

SITUATION

The signals from a **DIRECTV®** (4) polarity **SLSP-F SlimLine®** dish with **SL5 LNB**, **DTV66E 95°** dish and a possible 6th polarity are required for multiple switches.

SOLUTION

Model **SD PI-6S** powers a **DIRECTV®** **SL5 LNB**, polarity locks the four dish outputs and provides (2) 20 V outputs to power the 95° LNB on the **DTV66E** dish and a possible future polarity.

RELATED CONSIDERATIONS

Line powered amplifiers may be powered by the power inserter. A total of 2 amps of DC is available from the short circuit protected power transformer.

FEATURES

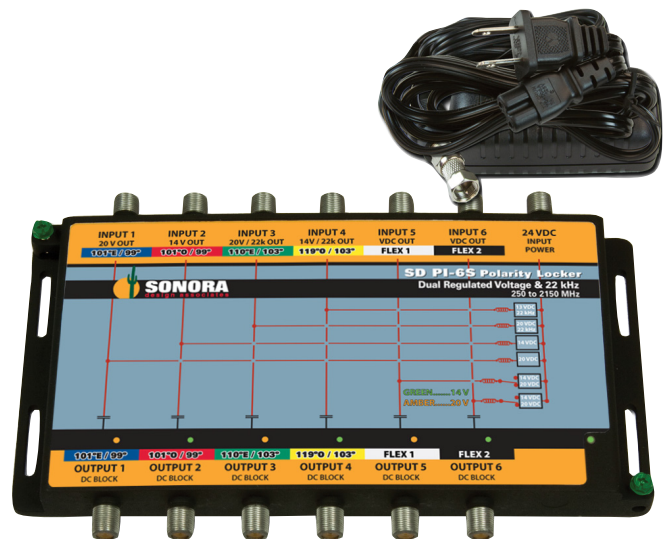
- **DBS Compatibility** **DIRECTV®SL5, 95° & Flex2**
- **2 Amp Power Supply** powers LNBs & line amplifiers
- **Power LEDs per polarity** green if NO short circuits
- **Locks SL5 LNBs** one polarity on each of (4) coax
- **Indoor / Outdoor case** Die cast Aluminum

APPLICATION NOTES

Model **SD PI-6S** provides voltages and control signals to power and polarity lock the LNBs'. The (2) amp power supply has sufficient current to power model **SD SA-6AL** and model **CA24R** amplifiers.

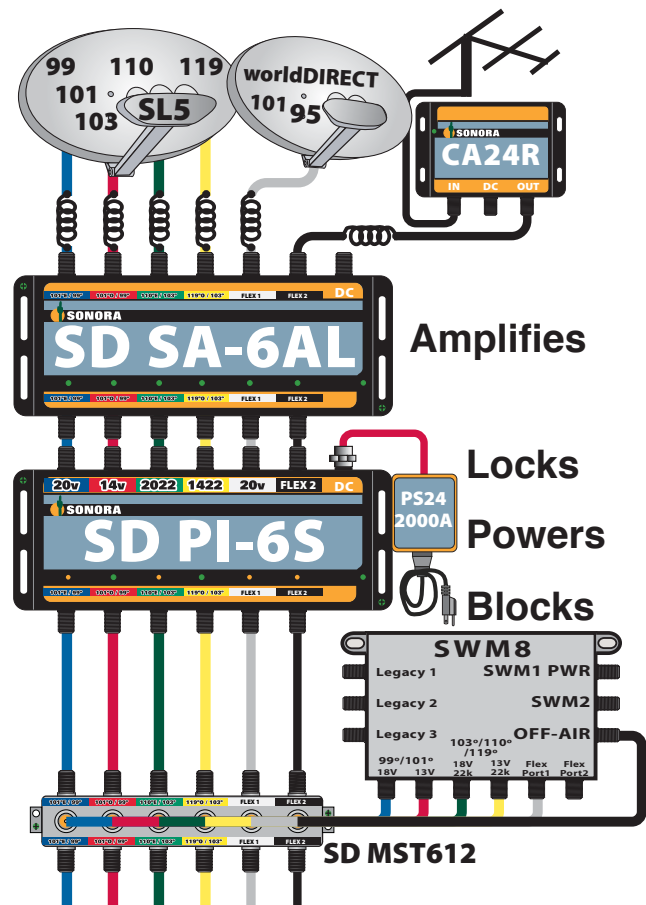
DC voltage indicator LEDs on the **SD PI-6S** glow orange for 20 volts and green for 14 volts. A single unlit LED indicates a short circuit on the input.

Multi-tap models **SD MST616**, **SD MST612**, **SD MST609** and **SD MST606** extract a portion of the trunk signal to feed DBS switches.



DESCRIPTION

DIRECTV® SlimLine® SL5, 95° Ku/Ka and **FLEX2** polarity locker and power inserter.



**Updated:
Sept 15, 2011**

DISH

Frequency Range	Channels
18V	9507, 99°c, 9502, 101°
13V	9506, 99°c, 99°s, 9501, 101°
18V & 22kHz	9511, 103°ca, 110°, 9512, 119°, 9514, 103°ca, 9509
13V & 22kHz	9510, 103°cb, 119°, 9513, 103°ca, 9508

250 MHz 750 950 1450 1680 2150

Receivers selecting **99°** or **101° odd** generate **13V**.

Receivers selecting **99°** or **101° even** generate **18V**.

Receivers selecting **103°** or **119° odd** transponders generate **13V & 22 kHz**.

Receivers selecting **103°, 110° or 119° even** transponders generate **18V & 22 kHz**.

DIRECTV® provides test channels to verify the reception of each satellite. The test channel numbers associated with the bands of transponders is provided.

The most common problem for installers is maintaining the correct trunk to switch polarity. Use the test channels to verify trunk polarity.

SPECIFICATIONS

Specifications	Typical	QC Limit
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Inputs / Outputs (5) @ 5 to 2400 MHz

Insertion Loss..... 0.5 dB..... 1 dB

Return Loss 54-2400 MHz..... 12 dB.....10 dB

Power Specifications

Power Transformer24 VDC, 2 Amp

100 to 240 VAC input, switching, short circuit protected

Output Voltages and tones

101°& 99° (Even) LHCP.....	19.4 Vdc
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101° & 99° (Odd) RHCP	13.4 Vdc
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119° & 103° (Odd) RHCP 22 kHz & 13.4 Vdc

110°/119° & 103° (Even) LHCP..... 22 kHz & 19.4 Vdc

FLEX1 & 2.....19.4 Vdc

Mechanical Specifications

Dimensions8.5"L x 5.4"W x 0.9"H

Weight 1.5 lb (0.7 kg)

Master Carton (8 units).....12" x 9" x 9"

Master Carton Weight.....16 lb. (7.2 kg)

Environmental Specifications

Operating Environment:Indoor/Lockbox

Ambient Temperature.....-30° C to +60°C

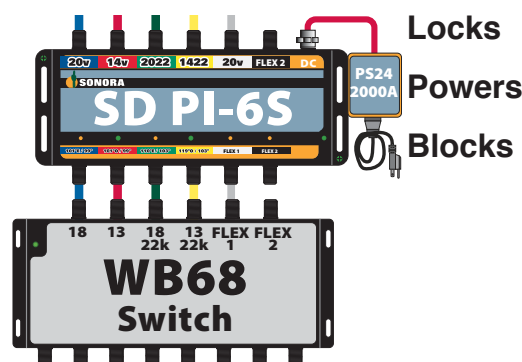
Cables from the Polarity locker outputs must match switch input voltages:

20V to 18V,

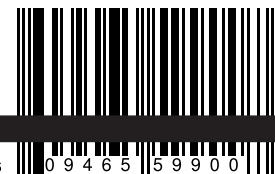
14V to 13V,

20V/22k to 18V/22k

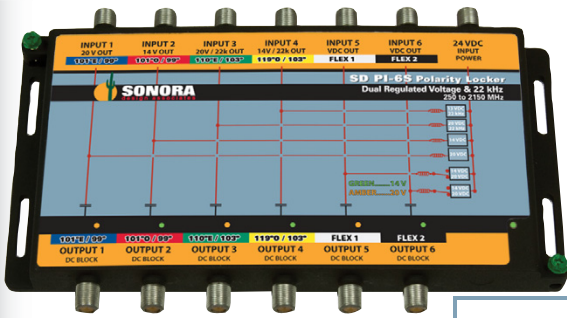
14V/22k to 13V 22k.



SD PI-6S-T



Revised Jun 2 2011



MDU switch able Power Inserter and Tone Generator Unit
Simplifies MDU installations by providing an integrated module for
locking LNB polarizations and satellite selection

SD PI-6S Trunk Power Inserter

- Powers SL5, 95W & FLEX2 ODU's
- Regulated DC Voltages
- F-Connector Power Input
- Dual 10 AWG Ground Lugs
- Dual Color LED Indicators



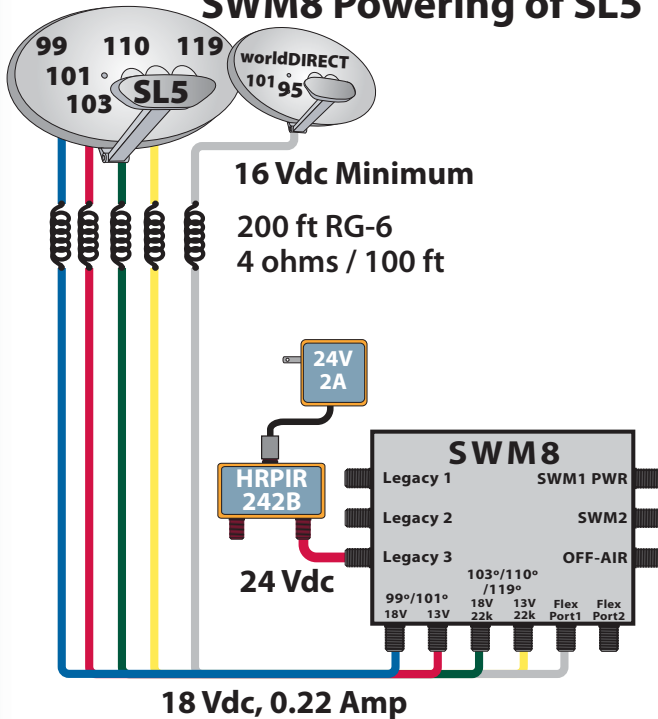
PS242000A DC Power Supplies

- UL Approved
- 24 Volt 2 Amp
- Interchangeable AC Cord
- F-Connector for DC Input
- Overload Protection



Parameter	UNIT	SD PI-6
Operating Frequency Range	MHz	250 - 2150
Insertion Loss	dB	1.5 (max.)
Flatness in operating frequency range	dB	± 0.5
Number of Input Ports	Each	(6) SCTE Indoor F
Number of Output Ports	Each	(6) SCTE Indoor F
Isolation between ports	dB	> 35 dB
Input / Output Return Loss	dB	> 10 (min)
DC Power provided to inputs	VDC	
Port #1 (20 V 101° & 99°)	VDC	20 ± 0.5
Port #2 (13 V 101° & 99°)	VDC	13.5 ± 0.5
Port #3 (22 kHz & 20 V 119° & 103°)	VDC	20 ± 0.5 (+ 22 kHz)
Port #4 (22 kHz & 13 V 119/110° & 103°)	VDC	13.5 ± 1 (+ 22 kHz)
Port #5 (Flex Port 1)	VDC	20 ± 1 or 13.5 ± 1 (Internally switch able)
Port #6 (Flex Port 2)	VDC	20 ± 1 or 13.5 ± 1 (Internally switch able)
LED Color corresponding to:	GREEN	VDC 10.0 - 14.5
	AMBER	VDC 17.0 - 20.5
Number of LEDs	Each	7 (1 per input & 1 for adaptor input)
22 kHz Tone to ODU	kHz	
Frequency	kHz	22.0 ± 0.5
Duty Cycle	%	50
Amplitude	mVpp	800 (min)
DC Power Path	mA	1000 (max.) From DC Input to each Input
DC Power Connector Type	Each	(1) SCTE Indoor F
Switching Mode Power Supply		24 V, 1.2 A (min)
Short Circuit Protection		Yes, 1 A Multi fuse
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	mm	136 x 217 x 23
Environmental Requirements		Indoor use only
Operating Temperature range	°C	-34 to + 60 Indoor housing
Humidity		Shall survive 95% relative humidity over operating temperature

SWM8 Powering of SL5



DIRECTV® recommends that the distance between receiver and dish be less than 150 feet of solid copper RG-6. Here is why.

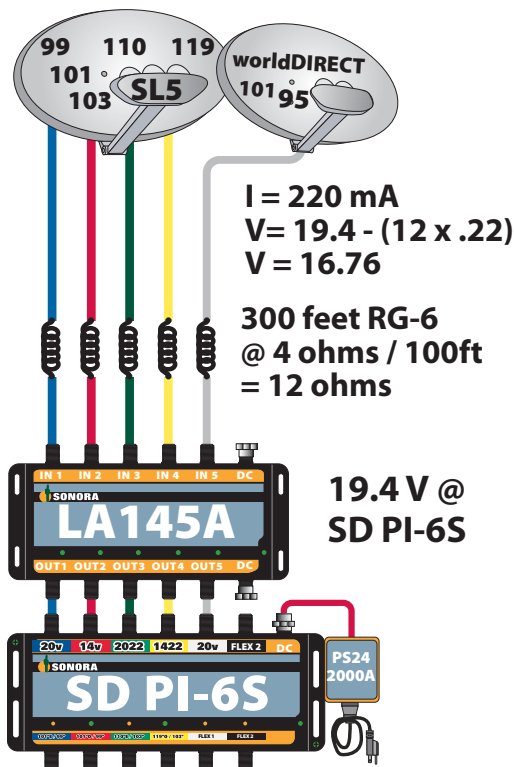
Model SL5 LNBs employ current management to minimize the current carried per coax. (540 mA total) 18 V = 220 mA, 18V 22kHz = 220 mA, 13V = 50 mA, 13V 22kHz = 50 mA.

The 18 volts originating at the SWM8 must arrive at the SL5 above 16 volts for the SL5 to operate correctly. Up to (2) volts can be lost in the coax.

Current x Resistance = Voltage loss

Solid copper RG-6 has a typical loop resistance of 4 ohms per 100 feet. At 200 feet the resistance is 8 ohms. 0.22 Amp x 8 ohms = 1.76 volts loss

18 V - 1.76 V = 16.4 volts to the SL5



Model SD PI-6S-T starts with 19.4 Volts to provided extended dish to Main Point of Entry distances.

The extra voltage provides an additional 150 feet RG-6 distance. Model LA145a offsets the signal loss of 150 feet of RG-6.

The LA145a located at the polarity locker does not affect the current loss in the cable to the dish. What is the voltage loss in the 18v coax?

At **350** feet the resistance is 12 ohms.

0.22 Amp x 12 ohms = 2.64 volts loss

19.4 V - 2.64 V = 16.76 volts to the SL5

SWM8 to SL5 Communication

Multiple SWM8's talking to the SL5 creates strange field problems that can be attributed to 22 kHz phasing.

Multiple 22 kHz signals when combined can create constructive and destructive interference. 180° out of phase combining will reduce the 22 kHz signal to zero!

The following web location has a live demonstration on the affects. <http://www.kettering.edu/~drussell/Demos/superposition/superposition.html>

Model **SD PI-6S-T** polarity locker located between the splitters and **LA145a** amplifier blocks the 22 kHz signals generated by multiple switches and generates a fresh set of voltages and 22 kHz tones .

