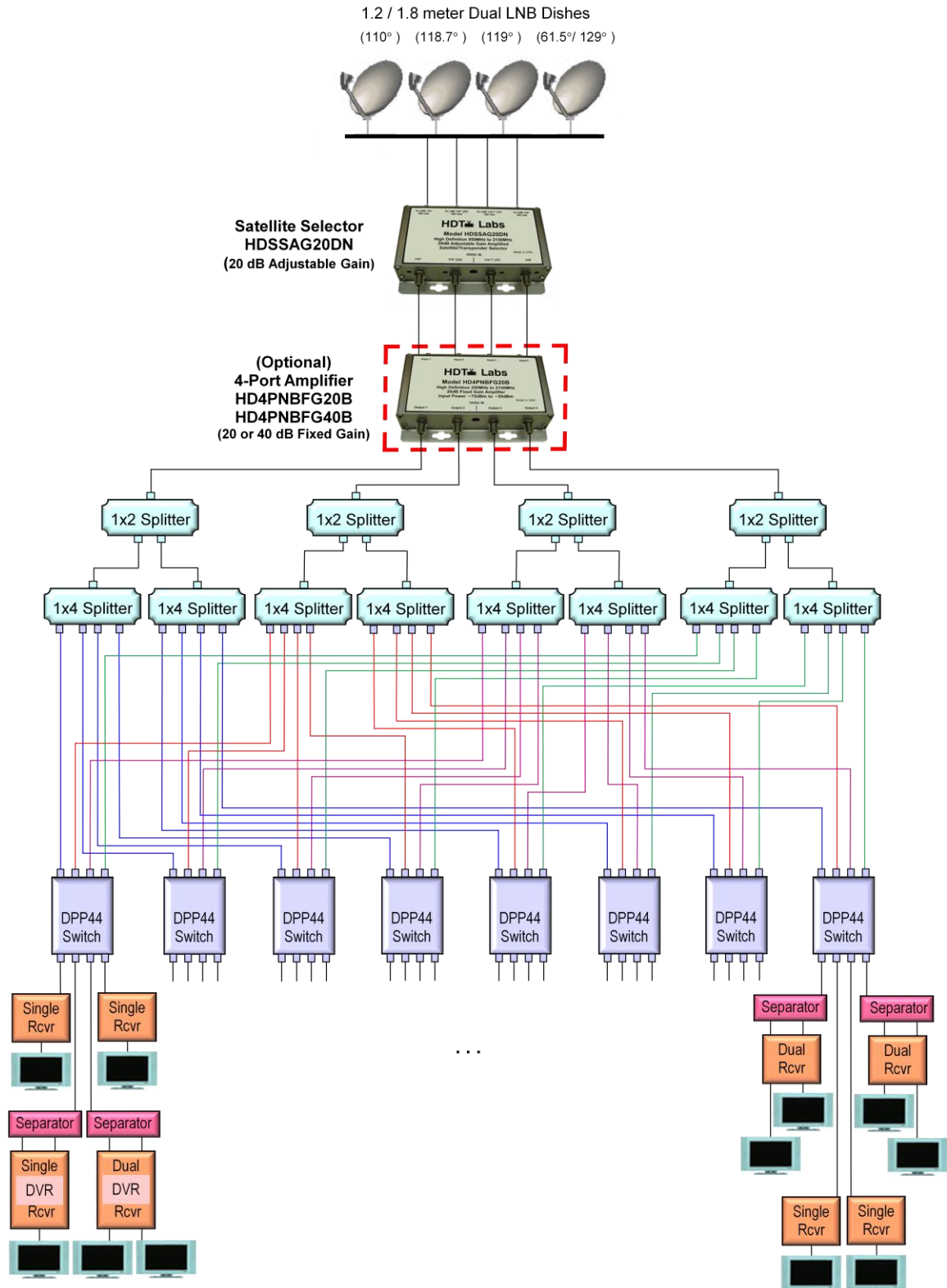


Typical HDTV Commercial Multi-Switch System Diagram for DISH Network



Typical HDTV Commercial Multi-Switch System Description for DISH Network

DISH ANTENNAS

The satellite dishes used in most commercial installations are typically 1.0 to 1.8 meters in diameter. The increased size improves the quality of the satellite signal and also helps to keep rain fade to a minimum. One dish is normally used for the reception of each desired satellite. The RF output signal levels of the smaller dishes are typically about -25 to -30 dBm, depending upon configuration parameters. The output levels of the larger dishes can vary between -15 and -25 dBm. 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 splitters, multi-switches, and cable runs in the system, a Satellite Selector should be used to optimize system performance. The **20dB Adjustable Gain Satellite Selector (HDSSAG20DN)** is a combination of four power inserters, a 20dB adjustable gain amplifier, and independent power supply that ensures strong and consistent DC voltage levels to the dish LNBS and adds signal strength to the system.

The multi-switches in DISH Network installations are designed to receive signal levels identical to that of a receiver and the parameters thus are the same. This means that the installer should hit the input of a switch within the -30 to -55 dBm window. However, as it is necessary to meet this same window at a receiver, the drop length from the switch needs to be considered. If the level at the switch is at the low end of -55 dBm and drop lengths are of concern, the Satellite Selector should be used to reduce the potential of outages and bring levels back into the required input window range.

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. 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. The Adjustable Gain Satellite Selector allows you to build more reliable systems, use fewer parts, and produce a cleaner C/N output on all channels.

4-PORT AMPLIFIERS

If the amplification from the Satellite Selector still does not allow you to hit the desired input windows of the multi-switches and receivers, optional 4-Port Amplifiers can be used. The **20dB Fixed Gain Amplifier (HD4PNBFG20B)** when paired with the adjustable gain of the Satellite Selector would be a preferred solution for relatively small system losses. If very large system losses exist, the **40dB Fixed**

Gain Amplifier (HD4PNBFG40B) should be considered. Although gain adjustment is provided through the satellite selector, the **20dB Adjustable Gain Amplifier (HD4PNBAG20B)** could be an option if special circumstances exist.

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. 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.

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 ports. Each splitter, however, does introduce loss into the system and the resulting reduction in signal strength normally requires some sort of amplification. 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-SWITCHES

Three multi-switches commonly used in commercial installations are the DISH Pro Plus 44 (DPP44), DISH Pro Plus 33 (DPP33), and DISH Pro 34 (DP34). For reception of three satellites, all three types of multi-switch could be used, but for four satellite reception, the DPP44 would be the selection. Cascading multi-switches in a commercial installation can be done, but there is a risk that failure to the first or second switch would also disable the outputs of a third switch. If used, the DISH Pro Plus 33 (DPP33) must be the last switch cascaded since it has no ports to cascade. All switches provide satellite TV signals to the inputs of any combination of multiple receivers.

SET TOP BOXES, TV'S, AND DVR'S

DuoDvr VIP 722k and DuoDvr VIP 622 (2 TVs + DVR), VIP 922 DVR and Solo DVR VIP 612 (1 TV + DVR), Duo VIP 222k (2 TVs), and Solo VIP 211k (1 TV) are the current models of set top boxes being used to receive the HD DISH Network signal. The minimum input signal to each device by standards is a level of -51 dBm. However, for peak performance, our recommendation would be to use a stronger input level of about -30 dBm. This should result in the desired C/N ratio of about 16.

When DISH Pro Plus multi-switches are used, dual tuner and DVR receivers can be connected with a single wire if a DPP Separator is installed at the back of the receiver. This setup will not work, however, if you try to connect two single tuner receivers. The DPP Separator also will not work with DISH Pro multi-

switches. For installations not using DPP multi-switches or separators, a single wire from the multi-switch is required for each receiver and two wires are required for both dual and DVR receivers.