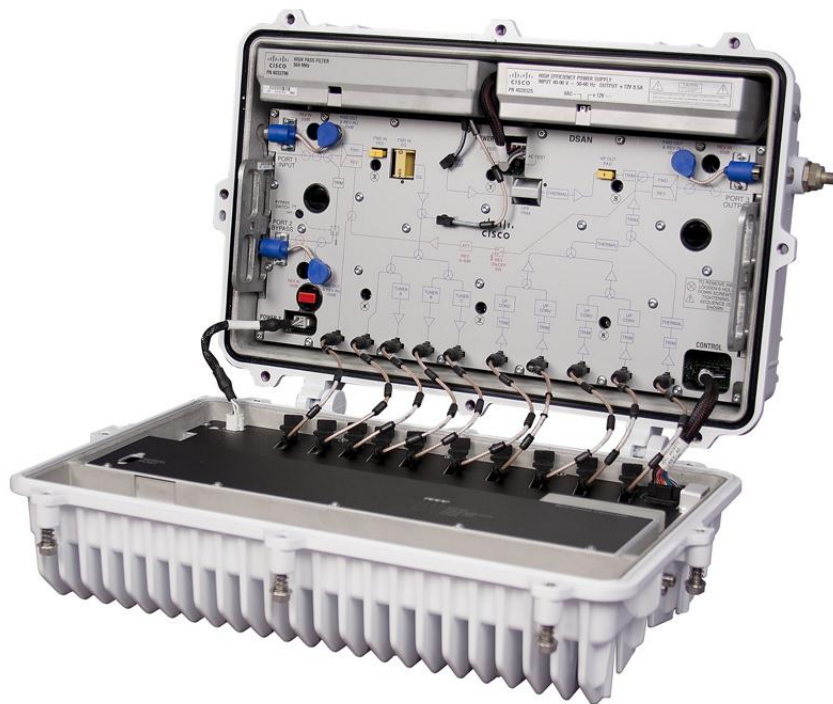


## Cisco DSAN System

As broadband service providers begin to migrate to deep digital networks, the Cisco<sup>®</sup> Digital Service Access Node (DSAN) provides a cost-effective, flexible, easy-to-deploy solution for serving the needs of multiple dwelling unit (MDU) and bulk analog accounts. Its HFC-ready design, environmentally hardened enclosure, and output port flexibility provide service providers with the right product for maintaining analog service to its bulk MDU customers. With 82 analog channels to populate, 8 of which can be locally generated, service providers are sure to be able to meet even the most demanding custom channel lineup needs.

**Figure 1.** Cisco DSAN System, Interior



### Benefits of the Cisco DSAN Solution

- Meet the analog channel requirements for bulk MDU accounts
- Create custom channel lineups
- Turn on and off individual channels
- Reduce cable programming theft through bulk agreements
- Local channel insertion capability
- Additional revenue streams through up-sell opportunities for advanced services

## Features of the Cisco DSAN Solution

- Recreates up to 82 channels of analog content from Standard Definition (SD) MPEG-2
- Recreates the analog spectrum from 54 to 552 MHz
- Three input tuners each capable of tuning a 48 MHz block of spectrum (8 QAM channels) anywhere from 88 to 1002 MHz
- Three input tuners collectively capable of tuning 144 MHz of spectrum (24 QAM channels)
- Analog content generated from up to 16 QAM channels within the tuned spectrum
- Complete flexibility in assigning QAM channel input to analog channel output
- Digital pass-through path
- Bypass port
- Two ASI input ports for local channel insertion
- Plug-in, self-contained diplex filters
- Fixed-value plug-in accessories are common to all GainMaker<sup>®</sup> products
- 60 and 90 VAC powering capability
- 15 Amperes current capacity (steady-state) and 25 Amperes surge survivability
- Indoor/outdoor environmentally hardened IP68 (UL50E) compliant housing
- Modular tech-friendly design
- Modular high-efficiency power supply simplifies maintenance
- Support for Cisco PowerKEY<sup>®</sup> conditional access
- Integrates easily into existing Cisco DNCS

## Supplied Accessories

The DSAN ships from the factory in a fully operational configuration that includes the following pre-installed modules and accessories:

- RF Module
- DC Power Supply Module
- High-Pass Filter Module
- Plug-in attenuator pads
- Plug-in forward equalizer (EQ) jumper
- Plug-in system trim jumper
- Crowbar surge protector
- AC shunts (not installed)
- Strand clamp mounting hardware (not installed)

## Optional Accessories

The following optional accessories are available separately for the DSAN:

- Wall Mounting Bracket
- AC Mains Power Pack Kit
- Replacement Cable Kit (10 x RF cables, DC cable, control cable)
- Replacement DC Power Supply Module
- Replacement High-Pass Filter Module
- DSAN Auxiliary Input Box (DAXI)

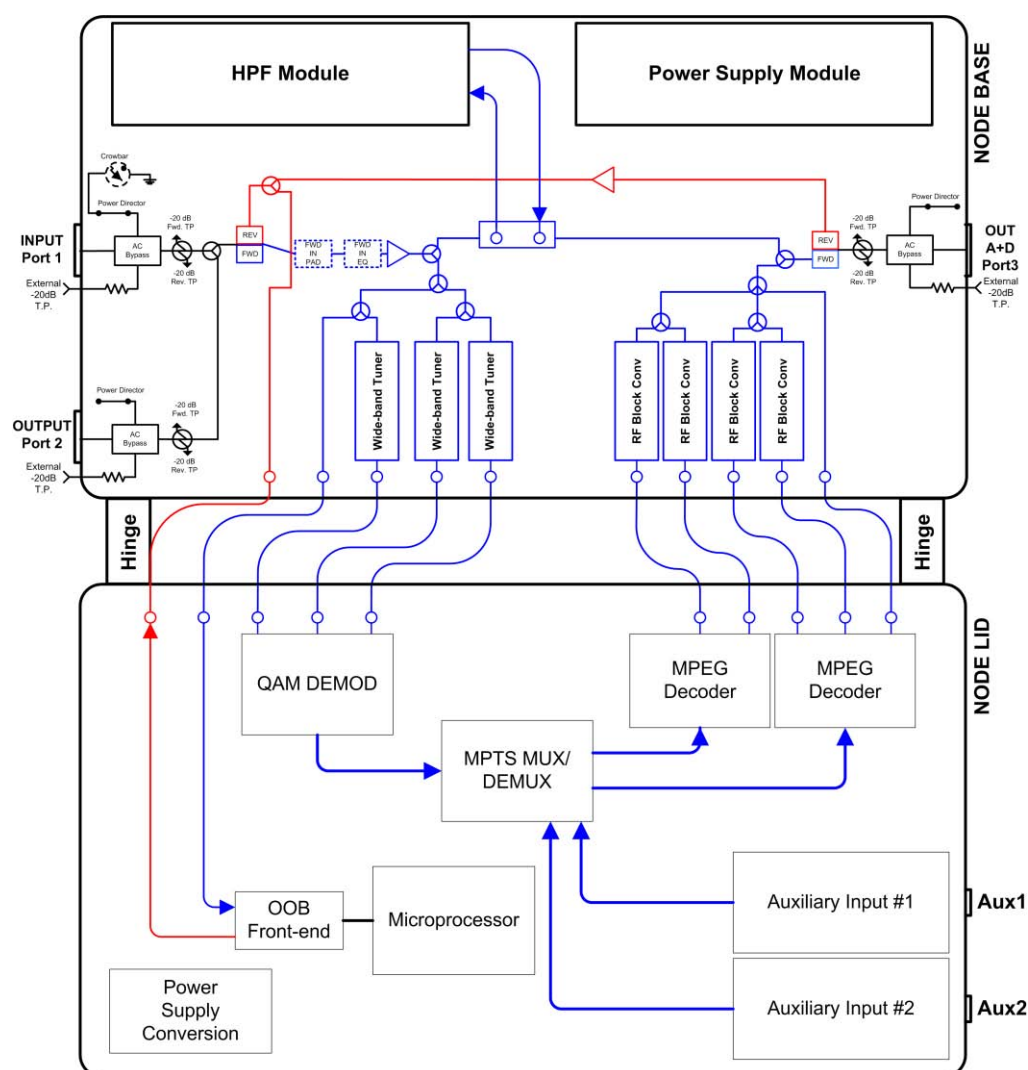
In addition, the DSAN accepts the following GainMaker 1 GHz compatible field-replaceable accessories:

- Plug-in Attenuator Pads
- Plug-in Forward Equalizer
- Crowbar Surge Protector

For details and ordering information, see *GainMaker Amplifier Accessories*, part number 716336.

## DSAN Block Diagram

Figure 2. DSAN Block Diagram



### Cisco DSAN Auxiliary Input Box (DAXI)

The DAXI is an external stand-alone accessory that converts analog baseband input into Standard Definition (SD) MPEG-2 format. The DAXI accepts up to four video or audio analog baseband inputs, converts them into an MPEG-2 transport stream, and outputs a single ASI channel.

The DAXI ASI output channel can be locally inserted into a DSAN through one of its two Aux ports. The locally inserted content can then be assigned to any of the DSAN analog output channels and distributed throughout the DSAN service area. Locally generated content sources typically include security cameras, character generators, and DVD players.

For additional information, see the *Cisco DAXI* data sheet, part number 7019475.

## DSAN System Specifications

**Table 1.** QAM RF (CATV) Input (Port 1)

Parameter	Value
Connector	KS Port (F adaptor)
Frequency Range	5 to 42 MHz (upstream) 54 to 1002 MHz (downstream)
Nominal Input Level	+10 dBmV (54 to 1002 MHz, analog carrier) +4 dBmV (54 to 1002 MHz, digital carrier)
Input Level Range	+10 to +30 dBmV (54 to 1002 MHz, analog carrier) +4 to +24 dBmV (54 to 1002 MHz, digital carrier)
Return Loss	16 dB minimum (5 to 42 MHz) 17 dB minimum (54 to 1002 MHz)
Test Point Response <sup>1</sup>	-20 ±0.5 dB (5 to 42 MHz, reverse TP) -20 ±0.5 dB (54 to 1002 MHz, forward TP)
Modulation	64 or 256 QAM (Annex B)
QAM Input Tuning Range	88 to 1002 MHz
QAMs demodulated (Maximum)	16
CAS Type - Model 8200	Cisco PowerKEY
AC Power Passing	15 Amperes

**Table 2.** Transport Stream Details

Parameter	Value
Video Format	MPEG-2, MP@ML 4:2:0 chroma subsampling 4:3 aspect ratio
Video Resolution	480 x 720 480 x 704 480 x 544 480 x 528 480 x 352
Audio Format	Dolby™ Digital (AC3)
Audio Bit Rate	MPEG Audio 512 kb/s maximum Dolby Audio 512 kb/s maximum
Audio Sample Rates	32 kHz 44.1 kHz 48 kHz

## DSAN System Specifications, cont'd.

**Table 3.** Mixed Analog + Digital Output (Port 3)

Parameter	Value
Connector	KS Port (F adapter)
Number of Analog RF Channels	82 NTSC
Frequency Range	5 to 42 MHz (upstream) 54 to 552 MHz (analog) 564 to 1002 MHz (digital pass-through)
Nominal Output Level	+20 dBmV (54 to 552 MHz, analog carrier) +14 dBmV (564 to 1002 MHz, digital carrier) <sup>2</sup>
Analog Output Level Range	+18.75 to +21.75 dBmV (54 to 552 MHz)
Analog Output Flatness	≤ 2.5 dB (54 to 552 MHz)
Gain	0.0 ±0.5 dB (5 to 42 MHz, upstream) <sup>3</sup> +9.15 to +11.25 dB (600 to 1002 MHz, digital pass-through)
Flatness	≤ 1.0 dB (5 to 42 MHz, upstream) ≤ 3.0 dB (564 to 600 MHz, digital pass-through) ≤ 1.2 dB (600 to 1002 MHz, digital pass-through)
Return Loss	16 dB minimum (5 to 42 MHz) 17 dB minimum (54 to 1002 MHz)
Test Point Response <sup>1</sup>	-20 ±0.5 dB (5 to 42 MHz, reverse TP) -20 ±0.5 dB (54 to 1002 MHz, forward TP)
Distortion	(82 NTSC Channels, 54 to 552 MHz) CTB = 67 dB typical CSO = 70 dB typical CNR = 49 dB typical
NPR = 40 dBc	≥ 40.0 dB (5 to 42 MHz, upstream)
VBI Support	SCTE 18 SCTE 20 SCTE 21 user data type code 3, 4, and 5
AC Power Passing	15 Amperes
Hum Modulation @ 15 Amperes	55 dB (5 to 10 MHz, upstream) 60 dB (11 to 42 MHz, upstream) 60 dB (564 to 870 MHz, digital pass-through) 55 dB (871 to 1002 MHz, digital pass-through)

## DSAN System Specifications, cont'd.

**Table 4.** Bypass Output (Port 2)

Parameter	Value
Connector	KS Port (F adapter)
Frequency Range	5 to 42 MHz (upstream) 54 to 1002 MHz (bypass)
Insertion Loss	-9 ±0.5 dB (5 to 42 MHz, upstream) -9 ±0.7 dB (54 to 1002 MHz, bypass)
Flatness	≤ 1.0 dB (5 to 42 MHz, upstream) ≤ 1.0 dB (54 to 1002 MHz, bypass)
Return Loss	16 dB minimum (5 to 42 MHz) 17 dB minimum (54 to 1002 MHz)
Test Point Response <sup>1</sup>	-20 ±0.5 dB (5 to 42 MHz, reverse TP) -20 ±0.5 dB (54 to 1002 MHz, forward TP)
AC Power Passing	15 Amperes

**Table 5.** Auxiliary Inputs

Parameter	Value
Connectors	2 x F type, female
Impedance	75 ohms
Input Type	ASI
Maximum Input Voltage	880 mV (p-p)
Maximum Cable Length	250 meters Belden 8281 or equivalent
Input Return Loss	15 dB minimum (27 to 270 MHz)
ASI Input Transmission Format	Burst Packet Mode or Spaced Byte Mode, auto-sensing
Output Channels	Each auxiliary input channel can be mapped to any EIA output channel.

**Table 6.** Control and Management

Parameter	Value
Local Craft Interface	RS-232 9-pin
Protocols Supported	SNMP, DHCP, TFTP
Embedded Cable Modem	DOCSIS 2.0 with DSG

**Table 7.** Environmental

Parameter	Value
Operating Temperature Range	-40 to 140°F (-40 to 60°C)
Storage Temperature Range	-40 to 158°F (-40 to 70°C)
Relative Humidity	5 to 95% non-condensing
Altitude	60 to 3700 meters

**Table 8.** Mechanical

Parameter	Value
Housing Dimensions	8.60 in. H x 19.85 in. W x 13.49 in. D 21.8 cm H x 50.4 cm W x 34.3 cm D
Weight, Loaded	53 lbs (24 kg)

## DSAN System Specifications, cont'd.

**Table 9.** Power

Parameter	Value
Input Voltage <sup>4</sup>	40 to 90 VAC line power
Power Consumption	< 106 Watts

**Table 10.** Typical Station Powering Data at 25°C<sup>5</sup>

DSAN		AC Voltage <sup>4</sup>										
		90	85	80	75	70	65	60	55	50	45	40
DC Current: +12.5 VDC @ 7 Amperes <sup>5</sup>	AC Current (Amperes)	1.30	1.31	1.37	1.45	1.54	1.65	1.79	1.96	2.18	2.39	2.82
	AC Power (Watts)	102	101	101	101	101	101	101	101	102	100	102

**Table 11.** Regulatory Compliance

Parameter	Value
Regulatory and Safety Approvals	As required per country where the DSAN will be used

### Notes:

1. Test point response is referenced to the nearest port.
2. Nominal digital carrier output level assumes digital carrier input level is set to nominal value.
3. The reverse path (5 to 42 MHz) is set up for unity gain performance. A reverse path amplifier is used to offset the internal losses in the product.
4. This power supply has a fixed under-voltage lockout of 30 VAC.
5. AC currents specified are based on measurements made with a typical CATV type ferro-resonant AC power supply (quasi-square wave).
6. The power supply maximum current rating is 12.5 V @ 8.5 Amperes.



## Ordering Information

This page contains ordering information for the DSAN and its optional accessories.

The DSAN ships with a pre-installed forward equalizer (EQ) jumper and pre-installed plug-in attenuator pads. The value of the DSAN forward EQ and input attenuator pad may need to be changed in order to optimize the DSAN's performance for the system in which it is operating. For a list of available plug-in forward EQ and attenuator pad values and their part numbers, see *GainMaker Amplifier Accessories*, part number 716336.

Please speak with your Account Representative, Customer Service Representative, or Systems Engineer to help determine the best configuration for your particular application.

**Table 12.** DSAN Configurations

Description	Customer Order Number
DSAN System - PowerKEY	DSAN8200

**Table 13.** Optional Accessories

Description	Customer Order Number
Wall Mount Bracket	DSAN_WALL
AC Mains Power Pack Kit	DSAN_MAINS
Replacement Cable Kit (10 x RF cables, DC cable, control cable)	DSAN_CBLS
Replacement DC Power Supply Module	DSAN_PWR
Replacement High-Pass Filter Module	DSAN_82HPF
DSAN Auxiliary Input Box (DAXI)	DSAN_DAXI

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