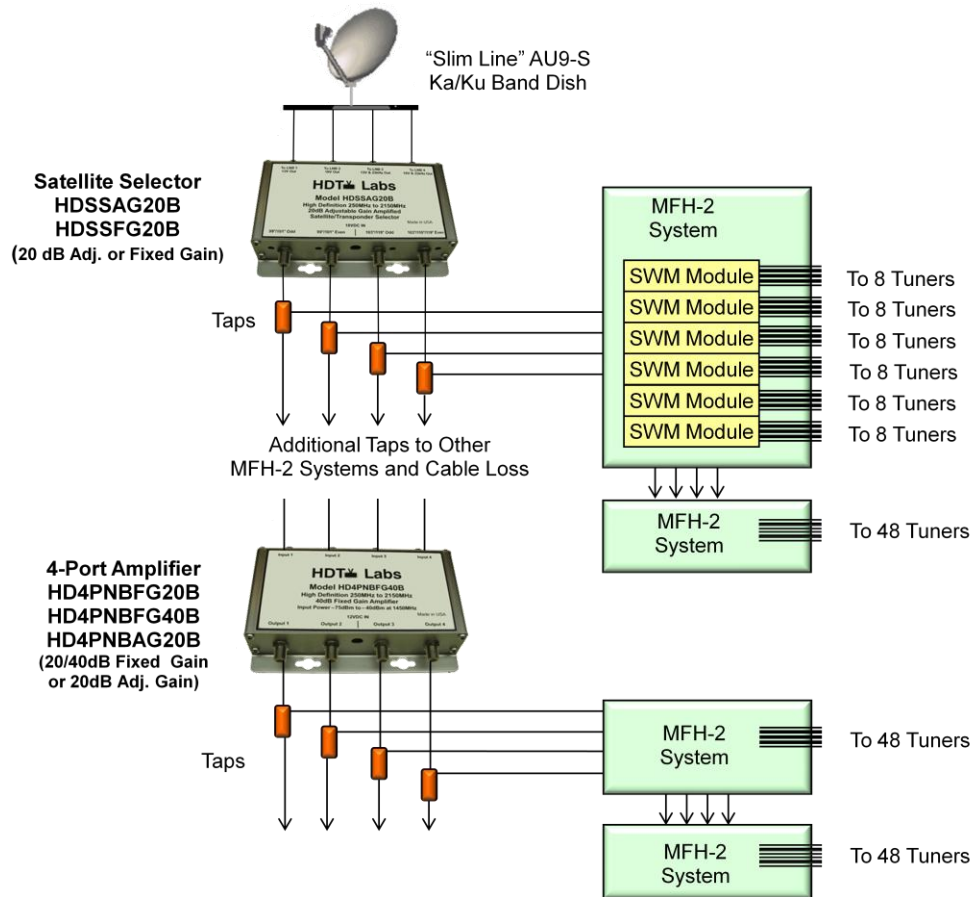


# Typical HDTV MFH-2 Commercial Stacked System Diagram



# Typical HDTV MFH-2 Commercial Stacked System Description

## DISH ANTENNA

In most typical commercial 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 commercial installations will have considerable signal loss due to the number of devices and cable runs in the system, a Satellite Selector should be used to optimize system performance. The **20dB Adjustable Gain Satellite Selector (HDSSAG20B)** is a combination of polarity locker, 20dB adjustable gain amplifier, and independent power supply that ensures strong and consistent control signals to the dish LNBs and adds signal strength to the system. Use the Adjustable Gain Satellite Selector to more accurately tune each of the four system channels and optimize the input levels to the next device.

Another Satellite Selector option would be the **20dB Fixed Gain Satellite Selector (HDSSFG20B)**. This device, when paired with the 20dB Adjustable Gain 4-Port Amplifier (HD4PNBAG20B), gives you both additional signal strength and variable gain control. Care should be taken in this case to not over-drive the Adjustable Gain Amplifier. Additional signal strength and variable gain control could also be achieved by using the Adjustable Gain Satellite Selector with either the 20dB or 40dB Fixed Gain 4-Port Amplifiers described below.

Connections from the dish LNBs can be to any of the four Satellite Selector input ports. Unused channels on the Satellite Selector do not require termination. Both Adjustable Gain and Fixed Gain Satellite Selectors allow you to build more reliable systems, use fewer parts, and produce a cleaner C/N output on all channels.

## TAPS

Common taps may be used in any combination and number in order to produce the desired number of signal paths. Each tap introduces a certain amount of loss into the system and the resulting reduction in signal strength normally requires some sort of amplification.

## 4-PORT AMPLIFIERS

When long cable runs as well as multiple taps and splitters significantly reduce the signal strength in the main lines of the system, using an appropriate 4-Port Amplifier can boost signal strength to desired levels. Depending upon the amount of amplification required, three types of HDTV Labs 4-Port Amplifiers could be used. The **20dB Fixed Gain Amplifier (HD4PNBFG20B)** is great for general purpose use while the **40dB Fixed Gain Amplifier (HD4PNBFG40B)** would be used to overcome very large system losses. If precise gain control is needed, the **20dB Adjustable Gain Amplifier (HD4PNBAG20B)** is ideal for setting the proper drive level to the next device.

Input power levels to all three amplifiers can be as low as -75dBm. Since the amplifiers can detect these very weak signals, longer cable runs may be used before amplification is required. This in turn can result in fewer amplifiers being needed in the overall system design. All three amplifier types have gain/slope networks built into each of their four channels. As system channel frequencies increase, so does the loss associated with that channel. The gain/slope circuitry essentially keeps the output signal at a consistent level across all frequencies by applying more gain at the higher frequency channels and less gain at the lower frequency channels.

## **MFH-2 SYSTEM**

The MFH-2 system consists of a six slot chassis designed to hold up to six Single-Wire Multi-switch modules (SWM-8). Since each of the SWM-8 modules has outputs to 8 tuners, a total of 48 tuner outputs are possible with each system. Multiple MFH-2 systems can also be linked together. The SWM-8 modules provide satellite TV signals from all five of DIRECTV's primary satellites to the inputs of multiple receivers. The modules have four main input ports and SWM1 and SWM2 output ports. These two 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 SD + DVR set top box. Only one wire is required to the HD + DVR set top box.