

## **Wright's Aerials**

### **Glossary of terms**

*This glossary is written with domestic television and radio reception equipment in mind. Some of the definitions are limited to that context, so the glossary should not be used outside it. © Wright's Aerials 2008.*

**AC.** Alternating Current.

**Aerial.** An conductor, usually in a high position, designed to receive or transmit radio and TV signals.

**AGC.** Automatic gain control – circuitry to adjust the sensitivity of a receiver to suit the strength of the incoming signal.

**Amplifier.** A device that increase the strength, or power, of a signal.

**Analogue.** The basic transmission method used since television and radio began. The word 'analogue' is usually used to differentiate between this transmission method and digital transmission (see 'digital'). An analogue vision signal has a varying voltage that is a direct representation of the brightness of different areas of the original picture.

**Antenna.** The US term for 'aerial'.

**Aperture.** The cross sectional area of the dish that is exposed to the satellite signal. A volume of space surrounding an aerial within which objects can affect the aerial's performance.

**ASO.** Analogue switch-off. The end of analogue TV transmissions in an area, when they are replaced by digital ones. Also known, more positively perhaps, as DSO (digital switch over).

**Astra.** The main satellites for UK and European reception. Astra 1A – 1K orbit the Earth at 19.2 E, and supply hundreds of foreign digital channels. Astra 2A – 2D orbit at 28.2 E and provide the Sky Digital signals.

**Attenuator.** A small in-line device used to reduce the strength of signals.

**Audio.** Used to identify sound (as opposed to vision) baseband signals.

**AV.** Audio and video signals as components of the same system.

**Azimuth.** The horizontal angle between the reception path and a compass direction. It is usually expressed as a compass bearing, or in the case of satellite TV as degrees east or west of south.

**Backbox.** A small box used to mount an outlet plate (aerial socket) on the wall. Backboxes either mount the outlet 'flush' or 'surface' on the wall. Surface backboxes are also known as 'patresses'.

**Bandwidth.** A range of frequencies occupied by a signal or accepted by receiving equipment. The greater the bandwidth the greater the information carrying capacity.

**Baseband.** The sound and vision signals as they leave, for example, a camera or a microphone. Baseband signals are converted into the form of a TV channel by a modulator.

**Beam tilt.** Transmission aerials at main sites are usually tilted downwards to reduce the amount of signal that travels to the far horizon. This is done to conserve power and to reduce 'spillage' into other areas where the transmissions are not required. An undesirable consequence of beam tilt is that very high receiving sites within the coverage area can suffer reduced field strength.

**Beamwidth.** The acceptance angle of an aerial. The angle through which the aerial will continue to receive signals without the received level dropping more than 3dB.  
**BER.** Bit error rate (or ratio). A measure of digital reception quality. The ratio of errors occurring in a digital signal. Denotes the quality of a received and demodulated digital signal. The lower the rate, the better the signal, for example a BER of  $10^{-4}$  means there is one error in every 10,000 bits. The raw pre-correction BER is the important one for aerial and dish alignment.

**Booster.** Small domestic amplifier, often used where the real solution would involve aerial work. The other name for a booster is a 'set back amplifier'.

**Brown goods.** A retailers' term for TV sets, radios, and the like (as opposed to 'white goods': laundry and kitchen equipment)

**Carrier to Noise Ratio (c/n).** The ratio of the received carrier power and the noise power in the bandwidth occupied by the carrier. The higher the c/n, the better.

**Channel.** A frequency band of fixed width that provides a path for signals. The UHF band has channels numbered from 21 to 68. This is not to be confused with 'channel' meaning a television service. For instance, 'Channel 5' is actually transmitted on various 'real' UHF channels, including channel 37.

**Channel filter.** A filter that passes one channel, usually UHF TV, and (ideally) stops all other frequencies.

**Channelised.** Equipment that processes each channel separately.

**Chrominance.** The part of a colour video signal that carries the colour information.

**Clarke Belt.** The geostationary orbit where all the TV satellites sit. A satellite in that orbit goes round the Earth at the same speed as the Earth rotates, so it seems to stay still. The orbit was named after Arthur C Clarke, who had the idea.

**Coax.** Co-axial cable. Cable with an inner conductor and an outer screen. There are many different types of coax, and they are often not interchangeable.

**COFDM.** Coded Orthogonal Frequency Division Multiplex. The modulation system used for digital terrestrial television in the UK. COFDM makes the signal highly immune to multipath reflections.

**Co-channel interference.** Interference from another TV transmitter on the same channel. Usually the interfering transmitter is distant, and in theory its signals should not arrive at the receiving site in question. Unfortunately coverage areas cannot be precisely defined, and weather conditions often cause signals to travel outside their intended areas.

**Co-location.** Several satellites located in the same nominal orbital slot.

**Conditional Access System.** Signal scrambling to make sure that programmes are only accessible to those entitled to receive them.

**Compression.** Digital signals are reduced in size by compression, in order to save bandwidth. The effect on picture and sound quality depends on the degree of compression. Some 'low rent' satellite channels are severely compressed and it shows.

**Copper on copper.** A shorthand specification for coaxial cable that has a copper foil screen and also a copper braid screen. This is the best cable for all domestic use. Cables with 'silver' foil screens do not perform nearly as well.

**Cross-modulation.** If a masthead or distribution amplifier has too strong a signal at its input, the output will be distorted. In the case of analogue TV reception, various sorts of patterning might appear, or one channel might be seen in the background of another. Digital reception might suffer 'blocking' or complete loss of reception. The same faults can occur if the input to a TV set or video recorder is too strong.

**DAB.** Digital Audio Broadcasting, or Digital Radio. Not the same thing as radio received by satellite or via DTT.

**Daisy chain.** A long sequence of active components, for instance: masthead amplifier, distribution amplifier, repeater, video recorder, satellite receiver, set-back amplifier, TV set. Since every active component introduces a small amount of additional signal degradation, such arrangements are rarely satisfactory.

**dB.** The unit used to express the ratio of two power levels. It is used to quantify the gain or loss in power of, for instance, an amplifier.

**DC.** Direct current.

**Decoder.** An MPEG decoder, for instance, takes the digital MPEG signal and converts it into a form that can be used to produce pictures and sound. 'Decoder', however, is commonly used to mean the unit built into a satellite receiver that unscrambles a picture that is protected by encryption. A 'Sky decoder' for example. This should really be called a descrambler.

**Digital.** A relatively new transmission method that is superseding analogue in many

applications (see 'analogue'). A digital signal is a sequence of ones or zeros, or on/off states.

**Digital cliff.** The sudden breakdown or loss of digital reception when the data stream has more errors than the error correction system can deal with. Up to this point reception stays fine but when it is reached the degradation is sudden and severe. Analogue reception, in contrast, 'degrades gracefully'.

**Diplexer.** A device that combines two sets of signals of different frequencies. For instance, a diplexer might combine VHF DAB radio (frequencies below 250MHz) with UHF TV (frequencies above 470MHz).

**Directivity.** The concept that relates to the way an aerial will respond differently to signals from different directions.

**DiSEqC.** Digital Satellite Equipment Control. Facility that lets you control several LNBs or dishes from one LNB input.

**Distribution amplifier.** An amplifier that provides the strong signals necessary to feed a distribution system network.

**Distribution network.** The cables, tap-off units, trunk splitters, downloads, and outlet plates that carry the signal from the head-end or repeaters to the TV sets.

**Distribution system.** A system that receives incoming TV and radio signals and supplies them to a number of receivers.

**Dolby Digital.** A high quality surround sound format using digital signals, with five surround sound channels and one bass channel.

**Double screened.** Originally this meant that the coaxial cable in question had two separate screens, insulated from each other, but it's now come to mean cables that have a foil and a braid screen in contact with each other. See 'copper on copper'.

**Doppler effect.** A change of the frequency of a signal as the receiving site caused by the path length altering.

**Download.** The final cable running to the wall outlet, usually from a tap-off unit. The cable linking the aerial to the head-end.

**Downlink.** The signal path from the satellite to the reception sites on earth.

**DSB.** Double Side Band. The cheap modulators in VCRs and satellite receivers send out the lower as well as the upper sideband. This is technically unnecessary and occupies bandwidth, but suppression of the lower sideband is expensive to suppress the lower sideband. See VSB.

**DTT.** Digital terrestrial television, also known as DVB-T. Digital TV (and radio) from an aerial. Marketed as 'Freeview' and TopUp TV. Used to describe digital TV channels that are received by a set-top box such as a Freeview adapter, or an IDTV.

**Dual LNB.** An LNB with two independent outputs.

**DVB.** Digital Video Broadcasting. The European digital TV standard. A digital universal transmission technique for picture, graphics, sound, and text, as well as for data of any kind or quality. Sometimes another letter is added such as S in DVBS for 'satellite' to indicate the transmission method. A sticker on equipment with 'DVB' indicates that it is ready for digital reception.

**DVR.** Digital Video Recorder. The modern equivalent of the familiar VCR or 'video'. Records digitally onto a disc.

**Earth bonding.** Secure, very low resistance, conductive path to earth.

**Elevation.** The angle above the horizontal at which the satellite appears at the reception site.

**Encryption.** Technique that ensures that a broadcast is unwatchable without decrypting equipment. Encrypted signals are usually reconstructed using a 'decoder' and a smart card. Also known as 'scrambling' or 'conditional access'.

**EPG.** Electronic Programme Guide. An on-screen listings guide with current and future programme details.

**ERP.** Effective radiated power. A measurement of transmitter power that takes the gain of the transmitting aerial into account.

**Equalisation.** Signal loss on cable increases with frequency. To compensate for this an equaliser, or slope filter, is used. This reduces the strength of the lower frequencies. Equalisers are often fitted at an intermediate point on a system, at a repeater. Slope is also called 'tilt'.

**Event timer.** Programmable timer built into many satellite receivers, which switches on and changes channels for unattended video recording.

**F- connector.** A screw-on or crimp plug commonly used for LNB-satellite receiver connections.

**Fibre optics.** A very efficient method of sending signals long distances by optical pulses in a transparent fibre.

**Filter.** A device that passes signals within a nominated frequency or group of frequencies and rejects others.

**Flylead.** The short cable that connects the TV set (or VCR) to the wall plate.

**Footprint.** The area on the Earth where a satellite provides useable signal strength.  
**Forward Error Correction (FEC).** Extra data in a satellite signal that can be used to correct any errors. An FEC of 7/8 means 7 bytes are used for the actual signal for every one that provides error correction. FEC is also known as the Viterbi Rate.

**Freesat.** Essentially, groups of freeTV and radio channels delivered by satellite, with an electronic programme guide, or EPG. There are two competing Freesat systems in the UK, one operated by Sky and the other by the public service broadcasters.

**Freeview.** A package of around 40 channels organised by the BBC, Sky, and National Grid Wireless. Freely available to anyone with a TV aerial and a Freeview adapter. Transmitted terrestrially, so no dish is required.

**FSS and DBS.** (Fixed Satellite Services and Direct Broadcasting by Satellite) band. Portion of the Ku-band (10.95 – 12.40GHz) which is the main satellite TV band.

**FTA.** Free-to-air. Channels that don't need a subscription and that are not encrypted.

**FTV.** Channels that don't need a subscription but are encrypted for copyright reasons. Usually a free (or nearly free) smartcard is needed.

**Gain.** (i) The amount an amplifier increases the signal that passes through it. (ii) A measure of the sensitivity (or efficiency) of an aerial.

**Geostationary Orbit.** An orbit 22,500 miles above the equator where a satellite keeps the same position relative to the Earth.

**Ghosting.** The appearance on the (analogue) TV screen of a secondary image, normally to the right of the main image. This is caused by multipath reception, in which TV signals are reflected back to the aerial from a building or other large object.

**Ground loop.** An AC current on the screen of a coaxial link. Usually caused by different earth potentials at each end. The result is picture interference.

**HDTV.** High definition TV, in which more scanning lines give a sharper result than a standard 625 line picture.

**Head-end.** The collection of filters, amplifiers, power supplies, etc., that takes in all the signals from aerials, satellite receivers, and other signal sources, and sends them out to the system network.

**Hub.** A strategically placed location in a building where a fairly large number of download cables meet. At the collection point there will be polarity switches, tap-off units, or amplifiers, to provide the signal for all the downloads. Trunk cables will link a series of collection points to the head-end or to a repeater.

**IDTV.** Integrated digital television set. A TV set with a terrestrial digital receiver built in.  
**IF.** Intermediate Frequency. The LNB down-converts the incoming signals to the band 950-2,150 MHz. These frequencies can be carried reasonable distances on co-axial cable, unlike the signals that come down from the satellite, which are at much higher frequencies.

**Interference.** An unwanted signal that disturbs reception.

**IRD.** Integrated receiver/decoder. A satellite receiver with a built in descrambler for unscrambling subscription channels such as Sky Movies.

**Isolating.** An isolating outlet plate includes components that prevent the passage of high voltages.

**Leveller.** A device used to adjust the strength of individual channels or multiplexes. Also known as a channel or cluster equaliser.

**Line amplifier.** An amplifier used at an intermediate position along a cable to boost the signal.

**Line power.** Power carried along the coax cable that is also used for signal. Line power is used for masthead amplifiers, LNBs, and repeater amplifiers.

**LNB.** Low Noise Block down-converter. The electronics on a satellite dish. The unit at the front of the dish that receives, amplifies, and frequency-converts the incoming signals. The LNB output is 'satellite IF'. Some LNBs have more than one output to feed several receivers or for Sky+.

**Loopthrough.** Connections on a receiver which allow for external equipment such as decoders to be inserted into a TV's signal path. RF loopthrough allows the aerial signals to pass through a VCR or satellite receiver.

**Loss.** The amount by which a component or cable reduces the signal that passes through it.

**Low loss coax.** The name given to the cables introduced in the 1960s for UHF installations. Nowadays 'low-loss' is likely to mean domestic-quality semi-airspaced cable with only a braid screen – quite unsuitable for modern distribution systems. The downgrading for commercial reasons of the expression 'low loss' to mean cables that are anything but is unfortunate.

**Mast.** The pole (usually aluminium), that supports the aerial.

**Masthead amplifier.** A small amplifier fitted at the aerial to increase signal levels.

**MATV.** Master Antenna Television (US).

**Modulator.** A device that converts baseband signals to RF. In other words, it converts video and audio signals (possibly from a camera and microphone) into a form that appears, to a TV set, to be a standard broadcast channel. A modulator can be thought of as a very low powered TV transmitter. Any analogue channel carried on a system, except analogue terrestrial broadcasts, originates from a modulator.

**Multipath.** If the transmitted signal finds more than one route to the receiving aerial—usually by being reflected from a building—various reception faults can be caused. In the case of analogue TV, the visible effect is called 'ghosting'.

**Multiplex.** A group of digital signals transmitted within one channel. A terrestrial

digital TV multiplex usually carries approximately six programme services. Digital satellite transmissions are also in multiplex form, as is digital radio. Commonly: 'mux'.

**Multiswitch.** ('magic switch', polarity switch) A device at the heart of most satellite distribution systems. The multiswitch takes the four outputs from a 'four fixed output' LNB and allows each satellite receiver connected to select from the four. In the UK the four inputs are usually the four groups of channels transmitted by the 'Sky' satellites. These groups of channels are (1) low band vertical polarisation (2) low band horizontal polarisation (3) high band vertical polarisation (4) high band horizontal polarisation. The multiswitch will have between four and 16 outputs. Each output feeds a satellite TV outlet. The multiswitch automatically sends the correct group of channels to each output, depending on the channel selected by the viewer. The satellite receiver sends a signal to the multiswitch telling it which groups of channels to provide. To each receiver it appears that it is connected directly to a dish. The multiswitch usually has a terrestrial TV input and if so the terrestrial signals are always available at all outputs.

**Mux.** See multiplex.

**MPEG-2.** The standard used for the compression and multiplexing of digital TV. (Moving Pictures Experts Group).

**Noise.** Undesired disturbance, received by an aerial or satellite dish, or accidentally or unavoidably generated within a system. All active devices (amplifiers, etc) generate a certain amount of noise. See S/N ratio.

**Noise Figure.** A measure of the performance (noise contribution) of an LNB or amplifier in decibels. The lower the said figure, the better.

**Octo LNB.** An LNB with eight 'universal' outputs; that is, outputs that are independently switchable between bands and polarities by means of control signals. A quad LNB is the same but with four outputs.

**Outlet.** The wall plate (or wall socket) that provides the connection point for the TV set.

**Oscillation.** In the context of RF distribution systems, the term is used to describe a situation that can occur if the output of a system leaks into the input. If the net gain of the circuit exceeds unity the whole system will oscillate uncontrollably. This is the RF equivalent of audio 'howl round'.

**Padded outlets.** Wall plates designed to be connected with several in a series along a cable. This was a technique used in the 1960s and early 1970s, but is unsuitable for modern requirements.

**PAL.** Phase Alternating Line. Analogue colour television system used by both British terrestrial and satellite broadcasters.

**Phono.** Round sockets that are commonly found on the back panel of satellite receivers for sending audio and video. Red for right audio. White for left audio. Yellow for video. Also called 'RCA'.

**Polarisation.** Radio waves have electric and magnetic components. These are at right angles to each other. The elements of a receiving aerial (or the receiving probe inside an LNB) must have the correct orientation with respect to these components.

Polarity switch. See multiswitch.

**Pre-echo.** In areas of high field strength, the TV set, and other components, can pick up signal directly off air. This direct signal can be strong enough to compete with that from the aerial system. This is pre-echo. The most obvious symptom is a ghost image. Since the interfering signal is received directly at the TV set it arrives before the aerial signal so the shadow is to the left. The shadow can be very strong, resulting in a double picture, which may pull sideways. Teletext and Nicam may be garbled. Moving the TV set or its leads even slightly will have a great effect on reception, because this affects the strength of the signal that they pick up, and its phase relationship with the main signal.

**PSU.** Power supply unit.

**PVR.** Personal Video Recorder. The same basic idea as the DVR, but with bells and whistles that allow you to skip adverts and so forth. Uses an Electronic Programme Guide to schedule recordings. The recording medium is a hard drive. Many PVRs have digital tuners only, so can't be used for analogue channels.

**QAM.** Quadrature Amplitude Modulation.

**Quad LNB.** An LNB with four 'universal' outputs; that is, outputs that are independently switchable between bands and polarities by means of control signals. An 'Octo' LNB is the same but with eight outputs.

**Quattro LNB.** An LNB with four outputs, each of which provides one of the following sets of signals: vertical high band, vertical low band, horizontal high band, and horizontal low band. These LNBs are used to feed signals to multiswitches.

**Rain Fade.** Loss of satellite reception caused by signal absorption during heavy rainfall.

**RF.** All signals carried on a normal TV distribution system are RF, as opposed to baseband.

**RFI.** Radio frequency interference.

**Repeater.** A collection of filters, amplifiers, power supplies, etc., situated on the system network some distance from the head-end. The usual function is simply to amplify (strengthen) the signals, but in some cases there is also equalisation or other processing.

**RSL.** Restricted Service LicenseLicence. A tv or radio channel broadcast to a small local area, either permanently or for a limited time. Transmissions are usually low powered and the coverage area might or might not be the same as a local relay station carrying the main channels.

**Satellite IF.** The signals that leave the LNB (on the dish) and feed the receiver input. 'IF' is 'intermediate frequency' – the signals have had one frequency conversion at the LNB and will be further converted in the receiver.

**Satellite receiver.** The 'set-top' box. Includes the decoder.

**Scart.** A connector on TV sets, VCRs, satellite receivers and other entertainment equipment for transmission and reception of audio (sound) and video (picture) signals (AV).

**Screening.** In cable, a conductive material, often earthed, that surrounds the signal conductor and prevents radiation either to or from that conductor.

**Set-back amplifier.** A small DIY device fitted behind the TV set to increase signal strength or provide signals for further receivers. Also known as a 'booster'.

**Signal.** A waveform that conveys information, such as a TV picture.

**Signal strength meter.** An instrument used for aligning aerials, or for making simple tests on distribution systems.

**Signal to Noise Ratio (s/n).** The ratio of the signal power to the noise power. As an example, a s/n ratio of 48dB is the minimum for an analogue video signal.

**Skew.** Fine-tuning of the LNB polarisation, to compensate for the fact that 'vertical' varies with the satellites' positions above the Earth.

**Sky.** British Sky Broadcasting. In the UK 'Sky' is almost synonymous with 'satellite'.

**Sky+.** A clever device that has two satellite tuners and a hard drive recorder in one box. To work properly the Sky+ box needs two independent satellite dish feeds, either from a dish with a multi-output LNB or from a distribution system.

**Smart-card.** A card used to de-scramble encrypted broadcasts when placed in a decoder or receiver that has a built-in de-encrypter.

**SMATV.** Satellite Master Antenna Television. Satellite and terrestrial TV distribution system (US).

**S/N ratio.** Signal to noise ratio. The ratio between the wanted signal and the sum of all the unwanted (interfering) signals.

**Spectrum.** A range of frequencies.

**Spectrum analyser.** An instrument that gives a graphical representation of the strengths of the signals across a range of frequencies. Most analysers used in the industry provide a host of other measurement facilities.

**Splitter.** A device used to originate two or more signal feeds from one input.

**Spur unit.** A device that taps off a secondary feed from a trunk, of lower level but with the same quality as the primary feed.

**Stacking.** A technique by which the outputs of two identical aerials are combined. An increase in gain can be achieved. By exploiting the phase relationship of the outputs the combined array can be used to discriminate against interference, including ghosting.

**STB.** Set-top box.

**Tap-off line.** A large size co-ax cable that runs along a route convenient to feed a large number of outlets, with tap-off units positioned strategically along its length.

**Tap-off unit.** Fitted at intervals along a tap-off line, these units extract a small percentage of the signal and feed it, via the download, to a wall outlet. The bulk of the signal is passed on to the next tap-off unit, or, in the case of the last unit on the line, is absorbed by a line terminator.

**Terminator, or termination.** A  $75\Omega$  resistance that absorbs the signal at the end of a coaxial cable. If the terminator wasn't there the signal would bounce back and cause all sorts of problems.

**Terrestrial.** A television station that broadcasts from the ground, as opposed to from a satellite. The broadcasts are received by an aerial as opposed to a dish.

**Terrestrial Interference.** Interference to satellite reception caused by ground-based microwave stations. The frequencies used for satellite downlinks are also allocated to terrestrial microwave links.

**Topography.** In this context we are usually considering whether or not the landscape will obstruct the signal path.

**Transponder.** Components in a satellite that receive, process, and re-transmit a signal back down to Earth.

**Trunk cable.** Links the head-end to a repeater. Usually a large size co-ax.

**Twin tuners.** Describes a set-top box that can record two channels at once or record one channel while watching another channel live.

**UHF.** Ultra High Frequency. The frequency band used in the UK for terrestrial television broadcasting, both analogue and digital. The UHF TV channels are numbered 21 to 68.

**VCR.** Videocassette recorder, or 'video'.

**VHF.** Very High Frequency. The frequency band used in the UK for terrestrial radio broadcasting, both analogue and digital. Despite the name, VHF frequencies are the lowest we use nowadays, unless you include AM radio.

**Video.** (i) Used to identify a vision (as opposed to sound) baseband signal. (ii) Common parlance for videocassette recorder or the tape that goes into it.

**Voltage-switched LNB.** Combined LNB/polariser commonly found on Astra systems with polarisation selected by changing the voltage supplied to the LNB.

**VSF.** Vestigial Side Band. The lower sideband of a signal is suppressed. Ideally all modulators would be VSB, but this is a costly option so the modulators in VCRs, etc, are always DSB (double sideband).

**Wallplate.** The fitting (usually found near a mains socket) that allows the connection of the aerial signal to a TV set or other receiver.