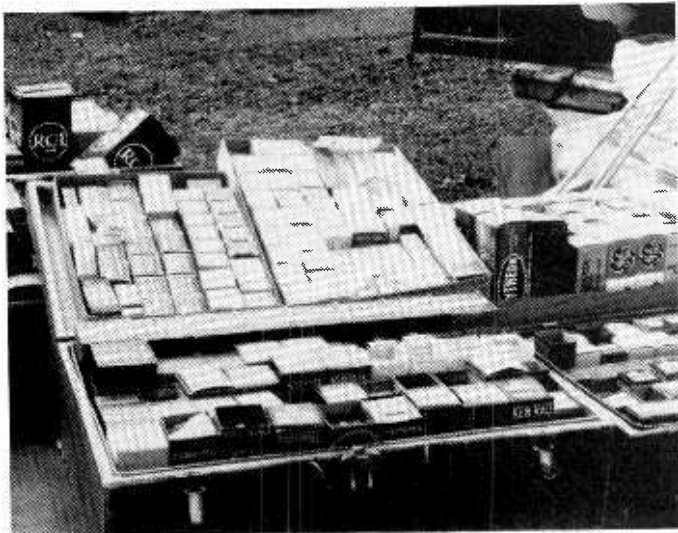
And if the big one is dropped, the Collins R-390A/URR will not only survive, but thrive! The R-390A is a military surplus receiver that can go head to head with the best communications receivers made, regardless of price. Yet, they can be had for one-quarter of the price of an NRD-525. This radio has mechanical digital readout and a



Tubes sold in their original boxes are not only useful but collectable as well.

bank of Collins' world-renown mechanical filters that will let you hear a flea burp in Borneo.

I once ran across a guy who had two of these rigs wired up for diversity reception fed by phased beverage antennas. The man could hear *anything he wanted to!!!* Total cost of his system was \$500. Then there is the DXer whose R-390 shows signs of machine gun fire but still keeps ticking. You want stability? I saw one of these rigs fall off a table and stay on frequency. When you buy an R-390A you will not just get a radio, you will have an adventure.



Purchase used tubes only as a last resort.

Other Considerations

Tubes are very elegant devices; modern circuit boards are reduced to a bunch of teeny square pieces of plastic. Tube circuits are covered with components, they tend to be quite colorful, fun to look at. They are big enough that they can be worked on without a magnifying glass and you will never have to worry about grounding the tip of your soldering iron. But finally, tubes give off a beautiful glow in a darkened room. They also throw off some heat and can make you feel all warm and cozy on a cold winter night.

Now the Bad News

Tube circuits are subject to frequency drift, especially in the first few hours of operations. However, most experienced users have learned to work around this problem. Better circuits allow you to place the receiver in a standby mode that resolves the worst effects.

Most important to anyone considering the tube route is that vacuum tubes are growing more rare, and hence, more expensive as time goes by. A tube type technocrat will need to become an experienced scrounger to keep his or her equipment going strong.

Tube Sources

The dedicated tube user will find plenty of tubes at local hamfests and radio flea markets. You will learn to carry a list of the tubes you need as spares wherever you go. Pick through those tubes you find in good condition and in their original boxes first. Buy loose tubes only as a last resort.

Your local Radio Shack can order many common tubes from their "Hotline Service." However, you will probably have to show your salesman page 116 of their 1989 catalog to convince him it can be done.

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The numerical frequency list covers 16280 frequencies of stations which have been monitored during 1988, thereof 35 % RTTY and 3 % FAX. Frequency, call sign, name of the station, ITU country symbol, types of modulation and corresponding return frequency, or times of reception and details, are listed. The alphabetical call sign list covers 3014 call signs, with name of the station, ITU country symbol, and corresponding frequencies.

82 RTTY press services are listed on 547 frequencies not only in the numerical frequency list, but also chronologically for easy access around the clock, and alphabetically in country order.

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- 73 meteo RTTY stations on 231 frequencies. 518 kHz NAVTEX schedule.
- 924 name and traffic abbreviations and signals. 182 telex service codes.
- 1000 utility station addresses in 200 countries.
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A great source I have had luck with over the years can be tapped by keeping an eye out for older TV repair shops in your travels. Many of these folks have tube cases full of goodies just waiting for you to blow the dust off.

There is an organization that keeps track of tube sources and other information concerning tube radios that I commend to anyone working with older equipment: *The Hollowstate Newsletter*, P.O. Box 1226, New York, NY 10159.

This is not so much a club as it is a clearing house for information about vacuum tube radios, servicing tips, and tube sources. Occasionally, a tube becomes so rare that it is no longer practically available. The people at HSN can show you how to "solid state" your way around the problem. They must have published half a dozen gimmicks to replace the rare 3TF7 tube over the years. Tell 'em that Uncle Skip over at *Monitoring Times* sent ya.

And, of course, you should keep an eye on the advertisements here in *MT* because periodically tube sources can be found in radio magazines.

In Closing

Old Uncle Skip is glad to be living in the modern age. Why, if it wasn't for the spellchecker in my wordprocessor, I wouldn't have this gig. But I still like to harken back to the days when radio was young. Hot items in the stores this past holiday season were replicas of old Crosley and Silvertone radios with modern circuits inside them. Very fashionable, but if you want to really impress the troops, restore the real thing. Tubes are neat!



Integration in the Government

. . . of voice privacy systems, that is. And that isn't turning out to be easy to achieve, either!

Voice privacy are two words that strike fear into the hearts of most VHF-UHF monitors.

The most commonly utilized form of voice privacy is digital scrambling. In digital scrambling, analog voice data is converted into digital data and then scrambled and transmitted via the RF carrier. The resultant signal is nothing but noise, similar to that of a receiver tuned to a channel where no signal is present. A brief tone or tone burst may be heard prior to or following each transmission, but that's of little interest to the person hoping to eavesdrop on the action.

Monitoring Times readers aren't the only people interested in voice privacy systems. So is the U.S. General Accounting Office. The GAO, it seems, has been keeping an eye on the FBI's voice privacy program.

How it was supposed to work

The program started back in 1982 when the FBI initiated a new system designed to protect communications from prying ears. Henceforth, it was hoped, what the FBI was saying on the air would be off-limits to criminals, the news media -- and you. Three years later, the program was expanded to include integrated voice privacy systems for the DEA and USMS (U.S. Marshals Service). Prior to this time, each agency was implementing its own,

albeit similar, Motorola systems.

All of the systems were composed of four main components: 1) radio units -- mobile and hand-held, 2) base stations, 3) repeaters, and 4) consoles which control the network of base stations and repeaters. The FBI was installing microwave links in addition to the four basic elements.



Motorola's Securenet

used by all three agencies. The benefits would have been the facilitation of joint operations, the extension in range of existing DEA and USMS radio communications and the ability to manage one system, not several. Ideally a DEA, FBI, or USMS field agent would be able to communicate with any other agent nationwide amongst the three agencies.

The basic plan was to convert DEA radio operations to VHF HB (from UHF) and convert the USMS from DVP to DES. The idea of a fully integrated system sounds good on paper, but both the DEA and

USMS had concerns from the beginning.

The DEA and USMS questioned the technical, operational, and economical feasibility of one fully integrated system. A concern of the DEA was whether there existed a sufficient number of VHF frequencies to fully integrate such a system for three separate agencies. The USMS also had concerns based on economical reasons since its DVP system was almost completed and joint operations with either the DEA or FBI were rare.

The FBI continued with the full integration system plan believing that their approach was achievable and implementable despite the concerns raised by the DEA and USMS.

The plan goes awry

The FBI conducted a test from April of 1985 'til March of 1987 of an integrated system in Boston with the DEA and FBI participating. Because of a lack of funding, the USMS was not included. The Boston FBI Field Office was labeled as the "testbed" during the integration and testing phase of the system. By the spring of 1987, the decision was made to place the test on hold.

According to the GAO, problems arose when the DEA loaned FBI-provided testbed equipment to state and local law enforcement agencies during a joint operation. The FBI officials complained that loaning the testbed radios to state and local agencies provided unauthorized access to encrypted FBI channels. Other operational problems arose from the different patterns of operations between the two agencies. Additionally, the lack of available frequencies caused logistical problems during simultaneous but independent operations. In the end, the DEA decided to return to their UHF system, interfacing with the FBI system as operations required.

At about this time, the FBI had hired private consultants to evaluate system alternatives and determine the requirements for a fully integrated system in the northeast region. The consultant's report, based on the Boston testbed, was not surprising.

One report indicated that some 151 frequencies would be needed if a fully integrated DEA, FBI USMS system was to be implemented in the northeast. The Department of Justice has only 82 VHF frequencies currently assigned. Several other agencies under the Justice Department, such as the U.S. Border Patrol and Immigration and Naturalization Service, also require frequency allotments. Frequency limitations would provide a severe problem to the successful completion of a fully integrated system by the FBI.

The outlook for other cities and regions of the U.S. looked equally bleak and the original plan for a fully integrated system began to fade quickly. An alternate plan was developed in October of 1986 for an interoperable voice privacy system. To achieve the interoperability (given the frequency limitations), it was decided that both VHF and UHF frequencies would be utilized for radio communications among the three agencies.

In the metropolitan areas of Boston and New York City, the FBI operated on the VHF band and DEA operated on the UHF band. The two agencies communicated directly with each other via a cross-band repeater. The cross-band repeater connected a DEA UHF repeater with a FBI VHF repeater. When joint operations occur, the repeater is enabled, allowing direct communications. The repeater is selectively chosen so that it is only active during joint operations.

The Boston testbed started with less than 40 VHF frequency assignments. The FBI obtained 110 VHF assignments for the interoperable system through interaction with the IRAC (Interdepartment Radio Advisory Committee) and the cooperation of other federal agencies. The FBI has been appearing on frequencies in the 162

and 164 MHz range for a couple of years now. (Refer to the July, 1988, "Federal File" column for additional details).

Outside of Boston and New York City, a different plan was implemented. The DEA and FBI both operated on VHF systems. The DEA utilized dual band radios that were capable of operating on both VHF and UHF frequencies. The DEA agents would use the VHF channels for communications with the FBI outside the metro areas and switch to UHF when entering either Boston or New York City metro areas.

For joint operations requiring hand-held radios, the DEA and FBI would share either VHF or UHF radios. The FBI anticipated that the USMS would convert to DES allowing the FBI access to the USMS system in the northeast region. Unfortunately, this never happened.

Regional compromises

The FBI began implementation on a nationwide basis in December of 1987. The point reached in early 1988 was essentially the ideal of the original plan from 1982. The FBI honored the USMS request to remain independent with its DVP system and the USMS was then dropped from the program. The FBI also decided not to enhance its microwave system nationwide due to budget constraints. And instead of a fully integrated system, a limited interoperability system would be implemented.



Motorola's Securenet

Under the current approach, DEA and FBI officials plan to cross-band one set of repeaters, as necessary, in each of DEA's 19 field divisions, which are located in major metropolitan areas. During the interim, DEA is installing dual-band radios in all resident office vehicles (resident offices are similar to the FBI resident agencies as they are small local offices that are subordinate to the field divisions).

Also, DEA is installing dual-band radios in metro areas of most field divisions except

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for three northeast region divisions, where funding does not permit equipping the large vehicle fleets, and for six divisions that have a UHF voice privacy system installed and operational.

The system is scheduled for nationwide completion by 1992. The FBI had 36 of its 59 field offices under contract by April of last year for DES integration. The remaining 23 field offices are estimated to be fully integrated by 1991 with a limited capability prior to 1991. The limited capability would provide each field office with one DES capable base station and limited amounts of DES capable units for communications with the base. Only one field office was completely integrated as of April with the remainder of the 36 field offices still under various phases of integration.

The next Federal File will continue the examination of the northeast region with respect to UHF military operations in the 225-400 MHz range.





Aero Security

Every day, the Federal Aviation Administration is responsible for tens of thousands of lives. Security is no small word to them -- and certainly no small job.

There's always the chance, no matter how small, that some little-

known guerilla group, protesting oppression in this land or that, will infiltrate the swamps surrounding Philadelphia International Airport and bring down a fully-loaded passenger liner with a stinger missile. Such scenes are, of course, unlikely -- except on TV.

Today, when the word "security" is raised in Washington, it's far more likely to concern computers than foreign invaders. Right now, in fact, agencies like the FAA are busy implementing the new federal computer security standards mandated by the Computer Security Act.

The Computer Security Act has three requirements. First, all systems that contain sensitive information must be identified. Needless to say, any system involved with air traffic control is defined as sensitive.

Second, a security plan must be constructed for the system. In the case of the FAA, the plan is to defend against any activity that would jeopardize air safety, whether it be the work of hostile powers or high school hijinks.

Part three is to train people who work on sensitive systems about computer security. A formal five-week curriculum for FAA's system security coordinators has been established. The course begins with two weeks of computer security training, continues with a course in information systems risk management and finishes with a computer fraud course. Fifteen people at the FAA have been required to take this course of study so far.

Once a sensitive system has been identified, potential threats are evaluated, and countermeasures are put in place, after which the system can be accredited as sufficiently secure. Accreditation is a formal statement identifying the system, mode of operation, and the security level of data that can be processed.

Apparently, none of this was new to the FAA. One of the top Automated Information Security Specialists at the Federal Aviation Administration was quoted as saying that the employees involved in data processing specializations for the agency were already doing a lot of the security things and had recently revised the program incorporating the new directives.

American Airlines Communications System

American Airlines (AA) schedules more than 1,500 flights daily. As many as 300 of these are in the air at any given time. Controlling, planning, and monitoring them requires both reliable and speedy radio and telephone communications.

American is now doing this controlling, planning and monitoring almost twice as fast as before since they have installed a new operations communications system. The system is located at the airline's system operations control center near Dallas/Fort Worth International Airport.

The key to the new system is a modular, multi-line, push button telephone turret. Each of the control center's 24 main dispatcher stations and supervisory stations in the equipment and flight crew control sections is equipped with one of these turrets.

Each turret consists of several modules. Each module is programmed with the telephone numbers of up to 30 communications lines or channels. These include American's own aero radio network, the ARINC network, overseas radio nets in Europe, Asia, and Central America, AA's ground station net, and the company's internal phone system. Just by pushing a button, a dispatcher is connected to one of nine dedicated phone lines.

Each of these dedicated phone lines is assigned to the frequency of one of American's nine radio transmitters in the U.S. The dispatcher is thus put into direct radio contact with any American aircraft in range of the transmitters. There is no need to go through an outside radio operator.

For parts of the U.S. not covered by American's network, other push buttons automatically link the dispatcher to an aircraft pilot via ARINC stations. Only for overseas flights that have moved outside the range of coastal American or ARINC stations is operator assistance needed and such occasions are rare.

Another purpose fulfilled by this system is the management of multiple-aircraft diversions caused by the shutdown of one or more airports by severe weather. One dispatcher at the operations center explains: "Speed is of the essence in a diversion situation. All of the airplanes headed for a closed airport must be sent to other airports as quickly and safely as possible. Decisions on where the planes land have to be made rapidly, based on the size of the aircraft, its current fuel load, capabilities of other airports to handle additional traffic, and the air traffic situation, among other factors. Then those decisions have to be communicated to all concerned.

"The diversion of each plane," continues the dispatcher, "requires at least five distinct radio or telephone contacts. The first is with the captain of the plane being diverted. The second contact is with the

MAJOR WORLD AIR ROUTE AREA (MWARA) High frequencies available at ARINC aeronautical stations as of July 30, 1987				
STATION LOCATION AND CALL SIGN	FREQUENCIES (HF-kHz VHF-MHz)	TYPE OF EMISSION	MAJOR WORLD AIR ROUTE AREA (MWARA) SERVED	
HONOLULU	3413, 5574, 8843, 13354, 17904	kHz	J3E*	Central East Pacific 1
	5547, 11282 13288, 17904	kHz	J3E	Central East Pacific 2
	2998, 4666, 6532 8903, 11384, 13300 17904	kHz	J3E	Central West Pacific
	2932, 5628, 6655 8951, 10048, 11330 13273, 17904	kHz	J3E	North Pacific
	3467, 5643, 8867 13261, 17904	kHz	J3E	South Pacific
NEW YORK	3016, 5598, 8825 13306, 17946	kHz	J3E	North Atlantic Family A
	2899, 5616, 8864 13291, 17946	kHz	J3E	North Atlantic Family B
	2887, 5550, 6577 8846, 8918, 11396 13297, 17907	kHz	J3E	Caribbean Family A
SAN FRANCISCO	3413, 5574, 8843 10057, 13354, 17904	kHz	J3E	Central East Pacific 1
	2869, 5547, 6673 11282, 13288, 17904	kHz	J3E	Central East Pacific 2
SAN JUAN	3016, 5598 8825, 13306	kHz	J3E	North Atlantic Family A
	2887, 5550, 6577 8846, 8918, 11396 13297, 17907	kHz	J3E	Caribbean Family A

*J3E means: Single sideband (upper sideband) suppressed carrier, radio telephone.

station where the plane was originally destined to land; the third with the American ground station manager at the new destination. The fourth contact is the aircraft routing groups in American Airline's Tulsa maintenance center and the fifth is with American's crew trackers at the operations control center.

Being able to establish instant communications with all of these diverse points by simply pushing a few buttons on a single communications turret has enabled us to reduce the time it takes to handle a single plane diversion from as much as a half hour to just five or so minutes!"

Incidentally, for those of you who would like to tune in American Airlines' communications on your programmable scanner, try 130.250, which is the frequency they use to communicate with O'Hare Maintenance and their communications center in Dallas/Fort Worth. 129.200 and 129.225 are also in use by American in various parts of the country.

Airborne Aero QSLs

Now let's talk about sending reception reports to airborne stations (flights) so that they result in QSLs or Verification letters sent to you.

One of the most important items to have is a utility address book which contains airline home office addresses. There are several of them available from Grove, Universal Shortwave, and other dealers. Your public library can also be a good source. Two of the publications which this writer has used include *Utility Address Handbook* by Wilhelm Herbst Verlag, and *The Air Traveler's Handbook* by Laura Torbet and Kalia Lulow. The latter is a paperback with an appendix listing close to one hundred domestic and international airline addresses.

Two things you will need cannot be bought; you must develop them. They are patience and persistence. If you've ever sent a reception report to a shortwave broadcast station (or to any other source), you have come to realize that not all stations will verify your report or send a QSL card. Those that do sometimes take an infuriatingly long time to respond and you may even have to send more than one report before you receive a response.

The same holds true for utility stations -- and they can be even slower to respond if they choose to respond at all. So keep in mind that you must be patient and persistent if you want a response from both ground and airborne aero communications facilities and stations.

Tipping the Scales in Your Favor

There are a few things that you can do to tip the scales in favor of receiving verification letters and QSL cards. One of the most basic rules to remember is to keep trying, even if your first few attempts don't produce the

desired results. Another is to always -- and I do mean always -- type your reports out, especially if you don't use prepared forms. The third thing to remember is to include return postage in the form of mint stamps or International Reply Coupons if the report is going to an airline overseas. A self-addressed stamped envelope should be included if you are sending a reception report to a domestic airline within the United States (providing, of course, that you are living in the U.S. or its possessions).

When you monitor a flight to which you are going to send a reception report, listen for about 20 to 30 minutes (if possible) to make sure that you have positive I.D. of the airline, flight number, airport of origin (if possible), and destination.

Make sure that your report contains these details, the time which you monitored the flight (always in UTC), date, frequency (or frequencies) and, if applicable, the type of transmission. But remember. *Do not* give actual details of the transmission. Instead, simply say that it was a position report, request for SELCAL check, phone patch, or what have you. You might also want to mention the kind of receiving equipment/antenna system that you use and maybe even include a picture of yourself at your listening post.

Since aero enroute stations and airlines rarely have their own QSL cards or verification forms, you will want to include one of your own for the pilot to fill out and return to you. You can design your own and have a batch of them printed up quite inexpensively. At the end of the column is an example of the verification card which I use to send with my reception reports.

Address your report to: Captain, (Airline and Flight Number), Airline address (include city, country, etc, of home office).

Another method is to send your report to the airport at the flight's destination. Some monitors who try this approach say that it works as well as sending the report to the airline's home office. Either method is acceptable as long as it gets the job done.

This writer realizes that some of the fine points involved in sending good reception reports to airborne stations are the same as those for sending reports to aero enroute ground stations. However, it is important to emphasize these (i.e. typing your report, remember to include return postage, etc.) because they do contribute to making sure you send the kind of report that will bring the results

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you desire -- a verification of your reception. But don't forget to include your return address with your report!

If any readers would like to tell other MT readers about the verification letters/QSL cards they've received from airlines or other aeronautical sources, please drop me a line.

Recently many readers have requested a listing of ARINC's high frequency allocations. Here is the most up-to-date chart available (see table above). In future issues we will also feature frequency allocations for other aero enroute stations.

LDOCs (Long Distance Operational Control) frequencies and station locations is the subject for "Plane Talk" in the April issue of MT.

Until then, 73 and out.



RECEPTION CONFIRMATION

AIRLINE AND FLIGHT NUMBER _____

TYPE OF AIRCRAFT _____ CALLSIGN (if applicable) _____

DATE AND TIME _____ LOCATION OF TRANSMISSION (Lat/Long. etc.) _____

FREQUENCY _____ MODE _____

SIGNATURE _____ DATE _____

Hamming Without Code

There was a time when people literally lined up at stores to await the latest supply of amateur radio gear. Fathers proudly passed their hobby on to their sons who passed it on to their sons. There was genuine pride here; pride in the service they performed and in the knowledge that as a ham you were on the cutting edge of technology.

The same rapid fire advances in technology that once made ham radio so attractive also contributed to its stagnation. Society now takes instantaneous global communications for granted. And when kids today compare ham radio with computers and other hi-tech gadgets, they seem to find radio registering low on the thrill-per-second scale.

As a result, for many years amateur growth in the United States has been static. Hoping to increase the number of people entering the hobby, someone came up with an idea called "Novice enhancement." Now, instead of being limited to Morse code, the new novice could also use phone (talk).

There was a surge of interest. But within months, the sad truth was known. While the Novice enhancement did bring in some new hams, they were mostly people who already were thinking about getting a ham license but who had been put off by the Morse code-only restriction. The thousands of hoped-for new hams were not coming. We threw a party but no one came.

Taking a new tack

Some organizations have been trying to recruit retirees and senior citizens into the hobby. And that's great. But older hams will not ensure the continuation of the hobby. Only an infusion of grade school and high school-age hams can do that. These are the people who will apply high-tech to the hobby and develop new and better means of communicating via the ham bands. I am convinced that these kids are out there. All we have to do is find a way to attract them.

The Rub

Today's youngsters are far from stupid! But they question the value of a hobby that insists they learn Morse code, a mode of communications that has had little value for years. Archaic, it is the slowest form of digital communications available.

Today's youth much prefer the computer. With a computer they can solve problems, play

games and communicate with friends all over the world. Computers are fun and any effort required to learn a new technique or develop some special software pays off. So what can we do to get these kids to learn to love code the way we do? NOTHING!

In any school in America today, you will find dozens of youngsters who own computers and use the telephone lines to communicate with like-minded kids all over the country. There is no doubt these kids are catching flack from Mom and Pop about the ever expanding telephone budget. Suppose we show these young people how they can communicate via the ham bands and open up possibilities that simply are too expensive to be done via telephone. Let's tell them how they can talk via radio-telephone with their friends and all the other interesting things that can be done with ham radio.

Now we have their attention; let's not blow it by telling them they must spend several weeks of agonizing effort learning Morse code.

Several years ago the ARRL considered a "no code" license. It was rejected by many members of the League. Generally the thought was, "I had to bust my chops to learn code. So should everyone else."

Well folks, it's time to think again!

The Loophole

International law requires countries to include a code requirement in any amateur radio exam that permits the holder to operate on bands below 30 MHz. However, code is not required for VHF operation. Japan was one of the first to take advantage of the no code license to enhance its population of radio amateurs; hence its supply of engineers and technicians. The fact is that Japan now has four or five times the numbers of amateurs the USA has and about eight times the number of engineers. (Look what it has gotten them!)

What I am suggesting is a license similar to Japan's. Pass a theory exam and be allowed phone, CW, digital modes on frequencies above 50 MHz. Just think what the FCC would have said if we had four or five hundred thousand hams using 220 MHz -- there would have never been any question about losing that band! Another benefit we would gain from a code-free license (aside from the added numbers of technically minded young folks we would encourage) is more domestic amateur gear being built. With an expanded base of amateurs, more manufacturers would be encouraged to produce ham gear. On top of this, these new comers are sure to produce better modes of communications in a very short time.

Write the ARRL (Larry Price, President, 225 Main St., Newington, CT 06111) and the FCC (Personal Radio Branch, Washington, DC 20554) and tell them you support a NO CODE LICENSE! We have nothing to lose and everything to gain!

AEA DX Handy

A few months ago, I managed to get my hands on one of AEA's DX Handy ten meter transceiver. This little handful of radio is a real blast! The unit is about the size of your average VHF FM handi-talkie, but operates on ten meters, with an output of two watts on CW or SSB.

The frequency is controlled by a VXO (variable crystal oscillator). The unit comes equipped with two crystals that allow you to cover the upper 50 KHz of the Novice CW band and the lower 50 KHz of the Novice SSB band. The receiver is truly outstanding.

Using only the whip that comes with the unit, I received a CW beacon in Brazil, signals from all over the U.S.A., South America and Europe. Several VK (Australian) and ZL (New Zealand) stations were also copied.

Working these stations was another story. After two frustrating days, I hung the rig on my ten meter beam and worked stations in Europe and through out North and South America. Most contacts were on SSB. While it is possible to work CW with the "DX Handy" this mode is difficult, because you must hold the transmit switch down while depressing a micro-switch key on top of the rig. After using the rig on the beam for a few days, I again tried using the unit with the standard whip and did manage a few QSO's.

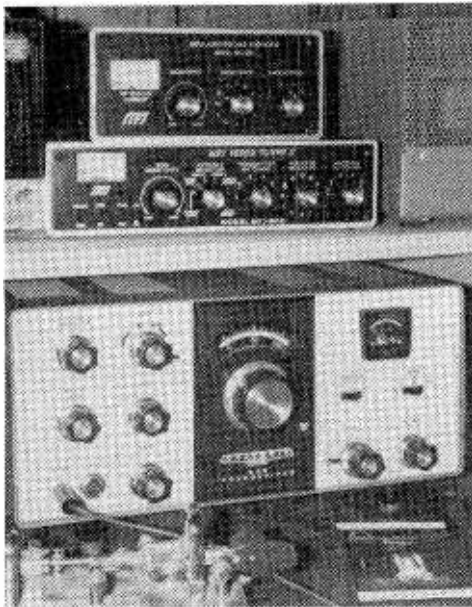
Overall, I was impressed with the "DX Handy". It is a great deal of fun, but don't expect to become a DX champ using the little loaded whip that comes with it. If you are a hiker, biker or camper it would be neat to include this little job in the pack, but take a better antenna along too.

Speaking of Better Antenas

WB3EFI came up with a dandy ten meter antenna that is inexpensive and works great. It is a ten meter extended Zepp. The antenna is



AEA DX Handy in use. Jack Clark HC4-MUG/3 chases rare DX with two watts



The MFJ 931 Artificial Ground atop the MFJ 941D antenna tuner at N3IK's station, bringing ground right to the rig. It can make a big difference on all bands, but is especially useful when working lower bands (i.e., 160 & 80) with short antennas.

great in all directions. Later we hung the antenna horizontal and noticed directional characteristics broadside to the axis of the wire. As a sloper the antenna is unidirectional (about 100 degree lobe) in the direction of the slope and seems to be as effective as a two element beam. Maximum power limit is 400 watts (great antenna for the new Uniden and Radio Shack ten meter transceivers.)

WB3EFI has three models to choose from ten, twelve and fifteen meters. Prices are \$18.00, 19.00 and 21.00 dollars postpaid in the 48 states. Available from "The Ant Farm," RR 1 Box 1237, Kunkletown, Pa. 18058.

More New Stuff

Another new product we have had an opportunity to try is the MFJ artificial ground (MFJ 931). I had been a bit skeptical about how much this product could do for the average station until I used it.

Basically, the MFJ 931 is used to tune a random wire as a ground system for your station. Simply tune the unit for maximum current as indicated by the built-in meter.

Using this unit in conjunction with a wire (unknown length) that was strung around two sides of my basement, I was able to put out a very effective signal on 160, 80 and 40 meters while using a 60 foot end fed wire antenna. Previously the antenna was worked against a ground rod driven ten feet into the earth.

Switching between the two ground systems indicated at least a one S unit increase in signal strength on all three bands and at times as much as four S units when using the 931. If you cannot install a decent ground system at your station or if your station is located a good distance away from ground, this unit will help!

At a price of \$79.95 the 931 is a wise investment for the average ham. Available from MFJ Enterprises Inc. Box 494, Mississippi State, MS 39762.

MIR

Have you worked the Soviet Space station MIR yet? Signals are extremely loud and it is easy to work the station when it is within range and the operators are listening. Vladimer U1MIR and Musa U2MIR are no longer aboard the space station, having returned to earth December

44 feet long and provides about 3.5 dB of gain over a dipole, more if arranged as a sloper. The antenna is made from 18 gauge copper clad steel wire and is nearly invisible in the air, the center insulator is glass filled, and the antenna is fed with 50 ohm coax. WB3EFI's antenna has an SWR or less than 2:1 from 28 to 28.7 MHz., between 28.1 to 28.5 the SWR averaged under 1.5:1 with resonance occurring at 28.4 MHz. You do not need a transmatch with this antenna; just connect the coax and operate.

I tried one and, set up initially as an inverted vee, it worked

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And there's more! Monthly columns by: Joe Carr, K4IPV on the ins and outs of repairing and troubleshooting your radio. Bill Orr, W6SAI on antennas and antenna technology plus a lot more, noted HF/VHF operator and DX'er Joe Reisert, W1JR's world of VHF and UHF technology, and noted government propagation expert Garth Stonehocker, KØRYW on propagation.

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21, 1988 after a year-long record-breaking space flight. Dr. Valeri Poliakov U3MIR is still aboard the spacecraft, although it appears he does not speak English. There are several other crew members aboard and some of them may be able to help out.

If you leave a scanner set on 145.55 MHz, you will hear MIR if it is active and in range. One local ham has worked the space station several times using this method (most active passes have been early in the morning).

Oscar 13 Handbook

... is available from AMSTAT UK, London E12 5EQ, England. This 60 page handbook describes the history and mechanics of AO-13 and helps the beginner understand how Oscar works and how to use it. Nice deal!

DX

5R8AL will be on the air from Madagascar for several weeks in February. Keep an eye open for him.

Contests

Feb 4-5 Vermont QSO Party; 11-13 YLRL YL/OM SSB; 18-19 ARRL DX CW; 24-26 CQ WW 160 Meter SSB; 25-27 YL/OM CW

An interesting contest for our shortwave listening brethren is the U.A. SWL Competition. This contest runs until December 31, 1989. There are several categories for all modes CW, phone, digital and SSTV or Fax. While this is a bit late for most of us, it may be fun to get into anyway. For full details and logs send 4 IRCs or \$2.00 U.S. to Contest Manager Marc Domen, P.O. Box 38 Borgerhout, B2200 Belgium.

That's all for this month, gang. Thanks for the many letters and cards; keep them coming. 73, Ike



Antarctica

McMurdo Station, NNNOICE, 13974.0 kHz. Full data color photo card of Antarctica. Verification signer, Dave. Received in 47 days for an English reception report, and souvenirs. Station address: Dept. of the Navy, COMNAVSUPPORANT Antarctica, FPO San Francisco, CA 96601. (Larry Van Horn, Gretna, LA)

Austria

Radio Austria Int'l., 9875 kHz. Full data color card of regional costumes, without verification signer. Received in 64 days for an English reception report. Station address: A-1136 Vienna, Austria. (Terry Ryan, Bellerose, NY)

Costa Rica

Radio for Peace Int'l., 7375 kHz. Full data blue card with station logo in white. Verification signer, James Latham, Station Manager. Received in 23 days for mint stamps, and an English reception report. Station address: Apartado 119, Escazu, Costa Rica. (Terry Ryan, Bellerose, NY) (George Neff, Tampa, FL)

Cuba

Radio Habana, 9655 kHz. Full data card. Verification signer, Rolando Pezaez. Received in 110 days for an English reception report. Station address: P.O. Box 7026, Habana, Cuba. (Fraser Bonnett, Kettering, OH)

Denmark

Radio Denmark, 15165 kHz. Full data card of Danish art painting, without verification signer. Received in 37 days for one IRC and an English reception report. Station address: Shortwave-Dept, Radiohouse, DK-1999 Frederiksberg C, Denmark. (Terry Ryan, Bellerose, NY)

Germany-FRG

AEM1QF (Army MARS, Berlin) 14401 kHz. Full data color card. Received in 14 days for a self-addressed envelope, a souvenir postcard, and an English reception report. Station address: C & E Division Berlin Bde, APO New York, 09742. (Rick Albright, Merced, CA)

West Berlin-RIAS, 6005 kHz. Full data color studio card, station stickers, brochures, and program schedule, without verification signer. Received in 18 days for one IRC, one U.S. dollar, and an English reception report. Station address: Kufsteiner Strabe 69, D-1000 Berlin 62. (ed.)

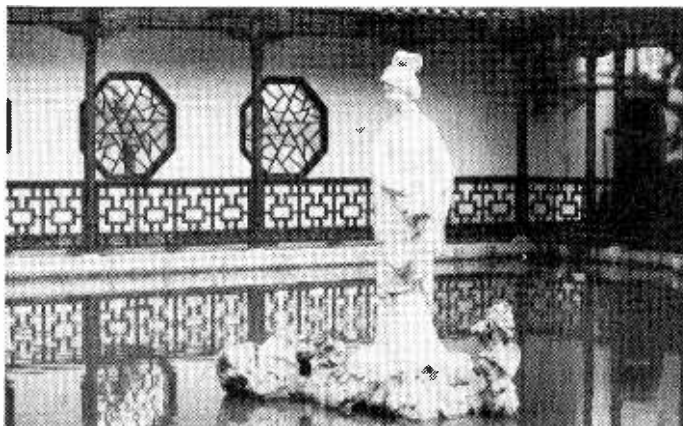
Sudwestfunk, 7265 kHz. Full data color globe card. Verification signer, Dr. Krank-Technical Director. Received in 144 days for two IRCs and an English reception report. Station address: Postfach 1115, 7570 Baden-Baden 1, Federal Rep. of Germany. (ed.)

Indonesia (Sumatra)

Radio Republik Indonesia-Bukittinggi, 3232 kHz. Partial data personal letter. Verification signer, Effem, Sekretariat. Received in 20 days after third Indonesian reception report, and one U.S. dollar. Station address: RRI Regional I Bukittinggi, Jin. Prof. Mohd. Yamin SH, No. 199 Aurkuning, P.O. Box 3, Bukittinggi, Sumatera, Barat, Indonesia (Richard L. Coday, Oildale, CA)

Kure Island

NNONCE (USCG MARS) 14478 kHz. Full data prepared card, with station logo. Received in 50 days for a self-addressed envelope, souvenir postcard, and an English reception report. Station



Lady "What-me-worry?" is a keep-sake QSL from Radio Beijing. Along with your QSL report, how about sending the QSL card or a good photo-copy? We'll return your original within four weeks.

address: FPO San Francisco, CA 96619. (Richard Albright, Merced, CA)

Manchuria

Radio Beijing via Heilongjiang, 4840 kHz. Full data color Chinese statue (Lady "Don't Worry"), without verification signer. Received in 50 days for an English reception report. Station address: English Service, Beijing, People's Republic of China. (ed.)

Marcus Island

NNNONCA (USCG MARS), 13826 kHz. Full data prepared form card. Received in 30 days for a self-addressed envelope, souvenir postcard, and an English reception report. Station address: FPO Seattle, WA 98782. (Rick Albright, Merced, CA)

Martinique

FUF (French Navy), 22390 kHz. No data prepared and stamped form card with station logo. Received in 300 days for two IRCs and a French reception report. Station address: Pointe de Sables, Fort de France, Martinique, French West Indies. (Rick Albright, Merced, CA)

Micronesia

NNONYA (US Navy MARS, Yap Island), 13826 kHz. Full data prepared form card and informative letter. Verification signer, Rick Horn, EO1. Received in 90 days for a self-addressed envelope, (US stamps not valid there, it turns out) a souvenir postcard, and an English reception report. Station address: OIC CAT Yap, Box 9, Yap, WCI, 96943. (Rick Albright, Merced, CA)

New Zealand

Radio New Zealand, 15150 kHz. Full data postcard of a soccer game, flag pennant, and program schedule. Verification signer, Rudy Hill. Received in 18 days for an English reception report. Station address: P.O. Box 2092, Wellington, New Zealand. (Frank Mierzwinski, Reading, PA)

Romania

Radio Bucharest, 11940 kHz. Full data station card, and souvenir postcard, without verification signer. Received in 97 days for one IRC and an English reception report. Station address: 79756 Bucharest, Socialist Republic of Romania. (Fraser Bonnett, Kettering, OH)

Senegal

Radiodiffusion-TV National du Senegal, 4890 kHz. Full data color globe/map card, and station stickers, without verification signer. Received in

35 days for mint stamps and a French reception report. Station address: Boite dPostal 1765, Dakar, Republique de Senegal. (Terry Ryan, Bellerose, NY)

Singapore

Singapore Radio Maritime Telex, 8715 kHz. Full data QSL on station letterhead. Verification signer, Thomas Woo-Engineer Frequency Management. Received in 25 days for mint stamps (which were returned with QSL), and an English reception report. Station address: Telecom Headquarters, Comcentre, 31 Exeter Road, Singapore 0923, Republic of Singapore or Orchard Point Box 399, Singapore 9123 (Larry Van Horn, Gretna, LA) (Milan Seifert, APO San Francisco)

SS Columbus Virginia

DGZV, 16593 kHz. Full data prepared form card with ship's logo. Verification signer, Erika Schnuis-Radio Officer. Received in 60 days for a souvenir postcard and a German reception report. Station address: Columbus Line, 650 California, San Francisco, CA 94108. (Rick Albright, Merced, CA)

Tahiti

RFO Radio Tahiti, 15170 kHz. Full data color butterflies card, without verification signer. Received in 27 days after a second French follow-up reception report. Station address: Boite Postal 125, Papeete, Tahiti, French Polynesia. (Ronald Van Campen, Curacao, Netherlands Antilles)

United States

WMLK, 9455 kHz. Full data station letter, with transmitter site information. Verification signer, Elder Jacop O. Meyer. Received in 63 days for an English reception report. Station address: P.O. Box C, Bethel, PS 19501. (Terry Ryan, Bellerose, NY)

USCGC Mallow

NNONXS, 14383 kHz. Location: Taongi Atoll, Marshall Islands, Full data prepared form card. Received in 18 days for a self-addressed envelope and an English reception report. Station address: FPO San Francisco, CA 96672 (Rick Albright, Merced, CA)

Vatican City

Radio Vaticana, frequency unknown. Full data postcard of St. Peter's Basilica. Received in 70 days for an English reception report. Station address: Vatican Radio, Vatican City State. (Thomas J. Maslanka, Cleveland, OH)

Just When You Thought It Was Safe to Turn on the Radio!

In order to appease the appetite of the more learned RTTY Reader, sometimes I find it necessary to report on or discuss "High Tech" subjects that will, in some cases, cause the average reader to have migraine headaches. For those of you who suffer such ailments, we will try to return to the normal mode next month.

Now that you have read the above disclaimer, it's time to put on your thinking caps and dabble in a world that may or may not be an untapped source of readable RTTY text.

Like a shark in water, I always seem to come across some strange noise or beeping while tuning the bands. For the past year and a half I've been noticing a strange noise that I identified as the new Piccolo system. I mentioned it a few times in previous issues of *Monitoring Times* but I didn't receive any response. Piccolo is a form of RTTY known as MFSK or "Multi-Frequency Shift Keying." Unlike FSK, which has two tones, MFSK can use as many as twelve tones for sending data on the HF bands.

Piccolo isn't new. An old 36 tone system was used to send the complete alphabet including control codes. The tones were spaced very close together and required a very stable receiver and transmitter (one tone represented a single ITA2 character). Unfortunately, there weren't many shortwave listeners who had the ability to copy it. Until the 1980s, you were lucky if you could find an affordable receiver that even had a 100 Hz stability! Now-a-days, that isn't true. With fully synthesized receivers and high stability oscillators, today's receivers can lock onto a signal with a ten Hertz accuracy.

My setup is an ICOM R71 with the high stability oscillator and a "Hombre" TU that uses a "Bow Tie" audio filter discriminator circuit and a tuning oscilloscope. The bowtie filter gives me the ability to measure the tones that are spaced 20 Hz apart. I was able to identify the new "Mark IV" piccolo signal by tuning to a channel that was sending the idle tones. The piccolo system is described in

Figure 1
Piccolo Tones Which Correspond to Baudot

- Tone 3 ----- 460 Hz
- Tone 4 ----- 480 Hz
- Tone 5 ----- 500 Hz (Stby)
- Tone 6 ----- 520 Hz (Stby)
- Tone 7 ----- 540 Hz
- Tone 8 ----- 560 Hz

Georg Klingenfuss's *RTTY Code* book on page 66. Dr. Dave Wilson (of Fredericks, Virginia), with his analytic mind, was able to complete the conversion chart. The results are shown in Figure 2.

This system is similar to FDM in that more than one channel can be transmitted at a time. I haven't been able to get an actual printout as yet but I am "homebrewing" an MFSK tuning unit. Dr. Dave Wilson is working on the software for an IBM compatible. A list at the bottom shows the frequency and the number channels that were heard.

Sometimes a two or three channel piccolo signal will run idle on two or three channels which is characterized by the constant shifting of the same two tones (tones five and six). This is called "Standby" mode and it's possible to have all three piccolo channels in standby.

Figure 2
Conversion from Piccolo to Baudot

1ST Tone	2ND Tone	Bit					Lts	Figs	
		1	2	3	4	5			
3	3	1	1	1	0	1	Q	1	
3	4	1	0	1	0	1	Y	6	
3	5	1	1	0	0	1	W	2	
3	6	1	1	0	1	1	fs	fs	
3	7	1	0	1	1	1	X	/	
3	8	1	1	1	1	1	ls	ls	
4	3	0	1	1	0	1	P	0	
4	4	0	0	1	0	1	H	nu	
4	5	0	1	0	0	1	L)	
4	6	0	1	0	1	1	G	nu	
4	7	0	0	1	1	1	M	.	
4	8	0	1	1	1	1	V	=	
5	3	1	0	0	0	1	Z	+	
5	4	0	0	0	0	1	T	5	
5	5	Not valid							
5	6	Standby							
5	7	0	0	0	1	1	O	9	
5	8	1	0	0	1	1	B	?	
6	3	1	0	0	0	0	E	3	
6	4	0	0	0	0	0	Idle	Idle	
6	5	Not valid							
6	6	Not valid							
6	7	0	0	0	1	0	cr	cr	
6	8	1	0	0	1	0	D	wru	
7	3	0	1	1	0	0	I	8	
7	4	0	0	1	0	0	sp	sp	
7	5	0	1	0	0	0	If	If	
7	6	0	1	0	1	0	R	4	
7	7	0	0	1	1	0	N	.	
7	8	0	1	1	1	0	C	:	
8	3	1	1	1	0	0	U	7	
8	4	1	0	1	0	0	S	'	
8	5	1	1	0	0	0	A	-	
8	6	1	1	0	1	0	J	bell	
8	7	1	0	1	1	0	F	nu	
8	8	1	1	1	1	0	K	(

nu=not used/cr=carriage return/lf=line feed
fs=figures/Ls=letters/wru = who are you

The piccolo system uses twelve tones to handle the ASCII character set, but on the SW bands, it appears that a six tone system is used (see Figure 1). Any two of the six tones can make up the ITA2 equivalent (in Figure 2 there are three unused and one standby character which isn't used in baudot). One tone is transmitted for 50 milliseconds; therefore, it takes 200 ms to transmit a single character.

The start stop bits that are used in Baudot aren't used in Piccolo; therefore, a computer program that is similar to TDM or SITOR is needed to synchronize to the data. Dr. Dave Wilson came to this conclusion because he noticed that some piccolo groups transmit the "Standby" signal when no data is being sent. This is a practice that is similar to the idle character in TDM.

Finally, the frequency list which consisted of only a few loggings a year ago has grown to 49. If you have a list of new frequencies, send them in! We'll sure appreciate it! Has anyone copied Piccolo?

Again, I hope I didn't bore you with this technical jargon. RTTY is a mode that involves the receiving and sending of data and it can get complicated at times. I try to keep it simple but sometimes it's just impossible. ZCZC

Figure 3
Piccolo Log

Frequency (kHz)	No. of Channels	18057	3
		18178	1
		18479	1
5322.5	4	18482	1
5333.5*	1	18525*	3
5750*	1	18642*	1
7823.7		18706*	1
8086*	1	18750	1
8095.4		18879*	3
8126		18940	
10336.5*	1	19005	2
10746	1	19546	1
10760*	2	19613	3
12270	2	19679	1
13499	1	19810	
13580	3	20161	1
13822	1	20171	1
14368	3	20266	2
14373	3	20554	1
14847*	2	20986	3
15778	4	23177	2
15855	1	23543	1
16165	1	23680	3
16179	1	24661	1
16205	3	+14473*	3
16281	1	+14593	2
16320*	1		
16345	3		
16390	3		
16842x	1		
17445	1		
17459	1		
17507*	1		

* Denotes frequency in use on more than one day
x The old piccolo system
+ Last minute entries

The Sky Store and Grocery Star Wars

The hottest phenomenon on satellite in the last few years has been that of the home shopping channels.

All of the home shopping channels are in reality nothing more than clones of Home Shopping Network (HSN), which operates no less than three separate channels. Together, there are no less than 11 such "services" hawking their wares -- to an audience apparently endowed with an abundance of time and disposable income. The whole business prompts the philosophical question: Is there no end to the world's supply of ceramic clowns?

Rest for the Weary

There is an oasis in this desert of liquidated geegaws. It's called *The Sky Store* and can be seen on W5,3 every Tuesday night from 9:00 - 11:30 pm. What sets this home shopping show apart from its slickly produced, horn tooting, blow-dried ex-weathermen counterparts is, well, everything. The atmosphere of *The Sky Store* is more like that of a high-tech general store.

Usually wearing a flannel shirt and sporting a Gabby Hayes beard, Doug Dehnert hosts the show from behind what looks like a school table (that's because it is a school table). In front is a blue curtained backdrop to which is pinned, on one side, a list of phone numbers to call and, on the other side, a Sky Store T-shirt.

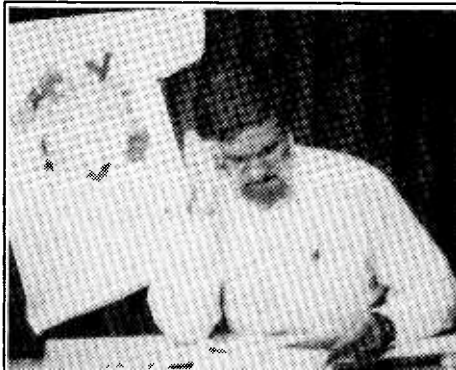
During the course of the show the colors on the screen may come and go; "noise bars" creep through the picture now and then; a restless character generator trickles phone numbers across the screen sometimes at the top, sometimes at the bottom; and the audio fluctuates wildly when Doug sneezes or coughs into the mike.

Labor of Love

But who cares? What you're watching is more a labor of love than an attempt to impress viewers with technological hyperbole.

Doug and the staff of *The Sky Store*, based in Thief River Falls, Minnesota, tape the show each week in a classroom of a nearby school and ship the tape to the uplink facility which duly takes the tape and Doug's money and puts the show up on the satellite. Meanwhile, the staff scurries back to the shop Tuesday night to await the calls that will come in.

One of the few modest people in the TVRO industry, Doug is a living encyclopedia of everything that needs to be known about satellite television. Every week he begins the show with an hour lecture on a particular



Doug Dehnert, one of the sharpest guys in the TVRO industry and host of *The Sky Store*, reads a viewer's letter.

aspect of satellite TV technology. Using the convenient school chalkboards, he sketches as he talks, sometimes rambling off the subject, but almost always giving a clear explanation through the use of plain language and self-deprecating humor.

Often these lectures are prompted by questions posed by viewers who write in concerning the specific operation of their system or other subjects of a general nature. These letters are read aloud by Doug (including parts of a more personal nature) and he dutifully holds up any snapshots of the viewer's dish, dog, or grandmother which might have been enclosed.

The Soft Sell

It isn't until after the "Tech Talk" feature of the show that Doug gets around to selling TVRO related merchandise. When he does, it's clear that he doesn't offer liquidated close-outs or bottom end junk but the best quality gear available to the home dish market.

With the patience of a good teacher, Doug carefully explains how each of the products he sells works and why they are better than many on the market. To make a point it is not unusual for him to literally take apart a competitor's product and point out the weaknesses in design and production.

No one with more than a passing interest in TVRO should miss *The Sky Store*. Too busy Tuesday nights? Tape it.

In the Clear

The American Home Satellite Association (AHSA) is a consumer advocate organization for the home dish owner. For more than a year they have operated a technical hotline to help dish owners with installations, trouble-

shooting, and other problems the satellite TV owner is bound to have. For this service and more information about the AHSA, call 206-453-8309.

It was only natural that the AHSA would progress to the next level and hit the airwaves. And so they did last fall with a show called *In the Clear* which features a live phone-in format and industry news. Look for it on Spacenet 1, 15.

Unfortunately, *In the Clear* airs Tuesdays from 9:00 - 10:00 pm in direct conflict with *The Sky Store*. It's too bad that the only two video shows aimed directly at the home dish owner have to butt heads in the same time slot. At least they could be on the same satellite so those with block downconverters and two receivers could watch one while taping the other.

A Sports Fanatic's Dream

One of the motivations which have pushed many to buy TVRO systems has been an insatiable need for sports programming. The accompanying chart should satisfy even the greediest sports fanatic. What the chart does not show are the dozens of channels which the various national and regional networks use for backhauls.

Of course, baseball backhauls are lost to dish owners thanks to the VC I, but NFL, NBA, NHL, and NCAA games are all still there. In that respect, it's still the good old days when everything was available just for pointing the dish in the right direction. It won't stay this way for many more seasons, but it sure is nice while it lasts.

Transponder Notes

Jones Intercable, a multi-system operator which uplinks seven audio programming formats (known collectively as Galactic Radio [see *Monitoring Times*, July, 1988]) on G3,11 is adding three new services. The three, all of which are AM radio stations, are: KOA, Denver; WCCO and KSJN, both from Minneapolis. The addition of these mostly news/talk/sports stations will counter the nearly all music formats now carried. Catch these new radio superstations as follows: KOA 8.05 MHz, WCCO 8.15 MHz, and KSJN 8.26 MHz. All are monaural and narrowband format.

Galactic Radio has been announcing that listeners may sign up for a free monthly program guide to all their audio services by writing: Galactic Radio, 9697 E. Mineral Avenue, Englewood, CO 80112.



The In-Store Satellite Network: Tune in to hear Safeway and Superfresh slug it out with late-breaking bulletins on hot-selling vegetables "sandwiched" in between highly orchestrated versions of Top 40 hits.

Attention Shoppers

Those of you with Safeway or Superfresh grocery stores in the neighborhood may have noticed satellite dishes popping up on their roofs. Both chains are now piping their in-store music via the same satellite, indeed the same transponder. If E-Z Radio music is your cup of tea, you won't mind these channels and you'll always be up-to-date on store sales. These two services are just two of many background music channels to be found on Spacenet 1,17.

Back to Basics: Mail Order TVRO

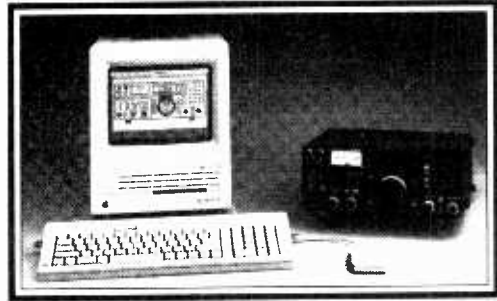
Whether you're thinking about buying your first TVRO system or considering an upgrade, it always helps to have sources for quality gear. A good place to start is your local dealer. Here you'll find systems of varying sophistication and price. When you visit your dealer, take a notebook and jot down the brand names, model numbers, and prices on the systems available. Make notes on installation, warranty, repair costs, and turn-around time. Use these notes to compare prices, etc., with the TVRO mail-order companies listed below.

West, Incorporated has a 32 page catalog of complete systems or separate components depending on your need. The catalog also lists "satellite TV 'toys'" including portable TVRO systems for your RV, surround sound amplifiers and the General Instrument's InfoCipher 1500R Data Receiver. West's carries all the top brand names; have

Sports Channels Available to Dishowners

Service	Sat/xponder	Mode
Madison Square Garden Network	F4 6	Clear
SportsVision	F4 9	Clear
Sports Channel America (Alt.)	F4 10	Clear
Home Sports Entertainment (Alt.)	F4 11	Scrambled
Sports Channel New York	F4 12	Scrambled
New England Sports Network	F4 13	Clear
Sports Channel Florida	F4 14	
Prime Ticket (L.A.)	F4 20	Scrambled
Home Team Sports	F4 22	Clear
Sports Channel New England	F4 23	Clear
PASS (Detroit)	S3 21	Clear
ESPN (Alt.)	F3 7	
ESPN	G1 9	Scrambled
PrimeTicket	F1 7	Scrambled
HSE Houston Alt.	F1 9	Scrambled
HSE	F1 10	Scrambled
Sunshine Network	F1 11	Clear
HSE Houston Alt.	F1 18	Scrambled
Prime Sports Network	F1 24	Clear

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dishes from six feet to 32 feet; lists hard to find installation hardware like roof mounts and house brackets for pole mounting. Call for their catalog 800-222-9064 (US), 800-952-5520 (WA), or write: West, Inc., 1741 Cedardale Road, Mt. Vernon, WA 98223.

NBO "Name Brands Only" Home Satellite Store offers a free 16 page buyer's guide. NBO says its customers get one year free programming with all systems (they sell only IRDs). Customers are urged to do the installation themselves and offer a customers-only "Tech Hot Line" as well as an installation video tape for \$39.95. Call for their catalog at 800-346-6466 (anywhere in the U.S.) or write: NBO Distributors, Inc., 5631 Palmer Way, Carlsbad, CA 92008.

The Sky Store has a six page catalog which lists in print the same things which are sold on the show. United Satellite Systems (USS), which is the parent company of The Sky Store, has commercial as well as home TVRO gear. In addition, it is an excellent source for good used satellite equipment. They also service all the gear they sell and offer technical assistance via their Minnesota phone number. Write: USS, St. Hilaire, MN 56754, or call 218-681-5616 (MN) or 800-328-7733 (US).

Another mail order firm for do-it-yourselfers is Satman (see MT July, 1988). They offer a free buying guide with minimal installation instructions. Call 800-SATMAN or write: Satman, 5017 N. Melody, Peoria, IL 60614.

And finally, let's not forget Radio Shack, which features only one system, but it comes complete with a How-To video tape. See your local Radio Shack store for details.

In addition, there are at least eight dog and horse race tracks on various birds all scrambled and unavailable to home dish owners. All above channels are regularly scheduled networks. A listing of programs and times are carried in all major home dish guides.



"...AM's survival [as a means of broadcasting] depends on technology to improve the reception and transmission of broadcasts as well as finding its own format niche."

-- Radio World

"...Stone axes' survival [as a tool for brain surgery] depends on the technology to improve the sharpness of its edge as well as finding patients willing to be operated on by doctors using them."

-- Stone Axe World

AM, then FM ... now DM !

Let's stop fooling ourselves. AM radio is not going to rebound, come back or survive. No longer acceptable for the transmission of consumer-grade audio, in ten years they'll be using the band to dispatch taxi cabs. Don't get me wrong. AM is a blast to DX. But instead of wasting time trying to save struggling stations with short-term Band Aids like AM stereo and all-Elvis formats, broadcasters had best begin preparing for the future.

Michael Starling, writing in a recent issue of *Radio World*, thinks that the AM and FM bands should be combined into an entirely new band called DM (digital modulation). Finding space for that new band will be, he says, "the industry's single most important issue in the 1990s."

Starling is no odd voice calling out from the fringes of technology. Some rather important, usually conservative, organizations have echoed his views. In a recent edition of *Federal Communications TechNews* (12 issues/\$147 from New Signals Press, P.O. Box 435, Falls Church, VA 22046), editor Benn Kobb quotes the National Public Radio Network as saying that "It does not seem likely that advanced radio systems incorporating digital technologies will be feasible using existing AM or FM bandwidths. In addition, downward compatibility (continued use of existing radio receivers to receive analog signals) for advanced radio systems would be impossible. Therefore, *new spectrum will almost certainly be required.*"

Says Kobb, "Watch for DM advocates to add their voices to the clamor of interest asking the FCC to preserve or allocate spectrum [space] for [such] new technologies. Digital Modulation," he says, "is the ultra-fidelity future for radio broadcasting."

No Money: Off the Air

Saying that AM "could never win," 1480-WLEE in Richmond, Virginia, pulled the plug after 43 years on the air. According to station manager Tony Booth, WLEE hadn't made money since 1978. The only way that the facility managed to stay on the air as long as it did was by selling off a portion of its antenna site to the Marriott Corp.

There was a time when WLEE vied for first place among Richmond stations, besting even the legendary WRVA. At that time, WLEE was well known for its personalities, promotional events and community involvement.

WBBL, owned by the Grace Covenant Church and operated only on Sundays, shares

we've owned for so many years go dark permanently." WLEE signed on in 1945, WBBL in 1924. Says *Monitoring Times* reader and WLEE listener Selden Richardson, "Alas, no more fine Big Band music in Richmond. How sad."

Off the Air: Court Order

U.S. District Judge John J. McNaught has imposed what Long Island, New York's *Newsday* called a "permanent silence" on broadcasts from the *Sarah*, a rusting freighter registered to the self-declared principality of Sealand. In upholding the ban, McNaught rejected 1620-Radio New York International's contentions that their First Amendment rights had been violated and said that the station's operations violated an international law. RNI co-owner J. P. Ferraro called the ruling "pretty rotten" and pledged to appeal it.

Bits 'n Pieces

Country Music fans should enjoy Nashville Network Radio's new 24-hour, satellite-delivered country music format. About 85 stations now take the format off the bird. The number of affiliates is expected to double by year end. By the way, one of radio's most successful survivors, Wolfman Jack, is hosting a daily show on NNR. Mr. Jack, now nattily attired in cowboy duds, is heard from 10 p.m. to 1 a.m. (ET).

Regular *MT* contributor and HCJB *Saludos Amigos* host Ken MacHarg will be filling in as host of 840-WHAS' "Let's Talk" program. Tune him in from 9:00 p.m. until midnight (eastern time) on February 19th. Or call him at 1-800-444-8484. WHAS is regularly audible over large portions of North America.

How 'bout 88.9 *WXPN's* *World Rhythm* program, weekdays 1:00 to 5:00 p.m., Saturdays 7:00 'til 9:00 p.m.? It's the newest fad/phenomenon to hit the

WLEE's frequency and transmitter but not the decision to sign off. "The church is not desirous of seeing the station

airwaves since New Age. World Rhythm music is best exemplified by the group *Dissidenten*. Composed of four West German punk rockers, an Algerian and a Moroccan (who sings in Arabic), they play music that combines ethnic music -- ranging from African, Middle Eastern, Greek and even American Indian -- with a rock beat and contemporary electronic technology. The result can be electrifying.

According to *Broadcasting* magazine, there are 4,915 commercial AMs, 4,116 commercial FMs and 1,356 non-commercial FMs on the air in the U.S. right now. That makes for a total of 10,387 stations. Currently on the record are construction permits for an additional 1,149 stations. And that doesn't count the plethora of easily heard Canadians.

Speaking of easily heard Canadians, try for Ottawa's fledgling 54 Rock. "I say 'fledgling.'" says hot overnight DJ Nikki Shaw, "because we haven't been in this format very long. Most of the staff is relatively new to the station." Shaw, obviously being modest, sounds great. Beside 540 AM where the station can be heard over wide portions of North America, 54 rock is broadcast over 88.5 cable FM.

Mailbag

Reader Ken Marley says that Phoenix, Arizona's (actually, Mesa) 1510-KJAA is back on the air, this time as business formatted KFNN. Meanwhile, stations exploring the possibility of going "all business" will now have another source of programming available to them. The Financial Business Network, based in Boston, gets under way this month.



Who says there's nothing to listen to? You've got your pick, from *Dissidenten* to an off-the-wall wake-up crew to Wolfman Jack in country duds!

1420 WHK, Cleveland, Ohio, says John Thomas, has dropped its C-Quam stereo signal. Owned by Malrite Communications, it operates from a studio in the Statler Office Tower building downtown. The transmitter is in a nondescript shed in Seven Hills, Ohio at the southeast corner of Pleasant Valley and McCreary Roads. Malrite makes its bucks, says John, from its FM, 100.7-WMMS and independent TV outlet, 19-WOIO. Also in Cleveland, 1220-WGAR dumped its Harris AM stereo and went C-Quam for its country and western simulcast from sister station FM WGAR-FM.

It has been announced, says Chuck Darrow, that Philly's 950-WPEN and 560-WFIL are going to switch frequencies. Then

WFIL will be bought by ex-1420-WHAT personality Mary Mason, who will turn it talk. Odd, that is. Frank Ford just closed an AM talker in the City of Brtherly Love, 900-WDVT. Ford worked with Mason at sister station 96.5-WWDB, also a talker.

Jim Kalach of Waterbury, Connecticut, does a little AM DXing at sunset each day as a way to wind down after his hectic one hour commute. He passes along a copy of his QSL letter from 670-WMAQ in Chicago. "I realize it isn't the rarest catch in the world," says Jim, "but it's special to me because it's my first QSL from a medium wave station." Congratulations, Jim!

Jacques Ahouansou says he managed to pick up that 2 million watt powerhouse out of Duba, Saudi Arabia, on 1512 kHz we mentioned last month. Included in the program were readings from the Holy Quran. Reception at 1929 UTC, says Jacques, was "poor and deteriorating rapidly." A little over an hour later Jacques also nailed 1350-ORTM Nouakchott, Mauritania, from his listening post in Abidjan, Ivory Coast. Incidentally, that list of over 700 AM stations from around the world (operating with over 50,000 watts) is still available for \$2.00 cash plus a self-addressed, stamped envelope from American BandScan,

P.O. Box 98, Brasstown, NC 28902.

New Station Grants

88.5 Mobile, Alabama; 91.3 Barstow and 107.7 Kings Beach, California; 92.9 Smyrna, Delaware; 107.9 McKee, Kentucky; 98.9 Mountain Lake Park, Maryland; 97.9 Newberry, Michigan; 91.7 Itta Bena and 102.5 Lexington, Mississippi; 97.5 Hatteras, North Carolina; 89.5 West Union, Ohio; and 103.3 Clifton, Texas have all been given the green light by the FCC to begin building new facilities. *M Street Journal* also lists the following Canadian grants: 1030 Edson and 1160 Vegreville, Alberta; 1120 Fort St. John and 1020 Terrace, British Colum-

bia; 1100 Corner Brook, Newfoundland; 1120 Halifax and 1020 New Glasgow, Nova Scotia; 1020 Kenora and 1120 Timmins, Ontario; and 1160 Baie-Comeau and 1180 Perce, Quebec, but describes them as "more of an allocation than a grant."

For Sale

Small market north Florida AM. Profitable. \$225,000 (Randy Millar 407-466-5086). Hawaii AM-FM combo, \$2,500,000 cash (George Moore Associates 214-661-8970). Single station market AM/FM in Kansas. Profitable. Excellent owner-operator opportunity. \$900,000 (Charles C. Earls, 314-888-3224). New England 1 kw fulltime. Excellent market, good ratings, owned real estate. Asking \$1 million. (Bob Kimmel 802-524-5963).

International Bandscan

English can now be heard on Radio Vilnius, Lithuanian, USSR, from 2230 to 2300 UTC (5:30-6:00 p.m. EST) on 666. Also new is Radio Sweden's broadcast in Estonian. That five minute snippet of news will be heard at 1755 UTC (12:55 p.m. EST) on 1179 kHz.

Jordan Radio and TV already has two powerhouse AM transmitters on the air -- one

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of which pumps out 2,000,000 watts on 801 kHz. According to the BBC Monitoring Service, those have been joined by another unit operating on 1449 kHz from Al Karanah. No word on how powerful, though.

Just off the coast of Israel is a boat that broadcasts in Hebrew and calls itself "Channel 7." The frequency is 918 kHz, the programs are religious and the schedule is as follows: Sunday through Thursday from 0500 to 1900 (12:00 a.m.-2:00 p.m. EST), Fridays 0500 to 1300 (12:00 a.m.-8:00 a.m. EST) and Saturdays from 1700 to 2200 UTC (12:00 p.m.-5:00 p.m. EST).

Here's the affiliates list for Lao National Radio: 580-Vientiane, 585-Savannakhet, 640-Vientiane, 800-Oudomxay, 850-Luang Prabang, 1000-Houaphanh, 1030-Vientiane, 1200-Xiengkhouang and 1350-Pakse. 1030-Vientiane also carries broadcasts in French, English, Vietnamese, Thai and Khmer.

Rumor has it that West Germany's Sueddeutscher Rundfunk (576, 711, 1413, 1485 kHz plus FM and SW) may be merging with Sudwestfunk (666, 828, 1017, 1485 kHz plus FM and SW). Film at eleven.



In addition to our own information, we thank the following publications and BandScanners for their assistance in producing this column: BBC Monitoring Service, Camden Courier-Post (via W. E. Dolan), Christian Science Monitor, Federal Communications TechNews, DX Listener's Digest, M Street Journal, Newsday (via Herbert R. Gesell), Radio World, Seattle Times (via an anonymous reader), Richmond Times-Dispatch (via Selden Richardson), St. Petersburg Times (via Donald Bice), Stone Axe World, Sweden Calling DXers (Frank W. Bampton, Julius Hermans, Ron Podchebnik, Pasquale Salemme) Scott Tawl.

NEWSROOM



Pirate Hunters, Take Heart!

Last month we started this column by saying that "there are signs that things are looking better [for pirate and clandestine listeners]." This month, things *are* better. Turn that receiver on! We've got some things for you to hear.

Radio Patria Libre (Free Country) is a new clandestine broadcasting from Colombia. Thanks to a tip from ace DXer Terry Krueger, this writer was able to log Patria Libre with a very solid signal on 6766 kHz. Expect to hear revolutionary news and commentary. The station signs off at 0100 with the Colombian national anthem. Broadcasts begin with several minutes of bugle and snare drum around 0000 UTC.

Another DX South Florida member, Bob Wilkner, was successful in getting RDF [radio direction finding] bearings on the transmitter. These are 8.43 north and 75.47 west, which puts the location close to the Venezuelan border. Given the strong signal strength this clandestine should be widely heard throughout North America and Europe as well.

Exactly who is responsible for this operation is not yet clear. However, Radio Patria Libre expresses sympathy for the Revolutionary Armed Forces of Colombia (FARC), one of the most important of the numerous leftist guerilla armies in opposition to the government of Colombia.

Counterfeit Irish

From Ohio, Fraser Bonnett sends along one of the most fascinating pirate loggings we have seen in quite some time. From 0240 to 0315 on 7415 he logged a station identifying as "The Voice of the Celtic Nation." The broadcast featured pro-IRA commentary and political Irish folk songs. The announcers claimed to be "broadcasting live from Londonderry in Ireland."

Really good show, guys. We commend you for your creativity, but you made one slip-up. No self-respecting member of the IRA or IRA sympathizer would ever use the term "Londonderry." To do so would be considered acknowledgment of the legitimacy of British control of Northern Ireland. The city in Northern Ireland is simply referred to as "Derry."

Fraser also logged another pirate on the same frequency. This one identified as 95-Rock, WROX-FM. He believes this probably was a simulcast with the FM transmission. Unlike most pirate broadcasts, it was in USB. WROX was logged at 2350 UTC. Later that same evening at 0305 on 7415 he heard WRFT, The Voice of Free Texas.

New Nicaraguan Clandestine

From our loyal contributor John Demmitt comes word that a new anti-Sandinista clandestine may be taking to the airwaves in the near future. We have no further details at

this time, but if you hear something new and unusual on the bands this may be it!

We Get Letters

George Zeller of Ohio writes an outstanding clandestine column for *Free Air* (the bulletin of the club "ACE." George agrees with our opening statement saying that "pirate activity [up his way] has exploded lately." He sends some nice logs along to prove it.

He too has logged WROX on 7415 (at 2236 UTC) and says it also announces the FM frequency of 95.9. WROX claims to be broadcasting "from the Northeast to the World." The Voice of Free Long Island was another catch. It gives a mailing address of Via Tagar, Room 258, Union Building, Stony Brook, NY 11794. This one is rather political at times with commentary on the Vietnam Veterans Memorial and South Africa. The frequency was 7414.6 and the time 0322.

Like fellow Ohio resident Fraser Bonnett, George managed to log WRFT, The Voice of Free Texas. George notes the announcer had considerable technical knowledge. The address is Box 300, Dallas, Texas, 75215.

Varying from 7411 to 7416 was a Canadian pirate identifying as CVOR or CBOR. The announcer claimed to be in Edmonton, Alberta, and gave some political commentary as well as an announcement of a grand opening for an Edmonton tire store.

George's final log was Radio Free Willy on 7415 from 0056 all the way past 0315. He reports an excellent special election program with announcers "Abdul" and "Oman." In addition to political parodies, they played rock music selected for its political content.

It seems as if the folks in Ohio are bagging their share of pirates these days. Now let's hear from the rest of the country!



R.I.P. Irish Pirates

As we previously reported, all Irish pirates were scheduled to leave the air at the end of 1988.

RADIO
NEW YORK



INTERNATIONAL

The RNI Fight Continues

Radio Newyork International continues to make news. Our anonymous contributor of a couple of months ago returns with another deeply appreciated clipping from the *Boston Globe*. The *Globe* reports that the American Civil Liberties Union and the former owner of the SARAH (RNI's ship) are trying to get a U.S. District Court Judge to lift the injunction which halted RNI's recent broadcasts off the coast of Long Island.

To pay the cost of the refurbishing of the ship, Weiner sold it to Atlantic Radio Communications of London. However, he retains an option to repurchase it if the courts allow RNI back on the air.

Currently, the SARAH is registered as "a radio station in the principality of Sealand." Sealand is not exactly your conventional country. It's an old World War II offshore platform in the North Sea. Now in private hands, its owner has declared himself king. Recognition from more traditional sovereign states has yet to materialize, but apparently Weiner and Atlantic Radio are satisfied with Sealand's legitimacy. You never know. This case could establish some sort of legal precedent. Stranger things have happened.

Some people were not content to simply hear the SARAH and RNI. While biking on the boardwalk at Long Beach, New York,

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Jeff Michaelson was able to see the ship! Binoculars confirmed his original sighting.

Mission Radio on Caroline's 6215 kHz shortwave relay.

Caroline Update

Holland's Ary Boender sends us an update on the seemingly never-ending changes at

Ary also reports that the ship-based Voice of Peace now has company in the Mediterranean. A new station, Radio Aruts Sheva, is broadcasting from the ship Erets Hatsui on 918 kHz. The schedule is 0700 to 2200 UTC. Can any of our European readers hear this one?



Caroline continues to evolve

Several North American DXers have had success in logging Radio Fax. The station was once based in Ireland but relocated to Britain. Look for it around 6205 kHz signing on from possibly as early as 0600 to as late as 0810 UTC. Ary provides us with an address: Radio Fax, The Forge, Cranleigh, GU6 7BG, England.

Wanted: We need your loggings of pirates and clandestines. But we also need photocopies of QSLs and other material you receive from such stations. All such contributions will be greatly appreciated.

Radio Caroline. Caroline is now running three separate services. There is radio Caroline 558 (558 kHz) which is, or shortly will be, a 24-hour service. Radio 819 runs from 0500 until 1800 when Viewpoint 819, The Voice of Evangelism, broadcasts until 2000. Meanwhile, here in central Florida, I am hearing both Caroline 558 and World

Monitoring Times welcomes your considered comments, questions and opinions on the world of radio. Address them to "Letters," PO Box 98, Brasstown, NC 28902.

New Techniques

A lot of people tune below 500 kiloHertz. Unfortunately, many of them only are only passing through and tune elsewhere rather quickly. They get discouraged because they can't seem to get a handle on what's being transmitted.

When you first start listening to international broadcasters on shortwave, all you really need to know how to do is turn the radio on and change frequencies. You really don't need to learn much about the other buttons and dials.

Eventually, some of us do learn about those other buttons, using the CW mode for Morse code and the sideband modes to listen to some of the military, aviation or amateur voices that were otherwise unintelligible. We were now utility specialists. But we still did a lot of listening in the AM mode. And we still left a lot of those buttons and dials pretty much alone.

What does all this have to do with the problems of DX-ing in the world below 500 kiloHertz? Unless you are going to concentrate only on the limited number of international broadcasters transmitting in the low bands, you are going to have to learn some new techniques.

Most of the transmissions below 500 kiloHertz are in Morse code (CW). In the AM mode, code sounds softer and it is very easy to confuse dits and dahs, and consequently misread the letter.

The second problem with AM mode is the wider bandwidth. This is not a problem in international broadcasting or medium wave (BCB) stations where stations are spaced five to ten kiloHertz apart making the probability of picking up several trans-

missions at once less likely.

The experienced utility listener is familiar with the sideband and CW modes, both of which have narrower bandwidths than the AM mode. It is easier to separate individual stations in these modes, where stations are far more likely to be close together.

The CW mode will work well for the coastal station portion of the frequencies below 500 kHz, about 435 to 500 kHz. The transmissions here are keyed carrier like other marine coastals. They are crisp and clear when you are tuned to the exact frequency.

But something different happens when you tune in the aeronautical and marine beacons, 190 to 435 kHz and 515 to 530 kHz. These are not keyed carrier but are sideband stations with the audio portion of the beacon shifted several hundred Hertz away. When you are tuned to the carrier frequency in CW, you may or may not hear the ID of the station (depending on your CW bandwidth).

400 vs 1020 Hertz Shifts

Almost all U.S. beacons use an upper sideband shift of 1020 Hertz, while Canadian beacons are either 400 or 1020 Hertz above the carrier. In addition,

many U.S. beacons also have a lower sideband that is 1020 Hertz below the carrier frequency. These are called double sideband beacons.

Practically all beacons have an upper sideband; with or without a lower sideband. Thus, the preferable mode for listening to beacons is USB.

Now you can tune to the carrier frequency and hear the upper sideband of

the beacon. If the beacon is a 400 Hertz Canadian beacon, you will notice that the tone is lower. If you have both a 1020 and a 400 beacon on the same frequency, you can sometimes identify each of them because of the difference in tone.

If your receiver has passband tuning (PBT), which may be called IF shift, you can use this to separate the 400 and 1020 beacons. Turning the dial down will bring in the 400 Hertz beacons while tuning out the 1020s. Conversely, turning the dial up will help the 1020 beacons and reduce the 400s. If you have only one of each on the frequency, this will be sufficient to separate them.

Use Your Loop

However, the range of a 25 watt beacon at night can be 600 to 1000 miles. With the number of beacons in the United States and Canada, it is not unusual to hear five or six beacons on the same frequency at the same time.

This is a major reason for using a loop antenna on low frequency beacons. They are very directional and can thus be peaked or nulled by turning the loop. (Be sure to turn off the AGC or at least turn the dial to slow response. Otherwise, you will be trying to null with your loop while boosting the signal strength with the AGC.)

If you don't have a loop (and many good beacon DXers work with long-wire antennas) you can often identify several different beacons by listening carefully for a little while. The time required for each ID is probably different. Over a period of several minutes, different letters of each ID will occur during a clear space and be identifiable. Thus, you can slowly build up each ID, letter by letter, until you have the two or three letters involved in each of the beacon IDs.

Experiment with other controls, such as a notch, to see how these affect the signal and your ability to identify the letters. In this way you will learn the best way to use your receiver in listening to low frequency beacons. Join the fun.

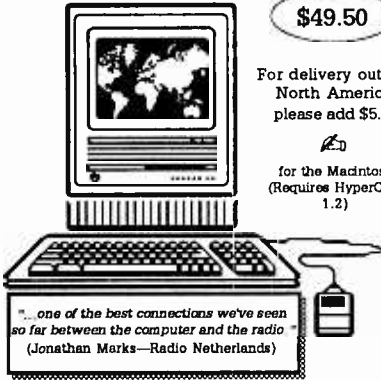


If you listen carefully, you should be able to pick out each ID, letter by letter



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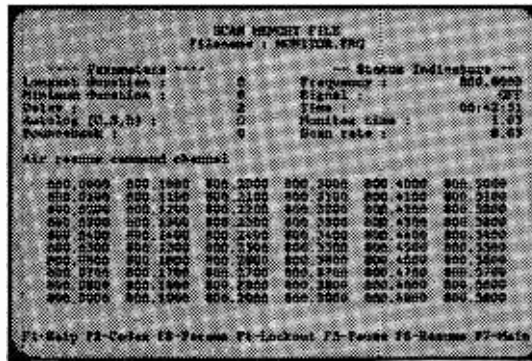
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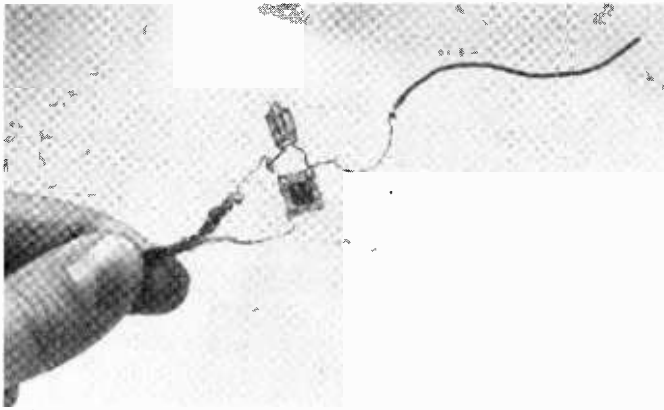
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what's new?

continued



Tiny Hybrid Antenna

LF Engineering, known for low frequency experimenter products, has just announced a tiny hybrid active antenna circuit for 50-200 kHz reception. Of interest to OMEGA, LORAN and military users, the fingernail-size package includes lowpass filtering and diode protection.

Operated with a tiny antenna only 4-12 inches in length, the hybrid is usable as low as 5 kHz. For additional information, contact LF Engineering C., 17 Jeffry Rd., East Haven, CT 06513.

New Motorolas

Motorola's new MTX-900 hand-held portable transceiver can be used for trunked radio systems, conventional communications and even as a portable telephone. The dual mode portable includes a privacy function to exclude intruders from listening.

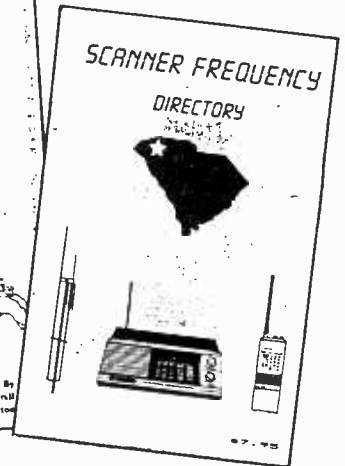
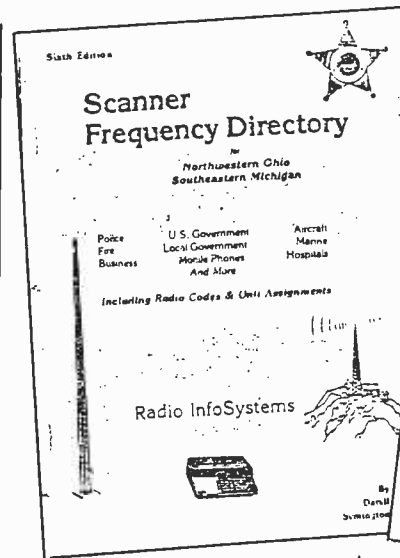
Other perks included with the MTX-900 are 18 channel capacity, keypad control, talk-around/repeater selectability, paging decoder and low-distortion audio enhancement.

For more information,

contact Motorola Communications, Public Relations Department, 1301 E. Algonquin Rd., Schaumburg, IL 60196 or phone 312-397-1000.

Scanner Freqs!

With desktop publishing cresting at an all-time high, it isn't surprising



to see a record number of localized scanner frequency directories on the market. Fortunately, few of them overlap their regions.

Symington's Scanner Frequency Directory for Northwestern Ohio and Southeastern Michigan is now in its sixth edition, each volume improved over its former and this latest being no exception. Including public safety, business, federal and local government, mobile telephones, aircraft and marine, the directory is honed geograph-

ically to concentrate on those counties which share the common lower Michigan/northwestern Ohio state line.

Reprints of several ten codes are included along with an excellent tutorial chapter on specialized monitoring topics such as base and mobile frequency offsets, trunking, cellular and repeaters.

The data portion of the book is cross-referenced by frequency and alphabetically by licensee. This makes it easy to identify an unknown user on a frequency the listener stumbles across as well as to find a specific frequency to look for a particular agency.

The *Scanner Frequency Directory* for Northwestern Ohio and Southeastern Michigan (104 pages) can be obtained for \$8.95 plus \$1.50 book rate shipping or \$2.50 first class or UPS from Radio InfoSystems, PO Box 399, Holland, Ohio 43528.

Another regional directory is the *Scanner Frequency Directory* centered on Greenville, South Carolina; however, it does include listings for neighboring counties right into North Carolina as well, and offers a quick-lookup list of state police and patrol frequencies for the rest of the nation.

Contained in the booklet's pages are speedway, business, industrial, local and federal government, law enforcement, amateur, military



and civilian aircraft, marine and telephone, public utilities ... just a little of everything which the scanner enthusiast is likely to encounter on his journey through the keypad!

The *Directory* for South Carolina (71 pages) is available for \$7.95 from Radio Research, 10 Elf Lane, Greenville, SC 29611.

New Utility Edition

Although the new Joerg Klingenfuss *Guide to Utility Stations* has strong European emphasis, it is rigorously purged of inaccurate and expired listings. This seventh edition has nearly 8000 frequency entries and 4000 call signs, cross-referenced, to assist the shortwave utilities monitor to identify those unknown intercepts.

Now including facsimile and radioteletype, the *Guide* is prefaced by an excellent introduction to the various modes and protocols likely to be encountered in the HF spectrum. RTTY press transmissions are cross-referenced by time and agency; weather FAX is listed by schedule and country.

Country and address lists, radiotelegram formats and abbreviations, Q and Z codes, technical definitions of emission modes, and a chart of worldwide aeronautical frequencies round out the comprehensiveness of this encyclopedic 484-page volume.

The *Guide to Utility Stations* is available for \$26.95 plus \$1 shipping from Universal Shortwave, 1280 Aida Drive, Reynoldsburg, OH 43068, or from Klingenfuss Publications (see ad on p.39 for ordering information.)

Two from Ace

While several offshore manufacturers offer low power (1 watt) walkie talkies, ACE Communications now has available a 6 watt

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unit. Factory equipped for low-power industrial frequency 154.600 MHz, the 4-channel hand-held will operate on any frequency in the 150-174 MHz high band. Additional crystals are \$25 per pair (transmit and receive).

Specifications show a 0.3 microvolt (SINAD) sensitivity, 5 MHz zero-degradation frequency spread (without retuning), and unwanted signal rejection of -70 dB.

A tiny pocket portable measuring only 5"H x 2-1/4" W x 1-11/16"D and weighing a scant 19 ounces, the new Triumph BC-105 transceiver comes with stainless steel belt clip, rechargeable battery (including one spare battery

at no extra cost), drop-in charger, flexible antenna and a soft case.

The BC-105 sells for \$279 including shipping from ACE Communications, 10707 E. 106th St., Indianapolis, IN 46256.

The AR2002 VHF/UHF scanner has been upgraded to the AR2515. AOR has taken the popular AR2002 and extended its coverage well down into shortwave. Now offering continuous 5-1500 MHz frequency coverage, the new AR2515 includes an RS232C port for external computer control.

Boasting a sensitivity of

0.35 microvolts FM for 12 dB SINAD (1.2 uV AM for 10 dB S/N) and offering a selection of 5, 10, 12.5 and 25 kHz tuning increments, the receiver is capable of scanning up to 1984 memories (62 banks of 32 channels each) at a turbo 36 channels per second!

An optional BFO (\$149) with fine tuning can be wired into the unit at the time of order to allow SSB and CW reception. The AR2515 is available for \$695 from Ace Communications at the address given above. Present AR2002 owners may have their units upgraded to an AR2515 for \$250.

What's Not New

Ten Tec, the only remaining U.S. company actively manufacturing amateur radio equipment, has decided against re-releasing their discontinued RX325 general coverage receiver. A nice radio, compact and feature-filled, it proved uncompetitive at its pricing point in the face of off-shore manufactured equipment.

MT Program Team

**Kannon Shanmugam,
Program Manager**

4412 Turnberry Drive
Lawrence, KS 66046

Jim Frimmel, TX

Dale Vanderpoel, FL

LEGEND

* The first four digits of an entry are the program start time in UTC.

* The time is followed by the station name, program name, and a brief summary of the program's content.

* Some listings may be followed by "See X 0000." The letter stands for a day of the week:

S=Sunday M=Monday
T=Tuesday W=Wednesday
H=Thursday F=Friday
A=Saturday

The four digits stand for a time in UTC. Listeners should check back to that date and time to find out more about that particular program.

* All broadcasts are listed in chronological order, starting on Sunday at 0000 UTC and ending on Saturday at 2359 UTC.

* All days are in UTC. Remember that if you are listening in North American prime time, it is actually the next morning UTC. For example, if you are listening to a program at 7:01 pm [EST] on your Thursday night, that's equal to 0001 UTC and therefore Friday morning UTC.

We suggest that you tune in to a program a few minutes before the schedule start time, as some stations have tentative schedules which may slightly vary. We invite listeners and stations to send program information to the program manager at the address above.

program guide

Sunday

Feb. 5, 12, 19, 26

- 0010 Voice of America (Americas): Closeup. A closeup look at issues facing the world.
- 0010 Voice of America: VOA Morning. Sports, science, business, music, and features about America.
- 0030 BBC: Composer of the Month. Profiles and music of famous composers.
- 0030 Voice of America (Caribbean): Press Conference, U.S.A. Correspondents ask questions of newsmakers.
- 0030 Voice of America: Special English News and Features. Programming in s-to-w English.
- 0045 Voice of America: VOA Morning. See S 0010.
- 0101 BBC: Play of the Week. Hour-long drama selections. 0110 Voice of America (Americas): Communications World. A look at modern telecommunications.
- 0110 Voice of America: VOA Morning. See S 0010.
- 0130 Voice of America (Americas): Weekend Magazine. Music, conversations with correspondents, and talks about the arts.
- 0209 BBC: British Press Review. Survey of editorial opinion in the British press.
- 0210 Voice of America: VOA Morning. See S 0010.
- 0215 BBC: Reading. A novel adapted for radio in serial format.
- 0230 BBC: The Ken Bruce Show. A mix of popular music and entertainment news.
- 0310 Voice of America: VOA Morning. See S 0010.
- 0315 BBC: From Our Own Correspondent. In-depth news stories from correspondents worldwide.
- 0330 BBC: Quote, Unquote. A quiz show testing knowledge of famous quotes.
- 0410 Voice of America: VOA Morning. See S 0010.
- 0430 BBC: From Old Time to New Country. Country music from past to present.
- 0445 BBC: Worldbrief. A 15-minute roundup of the week's news headlines and other events.
- 0509 BBC: Twenty-Four Hours. Analysis of the main news of the day.
- 0510 Voice of America: VOA Morning. See S 0010.
- 0530 BBC: Financial Review. A look back at the financial week.
- 0540 BBC: Words of Faith. People share how their scripture gives meaning to their lives.
- 0545 BBC: Letter from America. Alistair Cooke's distinctly British view of America.
- 0610 Voice of America: VOA Morning. See S 0010.
- 0630 BBC: Jazz for the Asking. Jazz music request show.
- 0709 BBC: Twenty-Four Hours. See S 0509.
- 0730 BBC: From Our Own Correspondent. See S 0315.
- 0745 BBC: Book Choice. Short reviews of current or future best-sellers.
- 0750 BBC: Waveguide. How to hear the BBC better.
- 1000 Voice of America (Caribbean): VOA Morning. See S 0010.
- 1110 Voice of America (Caribbean): Critic's Choice. News from the world of the arts.
- 1110 Voice of America: New Horizons. The world of science, medicine, and technology.
- 1115 BBC: From Our Own Correspondent. See S 0315.
- 1130 BBC: Composer of the Month. See S 0030.
- 1130 Voice of America (Caribbean): Spotlight. Reports and interviews of interest to listeners in the Caribbean.
- 1130 Voice of America: Issues in the News. Members of the Washington press corps discuss current topics.
- 1200 BBC: News Summary.
- 1201 BBC: Play of the Week. See S 0101.
- 1210 Voice of America: Encounter. A discussion program presenting opinions on world issues.
- 1230 Voice of America: Studio One. Dramatized and narrative documentaries.
- 1309 BBC: Twenty-Four Hours. See S 0509.
- 1310 Voice of America: Critic's Choice. News from the world of the arts.
- 1330 BBC: Sports Roundup. The day's sports news.
- 1330 Voice of America: Special English News and Features. See S 0030.
- 1345 BBC: Worldbrief. See S 0445.
- 1400 BBC: News Summary.
- 1401 BBC: With Good Reason. A roundtable discussion chaired by Gordon Clough.
- 1410 Voice of America: The Concert Hall. Classical music and interviews with America's great artists and conductors.
- 1430 BBC: Anything Goes. A variety of



Andy Kershaw plays exotic music from the world over in "Andy Kershaw's World of Music," heard on the BBC Mondays at 0215 UTC and Thursdays at 0445 UTC.



John Timpson hosts the BBC's "Novel Ideas," a quiz show covering fiction from Charlotte Bronte to Barbara Cartland. "Novel Ideas" can be heard Mondays at 1215 UTC and Thursdays at 0330 UTC.

music and much more, as requested by listeners.

- 1455 Voice of America: Editorial. American opinion.
- 1510 Voice of America: New Horizons. See S 1110.
- 1515 BBC: Concert Hall. 45 minutes of sounds from classical music concerts.
- 1530 Voice of America: Studio One. See S 1230.
- 1615 BBC: Feature. Programming on various subjects.
- 1645 BBC: Letter from America. See S 0545.
- 2309 BBC: Book Choice. See S 0745.
- 2310 Voice of America: Newline. News, correspondent reports, interviews, and opinion.
- 2315 BBC: Letter from America. See S 0545.
- 2330 BBC: With Good Reason. See S 1401.
- 2330 Voice of America: VOA Morning. See S 0010.

Monday Feb. 6, 13, 20, 27

- 0010 Voice of America (East Asia): Newline. See S 2310.
- 0010 Voice of America: Encounter. See S 1210.
- 0030 BBC: In Praise of God. A half-hour program of worship.
- 0030 Voice of America (East Asia): Special English News and Features. See S 0030.
- 0030 Voice of America: Studio One. See S 1230.
- 0045 Voice of America: VOA Morning. See S 0010.
- 0101 BBC: A Question of Science. John Wilson discusses the benefits and detriments of man's control of our planet.
- 0110 Voice of America (South Asia): Newline. See S 2310.
- 0110 Voice of America: New Horizons. See S 1110.
- 0130 Voice of America (South Asia): VOA Morning. See S 0010.
- 0130 Voice of America: Issues in the News. See S 1130.
- 0145 BBC: Music Series.
- 0209 BBC: British Press Review. See S

- 0209.
- 0210 Voice of America: Newline. See S 2310.
- 0215 BBC: Andy Kershaw's World of Music. Exotic and innovative music from the world over.
- 0230 BBC: Science in Action. The latest in scientific developments.
- 0230 Voice of America: VOA Morning. See S 0010.
- 0310 Voice of America: Daybreak Africa. Correspondent reports, news features, and background reports.
- 0315 BBC: Good Books. Detailed opinions on specific books.
- 0330 BBC: Anything Goes. See S 1430.
- 0410 Voice of America: Newline. See S 2310.
- 0430 BBC: Dangerous in Love. Leslie Thomas' story of a detective (runs through March).
- 0430 Voice of America: VOA Morning. See S 0010.
- 0445 BBC: Nature Now. Information about flora, fauna, and natural resources.
- 0509 BBC: Twenty-Four Hours. See S 0509.
- 0510 Voice of America: Newline. See S 2310.
- 0530 BBC: Waveguide. See S 0750.
- 0530 Voice of America: VOA Morning. See S 0010.
- 0540 BBC: Words of Faith. See S 0540.
- 0545 BBC: Recording of the Week. A personal choice from the latest classical music releases.
- 0610 Voice of America (Africa): Daybreak Africa. See M 0310.
- 0610 Voice of America: Newline. See S 2310.
- 0630 BBC: With Good Reason. See S 1401.
- 0630 Voice of America: VOA Morning. See S 0010.
- 0709 BBC: Twenty-Four Hours. See S 0509.
- 0730 BBC: Feature.
- 1110 Voice of America (Caribbean): Focus. A look at the major figures and issues that shape contemporary life.
- 1110 Voice of America: Special English Features. The usual s-l-o-w English program, but sans news.
- 1115 BBC: Health Matters. Latest developments in medicine and advice on how to stay fit and well.
- 1130 BBC: The Ken Bruce Show. See S 0230.
- 1130 Voice of America (Caribbean): VOA Morning. See S 0010.
- 1130 Voice of America: Music, U.S.A. (Standards). Classics of American popular music.
- 1210 Voice of America: Newline. See S 2310.
- 1215 BBC: Novel Ideas. John Timpson hosts a new, freaky quiz show on books.
- 1230 Voice of America: Magazine Show. Features about culture, science, sports, medicine, and the arts in America.
- 1245 BBC: Sports Roundup. See S 1330.
- 1309 BBC: Twenty-Four Hours. See S 0509.
- 1310 Voice of America: Focus. See M 1110.
- 1330 BBC: Feature. See M 0730.
- 1330 Voice of America: Special English News and Features. See S 0030.
- 1405 BBC: Outlook. An excellent magazine (i.e., covering everything!) program.

NEWS GUIDE

This is your guide to news broadcasts on the air. All broadcasts are daily unless otherwise noted by brackets. These brackets enclose day codes denoting days of broadcast. The codes are as follows:

S = Sunday M = Monday
T = Tuesday W = Wednesday
H = Thursday F = Friday
A = Saturday

We invite listeners and stations to send program information to the program manager.

- 0000 BBC: Newdesk
- 0000 Kol Israel: News
- 0000 KYOI: News [M-F]
- 0000 Radio Australia: International Report
- 0000 Radio Moscow: News
- 0000 Voice of America: News
- 0000 WCSN: News [T-F]
- 0030 WCSN: News [T-F]
- 0045 Radio Berlin International: News
- 0100 BBC: News Summary
- 0100 Deutsche Welle: World News
- 0100 Kol Israel: News
- 0100 KYOI: News [M-F]
- 0100 Radio Australia: World and Australian News
- 0100 Radio Berlin International: News
- 0100 Radio Japan: News
- 0100 Radio Moscow: News
- 0100 Radiotelevisione Italiana: News
- 0100 Voice of America: News
- 0100 WCSN: News [T-F]
- 0130 WCSN: News [T-F]
- 0151 Radio Veritas Asia: World News [M-F]
- 0200 BBC: World News
- 0200 Deutsche Welle: World News
- 0200 Kol Israel: News
- 0200 KYOI: News [M-F]
- 0200 Radio Australia: International Report
- 0200 Radio Berlin International: News
- 0200 Radio Moscow: News
- 0200 Radio RSA: News
- 0200 Swiss Radio International: News
- 0200 Voice of America: News
- 0200 Voice of Free China: News and Commentary
- 0200 WCSN: News [T-F]
- 0215 BBC (South Asia): Newsreel
- 0215 Radio Cairo: News
- 0230 Radio Netherlands: World News [T-S]
- 0230 Radio Portugal: News [T-A]
- 0230 WCSN: News [T-F]
- 0245 Radio Berlin International: News
- 0300 BBC: World News
- 0300 Deutsche Welle: World News
- 0300 KYOI: News [M-F]
- 0300 Radio Australia: World and Australian News
- 0300 Radio Berlin International: News

news guide cont'd from p.59

- 0300 Radio Japan: News
- 0300 Radio Moscow: News
- 0300 Radio RSA: News
- 0300 Voice of America: News
- 0300 Voice of Free China: News and Commentary
- 0300 WCSN: News [T-F]
- 0309 BBC: News About Britain
- 0315 Radio Cairo: News
- 0330 WCSN: News [T-F]
- 0350 Radiotelevisione Italiana: News
- 0400 BBC: Newsdesk
- 0400 Deutsche Welle: World News
- 0400 KYOI: News [M-F]
- 0400 Radio Australia: International Report
- 0400 Radio Berlin International: News
- 0400 Radio Moscow: News
- 0400 Radio RSA: News
- 0400 Swiss Radio International: News
- 0400 Voice of America: News
- 0400 WCSN: News [M-F]
- 0425 Radiotelevisione Italiana: News
- 0430 WCSN: News [T-F]
- 0445 Radio Berlin International: News
- 0500 BBC: World News
- 0500 Deutsche Welle: World News
- 0500 KYOI: News [M-F]
- 0500 Radio Australia: World and Australian News
- 0500 Radio Berlin International: News
- 0500 Radio Moscow: News
- 0500 Radio New Zealand International: News
- 0500 Voice of America: News
- 0500 WCSN: News [M-F]
- 0530 Radio Netherlands: World News [T-S]
- 0530 WCSN: News [T-F]
- 0600 BBC: Newsdesk
- 0600 Deutsche Welle: World News
- 0600 KYOI: News [M-F]
- 0600 Radio Australia: International Report
- 0600 Radio Moscow: News
- 0600 Voice of America: News
- 0600 WCSN: News [M-F]
- 0615 Radio Berlin International: News
- 0615 Radio Canada International: News [M-F]
- 0630 Swiss Radio International: News
- 0630 WCSN: News [T-F]
- 0645 Radio Canada International: News [M-F]
- 0700 BBC: World News
- 0700 KYOI: News [M-F]
- 0700 Radio Australia: World and Australian News
- 0700 Radio Moscow: News
- 0700 Voice of Free China: News and Commentary
- 0700 WCSN: News [M-F]
- 0730 Swiss Radio International: News
- 0730 WCSN: News [T-F]
- 0745 Radio Berlin International: News
- 0800 BBC: World News

program guide

- 1410 Voice of America: Asia Report. News, correspondent reports, interviews, and opinion.
- 1445 BBC: Reading. See S 0215.
- 1455 Voice of America: Editorial. See S 1455.
- 1510 Voice of America: Newline. See S 2310.
- 1515 BBC: A Question of Science. See M 0101.
- 1530 Voice of America: Magazine Show. See M 1230.
- 1615 BBC: Dangerous in Love. See M 0430.
- 1630 BBC: Health Matters. See M 1115.
- 1645 BBC: The World Today. News analysis on a selected location or event in the news.
- 2309 BBC: Commentary. Background to the news from a wide range of specialists.
- 2310 Voice of America: Newline. See S 2310.
- 2315 BBC: The Learning World. An international survey of education around the world, hosted by John Turtle.
- 2330 BBC: Multitrack 1: Top 20. What's hot on the British pop music charts.
- 2330 Voice of America: VOA Morning. See S 0010.
- 0045 Voice of America (East Asia): VOA Morning. See S 0010.
- 0101 BBC: Outlook. See M 1405.
- 0110 Voice of America (East Asia): Newline. See S 2310.
- 0110 Voice of America: Report to the Americas. News, correspondent reports, interviews, and opinion.
- 0125 BBC: Financial News. News of commodity prices and significant moves in currency and stock markets.
- 0130 BBC: W B Yeats: Readings from the Poems. Reading of Yeats' poems to commemorate the 50th anniversary of his death.
- 0130 Voice of America (East Asia): VOA Morning. See S 0010.
- 0145 BBC: Europe's World. A magazine program reflecting life in Europe and its links with other parts of the world.
- 0209 BBC: British Press Review. See S 0209.
- 0210 Voice of America: Newline. See S 2310.
- 0215 BBC: Network UK. A look at the issues and events that affect the lives of people throughout the UK.
- 0230 BBC: Sports International. Feature program on a topic or person making sports headlines.
- 0230 Voice of America: VOA Morning. See S 0010.
- 0310 Voice of America: Daybreak Africa. See M 0310.
- 0315 BBC: The World Today. See M 1645.
- 0330 BBC: John Peel. Tracks from newly released albums and singles from the contemporary music scene.
- 0410 Voice of America: Newline. See S 2310.
- 0430 BBC: The Learning World. See M 2315.
- 0430 Voice of America: VOA Morning. See S 0010.
- 0445 BBC: New Ideas. A radio shop window for new products and

Tuesday Feb. 7, 14, 21, 28

- 0010 Voice of America (Caribbean): Caribbean Report. The latest news, sports, financial news, and weather reports for the Caribbean.
- 0010 Voice of America (East Asia): Newline. See S 2310.
- 0030 BBC: Megamix. A compendium of music, sport, fashion, health, travel, news and views for young people.
- 0030 Voice of America (Caribbean): Music, U.S.A. (Standards). See M 1130.
- 0030 Voice of America: Special English



Paddy Feeny hosts the BBC's sports programs, including "Sportsworld" (Saturdays beginning at 1430 UTC) and "Sports International" (Tuesdays at 0230 UTC).

inventions.

- 0455 BBC: Book Choice. See S 0745.
- 0509 BBC: Twenty-Four Hours. See S 0509.
- 0510 Voice of America: Newslines. See S 2310.
- 0530 BBC: Financial News. See T 0125.
- 0530 Voice of America: VOA Morning. See S 0010.
- 0540 BBC: Words of Faith. See S 0540.
- 0545 BBC: The World Today. See M 1645.
- 0610 Voice of America (Africa): Daybreak Africa. See M 0310.
- 0610 Voice of America: Newslines. See S 2310.
- 0630 BBC: The Beeb's Lost Beatles Tapes. Previously unbroadcast Beatles tracks (through March).
- 0630 Voice of America: VOA Morning. See S 0010.
- 0709 BBC: Twenty-Four Hours. See S 0509.
- 0730 BBC: Europe's World. See T 0145.
- 0745 BBC: Network UK. See T 0215.
- 1110 Voice of America (Caribbean): Focus. See M 1110.
- 1110 Voice of America: Special English Features. See M 1110.
- 1115 BBC: Waveguide. See S 0750.
- 1125 BBC: Book Choice. See S 0745.
- 1130 BBC: Citizens. A radio soap opera, featuring the travails of five fictional Britons and their friends.
- 1130 Voice of America (Caribbean): VOA Morning. See S 0010.
- 1130 Voice of America: Music, U.S.A. (Jazz). Willis Conover looks at jazz of yesterday and today, in the U.S. and abroad.
- 1210 Voice of America: Newslines. See S 2310.
- 1215 BBC: Multitrack 1: Top 20. See M 2330.
- 1230 Voice of America: Magazine Show. See M 1230.
- 1245 BBC: Sports Roundup. See S 1330.
- 1309 BBC: Twenty-Four Hours. See S 0509.
- 1310 Voice of America: Focus. See M 1110.
- 1330 BBC: Network UK. See T 0215.
- 1330 Voice of America: Special English News and Features. See S 0030.
- 1345 BBC: Recording of the Week. See M 0545.
- 1405 BBC: Outlook. See M 1405.
- 1410 Voice of America: Asia Report. See M 1410.
- 1445 BBC: Music Series.
- 1455 Voice of America: Editorial. See S 1455.
- 1510 Voice of America: Newslines. See S 2310.
- 1515 BBC: A Jolly Good Show. Dave Lee Travis presents your record requests and dedications in his own unique way, including the Album of the Month.
- 1530 Voice of America: Magazine Show. See M 1230.
- 1615 BBC: Omnibus. A half-hour program on practically any topic.
- 1645 BBC: The World Today. See M 1645.
- 2309 BBC: Commentary. See M 2309.
- 2310 Voice of America: Newslines. See S 2310.
- 2315 BBC: Concert Hall. Forty-five minutes of unadulterated music from classical music concerts.
- 2330 Voice of America: VOA Morning. See S 0010.

Wednesday Feb. 1, 8, 15, 22

- 0010 Voice of America (Caribbean): Caribbean Report. See T 0010.
- 0010 Voice of America (East Asia): Newslines. See S 2310.
- 0030 BBC: Omnibus. See T 1615.
- 0030 Voice of America (Caribbean): Music, U.S.A. (Jazz). See T 1130.
- 0030 Voice of America: Special English News and Features. See S 0030.
- 0045 Voice of America (East Asia): VOA Morning. See S 0010.
- 0101 BBC: Outlook. See M 1405.
- 0110 Voice of America (East Asia): Newslines. See S 2310.
- 0110 Voice of America: Report to the Americas. See T 0110.
- 0125 BBC: Financial News. See T 0125.
- 0130 BBC: How It All Began. Keith Parsons looks at the origins of some of the major issues in the world.
- 0130 Voice of America (East Asia): VOA



The BBC's Oliver Scott (left to right), Hugh Pryor-Jones and Nick Worrall present "Newshour" daily at 2200 UTC.

- Morning. See S 0010.
- 0145 BBC: The Sound of Scotland. A look at Scotland's musical styles and the people behind them.
- 0209 BBC: British Press Review. See S 0209.
- 0210 Voice of America: Newslines. See S 2310.
- 0215 BBC: Health Matters. See M 1115.
- 0230 BBC: Citizens. See T 1130.
- 0230 Voice of America: VOA Morning. See S 0010.
- 0310 Voice of America: Daybreak Africa. See M 0310.
- 0315 BBC: The World Today. See M 1645.
- 0330 BBC: Discovery. An in-depth look at scientific matters.
- 0410 Voice of America: Newslines. See S 2310.
- 0430 BBC: Business Matters. A weekly survey of commercial and financial news.
- 0430 Voice of America: VOA Morning. See

- 0800 KYOI: News [M-F]
- 0800 Radio Australia: International Report
- 0800 Radio Berlin International: News
- 0800 Radio Moscow: News
- 0830 Swiss Radio International: News
- 0900 BBC: World News
- 0900 Deutsche Welle: World News
- 0900 KYOI: News [M-F]
- 0900 Radio Australia: World and Australian News
- 0900 Radio Moscow: News
- 0930 Radio Canada International: News [M-F]
- 1000 BBC: News Summary
- 1000 KYOI: News [M-F]
- 1000 Radio Australia: International Report
- 1000 Radio Berlin International: News
- 1000 Radio Moscow: News
- 1000 Radio New Zealand International: News [M-F]
- 1000 Swiss Radio International: News
- 1000 Voice of America: News
- 1030 KYOI: News [T-F]
- 1100 BBC: World News
- 1100 Deutsche Welle: World News
- 1100 Koi Israel: News
- 1100 KYOI: News [M-F]
- 1100 Radio Australia: World and Australian News
- 1100 Radio Berlin International: News
- 1100 Radio Moscow: News
- 1100 Radio New Zealand International: News
- 1100 Radio RSA: News
- 1100 Swiss Radio International: News
- 1100 Voice of America: News
- 1109 BBC: News About Britain
- 1130 KYOI: News [T-F]
- 1200 BBC: News Summary
- 1200 BBC: Newsreel [M-A]
- 1200 KYOI: News [M-F]
- 1200 Radio Australia: International Report
- 1200 Radio Canada International: News [S-F]
- 1200 Radio Moscow: News
- 1200 Voice of America: News
- 1215 Radio Berlin International: News
- 1230 KYOI: News [T-F]
- 1230 Radio Berlin International: News
- 1300 BBC: World News
- 1300 KYOI: News [M-F]
- 1300 Radio Australia: World and Australian News
- 1300 Radio Berlin International: News
- 1300 Radio Moscow: News
- 1300 Swiss Radio International: News
- 1300 Voice of America: News
- 1330 KYOI: News [T-F]
- 1330 Swiss Radio International: News
- 1345 Radio Berlin International: News
- 1400 BBC: World News [M-F]
- 1400 KYOI: News [M-F]
- 1400 Radio Australia: International Report
- 1400 Radio Berlin International: News

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1400 Radio Moscow: News
 1400 Radio RSA: News
 1400 Voice of America: News
 1500 BBC: Newsreel
 1500 Deutsche Welle: World News
 1500 KYOI: News [M-F]
 1500 Radio Australia: World and Australian News
 1500 Radio Moscow: News
 1500 Radio RSA: News
 1500 Voice of America: News
 1527 Radio Veritas Asia: World News [M-A]
 1530 Swiss Radio International: News
 1545 Radio Berlin International: News
 1545 Radio Canada International: News
 1600 BBC: World News
 1600 Deutsche Welle: World News
 1600 Radio Australia: International Report
 1600 Radio Berlin International: News
 1600 Radio Moscow: News
 1600 Voice of America: News
 1600 WCSN: News [S-F]
 1609 BBC: News About Britain
 1630 WCSN: News [S-F]
 1700 BBC: World News [S-F]
 1700 Radio Australia: World and Australian News
 1700 Radio Moscow: News
 1700 Voice of America: News
 1700 WCSN: News [S-F]
 1715 Radio Berlin International: News
 1715 Radio Canada International: News
 1730 Radio Berlin International: News
 1730 Radio New Zealand International: News [S-F]
 1730 WCSN: News [S-F]
 1800 BBC: Newsdesk
 1800 KYOI: News [M-F]
 1800 Radio Australia: International Report
 1800 Radio Canada International: News
 1800 Radio Moscow: News
 1800 Radio New Zealand International: News
 1800 Radio RSA: News
 1800 Swiss Radio International: News
 1800 Voice of America: News
 1800 WCSN: News [S-F]
 1830 Radio New Zealand International: News [M-F]
 1830 Swiss Radio International: News
 1830 WCSN: News [S-F]
 1900 BBC: News Summary
 1900 Deutsche Welle: World News
 1900 KYOI: News [M-F]
 1900 Radio Australia: World and Australian News
 1900 Radio Canada International: News [M-F]
 1900 Radio Moscow: News
 1900 Radio New Zealand Int'l: News

S 0010.
 0445 BBC: The Sound of Scotland. See W 0145.
 0509 BBC: Twenty-Four Hours. See S 0509.
 0510 Voice of America: Newline. See S 2310.
 0530 BBC: Financial News. See T 0125.
 0530 Voice of America: VOA Morning. See S 0010.
 0540 BBC: Words of Faith. See S 0540.
 0545 BBC: The World Today. See M 1645.
 0610 Voice of America (Africa): Daybreak Africa. See M 0310.
 0610 Voice of America: Newline. See S 2310.
 0630 BBC: Meridian. The world of the arts, including music, drama, and books.
 0630 Voice of America: VOA Morning. See S 0010.
 0709 BBC: Twenty-Four Hours. See S 0509.
 0730 BBC: Development '88. Aid and development issues.
 1110 Voice of America (Caribbean): Focus. See M 1110.
 1110 Voice of America: Special English Features. See M 1110.
 1115 BBC: The Sound of Scotland. See W 0145.
 1130 BBC: Meridian. See W 0630.
 1130 Voice of America (Caribbean): VOA Morning. See S 0010.
 1130 Voice of America: Music, U.S.A. (Jazz). See T 1130.
 1210 Voice of America: Newline. See S 2310.
 1215 BBC: They Made Our World. A look at the people who have shaped our world, from Sir Francis Bacon to Henry Ford.
 1225 BBC: The Farming World. Issues in agriculture.
 1230 Voice of America: Magazine Show. See M 1230.
 1245 BBC: Sports Roundup. See S 1330.
 1309 BBC: Twenty-Four Hours. See S 0509.
 1310 Voice of America: Focus. See M 1110.
 1330 BBC: Development '88. See W 0730.
 1330 Voice of America: Special English News and Features. See S 0030.
 1405 BBC: Outlook. See M 1405.
 1410 Voice of America: Asia Report. See M 1410.
 1445 BBC: Business Matters. See W 0430.
 1455 Voice of America: Editorial. See S 1455.
 1510 Voice of America: Newline. See S 2310.
 1515 BBC: The Learning World. See M 2315.
 1530 BBC: King Street Junior. Serialized drama about life in a city primary school.
 1530 Voice of America: Magazine Show. See M 1230.
 1615 BBC: The Beeb's Lost Beatles Tapes. See T 0630.
 1645 BBC: The World Today. See M 1645.
 2309 BBC: Commentary. See M 2309.
 2310 Voice of America: Newline. See S 2310.
 2315 BBC: Good Books. See M 0315.
 2330 BBC: Multitrack 2. Mitchell Johnson presents pop music and news.
 2330 Voice of America: VOA Morning. See S 0010.

Thursday Feb. 2, 9, 16, 23

0010 Voice of America (Caribbean): Caribbean Report. See T 0010.
 0010 Voice of America (East Asia): Newline. See S 2310.
 0030 BBC: King Street Junior. See W 1530.
 0030 Voice of America (Caribbean): Music, U.S.A. (Jazz). See T 1130.
 0030 Voice of America: Special English News and Features. See S 0030.
 0045 Voice of America (East Asia): VOA Morning. See S 0010.
 0101 BBC: Outlook. See M 1405.
 0110 Voice of America (East Asia): Newline. See S 2310.
 0110 Voice of America: Report to the Americas. See T 0110.
 0125 BBC: Financial News. See T 0125.
 0130 BBC: Waveguide. See S 0750.
 0130 Voice of America (East Asia): VOA Morning. See S 0010.



Sarah Ward hosts "Multitrack 3," a look at the latest in British rock and progressive music. The program airs on the BBC World Service Fridays at 2330 UTC, and is repeated on Saturdays at 1215 UTC.

0140 BBC: Book Choice. See S 0745.
 0145 BBC: Society Today. A weekly look at the changes in Britain.
 0209 BBC: British Press Review. See S 0209.
 0210 Voice of America: Newline. See S 2310.
 0215 BBC: Network UK. See T 0215.
 0230 BBC: Assignment. A weekly examination of a topical issue.
 0230 Voice of America: VOA Morning. See S 0010.
 0310 Voice of America: Daybreak Africa. See M 0310.
 0315 BBC: The World Today. See M 1645.
 0330 BBC: Novel Ideas. See M 1215.
 0410 Voice of America: Newline. See S 2310.
 0430 BBC: Society Today. See H 0145.
 0430 Voice of America: VOA Morning. See S 0010.
 0445 BBC: Andy Kershaw's World of Music. See M 0215.
 0509 BBC: Twenty-Four Hours. See S 0509.
 0510 Voice of America: Newline. See S 2310.
 0530 BBC: Financial News. See T 0125.

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- 0530 Voice of America: VOA Morning. See S 0010.
- 0540 BBC: Words of Faith. See S 0540.
- 0545 BBC: The World Today. See M 1645.
- 0610 Voice of America (Africa): Daybreak Africa. See M 0310.
- 0610 Voice of America: Newline. See S 2310.
- 0630 BBC: They Made Our World. See W 1215.
- 0630 Voice of America: VOA Morning. See S 0010.
- 0640 BBC: The Farming World. See W 1225.
- 0709 BBC: Twenty-Four Hours. See S 0509.
- 0730 BBC: Mediawatch. A look at worldwide developments in communications.
- 0745 BBC: Network UK. See T 0215.
- 1110 Voice of America (Caribbean): Focus. See M 1110.
- 1110 Voice of America: Special English Features. See M 1110.
- 1115 BBC: New Ideas. See T 0445.
- 1125 BBC: Book Choice. See S 0745.
- 1130 BBC: Citizens. See T 1130.
- 1130 Voice of America (Caribbean): VOA Morning. See S 0010.
- 1130 Voice of America: Music, U.S.A. (Jazz). See T1130.
- 1210 Voice of America: Newline. See S 2310.
- 1215 BBC: Multitrack 2. See W 1830.
- 1230 Voice of America: Magazine Show. See M 1230.
- 1245 BBC: Sports Roundup. See S 1330.
- 1309 BBC: Twenty-Four Hours. See S 0509.
- 1310 Voice of America: Focus. See M 1110.
- 1330 BBC: Network UK. See T 0215.
- 1330 Voice of America: Special English News and Features. See S 0030.
- 1345 BBC: Folk in Britain [4th, 18th] or Jazz Scene UK [11th, 25th]. A look at folk or jazz music on the British Isles.
- 1405 BBC: Outlook. See M 1405.
- 1410 Voice of America: Asia Report. See M 1410.
- 1445 BBC: Mediawatch. See H 0730.
- 1455 Voice of America: Editorial. See S 1455.
- 1510 Voice of America: Newline. See S 2310.
- 1515 BBC: The Pleasure's Yours. Gordon Clyde presents classical music requests.
- 1530 Voice of America: Magazine Show. See M 1230.
- 1615 BBC: Assignment. See H 0230.
- 1645 BBC: The World Today. See M 1645.
- 2309 BBC: Commentary. See M 2309.
- 2310 Voice of America: Newline. See S 2310.
- 2315 BBC: Music Now. Geoffrey Norris presents modern classical music.
- 2330 Voice of America: VOA Morning. See S 0010.
- 2340 BBC: Images of Britain. Foreign correspondents talk about how they perceive developments in the UK.

Friday Feb. 3, 10, 17, 24

- 0010 Voice of America (Caribbean): Caribbean Report. See T 0010.
- 0010 Voice of America: Newline. See S 2310.

- 0030 BBC: The Great Ballets. From "Petruschka" to "Cinderella," a look at some of the greatest ballets ever composed.
- 0030 Voice of America (Caribbean): Music, U.S.A. (Jazz). See T 1130.
- 0030 Voice of America: Special English News and Features. See S 0030.
- 0045 Voice of America: VOA Morning. See S 0010.
- 0101 BBC: Outlook. See M 1405.
- 0110 Voice of America (Caribbean): Report to the Americas. See T 0110.
- 0110 Voice of America: Newline. See S 2310.
- 0125 BBC: Financial News. See T 0125.
- 0130 BBC: Folk in Britain [5th, 19th] or Jazz Scene UK [12th, 26th]. See H 1345.
- 0130 Voice of America: VOA Morning. See S 0010.
- 0145 BBC: Profile. Character sketches of today's public figures.
- 0209 BBC: British Press Review. See S 0209.
- 0210 Voice of America: Newline. See S 2310.
- 0215 BBC: Seven Seas. A weekly program about ships and the sea.
- 0230 BBC: Citizens. See T 1130.
- 0230 Voice of America: VOA Morning. See S 0010.
- 0310 Voice of America: Daybreak Africa. See M 0310.
- 0315 BBC: The World Today. See M 1645.
- 0330 BBC: Focus on Faith. Comment and discussion on the major issues in the worlds of faith.
- 0410 Voice of America: Newline. See S 2310.
- 0430 BBC: Feature.
- 0430 Voice of America: VOA Morning. See S 0010.
- 0445 BBC: Folk in Britain [5th, 19th] or Jazz Scene UK [12th, 26th]. See H 1345.
- 0509 BBC: Twenty-Four Hours. See S 0509.
- 0510 Voice of America: Newline. See S 2310.



Larry Wayne is the presenter of "Larry's Random Selection," a program of potpourri on Deutsche Welle. The program can be heard on Deutsche Welle's Saturday broadcasts, at 0134, 0234, 0334, and 0434 UTC among others.

- 1900 Radio RSA: News
- 1900 Voice of America: News
- 1900 WCSN: News [S-F]
- 1915 Radio Berlin International: News
- 1930 Radio Canada International: News [M-F]
- 1930 WCSN: News [S-F]
- 1935 Radiotelevisione Italiana: News
- 1945 Radio Berlin International: News
- 2000 BBC: World News
- 2000 Kol Israel: News
- 2000 KYOI: News [S-F]
- 2000 Radio Australia: International Report
- 2000 Radio Berlin International: News
- 2000 Radio Moscow: News
- 2000 Radio New Zealand International: News
- 2000 Radio RSA: News
- 2000 Voice of America: News
- 2000 WCSN: News [S-F]
- 2025 Radiotelevisione Italiana: News
- 2030 KYOI: News [M-H]
- 2030 WCSN: News [S-F]
- 2100 BBC: News Summary
- 2100 Deutsche Welle: World News
- 2100 KYOI: News [S-F]
- 2100 Radio Australia: World and Australian News
- 2100 Radio Berlin International: News
- 2100 Radio Japan: News [S-F]
- 2100 Radio Moscow: News
- 2100 Swiss Radio International: News
- 2100 Voice of America: News
- 2100 WCSN: News [S-F]
- 2130 KYOI: News [M-H]
- 2130 Radio Canada International: News
- 2130 WCSN: News [S-F]
- 2200 BBC: Newshour
- 2200 KYOI: News [S-H]
- 2200 Radio Berlin International: News
- 2200 Radio Canada International [Asia]: News
- 2200 Radio Moscow: News
- 2200 Voice of America: News
- 2200 Voice of Free China: News and Commentary
- 2200 WCSN: News [S-F]
- 2230 Kol Israel: News
- 2230 KYOI: News [M-H]
- 2230 WCSN: News [S-F]
- 2245 Radio Berlin International: News
- 2300 BBC: World News
- 2300 KYOI: News [S-H]
- 2300 Radio Australia: World and Australian News
- 2300 Radio Berlin International: News
- 2300 Radio Canada International: News
- 2300 Radio Japan: News [S-F]
- 2300 Radio Moscow: News
- 2300 Radio New Zealand International: News
- 2300 Voice of America: News
- 2300 WCSN: News [S-F]
- 2330 KYOI: News [M-H]
- 2330 WCSN: News [S-F]

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0530 BBC: Financial News. See T 0125.
 0530 Voice of America: VOA Morning. See S 0010.
 0540 BBC: Words of Faith. See S 0540.
 0545 BBC: The World Today. See M 1645.
 0610 Voice of America (Africa): Daybreak Africa. See M 0310.
 0610 Voice of America: Newsline. See S 2310.
 0630 BBC: Meridian. See W 0630.
 0630 Voice of America: VOA Morning. See S 0010.
 0709 BBC: Twenty-Four Hours. See S 0509.
 0730 BBC: Market Leaders. Leading British success stories, from Rolls-Royce to Marks and Spencer.
 1110 Voice of America (Caribbean): Focus. See M 1110.
 1110 Voice of America: Special English Features. See M 1110.
 1115 BBC: Profile. See F 0145.
 1130 BBC: Meridian. See W 0630.
 1130 Voice of America (Caribbean): VOA Morning. See S 0010.
 1130 Voice of America: Music, U.S.A. (Jazz). See T 1130.
 1210 Voice of America: Newsline. See S 2310.
 1215 BBC: Market Leaders. See F 0730.
 1230 Voice of America: Magazine Show. See M 1230.
 1245 BBC: Sports Roundup. See S 1330.
 1309 BBC: Twenty-Four Hours. See S 0509.
 1310 Voice of America: Focus. See M 1110.
 1330 BBC: John Peel. See T 0330.
 1330 Voice of America: Special English News and Features. See S 0030.
 1405 BBC: Outlook. See M 1405.
 1410 Voice of America: Asia Report. See M 1410.
 1445 BBC: Nature Now. See M 0445.
 1455 Voice of America: Editorial. See S 1455.
 1510 Voice of America: Newsline. See S 2310.
 1515 BBC: Music Now. See R 2315.
 1530 Voice of America: Magazine Show. See M 1230.
 1615 BBC: Science in Action. See M 0230.
 1645 BBC: The World Today. See M 1645.
 2309 BBC: Commentary. See M 2309.
 2310 Voice of America: VOA Morning. See S 0010.

2315 BBC: From The Weeklies. A review of the British weekly press.
 2330 BBC: Multitrack 3. Sarah Ward presents innovative and alternative rock music.

Saturday Feb. 4, 11, 18, 25

0010 Voice of America (Caribbean): Newsline. See S 2330.
 0010 Voice of America: VOA Morning. See S 0010.
 0030 BBC: Personal View. Opinion on topical issues in British life.
 0030 Voice of America (Caribbean): Music, U.S.A. (Jazz). See T 1130.
 0030 Voice of America: Special English News and Features. See S 0030.
 0045 BBC: Recording of the Week. See M 0545.
 0045 Voice of America: VOA Morning. See S 0010.
 0101 BBC: Outlook. See M 1405.
 0110 Voice of America (Caribbean): Report to the Americas. See T 0110.
 0110 Voice of America: VOA Morning. See S 0010.
 0125 BBC: Financial News. See T 0125.
 0130 BBC: Classical Record Review. Edward Greenfield reviews new releases.
 0134 Deutsche Welle: Larry's Random Selection. Larry Wayne presents his weekly program of potpourri.
 0145 BBC: Book Choice. See S 0745.
 0150 BBC: New Ideas. See T 0445.
 0209 BBC: British Press Review. See S 0209.
 0210 Voice of America: VOA Morning. See

S 0010.
 0215 BBC: Network UK. See T 0215.
 0230 BBC: People and Politics. Background to the British political scene.
 0234 Deutsche Welle: Larry's Random Selection. See A 0134.
 0310 Voice of America: VOA Morning. See S 0010.
 0315 BBC: The World Today. See M 1645.
 0330 BBC: The Vintage Chart Show. Past top ten hits with Jimmy Savile.
 0334 Deutsche Welle: Larry's Random Selection. See A 0134.
 0410 Voice of America: VOA Morning. See S 0010.
 0430 BBC: Here's Humph! All that jazz with Humphrey Lyttelton.
 0434 Deutsche Welle: Larry's Random Selection. See A 0134.
 0445 BBC: Personal View. See A 0030.
 0509 BBC: Twenty-Four Hours. See S 0509.
 0510 Voice of America: VOA Morning. See S 0010.
 0530 BBC: Financial News. See T 0125.
 0540 BBC: Words of Faith. See S 0540.
 0545 BBC: The World Today. See M 1645.
 0610 Voice of America: VOA Morning. See S 0010.
 0630 BBC: Meridian. See W 0630.
 0709 BBC: Twenty-Four Hours. See S 0509.
 0730 BBC: From The Weeklies. See F 2315.
 0745 BBC: Network UK. See T 0215.
 1110 Voice of America (Caribbean): American Viewpoints. A provocative magazine or newspaper article is discussed pro and con by experts.
 1110 Voice of America: Closeup. See S 0010.
 1115 BBC: Classical Record Review. See A 0130.
 1130 BBC: Meridian. See W 0630.
 1130 Voice of America (Caribbean): Music, U.S.A. (Jazz). See T 1130.
 1130 Voice of America: Press Conference, U.S.A. See S 0030.
 1210 Voice of America: Communications World. See S 0110.
 1215 BBC: Multitrack 3. See F 2330.
 1230 Voice of America: Weekend Magazine. See S 0130.
 1245 BBC: Sports Roundup. See S 1330.
 1309 BBC: Twenty-Four Hours. See S 0509.
 1310 Voice of America: American Viewpoints. See A 1110.
 1330 BBC: Network UK. See T 0215.
 1330 Voice of America: Special English News and Features. See S 0030.
 1345 BBC: From Old Time to New Country. See S 0430.
 1400 BBC: News Summary.
 1401 BBC: The Ken Bruce Show. See S 0230.
 1430 BBC: Sportsworld. Paddy Feeny presents live sports.
 1515 BBC: Sportsworld (continued). See A 1430.
 1615 BBC: Sportsworld (continued). See A 1430.
 2309 BBC: Book Choice. See S 0745.
 2310 Voice of America: Newsline. See S 2330.
 2315 BBC: A Jolly Good Show. See T 1515.
 2330 Voice of America: VOA Morning. See S 0010.



Who is the man with a trumpet? It's none other than Humphrey Lyttelton, who presents jazz music in the BBC's "Here Humph!", Saturdays at 0430 UTC.

INTERESTED IN WRITING?

Send a self-addressed, stamped envelope for your copy of the *MT* writer's guidelines to:

WRITER'S GUIDELINES

Monitoring Times

P.O. Box 98

Brasstown, NC 28902

frequency SECTION

0000 UTC [7:00 PM EST/4:00 PM PST]

0000-0015	Voice of Kampuchea, Phnom-Penh	9693	11938				
0000-0030	BBC, London, England	5975	6005	6175	7325		
		9515	9590	9915	11945		
		11955	12095	15260	17875		
0000-0030	Kol Israel, Jerusalem	7465	9385	9435			
0000-0030	Radio Korea (South), Seoul	15575					
0000-0030	M Radio Norway Int'l, Oslo	9620	11850				
0000-0030	Radio Sofia, Bulgaria	9700	11950				
0000-0045	WINB, Red Lion, Pennsylvania	15295					
0000-0050	Radio Pyongyang, North Korea	15115	15160				
0000-0055	Radio Beijing, PR China	9665	9770	11715			
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	FEBG, Manila, Philippines	15445					
0000-0100	(US) Far East Network, Tokyo	3910					
0000-0100	KSDA, Guam	15125					
0000-0100	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	9515	11775				
0000-0100	Radio Canada Int'l, Montreal	5960	9755				
0000-0100	Radio Havana Cuba	9655					
0000-0100	Radio Luxembourg	6090					
0000-0100	Radio Moscow	7370	9790	9840	12010		
		12045	15170	15295	17570		
		17655	17675	17850	17860		
		17880	17890	21790			
0000-0100	Radio Moscow N. America Service	6045	7115	7150	7215		
		7310	9765	15405	15420		
		17605	17720	17700			
0000-0100	Radio New Zealand, Wellington	15150	17705				

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

Pete Wahlquist, CA

0000-0100	Radio for Peace, Costa Rica	21555			
0000-0100	Radio Thailand, Bangkok	9655	11905		
0000-0100	SBC Radio One, Singapore	5010	5052	11940	
0000-0100	Spanish Foreign Radio, Madrid	9630	11880		
0000-0100 T-S	Superpower KUSW, Utah	15580			
0000-0100	Voice of America, Washington	5995	6130	9455	9775
		9815	11580	11695	11740
		15205	15290	17735	17820
		18157	USB		
0000-0100 T-A	Voice of Nicaragua, Managua	6100			
0000-0100	WCSN, Boston, Massachusetts	9850			
0000-0100	WHRI, Noblesville, Indiana	7365	9495		
0000-0100	WRNO, New Orleans, Louisiana	7355			
0000-0100	WSHB, Cyprus Creek, S. Carolina	11980			
0000-0100	WYFR, Oakland, California	5950	9505	15440	
0030-0045	BBC, London, England*	6195	7235	9570	11945
		15360	17875		
0030-0055 M-A	BRT, Brussels, Belgium	9675	9925		
0030-0100	BBC, London, England	5975	6005	6175	7325
		9515	9580	9915	9590
		12095	15260	15360	17710
		9720	11755	11910	15155
0030-0100	HCJB, Quito, Ecuador	9875			
0030-0100	Radio Austria Int'l, Vienna	6110	9520	9585	9835
0030-0100 T-S	Radio Budapest, Hungary	11910	15160		
0030-0100	Radio Kiev, Ukrainian SSR	7165	7400	13645	15180
		15455			
0030-0100	SLBC, Colombo, Sri Lanka	6005	9720		
0035-0040	All India Radio, New Delhi	3925	4860		
0045-0100	Radio Berlin Int'l, E. Germany	6080	11890		

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 (they 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	Radio Korea (South), Seoul	15575
0045-0100 A	Radio New Zealand, Wellington	15150 17705
0048-0100	WINB, Red Lion, Pennsylvania	15145
0050-0100	Vatican Radio, Vatican City	6150 9605 11780

0100 UTC [8:00 PM EST/5:00 PM PST]

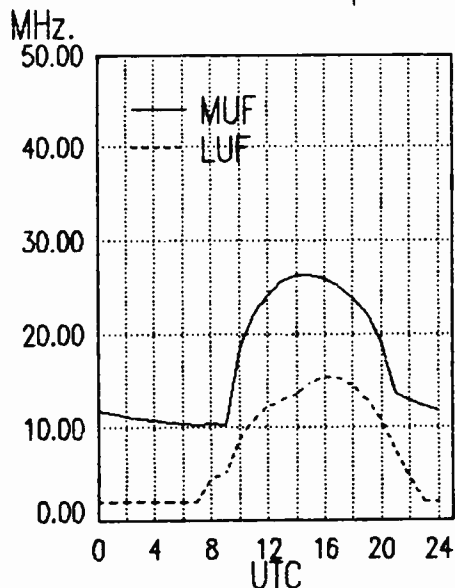
0100-0103 S	Port Moresby, Papua New Guinea	3295 4890 5960 5985
		6020 6040 6080 6140
		9520
0100-0110	Vatican Radio, Vatican City	6150 9605 11780
0100-0115	All India Radio, New Delhi	6055 7215 9535 9910
		11715 11745 15110
0100-0120	RAI, Rome, Italy	9575 11800
0100-0130	Kol Israel, Jerusalem	7465 9385 9435
0100-0130	Radio Berlin Int'l, East Germany	6080 11890
0100-0130	Radio Canada Int'l, Montreal	5960 9535 9755 11845
0100-0130	Radio Japan, Tokyo	11905 17810 17845
0100-0130	Laotian National Radio	7113v
0100-0130 S,M	WINB, Red Lion, Pennsylvania	15145
0100-0145	Radio Yugoslavia, Belgrade	5980 9620 11735
0100-0150	Deutsche Welle, West Germany	6040 6085 6145 9565
		9735 11865
0100-0150	Radio Baghdad, Iraq	9515 11810
0100-0155 S	Radio Austria Int'l, Vienna	9875
0100-0200	BBC, London, England	5975 6005 6175 7325
		9410 9515 9590 9915
		11955 12095 15260 17875
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 11755 11910 15155
0100-0200 T-A	KVOH, Rancho Simi, California	13695
0100-0200	KYOI, Saipan	15405
0100-0200	Radio Australia, Melbourne	15160 15180 15240 15320
		15395 17715 17795
		17750 21740

0100-0200	Radio Havana Cuba	6140 9655
0100-0200	Radio Japan, Tokyo	11815 15195 17810 17845
0100-0200	Radio Luxembourg	6090
0100-0200	Radio Moscow	17655 17685 17825 17850
		17860 17890 21790
0100-0200	Radio Moscow, N. American Service	7115 7150 7215 7310
		9635 9700 9720 12010
		12050 15425 17700 17720
0100-0200	Radio New Zealand, Wellington	15150 17705
0100-0200	Radio for Peace, Costa Rica	13660
0100-0200	Radio Prague, Czechoslovakia	5930 6055 7345 9540
		9625 11990
0100-0200	Radio Thailand, Bangkok	9655 11905
0100-0200	RAE, Buenos Aires, Argentina	9690
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 6130 9455 9740
		9775 9815 11580 11740
		15205 17735 18157 USB
0100-0200	Voice of Indonesia, Jakarta	9680 11790
0100-0200	WCSN, Boston, Massachusetts	9850
0100-0200	WHRI, Noblesville, Indiana	7365 9495
0100-0200	WRNO New Orleans, Louisiana	7355
0100-0200	WSHB, Cyprus Creek, S. Carolina	11980
0100-0200	WYFR, Oakland, California	5950 9505 9680 11715
		15440
0130-0140 T-S	Voice of Greece, Athens	7430 9420 11645
0130-0200	Radio Budapest, Hungary	6110 9520 9835 11910
		15160
0130-0200 S,M	Radio Canada Int'l, Montreal	5960 9755 11845 11940
0130-0200	Radio Veritas Asia, Philippines	15330 15365
0130-0200	WINB, Red Lion, Pennsylvania	15145

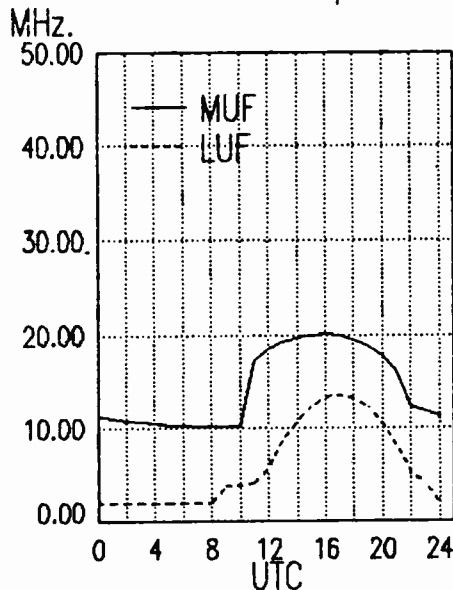
0200 UTC [9:00 PM EST/6:00 PM PST]

0200-0215	Vatican Radio, Vatican City	6145 7125 9650
0200-0225	Kol Israel, Jerusalem	7465 9435
0200-0230	BBC, London, England	5975 6005 6175 7325
		9410 9515 9590 9915
		12095 15260
0200-0230	Burma Broadcasting Service, Rangoon	7185

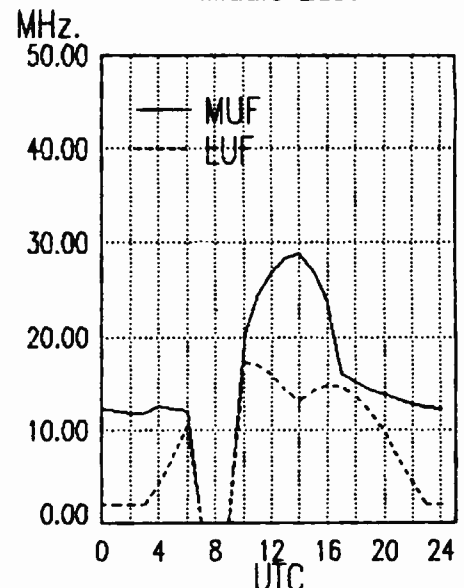
East Coast To
Western Europe



East Coast To
Arctic Europe



East Coast To
Middle East



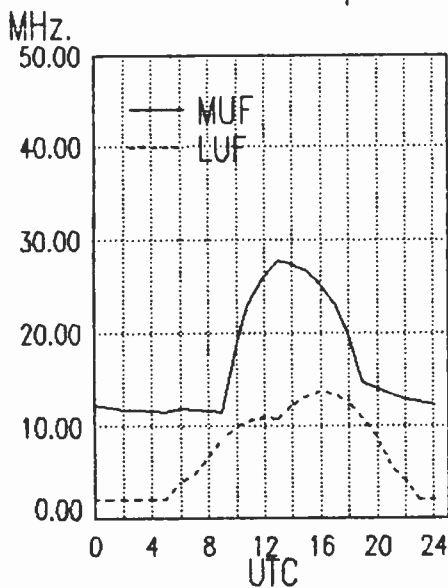
frequency SECTION

0200-0230	W,A	Radio Budapest, Hungary	6110	9520	9585	9835	0200-0300	Voice of America, Washington	5995	6035	7205	18157
			11910	15160				USB	7285			
0200-0230		Swiss Radio Int'l, Berne	6095	6135	9725	9885	0200-0300	Voice of Asia, Taiwan	5985	9680	11740	15345
			12035	17730			0200-0300	Voice of Free China, Taiwan	6045			
0200-0230		WINB, Red Lion, Pennsylvania	15145				0200-0300	Voice of Kenya, Nairobi	9850			
0200-0245		Radio Berlin Int'l, E. Germany	6080	9730			0200-0300	WCSN, Boston, Massachusetts	15145			
0200-0250		Deutsche Welle, West Germany	6035	7285	9690	11945	0200-0300	WINB, Red Lion, Pennsylvania	7520	9495		
0200-0250		Radio Baghdad, Iraq	9515	11810			0200-0300	WHRI, Noblesville, Indiana	7355			
0200-0250		Radio Bras, Brasilia, Brazil	11745v				0200-0300	WRNO, New Orleans, Louisiana	9745			
0200-0255		Radio Bucharest, Romania	5990	6155	9510	9570	0200-0300	WSHB, Cyprus Creek, S. Carolina	15440			
			11830	11940			0200-0300	WYFR, Oakland, California	5950	9505	11715	
0200-0300		CBC Northern Quebec Service	6195	9625			0200-0300 T-S	WYFR Satellite Net, California	9790	9800	11670	13685
0200-0300		CBN, St. John's, Newfoundland	6160				0213-0300	Radio France International, Paris	5005	7165		
0200-0300		CBU, Vancouver, British Columbia	6160				0215-0220	Radio Nepal, Kathmandu	3925	4890	5960	5985
0200-0300		CFCF, Montreal, Quebec	6005				0230-0240	Port Moresby, Papua New Guinea	6020	6040	6080	6140
0200-0300		CFCN, Calgary, Alberta	6030						9520			
0200-0300		CFRB, Toronto, Ontario	6070				0230-0245TWFS	Radio Budapest, Hungary	6110	9520	9585	9835
0200-0300		CHNS, Halifax, Nova Scotia	6130						11910	15160		
0200-0300		CKWX, Vancouver, British Columbia	6080				0230-0245	Radio Pakistan, Islamabad	7010	11570	15115	15580
0200-0300		(US) Far East Network, Tokyo	3910						17660			
0200-0300		HCJB, Quito, Ecuador	9720	11775	15155		0230-0300	BBC, London, England	5975	6005	6175	7325
0200-0300	A,S	KSDA, Guam	17865						9410	9515	9915	12095
0200-0300	T-A	KVOH, Rancho Simi, California	13695				0230-0300	Radio Netherland, Hilversum	15260	15280	15420	
0200-0300		KYOI, Saipan	17780				0230-0300 T-A	Radio Portugal, Lisbon	6020	6165	9590	9895
0200-0300		Radio Australia, Melbourne	15320	17715	17795				6060	9600	9635	9680
0200-0300		Radio Cairo, Egypt	9475	9675			0230-0300	Radio Sweden, Stockholm	9705	11840		
0200-0300		Radio Canada Int'l, Montreal	9535	9755	11845	11940	0230-0300	Radio Tirana, Albania	9695	11705	11950	SSB
0200-0300		Radio Havana Cuba	6140	9655	9770		0230-0300	Radio Moscow, USSR	7065	9760		
0200-0300		Radio Korea (South), Seoul	15575				0240-0250	All India Radio, New Delhi	3905	4860	4880	4895
0200-0300		Radio Luxembourg	6090						5960	5990	6110	6120
0200-0300		Radio Moscow, USSR	6000	6045	7115	7150			7195	7295	9550	9610
			7215	7310	9700	9765			11830	11870	15305	
			15425				0245-0300	Radio Berlin Int'l, E. Germany	11890	11785		
0200-0300		Radio Moscow World Service	11845	12010	17570	17590	0245-0300	Radio Korea, Seoul, South Korea	9640	15575		
			17560	17655	17825	17890						
			21690	21790								
0200-0300		Radio Orion, South Africa	3955									
0200-0300		Radio for Peace, Costa Rica	13660									
0200-0300	A	Radio New Zealand, Wellington	15150	17705								
0200-0300		Radio RSA, South Africa	9580	9615	11760							
0200-0300		Radio Thailand, Bangkok	9655	11905								
0200-0300		SBC Radio One, Singapore	5010	5052	11940							
0200-0300		SLBC, Colombo, Sri Lanka	6005	9720	15425							
0200-0300	T-S	Superpower KUSW, Utah	11695									
0200-0300		Trans World Radio, Bonaire	11930									

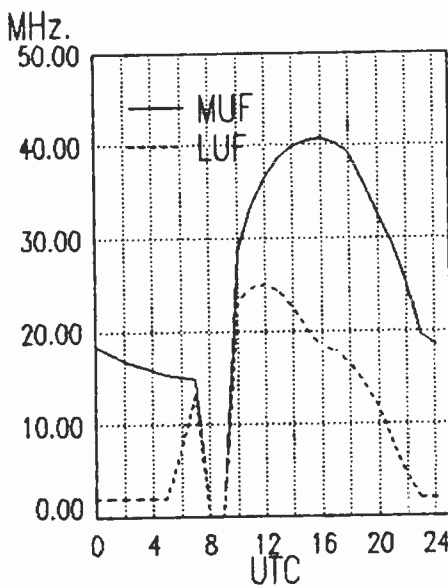
0300 UTC [10:00 PM EST/7:00 PM PST]

0300-0330	Radio Berlin Int'l, E. Germany	11785	11890
0300-0330	Radio Kiev, Ukrainian SSR	7165	7400
		15455	
0300-0330	WINB, Red Lion, Pennsylvania	15145	
0300-0307	Radio Pakistan, Islamabad	5090	5930
		7095	

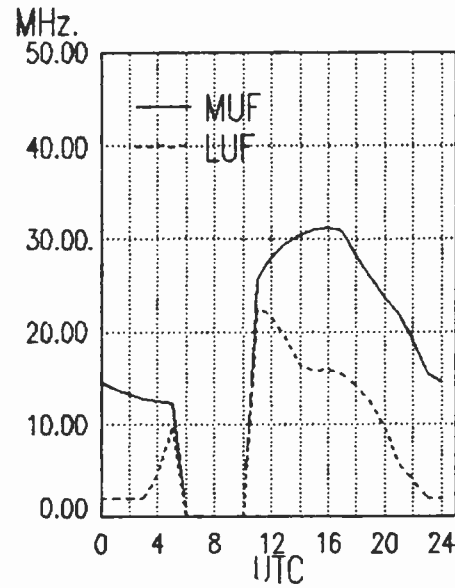
East Coast To
Eastern Europe



East Coast To
Central Africa



East Coast To
East Africa

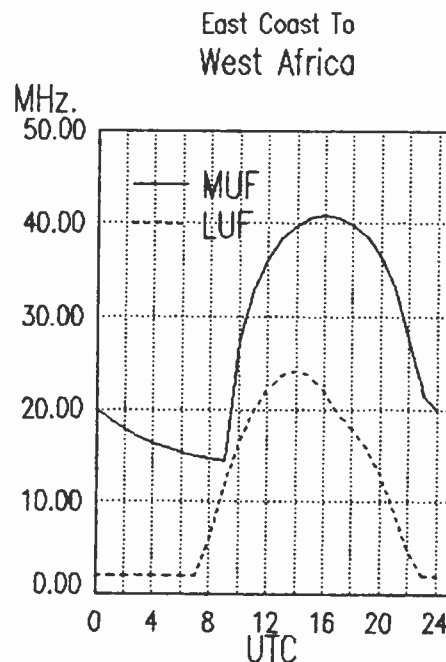
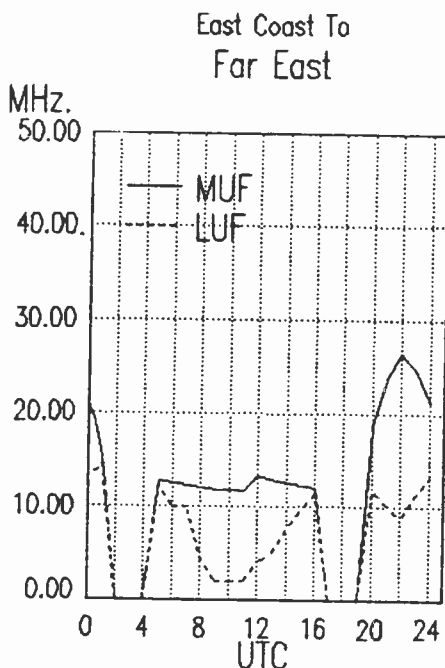
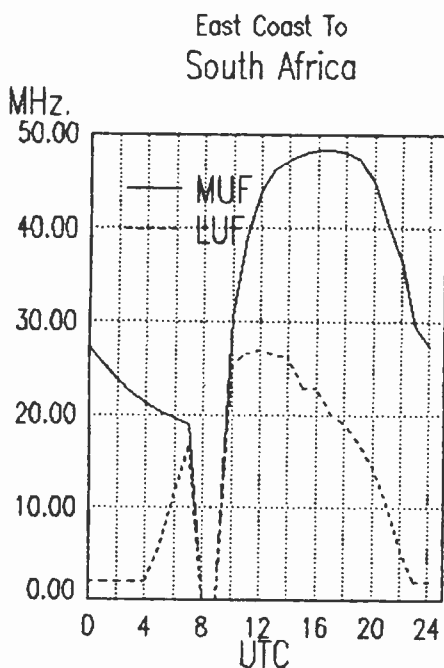


frequency SECTION

0400-0430	BBC, London, England	3955	5975	6005	6155	0400-0500	Voice of Kenya, Nairobi	6045
		6175	6195	7105	7160	0400-0500V	Voice of Nicaragua, Managua	6100
		7185	7260	9410	9580	0400-0500	WCSN, Boston, Massachusetts	9870
		9600	9915	12095		0400-0500	WHRI, Noblesville, Indiana	7520 9495
0400-0430	La Voz Evangelica, Honduras	4820				0400-0500	WRNO, New Orleans, Louisiana	6185
0400-0430 S,M	Radio Austria Int'l, Vienna	6015	6155	15450	21790	0400-0500	WSHB, Cyprus Creek, S. Carolina	9455
0400-0430 M	Radio Norway Int'l, Oslo	9650	11750			0400-0500	WYFR Satellite Net, California	5950 9520 13695
0400-0430	SLBC, Colombo, Sri Lanka	6005	9720	15425		0425-0440	RAI, Rome, Italy	5990 7275
0400-0430	Radio Tanzania, Dar es Salaam	9684				0430-0455	Radio Austria Int'l, Vienna	6015 6155 9875 15410
0400-0430	Swiss Radio Int'l, Berne	6135	9725	9885	12035	0430-0500	BBC, London, England	3955 5975 6005 6015
0400-0430	Trans World Radio, Bonaire	11930						6155 6195 7120 7185
0400-0430 S,M	WINB, Red Lion, Pennsylvania	15145						9410 9510 9580 9600
0400-0445	Radio Berlin Int'l, E. Germany	9620	11785					11945 12095 15070 15280
0400-0450	Deutsche Welle, West Germany	7150	7225	9565	9765			15420 17815
		11765				0430-0500	BBC, London, England*	7210 9750 11945
0400-0450	Radio Pyongyang, North Korea	15160	15180			0430-0500	Radio Tirana, Albania	9480 11835
0400-0450	Voice of Turkey, Ankara	9445	9680			0430-0500 S,M	Trans World Radio, Bonaire	11930
0400-0455	Radio Beijing, PR China	9645	11695	11980		0430-0500	Trans World Radio, Swaziland	3205 7205
0400-0500	CBC Northern Quebec Service	6195	9625			0432-0500 A,M	FEBA, Seychelles	15325 17820 (Irr)
0400-0500	CBN, St. John's, Newfoundland	6160				0445-0500	Radio Berlin Int'l, East Germany	9620 11785
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	KVOH, Rancho Simi, California	11960						
0400-0500	KYOI, Saipan	17780						
0400-0500	Radio Australia, Melbourne	11910	11945	15160	15240			
		15320	17715	17795				
0400-0500	Radio for Peace, Costa Rica	13660						
0400-0500	Radio Havana Cuba	5965	6035	6140	9655			
		9770						
0400-0500	Radio Moscow, USSR	6000	7115	7165	7215			
		7310	7370	11710				
0400-0500	Radio New Zealand, Wellington	15150	17705					
0400-0500	Radio Sofia, Bulgaria	7115						
0400-0500	SBC Radio One, Singapore	5010	5052	11940				
0400-0500 T-S	Superpower KUSW, Utah	9815						
0400-0500	Voice of America, Washington	3980	5995	6035	7280			
		9575	11835	11925	15205			

0500 UTC [12:00 AM EST/9:00 PM PST]

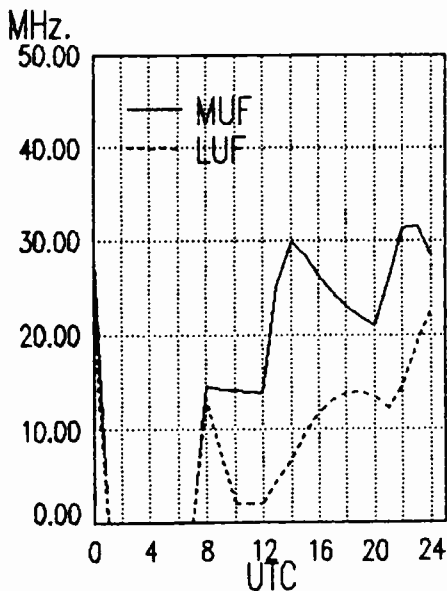
0500-0510	Radio Lesotho, Maseru	4800
0500-0510 M-A	Radio Zambia, Lusaka	3345 6165
0500-0515	GBC, Accra, Ghana	4915
0500-0515	Kol Israel, Jerusalem	7460 9435 11588
0500-0515	Vatican Radio, Vatican City	9645 15190
0500-0530 A	FEBA, Seychelles	15325 17820 (Irr)
0500-0530	Radio Berlin Int'l, East Germany	5965 9620 11785
0500-0530 M	Radio Norway Int'l, Oslo	11745 15175
0500-0530 S,M	Trans World Radio, Bonaire	9535 11930
0500-0530	Trans World Radio, Swaziland	3205 5055 7210
0500-0550	Deutsche Welle, West Germany	5960 6120 6130 9635
		9700
0500-0555	Radio Beijing, China	9690
0500-0600	BBC, London, England	5975 6005 6180 6155
		6195 7105 7120 7185
		9410 9510 9580 9600
		12095 15070 15120 15420
		17815 17885
0500-0600	CBC Northern Quebec Service	6195 9625
0500-0600	CBU, Vancouver, British Columbia	6160



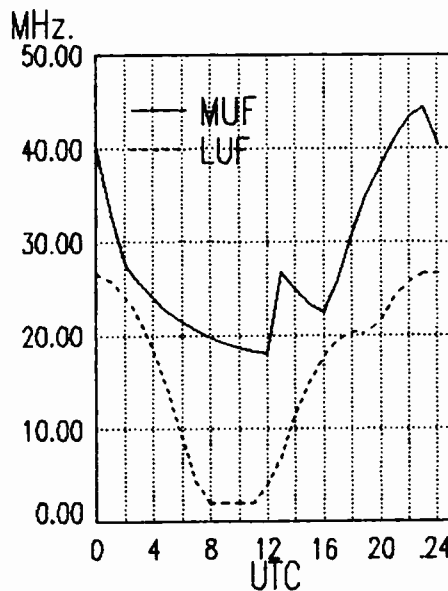
frequency SECTION

0500-0600	CFCF, Montreal, Quebec	6005	0530-0600	UAE Radio, United Arab Emirates	15435 17775 21700
0500-0600	CFCN, Calgary, Alberta	6030	0555-0600	Ghana Broadcasting Corp., Accra	4915
0500-0600	CHNS, Halifax, Nova Scotia	6130	0555-0600	Voice of Malaysia, Kuala Lumpur	6175 9750 15295
0500-0600	CKWX, Vancouver, British Columbia	6080			
0500-0600	CFRB, Toronto, Ontario	6070	6000 UTC [1:00 AM EST/10:00 PM PST]		
0500-0600	(US) Far East Network, Tokyo	3910	0600-0615	Radio Ghana, Accra	3366 4915
0500-0600	FEBC, Manila, Philippines	11850	0600-0615 M-A	Radio Zambia, Lusaka	6165 7235
0500-0600	HCJB, Quito, Ecuador	6230 9720 11775	0600-0620	Vatican Radio, Vatican City	6185 9645
0500-0600	KVOH, Rancho Simi, California	11960	0600-0625	Radio Netherlands, Hilversum	6165 9715
0500-0600	KYOI, Saipan	17780	0600-0630 F	FEBA, Mahe, Seychelles	17820
0500-0600	Radio Australia, Melbourne	11910 15160 15240 17795	0600-0630	Laotian National Radio	7113
0500-0600	Radio for Peace, Costa Rica	13660	0600-0630	Radio Australia, Melbourne	11910 11945 15160 15240
0500-0600	Radio Havana Cuba	5965 6035 9655 9770			15315 15395 15425 17715
0500-0600	Radio Japan, Tokyo	11870 17810			17750
0500-0600	Radio Kuwait	15345			17795
0500-0600	Radio Moscow, USSR	7165 7215 7310 15455	0600-0630	Radio Tirana, Albania	7300
0500-0600	Radio New Zealand, Wellington	15150 17705	0600-0630	Trans World Radio, Swaziland	6070
0500-0600	Radio Thailand, Bangkok	9655 11905	0600-0630	Voice of Kenya, Nairobi	6045
0500-0600 S,M	Radio Zambia, Lusaka	11880	0600-0645	Radio Berlin Int'l, East Germany	5965 6115 9645 11810
0500-0600	SBC Radio One, Singapore	5010 5052 11940			13610
0500-0600	Spanish Foreign Radio, Madrid	9630	0600-0645 S	Radio Cameroon, Yaounde	4850
0500-0600 S	Superpower KUSW, Utah	6175	0600-0650	Deutsche Welle, West Germany	11765 13790 15185 17875
0500-0600 S	Swaziland Commercial Radio	6155 9705	0600-0650	Radio Pyongyang, North Korea	13650 15160 15180
0500-0600	Voice of America, Washington	5995 6035 7170 7280	0600-0700	BBC, London, England	5975 6195 7105 7185
		9540 9575 15205			9410 9580 9600 9640
0500-0600	Voice of Kenya, Nairobi	6045	0600-0700	CBC Northern Quebec Service	6195 9625
0500-0600 IRR	Voice of Nicaragua, Managua	6100	0600-0700	CBU, Vancouver, British Columbia	6160
0500-0600	Voice of Nigeria, Lagos	7255 15120 15185	0600-0700	CFCF, Montreal, Quebec	6005
0500-0600	WCSN, Boston, Massachusetts	9870	0600-0700	CFCN, Calgary, Alberta	6030
0500-0600	WINB, Red Lion, Pennsylvania	15145	0600-0700	CHNS, Halifax, Nova Scotia	6130
0500-0600	WHRI, Noblesville, Indiana	7520 9495	0600-0700	CKWX, Vancouver, British Columbia	6080
0500-0600 M-A	WMLK, Bethel, Pennsylvania	9455	0600-0700	CFRB, Toronto, Ontario	6070
0500-0600	WRNO, New Orleans, Louisiana	6185	0600-0700	HCJB, Quito, Ecuador	6230 9720 11775
0500-0600	WSHB, Cyprus Creek, S. Carolina	9455	0600-0700	(US) Far East Network, Tokyo	3910
0500-0600	WYFR Satellite Net, California	5950 11580 13695	0600-0700	King of Hope, South Lebanon	6215
0510-0520	Radio Botswana, Gaborone	3356 4820 7255	0600-0700	KVOH, Rancho Simi, California	11960
0527-0600 F	FEBA, Seychelles	17820	0600-0700	KYOI, Saipan	17780
0530-0545	BBC, London, England*	3990 6050 6140 7210	0600-0700	Radio Havana Cuba	9525 11760
		9750	0600-0700	Radio Jordan, Amman	9560
0530-0555	Radio Bucharest, Romania	9640 11840 11940 15340	0600-0700	Radio Korea, Seoul, South Korea	6060 7275 9570
		15380 17720	0600-0700	Radio Kuwait	15345
0530-0600	Radio Finland, Helsinki	6120 9635 11715 15185			
0530-0600	Radio Netherland, Hilversum	6165 9715			
0530-0600	Radio Tirana, Albania	7300			
0530-0600	Trans World Radio, Swaziland	5055 7210			

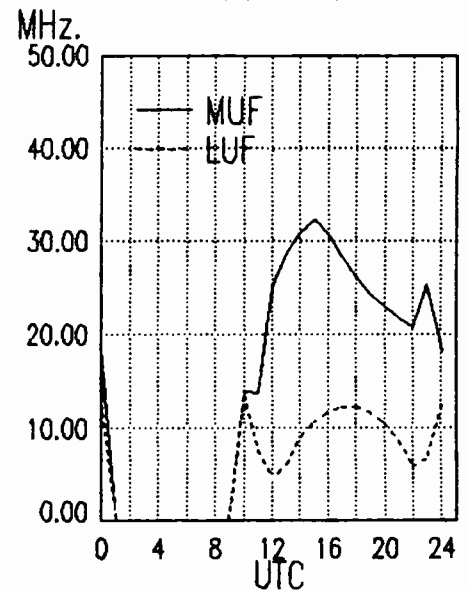
East Coast To
Australia



East Coast To
Pacific



East Coast To
Indonesia



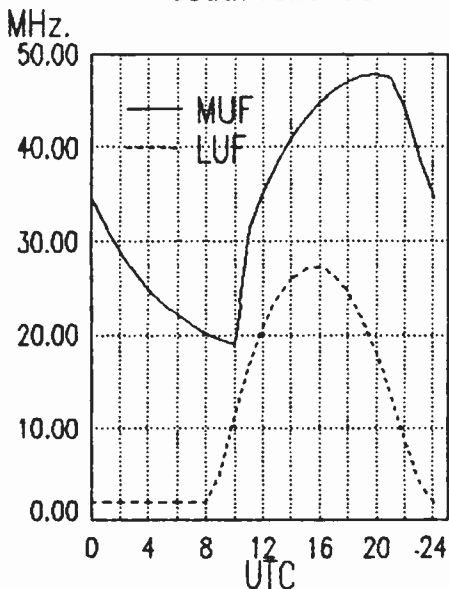
frequency SECTION

0600-0700	Radio Moscow, USSR	7165	7195	9765
0600-0700	Radio New Zealand, Wellington	12045	17705	
0600-0700 A,S	Radio Thailand, Bangkok	9655	11905	
0600-0700 S	Radio Zambia, Lusaka	11880		
0600-0700	SBC Radio One, Singapore	5010	5052	11940
0600-0700 S	Superpower KUSW, Utah	6175		
0600-0700	Voice of America, Washington	5995	6035	6080 6125
		7170	7200	11805
0600-0700	Voice of Asla, Taiwan	7285		
0600-0700	Voice of Malaysia, Kuala Lumpur	6175	9750	15295
0600-0700	Voice of Nicaragua, Managua	6100		
0600-0700	Voice of the Mediterranean	9765		
0600-0700	Voice of Nigaria, Lagos	15185		
0600-0700	WCSN, Boston, Massachusetts	7365		
0600-0700	WHRI, Noblesville, Indiana	6100	9495	
0600-0700 M-A	WMLK, Bethel, Pennsylvania	9455		
0600-0700	WSHB, Cyprus Creek, S. Carolina	9455		
0600-0700	WYFR, Oakland, California	11580		
0600-0700	WYFR Satellite Net, California	5950	7355	9680
		9852.5		
0615-0630 M-F	Radio Canada Int'l, Montreal	6055	6140	7155 9740
		9760	11840	15325
0615-0630 M-A	Vatican Radio, Vatican City	15190	17730	
0615-0700	Radio Berlin Int'l, E. Germany	15240	17775	
0625-0700	Trans World Radio Monte Carlo	7105		
0630-0700	AWR, Forli, Italy	7125		
0630-0700 A	CPBS-1, China*	11330	15550	15590 17605
0630-0655	Radio Netherland, Hilversum	9895	11930	
0630-0700	Radio Australia, Melbourne	11945	15160	15240 15315
		15395	15425	17715 17750
		17795		
0630-0700	Radio Bucharest, Romania	21600		
0630-0700	Radio Polonia, Warsaw, Poland	6135	7270	15120
0630-0700	Radio Tirana, Albania	7205	9500	
0630-0700	Swiss Radio Int'l, Berne	12030	15430	17570
0630-0700	Trans World Radio, Swaziland	5055	6070	7210 9725
0630-0700 A,S	Voice of Kenya, Nairobi	7270		
0645-0700	BBC, London, England*	6150	7260	11945
0645-0700	Radio Berlin Int'l, East Germany	15240	17880	21540 21645
0645-0700 M-F	Radio Canada Int'l, Montreal	6050	6140	7155 9740
		9760	11840	15325
0645-0700	Radio Ghana, Accra	6130		
		11705	11800	
0645-0700	Radio Bucharest, Romania	11940	15250	15335 17790
		17805	21665	

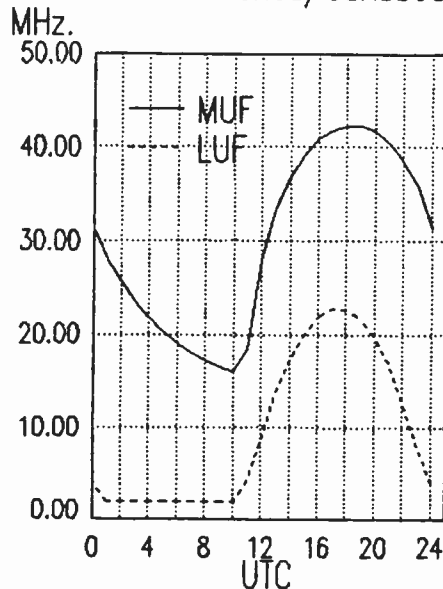
0700 UTC [2:00 AM EST/11:00 PM PST]

0700-0703	Port Moresby, Papua New Guinea	3925	4890	5960 5985
		6020	6040	6080 6140
		9520		
0700-0710	Radio Bucharest, Romania	11825	11940	15250 15335
		17790	17805	21665
0700-0710	Radio Sierra Leone, Freetown	5980		
0700-0715	Radio Ghana (HS), Accra	3366	4915	
0700-0730	BBC, London, England	3955	5975	6195 7150
		9410	9600	9640 11825
		11860	12095	15070 15400
		17815		
0700-0730	Burma Broadcasting Service, Rangoon	9730		
0700-0730	Radio Australia, Melbourne	9655	11720	15160 15240
		15395	17715	17750
0700-0730	Radio Berlin Int'l, East Germany	15240	17880	21645
0700-0730	Radio Bucharest, Romania	21600		
0700-0730	Radio New Zealand, Wellington	12045	15150	
0700-0730 S	Radio Zambia, Lusaka	11880		
0700-0745	Radio Berlin Int'l, East Germany	5965	11810	
0700-0750	Radio Pyongyang, North Korea	15340	17795	
0700-0800	ABC, Perth, Australia	15425		
0700-0800	CBU, Vancouver, British Columbia	6160		
0700-0800	CFCF, Montreal, Quebec	6005		
0700-0800	CFCN, Calgary, Alberta	6030		
0700-0800	CHNS, Halifax, Nova Scotia	6130		
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	6205	9610 9745
		11925		
0700-0800	King of Hope, South Lebanon	6215		
0700-0800	KVOH, Rancho Simi, California	11960		
0700-0800	KYOI, Saipan	17780		
0700-0800	Radio Ghana, Accra	6130		
0700-0800	Radio Havana Cuba	9525		
0700-0800	Radio Japan, Tokyo	5990	15195	15270 15325
		17810	21695	
0700-0800	Radio Jordan, Amman	11955		
0700-0800	Radio Korea, Seoul, South Korea	6060	7275	9570
0700-0800	Radio Kuwait	15345		

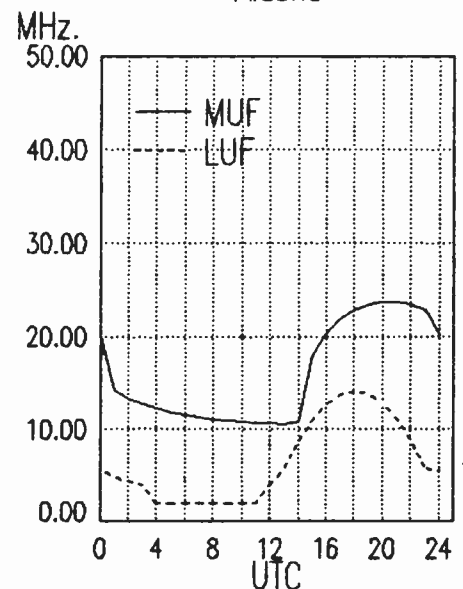
East Coast To
South America



East Coast To
Central America/Caribbean



East Coast To
Alaska

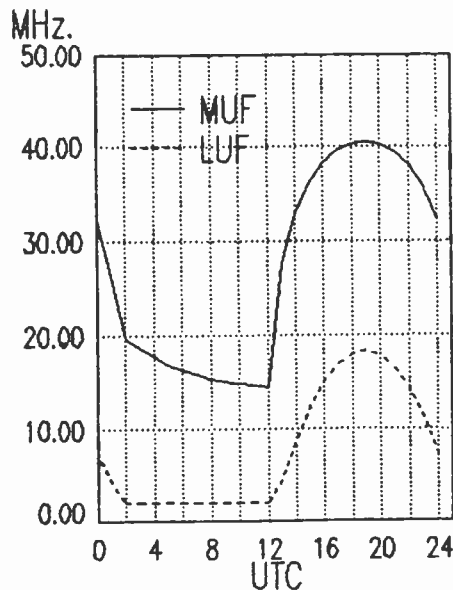


frequency SECTION

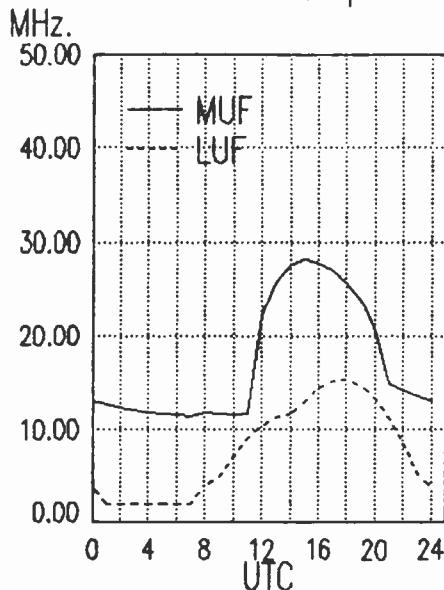
0700-0800	Radio Moscow, USSR	7165 7175 7195 7260
		7270 7310 11705 11850
		12010 15475
0700-0800 A.S	Radio Thailand, Bangkok	9655 11905
0700-0800	SBC-1, Singapore	11940
0700-0800	Soloman Islands Broadcasting Corp	9545
0700-0800 S	Superpower KUSW, Utah	6155
0700-0800	Trans World Radio, Monte Carlo	7105
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	7365
0700-0800	WHRI, Noblesville, Indiana	6100 9495
0700-0800 M-A	WMLK, Bethel, Pennsylvania	9455
0700-0800	WSHB, Cyprus Creek, S. Carolina	9455
0700-0800	WYFR, Oakland, California	6065 7355 9680
0700-0800	WYFR Satellite Network	9852.5
0715-0730	Radio Korea, Seoul, South Korea	13670 15575
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
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	5955 9655 11720 15240
0730-0800	Radio Finland, Helsinki	6120 9560 11755 15270
0730-0800	Radio Prague, Czechoslovakia	11685 17840 21705
0730-0735	All India Radio, New Delhi	5990 6010 6020 7110
		7205 9610 9675 11850
		11935 15235 15250 17705
0730-0745	BBC, London, England*	3975 6010 7230 9915
0730-0800	AWR, Forli, Italy	7125
0730-0800	BBC, London, England	3955 5975 7150 9410
		9600 9640 11860 12095
		15070 15105 15400
0730-0800	Radio Netherland, Hilversum	9630 9715
0730-0800	Radio Prague, Czechoslovakia	11685 17840 21705
0730-0800	Swiss Radio Int'l, Berne	3985 6165 9535
0740-0750 W	Radio Free Europe, Munich*	5985 7115 9695 9725
		11895 15355

0800 UTC [3:00 AM EST/12:00 AM PST]					
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 21815			
0800-0825	Radio Netherland, Hilversum	9630 9715			
0800-0825	Voice of Malaysia, Kuala Lumpur	6175 9750 15295			
0800-0830	HCJB, Quito, Ecuador	6130 6205 9745 11925			
0800-0830 S	Radio Austria Int'l, Vienna	6155 13730 15410 15450			
0800-0830	Radio Bangladesh, Dhaka	12030 15525			
0800-0830	Radio Tirana, Albania	9500 11835			
0800-0830	Voice of Nigeria, Lagos	7255 15185			
0800-0830	Voice of Islam, Pakistan	15525 17870			
0800-0835 S	FEBA, Mahe, Seychelles	15325, 17785			
0800-0835	Trans World Radio, Swaziland	6070 9725			
0800-0840	Trans World Radio, Monte Carlo	7105			
0800-0850	Deutsche Welle, Koin, W. Germany	9770			
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, Perth, Australia	15425			
0800-0900	ABC, Tennant Creek, Australia	2325 [ML]			
0800-0900	AFAN, Antarctica	6010.5			
0800-0900	BBC, London, England	5975 9410 7150 9600			
		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			
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, Anhor Point, Alaska	6065			
0800-0900	KYOI, Saipan	11900			
0800-0900	Radio Australia, Melbourne	5995 9580 9655 9710			
		11720 15285 15395			
0800-0900	Radio Jordan, Amman	11955			

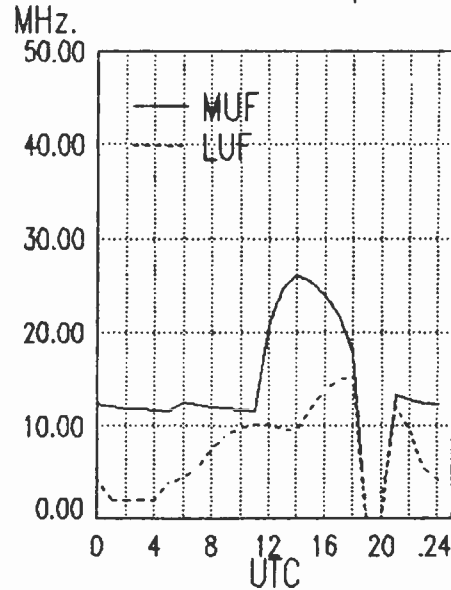
East Coast To West Coast



Midwest To Western Europe



Midwest To Eastern Europe



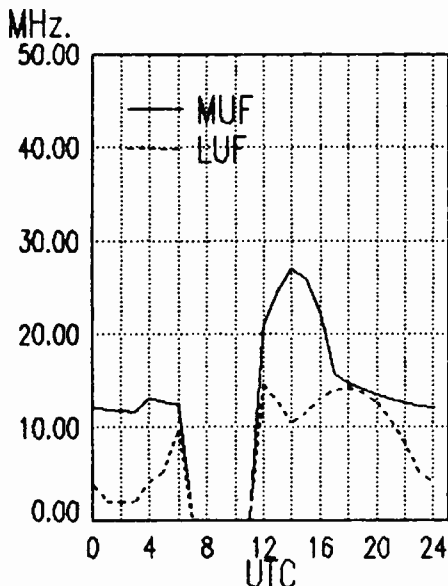
frequency SECTION

0800-0900	Radio Moscow, USSR	7310 9760 11705 11745 11900 12010 15135 15155 15475 15230 15460 15520 15540
0800-0900	Radio for Peace, Costa Rica	12030
0800-0900	SBC Radio One, Singapore	5010 5052 11940
0800-0900	S Superpower KUSW, Utah	6135
0800-0900	Voice of Indonesia, Jakarta	11790 15105
0800-0900	A,S Voice of Kenya, Nairobi	7270
0800-0900	WHRI, Noblesville, Indiana	7355
0800-0900	WSHB, Cyprus Creek, S. Carolina	9495
0800-0900	WYFR, Oakland, California	9680 11580
0800-0900	WYFR Satellite Network	6065
0805-0900	KTWR, Guam	11805
0815-0845	M-F Voice of America, Washington DC	7175 9575 9750 11710 11915 15600 17715 21500 [ML]
0815-0900	A,S Radio Berlin Int'l, East Germany	6040 7185 9730 21465 21540
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 13730 15410 15450
0830-0900	S Bhutan Bcating Service, Thimpu	6035
0830-0900	FEBC, Manila, Philippines	11850 15350
0830-0900	HCJB, Quito, Ecuador	6130 9745
0830-0900	Radio Beijing, China	9700 11755 15440
0830-0855	Radio Finland, Helsinki	6120 9560 11755
0830-0900	Radio Netherlands, Hilversum	9770
0830-0900	Radio Prague, Czechoslovakia	11685 17840 21705
0830-0900	Radio Sofia, Bulgaria	9700 11720
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
0840-0900	S-F Trans World Radio, Monte Carlo	7105
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

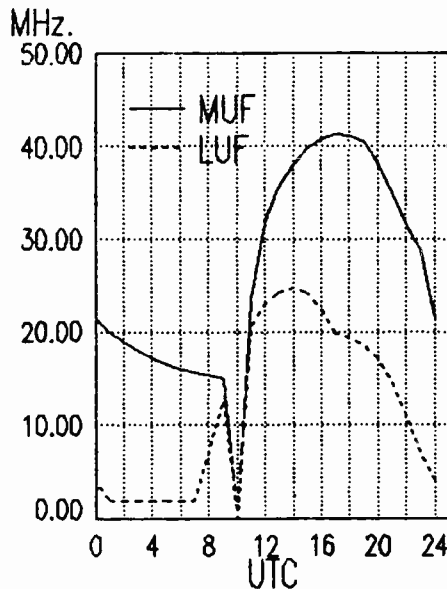
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0900-0910	All India Radio, New Delhi	5960 5990 6010 6020 6050 6065 6100 6140 7110 7140 7150 7160 7250 7280 7295 9610 11850 15235 15250 17705
0900-0910	Port Moresby, Papua New Guinea	3295 4890 5960 5985 6020 6040 6080 6140 9520
0900-0910	S Trans World Radio, Monte Carlo	7105 9480
0900-0910	Voice of Lebanon, Beirut	6548
0900-0925	M-A Radio Finland, Helsinki	17795 21550
0900-0930	FEBC, Manila, Philippines	11850 15350
0900-0930	Nippon Broadcasting Corp.	3925
0900-0930	Radio Beijing, China	9700 11755 15440
0900-0930	A,S Radio Prague, Czechoslovakia	11685 17840 21705
0900-0950	A,S Deutsche Welle, West Germany	6160 9650 11785 11945 17780 17875 21650
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	BBC, London, England	5975 7150 7180 7325 9410 9750 9760 11750 11845 11860 11955 12095 15070 15360
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
0900-1000	King of Hope, South Lebanon	6215
0900-1000	KNLS, Anchor Point, Alaska	6065
0900-1000	KTWR, Agana, Guam	11805
0900-1000	KYOL, Salpan	11900
0900-1000	Radio Afghanistan, Kabul	4450 6085 15435 17720
0900-1000	Radio Australia, Melbourne	5995 6080 9580 9655 9760 11720 15415
0900-1000	Radio Japan, Tokyo	11840 11885 15270 17810
0900-1000	Radio Korea, Seoul, South Korea	7550 13670

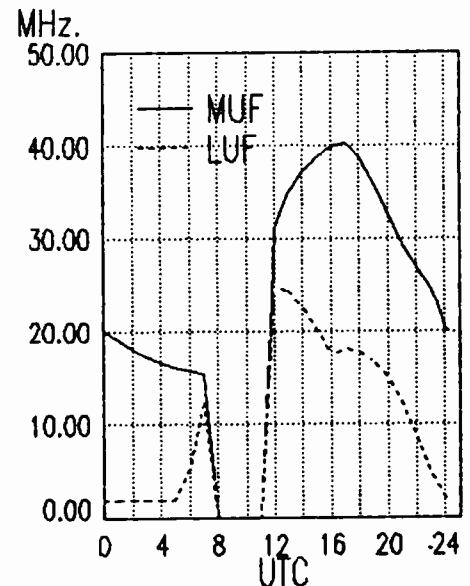
Midwest To
Middle East



Midwest To
West Africa



Midwest To
Central Africa



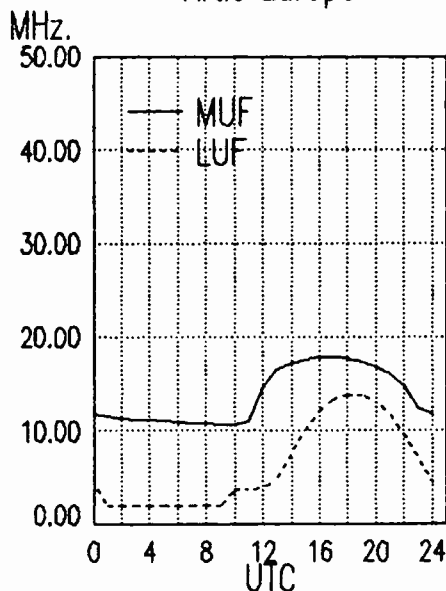
frequency SECTION

0900-1000	Radio Moscow, USSR	9735 11705 11900 12010	1000-1100	ABC, Katherine, Australia	2485
		15475	1000-1100	ABC, Perth, Australia	9610
0900-1000	Radio for Peace, Costa Rica	13660	1000-1100	ABC, Tennant Creek, Australia	2325 [ML]
0900-1000 S	Radio Prague, Czechoslovakia	6055 7345 9505 [ML]	1000-1100	All India Radio, New Delhi	11860 11915 15130 15335
0900-1000	Radio Tanzania, Dar es Salaam	7165			17387 11785
0900-1000	SBC Radio One, Singapore	5010 5052 11940	1000-1100	BBC, London, England	9410 9740 9750 11750
0900-1000 S	Superpower KUSW, Utah	6135			12095 15070 15400 17705
0900-1000	Voice of America, Washington	6130			17790 18080 21710 21470
0900-1000	Voice of Kenya, Nairobi	7270			25750
0900-1000	Voice of Nigeria, Lagos	7255 15120 15185	1000-1100	CBN, St. John's, Newfoundland	6160
0900-1000	WHRI, Noblesville, Indiana	7355	1000-1100	CFCF, Montreal, Quebec	6005
0900-1000	WYFR, Oakland, California	11580	1000-1100	CFCN, Calgary, Alberta	6030
0915-0930	Radio Korea, Seoul, South Korea	9570	1000-1100	CHNS, Halifax, Nova Scotia	6130
0915-0950 M-A	Radio Ulan Bator, Mongolia	9615 12015	1000-1100	CKWX, Vancouver, British Columbia	6080
0930-0935	All India Radio, New Delhi	5960 5990 6010 6020	1000-1100	CFRB, Toronto, Ontario	6070
		6050 6065 6100 6140	1000-1100	(US) Far East Network, Tokyo	3910
		7110 7140 7160 7250	1000-1100	KSDA, Guam	9465
		7280 7295 9610 11850	1000-1100	KTWR, Agana, Guam	11805
		15235 15250 17705	1000-1100	KYOI, Saipan	11900
0930-0945	BBC, London, England*	9725 11955	1000-1100	Radio Afghanistan, Kabul	15435 17720
0930-1000	CBN, St. John's, Newfoundland	6160	1000-1100	Radio Australia, Melbourne	9580 9770 15415
0930-1000	Radio Beijing, China	9700 11755 15440	1000-1100	Radio Moscow, USSR	9705 9780 9875 11705
					11900 15140 15150 15225
0930-1000	Radio Finland, Helsinki	11855 15245			15260 15405 15420 15460
0930-1000	Radio Sweden Int'l, Stockholm	15390			15595 17600 21680
0945-1000	BBC, London, England*	5995 7180 9725 11955	1000-1100	Radio New Zealand, Wellington	6100 9850
0945-1000 M-A	Radio Prague, Czechoslovakia	6055 7345 9505	1000-1100 S	Radio Prague, Czechoslovakia	6055 7345 9505 [ML]
			1000-1100 S	SBC Radio One, Singapore	5010 5052 11940
			1000-1100 S	Superpower KUSW, Utah	6135
			1000-1100	Voice of America, Washington	6030 5985 6165 9590
			1000-1100	Voice of Kenya, Nairobi	7270
			1000-1100	Voice of Nigeria, Lagos	7255 15120
			1000-1100	WHRI, Noblesville, Indiana	7355
			1000-1100	WSHB, Cyprus Creek, S. Carolina	9495
			1000-1100	WYFR, Oakland, California	5950
			1005-1010	Radio Pakistan, Islamabad	15606 17660
			1030-1040	Voice of Asia, Taiwan	5980
			1030-1100	BBC, London, England*	7180 9660 9725
			1030-1100	HCJB, Quito, Ecuador	6130 11925
			1030-1100	Radio Netherlands, Hilversum	6020 9505
			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
			1030-1100	Voice of America, Washington*	11965

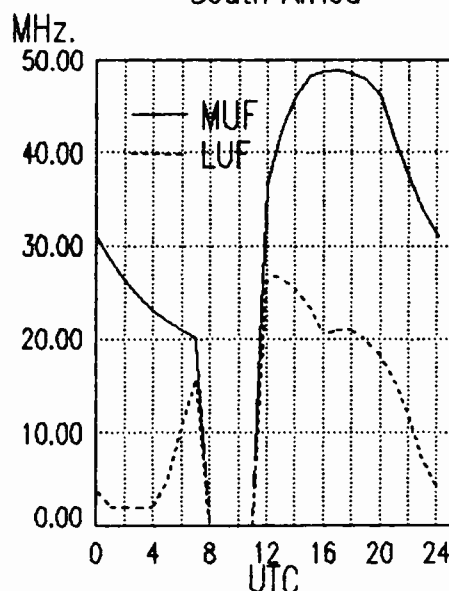
1000 UTC [5:00 AM EST/2:00 AM PST]

1000-1025	BRT, Brussels, Belgium	17595 21810
1000-1030	HCJB, Quito, Ecuador	6130 9745 11925
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	11850 15230 21705 25730
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	9840 15010
1000-1045	Radio Berlin Int'l, East Germany	21465(A,S) 21540
1000-1055 A	Trans World Radio, Monte Carlo	7105
1000-1100	ABC, Alice Springs, Australia	2310 [ML]

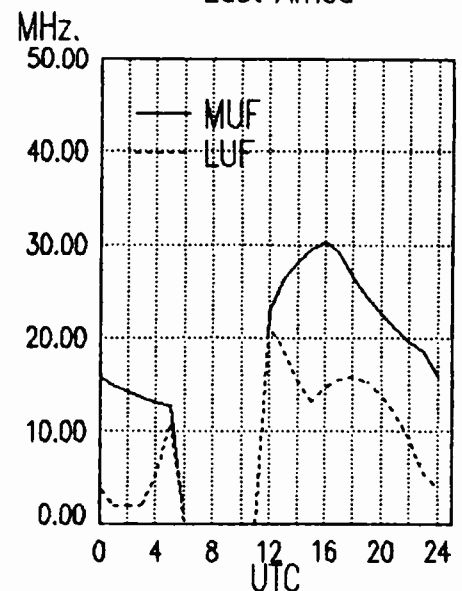
Midwest To
Arctic Europe



Midwest To
South Africa



Midwest To
East Africa



frequency SECTION

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	S	Radio Budapest, Hungary	7220	9585	9835	11910
			15160	15220		
1045-1100	M-A	Radio Prague, Czechoslovakia	6055	7345	9505	
1055-1100	S	Trans World Radio, Monte Carlo	7105			

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, Salpan	11900
1100-1200	Radio Australia, Melbourne	5995 7215 9580 9710
		9770 11705
		6120

1100-1200	Radio Japan, Tokyo	6000 9600 9705 11900
1100-1200	Radio Moscow, USSR	13690 15225 15260 15320
		15335 15350 15420 15460
		15465 15475 15490 15500
		15530 15540 15550 15560
		15565 17645 17700 17820
		11900 17755 21590 21800

1100-1200	Radio RSA, South Africa	7165
1100-1200	A,S Radio Tanzania, Dar es Salaam	11880 [IRR]
1100-1200	S Radio Zambia, Lusaka	5010 5052 11940
1100-1200	SBC-1, Singapore	6130
1100-1200	S Superpower KUSW, Utah	5985 6030 6110 6165
1100-1200	Voice of America, Washington	9590 9760 15160 15425
		5980 7445
		7270

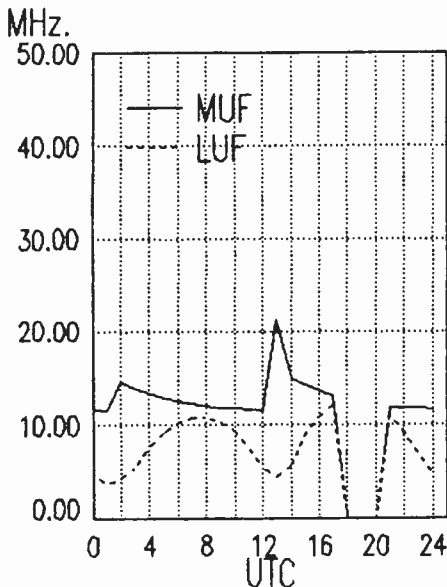
1100-1200	Voice of Asia, Taiwan	7255 15120
1100-1200	Voice of Kenya, Nairobi	7520 11790
1100-1200	Voice of Nigeria, Lagos	9495
1100-1200	WHRI, Noblesville, Indiana	5950 7355 9600
1100-1200	WSHB, Cyprus Creek, S. Carolina	4820 5955 7255
1100-1200	WYFR, Oakland, California	11740
1110-1120	M-F Radio Botswana, Gaborone	17840 21485
1115-1130	Radio Korea, Seoul, South Korea	5005
1115-1130	Vatican Radio, Vatican City	11815 15345
1115-1145	Radio Nepal, Kathmandu	7220 9585 9835 11910
1115-1200	Trans World Radio, Bonaire	15160 15220
1130-1145	A Radio Budapest, Hungary	11740

1130-1200	HCJB, Quito, Ecuador	5995 9715 15560 17575
1130-1200	Radio Netherland, Hilversum	17605 21480 21615
		9655 11905
1130-1200	Radio Thailand, Bangkok	9480 11855
1130-1200	Radio Tirana, Albania	7230 9520 9685 11790
1130-1200	Voice of Islamic Republic Iran	6065 7110 9610 9675
1135-1140	All India Radio, New Delhi	11850 15320

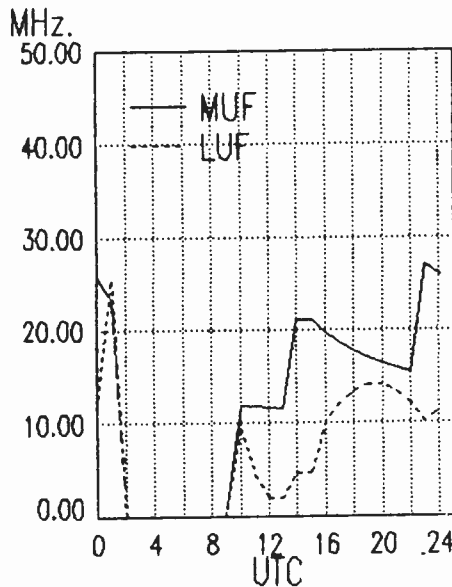
1100 UTC [6:00 AM EST/3:00 AM PST]

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	9850
1100-1120	Radio Pakistan, Islamabad	15606	17760
1100-1125	Radio Netherland, Hilversum	6020	9505
1100-1130	BBC, London, England*	7120	
1100-1130	HCJB, Quito, Ecuador	6130	11925
1100-1130	Kol Israel, Jerusalem	9385	11700 15485 15640
		15650 17635 17685 21625	
1100-1130	KTWR, Guam*	9820	11665
1100-1130	S Radio Austria Int'l, Vienna	13730	15450
1100-1130	Radio Mozambique, Maputo	9525	11818 11835
1100-1130	SLBC, Colombo, Sri Lanka	11835	15120 17850 [ML]
1100-1130	Swiss Radio Int'l, Berne	11935	13635 15570 17830
1100-1130	Voice of Vietnam, Hanoi	7430	9732 9840
1100-1150	Deutsche Welle, West Germany	15410	17765 17800 21600
1100-1150	Radio Pyongyang, North Korea	9600	9977 11735
1100-1155	Radio Beijing, China	9665	15110 17715
1100-1200	ABC, Alice Springs, Australia	2310	[ML]
1100-1200	ABC, Katherine, Australia	2485	
1100-1200	ABC, Perth, Australia	9610	
1100-1200	ABC, Tennant Creek, Australia	2325	[ML]
1100-1200	BBC, London, England	5965	6195 7180 9410
		9515	9740 9750 9760
		11750	11775 12095 15070
		17790	18080 21710 21470
		25750	
1100-1200	CBC Northern Quebec Service	6195	9625
1100-1200	CBN, St. John's, Newfoundland	6160	

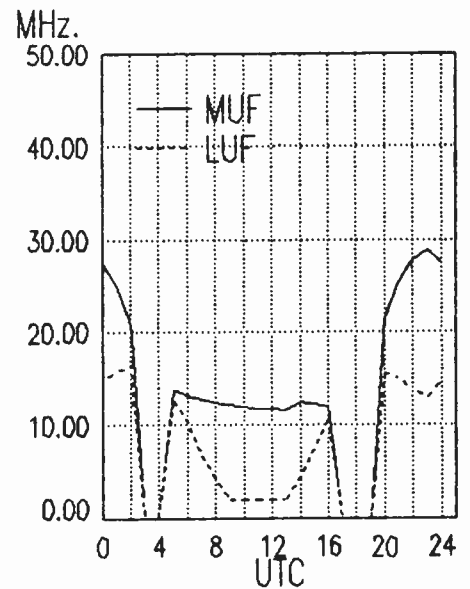
Midwest To Central Asia



Midwest To South East Asia



Midwest To Far East



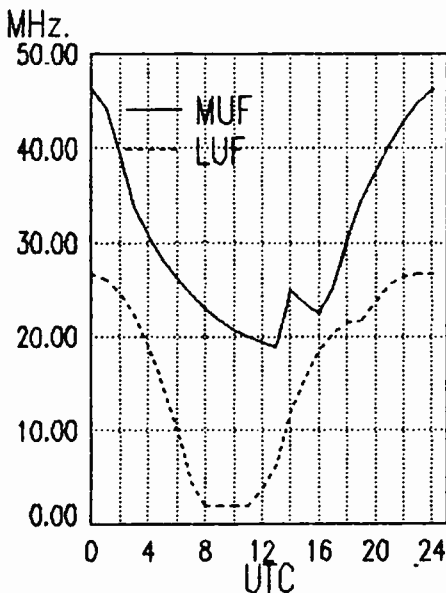
frequency SECTION

1140-1145	M-A	Vatican Radio, Vatican City	6248	9645	11740
1145-1200		BBC, London, England*	5995	7180	15280
1145-1200		Radio Bangladesh, Dakha	15255	17740	
1145-1200		Radio Prague, Czechoslovakia	6055	7345	9505

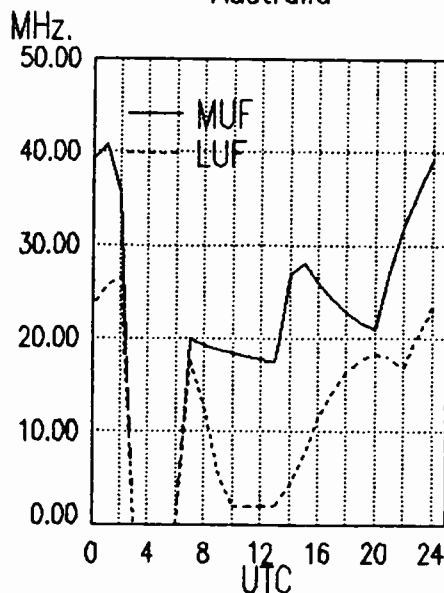
1200-1300		KYOI, Salpan	11900		
1200-1300		Radio Australia, Melbourne	5995	6060	6080 7205
			7215	9580	9710 9770
			11800		
1200-1300		Radio Moscow, USSR	6000	11900	13690 13710
			15225	15320	15350 15465
			15475	15490	15500 15560
			17565	17700	17810 21800
1200-1300	A,S	Radio Tanzania, Dar es Salaam	7165		
1200-1300		SBC Radio One, Singapore	5010	5052	11940
1200-1300	S	Superpower KUSW, Utah	6130		
1200-1300		Trans World Radio, Bonaire	11815	15345	
1200-1300		Trans World Radio, Sri Lanka	11920		
1200-1300		Voice of America, Washington	9760	11715	15160 15425
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	11790	
1200-1300		WSHB, Cyprus Creek, S. Carolina	13760		
1200-1300		WYFR, Oakland, California	5950	7355	9680
1215-1245		Radio Korea, Seoul, South Korea	7275	11740	
1215-1300		Radio Cairo, Egypt	17595		
1230-1235		All India Radio, New Delhi	3905	4800	4920 7280
			9565	9615	11735 15120
1230-1255		Radio Austria Int'l, Vienna	6155	13730	15450
1230-1300		BBC, London, England*	6125	7255	6195 9635
			9660	11780	12040 15270
			15390	15435	17695
1230-1300		Radio Bangladesh, Dhaka	15195	17710	
1230-1300		Radio Berlin Int'l, E. Germany	15440	17880	21465 21540
1230-1300		Radio Sweden, Stockholm	9565	17815	
1240-1250	M	Radio Free Europe, Munich*	5985	7115	9695 9725
			11895	15355	
1245-1300		Radio France Int'l, Paris	9805	11670	15155 17720
			21645		
1235-1245		Voice of Greece, Athens	11645	15630	17565

1200 UTC [7:00 AM EST/4:00 AM PST]					
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	9850
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		Radio Polonia, Warsaw, Poland	6095	7285	
1200-1230		Radio Finland	11945	15400	
1200-1230		Radio Netherland, Hilversum	9715	15560	17575 17605
			21480	21615	
1200-1230		Radio Somalia, Mogadishu	6095		
1200-1230		Radio Tashkent, Uzbek, USSR	5945	9540	9600 11785
			15445	15470	
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		
1200-1255		Radio Beijing, China	9665	11600	15110 17715
1200-1300		ABC, Alice Springs, Australia	2310	[ML]	
1200-1300		ABC, Katherine, Australia	2485		
1200-1300		ABC, Tennant Creek, Australia	2325	[ML]	
1200-1300	S	Adventist World Radio, Africa	17890		
1200-1300		AFAN, Antarctica	6012		
1200-1300		BBC, London, England	5995	6195	9510 9515
			9740	11750	11775 12095
			15070	17705	17790 18080
			21470	21710	25750
1200-1300		CBC Northern Quebec Service	9625	11720	
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

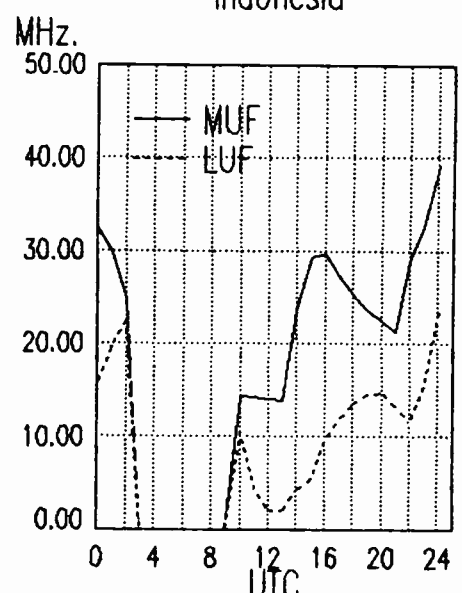
Midwest To Pacific



Midwest To Australia



Midwest To Indonesia



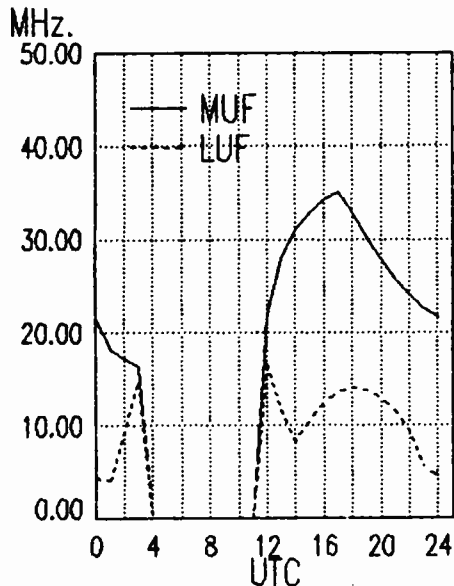
frequency SECTION

1300 UTC [8:00 AM EST/5:00 AM PST]

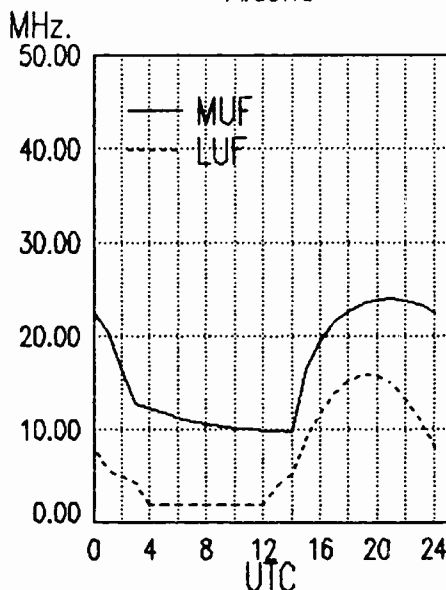
1300-1305	Port Moresby, Papua New Guinea	3295 4890 5960 5980
		6020 6040 6080 6140
		9520
1300-1310	Radio France Int'l, Paris	9805 11670 15155 17720
		21645
1300-1315	Radio Berlin Int'l, E. Germany	17880 21465 21540
1300-1325	Radio Bucharest, Romania	9690 11940 15405 17720
1300-1325 M-F	Radio Finland, Helsinki	11945 15400
1300-1330	BBC, London, England	5995 6195 7180 9510
		9515 9740 11750 11775
		12095 15070 15420 17790
		17885 18080 21470 21710
		25750
1300-1330 S	Radio Austria Int'l, Vienna	11780 13730 21490
1300-1330	Radio Cairo, Egypt	17595
1300-1330	Radio Ghana, Accra	4915 7295
1300-1330	Radio Moscow, USSR	6050 9705 9815 11840
		11900 15225 15465 15475
		15530 15540 15560 17645
		17810
1300-1330 S	Radio Norway Int'l, Oslo	6035 9590 15310 21705
1300-1330	Radio Yugoslavia, Belgrade	11735 15325 15380
1300-1330	Swiss Radio Int'l, Berne	6165 9535 12030
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
		11335 11735
1300-1355	Radio Beijing, China	11600 11660 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	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	FEBG, Manila, Philippines	11850
1300-1400	HCJB, Quillo, Ecuador	11740 15115 17890
1300-1400	KNLS, Anchor Point, Alaska	7355
1300-1400	KYOI, Saipan	11900
1300-1400	Radio Australia, Melbourne	5995 6060 6080 7205
		9580
1300-1400 M-F	Radio Canada Int'l, Montreal	9625 11855 17820
1300-1400	Radio Jordan, Amman	9560
1300-1400	Radio Korea (South), Seoul	9750 15575
1300-1400	Radio RSA, South Africa	17755 21590
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	6130
1300-1400	Voice of America, Washington	6110 9760 11715 15160
		15425
1300-1400	Voice of Malaysia	7295
1300-1400	Voice of Nigeria, Lagos	7255 15120
1300-1400	WCSN, Boston, Massachusetts	5980
1300-1400	WHRI, Noblesville, Indiana	9455 11790
1300-1400	WSHB, Cyprus Creek, S. Carolina	13760
1300-1400	WYFR, Oakland, California	5950 5990 9680 11550
		13695 15055
1315-1400	Radio Berlin Int'l, E. Germany	15240
1330-1345	Radio Korea, Seoul, South Korea	7275 11740
1330-1355 M-A	BRT, Brussels, Belgium	17565 21815
1330-1355	Radio Austria Int'l, Vienna	15320
1330-1400	BBC, London, England	5995 6195 7180 9410
		9740 15070 15420 11750
		17790 17885 18080 21470
		21710 25750
1330-1400	All India Radio, New Delhi	9545 10330 11810 15335
1330-1400 M-A	Bhutan Broadcasting Service, Thimpu	6035
1330-1400	Laotian National Radio	7113
1330-1400	Radio Moscow, USSR	6050 9705 11840 13680
		13710
1330-1400	Radio Tashkent, Uzbek, USSR	5945 9540 9600 11785
		15455
1330-1400	Swiss Radio Int'l, Berne	11695 13635 15135 15570
		17830 21695
1330-1400	UAE Radio, United Arab Emirates	15435 17865 21605
1330-1400	Voice of Islamic Republic Iran	9525 9685 9770
1330-1400	Voice of Kenya, Nairobi	6100
1330-1400	Voice of Turkey, Ankara	17785

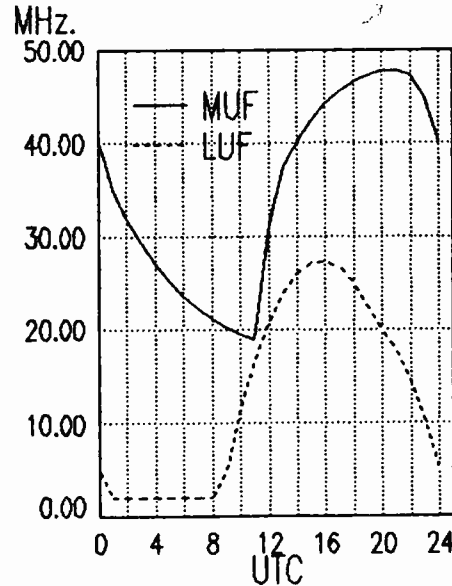
Midwest To Indian Ocean



Midwest To Alaska



Midwest To South America



frequency SECTION

1330-1400 Voice of Vietnam, Hanoi 9840 15010
 1332-1400 A Trans World Radio, Bonaire 11815 15345
 1345-1400 Radio Berlin Int'l, E. Germany 15440 17880 21465 21540

1400-1500 Radio Australia, Melbourne 5995 6035 6060 6080
 7205 9580
 1400-1500 S Radio Canada Int'l, Montreal 9625 11720 11955 17820
 1400-1500 Radio Japan, Tokyo 7140 9695 11815
 1400-1500 Radio Korea, Seoul 9570 9750 15575
 1400-1500 Radio Moscow, USSR 5905 5920 5980 6020
 6050 6095 7260 7315
 7345 7440 9705 9875
 11840 11900 13680 13710
 15225 15460 15480 15500
 15540 15560 15595 15975
 17665 17810 17860 21630
 11925 21535 21590 25790

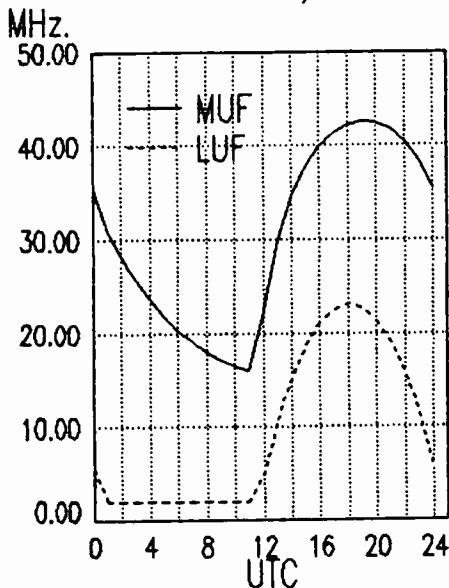
1400 UTC [9:00 AM EST/6:00 AM PST]

1400-1427 Voice of Nigeria, Lagos 15120
 1400-1430 ABC, Alice Springs, Australia 2310 [ML]
 1400-1430 ABC, Tennant Creek, Australia 2325 [ML]
 1400-1430 Radio Berlin Int'l, E. Germany 15440 17880 21465 21540
 1400-1430 Radio Finland, Helsinki 11945 15400
 1400-1430 S Radio Norway Int'l, Oslo 15175 15195 15310 21700
 1400-1430 Radio Peace and Progress, USSR 17645 17765
 1400-1430 Radio Polonia, Warsaw, Poland 6095 7285
 1400-1430 Radio Sweden, Stockholm 15345 17815 21615
 1400-1430 Radio Tirana, Albania 9500 11985
 1400-1430 Voice of Ethiopia, Addis Ababa 9550 11710
 1400-1450 T Radio Free Europe, Munich* 5985 7115 7695 9725
 11895 15355
 1400-1450 Radio Pyongyang, North Korea 6576 11735
 1400-1455 Radio Beijing, China 7405 11600 15165
 1400-1500 ABC, Katherine, Australia 2485
 1400-1500 ABC, Perth, Australia 9610
 1400-1500 Adventist World Radio, Italy 7275
 1400-1500 All India Radio, New Delhi 9545 11810 15335
 1400-1500 BBC, London, England 5995 6195 7180 9740
 9750 11750 12095 15070
 17705 17790 18080 21710
 21470 25750

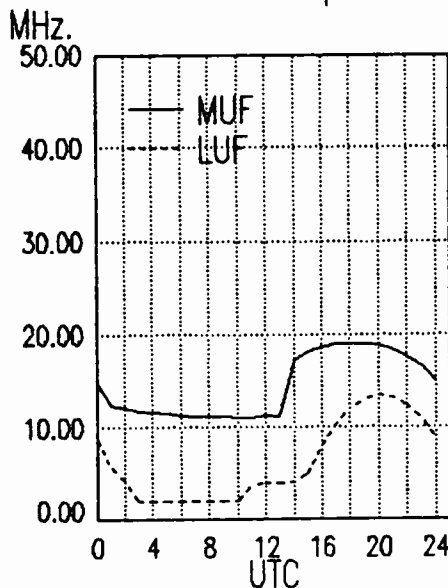
1400-1500 Radio RSA, South Africa 7165
 1400-1500 A,S Radio Tanzania, Dar es Salaam 5010 5052 11940
 1400-1500 SBC Radio One, Singapore 9850
 1400-1500 S Superpower KUSW, Utah 6110 9645 9700 9760
 1400-1500 Voice of America, Washington 11920 15160 15205
 1400-1500 Voice of Kenya, Nairobi 6100
 1400-1500 Voice of Malaysia, Kuala Lumpur 4950
 1400-1500 Voice of Mediterranean, Malta 11925
 1400-1500 Voice of Nigeria, Lagos 7255
 1400-1500 WCSN, Boston, Massachusetts 13760
 1400-1500 WHRI, Noblesville, Indiana 9455 11790
 1400-1500 WSHB, Cyprus Creek, S. Carolina 17640
 1400-1500 WYFR, Oakland, California 9600 11830 17612.5
 1400-1500 WYFR Satellite Net, California 13695 15375
 1415-1420 Radio Nepal, Kathmandu 3230 5005
 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 A,S Radio Finland, Helsinki 11945 15400
 1430-1500 Radio France International, Paris 6175 9805 11670 13715
 15155
 1430-1500 Radio Netherland, Hilversum 13770 15560 17575 17605
 21615
 1430-1500 Radio Prague, Czechoslovakia 9605 11685 13715 15110
 17705 21505
 1430-1500 Voice of Turkey, Ankara 15255
 1445-1500 M-A Radio Utan Bator, Mongolia 9575 15305

1400-1500 CBN, St. John's, Newfoundland 6160
 1400-1500 CBC Northern Quebec Service 9625 11720
 1400-1500 M-A CBU, Vancouver, British Columbia 6160
 1400-1500 CFCF, Montreal, Quebec 6005
 1400-1500 CFCN, Calgary, Alberta 6030
 1400-1500 CHNS, Halifax, Nova Scotia 6130
 1400-1500 CKWX, Vancouver, British Columbia 6080
 1400-1500 CFRB, Toronto, Ontario 6070
 1400-1500 S ELWA, Monrovia, Liberia 11830
 1400-1500 (US) Far East Network, Tokyo 3910
 1400-1500 FEBC, Manila, Philippines 9670 11850
 1400-1500 HCJB, Quito, Ecuador 11740 15115 17890
 1400-1500 KYOI, Saipan 11900

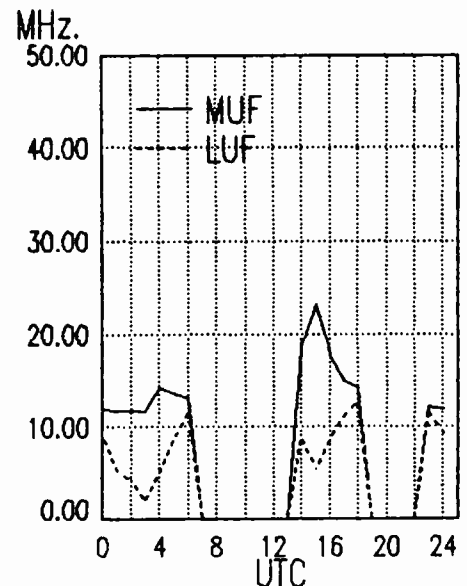
Midwest To
Central America/Caribbean



West Coast To
Arctic Europe



West Coast To
Middle East



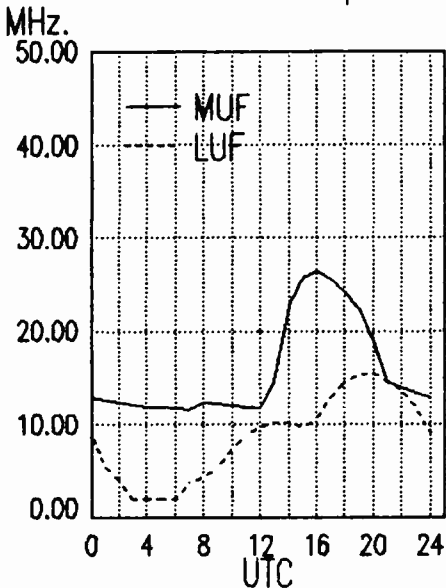
frequency SECTION

1500 UTC [10:00 AM EST/7:00 AM PST]

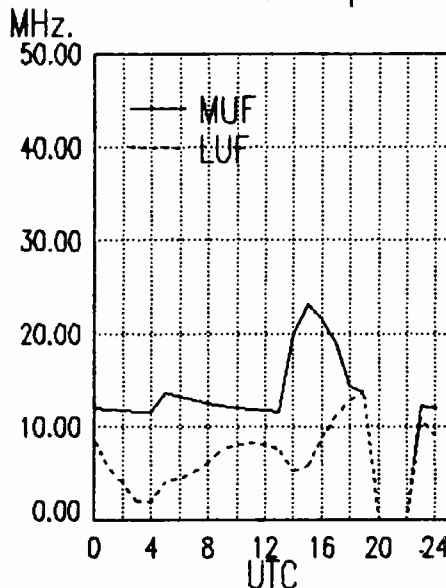
1500-1505	Africa No. 1, Gabon	7200 15200
1500-1510	Vatican Radio, Vatican City	11960 15090 17870
1500-1515	BBC, London, England	5995 6195 7180 9410 9515 9740 11750 12095 15070 15260 15400 17705 17885 18080 21470 21710 25750
1500-1515	FEBA, Mahe, Seychelles	15325
1500-1520	Radio Ulan Bator, Mongolia	9575 15305
1500-1525	Radio Bucharest, Romania	9510 9690 11775 11940 15250 15335
1500-1525	Radio Netherland, Hilversum	13770 15560 17575 17605 21615
1500-1530	Radio Finland, Helsinki	9560 11715 11850 15185
1500-1530 A,S	Radio Tanzania, Dar es Salaam	7165
1500-1530	Radio Veritas Asia, Philippines	9770 15215
1500-1550	Deutsche Weile, West Germany	9735 11965 17810 21600
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	AWR, Alajuela, Costa Rica	15460
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
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	7355
1500-1600	KTWR, Agana, Guam	11905
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	11955 17820
1500-1600	Radio Japan, Tokyo	9505 9695 11815 21700
1500-1600	Radio Jordan, Amman	9560
1500-1600	Radio Korea (South), Seoul	9870
1500-1600	Radio Moscow, USSR	5980 11730 11840 11900 15475 15540 15560 17665 17810 17820
1500-1600	Radio RSA, South Africa	11925 21535 21590 25790
1500-1600	SBC Radio One, Singapore	5010 5052 11940
1500-1600	SLBC, Sri Lanka	9720
1500-1600 S	Superpower KUSW, Utah	9850
1500-1600	Voice of America, Washington	6110 9575 9645 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 Mediterranean, Malta	11925
1500-1600	Voice of Nigeria, Lagos	7255 11770
1500-1600	WCSN, Boston, Massachusetts	13760
1500-1600	WHRI, Noblesville, Indiana	15105 21840
1500-1600 S	WRNO, New Orleans, Louisiana	11965
1500-1600	WSHB, Cyprus Creek, S. Carolina	17640
1500-1600	WYFR, Oakland, California	5950 9600 17612.5
1500-1600	WYFR Satellite Net	11830 13695 15375
1515-1600	BBC, London, England	5995 6195 7180 9410 9515 9740 11750 12095 15070 15260 15400 17885 18080 21470 21710
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 7395 9605 11685 11990 13715 15110 15155 17705 21505
1530-1600	Radio Sofia, Bulgaria	7245 9740 11735
1530-1600	Radio Sweden, Stockholm	15240 15330
1530-1600	Radio Tanzania, Dar es Salaam	9684
1530-1600	Radio Tirana, Albania	9480 11835
1530-1600	Radio-Television Morocco, Rabat	17595
1530-1600	Swiss Radio Int'l, Berne	13685 15430 15570 17830 21630
1530-1600	Voice of Asia, Taiwan	5980 7445

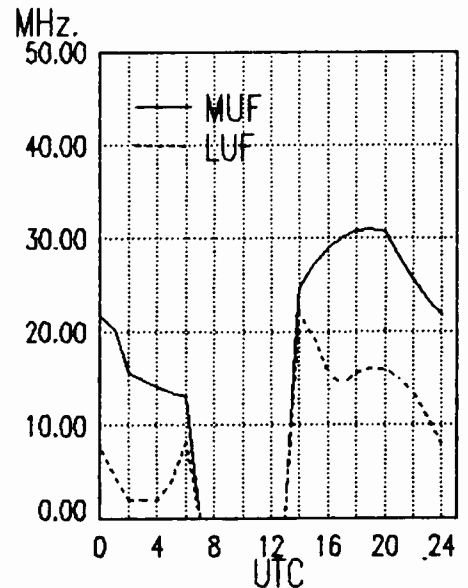
West Coast To Western Europe



West Coast To Eastern Europe



West Coast To Central Africa



frequency SECTION

1530-1600	Voice of Nigeria, Lagos	15120
1540-1550 M-A	Voice of Greece, Athens	9855 11645 15630
1545-1600	Radio Berlin Int'l, East Germany	15240 17880
1545-1600	Radio Canada Int'l, Montreal	9555 11915 11935 15315
		15325 17820
1545-1600	Vatican Radio, Vatican City	11810 15120 17730
1545-1600	Voice of Vietnam, Hanoi	10011 11750
1550-1600 H-S	KTWR, Agana, Guam	9780

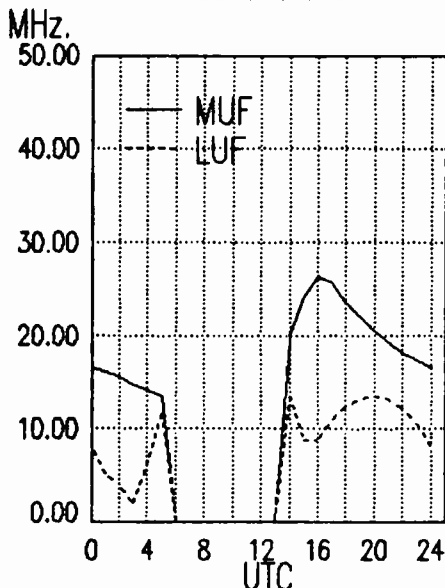
1600-1700	CBC Northern Quebec Service	9625 11720
1600-1700	CBN, St. John's, Newfoundland	6160
1600-1700	CBU, Vancouver, British Columbia	6160
1600-1700	CFCF, Montreal, Quebec	6005
1600-1700	CFCN, Calgary, Alberta	6030
1600-1700	CHNS, Halifax, Nova Scotia	6130
1600-1700	CKWX, Vancouver, British Columbia	6080
1600-1700	CFRB, Toronto, Ontario	6070
1600-1700	(US) Far East Network, Tokyo	3910
1600-1700	HCJB, Quito, Ecuador	17890
1600-1700	KNLS, anchor Point, Alaska	7355
1600-1700	KSDA, Guam	11980
1600-1700	Radio Australia, Melbourne	5995 6035 6060 6080
		7205 7215 9580

1600 UTC [11:00 AM EST/8:00 AM PST]

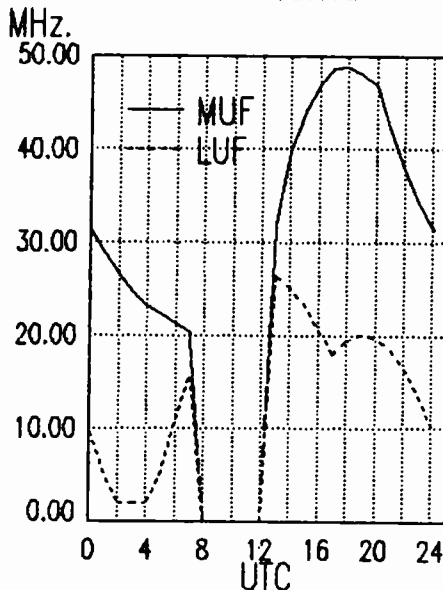
1600-1610	FEBA, Mahe, Seychelles	11865 15325
1600-1610	Radio Lesotho, Maseru	4800
1600-1610	SBC Radio One, Singapore	5010 5052 11940
1600-1625	Radio Prague, Czechoslovakia	6055 9605 11665 11685
		11990 13715 15110 15155
		15165 17730 21505
1600-1630	ELWA, Monrovia, Liberia	11830
1600-1630	KTWR, Agana, Guam	11905
1600-1630	Radio Berlin Int'l, E. Germany	15240 17880
1600-1630 S	Radio Norway Int'l, Oslo	11760 15310 21705
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 Sofia Bulgaria	7245 9560 11735 15310
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 12020
1600-1645	Radio Nacional Angola, Luanda	7245 9535 11955
1600-1645	UAE Radio, United Arab Emirates	11730 15435 17865
1600-1650	Deutsche Welle, West Germany	6170 7200 9745 15105
		15595 17825 21680
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	AWR, Alajuela, Costa Rica	15460
1600-1700	BBC, London, England	5975 5995 6195 7180
		9740 9410 9515 11750
		12095 15070 15260 15400
		17705 17885 18080 21470

1600-1700	Radio Beijing, China	15130
1600-1700 S	Radio Canada Int'l, Montreal	11955 17820
1600-1700	Radio France Int'l, Paris	11705 15360 17620 17795
1600-1700	Radio Jordan, Amman	9560
1600-1700	Radio Korea, Seoul, South Korea	5985 9870
1600-1700	Radio Malawi, Blantyre	3380 5995
1600-1700	Radio Moscow, USSR	7160 7265 7345 9705
		9825 9875 11730 11840
		12010 15475 15550
1600-1700	Radio Riyadh, Saudi Arabia	9705 9720
1600-1700	Radio Tanzania, Dar es Salaam	9684
1600-1700 S	Superpower KUSW, Utah	9850
1600-1700	Voice of America, Washington, DC	9575 9645 9760 15205
		15410 15445 15205 15580
		15600 17785 17800 17870
1600-1700	WCSN, Boston, MA	21640
1600-1700	WHRI, Noblesville, Indiana	15105 21840
1600-1700	WRNO, New Orleans, Louisiana	15420
1600-1700	WYFR, Oakland, California	9600 15440 17612.5
1600-1700	WYFR Satellite Network	11830 13695 15375 21525
		21615
1600-1700	Radio Zambia, Lusaka	9580
1615-1630 M,H	Radio Budapest, Hungary	7220 9585 9835 11910
		15160 15220
1615-1630	Voice of Vietnam, Hanoi	11750
1615-1700	Radio Berlin Int'l, East Germany	6115 7295 9730 15255
		17775
1630-1655 M-A	BRT, Brussels, Belgium	17585 21810
1630-1700	Radio Netherlands, Hilversum	6020 9540 15560
1630-1700	RTM Morocco	17595 17815
1645-1700	Radio Korea (South), Seoul	5975 7275 9870

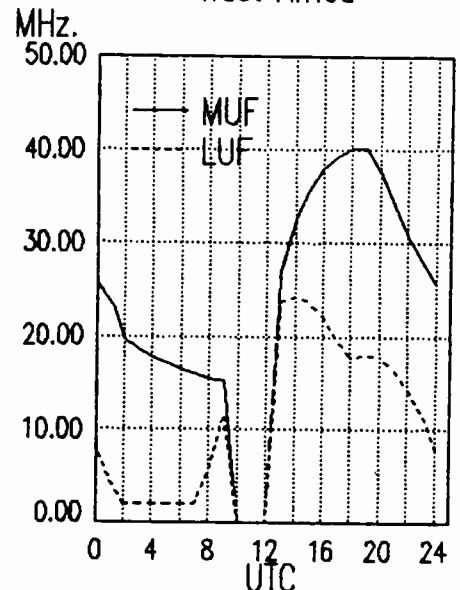
West Coast To East Africa



West Coast To South Africa



West Coast To West Africa



frequency SECTION

1700 UTC [12:00 PM EST/9:00 AM PST]

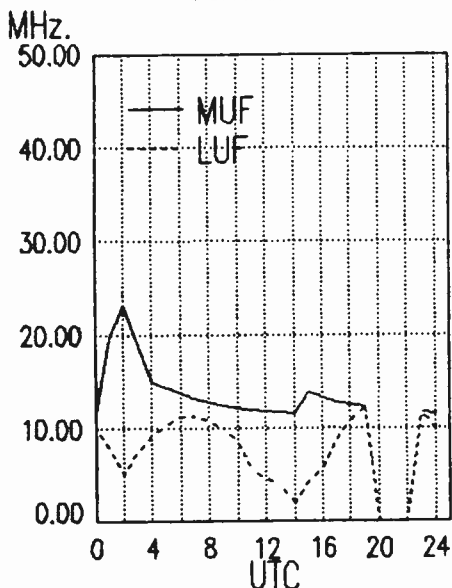
1700-1705	Radio Uganda, Kampala	4976	5026
1700-1715	M-A Voice of Namibia (Angola)	11955	
1700-1725	Radio Budapest, Hungary	6110	9585 9835 11910
		15160	
1700-1725	Radio Netherland, Hilversum	6020	9590 15560
1700-1730	Radio Australia, Melbourne	5995	6060 6080 7205
		9580	
1700-1730	Radio Japan, Tokyo	9505	11705 11815
1700-1730	S Radio Norway Int'l, Oslo	9655	15220 15310 21700
1700-1730	SLBC, Colombo, Sri Lanka	11800	
1700-1730	Swiss Radio Int'l, Berne	3985	6165 9535
1700-1745	BBC, London, England	9410	9515 9740 11750
		11775	12095 15070 15260
		15400	17885 21470
1700-1750	Radio Pyongyang, North Korea	7290	9345 9640 9977
1700-1755	Radio Beijing, China	9570	9750 11600
1700-1800	F ABC, Alice Springs, Australia	2310	[ML]
1700-1800	ABC, Tennant Creek, Australia	2325	[ML]
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	Radio Havana Cuba	11920	
1700-1800	Radio Jordan, Amman	9560	
1700-1800	Radio Korea, Seoul, South Korea	5975	9870 15575
1700-1800	M-F Radio Malabo, Equatorial Guinea	9553	[ML]
1700-1800	Radio Moscow, USSR	5920	6095 7260 7265
		7345	9705 9825 9875
		11840	12015 13680 15135
		15460	15550
		9705	9720
1700-1800	Radio Riyadh, Saudi Arabia	9684	
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	Superpower KUSW, Utah	15650	
1700-1800	A,S Swaziland Commercial Radio	6155	
1700-1800	Voice of Africa, Egypt	15255	
1700-1800	Voice of America, Washington	6110	9575 9645 9760
		11760	11920 15205 15410
		15445	15580 15600 17785
		17800	17870
		6100	
1700-1800	Voice of Kenya, Nairobi	11770	
1700-1800	Voice of Nigeria, Lagos	21640	
1700-1800	WCSN, Boston, Massachusetts	13760	15105
1700-1800	WHRI, Noblesville, Indiana	15295	
1700-1800	WINB, Red Lion, Pennsylvania	9465	
1700-1800	S-F WMLK, Bethel, Pennsylvania	15420	
1700-1800	WRNO, Louisiana	11830	13695
1700-1800	WYFR Satellite Net	11855	15170 15375 17750
1700-1800	WYFR, Okeechobee, Florida	21525	
1715-1745	Radio Canada Int'l, Montreal	5995	7235 15325 17820
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	Radio Austria Int'l, Vienna	5945	6155 12010 13730
1730-1755	Radio Bucharest, Romania	7105	9530 9685 11790
		11940	15270 15340
1730-1800	Radio Australia, Melbourne	5995	6035 6060 6080
		7205	9580
1730-1800	Radio Polonia, Warsaw, Poland	6135	9540
1730-1800	Radio Prague, Czechoslovakia	9605	11685 11990 13715
		15110	21505
1730-1800	RAE, Buenos Aires, Argentina	15345	
1734-1800	FEB, Mahe, Seychelles	11810	
1745-1800	BBC, London, England	9410	9740 11750 12095
		15070	15400 17885 21470

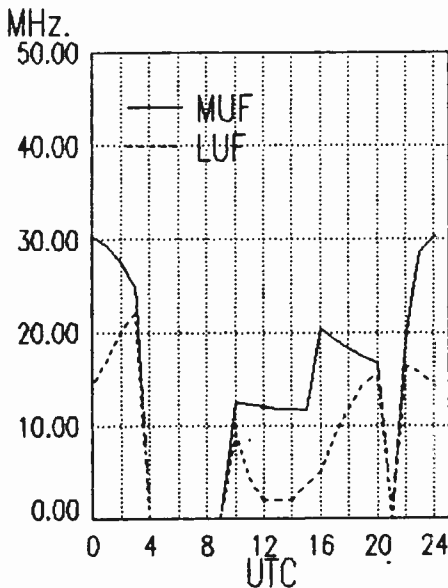
1800 UTC [1:00 PM EST/10:00 AM PST]

1800-1805	A SBC Radio One, Singapore	11940	
1800-1815	Kol Israel, Jerusalem	9385	9640 9925 11585
		13750	LSB

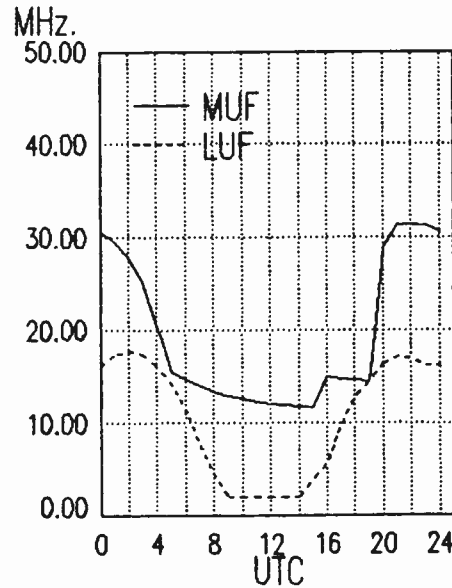
West Coast To
Central Asia



West Coast To
South East Asia



West Coast To
Far East

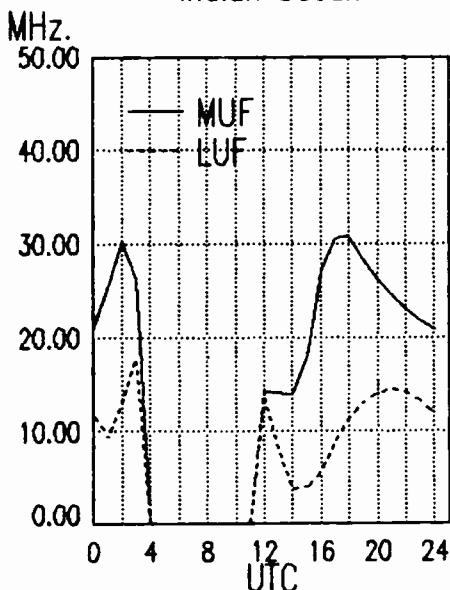


frequency SECTION

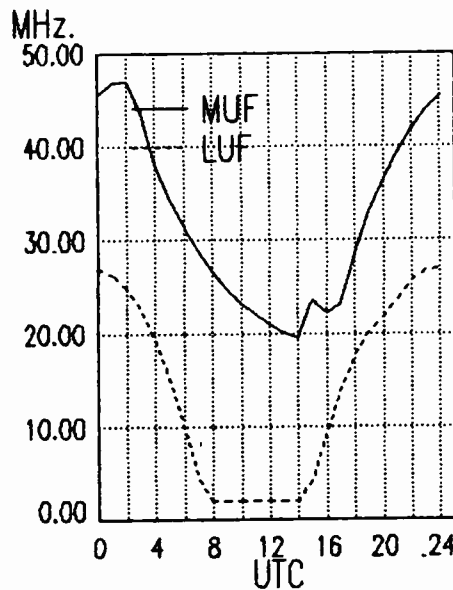
1800-1815	Radio Cameroon, Yaounde	3970	4750	4795	4850	1800-1900	Radio Tanzania, Dar es Salaam	9684
		5010				1800-1900	Radio Zambia, Lusaka	9580
1800-1815	SLBC, Colombo, Sri Lanka	11800				1800-1900	Superpower KUSW, Utah	15650
1800-1825 A,S	FEBA, Mahe, Seychelles	11760				1800-1900 A,S	Swaziland Commercial Radio	6155
1800-1825	Radio Prague, Czechoslovakia	5930	7345	9605	11685	1800-1900	Voice of America, Washington	9575 9760 11760 11920
		11990	13715	15110	21505			15205 15410 15445 15580
1800-1825	RAE, Buenos Aires, Argentina	15345						15600 17785 17800 17870
1800-1830	BBC, London, England	7325	9410	11750	12095			21485
		15070	15400	15420	17885	1800-1900	Voice of Ethiopia	9662
1800-1830 S	Radio Bamako, Mali	4835	5995			1800-1900	Voice of Kenya, Nairobi	6100
1800-1830 M-F	Radio Canada Int'l, Montreal	15260	17820			1800-1900	Voice of Nigeria, Lagos	11770 15120
1800-1830	Radio Mozambique, Maputo	3265	4855	9618		1800-1900	WCSN, Boston, Massachusetts	21640
1800-1830	Radio Sweden, Stockholm	6065	11845			1800-1900	WHRI, Noblesville, Indiana	13760 17830
1800-1830	Voice of Africa, Egypt	15255				1800-1900	WINB, Red Lion, Pennsylvania	15295
1800-1830	Voice of Vietnam, Hanoi	9840	12020			1800-1900 S-F	WMLK, Bethel, Pennsylvania	9465
1800-1845	Radio Abidjan, Ivory Coast	11920				1800-1900	WRNO, New Orleans, Louisiana	15420
1800-1845	Trans World Radio, Swaziland	9525				1800-1900	WYFR, Oakland, California	11580 11855 15170 15375
1800-1850	Radio Bras, Brasilia, Brazil	15265				1800-1900	WYFR Satellite Net, California	11830 13695
1800-1856	Radio RSA, South Africa	15185	15365	17795	21535	1815-1900	Radio Bangladesh, Dhaka	6240 7505 11510 15510
1800-1900	ABC, Alice Springs, Australia	2310 [ML]				1830-1855	Radio Austria Int'l, Vienna	5945 6155 12015 13730
1800-1900 F	ABC, Tennant Creek, Australia	2325 [ML]				1800-1855	Radio Polonia, Warsaw, Poland	5995 6135 7125 7285
1800-1900	All India Radio, New Delhi	11935	15360					9525 11840
1800-1900	CBC Northern Quebec Service	9625	11720			1815-1830	Radio Korea, Seoul, South Korea	9870 15575
1800-1900	CBN, St. John's, Newfoundland	6160				1830-1855	BRT Brussels, Belgium	5915 11695
1800-1900	CBU, Vancouver, British Columbia	6160				1830-1900	BBC, London, England	7325 9410 9740 11750
1800-1900	CFCF, Montreal, Quebec	6005						12095 15070 15400 17885
1800-1900	CFCN, Calgary, Alberta	6030				1830-1900	Radio Berlin Int'l, E. Germany	9665 13610 15145 15255
1800-1900	CHNS, Halifax, Nova Scotia	6130				1830-1900 MWF	Radio Mozambique, Maputo	3265 4855 9618
1800-1900	CKWX, Vancouver, British Columbia	6080				1830-1900	Radio Netherland, Hilversum	6020 15175 17605 21685
1800-1900	CFRB, Toronto, Ontario	6070				1830-1900	Radio Sofia, Bulgaria	7245 9560 11735 15310
1800-1900	(US) Far East Network, Tokyo	3910				1830-1900	Swiss Radio International, Berne	3985 6165 9535 21485
1800-1900	KNLS, Anchor Point, Alaska	7355				1840-1850 M-A	Voice of Greece, Athens	11645 12045 15630
1800-1900	KYOI, Salpan	9455				1840-1900	Radio Senegal, Dakar	4950
1800-1900	Radio Australia, Melbourne	5995	6035	6060	6080	1845-1855	Radio Nacional, Conakry, Guinea	4833 4900 7125
		7205	7215	9580		1845-1900	All India Radio, New Delhi	7412 11620
1800-1900 A,S	Radio Canada Int'l, Montreal	15260	17820					
1800-1900	Radio Jamahiriyah, Libya	15450				1900-1903	Africa No. 1, Gabon	15475
1800-1900	Radio Jordan, Amman	9560				1900-1905 M-A	Vatican Radio, Vatican City	6190 6248 7250 9645
1800-1900	Radio Kuwait, Kuwait	11665				1900-1915	Radio Bangladesh, Dhaka	6240 7505 11510
1800-1900	Radio Malabo, Equatorial Guinea	9553v [ML]				1900-1915	Radio Berlin Int'l, E. Germany	9665 13610 15145 15255
1800-1900	Radio Moscow, USSR	7150	7265	9540	9825	1900-1915	Radio Tanzania, Dar es Salaam	9684
		9875	11840	12010	15460			
		15480						
1800-1900	Radio New Zealand, Wellington	11780	15150					
1800-1900	Radio Riyadh, Saudi Arabia	9705	9720					

1900 UTC [2:00 PM EST/11:00 AM PST]

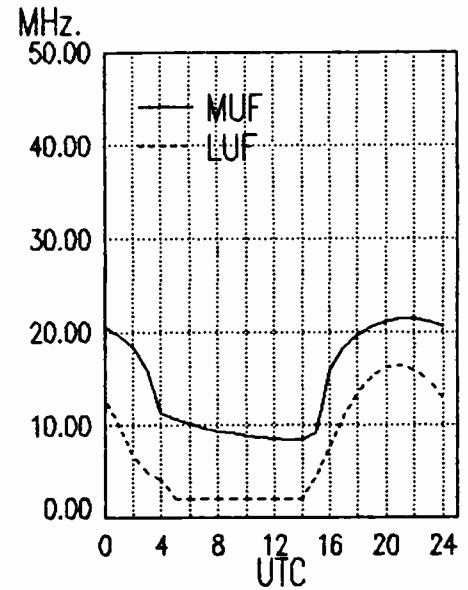
West Coast To
Indian Ocean



West Coast To
Pacific



West Coast To
Alaska



frequency SECTION

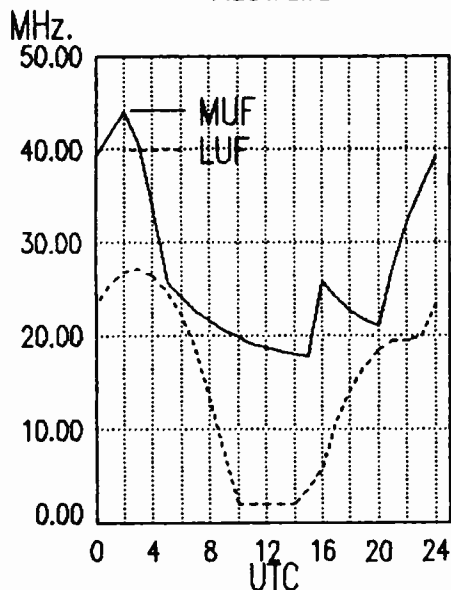
1900-1925	Radio Netherland, Hilversum	6020	15175	17605	21685
1900-1925	Voice of Islamic Republic Iran	9695			
1900-1930	F ABC, Alice Springs, Australia	2310	[ML]		
1900-1930	F ABC, Tennant Creek, Australia	2325	[ML]		
1900-1930	Radio Afghanistan, Kabul	7160	7310	9640	
1900-1930	Radio Japan, Tokyo	9505	11705		
1900-1930	Radio Kiev, Ukrainian SSR	5915	7205	7240	9600
1900-1930	S Radio Norway Int'l, Oslo	9590	15225	15310	
1900-1930	M-F Radio Portugal, Lisbon	11740	11870	15250	
1900-1930	Radio Sofia Bulgaria	7245	7155	9700	
1900-1930	Voice of Vietnam, Hanoi	9840	12020		
1900-1950	Deutsche Welle, Koin, W. Germany	9745	11810	13790	15390
1900-1955	Radio Beijing, China	6860	9470		
1900-2000	All India Radio, New Delhi	7412	11620	11935	15360
1900-2000	BBC, London, England	9410	9740	12095	15070
		15400	17885		
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	KYOI, Salpan	9455			
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	11950		
1900-2000	Radio Jordan, Amman	9560			
1900-2000	Radio Korea, Seoul, South Korea	9870	15575		
1900-2000	Radio Kuwait, Kuwait	11665			
1900-2000	M-A Radio Malabo, Equatorial Guinea	9553	[ML]		
1900-2000	Radio Moscow, USSR	5905	6030	7150	7170
		9540	9755	9765	9825
		9875	11840		
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	7295	15365	17795	
1900-2000	Radio Zambia, Lusaka	9580			
1900-2000	Spanish Foreign Radio, Madrid	11790	15375	15395	

1900-2000	Superpower KUSW, Utah	15650			
1900-2000	A,S Swaziland Commercial Radio	6155			
1900-2000	Trans World Radio Swaziland	3205			
1900-2000	Voice of America, Washington	9700	9760	11760	15205
		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	21640			
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	11855	15566	17845	
1900-2000	WYFR Satellite Net, California	11830	13695	15375	
1910-1920	Radio Botswana, Gaborone	3356	4820		
1920-1930	M-A Voice of Greece, Athens	6225	7430	9395	9425
1930-1940	Radio Togo, Lome	5047			
1930-1945	Radio Finland, Helsinki	6120	9530	11755	
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	Radio Budapest, Hungary	6110	7220	9585	9835
		11910	15160		
1930-2000	M-F Radio Canada Int'l, Montreal	9555	11945	15325	17875
1930-2000	Radio Finland, Helsinki	6120	9550	11755	15185
1930-2000	Radio Sofia Bulgaria	9700	11720		
1930-2000	Radio Yugoslavia, Belgrade	5980	9620	9660	
1930-2000	Voice of Republic of Iran	6080	9022		
1930-2000	WINB, Red Lion, Pennsylvania	15185			
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	

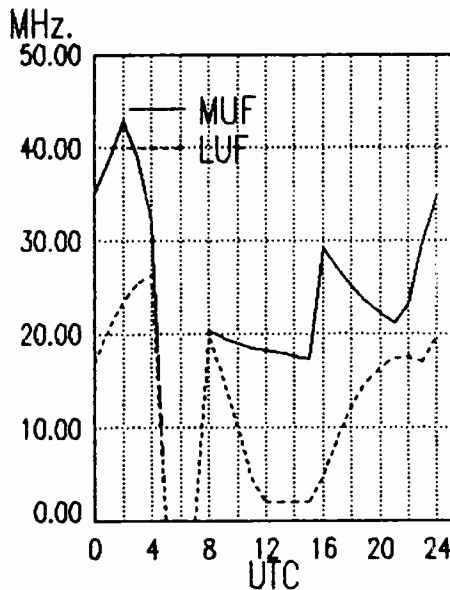
2000 UTC [3:00 PM EST/12:00 PM PST]

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	A Radio Zambia, Lusaka	3345	6165		

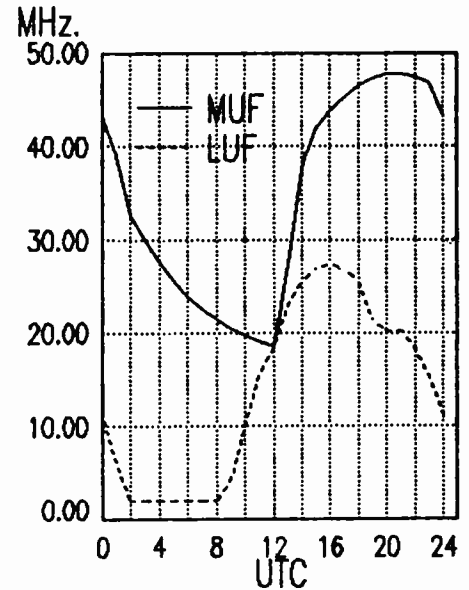
West Coast To
Australia



West Coast To
Indonesia

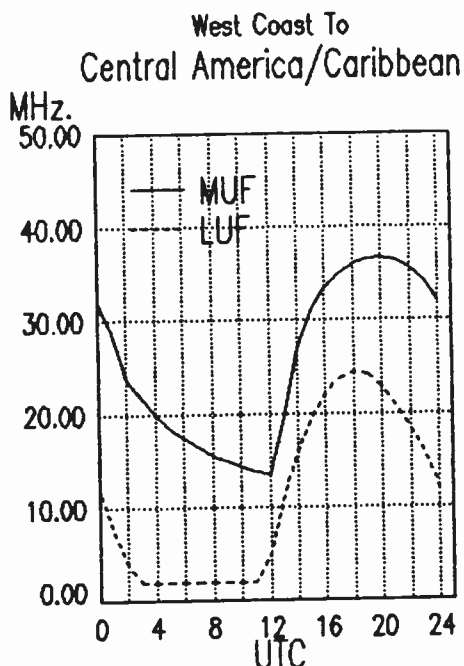


West Coast To
South America



frequency SECTION

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	9745
		11715			
2000-2025	Radio Bucharest, Romania	5990	6105	7145	7195
		9570	9690	11940	
2000-2030	Kol Israel, Jerusalem	7462	9435	9855	
2000-2030	Radio Australia, Melbourne	6035	7205	7215	9580
		9620			
2000-2030	Radio Berlin Int'l, East Germany	9665	11920	15255	
2000-2030	Radio Ghana, Nairobi	3366	4915		
2000-2030	Radio Norway International, Oslo	15310			
2000-2030	Radio Polonia, Warsaw, Poland	7125	7145	9525	
2000-2030	M-F Radio Portugal Lisbon	11740			
2000-2030	Radio Sofia, Bulgaria	7245	9560	11735	15310
2000-2030	Swaziland Commercial Radio	6155			
2000-2030	Voice of Nigeria, Lagos	7255			
2000-2030	Voice of Republic of Iran	6080	9022		
2000-2045	All India Radio, New Delhi	7412	9755	9910	11620
		11860			
2000-2050	Radio Pyongyang, North Korea	6576	9345	9640	9977
2000-2056	Radio RSA, South Africa	7295	15365	17795	
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]		
2000-2030	BBC, London, England	5975	6180	6195	7325
		9410	9740	11785	11820
		12095	15070	15260	15400
		17760	17885		
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	King of Hope, Southern Lebanon	6280			
2000-2100	KYOI, Saipan	9465			
2000-2100	Radio Havana Cuba	11800			
2000-2100	Radio Jordan, Amman	9560			
2000-2100	Radio Kuwait, Kuwait	11665			
2000-2100	Radio Malabo, Equatorial Guinea	9553v			
2000-2100	Radio Moscow, USSR	9765	9755	9825	9875
		11840	15405		
2000-2100	Radio Moscow (British Service)	5905	6020	7115	7150
		7170			
2000-2100	Radio New Zealand, Wellington	12050	15150		
2000-2100	Radio for Peace, Costa Rica	21555			
2000-2100	Radio Riyadh, Saudi Arabia	9705	9720		
2000-2100	Radio Zambia, Lusaka	9580			
2000-2100	Superpower KUSW, Utah	15650			
2000-2100	Voice of America, Washington	9700	9760	11760	15205
		15410	15445	15580	15600
		17785	17800	17870	
		11770			
2000-2100	Voice of Nigeria, Lagos	11680			
2000-2100	WCSN, Boston, Massachusetts	13760	17830		
2000-2100	WHRI, Noblesville, Indiana	15185			
2000-2100	WINB, Red Lion, Pennsylvania	9465			
2000-2100	S-F WMLK, Bethel, Pennsylvania	15420			
2000-2100	WRNO, New Orleans, Louisiana	17612.5			
2000-2100	WSHB, Cyprus Creek, S. Carolina	9455	11855	15566	17612.5
2000-2100	M-A WYFR, Oakland, California	11830	13695	15375	
2000-2100	Radio Damascus, Syria	9950	12085		
2010-2100	A,S Voice of Kenya, Nairobi	6100			
2015-2100	ELWA, Monrovia, Liberia	11830			
2015-2000	Radio Berlin Int'l, E. Germany	9665	13610	15255	
2025-2045	RAI, Rome, Italy	6165	9575		
2030-2055	Radio Polonia, Warsaw, Poland	6095	7285		
2030-2100	BBC, London, England	5975	6180	7325	9410
		11750	12095	15070	15400
		15260	17760	17885	
2030-2100	Radio Australia, Melbourne	9580	9620		
2030-2100	Radio Beijing, China	6955	7480	9440	9745
		11790			
2030-2100	Radio Korea, Seoul, South Korea	6480	7550	15575	
2030-2100	Radio Netherland, Hilversum	9540	9895	11740	15560
2030-2100	Radio Tirana, Albania	9480	11835		
2030-2100	Voice of Africa, Cairo, Egypt	15375			
2030-2100	Voice of Vietnam, Hanoi	9840	12020	15010	
2045-2100	All India Radio, New Delhi	7412	9550	9910	11620
		11715			
2045-2100	IBRA Radio, Malta	7110			
2045-2100	Vatican Radio, Vatican City	9625	11700	11695	15120



Betsy Robinson of Clinton, Tennessee, sends in this attractive QSL from Radio Norway.

Did We Miss Something?

Find a frequency we've missed? A new broadcast? Let us know! Write to frequency manager Greg Jordan at 1855-I Franciscan Terrace, Winston-Salem, NC 27127.

frequency SECTION

2100 UTC [4:00 PM EST/1:00 PM PST]

2100-2105	Radio Damascus, Syria	9950	12085		
2100-2105	Radio Zambia, Lusaka	3345	6165		
2100-2110	Vatican Radio, Vatican City	6190	7250	9645	
2100-2110 A,S	Voice of Kenya, Nairobi	6100			
2100-2115	IBRA Radio, Malta	7110			
2100-2125	Radio Beijing, China	6955	7480	9440	9745
		11790			
2100-2125	Radio Bucharest, Romania	5990	6105	7145	7195
		9690	11940		
2100-2125	Radio Netherland, Hilversum	9540	9895	11740	15560
2100-2130 S	Radio Austria Int'l, Vienna	5945	6155	9585	9870
2100-2130	Radio Budapest, Hungary	6110	7220	9585	9835
		11910	15160		
2100-2130	Radio Japan, Tokyo	5965	7140	7280	17835
2100-2130	Radio Korea, Seoul, South Korea	6480	7550	15575	
2100-2130	Radio Sweden, Stockholm	6065	9655		
2100-2130	Swiss Radio Int'l, Berne	9885	13635	15570	
2100-2135	ELWA, Monrovia, Liberia	11830			
2100-2145	WYFR, Oakland, California	5950	9455	9852.5	11855
		17612	17845	21525	21615
2100-2200	WYFR Satellite Net	11830	13695	15375	
2100-2150	Deutsche Welle, West Germany	7130	9765		
2100-2150	Voice of Turkey, Ankara	9825			
2100-2155	Radio Beijing, China	6860	9470	9860	
2100-2200 M-A	ABC, Alice Springs, Australia	2310	[ML]		
2100-2200	ABC, Katherine, Australia	2485			
2100-2200 M-A	ABC, Tennant Creek, Australia	2325	[ML]		
2100-2200	All India Radio, New Delhi	7412	9910	11620	11715
2100-2200	BBC, London, England	3995	5975	6005	6175
		6180	7325	9410	11785
		12095	15070	15260	15400
2100-2200	CBC Northern Quebec Service	9625	11720		
2100-2200	CBN, St. John's, Newfoundland	6160			
2100-2200	CBU, Vancouver, British Columbia	6160			
2100-2200	CFCF, Montreal, Quebec	6005			
2100-2200	CFCN, Calgary, Alberta	6030			
2100-2200	CHNS, Halifax, Nova Scotia	6130			
2100-2200	CKWX, Vancouver, British Columbia	6080			
2100-2200	CFRB, Toronto, Ontario	6070			
2100-2200	(US) Far East Network, Tokyo	3910			
2100-2200	King of Hope, Southern Lebanon	6280			

2100-2200	KSDA, Agat, Guam	7365	15125		
2100-2200	KVOH, Rancho Simi, California	17775			
2100-2200	KYOI, Saipan	9465			
2100-2200	Radio Australia, Melbourne	15160	15240	15395	17795
2100-2200	Radio Baghdad, Iraq	7280	9770		
2100-2200	Radio Jordan, Amman	9560			
2100-2200	Radio Moscow, USSR	5905	6055	7150	7170
		7290	9505	9515	9590
		9620	9625	9730	9765
		9780	9790	9800	9820
		9840	9875	11840	12030
		12050	15405	15425	17720
2100-2200	Radio for Peace, Costa Rica	21555			
2100-2200 A,S	Radio Malabo, Equatorial Guinea	9552.5			
2100-2200 A,S	Radio Zambia, Lusaka	9580			
2100-2200	Spanish Foreign Radio, Madrid	9765	11790		
2100-2200 M-A	Superpower KUSW, Utah	15650			
2100-2200	Voice of Africa, Cairo, Egypt	15375			
2100-2200	Voice of America, Washington	9700	9760	11760	15205
		15410	15445	15580	15600
		17785	17800	17870	
2100-2200	Voice of Nigeria, Lagos	15120			
2100-2200	WCSN, Boston, Massachusetts	11680			
2100-2200	WHRI, Noblesville, Indiana	9770	17830		
2100-2200	WRNO, New Orleans, Louisiana	15420			
2100-2200	WSHB, Cyprus Creek, S. Carolina	17750			
2103-2200	WINB, Red Lion, Pennsylvania	15185			
2110-2200	Radio Damascus, Syria	9950	12085		
2115-2200	Radio Cairo, Egypt	9900			
2125-2155 S	Radio Austria Int'l, Vienna	9870			
2130-2145	BBC, London, England*	5965	7160		
2130-2200	BBC, London, England*	6030	7230	9635	
2130-2200	HCJB, Quito, Ecuador	15270	11790	17790	
2130-2200 A,S	Radio Canada Int'l, Montreal	11880	15150	17820	
2130-2200	Radio Sofia Bulgaria	7115	7155	9700	11720
2135-2150 S-F	ELWA, Monrovia, Liberia	11830			
2150-2200 M-F	ELWA, Monrovia, Liberia	11830			

2200 UTC [5:00 PM EST/2:00 PM PST]

2200-2205 M-F	ELWA, Monrovia, Liberia	3993	11830
2200-2205	Radio Damascus, Syria	9950	12085

KOL ISRAEL QSL

קול ישראל

וישראל



Two different QSLs from Kol Israel: above is from Paul Williams of Shaw AFB, South Carolina, and the one on the right is from Michael Choleva, a very active DXer from Euclid, Ohio, shown with an album of his collection.

ISRAEL RADIO LA VOIX D'ISRAEL LA BOZ DE ISRAEL ГОВОЯ МЗРАИЯ

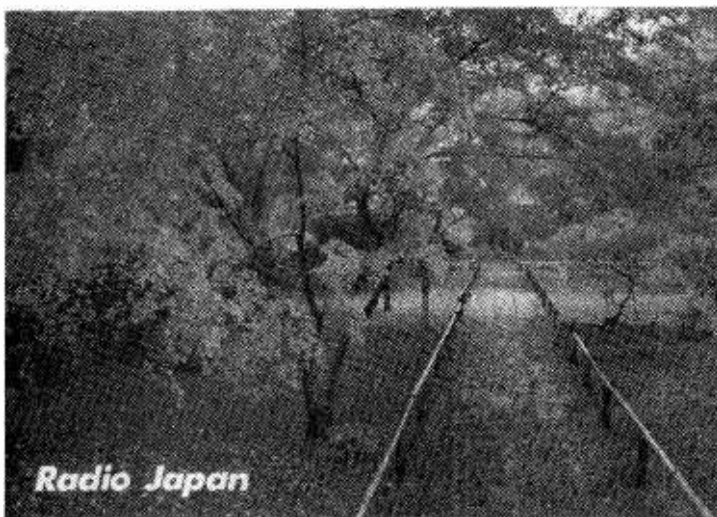
KOL ISRAEL QSL

LA VOZ DE ISRAEL IZRAEL HANGJA A VOZ DE ISRAEL VOCEA ISRAELULU



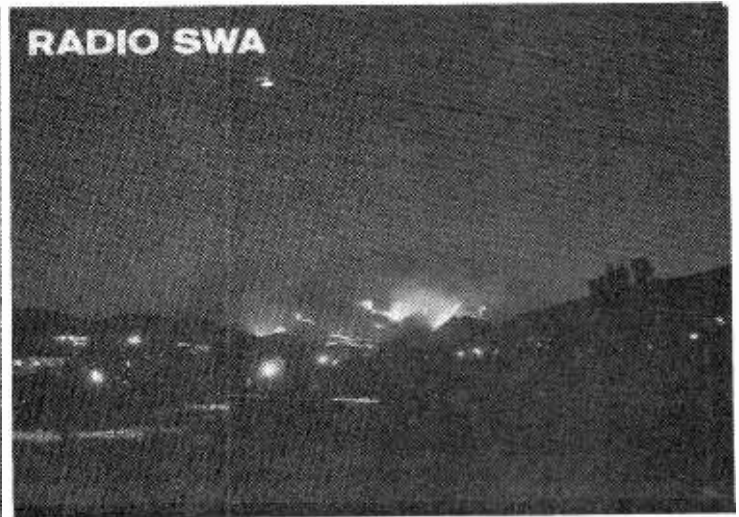
frequency SECTION

2200-2210	M-H	Port Moresby, Papua New Guinea	3925	4890	5960	5985	2200-2300	Radio for Peace, Costa Rica	21555			
			6020	6040	6080	6140	2200-2300	Radio Havana Cuba	7140			
			9520				2200-2300	Radio Moscow, USSR	4795	4860	5980	6030
2200-2210		Radio Sierra Leone, Freetown	5980						7115	7150	7170	7230
2200-2215	M-A	ABC, Alice Springs, Australia	2310 [ML]						9505	9515	9590	9620
2200-2215	M-A	ABC, Tennant Creek, Australia	2325 [ML]						9625	9780	9790	9820
2200-2215		BBC, London, England*	5965	7160					9840	9625	12050	15405
2200-2215	M-F	Voice of America, Washington	9640	11740	15120				15425	17570	17605	17700
2200-2225		BRT Brussels, Belgium	5915	9925			2200-2300	R. Peace & Progress, Moscow	4795	7360	17720	
2200-2225		Radio Finland, Helsinki	6120	9670	11755		2200-2300	SBC Radio One, Singapore	5010	5052	11940	
2200-2225		RAI, Rome, Italy	5990	9710			2200-2300	M-A Superpower KUSW, Utah	15580			
2200-2225		Vatican Radio, Vatican City	6015	9615	11830		2200-2300	Voice of America, Washington	11760	15185	15290	15305
2200-2230		ABC, Katherine, Australia	2485						15320	17735	17740	17820
2200-2230		All India Radio, New Delhi	7412	9550	9910	11620			18157	USB		
			11715				2200-2300	Voice of Free China, Taiwan	9852.5	9925	11805	
2200-2230		CBC Northern Quebec Service	9625	11720			2200-2300	Voice of the UAE, Abu Dhabi	6170	9595	11965	
2200-2230		Radio Beijing, China	3985	6165			2200-2300	WCSN, Boston, Massachusetts	9495			
2200-2230	F	Radio Budapest, Hungary	6110	9585	9835	11910	2200-2300	WHRI, Noblesville, Indiana	9770	17830		
			15160				2200-2300	WINB, Red Lion, Pennsylvania	15185			
2200-2230		Radio Jordan, Amman	9560				2200-2300	WRNO, New Orleans, Louisiana	15420			
2200-2230	S	Radio Norway Int'l, Oslo	9605	11850			2200-2300	WSHB, Cyrus Creek, S. Carolina	17640			
2200-2230		Radio Prague, Czechoslovakia	6055				2200-2300	WYFR, Oakland, California	5950	11830	11855	13695
2200-2245		BBC, London, England	3955	5975	6175	6180			15170	15375	17612	17845
			6195	7325	9410	9590	2215-2230	BBC, London, England*	11820	15390		
			9915	11955	12095	15070	2230-2300	A,S CBC Northern Quebec Service	9625	11720		
			15260	15400			2230-2300	Kol Israel, Jerusalem	9435	9010	11605	
2200-2245		Radio Berlin Int'l, East Germany	6125				2230-2300	Radio Austria Int'l, Vienna	9870	11780		
2200-2245		Radio Cairo, Egypt	7710	9900			2230-2300	Radio Mediterran, Malta	6110			
2200-2245		Radio Yugoslavia, Belgrade	5980	7130	9620	9660	2230-2300	Radio Polonia, Warsaw, Poland	5995	6135	7125	7270
2200-2250		Radio Baghdad, Iraq	7280				2230-2300	Radio Sofia, Bulgaria	9700	11720		
2200-2255		RAE, Buenos Aires, Argentina	11710	15345			2230-2300	Radio Sweden, Stockholm	11925	SSB		
2200-2300		CBN, St. John's, Newfoundland	6160				2230-2300	Radio Tirana, Albania	7215	9480		
2200-2300		CBU, Vancouver, British Columbia	6160				2230-2300	Radio Vilnius, Lithuanian SSR	6100			
2200-2300		CFCF, Montreal, Quebec	6005				2230-2300	Swiss Radio Int'l, Berne	6190			
2200-2300		CFCN, Calgary, Alberta	6030				2245-2300	All India Radio, New Delhi	6055	7215	9535	9910
2200-2300		CHNS, Halifax, Nova Scotia	6130						11715	11745		
2200-2300		CKWX, Vancouver, British Columbia	6080				2245-2300	BBC, London, England	3955	5975	6175	6195
2200-2300		CFRB, Toronto, Ontario	6070						7325	9410	9570	9590
2200-2300		(US) Far East Network, Tokyo	3910						9915	11785	11945	12095
2200-2300		King of Hope, Southern Lebanon	6280						15260	15400	17875	
2200-2300		KVOH, Rancho Simi, California	17775				2245-2300	Radio Berlin Int'l, E. Germany	6125			
2200-2300		KYOI, Saipan	15405									
2200-2300		Radio Australia, Melbourne	15160	15240	15320	15395						
			17795									
2200-2300		Radio Canada Int'l, Montreal	9760	11945								



Radio Japan

These QSL's need to be seen in color to be fully appreciated! Peach blossoms in Japan and



RADIO SWA

make for dramatic viewing. Both are from Marshall Watson, Ft. Walton Beach, Florida.

Mini-Portables: Sangean MS-101 and MS-103

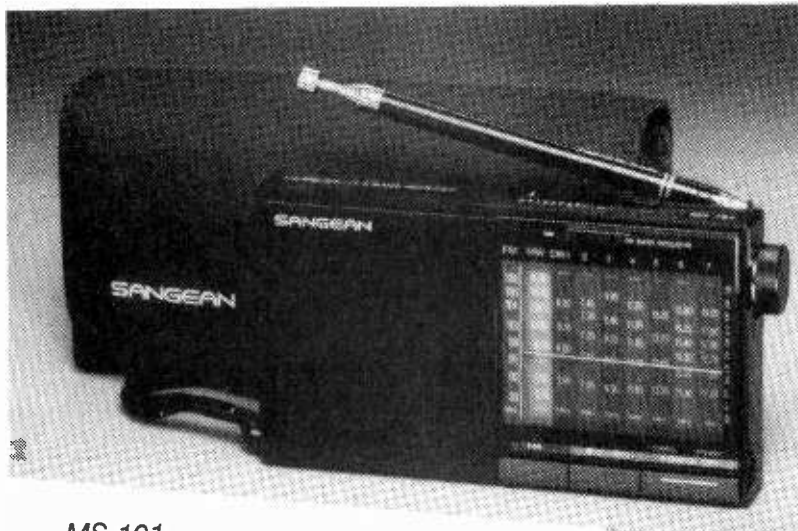
Just as there are good cigars and cheap cigars -- but no good, cheap cigars -- so there aren't any really good, cheap world band radios. Of all the models we've tested over the years at International Broadcasting Services, the only one going for less than a hundred US dollars that has performed reasonably well has been the Philips D1835, sold in North America as the Magnavox D1835. This is certainly good enough to take along on trips, unless you're really fussy.

"ghost" in to cause interference to the station you're trying to hear. These radios also aren't terribly selective, which means that stations on adjacent channels tend to be heard disturbing what you're trying to hear, or creating an annoying 5 kHz "whistle."

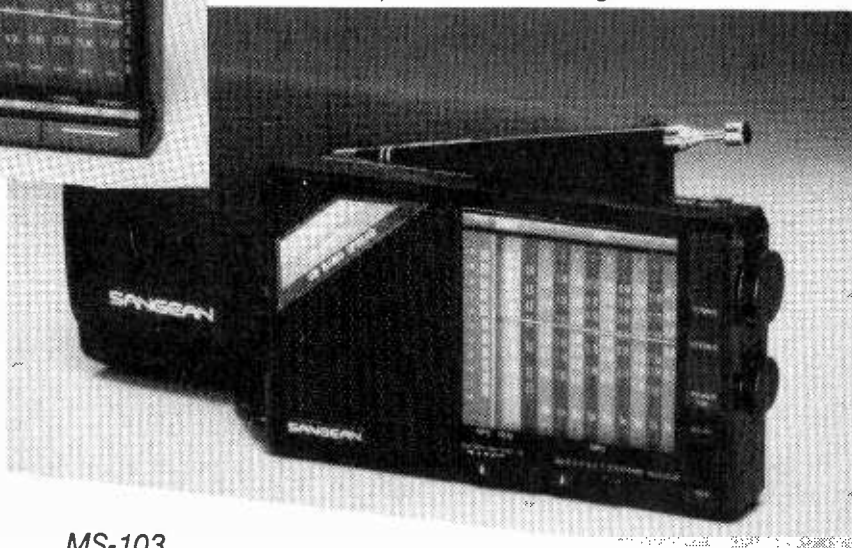
Otherwise, though, reception quality with these two Sangeans is not at all bad. These little low-cost sets are fairly sensitive, and because of their small antenna size overloading is not much of a problem. Audio quality isn't spectacular, mainly because of the small speaker size, but is more than adequate for listening to the news and such on trips.

Few Unnecessary Features

Of course, at these prices you don't expect digital readout, programmable channel memories, 24-hour clocks, or any of the other goodies you find on sets costing hundreds of dollars. You figure out where the set is tuned the same way people have since the earliest days of radio: by a needle and analog dial. In this case, each world band segment is broken out as a



MS-101



MS-103

But, in doing tests for the *Passport to World Band Radio's* Buyer's Guide, we've come across two other interesting bargain-basement models. They're the Sangean MS-101 -- a mini-portable that lists for \$89.95, and the kindred Sangean MS-103, which lists for \$109.95 in the US. Both are made in Taiwan and are lightweight mini-portables intended for use on trips, rather than around the house.

Little to Lose on Trips

These Sangeans are small and inexpensive. But a small radio doesn't have to be low cost. For example, Sony's miniature ICF-SW1S sells for more than 300 US dollars and is a very nice performer. The thing is, when you travel it's anybody's guess as to whether your luggage will wind up at your destination... or at the lost-and-found at the Pago-Pago international airport. This is the main reason why it's not always wise for travelers to take along a costly radio, especially if they're staying in hotels.

Performance Suitable to Price Range

The MS-101 and '103 are both single conversion devices, which is one reason they are relatively inexpensive. What this also means is that there are a fair number of signals from other channels that

separate dial -- the tried and true technique known as "bandspreading." So, while you usually can't tell precisely what channel the radio's tuned to, you can tell close enough to have a pretty good idea. Again, in this price range this is about all you can expect.

MS-103 Provides Wider Coverage

The only difference between the MS-101 and MS-103 is that the '103 covers the tropical band segments, plus 21 and 25 MHz that are missed by the '101. For this expanded coverage, it's well worth the additional twenty bucks for the '103. Both sets also cover the new 13 MHz band, which makes either a big improvement over the

cheaper \$74.95 Sangean SG-789, which does not cover 13 MHz.

Incidentally, the information we were given by Sangean some time back that the MS-101 was to replace the SG-789 does not appear to be correct, at least yet. According to Sangean dealers with whom we've spoken, the SG-789 continues to be supplied by Sangean, and is also available under other brand designations, such as the Emerson PSW4010.

The bottom line is that the Sangean MS-103, and to a lesser extent the '101, do just about what you would expect a very small radio in this price class to do. You can get an audible degree of better performance at about the same price from Sony's ICF-4920, also sold as the ICF-5100, because the Sony has double conversion and better selectivity. However, the Sony's coverage of the world band spectrum is seriously limited. So while you hear stations more clearly on the Sony, you don't hear as many stations.

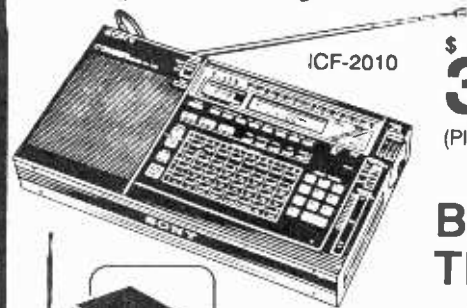


Passport's "RDI White Paper" equipment reports contain everything -- laboratory measurements, "hands-on" panel findings and user comments -- found during Passport's tests of communications receivers and advanced portables. RDI White Papers are available in the US from EEB and Universal Shortwave; in Canada from PIF Book-by-Mail, C.P. 232, L.d.R., Laval PQ H7N 4Z9; and in Europe from Interbooks, Stanley, Perth PH1 4QQ, Scotland, and the Swedish DX Federation.

A free catalogue of the latest editions of these reports may be obtained by sending a self-addressed stamped envelope these firms or to Publications Manager, International Broadcasting Services, Ltd., Box 300M, Penn's Park PA 18943 USA.

You can hear Larry Magne's equipment reviews the first Saturday of each month, plus Passport editors Don Jensen and Tony Jones the third Saturday, over Radio Canada International's SWL Digest. For North America, SWL Digest is heard at 8:10 PM EST on 5960, 9535, 9755, 11845 and 11940 KHz, with a repeat the following Tuesday at 8:30 AM EST on 9625, 11855 and 17820 KHz.

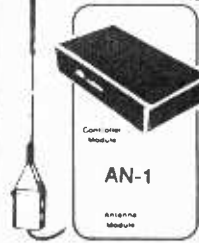
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OAK PARK, ILL. 60304



Great News from Magnavox

We recently heard a rumor that Magnavox was planning to raise prices on its world band radios in the US. Shortly thereafter, we heard another rumor that the D2935 and D2999 were to be discontinued as of February, 1989.

However, Pat Wilson, an official spokesman at Magnavox headquarters, tells us something considerably more encouraging. Far from raising the price on these models -- much less discontinuing them -- Wilson says Magnavox is *dropping* the price on all its world band radios.

These radios were already designated Best Values in the new *Passport to World Band Radio*, so now ... well, what can be said? The little D1835 that used to list at \$69.99 now has been dropped by ten dollars to \$59.95. The excellent D2935 midsize portable -- which is one of the best portables on the market, regardless of price -- has been dropped from \$249.99 to \$179.95. And the top-of-the-line D2999 has been dropped from \$399.00 to \$299.95.



Rumor had it that the excellent midsize D2935 (sold outside the U.S. as the Philips D2935) was to be discontinued.

Comparing Two Top Antennas

We recently had the opportunity to compare two long-time favorite, omnidirectional scanner antennas to determine which of the two was the better value. The two antennas were switched back and forth on the same metal mast, using the same coax feedline to an R7000 receiver for reading comparative signal levels at various test frequencies.

AV-801

(Approximate retail, \$49; no coax included)

Not too long ago, Antenna Specialists, a leading antenna manufacturer, assumed the assets of Avanti, including the popular AV-801 "Astro-Scan" rooftop monitor antenna. Originally advertised by Avanti as a tri-band (25-50, 140-174 and 450-512 MHz) base monitor antenna, Antenna Specialists has relabeled it for continuous 25-1000 MHz coverage.

While neither the photo nor the ads show assembly details, the antenna arrives as a prefabricated kit, requiring common workshop tools and about an hour for construction. The project shouldn't have taken that long since the exploded illustration is excellent, but following the assembly instructions proved frustrating.

In our sample, two swaged pipe ends were too large to be inserted into their mating tubing, even when tapped with a hammer; two of the radial elements as numbered on the pictorial are not the same as described in the text; one screw was too short to fasten once all the required washers were in place; an end "cap" to put over an element as shown in the drawing and called for in the instructions turned out to be a plug for insertion inside the tubing; two tubes of Teflon lubricant were included in the package, but there was no mention of them or their purpose in the instructions.

The quality of the components is excellent: heavy-duty, aluminum mounting plate; durable, seamless aluminum-tubing elements; and stainless steel spreader clamps.

After final assembly and checkout, the AV-801 was erected and tested. Because all side-mast-mounted "omnidirectional" antennas have some directional characteristics (often very

pronounced!), the AV-801 was turned 90 degrees and readings taken again.

5094A

(Approximate retail, \$45; includes 65 feet of RG59/U cable with Motorola plug)

Channel Master has maintained a low posture in the scanner antenna business, but their 5094A Monitenna has remained on line for a good many years. Originally designed for tri-band coverage (earlier model 5094) like its competitor, it has now been modified for improved 800 MHz performance.

Shipped in an oversized box, the antenna requires no assembly; once removed, its elements are pulled away from the boom where they snap into place. The metal is somewhat lighter weight than that used on the AV-801, but sturdy nonetheless.

A balun matching transformer with mounting clamp and 65 feet of RG59/U cable are included. It was alternately compared with the AV-801 on the same mast, using the same coax downlead. As with the competitor, it was rotated 90 degrees to accommodate directional affects for a second set of readings.

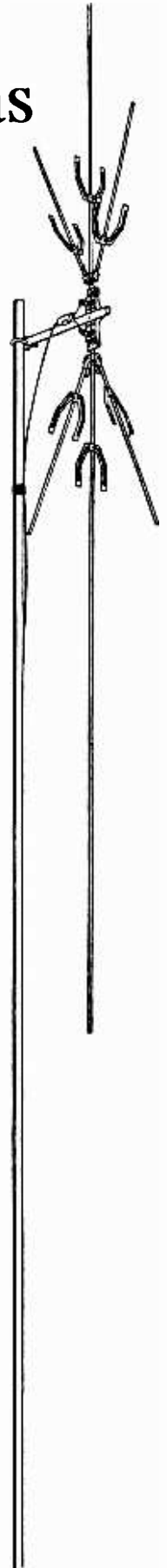
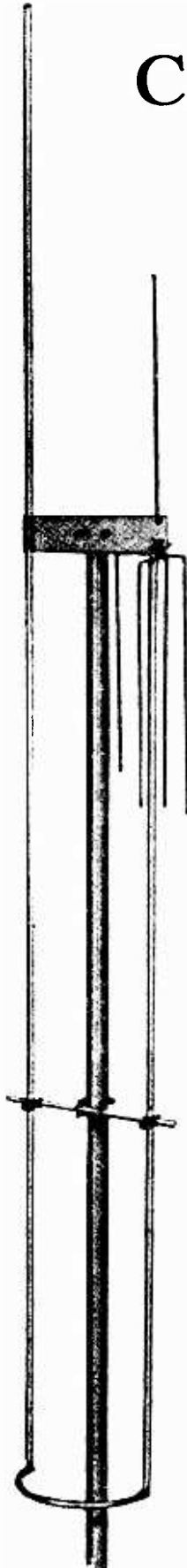
Results

At low band (30-50 MHz), and up through at least 100 MHz, signal strengths averaged out equally between the two antennas. At high band (150-174 MHz), several discrete measurements showed higher signal levels with the 5094--anywhere from 3 to 12 dB; a few were approximately equal.

At 255 MHz, in the military aircraft and satellite downlink range, signals undetectable on the AV-801 were loud and clear on the 5094. At UHF (406-512 MHz) signals seemed to average out equally again.

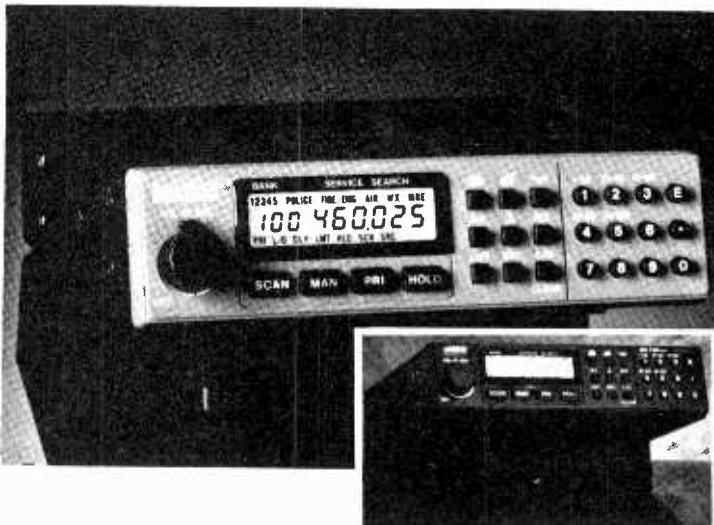
Conclusions

It must be remembered that absolute, reliable antenna data must be assembled over an extended period of time, using considerable numbers of frequencies and under a wide lati-



tude of conditions. Our test was relative and our conclusions based upon preliminary observations.

While either antenna would provide excellent scanner reception, the ease of assembly, provision of coax cable and apparently superior performance on some frequency ranges gives the nod to the Channel Master 5094A Monitenna. It is not listed in the Channel Master TV antenna catalog, but your dealer can find it at his electronic distributors.



Changes coming

News from Uniden

Uniden, manufacturer of the popular Bearcat scanner line, has revealed changes in several products presently on the market, the BC600XLT and BC950XLT (and presumably the BC580XLT and BC760XLT as well) scanners and the HR2510 and forthcoming HR2600 ten-meter amateur transceivers.

The demand for a CTCSS tone squelch option which allows reception of both tone-encoded and open squelch channels has prompted Uniden engineers to modify the scanner encoders which previously allowed only one function or the other.

An outcry from the amateur community protesting the easy conversion of the HR2510 to unlawful CB and freeband operation (26-30 MHz continuous) has forced Uniden to pot the frequency synthesizer circuitry to make it tamper-proof.

As an additional deterrent, Uniden claims they will void the warranty of any unit returned to the factory with the mod and forward the name and address of the owner to the appropriate FCC field office.

Two new scanners are slated for imminent introduction to the marketplace, the R1600 and the BC590XLT which will replace the BC580XLT. The 590 will have two upgrade innovations: a BNC antenna connector and a lithium backup battery for memory retention.



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Get a Grip on it!

Several recent purchasers of the high-performance Grove mobile scanner antenna (ANT4) reported that the magnetic base pulled loose at low road speeds. Since this had not previously been a problem and Grove had tested the mount at road speeds in excess of 85 miles per hour, the factory which supplies the base was contacted to see if something had been changed.

Sure enough, it had. A new vinyl anti-scratch boot holds the magnet too far from the car metal to assure good magnetic attraction. There is an easy fix. Simply remove the black plastic boot and the magnet will grip as tightly as ever!

For those who want anti-scratch protection, simply send an SASE to Grove Enterprises (PO Box 98, Brasstown, NC 28902) with a note stating your date of purchase of the ANT4 and requesting the adhesive-backed foil protector used on previous models. It will be mailed to you free of charge.

Do-it-yourselfers can improvise similar scratch protection for magnetic mounts by simply cutting a circle, using the round base as a template, of thin mylar (zip-lock baggies, etc.) and gluing it to the bottom of the base.

All ANT4 mobile antennas now being sold by Grove have had the problem corrected and the factory hopes to provide a future boot with thinner spacing.



How to Build a Frequency Converter

Do you enjoy building simple projects that are useful? If so, you may wish to construct a frequency converter that can be used with an AM radio to provide coverage of one of the shortwave bands.

The AM radio we discussed in November *Monitoring Times* can be used with a converter to enable you to listen to the high frequencies.¹ The AM receiver is tuned across its range to provide reception of signals in the HF (high frequency) spectrum, while the converter oscillator remains fixed at the crystal frequency. A calibration scale may then be added to the dial of the AM receiver for logging your favorite shortwave frequencies.

How a Converter Operates

We may use tunable or fixed-tuned converters for covering frequencies beyond the range of our basic receiver. When we place a tunable converter ahead of our main receiver, the main receiver is tuned to a particular frequency that we do not change. The shortwave tuning is done at the converter. It has a tunable oscillator rather than a crystal-controlled one. Therefore, this converter must have its own tuning mechanism and dial.

Alternatively, we can use a crystal-controlled converter, which requires that we tune the shortwave band by changing the dial settings on the main receiver. In this instance the main receiver is called a "tunable IF (intermediate frequency)" system. The frequency to which the main receiver is tuned is the IF for the converter. In other words, if we use an AM broadcast receiver as a tunable IF, the converter's IF varies from 550 to 1600 kHz as we scan the 1050 kHz-wide AM band spectrum.

A variety of tunable IFs may be used with converters. For example, if you have a receiver that tunes, say, 2 to 4 MHz, the outboard converter can be tailored for use across that tuning range. It is not necessary that we use an AM broadcast radio.

A good example of this concept is seen when we recall the earlier days of TV reception when outboard UHF converters were used ahead of the VHF TV receivers to permit coverage of the standard UHF channels. Radio amateurs have for years used homemade and commercial VHF converters ahead of their HF receivers in order to receive VHF, UHF and microwave signals.

An AM Receiver as the System IF

Most transistorized AM broadcast receivers have a built-in ferrite loop antenna. This means that the radio will pick up broadcast band signals, even when an HF converter is used with the AM radio. This is an annoyance, and it will spoil reception of the HF signals. Something needs to be done to prevent the broadcast-band signals from being heard when we listen to shortwave stations.

I enclosed my AM receiver in a metal box, and connected an earth ground to the box. This prevents pickup of all but the loudest AM-band signals. Even the nearby local AM station signals are so weak that they do not cause interference to the shortwave signals that are provided by the converter. The main tuning, audio gain and on-off controls are relocated to the front panel of the metal cabinet for the sake of convenience.

It is an easy matter to shield the AM radio module that was shown photographically in my November 1988 *MT* article. If you have a different radio, simply remove the circuit board from the plastic cabinet and install it in a metal case as described in the foregoing text. The circuit modifications suggested in the previous article are recommended if you plan to use a converter with your transistor radio. The small link that is wound on the ferrite loop will serve as your coupling circuit to an outboard converter. This link may be routed to a phono or coaxial jack on the rear of the metal cabinet.

Unfortunately, AM broadcast-band radios do not contain a BFO (beat frequency oscillator). This circuit is necessary for the reception of CW (continuous wave) and SSB (single sideband). Without a BFO the CW signals appear as dull thumping sounds in the receiver. SSB signals sound garbled and you cannot understand what the operator is saying.

A BFO provides a beat note for CW reception when its signal is beat against the incoming CW signal. This provides an audible tone in the speaker. The tone results from the difference between the CW signal and that of the BFO -- usually 400 to 1000 Hz offset, depending upon how you tune in the CW signal. For SSB reception, the BFO supplies the missing SSB carrier to allow a near equivalent to AM signal reception.

Most transistor AM receivers use a 455-kHz IF. Therefore, should you desire to add a BFO, you can build a one-transistor 455-kHz oscillator and feed its output signal to the diode detector in the AM radio. The BFO energy is applied between the detector diode and the last IF transformer of the AM radio. See Figure 1 for a suggested circuit. The upper part of the circuit diagram shows the last IF amplifier and AM detector in a typical AM transistor radio. Note that the 56-pf coupling capacitor from the BFO is attached between D1 and the secondary winding of the IF transformer.

The BFO in Figure 1 is a tunable type. A 455-kHz IF transformer may be taken from a discarded AM receiver and used for T1. The smaller winding (1 & 2) is used for feedback in order to make the 2N3904 oscillate. If your BFO does not oscillate, reverse the T1 leads marked 1 and 2. Oscillation will not occur unless the phasing of the two windings is correct for obtaining positive feedback. Tune T1 for the proper

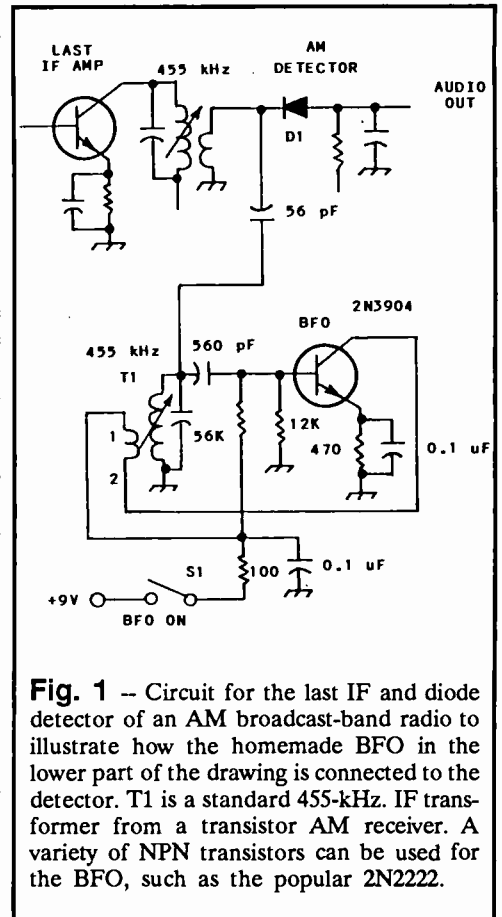


Fig. 1 -- Circuit for the last IF and diode detector of an AM broadcast-band radio to illustrate how the homemade BFO in the lower part of the drawing is connected to the detector. T1 is a standard 455-kHz IF transformer from a transistor AM receiver. A variety of NPN transistors can be used for the BFO, such as the popular 2N2222.

audio quality when listening to an SSB signal, after first tuning in the SSB signal for maximum strength. This setting will also permit CW reception.

A Converter for 7 TO 8 MHz

The range from 7 to 8 MHz will enable you to hear Amateur radio signals (CW and SSB), Radio Moscow, the Canadian time station (CHU) and a host of other foreign and domestic broadcasts. I chose this range mainly to acquaint you with BFO use for CW and SSB, since most shortwave broadcasts are done in the AM mode. The 40-meter ham band will contain CW and SSB transmissions.

Figure 2 shows the circuit for our simple shortwave converter. A dual-gate MOSFET is used as the mixer. T1 is tuned to 7.5 MHz for peak signal strength. T2, the IF transformer, is tuned for the center of the AM-Radio tuning range. A resistor is shown across the T2 primary winding. It is used to lower the tuned-circuit Q in order to broaden the response of the IF transformer. The lower the resistance value the greater the bandwidth, but the lower the converter gain. Experiment with this

resistor value to obtain the results you want. Values between 2.2K and 10K are normally used for this part of the circuit. The output of T2 (secondary) is connected to the input link on the AM-radio loop antenna.

Q2 is a JFET (junction field-effect transistor). It operates as a crystal-controlled oscillator at 8550 kHz. This frequency minus 7000 kHz equals 1550 kHz, and 8550 minus 8000 kHz equals 550 kHz, the tunable IF range of the AM receiver. Output from Q2 is injected on gate 2 of the Q1 mixer. The Q2 signal, when mixed in Q1 with the incoming 7-8 MHz signal, provides the IF of 550-1550 kHz at the output of Q1.

Construction

You may build the Figure 1 and 2 circuits on perforated board. Keep all signal leads short and direct in the interest of good performance. If you're experienced with circuit-board layout and fabrication you may prefer to build your BFO and converter on a PC board. Surplus computer crystals are available in frequencies close to 8550 kHz. You may wish to use one of these low-cost crystals if they are reasonably close

to the desired 8550 kHz frequency. A corresponding change in the tunable IF versus received frequency will occur when you use a crystal that is offset from 8550 kHz.

Final Remarks

The purpose of this article is to familiarize you with converters and how they operate. I urge you to tackle this project as a learning exercise. You may wish to alter the constants for T1 of Figure 2, plus the Q2 crystal frequency, to permit reception of other portions of the HF shortwave spectrum. No other circuit changes are necessary. The converter in Figure 2 represents, perhaps, the simplest circuit that can provide acceptable performance. I chose it over an elaborate, high-performance converter in order to keep this project simple and to the point.



References

- 1 DeMaw, "Improving AM Transistor Radio Performance," *Monitoring Times*, November 1988, page 92.

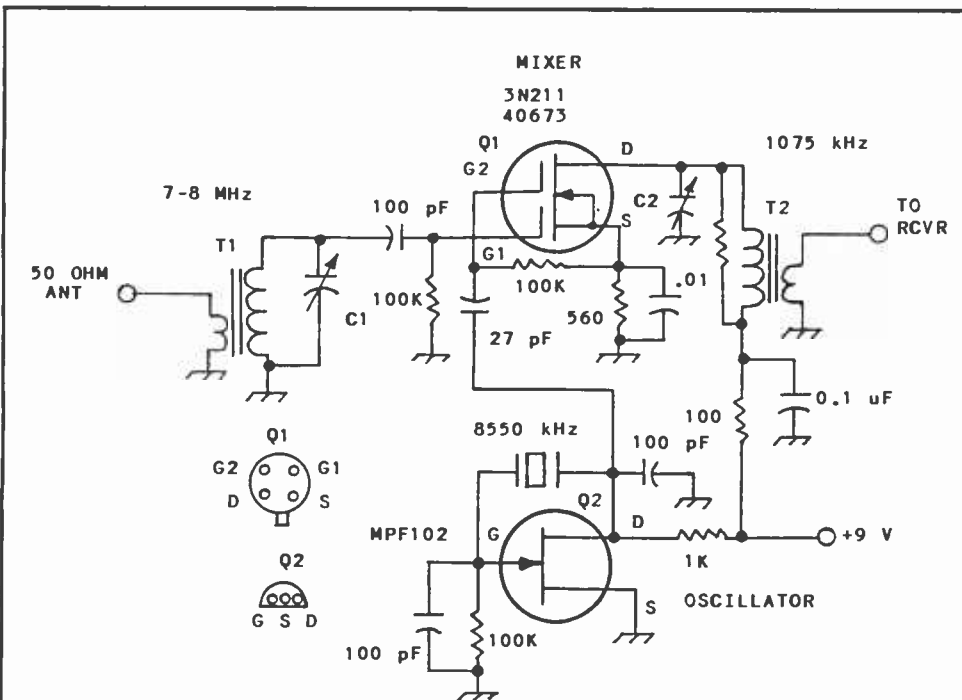


Fig. 2 — Schematic diagram of a practical shortwave converter for use with a broadcast band AM radio to permit reception from 7 to 8 MHz. C1 is a 100-pf ceramic or mica trimmer. C2 is a 300-pf mica trimmer. T1 has two turns of no. 26 enamel wire on the primary and the 6-uH secondary has 33 turns of no. 26 enamel wire on an Amidon Assoc. T68-2 powdered-iron toroid. T2 has an 80 uH primary winding. Use 34 turns of no. 28 enamel wire on an Amidon Assoc. FT-50-61 ferrite core (125 mu). The T2 secondary has 5 turns of no. 28 enamel wire. (Amidon Assoc., 12033 Otsego St., N. Hollywood, CA 91607). All fixed capacitors are disc ceramic and resistors are 1/4 watt carbon composition.



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The Dynamic Duo

by Ken Cornell

No, I am not writing about Batman and Robin, but rather a small active antenna working with a regenerative preamplifier that will provide amazing results for reception from the VLF to HF frequency range.

The unit consists of a short whip antenna mounted in a weathertight enclosure along with a broadband amplifier. Coax cable is used to allow the antenna to be placed at a remote location. A simple resistor/capacitor network is used at the receiving end to provide power supply isolation and receiver coupling for the antenna.

This antenna provides excellent reception from the VLF (10kHz) range through the amateur radio 2 meter band (148 MHz). The circuit is shown in figure one. Construction suggestions will be covered later in this article.

Most of us are familiar with an RF preamplifier (also called preselectors). They can be a valuable asset to receivers that lack sensitivity, particularly in the LF and HF range.

If we add feedback between the RF amplifier's output and input circuit, the amplifier can be placed in an oscillating condition. By carefully controlling the amount of feedback between RF amplification and oscillation, we form a regenerative

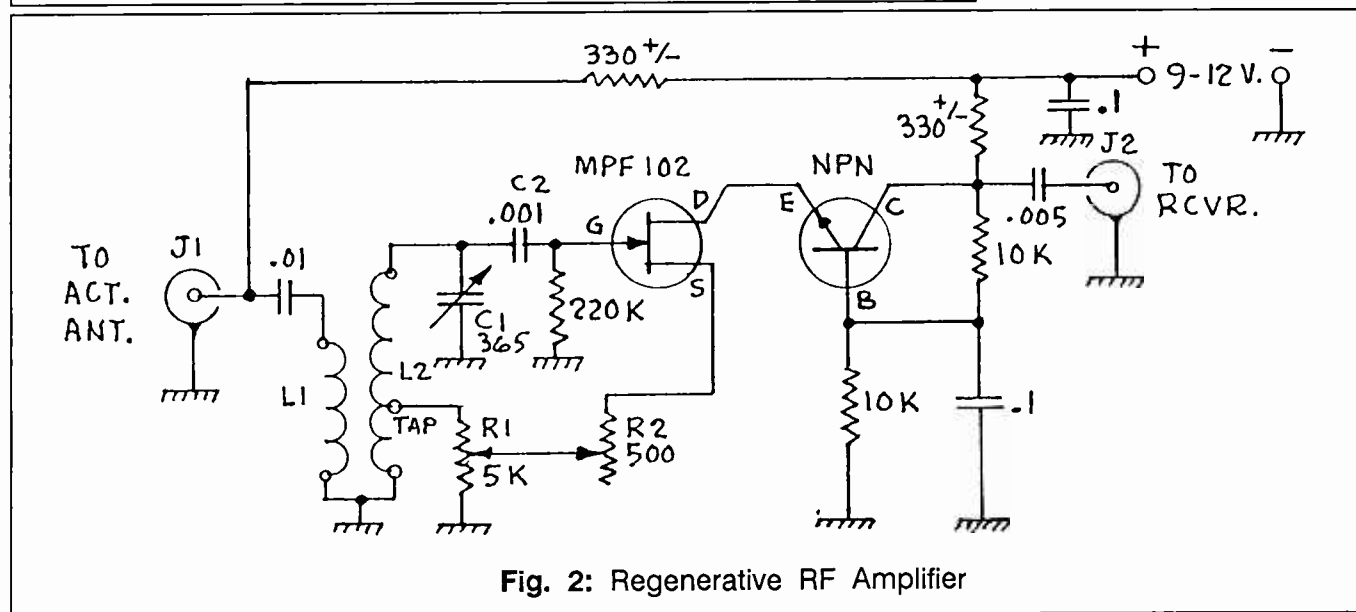
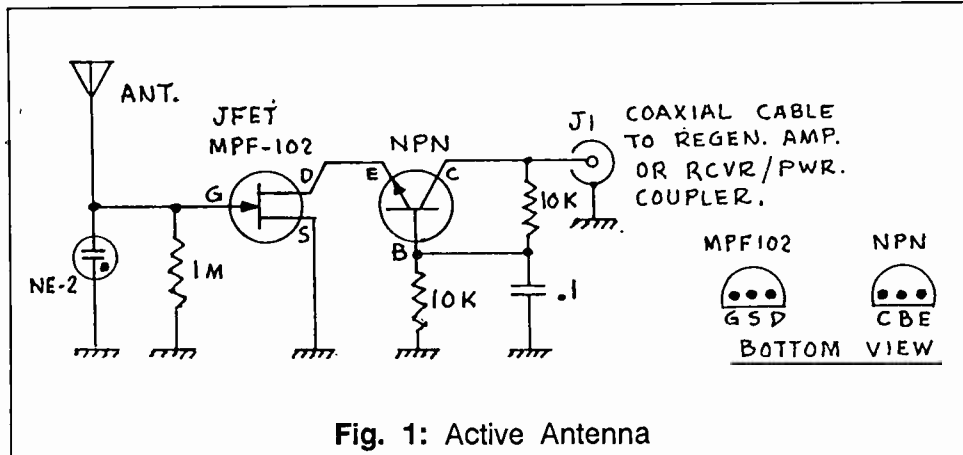
RF amplifier.

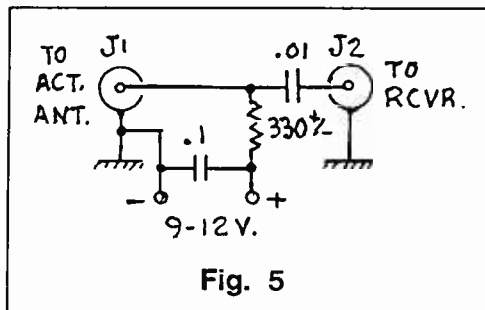
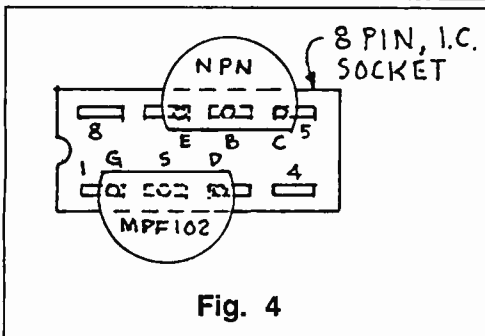
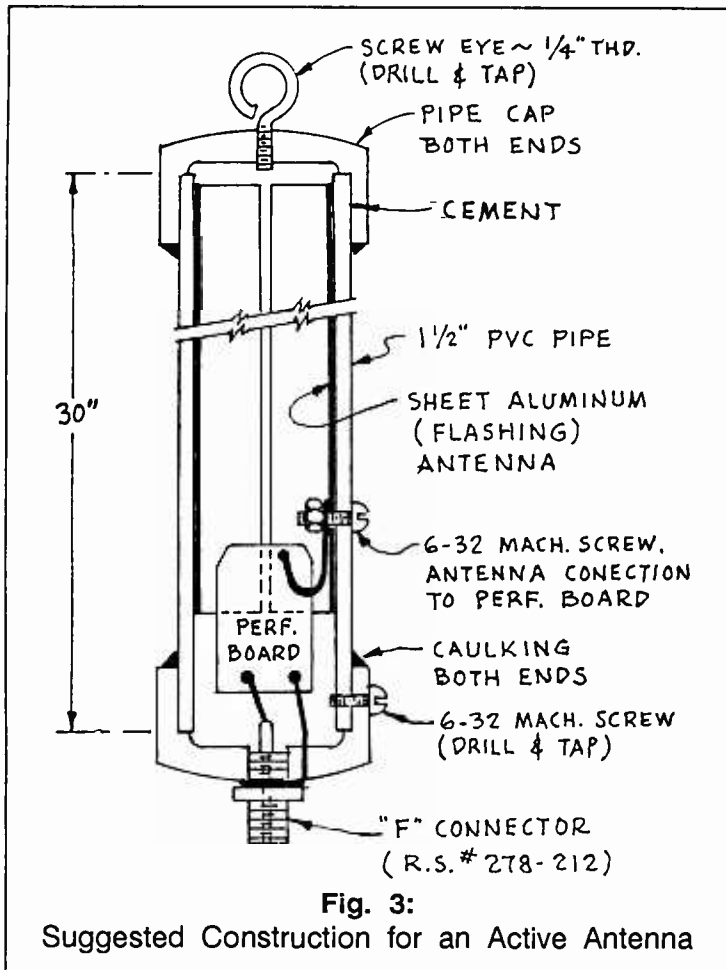
When the feedback control is set at the threshold of oscillation, the tuned circuit "Q" is increased a thousandfold and will peak-up a received signal and improve selectivity tremendously! A circuit for a regenerative RF amplifier is shown in figure two.

Construction of a practical antenna is shown in figure three. The housing is a thirty inch length of inch and a half diameter PVC pipe with pipe caps at both ends. Insert a four and one half inch wide by twenty-eight inch long sheet of aluminum flashing (copper is okay, too) rolled to fit the inside diameter of the pipe. This is the actual antenna.

An alternative would be to insert (STUFF) heavy duty aluminum foil inside the pipe and at the bottom, make a double fold and punch a hole for a 6/32 machine screw with a solder lug and nut. Solder a short length of flexible stranded wire to connect to the perf board. A one quarter inch screw eye in the top cap will allow the antenna to be hung from any convenient structure.

Install the "F" connector by filing a flat on the outside center of the bottom pipe cap. Drill a 23/64 inch diameter hole and screw the connector in; it will cut its own





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threads, hence assuring a weather-proof fit.

Use a piece of perf board 1-1/4 by 2-1/4 inches to mount the parts for the active antenna. Transistor sockets or an 8 pin IC socket as shown in figure four should be used to make removal of the transistors easy; this will allow you to experiment to find the most sensitive devices for your amplifier.

The coils (L2) are commercial units, Miller 9011 thru 9019, (inductance ranges from 40uH through 750mH). L1 is magnet wire of about the same size and consists of about 25% of the total turns of L2 wound on the cold end of L2. Exact wire size and number of turns is not extremely critical. If you wish, experiment with L1 to obtain the results you desire; more turns increase gain but lower selectivity. You can mount the coils on a socket such as a five pin automotive speaker plug or octal plug to provide plug in coil band changing. Or use a switching system to change coils for the respective bands.

All of the coax connectors can be your favorite type. An F connector is suggested for the active antenna if it is to be mounted outside. The NE-2 neon lamp provides a small measure of lighting protection; however, any outside antenna should be fitted with an approved lightning arrestor.

Use a vernier dial for C1 because tuning is extremely sharp on the HF bands. Resistors should be 1/4 or 1/2 watt and capacitors should have a minimum rating of 35 volts. The NPN transistor is any general purpose RF amplifier; the 2N2222A is a good choice.

Test your active antenna board in the enclosure before installing it at the final location.

Projects for Experimenter's Workshop, while reviewed by our Technical Editor, are submitted by readers and remain experimental.

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Goliaths of the Antenna World

Quite a while back some readers will remember that I ran a contest to see what we could come up with as the world's largest and smallest antennas. We found some remarkable ones, including the tiny antenna for a "transmitter in a pill," the giant dish at Arecibo, and a number of others. But there are many other large antennas around, and some of them are very impressive.

This month we'll take a look at some large specialized skywires designed for commercial, industrial, maritime, embassy, military, and shortwave broadcast work.

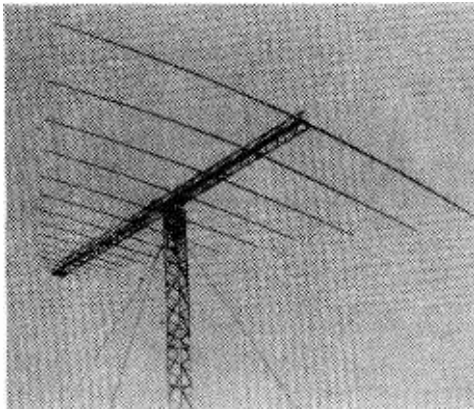


Fig. 1: A log periodic beam antenna design provides outstanding bandwidth (All photos by Hy Gain)

A Whole Ton of Antenna!

For instance, take a look at Figure 1. The log periodic beam antenna pictured there has a boom length of over 64 feet and weighs in at 1,400 pounds! This high power (50 KW) antenna boasts a forward gain of 10-13.5 dBi over the very broad range of 6 to 40 MHz! And its sister, designed for use from 3 to 30 MHz, weighs in at over 2000 pounds.

Yes, folks, that's over a ton of antenna! As you might expect, they are very rugged and can stand up to a lot of abuse from the elements.

Notice that the bandwidth of the log peri-

odic beams discussed above is extremely broad. The 3 to 30 MHz bandwidth of the second one mentioned just happens to be the entire high-frequency spectrum! Very few beam antenna designs have that kind of bandwidth.

Before the advent of the log periodic design, the rhombic was about the only way to achieve such bandwidth in a single beam antenna. Of course, the rhombic took several acres of ground to get the job done.

A Conical Whaticle?

Now let's take a look at the conical monopole of Figure 2. This design features the same wide bandwidth as the log periodic just discussed (3 to 30 MHz), but has an omni-directional (nondirectional) pattern rather than a beam. This gives the antenna a good all-around coverage, providing both long and short range communications potential by utilizing either ground-wave or sky-wave propagation.

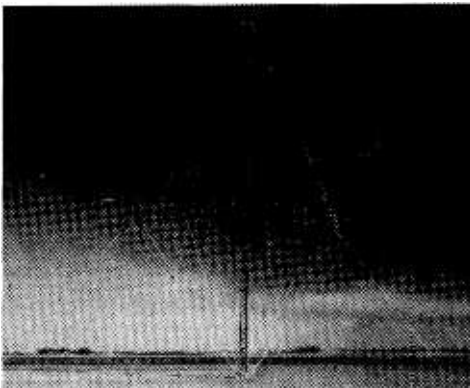


Fig. 2: This conical monopole antenna looks more like a birdcage than an antenna!

The monopole is over 70 feet in height, and has a ground screen composed of 30 wires, each 80 feet long. Net weight for this baby is over 1000 pounds. Yep, that's half a ton. Although this antenna is not what you'd call a backpacker's special, one version of it is designed to be installed by four men in

two hours -- not bad for such a giant.

Curtain Times

We sometimes hear of "curtain" beam antennas which are used by shortwave broadcasting stations for long-haul transmission. To qualify as a curtain antenna, an antenna must have a number of wire elements draped in such a way that they resemble, at least slightly, a drapery curtain.

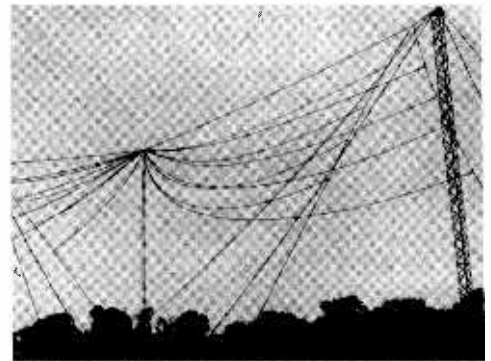


Fig. 3: A broadband curtain-dipole antenna system

The broadband dipole of Figure 3 has such a "curtain" of elements, and thus can be called a "curtain dipole". Bandwidth for this antenna is remarkably broad: 2 to 30 MHz. Erected on 80 foot towers, it can withstand winds of 140 miles per hour. The broadband curtain dipole is designed for short, medium, and long range communications circuits. As with many dipoles, the radiation patterns of this antenna are more omni-directional than beam-like.

And for just plain visual interest, the vertical unicone of Figure 4 is hard to beat. Providing high power service from 2 to 30 MHz, these antennas provide excellent omni-directional coverage across the entire HF band, and then some. Primary applications for such skywires are ground to air, shore to ship, station to mobile, and other HF broadcast applications.

Q. On what frequencies do medical helicopters communicate with hospitals? (Dal Watson, Lubbock, TX)

A. They use the hospital's own VHF or UHF frequency (155.340 MHz in this area). The only time they use 118-136 MHz AM is for routine air-to-ground navigation. Medical choppers are commonly equipped with frequency-agile transceivers like those made by Wulsberg.

Q. How high should I mount my shortwave receiving dipole? (William O'Connor, New Bloomfield, PA)

A. The old saw, "Mount it as high as you can" is still valid. There are some practicalities about the matter, however. Generally speaking, if a horizontal wire antenna is at least 15 feet above the ground, it should work just fine. You would probably have to raise it to 30 or more feet for any detectable difference.

Due to their longer wavelengths, low frequency reception is more height-conscious than higher frequencies. If considerable listening is done below 3-5 megahertz, the higher the antenna the better (50-60 feet), otherwise the pattern of greatest reception will favor overhead rather than the horizon (short

skip rather than low angle DX and ground wave).

Q. What are the modes and channel spacing increments used in the 225-400 MHz military aircraft band? (Joseph Girdler, San Juan Capistrano, CA)

A. Channel spacing is 25 kilohertz, mode is AM. When monitoring satellite downlinks in the 240-270 MHz portion of this band, voice is usually wider-band FM (30 kHz deviation), SSB or even digital encryption.

Q. While touring San Diego, I saw an enormous, circular steel and wire antenna system with a concrete building at the center at the Imperial Beach Naval Communications Center. Is this one of the "elephant cage" antennas described by author James Bamford in Jock Elliott's article, "Code Name: Esquire", May MT? (Richard Draper, Greer, SC)

A. Undoubtedly. Occupying some acreage, these giant radio-direction-finding arrays are more properly called "Wullenweber arrays" and are capable of resolving the bearing of an HF signal within a fraction of a degree.

Charge it!

Betty Curran of Clifton Springs, NY, asks how to avoid overcharging batteries, and if they can be charged while in use.

A good rule of thumb is to charge the nickel/cadmium (NiCd) battery only long enough for it to give about 6-8 hours of continuous service with the scanner; this may be only 4-10 hours for a partially charged battery or 10-15 hours for a depleted battery.

Repeated overcharging will reduce the anticipated lifetime of a NiCd. If it isn't allowed to deep cycle (fully discharge) occasionally, it will develop "memory", a condition whereby it senses its high and low charge state as being very close to each other and gradually loses its high capacity.

If you have a multimeter or V.O.M., you can actually gauge the appropriate charge rate. Read the capacity on the battery label

(typically 450-600 milliampere-hours, conventionally abbreviated 450-600 mah); your recharge current rate should be roughly 10% of this current or about 45-60 milliamperes.

By measuring the actual current being consumed by the radio, you can determine how long you should charge. For example, if you insert the meter between the battery wire and the playing radio and it reads an average of 50 ma., and you have operated the radio for 4 hours, then you would need to charge it for at least 4 hours at 50 ma. just to replenish the expended current.

Proportionally, if the radio draws 100 ma. of current and the charger only produces 50 ma., then you will have to charge it at least twice as long as it played. Since no battery is 100% efficient, add an extra hour of charge time.

Q. Why do scanners, including the so-called "wide frequency coverage" units, skip the 512-806 MHz range? (Dal Watson, Lubbock, TX)

A. This is the domain of UHF TV stations, of little interest to scanning enthusiasts.

Q. While Police Call directories are excellent sources of public service scanner frequencies, where does one find listings of business and commercial frequencies? (Chris Johnson, Keyport, NJ)

A. Business and commercial two-way frequency lists are virtually non-existent, at least for the vast majority of the country. Some enterprising listeners have published comprehensive public safety directories for their monitoring areas, but these are few and far between and no business directory exists for the New York/New Jersey metroplex.

The FCC, of course, maintains master files for all services. Microfiche copies are available from the National Technical Information Service (NTIS), US Department of Commerce, Springfield, VA 22161. Write or call 703-487-4650 to order the free promotional list PR-718-1 which describes various sets and their prices.

Q. I have a Sangean ATS803A portable receiver. When I am on a trip, the wake-up alarm comes on automatically, running down the batteries needlessly. How can I deactivate the clock circuit? (Benjamin Brewster, Amherst, NH)

A. I suspect that the timer button is being accidentally depressed during the trip; if not, the function is defective and the radio should be sent to a Sangean warranty repair center for service.

In lieu of that, you may wish to remove the batteries during transport rather than permanently unsoldering or clip-

ping the lead to the timer switch.

Q. I read recently that the ICOM AH7000 discone antenna is a popular target for lightning strikes. Is this true? (G.C. Willis, Morehead City, NC)

A. No more so than any other antenna which is elevated above the ground so that it competes with nearby lightning targets. Disconnect any antenna cable from your scanners and receivers when unattended during lightning season, even if you have lightning suppressors installed.

Q. I am restoring an old Hallicrafters receiver. Where can I buy tubes? (Chuck Merchant, Chicago Heights, IL)

A. Check with your Radio Shack dealer for their unadvertised inventory of replacement tubes. Also call one of the long-standing radio/TV repair shops in your area. Next, try a specialty dealer like TUBES, 1219 Wincanton, Deerfield, IL 60015; Unity Electronics, PO Box 213, Elizabeth, NJ 07206; International Components, 105 Maxess Road, Melville, NY 11747; or Richardson Electronics, 40W267 Keslinger Rd, LaFox, IL 60147.

Numerous small dealers and collectors specializing in tubes advertise in Antique Radio Classified, a sample of which is available for \$2 from A.R.C., PO Box 2, Carlisle, MA 01741.

Q. I have replaced the "rubber duckie" antenna on my hand-held scanner with the Grove ANT8 extendable whip, but I can't notice any improvement. How come? (C.A. Luse, La Mesa, CA).

A. A long, resonant antenna must capture greater signal strengths than a shorter antenna but, depending on several factors, the improvement might not be noticeable in all instances. Theoretically, there may be as much as 3 dB improvement when the length is doubled (all other factors being equal -- which they never are!). This is only half an S-unit and would only be noticed on very weak signals with significant background hiss present.

You should notice a sizeable improvement on low band (30-50 MHz) with the ANT8

fully extended when compared to the original duckie, and slightly less improvement at the higher frequencies. Your noticeable results will depend upon initial signal strength, your location, signal frequency, adjusted length of the whip, presence of nearby obstacles (including your body), and position of the radio.

Q. Is there any chance of hearing the Space Shuttle transmission direct here in Europe? (Gil Torbeck, HQ USEUCOM)

A. Absolutely. When the Shuttle makes its passes north of the equator. All depends upon your latitude, the orbital parameters of the Shuttle and your equipment. Listen on 259.7 MHz AM (primary) and 296.8 MHz (secondary) for direct Shuttle-to-ground communications, and to W3NAN on 20 meters for rebroadcasts in upper sideband.

Best results are being reported from listeners with good outside antennas.

Q. Why can't I enter the real frequency like 162.4375 MHz into my scanner? It only shows 162.435. (Dal Watson, Lubbock, TX)

A. While 0.5 kHz resolution would be 10 times more accurate than 5 kHz (that's what you have now), it is more expensive to build such a scanner and scan/search speed would be slowed down dramatically by such tiny increments. Because narrowband FM modulation techniques are quite broad, such extreme tuning accuracy is unnecessary to hear the station.

Q. A friend of mine has lost an earlier issue of MT. Are back issues available? (D.H. Dyson, Lancashire, England)

A. Unfortunately, not before about two months earlier due to the rapid growth of our subscription list and the requests for samples.

Q. I'd like to see Grove Enterprises bring back their Scanner Filter. The pirates in Toronto want over \$100 for such a filter! I'm positive the demand is there. (Eric Sillick, Don Mills, ONT)



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A. The demand is growing due to the increase in interference in our electronic age. Grove Enterprises is developing an improved version of their popular Scanner Filter for introduction some time in 1989.

Robert Edler reports that in our December column, in the GRE800 hint, he set his adjustable 12 volt power adapter to 7.5 volts, rather than 9, to correct the alignment on his converter.

Questions or suggestions sent to MT are printed in this column as space permits. If you prefer a reply by return mail, you must include a self-addressed, stamped envelope.

LETTERS

continued from page 3

Receiver Talk

"I read with interest the comments from three Sony ICF 2010 owners," says Harold M. Schneider of Montchanin, Delaware. I'd like to add a few comments of my own -- mainly positive.

"First, in order to prevent static electricity damage, I always unplug the power and antenna jack when the unit is not in use. Second, I built a stand for the radio so that it faces me at a 45 degree angle. The face of the unit is illuminated with a small halogen spotlight. Third, despite using external antennas like the Alpha Delta 'Sloper' and Metz trap dipole on shortwave, a Radio West loop (the big one) on mediumwave and a Parsec LS-3 on FM and Air Band, there is no overloading."

Harold also uses an antenna tuner and, when not using earphones, a set of AR "Power Partners" to provide "satisfying, room-filling sound."

Weird Batteries

In that same issue we mentioned that we were able to correct problems caused by loose batteries (memory loss, etc.) with a well-placed piece of foam in the battery case. Bob Grove relays the following tale.

"A recent call from a Sony ICF-2010 owner had us puzzled. He had purchased a brand new set of Mallory type AA Duracells (which power the '2010's microprocessor) yet his display faded out after just a few days. Assuming he might have bad batteries, he replaced them with another new set. Sure enough, out went the display again!

Letters should be addressed to **Letters to the Editor**, Monitoring Times, P.O. Box 98, Brassstown, 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.

"Our resourceful reader described the problem to a friend who also had a '2010. His friend replied, 'I'll bet you're using Duracells!' It seems that the Mallory cells are physically smaller than the battery holder is designed for. And it's also true for the main power-supply batteries as well. The Sony ICF-2010 manual recommends Eveready batteries and apparently there's good reason."

Mike Wallace of Lakehead, California, writes to say that he purchased one of those G.E. World Monitors from EEB. Mike says it's going to be a gift -- "If I can part with it. Thanks for the tip." *MT's* own Ike Kerschner bought one, too, and I had the opportunity to drool over it during a recent visit to the Kerschner ranch. That is one fine little radio for the price. Too bad they're all gone.

It's a shame there's not more solid, no-frills, low-priced receivers out there. That's what Bruce Heatley of Buffalo, New York, says. "I'd like to see manufacturers come up with radios that put performance first, not features. Things like Grove's new high-end receiver and AOR's unit."

Sorry, Wrong Message

"Can you believe it?" asks Willie Niles of Canton, Ohio. "Jordan signs on with these powerhouse transmitters and all they play is rock music. I cringed when I heard an English-accented woman spinning Huey Lewis hits. Why no Arabic music? Why no news from Jordan? No cultural programs?"

Perhaps you're looking for some traditional shortwave fare like Radio Sofia's numbing 164-part series on copper wire production in Bulgaria. No, what I want to hear from a foreign radio station is what the locals hear, only in English. But that's my

personal preference. While I'm no big fan of Top-40 on shortwave, I can assure you that I'll stop listening to Jordan when they start part 1 of the history of sand. In any case, they do have a major newscast in the English service from 1700 to 1725 UTC on 9560 kHz.

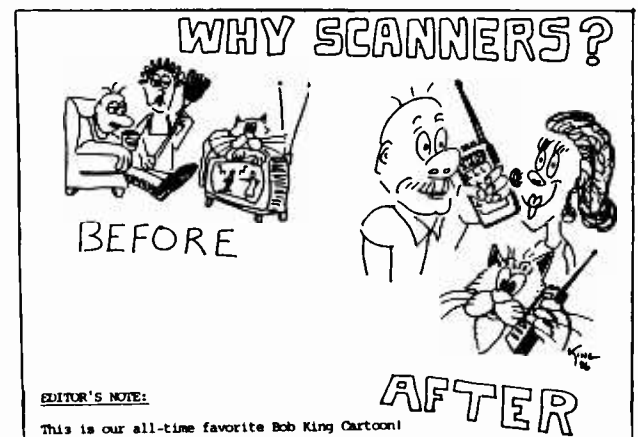
Family Magazine

Mark Widerstrom of Houston, Texas, wrote in to say that *MT* is indeed, "a family-oriented" publication. You don't think so? Look at the type of people who are subscribing.

"Communications fascinates me," says Sheila M. Giardino, KA1AVQ. "I am an amateur radio operator, licensed since 1978. Also, I'm a former teacher (2nd and 3rd grades), and now a homemaker and mother of four children. I was widowed three years ago when my husband, also a ham, passed away suddenly in his sleep at the age of forty-two. His call was WA1ZOZ. My oldest son is KC1G. He became an extra class at the age of eleven!"

"As you might imagine, we have scanners, 2 meter, 220 MHz, 440 MHz, SW, etc, radios throughout the house. And we couldn't fit another antenna on the roof if we wanted to (well, maybe we could squeeze one in). The trees are well-wired, also," says Sheila.

Welcome aboard, Sheila. Your letter reminds us of one of Bob King's cartoons that appeared in *Northeast Scanning News*.



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Wanted: GE MODEL 7-4885 digital clock radio. State condition and price. Ernest Johnson, Box 1191, Johnson City, TN 37605.

Wanted: RF CHOKE for Hallicrafters S-108 receiver. Part #050-300-243. Choke is dual stage tuning pot for RF section. Send price wanted to 975 Meriden Road, Box 5, Waterbury, CT 06705. Anyone within 50 miles of Waterbury, CT, who can fix this unit, please write.

INFO-TECH M600A mint condition w/PPO for printer and Zenith monitor, mint condition, \$500 or best offer. Steve, N4JQQ [313] 884-2382 after 2300Z.

Wanted: AUSTRALIAN Military Aviation

Frequencies: VHF, UHF, and HF. I will pay. Michael Donworth, 1308 Shady Hollow Ct., Euless, TX 76039 [817] 267-0619.

Sell: UNIDEN JIL-SX400 scanner, 20 channels 20-520 MHz and RF converter RF-8014 for 800-1400 MHz continuous coverage - \$296.00 MO. Cash for manual for TONO-777. Want REGENCY HX-2000. Call Matt KP4GO [512] 675-3323.

JIL SX-100 scanner. Works but needs power supply, power switch and antenna - \$25. AKAI AA-R32 45WPC stereo receiver - \$75. Call Barry [212] 828-0411.

For Sale: RTTY/CW computer interfaces. Both in mint condition. AEA CP-1 \$70. MFJ-1224 \$45. Shipping included. WA3CUQ, Don [215] 683-7592.

For Sale: BUTTERNUT Model 10 - 11 meter compact beam antenna, brand new - \$70. UNIDEN PRESIDENT HR2510, 10 meter amateur transceiver, brand new \$200. Call [716] 693-5290 after 4:00 pm EST.

For Sale: ICR 70 ICOM for \$350. DYMEK DA1000 Stoner Antenna - \$75. IC SP3 speaker for ICOM 70 \$25. ASTRON RS 4A power supply \$25. TAKE ALL for \$425 and I will ship at my cost. I will also consider swap for 2010 SONY plus \$137 cash. Equipment works very well and has been used little. Space requires me to down-scale equipment. Contact Joe deBeauchamp, 801 Deercliff Road, Bainbridge Island, Wash. 98110 or phone [206] 622-7200, evenings [206] 842-0165. You may call collect.

For Sale: REALISTIC 200 channel PRO-2021 programmable scanner, used 3 months; \$260 Call Mike [312] 579-0796.

SANGEAN 803 with stand, MFJ-1020A active antenna - \$210. Will separate. Bob Berg, 3539 Warringham, Waterford, Michigan 48095 [313] 623-6636.

KENWOOD R-2000, excellent condition, with manual - \$450. Call David at [314] 443-2964 after 6pm CST.

REGENCY HX1000 handheld programmable scanner - excellent condition, seldom used; Box, manual, accessories - \$100. Dann McKee, Box 2316, Winter Park, FL 32790.

UFOs REAL? Researcher seeks reports of activities related to UFOs, coverup, with frequencies, location. Write Vince, Room 167, 1493 Beach Park Blvd, Foster City, CA 94404

For Sale: NRD-92 communications grade receiver with NDH-95 scanner/timer (make offer). Excellent condition. Also ICOM IC-2KL with P.S. \$800. DAIWA CNA 2002 2.5 kw Auto Tuner \$225. R-71A with FL44A filter \$600, excellent condition. Call John [305] 235-5246 weekdays after 5p.m. EST. Will ship UPS C.O.D. only.

KENWOOD R-5000 (YK-88A1AM, YK-88SN SSB, scanning mod included) flawless condition and DATONG FL-2 audio filter (used 4 hours), with manuals, in original cartons, plus many extras. Hearing loss and sudden illness force sale. Michael [707] 943-3217. \$875 UPS prepaid.

HOUSTON - Wish to trade scanner frequencies for Houston and surrounding areas. RW, Box 890883, Houston, TX 77289.

ICOM R-7000 with 12 volt adaptor \$925. DRESSLER active HF antenna \$125. Lee Amoroso, P.O. Box 2996, Grand Junction, CO 81502 [303] 464-5405

Need to contact someone with a manual for a R-274/FRR ARMY SURPLUS receiver. Call collect at [501] 352-5907 between 5p.m.-8p.m. and ask for Bob.

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Date	Location	Club/Contact Person
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Feb 18-19	Sarasota, FL	Sarasota ARA/ Allan Matlick W2TKU 1817 Buccaneer Terrace, Sarasota, FL 33581
Feb 25-26	Cincinnati, OH	Ohio State Convention/ Stanley Cohen WD8QDQ 2301 Royal Oak Ct, Cincinnati, OH 45237
Feb 26	Dearborn, MI	Livonia ARC/ Neil Coffin WA8GWL 35681 Hees, Livonia, MI 48150
Mar 12	Conneaut, OH	Conneaut ARC/ Ray Keskinen W8HUK 86 Sandusky St, Conneaut, OH 44030
Mar 18	Walton Bch, FL	Playground ARC/ HJ Huddleston KF4BU 925 Forest Ave, Ft Walton Bch, FL 32543B
Mar 18-19	Charlotte, NC	Hamfest & Computer Fair/ Robert Starling N4GVF 7921 Holly Hill Rd, Charlotte, NC 28227
Mar 19	Grosse Pt Wds, MI	MSE Mich ARA/ Steven Corso KV8G 34556 Summers, Livonia, MI 48154
Mar 26	Annapolis, MD	RCMS of MD/ Izak Luchinsky (Tour of ARINC Hdqtrs PO Box 5722, Baltimore, MD 21208
Mar 31-Apr 2	Kansas City, MO	Midwest Div/ Chuck Miller WA0KUH 7000 NE 120th St, Kansas City, MO 64166

Monitoring Times is happy to run announcements of radio events open to our readers. Send your announcement at least 60 days before the event to: Monitoring Times Convention Calendar, P.O. Box 98, Brasstown, NC 28902.

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A couple of comments from *MT* readers:

"As a new subscriber to Monitoring Times, I'd like to express my sincere appreciation for your fine publication. I find it totally absorbing, well-balanced according to my interests, and packed with all sorts of fascinating hints and information. I completely wore-out my first issue before the second arrived..." - Earl Roper

"When the magazine arrives, I don't get much done, because I have to sit right down and check it out from cover to cover. MT is the best monthly all-round of communications magazines." - Bill Battles

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"Going Back"

It was 1970. I was all of 19 years old and in the Marine Corps. Having been lucky, I was stationed in North Carolina and made it home every weekend. During those days I spent a lot of time on the CB. My handle? "Weekend Warrior."

Back then, we didn't curse on the air and we respected the use of "numbers." When someone broke with call letters, we gave way for the "legal" message. I was one of the few with a license; KEQ6048.

There were only 20 channels on the CB then. But we had a full five watts. I even had QSL cards made up. Since we are all bandits, our addresses couldn't be listed. We delivered our QSLs by hand.

Most folk, at least in my area, hung around the higher channels. Channel 2 was quiet, especially late on Saturday night. Few people ever realized that old "Wheel Chair" was listening.

Wheel chair never "broke" on anyone. Fact is, he never came on unless someone called him. Even when you did call him, it was a considerable time before he answered.

I guess I sort of made his day when I did get him on the air. He often told me stories about his younger days and seemed to delight that I was a Marine. We chatted for

hours on some nights. He talked slowly, but distinctly. Sometimes his voice sounded labored, but it was always clear.

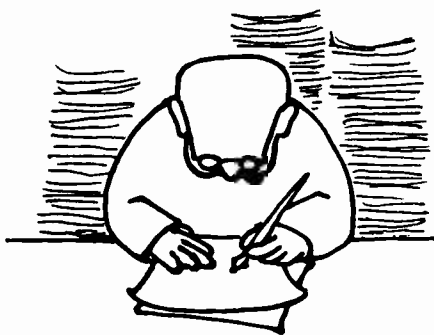
This radio companionship lasted for nearly a year. Whenever I came home on weekends, I always made it a point to raise old Wheel Chair. I can even remember coming home early from a date just so I could talk with him.

I remember that it was a cold, windy January night. I was still home on leave for the holidays. Being Saturday, I dialed up channel 2 and called for Wheel Chair. But instead of Wheel Chair, an elderly female voice answered. When I gave her my handle, she told me that Wheel Chair had passed away.

I had never met him, but she assured me that he looked forward to our Saturday night chats. I never did find out his real name. His QSL, which was given to me by a fellow CBer, simply had a picture of a wheel chair with a CB antenna mounted on it. The chair was empty. From that night forward, channel 2 seemed more quiet than ever.

They say that you "can never go back." But sometimes I wonder. I don't talk on CB anymore. Every time I see a rig, though, I get the urge to dial up channel 2 and break for old "Wheel Chair."

Bob Kay
MT Columnist



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Full Coverage, Maximum Performance. The superb IC-R71A is your front row seat to worldwide SSB, CW, RTTY, AM, and FM (optional) communications and foreign broadcasts in the 100kHz to 30MHz range. It features passband, IF Notch, low noise mixer circuits, and 100dB dynamic range. The pacesetter IC-R7000 receives today's hot areas of

interest, including aircraft, marine, public services, amateur, and satellite transmissions in the 25MHz to 2000MHz* range. It includes **all mode operation** low noise circuits plus outstanding sensitivity and selectivity. The combined IC-R71A/IC-R7000 pair creates a full radio window to the world!



The IC-R71A is a shortwave listener's delight. Its **32 tunable memories** store frequency and mode information, and they are single-button reprogrammable **independent of VFO A or VFO B's operations!** This HF reception is further enhanced by a dual width and level adjustable noise blanker, panel selectable RF preamp, selectable AGC, **four scan modes**, and all-mode squelch.

The IC-R7000 is a high band monitor's masterpiece. Its **99 tunable memories** are complemented by **six scanning modes**. It even scans a band and loads memories 80 to 99 with active frequencies without operator assistance! Additional features include selectable scan speed and pause delays, wide/narrow FM reception, and high frequency stability. Many professional services use IC-R7000's as calibration references.

Options. IC-R7000: RC-12 remote control, EX-310 voice synthesizer, CK-70 DC adapter, MB-12 mobile bracket. IC-R71A: RC-11 remote control, EX-310 voice synthesizer, FM module, CK-70 DC adapter, MB-12 mobile bracket, FL-32A 500Hz, FL-63A 250Hz, and FL-44A filters.

See the IC-R7000 and IC-R71A at your local authorized ICOM dealer.

* Specifications of IC-R7000 guaranteed from 25-1000MHz and 1260-1300MHz. No coverage from 1000-1025MHz

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First in Communications

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All stated specifications are approximate and subject to change without notice or obligation. All ICOM radios significantly exceed FCC regulations limiting spurious emissions. RCVRS587.