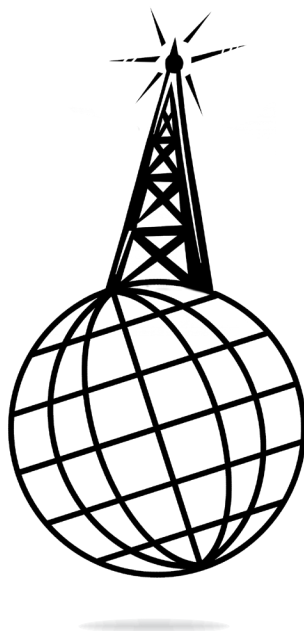


# TECSUN

RADIOS AUSTRALIA

## Shortwave Listener's Guide



*"Dedicated to those who seek to be better informed  
and gain more enjoyment out of life through the  
miracle of shortwave radio."*

THE HALLICRAFTERS CO.  
1961 Chicago Illinois.

## Introduction

Virtually every country in the world has some sort of national broadcasting system. This can include Medium Wave (MW), FM or shortwave (SW).

Shortwave signals can travel huge distances with very little loss and hence the audience for shortwave broadcasts is enormous.

Seasonal changes as well as the rotation cycle of the sun can have a direct affect on these reflective properties, and that is why broadcasters change frequencies depending upon the season, to ensure continued coverage into the target area all year round.

In addition to shortwave broadcasters, many countries allow amateur radio operations on the HF amateur bands allocated by the International Telecommunications Union (ITU). By restricting amateur radio operators to dedicated frequency bands a huge international group of radio enthusiasts are able to communicate with like minded persons around the world.

Amateur radio operators, unlike shortwave broadcasters are limited in how much output power they can transmit, and as a result, utilise more power efficient modes of transmission such as Single Sideband (SSB). This means that shortwave listeners will need an SSB capable receiver to listen to these transmissions.

Apart from acquiring a suitable receiver, whether it be for pure shortwave listening or a combination of shortwave and utility station listening, an external antenna will make a world of difference to reception.

Once the receiving system (receiver and external antenna) is put together, its time to consult a shortwave schedule to determine the time and frequency of operation of the desired station. Simply tuning across the shortwave bands will reveal many signals, particularly at night when these signals propagate greater distances.

Here are two major advantages of shortwave over local broadcasting; Reception is in real time, not prerecorded and programming does not suffer from government censorship.

At Tecsun Radios Australia we aim to cater for all shortwave listeners. We test and use all the products we sell and can advise you on all aspects of this hobby.

Welcome to the world of shortwave listening !

### **About Shortwave Radio**

Shortwave listening (commonly abbreviated to SWL) is the fascinating hobby of listening in to broadcasters around the world.

This can be done at minimal cost from anywhere in the world without having to reply on anyone else. All that is required is a suitable Shortwave (SW) radio receiver and an antenna. Often the antenna is part of the receiver.

Shortwave listeners range from casual listeners seeking overseas news and entertainment to technical enthusiasts developing new antennas and reception methods. There are hundreds of millions of shortwave listeners around the world.

The Shortwave radio (also referred to as HF radio) bands are alive with a plethora of domestic and international broadcasts from around the world. These bands are used by wide range of operators including amateur radio operators, 4WD clubs, marine pleasure craft, commercial aircraft, the Royal Flying Doctor Service, airports, and coastal patrols to provide real time up to date information services.

To ensure maximum coverage of their signals, shortwave broadcasters operate at very high power and utilise directional antennas to cover areas with significant population.

### **How Does it Work?**

The mechanism that allows radio stations to be received from around the world is called the ionosphere.

The ionosphere is the region above the Earth's atmosphere located between 100 to 1000 Km above the surface of the Earth, and contains atomic particles that become ionised when exposed to X-ray and UV radiation from the Sun. It has the capability of influencing radio propagation around the world, by allowing signals to bounce off it and back to earth. The ionosphere is separated into several layers, depending on the altitude above earth.

The most significant for shortwave listeners is the F2 layer, which occurs between 100 and 500Km above earth and is the densest part of the ionosphere.

It is the layer responsible for most radio wave reflection. Reception via the ionosphere is called “skywave”, in contrast to “groundwave” propagation which follows the surface of the earth.

Long range reception varies between day and night due to the ionisation caused by the Sun. Skywave transmissions can be heard thousands of miles away from the broadcasting location.

### **Shortwave Bands**

The RF spectrum between 1800Khz and 30000Khz (1.8-30Mhz) is known as shortwave. This spectrum is broken down into the following shortwave bands:

49m band: 5900-6200kHz	41m band: 7200-7450kHz	31m band: 9300-9900kHz	25m band: 11600-12100kHz	22m band: 13570-13870kHz
19m band: 15100-15800kHz	16m band: 17480-17900kHz	15m band: 18900-19020kHz	13m band: 21450-21850kHz	11m band: 25600-26100kHz

Most shortwave receivers cover some or all of these bands. Between these bands are frequency allocations for “utility” stations.

### **Utility Stations**

Apart from shortwave broadcasters, other organisations use the HF spectrum. Generally these will be radio networks established for communications purposes rather than providing entertainment signals. Organisations such as 4WD clubs, the Royal Flying Doctor Service, international aircraft, amateur radio operators, outback communications, ships at sea, Navy operations, and the Bureau of Meteorology.

### **MW Stations**

Long distance reception (called “DX”) of domestic AM stations also falls under the umbrella of shortwave listening. During the night, when the radio wave absorbing E layer is thinnest, MW and lower frequency SW signals propagate long distances. This is why it is possible to pick up strong interstate AM stations at night.

### **LW Stations**

Many airports have a continuous non directional beacon (NDB) for pilot navigation. Normally identified by several letters in Morse Code referring to the airport location, these beacons often broadcast weather information for pilots. This is the most up to date weather information for the local area that is available. There are over one hundred NDB stations in Australia.

### **FM Stations**

Most cities and country towns have access to several FM stations. Often these can be Community Radio stations, ABC FM, or commercial stations. These stations have been allocated power levels to ensure they only broadcast in the area designated by their transmitter license. So it can be very interesting to see if any far away stations can be received.

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One of the great advantages of shortwave listening is that it allows you to listen to world events from a different perspective other than the local media. The Russian or Chinese interpretation of world events can be surprisingly different to that of the US and other Western countries. News items are normally broadcast in real time to give listeners the most up to date information.

Not all shortwave stations use English as their primary language, but almost all do have some English programming. If you are trying to learn a foreign language, shortwave broadcasts can be an ideal source of foreign language material. For immigrants, shortwave may be the only way to keep in touch with events from their mother country.

Travellers can stay in touch and obtain accurate road condition, bush fire, and flooding reports, by listening to the VKS 737 4WD radio network. News and entertainment services are regularly received in our region by shortwave radio broadcasters including the BBC, Radio New Zealand International (RNZI), and Voice of America (VOA), particularly useful when you are out of range of regular AM and FM stations.

Additionally, many of the shortwave radio broadcasts can be used to obtain useful information for example Aerodrome longwave (LW) Non Directional Beacons are a good source of local weather conditions and the Bureau of Meteorology's marine weather broadcasts provide accurate and timely coastal and offshore weather information for mariners.

### **Sample Shortwave Listening with your computer**

Newcomers to shortwave listening might like to sample the hobby by connecting to our on-line shortwave receiver. You can do this with your computer and most popular web browsers. Simply visit: [www.tecsunradios.com.au](http://www.tecsunradios.com.au) and click the “Tecsun SW Radio Online” button on top of the page.

### **Digital Audio Broadcasting (DAB+)**

DAB+ radio uses an advanced digital and robust transmission system to overcome the problems of interference on MW (AM) signals and multipath distortion on FM. This improves performance over conventional broadcasting systems by offering improved building penetration and reception on the move, such as when using Public Transport.

There are 540 AM transmitters in Australia radiating from 50W to 50kW and almost 2,500 FM transmitters radiating from 1W to 250kW.

Each transmitter carries just a single program with some transmitting Radio Data Service (RDS) for the display of a line of text.

In Australia DAB+ transmissions are made in band III VHF spectrum on Ch 9 and Ch 10. As each transmitter can carry up to 26 programs, DAB+ has the potential to offer a huge range of programming and many traditional MW broadcasters already simulcast in this mode to achieve a larger audience, including those who are unable to receive satisfactory MW signals.

In addition, DAB+ radios include a visual display which can show news and weather information as well as current programming information.

DAB+ digital radio transmission provides superior audio quality when compared to traditional AM/FM radio signals and due to the compression system used, offers the listener a greater number of radio stations from which to choose.

### **Digital Radio Mondiale(DRM): The broadcasting system of the future**

Digital Radio Mondiale (DRM) is a revolutionary broadcasting system, suitable for medium and short wave bands. Since the earliest days of broadcasting these bands have been filled with signals that are amplitude modulated. These transmissions have limited audio quality and particularly in recent years interference from consumer electronics products has created havoc with AM reception. Broadcasts in the FM band have received far more listeners with the result that audience figures are dropping for AM broadcasting.

Now DAB+ Digital Radio is available in many countries and this has set a new standard in broadcasting. The next stage is to improve the transmissions on the medium and short wave bands. As a result a totally new system has been developed. Known as DRM, the system offers near-FM sound quality plus the ease-of-use that comes from digital transmissions. The improvement over AM is immediately noticeable. DRM can be used for a range of audio content, and has the capacity to integrate text and data. This additional content can be displayed on DRM receivers to enhance the listening experience.

For listeners in remote locations the capability of DRM receivers to display information such as news, weather alerts, bushfire, flood and tsunami warnings is invaluable. This is a method of conveying information to listeners immediately and as it becomes available.

For international broadcasters, DRM allows access to a huge audience across the world at the same cost as a regular analogue (AM) shortwave system. DRM on Medium Wave is perfect for broadcasters aiming for a national audience, especially in countries covering a sizeable geographical area.

In our part of the world Radio New Zealand International (RNZI) broadcast DRM signals into the Pacific. These signals can be heard in Australia, New Zealand, Vanuatu, PNG, Solomon Islands, Tonga, Fiji and most of other Pacific Islands.

<https://www.radionz.co.nz/international/listen>

Recently the Australian Broadcast Corporation began DRM test transmissions on 747 KHz.

### What you can listen to now

New Zealand:	9700, 9765, 11725, 13730, 15720 kHz
BBC (SE Asia):	3915, 6195, 7300, 7465, 7520, 11735, 11945, 17720 kHz
America:	7200, 7405, 9620, 11695, 11705, 11805, 12005 kHz
Australia:	4K2 5055KHz Bay Islands Radio 15045 Unique Radio: 3210, 5035 kHz
Solomon Islands	9545, 5020 kHz
Japan:	3925, 6055, 6115, 9760, 9595 kHz
Vanuatu:	3945, 5040, 7260 kHz
China:	15210, 17690, 9760, 11760, 11900 kHz
Taiwan:	7730, 9400, 9405, 9410, 9415, 9425, 9745, 9774, 9885, 9900, 11745, 11915, 12065, 13375, 13590, 13835, 15320, 15375 kHz
Guam (KWTR):	9320, 9870, 9900, 9910, 9975, 11550, 11965, 12040, 12055, 12120, 12160, 13740, 13740, 15205 kHz

### When to Listen

All shortwave schedules are based on Universal Time Co-ordinated. Until the 1970s this was known as GMT (Greenwich Mean Time), because the 0 degree line of longitude passes through Greenwich in London. There will be a variation from UTC for your local area. On the east coast of Australia the offset is +10 hours (+11 hours during Daylight Savings). UTC can easily be checked by listening to one of the many **time signal** stations broadcasting around the world. Such stations are WWV Colorado and WWVH in Hawaii which broadcast continuously on 2.5Mhz, 5.00Mhz, 10.00 Mhz, 15.00Mhz and 20.00Mhz. To differentiate between the 2 signals, WWVH uses a female and WWV uses a male voice announcement.



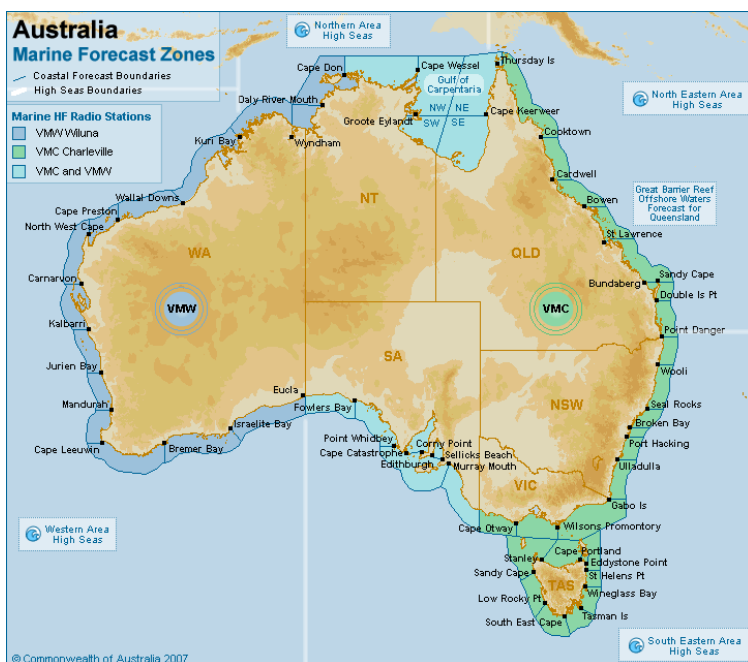
## Marine Weather Services

The Bureau of Meteorology provides 2 weather services for Australia: VMC for the East coast and VMW for the West coast. These services are designed for mariners and operators of leisure craft. However the weather forecasts are also relevant for land-based coastal residents and travellers.

VMC is on 4426, 8176, 12365 and 16546 kHz during the day (7am to 6 pm) and 2201, 6507, 8176 and 12365 kHz at night (6pm to 7am).

VMW operates on 4149, 8113, 12362, and 16528 kHz during the day from 7 am to 6pm, and at night on 2056, 6230, 8113 and 12362 kHz.

Both services broadcast bulletins or warnings on the hour. Weather forecasts for coastal waters and high seas followed by coastal observations are broadcast using a program that is repeated every four hours. Special announcements are made 5 minutes before every hour.



## **Aviation - Domestic**

For those of us interested in aviation, there are a number of HF USB stations that can easily be heard.

### **Royal Flying Doctor Service**

The Royal Flying Doctor Service (RFDS) is the largest and most comprehensive aeromedical organisation in the world and uses the latest in aviation, medical and communications technology to deliver extensive primary healthcare and 24-hour emergency service to those who live, work and travel throughout regional Australia.

The RFDS operate from a number of locations across outback Australia and can be heard on the following frequencies:

Derby	VJB	6945, 5300, 2792 kHz
Port Hedland	VKL	6960, 4030, 2280, 5300 kHz
Carnarvon	VJT	6890, 4045, 2280, 5360 kHz
Meekatharra	VKJ	6880, 4010, 2280, 5360, 6825 kHz
Kalgoorlie	VJQ	6825, 5360, 2656 kHz

### **VHF**

#### **Common Australia Wide VHF Airband frequencies**

119.100	Aero Club Operations, Flying Schools
119.200	Parachute operations
120.850	Sports aviation air to ground
121.500	Distress worldwide
122.500, 122.700, 122.900	Glider operations
123.100 and 123.200	Search and rescue Australia-wide
123.450	Air-to-air chat below 20,000'
127.900	Air Show Frequency
129.600	Crop dusting

## **HF VOLMET - International**

VOLMET aviation broadcasts contain critical meteorological information for aircraft in flight. Broadcasts include; TAF (Terminal Aerodrome Forecast), SIGMET (Significant Meteorological Information), and METAR (Meteorological Terminal Aviation Routine) information.

HF VOLMET broadcasts generally cover a large geographical area and are intercepted by flight crews whilst en-route to an area and out of local VHF ATIS (Automatic Terminal Information Service) broadcast range. The information received is used to determine possible flight route deviations by evaluating predicted weather conditions along their flightpath, which are out of aircraft weather radar range.

VOLMET terminal information for Brisbane, Calcutta, Bangkok, Karachi, Singapore, and Bombay is broadcast sequentially on 6676 kHz beginning on the hour and 30 minutes past the hour.

VOLMET terminal information for Tokyo, Hong Kong, Auckland, and Honolulu is broadcast sequentially on 8828 kHz beginning 10 minutes past the hour. All broadcasts are made using USB (upper sideband).

VOLMET broadcasts originate from the location on which they are reporting and can provide shortwave enthusiasts with a good indication of propagation conditions.

## **Australian Longwave or Non Directional Beacon (NDB) Frequencies**

These broadcasts are made to provide aviators with weather conditions at their point of arrival or departure and for navigation purposes. There are over 100 NDB transmitters operating in Australia, the list below provides some examples.

Bankstown 416, Richmond 347, Camden 281, Nowra 359, Brisbane 302, Archerfield 419, Mt Isa 338, Ballarat 239, Avalon 404, Moorabbin 398, Adelaide 362, Parafield 416, Perth 272, Darwin 344, Tindal 356, Alice Springs 335, Hobart 362, Launceston 242, King Island 332, Lord Howe Island 272, Broken Hill 332, Mildura 272, Nowra 359. (All frequencies are in kHz and use AM modulation.)

## **HF Networks for Outback Travellers.**

The Australian outback is a popular destination for travellers who want to see the real Australia and get off the beaten track. However, the isolation of remote areas is a constant concern for travellers and regular communications can help to identify potential hazards and ensure travelling safety.

There are several 4WD club networks operating on HF frequencies, that provide a safety network for people travelling through outback areas.

The VKS-737 4WD shortwave radio network provides a communication service for travellers including updates of the latest road conditions, weather forecasts, bushfire reports and a messaging service for travellers throughout Australia's most remote areas. [www.vks737.on.net](http://www.vks737.on.net)

The network operates on 3995, 5455, 6796, 8022, 10180, 11612 and 14977Khz depending on the time of day, from base stations located in Perth WA, Derby WA, Darwin NT, Alice Springs NT, Charters Towers QLD, St Marys TAS, Newcastle NSW and Swan hill SA.

The VKE-237 HF radio club operates on 3890.5, 5135, 6790, 7899, 9985, 11487, 12197, 14662 and 15972Khz. The club offers SMS, GPS tracking, phone patch and regular network skeds, operating from Wiluna WA, Alice Springs NT, Sapphire QLD and Cobar NSW. [www.hfradioclub.com.au](http://www.hfradioclub.com.au)

VMS-469 Reids Radio Data/ Bush Telegraph operates on 3773, 3995, 5455, 5744, 5836, 7899, 8027, 8083, 9081, 9360, 11612, 12121.5, 14977 and 15968 Khz. The network offers HF email, phone patch and daily voice skeds. [www.reidsradiodata.com.au](http://www.reidsradiodata.com.au)

The Austravel HF Safety Network VMD 750 provides daily skeds, GPS tracking, HF SMS, phonepatch and HF email services. The network operates base stations from Alice springs NT, Casino NSW, Perth WA, Kununurra WA, and Shepparton VIC. The network operates on 3175, 5127, 5270, 6793, 7652, 9323, 10203, 13910, and 17463Khz. [www.austravelsafetynet.org.au](http://www.austravelsafetynet.org.au)

The Australian HF Touring Club AXD-888 provides access to emergency services through base stations located in the Hunter Valley NSW, Sapphire QLD, Perth WA, and Alice Springs NT. The network operates on 3760, 3885, 5105, 5264, 5734, 6820, 6910, 7999, 8043, 8160, 11013.5, 11016.5, 11407, 11450, 12216, 15890.5Khz. <https://aussiehf.club>

## **Major World Air Routes**

Vast areas of the world lack the necessary local VHF radio communication systems needed to provide reliable radio coverage between aircrews and air traffic controllers. The lack of VHF coverage within most of these areas is due to the very remote location of these regions, for example much of the airspace over the Atlantic and Pacific oceans lacks VHF communications as it is impossible to install transmitters on a reliable platform within these regions. As a result a network of shortwave (HF) frequencies have been allocated to provide long range voice communications between aircrews and ATC facilities.

Aircraft arriving and departing from these locations: Auckland, Brisbane, Nadi, Pascua (Easter Island), Port Vila, Rarotonga, San Francisco, Tahiti, Wallis can be heard on 3467, 5643, 8867 13261 and 17904 kHz.

## **Australian Domestic Shortwave Services**

Since the demise of ABC domestic shortwave transmissions in 2017, several private operators have begun broadcasting. Unique Radio in Gunnedah, NSW, is operating on 5045Khz and 3210Khz USB, Radio 4KZ is operating from Innisfail on 5055 kHz, Shortwave Australia operates on 4835 and 2310 kHz, and Bay Islands Radio operates in 5045 kHz. Other licenses have been granted and could become operational at any time.

## **What is a QSL card ?**

QSL is the radio telegraph code meaning “I confirm” or “I acknowledge receipt”. In shortwave listening, a QSL is a card or letter from a radio station confirming that the recipient indeed heard the station. Most broadcasters will respond to listener reception reports with QSL cards or letters. Many SWL's (Shortwave Listener) have amassed impressive, colourful collections of these souvenirs of their listening experiences. To receive a QSL from a station, you need to send a “reception report” to the station giving information about what you heard. A good reception report should include the following:

1. The date and time (in UTC) you heard the station
2. The frequency on which you heard the station
3. Details about what you heard sufficient to establish that you indeed heard the station; these are things like names of announcers and programs, titles of musical selections, station slogans, etc.
4. An evaluation of the signal quality, including strength, degree of fading, and any interference you were experiencing (include the names and frequencies of interfering stations)
5. The make and model of radio you are using, along with any external antenna you use.

Some stations send out stickers, decals, and pennants made of paper, plastic, or cloth to regular reporters. A reception report to a station will typically get you on their mailing list for program schedules for years to come.

Always send your reports via air mail; the extra cost over surface mail is a small price to pay for the extra speed and reliability of air mail service. Some non-broadcast stations especially time signal stations, maritime stations, and hams will also reply to listener reports, especially if the listener prepares a QSL card and sends it along with their report.

Many of people enjoy short-wave listening without bothering to send reception reports and collecting QSLs, and indeed there are listeners (and stations) that consider the entire practice to be a waste of time and energy. Today, QSLs cards from stations in countries like the USSR, Czechoslovakia, East Germany, Yugoslavia and other countries that no longer exist, are pieces of history.



YUGOSLAVIA					
MIRO ČADEŽ C. NA BROD 32 - 61231 ČRNUČE					
1945 <b>YZ3UMC</b> 1975					
30 YEARS OF YUGOSLAVIA					
TO RADIO	DATE	GMT	MHz	RST	2-WAY
DL7SP	1.7	75	17.4	28	TS SB
RIG HW-100				BEST 73 FROM	
A EXP QUAD				Mito	
N ZL SPEC					
T 2EL QUAD					
		OSO Nr			
		QSL 100%			

## **A Practical Guide to Locating Sources of AM and HF interference**

The introduction of switch mode power supplies, light dimmers, flat screen TV sets, computers and their monitors, printers, modems, USB hubs etc and energy saving light bulbs has brought with it a range of interference problems for users of AM and HF shortwave bands.

RFI or radio frequency interference as it is formally known normally manifests itself on the AM broadcast and shortwave bands as harmonics of the fundamental interfering frequency.

In the “pre-digital” days, such battery chargers where “linear” in operation, typically containing a transformer, rectifier and filter capacitors. However the price of copper (used in the transformer) and the ability of switch mode designs to accept a wide AC voltage input range (typically 90-270V AC), has led to the almost universal adoption of this technology for battery chargers. No longer are there 110V and 240V AC variants of each battery charger, one design fits all!zzz

A primary source of these interfering harmonics, are such switch mode power supplies. Commonly known as “AC adaptors” or “plugpacks”, these are the little power supplies used as battery charges for smartphones, radio receivers themselves, battery chargers etc. Although these devices operate at 200KHz, the internal oscillator or more accurately the “chopper” circuit can generate harmonics well into the HF bands.

Normally built into a plastic case, the device is free to radiate, save for a few internal components designed to minimise interference. Assuming you are experiencing such interference, the first step is to locate the source.

First, ensure the receiver is being operated off its internal batteries, and tune to part of the AM or HF band where you can hear the interference but no radio signal is present. Turn off all room lights and see if there is any reduction in interference. Energy saving light bulbs contain electronic circuitry in the base of the light globe, which can cause interference, just as the electronic ballast can do in a fluorescent light. Dimmers are also a source of interference as well as fan controllers. All these need to be turned off.



It is prudent to only try one thing at a time, so turn the lights back on, and then systematically unplug every smart-phone battery charger in your house. A smart-phone charger generating interference on the AM band can be heard several rooms away, either by being radiated back down the house wiring, or by being radiated in free space.

The next potential culprits to eliminate are TV sets. Unplug each one from the wall (turning the power point off is OK) and see if there is any change in interference.

If you have progressed through the above steps without results, the next step is to turn off the power to your house at the fusebox. Whilst this normally means resetting all the clocks, microwave ovens etc. it will conclusively prove if the interference is coming from your house.

### **Xiegu GNR-1 Digital Audio Noise Reduction Unit**



The Xiegu GNR-1 is an advanced digital audio noise filter and processor integrating digital noise reduction and filtering. It can be used to externally process audio from any shortwave receiver or transceiver to reduce background noise and improve signal intelligibility. The GNR-1 is powered by a 12 volt DC power pack (supplied) and has an internal amplifier capable of driving either headphones or an external speaker.

Practical experience with this unit demonstrates a remarkable improvement of receiver performance when used with the Tecsun S-2000, PL-660, Gospel GR-216, and other non DSP technology receivers. The unit can also be used with online SDRs to process the recovered audio.







The Tecsun H501x features a class AB audio amplifier and twin speakers for high quality audio reproduction. This receiver covers LW,MW,FM and SW bands, is SSB capable, and has 3150 memory positions. The large LCD screen makes the receiver easy to use under all light conditions. User selectable bandwidths for both AM and SSB modes ensure the best possible reception under all conditions, and the SYNC feature helps overcome fading when conditions are less than optimum. Powered by two 18650 Li-ion batteries, this receiver also allows playback from a micro SD card and BT. Supplied with leatherette carry case earbuds, USB charging lead and charger, and 2 x 18650 li-ion batteries.

## Tecsun H-501x Deluxe Shortwave Radio



The Tecsun PL-990x High Performance Shortwave Radio is capable of receiving the FM broadcast, medium wave (MW), longwave (LW), and shortwave (SW) bands. The Tecsun PL990x High Performance Shortwave Radio can receive AM, CW, and single sideband (SSB) communication signals. The Tecsun PL-990x High Performance Shortwave Radio may be Tecsun's last high-end portable and is considered by many to be the Tecsun design team's final masterpiece. This is Tecsun engineering at its finest.

## Tecsun PL-990x High Performance Shortwave Radio



CE-19 Expansion Interface



sold separately

The **G90 Transceiver** is a portable HF Amateur Radio multimode transceiver covering 10-160 metres with 20 watt RF output. The G90 utilises 24-bit architecture to provide superb transmit and receive performance. The unit includes an ATU. Features

- High-performance front end with narrowband pre-selectors
- Frequency range of 0.5-30MHz (TX in Amateur bands)
- SSB/CW/AM/FM\* TX/RX modes
- 1.8-inch high brightness colour TFT LCD screen
- $\pm 24\text{k}$  bandwidth Fast-scan spectrum display with waterfall
- Fully adjustable RX bandpass filters (CW mode down to 50Hz)
- Detachable front panel/display unit
- Up to 20W of RF power
- Built-in wide-range automatic antenna tuner

## G90 HF Amateur Radio Transceiver



The Tecsun S2000 Desktop Radio is the ultimate desktop listeners radio. This receiver utilises a 240V AC linear power supply for low internal noise and can also be powered by 4 x D cells or an external 6V DC power supply. The Tecsun S2000 Desktop Radio will allow you to listen to AM, FM, shortwave, longwave and VHF Air Band broadcasts all on the one radio. A rotatable AM/LW antenna on the top of the receiver allows adjustment of the antenna position without moving the receiver. This radio also has provision for the simultaneous connection of external antennas for FM, MW and shortwave bands.

### Tecsun S2000 Desktop Radio



The Tecsun S-8800 has been designed as a Broadcast Listeners Radio to provide optimum sound quality on all bands. The receiver is equipped with bass and treble controls, and an RF gain control to ensure the best possible fidelity, regardless of band conditions. Capable of receiving LW, MW, SW and FM this receiver is supplied with a remote control to allow the receiver to be positioned and then operated without touching the unit. Connection to external antennas for MW, SW and FM bands is also facilitated. This receiver operates from two 18650 lithium ion batteries.

### Tecsun S-8800 AM/FM Radio



The Tecsun Radios Australia DRM Shortwave Radio is primarily designed to receive and decode DRM Shortwave Radio signals but the radio can also be used to receive traditional Shortwave (AM) broadcasts, FM, and AM (MW) broadcasts.

On the FM band this receiver also decodes RDS where broadcast. In slow tuning mode, the frequency step is reduced to 1 kHz. This is an advantage when tuning the extended MW band (530-1710 kHz) to receive specialised broadcasters in Australia.

### Gosnell GR-216 DRM Radio



The WR230S FM/Internet Radio is Tecsun Radios Australia's latest offering to enthusiasts. Featuring full 87.5-108 Mhz FM coverage and Internet radio coverage by broadband WiFi or direct ethernet connection. This unit also features Bluetooth playback and Auxiliary line input, allowing external audio devices to be connected for playback, dual alarms, sleep timer, display dimmer, and audio equaliser. The unit operates from an approved 9v DC (2 Amp) external power supply utilises 802.11b/g/n WiFi standard and has a Bluetooth range of up to 10 metres.

### WR230S FM/Internet Radio



The Tecsun PL880 Radio is the most popular portable radio in the Tecsun range. The PL-880 also offers 4 AM and 5 SSB user selectable bandwidth settings for optimum reception under all propagation conditions. The PL-880 offers 3050 memory storage positions, and is powered by a single 18650 lithium ion battery.

### TECSUN PL880 Radio



Protect your PL-880/990 with this hard ABS carry case lined with high density foam.

The case can accommodate your PL-880, battery, and battery charger, and is supplied with the AN-03L 7 metre longwire antenna. Closefit moulded case halves ensure resistance to moisture and the inbuilt feet allow the equipment to be stored vertically. A must have option for travellers, hikers, campers and those who simply want to take care of their PL-880.

Weight: 850g  
Dimensions 355mm(W) x 260mm (H) x 90mm (D).

### Tecsun PL880/990 Hard Carry Case



The Tecsun PL660 Radio with VHF Air Band is a great radio for communications enthusiasts, providing excellent reception to all of the major frequency bands including AM/MW, FM, Shortwave with SSB, Longwave, and VHF Air Band. This receiver also has synchronous detection to assist in the reception of shortwave signals suffering from propagation fading.

### TECSUN PL660 Radio



The Tecsun Radios Australia R-108 is an advanced pocket sized AM/FM/SW and VHF Airband receiver with squelch function. The unit has 500 memory storage, provision for an external SW/FM antenna connection, direct frequency entry, and a backlit LCD display capable of showing frequency, signal strength, S/N ratio, time, and temperature in either degrees F or C.

This receiver also features ATS (Auto Tuning Storage), adjustable squelch control and tuning speed, programmable alarm, and 5 AM bandwidth settings. This receiver is powered by a BL-5C Li-ion battery, and is supplied with a USB charging lead, and a 3m longwire for connection to the external antenna socket.

### TECSUN R-108 Radio



FDP Pro 80CH 5W UHF Handheld Transceiver CB is one of the most (if not the most) feature packed IP67 certified waterproof & dust proof handheld radios available for both the Citizen Band Radio Service and Land Mobile Radio Service, being AS/NZS Approved to both. Allows up to 128 Channels for the LMRS covering 430 – 500 Mhz. This compact and stylish transceiver represents superb value when you consider the list of extensive features that include Multi Battery Save, VOX, Frequency Receive Mode, Keypad access CTCSS/DCS, Voice Prompt Guide, PTT ID, Scrambler, Alpha Tagging and so much more. The special 'Function Button Disable' feature can also lock the radio to being Software Defined\* only, making the radio very simple to use if required.

### FDP Pro 80CH 5W UHF Handheld Transceiver CB



The TRA Self Powered Communications Speaker is designed to be used with any communications equipment where amplified audio is required. Utilising either Line or Bluetooth inputs, this self contained powered speaker is ideal for boosting the sound from shortwave receivers or amateur transceivers alike. We have found this unit to be the ideal companion to the Xiegu G-90 transceiver where the internal speaker does not provide sufficient audio under noisy or contest conditions. The additional audio power makes reception of weak signals and those affected by noise much more effective. Performance of some of the smaller receiver models (PL-365, PL-368, PL-330 and R-108) can be substantially improved by using this speaker. Simply connect directly to the line input of the speaker using the headphone output.

### TRA Self Powered Communications Speaker



This 76th edition is the last printed edition of the famous World Radio and Television Handbook, used by shortwave enthusiasts around the world since 1947.

This 670 page book contains the following:

An A-Z country by country directory of national radio stations with SW, MW and FM frequencies and contact details, websites etc. . International Radio – full details of the broadcasters and their winter (B20) shortwave frequency schedules, with an expanded Clandestine section.

- . Frequency Lists – MW by frequency, SW by frequency including DRM.
- . Technical Articles
- . Reviews of the latest receivers & equipment, including many Tecsun models.
- . Alphabetical listing of TV broadcasters by country.
- . Colour Maps showing SW transmitter sites.
- . Reference pages including domestic and International Shortwave transmitters, DX Clubs, Standard Time & Frequency transmissions, Internet resources etc.

### World Radio Tv Handbook-76th Edition



The Tecsun PL-368 is the latest handheld version of the popular PL-360/365 series of receivers. The form factor of this receiver makes it very convenient to store in a grab bag or glovebox. This latest version includes a keypad for direct frequency entry, and a synchronous detector to help overcome fading on shortwave signals. The SSB capability offers 10Hz tuning steps. The external antenna socket operates on MW as well as SW, which is a great advantage for MW Dx'ers. Operates from a BL-5C Li-ion battery and supplied with USB charging cable. This receiver also features Tecsun's ETM system which creates time specific memories for convenient listening

### TECSUN PL368 Radio



The Tecsun Radios Australia Best Emergency Radio is a high performance AM/FM/SW Solar Powered Radio with inbuilt Solar Panel and Hand Crank Dynamo Charging. Suitable for the reception of Australian AM, FM and International shortwave stations, this receiver has an LCD display showing the frequency to which the receiver is tuned. This eliminates any tuning ambiguity, so the frequency to which the receiver is tuned is always known. The receiver also includes a LED torch, personal alarm, and a siren to gain the attention of emergency services. The unit can be used to charge a mobile phone through the standard USB port on the side of the unit.

### Best Emergency Radio FM/AM/SW



Tecsun Radios Australia Communications Headphones have been specially selected with user comfort in mind. This is essential for long periods of shortwave listening. The over ear closed cavity design is fitted with leather earpads and ultra soft memory foam to ensure listening comfort. Good dynamic range is achieved by the use of efficient 50mm NdFeB magnet drivers. The 3m connection cable means there is always sufficient length for headphone monitoring whilst engaged in other activities in your radio shack. The durable, vacuum formed carry case, ensures your headphones are protected when not in use.

### Tecsun Communications Headphones



The Tecsun PL-330 is the latest pocket sized portable receiver offering SSB capability. This feature, coupled with direct frequency entry makes the PL-330 the ideal receiver for those wishing to listen to shortwave radio utility stations, amateur radio transmissions as well as regular shortwave broadcasts. The Tecsun PL-330 is the first receiver to offer ETM+, a search function that populates the 24 ETM memories according to the hour of day in which the signal was received. Pressing the ETM button once the initial frequencies have been stored, automatically selects the frequencies previously stored at that time of day.

### TECSUN PL330 Radio





The Tecsun DE13DSP economy Emergency AM/FM/SW Solar Powered Radio is the perfect radio to keep in touch with the outside world whilst camping or bushing walking. The radio includes a inbuilt Solar Panel and Dynamo hand crank charger that allows charging the internal battery or any other device by USB or mini USB including your mobile phone. DSP technology provides amazing radio performance.

### Tecsun DE13 Emergency Radio



The smallest receiver in the Tecsun range capable of SSB reception, the Tecsun PL365 provides reception of the LW, AM/MW, FM ,and shortwave bands the Tecsun PL365 has several unique features including the use of an external ferrite rod antenna for AM reception. It provides FM coverage down to 76 MHz. The Tecsun PL365 radio can be connected to an external AM antenna, or Tecsun AM loop antenna for improved AM reception.

### TECSUN PL310ET MultiBand Radio



The Tecsun Radios Australia HF amateur radio dipole covers the popular 5/7/10/14/18/21/24/28 and 50Mhz bands. The antenna is rated at 100Watts PEP power handling capability and is supplied in a convenient canvas carry bag. The antenna comprises a 1:1 balun and 2 bobbins containing the appropriate amount of wire to cover the specified bands.

### HF Amateur Radio Dipole Antenna



The Tecsun AN-100 AM Loop Antenna is designed to increase the reception of weak AM radio signals. The Tecsun AN-100 AM Loop Antenna acts as a high Q pre-selector that can be tuned to the desired frequency/station. The Tecsun AN-100 AM Loop Antenna will increase the audio quality and clarity when compared with the internal antenna.

### TECSUN AN-100 AM Loop Antenna



The MLA-30+ Shortwave Loop Antenna is an affordable active loop antenna that allows people without the luxury of a large backyard to use an external antenna to boost the performance of their Shortwave Radio and increase the number of radio stations and broadcasts that can be received. The MLA-30+ Shortwave Loop Antenna can be mounted indoors on any non-conductive rod or tube, such as PVC conduit or fibreglass rod (not metal). The loop element of the MLA-30+ Shortwave Loop Antenna has a diameter of 60cm and is connected to the active amplifier housing by two stainless steel wing nuts.

### MLA-30+ Loop Antenna



Our upgraded Discone Ultra-Wideband Antenna is an ultra-wideband antenna capable of covering 25-1300MHz. The antenna is supplied with 8 metres of low loss RG-58 coaxial cable terminated with a type N plug at the antenna end, and a BNC plug at the other, the antenna is easy to assemble, requiring only one Allen key (provided). Two support brackets are also included, together with U bolts to allow mechanical mounting onto a vertical pipe up to 50mm diameter. We also supply a BNC female to PL-259 coaxial adaptor for connection to many popular receivers and transceivers.

### Discone Ultra-Wideband Antenna



The Tecsun Shortwave Outdoor Antenna significantly enhances reception of signals in the Medium wave (AM) and shortwave bands covering 0.5-30Mhz. The antenna utilises a 9:1 weatherproof balun to ensure the correct impedance match to all Tecsun portable receivers. The antenna is terminated with a 3.5mm mono phono plug, which suits many Tecsun receivers. Supplied with several coaxial adaptors to suit other receivers.

### TECSUN Shortwave Outdoor Antenna



This compact, retractable longwire antenna allows the user to clip one end onto an elevated fixture inside a room and then plug the other end directly into the 3.5mm external antenna socket found on most Tecsun receivers. The retractable wire is 7 metres in length, sufficient to boost any shortwave signals over the performance offered by a telescopic whip antenna.

### AN-03L Retractable Longwire Antenna



This USB charger converts 5V standard USB voltage to 6V DC, suitable for charging the NiMH batteries supplied with the Tecsun PL 600, PL 660 and PL 680. The output plug (1.7 x 4.0 x 9.5mm) is wired centre negative to suit these models.

#### TECSUN USB to 6V



This is a pack of 4 Tecsun Rechargeable AA Batteries ideal for use in any of the Tecsun range of radios that take the AA cell size. The Tecsun NiMH batteries provide 1000 mAh of energy storage capacity enough to provide many (10-20 hours approx) hours of listening to your favourite radio station.

#### TECSUN Rechargeable Batteries



Our external Antenna BNC to 3.5mm Adaptor allows any external antenna fitted with a BNC plug to be connected to our range of Tecsun Radios including the Tecsun PL880, PL660, PL600, PL310ET and PL365.

#### TECSUN BNC to 3.5mm Adaptor



These SMA adaptors are used to convert the growing number of antennas utilising SMA output connectors to commonly used BNC and 3.5mm configurations.

#### SMA Coaxial Adaptors



SO-239 to BNC male adaptor



BNC female to PL-259 male



BNC female to BNC female

#### Commonly Used Coaxial Adaptors



3.5mm mono socket to RCA male and RCA female to BNC male adaptors. This combination is used to convert the output of the Tecsun Shortwave Outdoor Antenna to a suitable antenna plug for both S-8800 and S-2000 receivers. Available individually.

#### TECSUN SW Outdoor Antenna Adaptor





This genuine Tecsun replacement battery is used in PL330, PL368 and R-108 receivers. Model # BL5-C is rated at 3.7V 850mAh.

#### TECSUN BL-5C Li-ion Battery 850mAh



The Tecsun 18650 Li-ion Battery provides 3.7V at 2000mAh and is specifically designed for the PL880, S-8800, H-501x, PL990x. The Tecsun Li-ion Battery provides approximately 50 hours of operation on a full charge.

#### TECSUN 18650 Li-ion Battery



The Tecsun Rechargeable Battery Kit is a great addition to the Tecsun PL310ET or Tecsun PL365 radios. The Tecsun Rechargeable Battery Kit includes 3 x rechargeable NiMH AA batteries, a USB charging cable, and a Tecsun Australian USB Power Adaptor 240V.

#### TECSUN Rechargeable Battery Kit



The AN-06 10m wire antenna is perfectly suited to any model receiver with an external antenna socket. Just extend the length or wire, clip the end to a curtains window frame or other elevated fixture and plug the other end into the receiver.. An economical solution where space is limited. Perfect for use indoors or in locations with high levels of background interference.

#### TECSUN 10m Longwire Antenna



The Tecsun Australian USB Power Adaptor 240V features a compact design. This great, little power adaptor offers fast, efficient charging for any Tecsun model requiring a USB power source. The Tecsun Australian USB Power Adaptor 240V should be used with the USB cable that is provided with the Tecsun radio.

#### Australian USB Power Adaptor



Sometimes referred to as a "Galvanic Isolator" this Common Mode Choke helps reduce noise caused by switch mode power supplies, TV sets, PCs and other electronic devices. By placing this isolator in the antenna feedline, the signals being conducted up the outside braid are interrupted and do not reach the receiver. We recommend two chokes for each antenna system, one at the antenna and one at the receiver.

#### Common Mode Choke

TECSUN PL365  
Ferrite Antenna



Simply plug this antenna into the external antenna socket for enhanced MW reception. Although the PL-365/368 does have a small, internal ferrite rod antenna, this larger antenna will provide superior performance. Connection is made via the 3.5mm mono antenna socket on the top of the receiver. Supplied with both PL-365 and PL-368 and available as a spare part.

**PL365/368 External Ferrite Rod Antenna.**

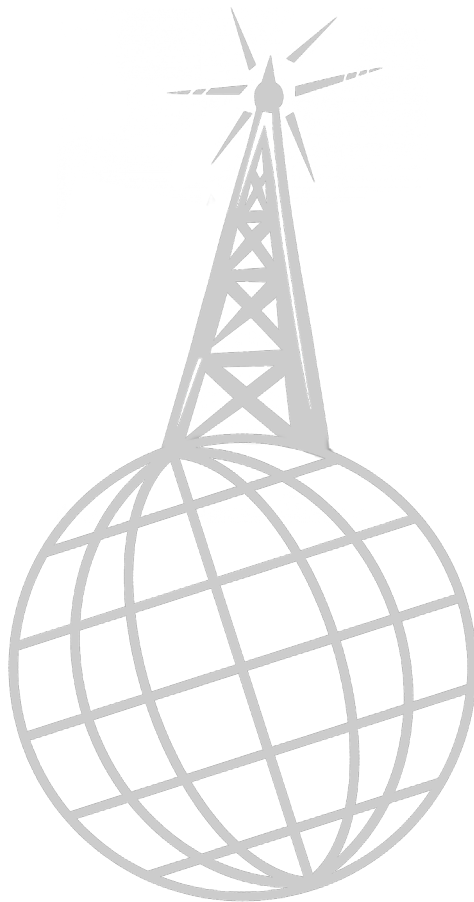


*We stock Tecsun genuine replacement telescopic antennas for H-501x, H-501x, PL-990X, PL-880, S-8800, S-2000, PL-368, PL-365, PL-660, PL-330, PL-310ET, De 13DSP*

*We stock replacement battery compartment lids and back stands for PL-880, PL-990X, H501x, PL-660.*

***Others Available on Request***





[www.tecsunradios.com.au](http://www.tecsunradios.com.au)