

# DIRECTV® AMPLIFIER

TAMP6R03 (6) INPUT AMPLIFIER

## SITUATION

DIRECTV® LNB signals need amplification to a constant level for multiple distribution locations.

## SOLUTION

Model **TAMP6R03** provides an automatic gain controlled output that is user adjustable from **-15 dBm** to **-24 dBm @ 2150 MHz**. Slope is field selected to either **12 dB** or **8 dB**.

At the minimum output setting, the LED indicators turn **Green** with an minimum input of **-52 dBm**. At the maximum output setting, the LED indicators turn **Green** with an minimum input of **-44 dBm**.

## RELATED CONSIDERATIONS

Model **TAMP6R03-T24** includes power adaptor **PS242000A**. DC power is directed to the 18 V input for line powering of amplifiers above. Model **TAMP6R03-T12** includes power adaptor **PS121500A**.

## FEATURES

- *Ka/Ku bandwidth..... 250 to 2150 MHz*
- *Automatic Gain ..... Adjustable window*
- *DC & 22 kHz/DiSeQc passing ..... low insertion*
- *Selectable Slope Pre-Emphasis..... 8 or 12 dB*
- *LED Signal Metering..... Blinking Red, Green, Red*

## APPLICATION NOTES

Model **SDPI6S** polarity locker powered by model **PS242000A** provides voltage for the LNBs' and model **TAMP6R03** trunk amplifier.

The **TAMP6R03** has a selectable slope pre-emphasis of either **8 dB** or **12 dB**. Placing a terminator on the slope port sets the pre-emphasis to **8 dB**. The output signal is **-16** at 250 MHz and **-15 dBm** at 2150 MHz.

The **TAMP6R03** has an adjustable automatic gain control window. At maximum output (pot fully clockwise), the output level of the 2150 transponder is **-15 dBm**.

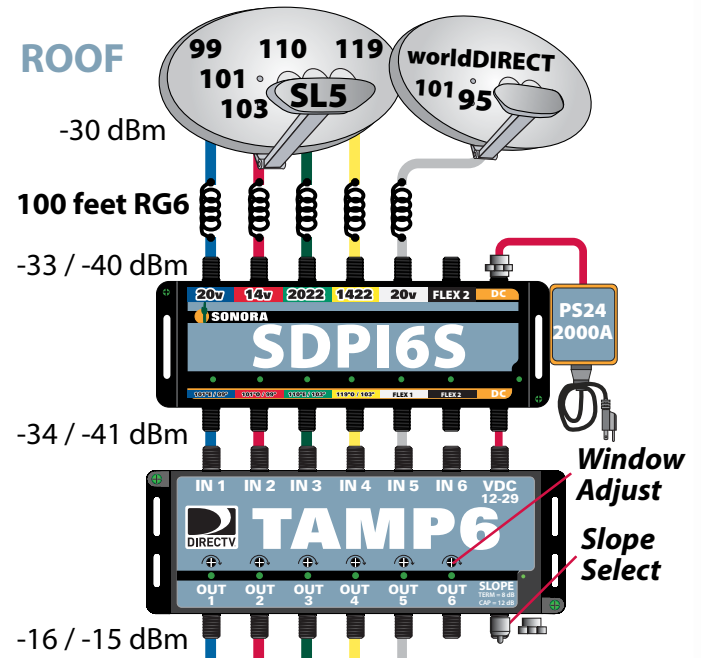


**DIRECTV® APPROVED**  
**Model PS242000A**

## DESCRIPTION

**DIRECTV® APPROVED** 250 to 2150 MHz (6) coax amplifier with automatic gain, adjustable output and selectable slope.

## ROOF



Multi-Satellite Trunk Amplifier featuring automatic gain, adjustable output, selectable slope compensation, input level detecting LED indicators and 10 to 29 VDC powering



### TAMP6R03



### TAMP6R03 Trunk Amplifier

- No Power Adaptor



### TAMP6R03-T12



### TAMP6R03-T12 Trunk Amplifier

- Includes PS121500A Power Adaptor



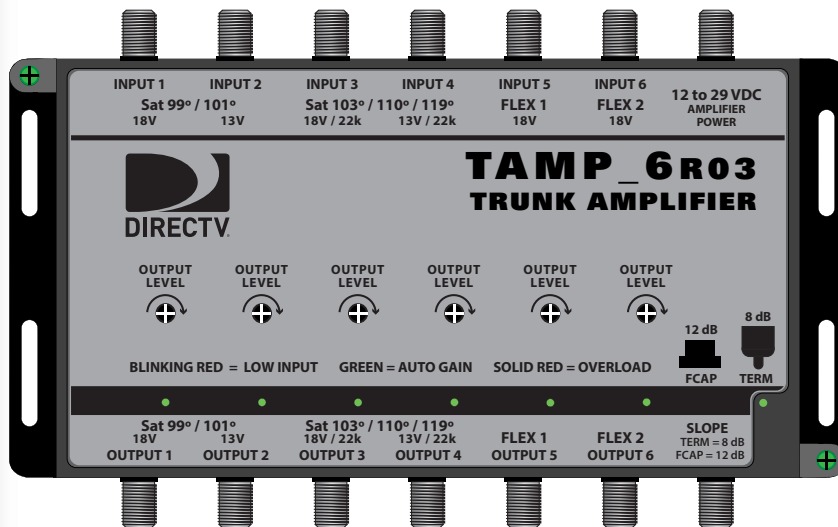
### TAMP6R03-T24



### TAMP6R03-T24 Trunk Amplifier

- Includes PS242000A Power Adaptor

Parameter	UNIT	TAMP6R03
System Impedance	Ohm	75
Operating Frequency Range	MHz	250 - 2150
Flatness in operating frequency	dB	± 0.5 dB over 36 MHz
ALC Output Power Level	dBm	0 dBm minimum
ALC Output Power Attenuation	dBm	9 dB variable pot
ALC Control Range	dB	24 minimum
Slope: Frequency	MHz	250 to 2150
Linearity	dB	± 1 dB away inverted from RG-6
Low Setting	dB	8
High Setting	dB	12
Slope set by Terminator to F connector		75 Ohm = Low, None = High
Noise Figure @ min ALC attenuation	dB	10 max @ 2150 MHz
Distortion (2) Tones	dBm	0 dBm composite
Output per Tone	dBm	-3 dBm
IM2 , IM3	dBc	< -40 , < -45
Input Level (Colored LED Indicator)		
Red Blinking: Signal below AGC	dBm	Composite Power
Green : Signal Inside AGC window	dBm	Input Signal < -24
Red : Signal is above AGC window	dBm	Input Signal @ -24 to +1
		Input Signal > +1
Isolation Satellite to Satellite	dB	> 35 dB
Input Return Loss	dB	>10
Output Return Loss	dB	>10
Number of Inputs	Each	6 SCTE Indoor F
Number of Outputs	Each	6 SCTE Indoor F
Non harmonic spurious emissions	dBm	-80 max
DC Input Voltage	VDC	10 to 29 from Power Adaptor
DC Power pass (any Output to Input)	mA	1000 (min)
DC block on Output ports		does NOT pass DC to output ports
Max Power Consumption	W	7.5 (max.)
DC to Port 1 Input when 29V present	V mA	20 to 24 200 to 400
Power Supply LED	color	Green with external supply RED, coax line powered
Lightning Surge Protection		32 V p-p, max shunt current 200 A; 8 msec, 1.5 kW max dissipation
Ground Screws	Each	2 Green Screw Ground pt.
Dimensions L x W x H	inch	5.35 x 8.54 x 0.9
Environmental Requirements		Indoor Only
Operating Temperature range	°C	-34 to +60
Storage Temperature	°C	-50 to +85
Humidity		Survives 95% relative humidity over operating temperature

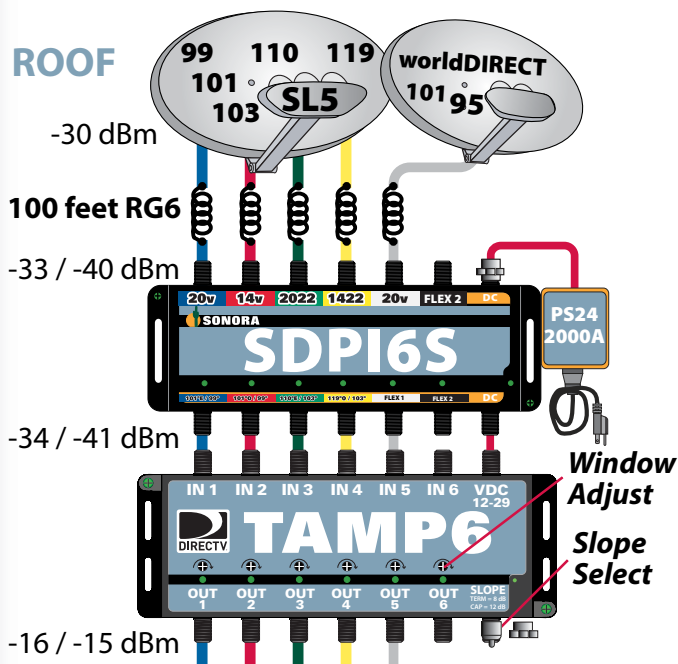


Model **TAMP6R03** provides either 8 dB or 12 dB of cable slope pre-emphasis. A weather sealed F cap is shipped on the units lower right F connector.

With the F-cap in place, the slope pre-emphasis is 12 dB. Replacing the F-cap with a standard 75 ohm terminator changes the slope pre-emphasis to 8 dB.

The **TAMP6R03** automatic gain control window is adjustable with variable potentiometers per channel. Signal level LEDs glow GREEN when the amplifier is operating within the automatic gain window.

With the potentiometers rotated *fully clockwise*, the output is **-15 dBm** at the 2150 MHz transponder when the input signal is greater than **-44 dBm**. With the potentiometers rotated *fully counter-clockwise*, the output is **-24 dBm** at the 2150 MHz transponder when the input signal is greater than **-53 dBm**.



The **PS242000A** 24 Volt, 2 Amp power supply powers the **SDPI6S**, the **SL5** LNBs, the **WorldDIRECT** LNB and the **TAMP6** amplifier.

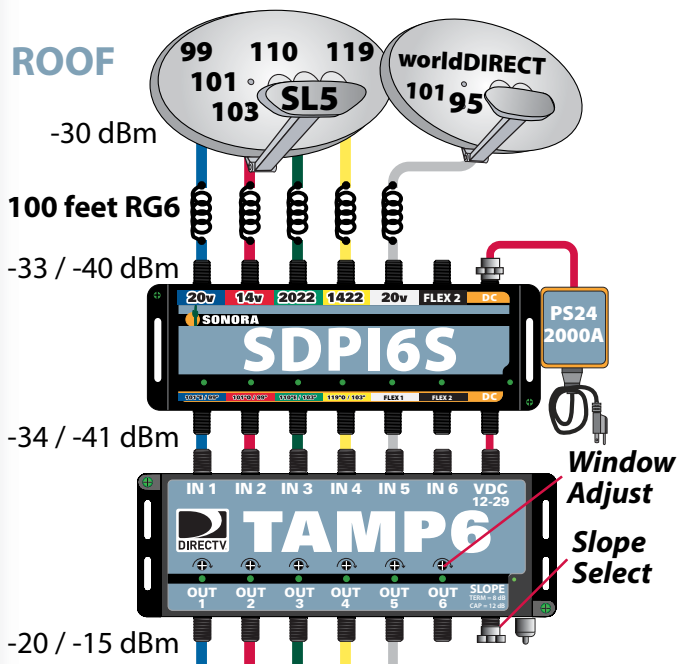
## 100 Feet RG-6: SDPI6S, TAMP6R03-T24

### SELECTABLE SLOPE:

At 100 feet of RG-6 from the dish, we start with a negative slope of 6 dB. The **TAMP6R03** has a selectable slope pre-emphasis of either 8 dB or 12 dB. Placing a terminator on the slope port sets the pre-emphasis to 8 dB. The output signal is **-16** at 250 MHz and **-15 dBm** at 2150 MHz.

### ADJUSTABLE OUTPUT:

The **TAMP6R03** has an adjustable automatic gain control window. At maximum output (pot fully clockwise), the output level of the 2150 transponder is **-15 dBm**. At minimum output, the window moves lower so **-50 dBm** at 2150 MHz sets the AGC LED to GREEN and the output to **-24 dBm**.



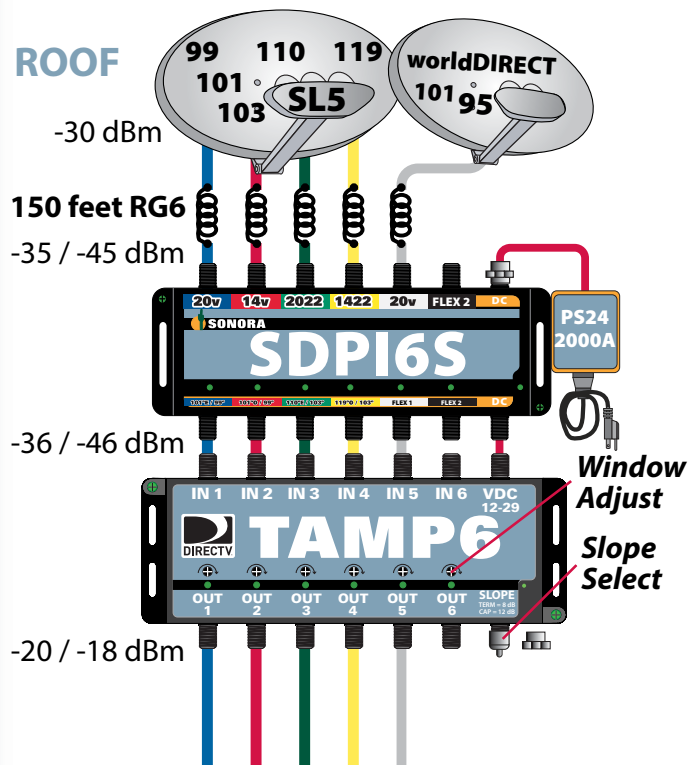
## 100 Feet RG-6: TAMP6R03, Positive Slope

### SELECTABLE SLOPE:

Slope selection is based on the application. In the example a flat slope was obtained for situations like a **COM1000** headend.

If the signal is traveling down coax cable and taps, then a positive pre-emphasized slope is desired. The amount of pre-emphasis should be half the total slope to the next amplifier.

Placing the F-cap on the slope port provides 5 dB of positive slope for a planned 10 db of coax and tap slope.



## 150 Feet RG-6: TAMP6R03, Flat Slope

### SELECTABLE SLOPE:

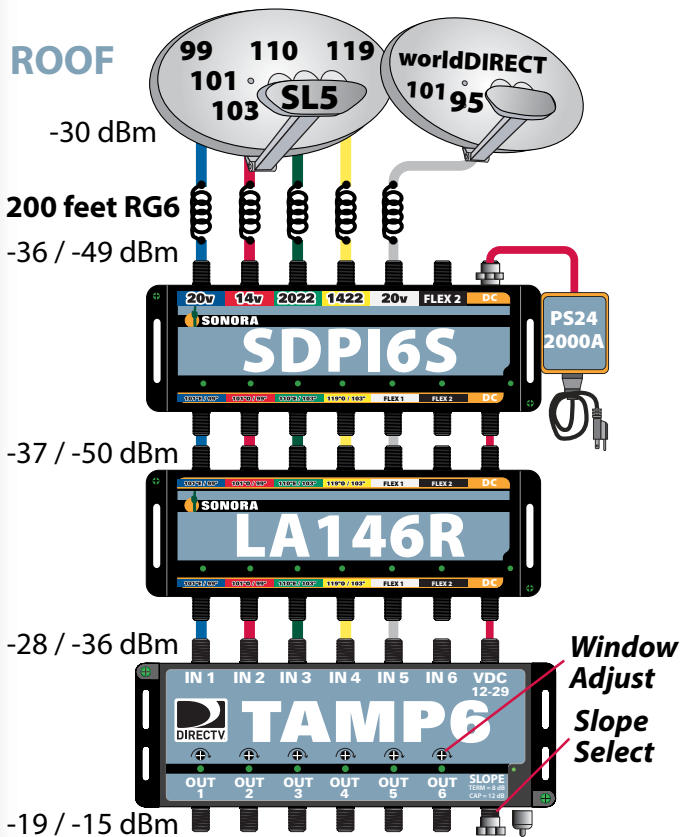
More cable slope must be offset as the dish to **TAMP6R03** amplifier distance increases. An F-cap (shipped with each unit) is placed on the slope port. The **TAMP6R03** produces an automatic gain output of **-20 dBm** at 250 MHz and **-18 dBm** at 2150 MHz.

### ADJUSTABLE OUTPUT:

The **TAMP6R03** at maximum output (pot fully clockwise), requires a minimum input of -42 dBm at 2150 MHz for a GREEN LED and the output to -15 dBm. When the input is less than -42 dBm, the Level Adjustment pots must be turned counter-clockwise until a Green LED is obtained.

The **PS242000A** 24 Volt, 2 Amp power supply powers the **SDPI6S**, the **SL5** LNBs, the **WorldDIRECT** LNB and the **TAMP6** amplifier.





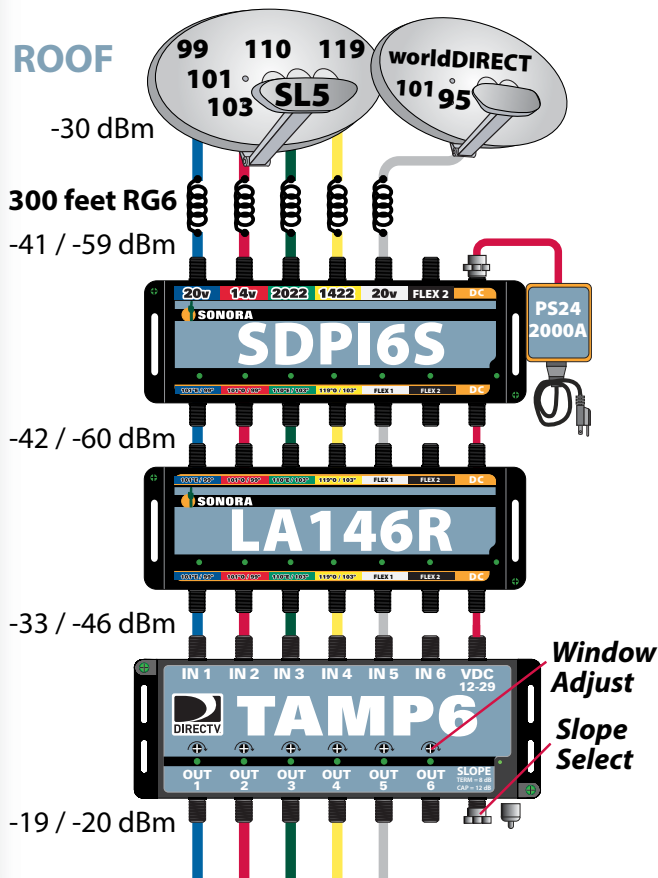
### 200 Feet: SD LA146R, SDPI6S, TAMP6R03

At 200 feet the signal to the **SDPI6S-T** is **-36 dBm** at 250 MHz and **-49 dBm** at 2150 MHz. The slope is 13 dB.

Model **LA146R** is used as an active equalizer. It provides 5 dB of pre-emphasis. The signal out of the **LA146R** has a negative 8 dB of slope. (-27 dBm at 250 MHz & -35 dBm at 2150 MHz)

If we set the **TAMP6R03** at 12 dB slope pre-emphasis produces an automatic gain output of **-15 dBm** at 250 MHz and **-19 dBm** at 2150 MHz. (At maximum output pot setting)

Models **LA146R & TAMP6R03** have energy saving regulators that conserve current from model **PS242000A**. The two amplifiers and LNBs can be powered by the single supply. The total current is 760 mA.



### 300 Feet: LA146R, SDPI6S, TAMP6R03

At 300 feet the signal to the **LA146R** is **-41 dBm** at 250 MHz and **-59 dBm** at 2150 MHz. The slope is 18 dB.

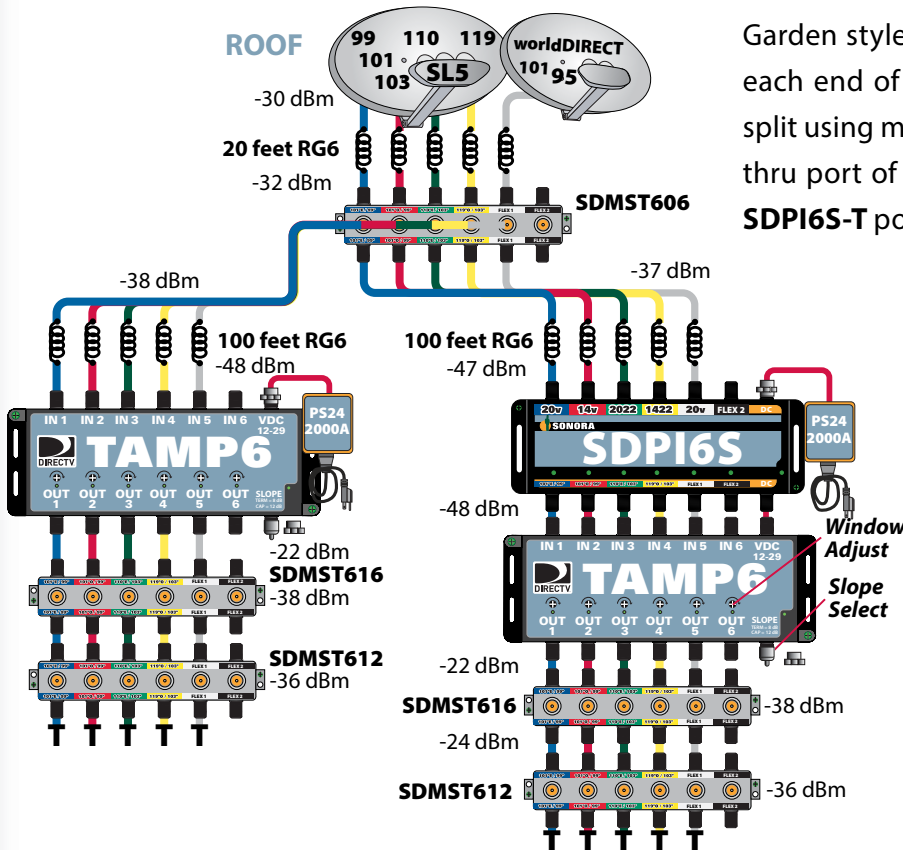
Model **LA146R** provides 5 dB of pre-emphasis. The signal out of the **LA146R** has a negative 13 dB of slope. (-32 dBm at 250 MHz & -45 dBm at 2150 MHz)

We set the **TAMP6R03** at 12 dB slope pre-emphasis. The Window Adjust pots are turned counter-clockwise to produce a Green AGC LED. This produces an automatic gain output of **-19 dBm** at 250 MHz and **-20 dBm** at 2150 MHz.

The slope is still negative but would be fine for feeding multiple switches at the IDF as required for a **COM2000** system.

If the signals are to be sent down a multiple floor high rise, more pre-emphasis is needed.

Garden style MDU buildings often have IDF closets at each end of the building. The signal from the dish is split using model **SD MST606** directional coupler. The thru port of the coupler feeds the IDF containing the **SDPI6S-T** power inserter.

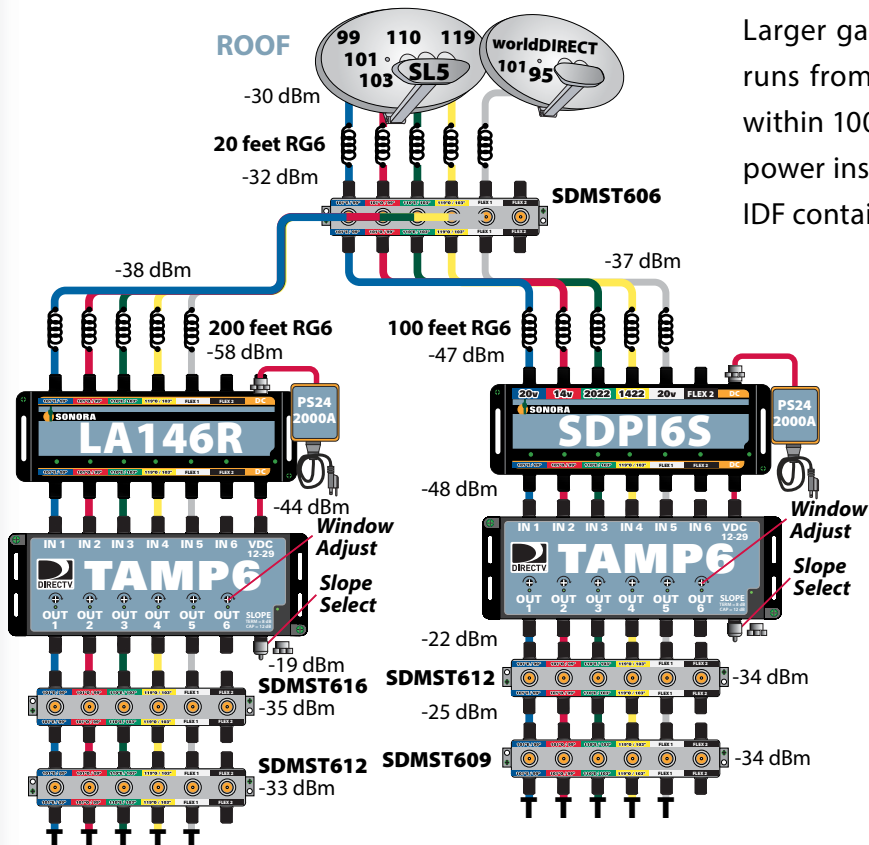


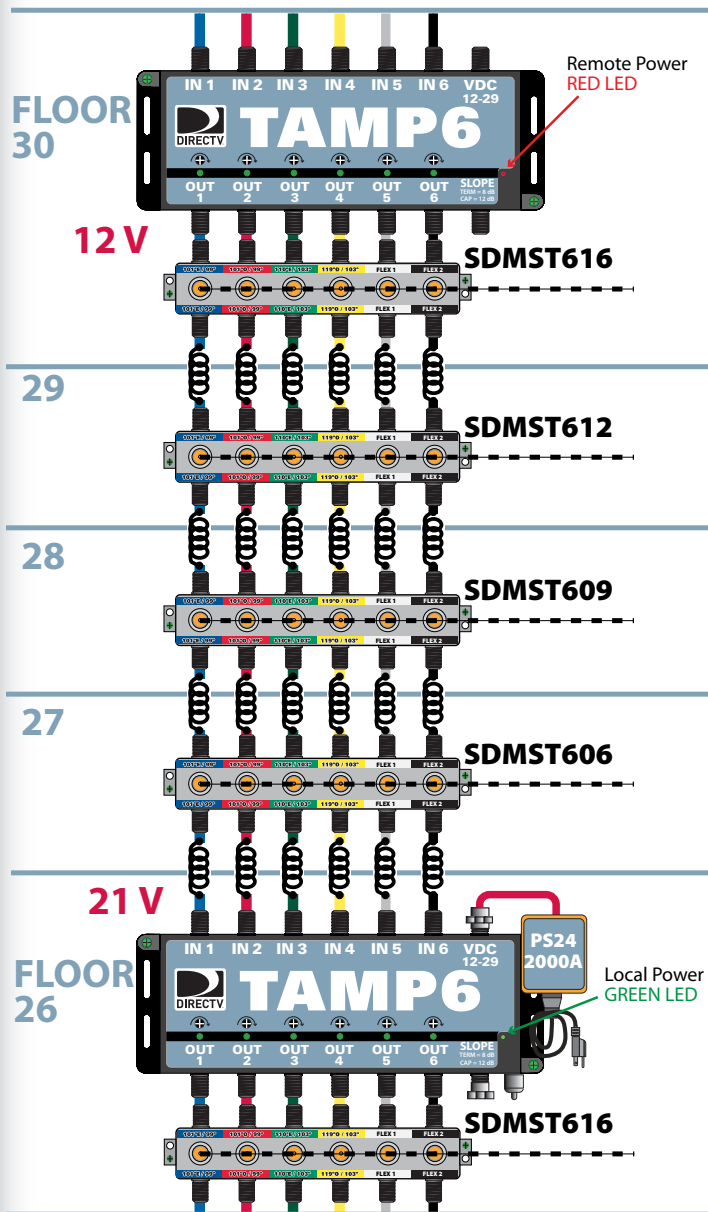
The maximum dish to IDF distance is 100 feet of RG-6 to maintain solid green LEDs on model **TAMP6** automatic gain amplifier. The Window Adjust pot is rotated counter-clockwise for a Green AGC LED.

Model **TAMP6-T12** is used in the other IDF. Model **SDMST616** taps provide signal to **SWM8**, **SWM16** or **SWM32** switches.

Larger garden style MDU buildings may have longer runs from the dish to the IDF closets. Place the dish within 100 feet of the IDF containing model **SDPI6S-T** power inserter. The thru port of the coupler feeds the IDF containing the **SDPI6S-T** power inserter.

The maximum dish to the second IDF distance is 200 feet of RG-6. Model **LA146R-T** 14 dB gain amplifier acts as a pre-amplifier to model **TAMP6** automatic gain amplifier.





## REMOTE LINE POWERING

Model **PS242000A** power adaptor is included with model **TAMP6R03-T24** amplifier. The 24 volt, 2 amp, 48 watt power supply powers the local amplifier and provides 21 volts to the amplifier coax 1 input. The remote amplifier receives the line voltage at the coax 1 output after some distance of coax cable. The power LED glows GREEN for local powering and glows RED when remotely powered.

Model **TAMP6** amplifiers employ current management. As the voltage to the amplifier decreases, more current is required from the power supply. A table of the voltage verses current draw is provided.

- 29 V 250 mA 7.3 watt
- 24 V 306 mA 7.3 watt
- 21 V 347 mA 7.3 watt

Voltages less than 12 volts at the amplifier results in signal errors.

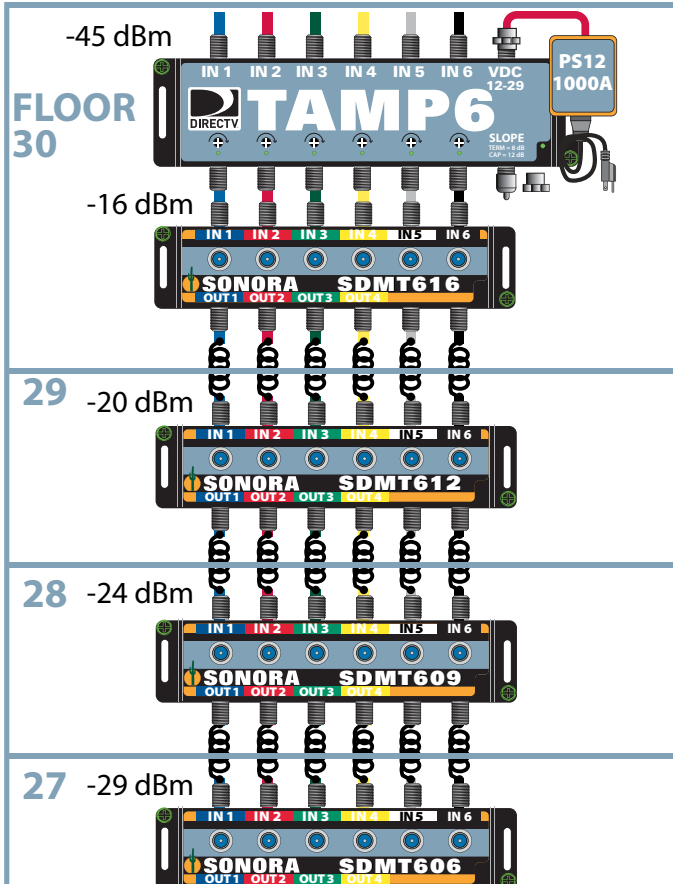
What is the maximum amplifier to amplifier distance that a 24 Volt supply can power the remote amplifier with **copper covered steel**, RG-6 cable?

$$(21 \text{ V} - 12 \text{ V}) / 0.616 \text{ AMP} = 15 \text{ OHMS}$$

$$15 \text{ OHMS} / 8 \text{ OHMS} / 100 \text{ feet} = 175 \text{ feet}$$

What is the maximum amplifier to amplifier distance with **solid copper**, RG-6 cable?

$$15 \text{ OHMS} / 4 \text{ OHMS} / 100 \text{ feet} = 350 \text{ feet}$$



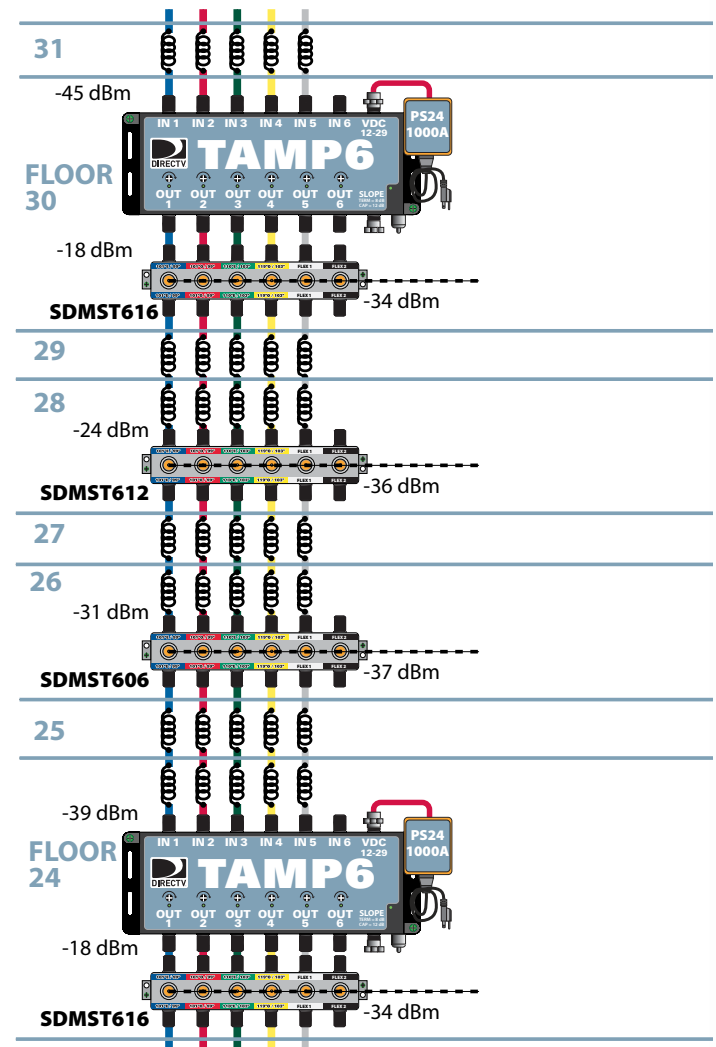
## Tap per Floor: 16, 16, 12, 9 dB Taps, 4 Floor Amplifier, 20 dB Spacing

Higher tap values are used on the floors closest to the amplifier to conserve trunk signal level. Lower tap values have higher trunk insertion loss. A minimum IDF input of **-38 dBm** is budgeted.

SD MST6xx / Floor, 20 dB Spacing

MHz/ dB	250	1450	2150
RG-6 80 ft	2.5	6.3	7.7
MST616	1.0	1.5	2.5
MST616	1.0	1.5	2.5
MST612	1.4	1.7	3.0
MST606	3.6	4.5	5.0
TOTAL	9.5	15.5	20.7

The **TAMP6R03-T12** internal slope compensation offset is set to **12 dB** for the **11 dB** slope.



## Tap per Alternating Floors, 6 Floor, 20 dB Amplifier Spacing

A minimum IDF input of **-37 dBm** is budgeted.

SD MST6xx / 2 Floors, 21 dB Spacing

MHz/ dB	250	1450	2150
RG-6 110 ft	3.4	8.7	10.7
MST616	1.0	1.5	2.5
MST612	1.4	1.7	3.0
MST606	3.6	4.5	5.0
TOTAL	9.4	16.4	21.2

The **TAMP6R03** internal slope compensation offsets **12 dB** of the **12 dB** slope.



## Tap per (3) Floors, 9 Floor, 22 dB Amp Spacing

Increasing the spacing between taps allows for fewer taps between amplifiers and increased amplifier spacing. A minimum IDF input of **-39 dBm** is budgeted.

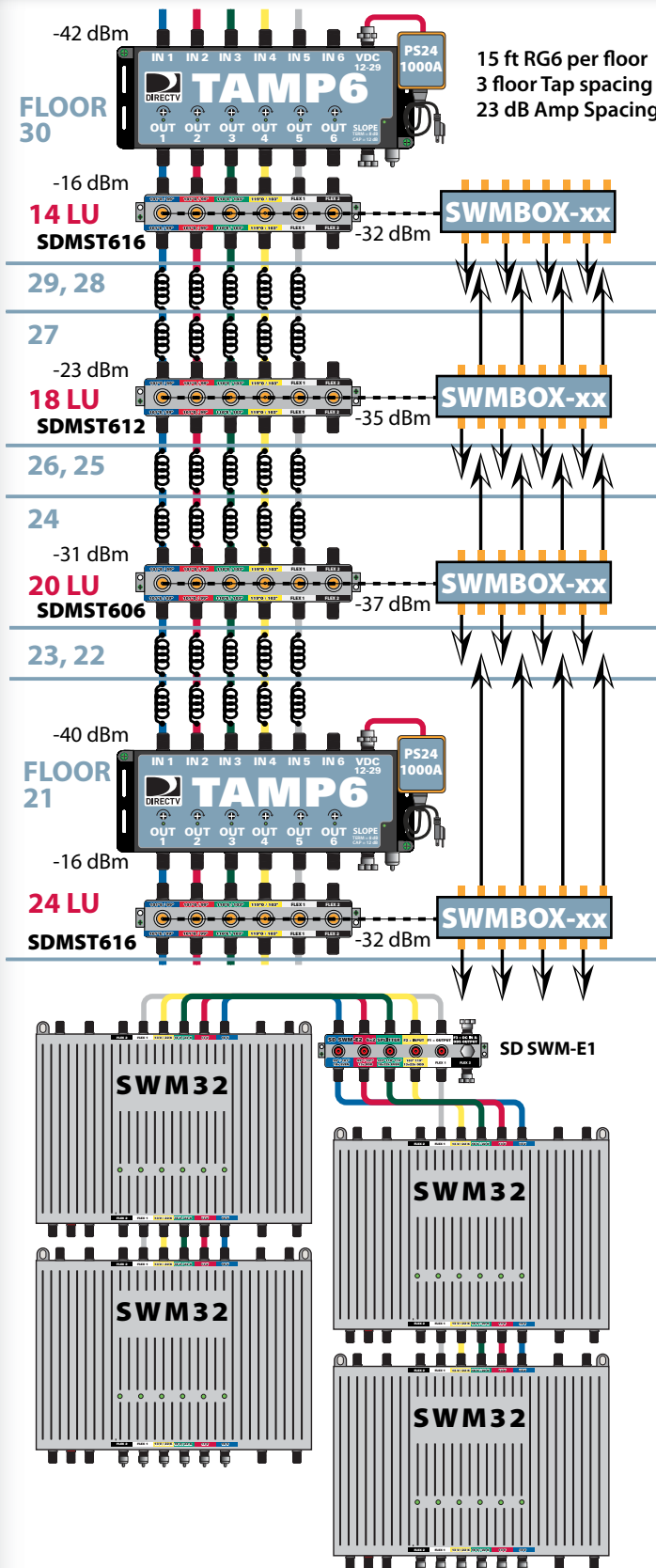
SD MST6xx / 3 Floors, RG6, 23 dB Spacing

MHz/ dB	250	1450	2150
RG-6 135 ft	4.2	10.7	13.1
MST616	1.0	1.5	2.5
MST612	1.4	1.7	3.0
MST606	3.6	4.5	5.0
TOTAL	10.2	18.4	23.5

The **TAMP6R03** internal slope compensation offsets **12 dB** of the **13 dB** slope.

The number of Living Units served by each IDF is annotated on the design. The number represents the 100% of the units subscribing for service. Units on alternating floors may be served by either the IDF above or the IDF below. This is important when some LU require (8) tuners for **HR34 Genie®** service.

We design the trunk for 100% of the floors receiving signal. We design the IDF to be scalable to serve **up to** 100% of the LU with up to (8) tuners per LU. At each IDF closet we design for a minimum signal level to support multiple SWM switches. **SWM32** switches may be cascaded to serve up to 64 tuners. The limit is one switch in cascade.



Model **SD SWME1** may be used to split the input signal to (2) sets of **SWM32** switches. The minimum input to the **SD SWME1** is -40 dBm so that each **SWM32** has a minimum of -45 dBm.

