



INSTALLERS GUIDE TO  
**SKY Q**

NEXT GENERATION  
SET TOP BOXES

# Should Installers Join the Sky Q?

*Sky has told the world that their new set top box range, the Sky Q box, is coming soon. But it uses a different method of tuning that means new LNBs, new distribution systems and host of new hurdles for the installers to overcome. The tech guys at Solutions Group examine the opportunities it brings - and potential pitfalls to avoid.*



## Sky Q Silver

The flagship of the system is the “Sky Q Silver box”, a 12 tuner STB with 4k support that is typically located under the lounge TV. (For those on a budget, there will also be a standard Sky Q STB, simply called Sky Q that does not support 4k).

These set top boxes (STBs) are smaller than the current Sky+ boxes despite the vast improvement in capability. The twelve tuners may seem like overkill, but each has a purpose:

- a. Four are for recording
- b. One is for constant viewing on the main TV
- c. One is used for picture-in-picture mode
- d. Two are used by the Sky Q Mini boxes (one per mini box)
- e. Two for tablet device streaming
- f. One is used to deliver data for the EPG etc
- g. One is described as “for future expansion”



One of the biggest features of Sky Q is the ability to start watching a programme or movie on one device – perhaps the main TV, then pause it and then pick it up where you left off on another device around your home, perhaps an iPad or a TV in the kids room. The on-screen display and information has been brought up to date, now with extra information in a graphical form rather than the text heavy version we have today.

In addition, there are a host of simple but really useful features designed to improve viewer's experience. For example, the new remote control is smaller than before and utilises Bluetooth rather than infra-red. So you don't need to point it directly at the STB, it doesn't struggle from IR overload on sunny days and it's much smarter too. For example, if you lose it down the sofa, just press a button on the STB and the remote will beep, helping you find it again. It has a touch sensitive control pad and a number of new buttons, such as a dedicated search facility.

## **Multiroom is now Sky Q Mini**

The Sky Q Mini STB is smaller than the main box and operates as a slave to the main STB. Although it only has one virtual tuner for live viewing, it can also access the recorded material from the main STB. There is no coax connection on the Sky Q Mini. It can connect via WiFi or wired Cat 6 and if you've got the Sky Q Hub and Sky Broadband it also doubles as a hotspot extender. If needs be, it can even be connected through a Powerline system. Powerline uses the existing mains wiring in a property to send data through the electric cables hidden in the walls. Connection is via the usual 13amp mains plug and makes connection very fast and simple for the consumer. Powerline is typically more reliable than WiFi, without the need to install a new cable.

## **Sky Q Hub**

Although it is possible to use the Sky Q Silver box and Mini boxes with any internet service provider's router, Sky will offer you the Sky Q hub. Its main benefit is the added features on the Sky Q mini, such as adding a wireless hotspot and Powerline networking capability. The router looks similar to the Sky Q Mini box and it features the faster 5GHz 802.11ac Wi-Fi service.

## **Coming soon**

Although not available at launch, Sky will be offering 4k viewing during 2016. They will be adding voice search and a range of apps too. The present tablet streaming facility will expand to phones too.

## **New Hardware, new Installs**

So let's start at the beginning and examine why Sky needed to change its hardware. The present system of transmission from the satellites sends two groups of signals simultaneously. They use the same frequency bands and are beamed down in two distinctly different polarities, horizontal and vertical. This means that an LNB "sees" all of the channels (grouped together in digital clusters called "MUX's) at the same time.

But coax cable can't operate in horizontal and vertical modes; it can only work with one polarity at a time. This problem is compounded because the traditional set top box (STB) tuner can't receive the whole band of channels at once, it can only deal with about half.

To solve this problem, the standard LNB only delivers half of one polarity down the coax at any point in time. When the viewer chooses a channel to watch, the set top box sends an instruction to the LNB, telling it which polarity it needs to select and which half of the band it requires, thus enabling it to receive the channel the viewer has requested.

This "instruction" is in the form of a voltage and a tone. The polarity is selected by moving the DC power from the STB to the LNB from 13 volts to 18 volts. It selects the lower or upper half of the band by adding a 22kHz tone to the coax cable. So there are four possible "groups" of signals.

When we look at STBs that can watch one channel and record a different one, we need to duplicate this process, using an additional coax cable from the set top box to the LNB. This all works fine, but these days two tuners are not considered sufficient, but adding more and more coax cables is impractical.

## **New wideband LNB**

The new LNBs have done away with the low band / high band 22kHz system. Instead they have just horizontal and vertical polarities and the new tuners can now receive all of the band at once. They have one fixed local oscillator set around 10.4 GHz. This converts all of one polarity down to a coax friendly 300MHz to 2.3GHz. This will introduce new challenges for the installer, particularly for communal systems. By using two coax cables that may already be installed, the STB can now “see” all of the channels at the same time. So a tuner inside the STB is free to select any channel without the need for any voltage switching or tones. This opens up the world of multiple tuners. The new Q box has twelve tuners all operating simultaneously. In theory, this method allows for an infinite number of tuners.

## **Domestic Installations**

A standard domestic system usually has two coax cables from the dish to the STB. Most are either CT100 type or CT63 – some may even have budget cable. The new LNB frequency range will mean the losses at the higher frequencies will have even more loss, but the typical cable lengths are less than 15m and this should not cause a problem. The tuners in the new boxes have a better dynamic range and will cope with the now substantial slope effect of lower loss at the lower frequencies and much higher losses at the top frequencies. However, if a budget cable has been used, it is possible that higher frequency attenuation may make installation quite a challenge.

## **Wall Plates**

Most domestic installations have no wall plates at all; the cable passes through the wall, directly to the set top box. If any form of wall plate has been used, this may introduce a problem. If the wall plate is a simple f coupler, this should not be an issue. However, if the plate uses any form of diplex or triplex (allowing terrestrial signals to share the satellite cable) this will filter out the lower channels on the new LNB, making the install fail. These plates will need to be replaced and a separate terrestrial cable installed. Today, terrestrial channels are transmitted between 470MHz and 790MHz, overlapping the new LNBs. So Q box systems can no longer share coax with Freeview.

## **4G Interference**

There has been a lot of publicity regarding 4G mobile phone transmitters causing interference on TV systems. There have been quite a number of problems caused to terrestrial TV, but little regarding Sky TV. This may be due to the fact that until the introduction of Sky Q, Sky signals sit outside of 4G transmissions. This will change with Sky Q. There are two main areas of potential problems. The first is the leakage of 4G signals into the coax or other parts of the installation, especially in IRS systems. If inferior cable has been used, or if an install runs near

a 4G transmitter, the potential for signal disruption exists. The second and perhaps ironic scenario is where 4G filters have been installed in a satellite system to protect it from 4G interference – but it will now block some Sky Q channels that sit around TV channel 61. This may be quite complex to solve and we recommend discussing the issue with Solutions Group before attempting any modifications.

## **Communal COAX systems**

The traditional coax systems use a 5 cable trunk running around the building. At appropriate locations, a tap is installed to “tap off” some of the trunk signals to supply the four satellite polarities and terrestrial signals to a switch. This switch has a number of outputs that each mimic a separate “standard” LNB.

Each STB is connected to the switch by a single coax cable and the switch automatically selects which polarity and which half of the band the STB is demanding. In addition, the switch adds the terrestrial TV signals to the cable. This allows one cable to carry satellite and TV signals simultaneously, reducing the cost of coax cable and speeds installation. In these cases the wall plate will have filters built-in, splitting the satellite signals from the terrestrial signals. So the consumer has a TV socket and a separate satellite socket. In recent years most installations include a second satellite connection for Sky+ functionality.

The new wideband LNB must not pass through a wall plate with a filter, so this type of install requires a new wall plate and will not deliver terrestrial TV without adding another coax cable.

Some coax cables installed in communal systems may be 30m long or more. Vision switch systems support CT100 type cables as long as 80m. At these lengths, the new higher frequencies will incur quite high losses, potentially making delivery over these distances quite problematic. In fact the loss itself is just part of the problem. Because the range of frequencies is now much larger, signal levels at 300MHz could be as much as 20dB bigger than the higher frequencies, possibly outside the dynamic range of the STB. This could mean overload at the lower channels or insufficient signal levels at the higher channels. Both are undesirable.

It is possible to add a device that takes in four traditional polarities and converts them into two wideband outputs, suitable for Sky Q. This can be achieved by tapping into the existing 4 wire backbone (terrestrial can't be added) and connecting a new interface to the two existing cables to the consumers STB. If required, the terrestrial signal can also be tapped off and a new cable installed for terrestrial TV added. Great care must be taken to maintain signal levels on the remaining system. The length of the consumer cables, the cable construction and any wall plates must be taken into consideration too.

Although considerably more expensive, it is also possible to use a new version digital SCR device to provide the feeds for the twelve tuners in a Sky Q STB down a single coax cable. These devices take the four bands in from the LNB and then generate 12 separate signals, all passed down one coax cable to the STB. The STB sends data to the SCR, telling it which 12 channels it needs and the SCR does the rest. The advantage of this approach is the satellite signals are above 950MHz, leaving room for terrestrial signals to co-exist on the same coax cable.

Some digital SCR units will also accept a terrestrial signal and diplex it onto the coax cable. The old outlet plate will still work too and the cable losses are not an issue either. To connect such a device to an existing IRS installation requires the addition of a five port tap or splitter.

Great care is needed to ensure this additional device doesn't alter the existing network levels, potentially causing inadequate signal levels in other parts of the installation. For further details, please contact Solutions Group.

## **Fibre systems**

Most fibre optic systems stack all of the channels into one very large group, negating the need to have voltage or tone signalling. The fibre optic receivers located close to the STB then convert this large band of channels back into a form the set top box can work with. Presently these receivers recreate a 4 band system, mimicking an LNB. Some will also recreate a terrestrial output. To upgrade these systems for Sky Q, the user interface must be replaced with a new two output wideband device for Sky Q. Some versions will be able to recreate the terrestrial feed as well.

## **Hotel Systems (SMATV)**

The main difference between an IRS system and a hotel system is the way channels are delivered. IRS systems rely on a STB being located next to a TV and all control is determined by the STB. In a SMATV or similar head-end system, the channels are preset at the head end using multiple STBs set to one channel only. The viewer then selects the channel from the TV. All available channels are delivered simultaneously at TV frequencies and the TV is tuned in as required. As a result, Sky Q is probably unnecessary for SMATV systems.

## **Existing systems**

There are around 15 million traditional Sky set top boxes in use today, around two thirds on subscription. Of these around 10% are on communal systems and will continue to operate without a problem for the foreseeable future. The Sky Q systems will be initially be charged at a premium and many viewers will continue with their existing STBs. Presently the wideband-ready products are quite expensive and only premium installs are likely to take up this new offering. Traditional systems will need to be maintained and over time, some

will need to be upgraded. Communal systems will probably use a hybrid approach, offering traditional feeds for most consumers, plus a spliced-on upgrade for those that demand it on a case by case basis.

## Further information and advice

Solutions Group works with a wide range of manufacturers and offer unrivalled levels of technical support for their trade customers. If you have an installation query, need advice on a new installation or want to learn more about any aspect of TV distribution installation, we will be pleased to help you.

Please contact your local Solutions Group branch for details:

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