Technical Installation Guide

Signal Splitting and Combining V1.1

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This Installation Guide supplements the information supplied with decoders as well as any installation information available on our website.

For more information, visit www.dstv.com

Changes from V1.0 to V1.1 :

- External power supply reference
- Separate diagrams for DC and 7MHz path

Signal Splitting and Combining V1.1 (13 Feb 09) e&oe

If you have technical comments or want to chat to other users about the installation and connection of a decoder or XtraView, visit the forums at www.dstv.com

SPLITTING SIGNALS TO TVS

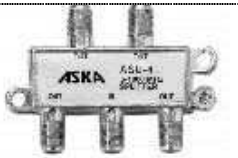
Splitting of a signal to multiple points is one of the most common requirements when installing DStv and there are various components which can be used.

PASSIVE SPLITTERS

Passive splitters are so named as they have no active components (ie. nothing that works with electricity). Some of these are :

2-way splitter

3-way splitter



4-way splitter

T-piece

Note: Splitters have at least some degree of isolation between the outputs legs which means that a device or signal connected to the one leg is less likely to interfere with a device or signals coming from (or going to) the device on the other leg(s). T-pieces have no isolation between the output legs and it is for this reason, that a splitter is less likely to cause a problem on either the other decoder or give a picture with a double edge (due to reflection).

ACTIVE SPLITTERS

Due to the losses incurred when splitting a signal (you get slightly less than half the signal power even when you just split it in two), an amplified splitter is required in cases where the other viewing point(s) have a fuzzy / noisy picture.

These splitters require power which can come either from a separate power supply, or (in many cases) from the tvLINK power as supplied by the decoder.

Using external power can take some strain off the decoder and may even provide slightly higher power at the tvLINK eyes (depending on the capacity of the external power supply).

Active splitter

SPLITTING SIGNALS TO USE A TVLINK OR XTRAVIEW

To split a signal in a way which allows a tvLINK signal to travel back to the decoder, the splitter needs to allow a reverse frequency (frequency allowed from the output back through to the input legs) of 7MHz. (5 to 30MHz are typical values)

The XtraView heartbeat goes in one direction only, ie. from the primary decoder to the secondary decoder. If the XtraView heartbeat has to pass through a splitter going in the forward direction, a splitter must be used that covers no less than 5MHz to 900MHz in the forward direction (this is because the heartbeat also runs at 7MHz). If you use the incorrect splitter, the heartbeat will get cut off as the splitter does not allow it through properly. (If the heartbeat is travelling in the reverse direction, the 3 to 30MHz reverse value as mentioned in the first paragraph is all that is required).

It is for this reason, that when doing an XtraView installation, we recommend that a relayed remote command from the primary to the secondary decoder be sent to check if the heartbeat path is functioning correctly.

WARNING!

Some splitters with design values that are different from the required ones may seem to allow the heartbeat / tvLINK commands through, however, if conditions change (cable terminations, or even just temperature), your heartbeat may stop working. In many cases, just enough of the heartbeat / tvLINK signal manages to squeeze through, however, when conditions change and the signal level drops even slightly, it stops working and there is suddenly a seemingly intermittent fault.

In addition to the low frequency range requirement, a tvLINK eye needs 9V DC power - so if a tvLINK eye is to be used, the splitter must also allow DC power pass on any leg leading to a TV that is being fitted with a tvLINK eye.

Note 1 : the XtraView system (the "heartbeat") does NOT require 9V DC to work, ie. no DC power pass components are required if you are not using a tvLINK eye.

Note 2 : Similarly, if no heartbeat or tvLINK signal needs to pass through a component, the 5MHz to 900MHz requirement falls away and components allowing as little as 450MHz to 900MHz will cater for all your DStv needs.

Note 3 : Passive splitters do not usually have a strict working frequency range and values of 5MHz to 2400MHz are common.

COMBINING SIGNALS FROM DECODERS

Combining signals from two or more decoders / sources so that these can be fed to an amplifier / splitter and then onto multiple TVs can also be done in various ways :

A T-PIECE

A simple T-piece can be used, but as it does not have any directionality, just as much of the signal will be going in the wrong direction (perhaps causing reflections) as will be going in the right direction.

It also does not have any DC power-pass isolation, so if tvLINK power is required, the 9V will be passed on to all equipment that is not isolated by way of a DC block.

An in-line DC Block

T-pieces can be used in XtraView networks using 2 x 1110 decoder or any networks where no tvLINK power required.

A SPLITTER (IN REVERSE!)

Just connect the RF OUTs from the decoders to the Output legs of a 2-way splitter. This effectively combines the two signals into one with the “INPUT” of the splitter providing the combined output.

A passive splitter must be used as combiner as any amplification would work in the wrong direction. (Remember you are using the outputs as inputs).

It is worth noting that the level of the 7MHz heartbeat signal is high enough to overcome the isolation on most of these splitters / combiners with ease. (Some professional high quality splitters have a lot of isolation between the legs, so test that the heartbeat is being transferred – don’t just make the assumption).

This means that using a splitter in this way not only combines your decoder outputs for easy distribution, but also acts as a heartbeat link. (See the example on page 7).

AN ACTIVE COMBINER

4-way active combiner

Active combiners are recommended when combining more than 2 inputs.

COMBINING WITH TVLINK / XTRAVIEW FUNCTIONALITY

As mentioned previously, a tvLINK eye needs 9V DC power, so if a tvLINK eye is to be used, the combiner must allow DC power pass on at least one of its legs.

For the SD PVR + HD PVR XtraView combo, the SD PVR must have its tvLINK power on (otherwise its heartbeat detection circuitry does not work), so connect the RF out from the SD PVR to the DC pass leg of the combiner.

> **WARNING!**
> In all cases it is better to switch the tvLINK OFF until the installation is completed and to then switch it back ON while watching for tvLINK Overload errors. Failure to do so can damage your decoder's tvLINK circuitry.

Combiners with DC pass on both legs (as well as T-pieces) can also be used, but watch out for "tvLINK overload" errors, as the DC will then be passed through to all other equipment connected to the network as well.

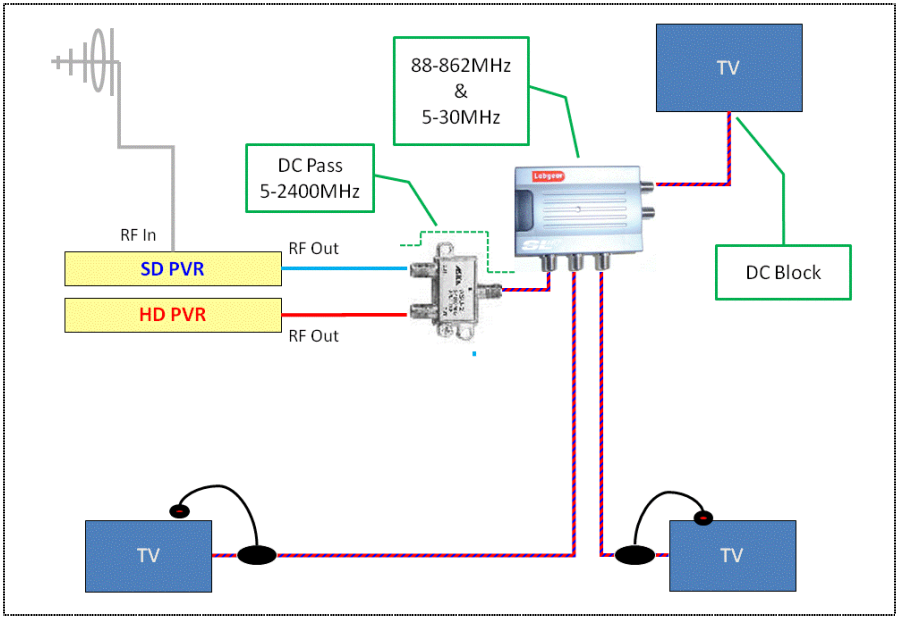
Equipment that can be damaged should be protected by placing them on legs without DC pass, or by fitting DC blocks.

As long as "tvLINK overload" errors do not occur, the tvLINK power can even be active on both decoders (this may be helpful in cases where multiple TV eyes as well as an amplifier needs to be powered).

Active combiners are relatively scarce and if used, care must be taken to ensure that they allow tvLINK / heartbeat signals as well as DC pass in the direction and on the legs as required.

EXAMPLE DIAGRAMS

The following is a typical example of an SD PVR + HD PVR installation :



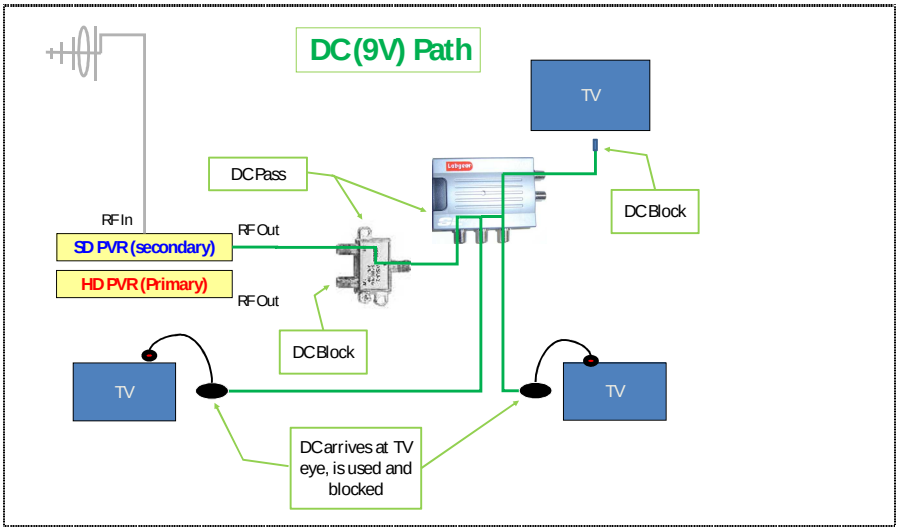
The splitter used is not passing 5-900MHz in the forward direction, but as there is no tvLINK or heartbeat signal that needs to pass through it in the forward direction, this is irrelevant. (The heartbeat couples inside the 2-way splitter from the HD feed to the SD feed and can be ignored past this point. Remember to confirm that the heartbeat / remote relayed commands are being received by the SD PVR).

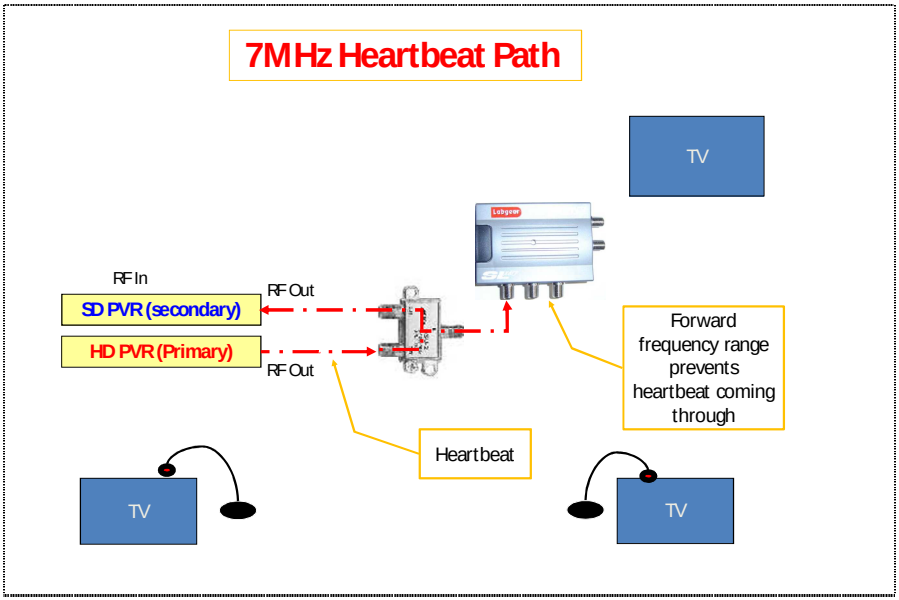
In the reverse direction, the tvLINK signals coming from the TV eyes not only gets passed through the splitter, but they get amplified as well (5-30MHz pass with 8dB gain in the reverse direction) - making this splitter ideal for this specific application.

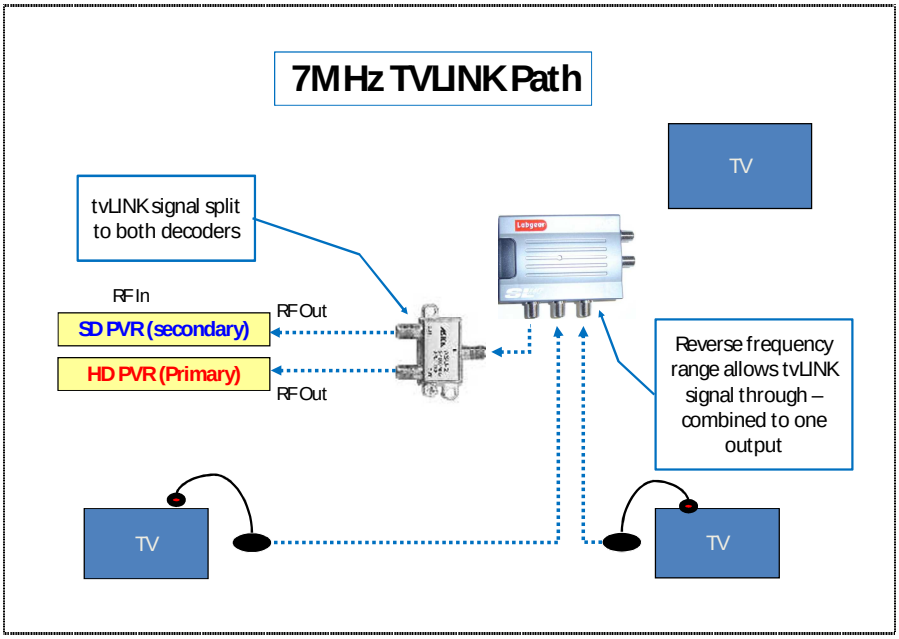
The 9V DC coming from the decoder is very unlikely to affect the TV, so the indicated DC block is an optional, but safe precaution. The 2-way splitter used in this example only has one DC pass leg, so the HD PVR is automatically protected from the SD PVRs 9V feed.

PS : For the eagle-eyed ones … channel 79 is indicated at 860MHz, but has audio up to 866MHz, so for this specific splitter, channel 79 will probably have slightly reduced audio performance.

The DC and MHz paths are shown separately in the diagrams which follow.


DC (9V) Path
TV
DC Pass
DC Block
RF In
SD PVR (secondary)
RF Out
HD PVR (Primary)
RF Out
DC Block
TV
TV
DC arrives at TV eye, is used and blocked


7MHz Heartbeat Path
TV
RF In
SD PVR (secondary)
RF Out
HD PVR (Primary)
RF Out
Forward frequency range prevents heartbeat coming through
Heartbeat
TV
TV



Last word : It is always a good idea to use the lowest possible channels for distribution as the lower the frequency, the less losses you get. A horrible channel 79 can actually turn into a pretty decent channel 21 if the terrestrial signals (if used) allow you to move the decoder output that low.

For full XtraView information, including detailed installation options and a guide to installation prices, go to www.dstv.com