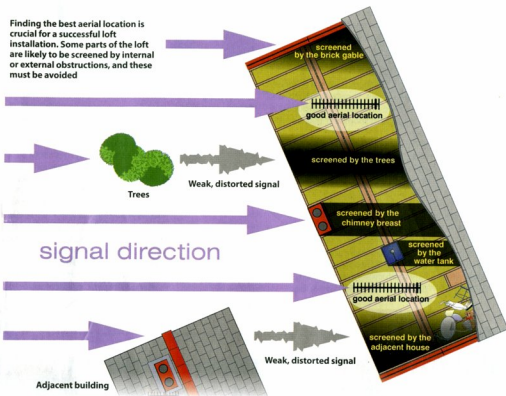


When it just has to be in the loft

At analogue switch-off the digital transmission power is greatly increased, making loft aerials feasible even in some mediocre reception areas, says Bill Wright

Finding the best aerial location is crucial for a successful loft installation. Some parts of the loft are likely to be screened by internal or external obstructions, and these must be avoided



Bill Wright

Bill grew up with a TV aerial in his hand, helping his aerial installer dad. In 1971 he seized the reins and has never looked back. Nowadays he concentrates on distribution systems, leaving everything else to his son, Paul.



To anyone contemplating the installation of a television aerial in a loft, my advice would be the same as Dr Johnson's to a young man contemplating marriage – don't!

But sometimes a young man feels that marriage is his easiest option, sometimes he feels that it's his only option, and sometimes of course he has no option. It's the same with loft aerials – the lofty advice of Dr Johnson regarding marriage, and that of the aerial puritans regarding loft aerials, isn't always practicable.

Outdoor aerials are best, but they are not always possible or desirable. Loft aerials are a wretched compromise in principle, but if there's no alternative they can work well as long as they are properly installed.

The problems

A loft is an inherently bad environment for a TV aerial. A loft aerial will be 'looking' through the slate or tile at the very least, and worse might be looking

through a solid brick wall. If the roof is lined with aluminium foil a loft aerial will not work at all, unless some signal penetrates an unlined brick gable. Some tiles have a high metallic content and will stop almost all the signal.

An aerial in a loft might be 10 or 15 feet lower than one on the chimney, so screening by nearby buildings and trees is more likely.

Aerials extract energy from the electromagnetic field in their vicinity. This is the capture area, and it extends several wavelengths above, below, and to the sides of the aerial. Conductive objects inside the capture area will affect the aerial's performance.

UHF aerials are tuned to operate efficiently on a given band of frequencies. Any conductive object near the aerial will affect this tuning, knocking the aerial off resonance and reducing its gain and directivity.

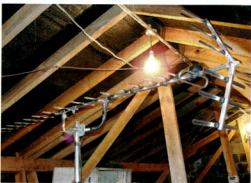
Loft aerials can receive interference from the mains power cables that run along the joists. Even the transient

generated by the turning of a light switch can cause DTT reception to freeze momentarily.

If several transmitters are possible, look again at the neighbours' aerials to get an idea of which is likely to be the best in your immediate area.

Once you know the signal direction you should stand some distance away from the house and try to visualise the

Luckily, this aerial is 'looking' through tile rather than brick. The nearby cables could radiate impulse interference, but the old water tank isn't close enough to be a problem



signal path to your loft. If there's 'clutter' towards the transmitter imagine that the sun is setting – actually on the horizon – in the exact transmitter direction. Where do the shadows of buildings and trees fall? These areas will be screened from the transmitter. You might see immediately that one part of the loft will be more screened than another. Another way to do it is print out an aerial view from Multimap or Google Maps and plot the signal direction and the screened areas onto it. Take this knowledge into the loft with you.

The aerial

With everything else against you, at least use the best possible aerial. This means that it should be CAI benchmarked, and should be channel grouped one rather than wideband.

Because the signal strength in the loft is likely to be low, it's best to use an aerial with reasonable gain (sensitivity). So unless you are in a really strong signal area, log-periodic aerials – which have inherently low gain – are not a good choice. Neither is a massive high-gain aerial: these are usually wideband, so actually their gain isn't really all that good, and their sheer size makes loft use problematic. Careful

positioning is the key to successful loft installations, and very large aerials restrict your positioning options – they are awkward to manoeuvre and fix. Proximity effects can also be more of a problem.

Unless the loft is very large indeed and clear of obstructions you should use a conventional 18-element aerial, CAI-benchmarked and grouped if possible. Good products include the Blake SR18, Antiference TCX18, and the Triax SG18. The channel group letter (A, B, CD, E, or W) is suffixed to the aerial type, e.g. 'SR18B'.

The large DIY sheds don't sell channel-grouped aerials. Suppliers with a better range of kit at better prices include local specialist shops and, by mail order. See:

CPC (<http://cpc.farnell.com/>)

Blake Aerials (<http://www.blake-uk.com/page/home>)

ATV Sheffield (<http://www.aerialsandtv.com/index.html>).

'Elf and Safety

Before we get onto the interesting bit, let me bore you with a safety lecture. I think there are more accidents in lofts than on roofs. People climb onto a roof very carefully because they perceive danger, but they climb into a loft



Always use a CAI-benchmarked aerial

without a care, despite the fact that between them and a possibly fatal fall is nothing but half an inch of brittle plasterboard. Loft access ladders can be horribly deceptive, so always treat them with suspicion. I always get about a third of the way up and then jump up and down to see if the ladder breaks or slips.

Some modern houses have factory-made loft hatches and frames, and often these are not properly fixed with a wooden surround, so if you sit on the edge you and about a square yard of ceiling will end up on the hall floor. It isn't a good start and it does nothing to inspire customer (or wifely)

PRO TIPS LOFT AERIALS

confidence. When this happened to a friend of mine an artificial Christmas tree followed him downwards and struck his head, and his wife said: 'Oh, I'd forgotten we had that!'

You know that you mustn't tread on the plasterboard, but don't treat wooden rafters as being perfectly safe either. They can sag and damage the plasterboard, and sometimes they are not properly fixed. Always try to spread your weight, and hold onto something above as you transfer weight from one rafter to the next. It could be worth putting boards down. Don't assume that there's a rafter under the glass fibre just because there 'should' be. Find it before you stand on it!

If the loft is very dusty wear a disposable mask. Rig up some decent lighting because in the dark it's all too easy to hurt yourself on a protruding object. A nail through your eye, would be a bit ironic when you're trying to improve the TV picture. Don't kneel anywhere without checking first for sharp objects, unless you want to end up with a knee like a balloon and a silly walk, like I did in 1976.

Finding the VERY best signal

It's no good just putting the aerial on a pole on the middle of the loft, pointing

it in the right direction, and hoping for the best.

Signal strength and interference vary enormously from place to place in a loft, so you have to find the best location. To do this you need an aerial with a short cable attached, and some means of measuring (or at least assessing) the signal. No problem for the professional, but what about the DIY man? It's totally futile trying to use a telly to check digital reception. A digital receiver with a signal strength indication is better or, better still, get one of the cheap wideband terrestrial meters, such as the SLX 2786R (£13), the Grade/Status/Vision Plus Signal Finder (£16), the Labgear TV Signal Finder (£9), or the Fringe TV Signal Finder (£30).

Use these meters with an in-line attenuator where necessary to reduce sensitivity so you can home in to the very best signal. Don't be satisfied with an 'adequate' or even a 'good' signal. Explore every feasible part of the loft looking for the absolute best signal possible. The more robust your reception the less chance there is of interference or drop out. In a very strong reception area a half-hearted attempt at a loft installation might produce apparently 'good' signal levels,

but if those levels are very much lower than those from an outdoor aerial reception will be unreliable. I'd like to stress this because it's really important, so please consider it stressed. Of course, because of the Rule of Peas you will know which areas of the loft are likely to have weak signals due to external screening, so add to this when you're in the loft by looking round and assessing obstructions.

Water tanks will stop signal dead. Where two pitched roofs join there



The Vision Plus UHF signal finder. A small signal finder makes aerial alignment far easier. Power for the meter can be in line or from the internal battery

The Rule of P's

The Rule of Peas states: Proper Prior Planning Prevents Pretty Poor Performance. Well, that's the clean version. Before you buy anything, do your homework. This is an important aspect of loft aerial installation.

First, you need to know whether your proposed installation has a cat in hell's chance of working. Look at the neighbours' aerials. If they are all massive things on tall poles, I suggest you save yourself some aggravation and forget loft aerials. The neighbours are on an average no less skint than your customer, so if they could have got away with a cheap and easy loft aerial they wouldn't have shelled out for a huge and hideous thing on the chimney. Massive aerials all along your street mean that a loft aerial ain't gonna work!

Assuming that the local aerials look fairly normal, you next need to know the direction, polarisation, and channel group of the transmitter.

Which transmitter, which channel group, and which direction?

The websites listed here will tell you all you need to know.

<http://tx.mb21.co.uk/gallery/>

Navigate to 'TV sites by area' for maps with all the transmitters marked, even the tiny relays

<http://www.wolfbane.com/cgi-bin/tvd.exe>

Type in the grid reference of your site (which you can get from Multimap) and it will tell you which way to point your aerial. Fantastic! Ignore the pessimistic 'antenna suggestions', though.

<http://www.radiolistenersguide.co.uk/>

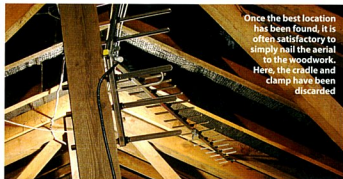
These pocket reference books give full details of every transmitter, including the channels, polarisation, and National Grid Reference.

Amplifiers

If you can't get the desired result having tried your level best, don't get all vexed and stamp off to buy a great big daft aerial to fix in the loft, because it won't solve the problem.

If the aerial works, but not perfectly, fit a screened masthead amplifier with a gain figure of about 16dB. Fit the amplifier near the aerial. The power for it comes up the co-ax from a unit behind the telly.

If the problem is simply 'weak signal', a masthead amplifier will help because it will counteract the losses in the download cable.



might be a wide strip of lead flashing above your head in the valley. If there are brick gable walls or party walls, or chimney breasts, you need to find a location where the aerial won't be 'looking' through them, if possible.

If you are unlucky and the whole loft has a brick wall in the direction of the transmitter, move back from the wall as far as possible. The fact is though, that if the signal from the transmitter is weakened by passing through thick masonry the aerial will be very susceptible to interference from other directions, where it might only have to pass through tile.

In general the signal will be better high up than low down, but you should experiment with the height. If there are external obstructions, in particular trees, the signal could peak strongly at any height.

As you move around the loft testing the signal, keep the aerial pointing in roughly the right direction. Keep the polarisation correct, and keep your body well out of the way, behind the aerial. Keep the cable out of the way of the signal, taking it to the rear of the aerial and then away. Hold the aerial behind the reflector. If you hold it half way along the director chain you will make a nonsense of the whole thing. At each promising location align the aerial exactly for the best signal strength and note it mentally, then move on. It's worth the effort to do this signal search

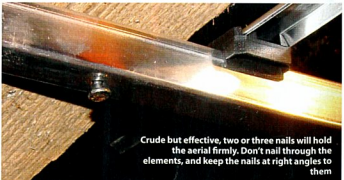
really thoroughly. It does need a bit of patience, and, dare I say it, skill. It's a bit like water divining!

If there's a known source of interference, such as another transmitter using the same channels, try to find an aerial location where a big tank or a wall or another building will form a screen.

Fixing

The fixing must not interfere with the signal, so no clamps or poles in between elements, please. Either use a conventional loft mount, or if the aerial is going to be high up simply nail it to the woodwork. The nails should be at right angles to the elements so they don't affect the signal. Nail through the boom, not through the elements. The proximity of the woodwork will have little effect, but keep away from joist hangers and other metal fixings.

Take the cable away from the aerial through the reflector, or tape it to the boom and mast to minimise its effect on the signal. Incidentally, use a CAT-benchmarked cable with a copper foil and copper braid screen. Cheap 'low loss' is no good. Point the aerial at the transmitter, not at the sky above it as so many people do. Don't leave the aerial where it will be knocked next time someone goes in the loft, or where someone groping around in the semi-darkness could hurt themselves on it.



Radio LISTENER'S GUIDE
2010 Edition

FM switch-off
proposed for 2015

Is this the shape of radios to come?



RADIO REVIEWS / RADIO NEWS / FREQUENCY GUIDE