SignalPath™ 201 (SP201™) Installation Guide

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SignalPath Software Version 1100

This *Installation Guide* presents a quick, standard installation of the SP201.

> **Note:** The needs of your network may require an installation that varies from the standard installation. For a customized installation, see the *SP201 Customization and Maintenance Guide*. For hardware information, see the *SP201 Hardware Reference Guide*.

The SP201 can support up to four trunk circuits. Each trunk circuit carries up to 30 channel circuits.

> **Note:** A standard trunk circuit (from one external device, through the SP201, to another external device) comprises trunk connections to two ports. The SignalPath™ configuration software defines each side of the trunk circuit (that is, each connection to a port) as a trunk.
>
> This document uses the term *trunk* to indicate a connection to one port; it uses the term *trunk circuit* to indicate the complete end-to-end connection (over two ports). Using these definitions, a trunk circuit comprises two trunks.

Before you start this installation, be sure you have filled out the worksheet for adding this device to your network. See the *SP201 Site Planning Worksheet*.

See the following sections for a standard installation of the SP201:

- Section A, *Physical Installation*
- Section B, *Clocking Configuration*
- Section C, *Trunk Configuration*
- Section D, *Channel Configuration*
- Section E, *SP201 Warmstart*

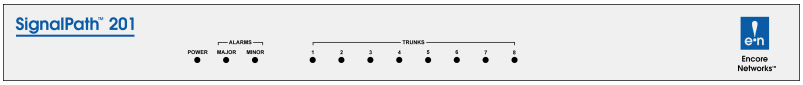

Figure 1. SP201 Chassis

Note: The cables you connect to the SP201 depend on the protocols. The following table lists the ports and line each protocol uses in this guide's standard installation.

Protocol Group	Protocol	SP201 Ports	Line
Channel-Associated Signaling (CAS)	DTMF	1–4	T1
	R1	1–4	T1
	R2	1–4	E1
	N5	1–4	E1
Signaling System 7 (SS7)	ITU C7	1–4 [a], 5–8 [b]	E1
	ANSI SS7	1–4 [c], 5–8 [d]	T1
ISDN	ETSI ISDN	5–8	E1
	NI2 ISDN	5–8	T1

a. when the other protocol on the SP201 is ISDN
b. when the other protocol on the SP201 is CAS or ANSI SS7
c. when the other protocol on the SP201 is ISDN or ITU C7
d. when the other protocol on the SP201 is CAS

A Physical Installation

1. Use the four holes on the front flange of the SP201to mount the chassis in a 19-inch equipment rack.
2. Connect cables to the ports on the rear of the SP201 chassis, as follows:
   - **a** For CAS trunks (DTMF, R1, R2, or N5), do one of the following:
     - ◆ For DTMF or R1, connect T1 cables to the RJ48C ports labeled **Trunk 1** through **Trunk 4**.

       or
     - ◆ For R2 or N5, connect E1 cables to the RJ48C ports labeled **Trunk 1** through **Trunk 4**.
   - **b** For SS7 trunks, determine whether the SP201's other protocol is a CAS protocol (DTMF, R1, or R2) or an ISDN protocol (ETSI ISDN or ANSI NI1, NI2, or NI3 ISDN). Then do one of the following:
     - ◆ If the other protocol is an ISDN protocol, the SS7 trunks are on ports 1 through 4. Do one of the following:
       - For ANSI SS7, connect T1 cables to the RJ48C ports labeled **Trunk 1** through **Trunk 4**.

         or
       - For ITU C7, connect E1 cables to the RJ48C ports labeled **Trunk 1** through **Trunk 4**.
     - ◆ If the other protocol is a CAS protocol, the SS7 trunks are on ports 5 through 8. Do one of the following:
       - For ANSI SS7, connect T1 cables to the RJ48C ports labeled **Trunk 5** through **Trunk 8**.

         or
       - For ITU C7, connect E1 cables to the RJ48C ports labeled **Trunk 5** through **Trunk 8**.

c For ISDN trunks, do one of the following:

- For ETSI ISDN, connect E1 cables to the RJ48C ports labeled **Trunk 5** through **Trunk 8**.

  or

- For NI2 ISDN, connect T1 cables to the RJ48C ports labeled **Trunk 5** through **Trunk 8**.

Note: In a standard installation, channels on trunk 1 of the SP201 map to channels on trunk 5, and vice versa. In like manner, channels on trunk 2 map to channels on trunk 6 (and vice versa). Standard mapping continues with trunks 3 and 7 and with trunks 4 and 8.

3. If you are using a DC connection for the SP201, connect the appropriate wires to the power input on the power supply, as described in the following substeps:

   a Connect an earth ground wire to the chassis, as follows: Attach a (minimum) 12 AWG wire to the large earth ground screw, located below the safety ground symbol on the rear of the SP201 chassis. Use a ring terminal, such as an AMP (part number 36160) for this connection.

   Note: An earth ground must connect to the SP201 chassis itself so that the chassis remains grounded even when the power connection is removed.

   b If your SP201 is a DC model, connect a (minimum) 14 AWG three-wire input cable to the green three-pin power plug. Make sure you connect the correct wire to each post. With the screwheads facing your left and with the three prongs pointing away from you (as shown in Figure 2), note the following:

   - The top post is -48 volts DC.
   - The middle post is DC common.
   - The bottom post (earth ground) is not used. (A ground wire was connected to the chassis in Step 3a.)

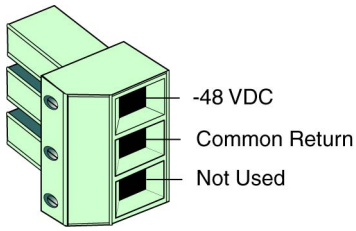

Figure 2. Power Connector

4. Connect the SP201 to a power source (a power outlet), and switch the power on.

   Note: Shipments within North America include a power cable for connection to the power outlet. For shipments outside North America, contact your distributor for a cable that meets local requirements to connect the power supply to an outlet.

5. Connect a DB9 cable from the DB9 serial port of the SP201 to the DB9 COM port of a control terminal—for example, a PC.

6. On the control terminal, start a terminal emulation program, such as HyperTerminal. Configure the serial communications for the control terminal as follows:

Baud rate	9600 bps
Data bits	8
Parity	None
Stop bit	1
Flow control	None

❖ When communication has been established, you should see the `user>` prompt.

7. If you don't see a prompt, press **Enter** once.

   ❖ The `user>` prompt appears.

   Note: After you have connected a local terminal to the SP201 device, you can connect a remote terminal to the local terminal and manage the device from a remote location. See the document *Remote Access to SignalPath™ Devices*.

B Clocking Configuration

What the terminal displays	What you type	What you are configuring
`user>`	**`config clocks`**	Clocking (synchronization) for the SP201

`Enter the trunk number [1-8] from which this card is to derive its clock source. Or enter "0" if this card is to use its internal clock.`
 	
`The PRIMARY clock source is derived from (current = INTERNALCLOCK):`
	`1`	Clock sourced from the device connected to the remote end of the R2 trunk

`The SECONDARY clock source is derived from (current = INTERNALCLOCK):`	**`0`**	Backup clock sourced from the SP201
`The TERTIARY clock source is derived from (current = INTERNALCLOCK):`	**`0`**	Last-resort clock sourced from the SP201
`user>`		(Clocking has been configured.)

C Trunk Configuration

Perform the following procedure once for each trunk (1–8).

What the terminal displays	What you type	What you are configuring
`user>`	**`config framer`** ***p*** *where p is the port number (1–8)*	Trunk on port *p*
`WARNING: Configuring framers will cause LOSS of calls!!!!!!!!` `Do you wish to proceed anyway (Y/N) :`	**`y`**	

For a T1 line:
`LIM type: 2 T1 100 Ohm/2 E1 120 Ohm`
`1 D4 SF`
`2 D4 ESF`
`enter T1 frame type (currently D4 SF):`
	For T1 lines: ***1*** *or your T1 frame type)*	

What the terminal displays	What you type	What you are configuring

For an E1 line:
`LIM type: 2 E1 120 Ohm/2 E1 120 Ohm`
`1 G704 CRC`
`2 G704 noCRC`
`3 G704 MF CRC`
`4 G704 MF noCRC`
`enter E1 frame type (currently G704 MF no CRC):`
	For E1 lines: **3** *(or your E1 frame type)*	Frame type for trunk

For T1 lines:
`line coding type choices are:`
`1 AMI`
`2 B8ZS`
`enter line coding type (currently B8ZS) :`
	For T1 lines: **2** *(or your T1 line coding)*	

For E1 lines:
`line coding type choices are:`
`1 AMI`
`2 HDB3`
`enter line coding type (currently HDB3) :`
	For E1 lines: **2** *(or your E1 line coding)*	Line coding for trunk

For T1 lines:
`line length choices are:`
`1 0 to 115 feet`
`2 82 to 213 feet`
`3 180 to 312 feet`
`4 279 to 410 feet`
`5 377 to 509 feet`
`6 476 to 607 feet`
`7 574 to 689 feet`
`enter line length (currently 0-115 feet):`
	1 *(or your T1 cable length)*	T1 cable length

`user >`		(The trunk has been configured.)

D Channel Configuration

See the following sections to configure the protocols in your SP201:

- DTMF signaling — Section D.1, *Channel Configuration for DTMF Signaling*
- R1 signaling — Section D.2, *Channel Configuration for R1 Signaling*
- R2 signaling — Section D.3, *Channel Configuration for R2 Signaling*
- N5 signaling — Section D.4, *Channel Configuration for N5 Signaling*
- ANSI SS7 signaling — Section D.5, *Channel Configuration for ITU C7 or ANSI SS7 Signaling*
- ITU C7 signaling — Section D.5, *Channel Configuration for ITU C7 or ANSI SS7 Signaling*
- ETSI ISDN signaling — Section D.6, *Channel Configuration for ETSI ISDN*
- NI2 ISDN signaling — Section D.7, *Channel Configuration for NI2 ISDN*

D.1 Channel Configuration for DTMF Signaling

What the terminal displays	What you type	What you are configuring
`user>`	**`config dt all`**	All DTMF channels
`Set 1/1 thru 4/31 out-of-service? (y or n) : <current=n>`	**`n`**	Placement of channels 1–31 of trunks 1–4 into service
`DTMF Caller ID/ANI used? (y or n) : <current=n>`	**`y`** *(or* **`n`** *if caller ID is not required)*	Request for caller identification
`Other modifications? : (y or n) : <current=n>`	**`n`**	Completion of standard configuration for DTMF signaling (If you wish to configure other parameters for DTMF signaling, type **`y`**. Then refer to the *SP201 Customization and Maintenance Guide*.)
`user>`		(DTMF signaling has been configured.)

D.2 Channel Configuration for R1 Signaling

What the terminal displays	What you type	What you are configuring
`user>`	**`config r1 all`**	All R1 channels
`Set 1/1 thru 4/31 out-of-service? (y or n) : <current=n>`	**`n`**	Placement of channels 1–31 of trunks 1–4 into service
`Template # for default IAM ? : (range 1 - 5) : <current=1>`	**`1`**	Use of R1 IAM template 1
`Template # for default ACM ? : (range 1 - 5) : <current=1`	**`1`**	Use of R1 ACM template 1
`Include Feature Group D (caller ID/ ANI)? (y or n) : <current=n>`	**`y`** *(or* **`n`** *if caller ID is not required)*	Request for caller identification
(The following four questions appear only if you answered **y** *to the previous question.)* `Use 911-Operator Services Signaling (y or n) : <current=n>`	**`n`**	No use of 911 support
`Max nbr of ANI digits to send R1 (0 = all) ? : (range 0 - 32) : <current=0>`	**`0`** *(zero)*	Support for ANI of any size
`Are Information digits supported? (y or n) : <current=n>`	**`n`**	No support of Information digits
`Separate Wink required for B-Party Number? (y or n) : <current=n>`	**`n`**	No separate wink for B-Party
`Require wink at end of selection? (y or n) : <current=n>`	**`n`**	No wink required at end of selection
`Generate ringback tone for R1 originated calls? (y or n) : <current=n>`	**`n`**	No ringback generated for caller
`user>`		(Standard configuration for R1 signaling has been completed. If you wish to configure other parameters for R1 signaling, refer to the *SP201 Customization and Maintenance Guide*.)

D.3 Channel Configuration for R2 Signaling

What the terminal displays	What you type	What you are configuring
`user>`	**`config r2 all`**	All R2 channels
`Set 1/1 thru 4/31 out-of-service? (y or n) : <current=n>`	**`n`**	Placement of channels 1–31 of trunks 1–4 into service

`Select R2 converter mode :`
`< 1> CCITT` `<14>Israel`
`< 2> Argentina` `<15>Korea`
`< 3> Brazil` `<16>Kuwait`
`< 4> Brazil-Emb` `<17>Malaysia`
`< 5> Chile` `<18>Mexico`
`< 6> China` `<19>New Zealand`
`< 7> Columbia` `<20>Paraguay`
`< 8> Columbia-Bts` `<21>Philippines`
`< 9> Columbia-Ngt` `<22>Singapore`
`<10> Costa Rica` `<23>Thailand`
`<11> Ecuador` `<24>Uruguay`
`<12> Greece` `<25>Venezuela`
`<13> Indonesia`		

`Outgoing R2 converter mode? (1-25; current=CCITT) :`	**`1`** *(or your country code)*	The country code for the version of R2 signaling this SP201 will use
`Request R2 caller ID? (y or n) : <current=n>`	**`y`** *(or* **`n`** *if caller ID is not required)*	Request for caller identification
`Send I15 to R2 side at end of address (vs timeout)? (y or n) : <current=y>`	**`y`** *(or* **`n`***, depending on your requirement)*	Sending an Address Complete code (An answer of **`n`** causes the adjacent switch to wait for the appropriate timer to expire before processing the call.)
`Other modifications? : (y or n) : <current=n>`	**`n`**	Completion of standard configuration for R2 signaling (If you wish to configure other parameters for R2 signaling, type **`y`**. Then refer to the *SP201 Customization and Maintenance Guide*.)
`user>`		(R2 signaling has been configured.)

D.4 Channel Configuration for N5 Signaling

What the terminal displays	What you type	What you are configuring
`user>`	**`config n5 all`**	All N5 channels
`Set 1/1 thru 4/31 out-of-service? (y or n) : <current=n>`	**`n`**	Placement of channels 1–31 of trunks 1–4 into service
`Destination country code for calls to N5 (current) : Enter up to 3 digits:`	*(your country code)*	Your country's international dialing code
`Transit calls to N5 enabled ? (y or n) : <current=n>`	**`n`**	Disallowance of transit traffic
`Use Calling Party Category to set N5 language digit? (y or n) : <current=n>`	**`n`**	No use of the calling party category to derive the language digit
`N5 side outgoing language digit (current) : Enter up to 1 digits:`	*(Press* **Enter** *to leave this field empty.)*	The fixed language digit for calls originating from the N5 side
`Prefix to be stripped from digits before sending to N5 (current) : Enter up to 3 digits:`	*(Press* **Enter** *to leave this field empty.)*	Digits to remove from the front of the country code
`Digits that cause C11 to be sent to N5 (current) : Enter up to 18 digits:`	*(Press* **Enter** *to leave this field empty.)*	Digit string that causes the C11 operator code to be sent to N5
`Digits that cause C12 to be sent to N5 (current) : Enter up to 18 digits:`	*(Press* **Enter** *to leave this field empty.)*	Digit string that causes the C12 operator code to be sent to N5
`Language digit expected from N5 [* = any] (current) : Enter up to 1 digits:`	*(Press* **Enter** *to leave this field empty.)*	Acceptance of calls only with a specific language digit (if entered)
`Transit calls FROM N5 enabled ? (y or n) : <current=n>`	**`n`**	Rejection of transit calls (by returning a busy flash)
`Digits to prepend in non-transit calls coming from N5 (current) : Enter up to 3 digits:`	*(Press* **Enter** *to leave this field empty.)*	Digits to prepend to non-transit calls
`Use calling party category from template ? (y or n) : <current=n>`	**`n`**	Derivation of the Calling Party Category from the N5 language digit
`Digits to send when C11 is received from N5 (current) : Enter up to 18 digits:`	*(Press* **Enter** *to leave this field empty.)*	The digit string to send when the C11 operator code is received from N5
`Digits to send when C12 is received from N5 (current) : Enter up to 18 digits:`	*(Press* **Enter** *to leave this field empty.)*	The digit string to send when the C12 operator code is received from N5
`Template # for default IAM ? : (range 1 - 5) : <current=1>`	**`1`**	Default values for IAM parameters required on the SS7 side but not specified by the N5 protocol

What the terminal displays	What you type	What you are configuring
`Template # for default ACM ? : (range 1 - 5) : <current=1>`	**1**	Default values for ACM parameters required on the SS7 side but not specified by the N5 protocol
`Use user-defined caller ID (ANI) in calls from N5? (y or n) : <current=n>`	**n**	No support of caller ID (ANI). **Note:** Although N5 does not use ANI, some networks require ANI in all calls. Answering **y** here places a fixed ANI in each call originating from N5.
`Generate ringback tone for N5 originated calls? (y or n) : <current=n>`	**n**	No ringback generation by SignalPath for calls from N5 device
`user>`		(This completes standard configuration of N5 signaling. If you wish to customize the configuration of N5 signaling, refer to the *SP201 Customization and Maintenance Guide*.)

D.5 Channel Configuration for ITU C7 or ANSI SS7 Signaling

What the terminal displays	What you type	What you are configuring
`user>`	**`config link 5`**	The trunk that supports the SS7 link
`Protocol for trunk 5 is Q767` `This trunk is currently assigned to the Q767 SS7 protocol`		
(The following message displays only if trunk 5 was not already the SS7 link.) `Assign the Q767 SS7 to this trunk? (y or n; current="n") :`	**`y`**	Trunk 5 as the SS7 link
`Which timeslot (1-31; current=16)? :`	*For E1 lines:* **`16`** *For T1 lines:* **`24`**	The channel that will carry signaling
`Enter a prox CIC to map UNMAPPED CICs to (0-16383; current=65535) :` *(where prox represents the other protocol in this signaling-conversion set)*	(Just *press* **Enter**.)	A CIC in the other protocol that will accepted unmapped CICs from this SS7 protocol
`Originating Point Code (current = 0-0-2) :`	***`i-j-k`*** *(where i-j-k is the originating point code)*	The point code for the originating node in the network **Note:** Get all point codes from your network administrator.
`Destination Point Code (current = 0-0-3) :`	***`m-r-q`*** *(where m-r-q is the destination point code)*	The point code for the destination node in the network **Note:** Get all point codes from your network administrator.
`Link speed (56 or 64; current=64) :`	**`64`**	The line speed for this connection
`The system must be reset for changes to take effect.` `Do you want to reset now? (y/n)`	**`n`**	Delay in implementation of changes until performing a warmstart (described in Section E, *SP201 Warmstart*)

D.6 Channel Configuration for ETSI ISDN

Perform the following procedure once for each ISDN trunk (trunks 5–8).

What the terminal displays	What you type	What you are configuring
`user>`	**`config dchans`**	ISDN signaling channel

`The following is the present Trunk configuration.`
`If a change to the Timeslot or Interface Type is desired`
`Enter the Trunk number you wish to modify or exit:`
 	
`Trunk Signaling Type Timeslot Trunk Type Link State Interface Type Protocol`
`5 D 16 E1 Inactive Network ETSI ISDN`
`6 D 16 E1 Inactive Network ETSI ISDN`
`7 D 16 E1 Inactive Network ETSI ISDN`
`8 D 16 E1 Inactive Network ETSI ISDN`		

`ISDN Trunk Number`
 	
`Enter value(5 - 8) or "exit" :`
	p
	where p is the port number (5, 6, 7, or 8)
		ISDN trunk *p*

`Select interface type - user(0) or network(1) : <current=1>`	**`1`** *(or* **`0`***)*	SP201 as the Network role *(or as the User role)* in this ISDN connection

`ISDN Interface number 1 assigned to Trunk p,`
`with a D Channel on timeslot 16.`
 	
`Change ISDN Signaling Channel`
 	
`Enter value(1 - 31; current="16") or "exit" :`
	`16`	Signaling timeslot

(The following message appears only if you change the channel number used as the signaling timeslot.)
 	
`Changes applied`
 	
`The card must be reset for the changes to operate properly`
`Do you wish to reset now (y/n)?`
	`n`	Delay in implementation of changes until performing a warmstart (described in Section E, *SP201 Warmstart*)

`not resetting...`
 	
`user>`
		(ISDN signaling has been configured on this trunk.)

D.7 Channel Configuration for NI2 ISDN

Perform the following procedure once for each ISDN trunk (trunks 5–8).

What the terminal displays	What you type	What you are configuring
`user>`	**`config dchans`**	ISDN signaling channel

`The following is the present Trunk configuration.`
`If a change to the Timeslot or Interface Type is desired`
`Enter the Trunk number you wish to modify or exit:`
 	
`Trunk Signaling Type Timeslot Trunk Type Link State Interface Type Protocol`
`5 D 24 T1 Inactive Network NI2 ISDN`
`6 D 24 T1 Inactive Network NI2 ISDN`
`7 D 24 T1 Inactive Network NI2 ISDN`
`8 D 24 T1 Inactive Network NI2 ISDN`		

`ISDN Trunk Number`
 	
`Enter value(5 - 8) or "exit" :`
	p
	where p is the port number (5, 6, 7, or 8)
		ISDN trunk *p*

`Select interface type - user(0) or network(1) : <current=1>`	**`1`** *(or* **`0`***)*	SP201 as the Network role *(or as the User role)* in this ISDN connection

`ISDN Interface number 1 assigned to Trunk p,`
`with a D Channel on timeslot 24.`
 	
`Change ISDN Signaling Channel`
 	
`Enter value(1 - 31; current="24") or "exit" :`
	`24`	Signaling timeslot

(The following message appears only if you change the channel number used as the signaling timeslot.)
 	
`Changes applied`
 	
`The card must be reset for the changes to operate properly`
`Do you wish to reset now (y/n)?`
	`n`	Delay in implementation of changes until performing a warmstart (described in Section E, *SP201 Warmstart*)

`not resetting...`
 	
`user>`
		(ISDN signaling has been configured on this trunk.)

E SP201 Warmstart

What the terminal displays	What you type	What you are configuring
`user>`	**`warmstart`**	Implementation of any SS7 configuration or ISDN configuration
`This action will drop any calls that are in progress.` `Do you really want to continue? (y/n):`	**`y`**	

(Information on tests and restarts)
 	
(Boot banner)
 	
`boot>`
 	
(Initializations)
 	
(Application banner)
 	
`user>`
	(Do not type anything. The application will load in a few seconds.)	(When you see the `user>` prompt, the SP201 is ready for use.)

This completes the standard installation. To configure other parameters, see the *SP201 Customization and Maintenance Guide*. For hardware specifications, see the *SP201 Hardware Reference Guide*.