



# Typical HDTV Large Residential System Description for DIRECTV

## DISH ANTENNA

In most typical large residential installations, HDTV desired systems will usually use the "Slim Line" AU9-S Ka/Ku band dish (99°/101°/103°/110°/119°) for signal reception. The RF output signal level of the dish will vary between -19dBm and -28dBm, depending upon the model of LNB used. Recommended RG-6 coaxial cable will have a loss of about 10dB per 100' at 2150MHz, when the connectors and ground blocks used are rated to 2GHz.

## SATELLITE SELECTOR

Since most large residential installations will have more signal loss due to the addition of splitters and more cable runs, a Satellite Selector should be used to optimize system performance. The **20dB Fixed Gain Satellite Selector (HDSSFG20B)** is a combination of polarity locker, 20dB fixed gain amplifier, and independent power supply that ensures strong and consistent control signals to the dish LNBS and adds signal strength to the system.

If the signal level at the input to the multi-switch is less than -35dBm, then a Satellite Selector should be used. When the input signal levels at the receivers are -45dBm or less, you could experience pixilation or 771 searching for satellite every time cloud cover impairs your dish. Hitting the multi-switch at the top of the input window will allow you to have the greatest output signal from the multi-switch. Use your satellite meter to make sure your C/N is greater than 11, typically being 16 to 17 on satellite 101° and 13 to 16 on satellite 119°.

A **20dB Adjustable Gain Satellite Selector (HDSSAG20B)** may also be used instead of the fixed gain version. Use the Adjustable Gain Satellite Selector to more accurately tune each of the four system channels and maximize the multi-switch output levels to the highest C/N ratio possible. Both HDTV Labs' Fixed Gain and Adjustable Gain Satellite Selectors allow you to build more reliable systems, use fewer parts, and produce a cleaner C/N output on all channels.

## SPLITTERS

The common 2-way, 4-way, and 8-way splitters may be used in any combination and number in order to produce the desired number of receiver inputs. Each splitter, however, does introduce loss into the system and reduces signal strength. Care should be taken when wiring splitter outputs to multi-switch inputs in that each multi-switch input must be from a different satellite, as the color coded lines in the diagram indicate.

## **MULTI-SWITCH**

A commonly used multi-switch in the industry is a 6x8 port switch with 6 input and 8 output ports. This multi-switch can provide satellite TV signals from all five of DIRECTV's primary satellites to the inputs of multiple receivers. Four of the multi-switch input ports can be used by the HDTV Labs' Satellite Selectors while the other two input (Flex) ports can be used with separate dishes if satellites 72.5° and 95° are desired.

## **SWM-8 MODULE**

An alternative to the 6x8 multi-switch is the Single-Wire Multi-switch with outputs to 8 tuners (SWM-8). This module also provides satellite TV signals from all five of DIRECTV's primary satellites to the inputs of multiple receivers. Both SWM-8 modules and 6x8 multi-switches have four main input ports and two "Flex" ports although the SWM-8 module also has an additional Off-Air input port. The SWM1 and SWM2 output ports combined can send signals to 8 tuners. If all 8 signals are used on SWM1, then port SWM2 should be terminated.

## **SET TOP BOXES, TV's, and DVR's**

HR23 (HD + DVR), H23 (HD), R16 (SD +DVR), and D12 (SD) are the current models of set top boxes being used to receive the DIRECTV signal. The minimum input signal to each device by standards is a level of -51 dBm. Typically, this level should be no lower than -40 dBm, but for peak performance our recommendation would be to use an even stronger input level of about -30 dBm. This should result in the desired C/N ratio of about 16.

A single wire is required for each set top box and two wires are required for each set top box with DVR. If a SWM-8 module is used instead of a multi-switch, only one wire is required to the HD + DVR set top box. Legacy receivers can be used with 6x8 multi-switches and SWM-8 modules if desired.