

Nextiva S1100 User Guide

Firmware Release 4.12

August 2007

Nextiva S1100
Firmware Release 4.12

User Guide

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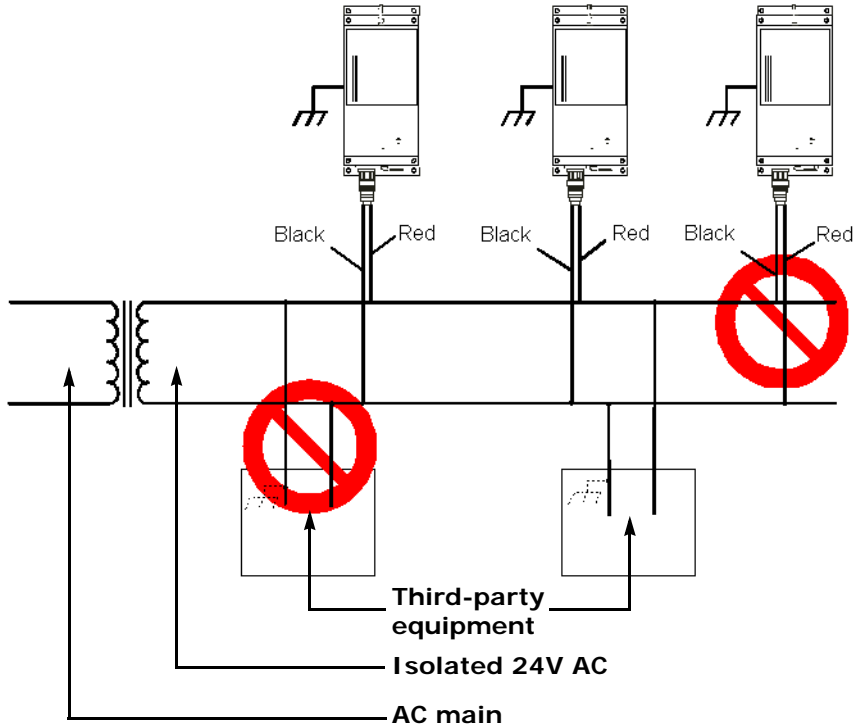
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www.verint.com/videosolutions

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Warning: If you connect multiple devices on the same 24V AC power supply, always wire them the same way: The red power wires of all devices must be on the same power supply terminal. Since the black power wire of the device is internally connected to its chassis (earth), swapping the power connection scheme from device to device will short out the AC power supply.

Warning: You can install third-party equipment with an earth-referenced power input on the same power source as the devices. To do so, you must connect the earth-referenced terminal of the equipment to the same AC terminal as the black wire of the devices. Failing to do so will short out the AC power supply.



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Preface

The *Nextiva S1100 User Guide* presents the information and procedures for installing, configuring, and using the Nextiva™ S1100 wireless video systems.

Who Should Read this Guide

This guide is intended for managers, IT system administrators, engineers, and technicians who will use the S1100 edge devices. It provides conceptual information on how to configure, install, and operate the devices.

This guide assumes that you are familiar with:

- Installation and manipulation of electronic equipment
- General use of computers
- Local area networks (LANs) and basic IP data communication concepts and practices
- Radio frequency (RF) platforms
- Pan-tilt-zoom (PTZ) platforms (cameras and keyboards)
- Microsoft Windows operating systems

How to Use this Guide

The *Nextiva S1100 User Guide* contains all the information needed to install, configure, and use an S1100 device.

Conventions

The following typographic conventions are used throughout this guide:

Visual cue	Meaning
Connect	The name of an interface element you have to act on. A key to press. The value of an interface element.
<i>connection_name</i>	Text that must be replaced by a user-supplied value. Text representing variable content.
SConfigurator.exe	The name of a command, file, or directory. Text that appears on the screen. Examples of user-supplied values.

Related Documentation

In addition to this guide, the following documentation is also available:

- *Nextiva S1100 Installation Guide*
- *SConfigurator User Guide*
- *Release Notes*

All these documents are contained on the *Utilities* CD shipped with the device. Furthermore, a paper copy of the installation guide is included with your order.

Related Products

You can use the S1100 devices with the Nextiva S3100 device. For more details about this product, visit our web site. For pricing information, call your dealer.

About Us

Verint® Systems Inc. (NASDAQ: VRNT) is a leading global provider of analytic software-based solutions for security and business intelligence. Verint solutions help organizations make sense of the vast voice, video, and data available to them, transforming this information into actionable intelligence for better decisions and highly effective performance.

Since 1994, Verint has been committed to developing innovative solutions that help global organizations achieve their most important objectives. Today, organizations in over 50 countries use Verint solutions to enhance security, boost operational efficiency, and fuel profitability.

Web Site

For information about the Nextiva line of products, visit www.verint.com/videosolutions.

To request the latest versions of firmware and software or to download other product-related documents, you need access to the Verint Video Intelligence Solutions partner extranet. To register, go to <http://vvs.verint.com>.

Support

If you encounter any type of problem after reading this guide, contact your local distributor or Verint representative. You can also use the following sections on the partner extranet to find the answers to your questions:

- Knowledge Base
- FAQ
- My Account

For assistance with the Nextiva edge devices and the related software, contact the customer service team:

- By phone: 1 888 747-6246 or 631 962-9202
- By email: vvssupport@verint.com

Warranty

Each product manufactured by Verint Systems is warranted to meet all published specifications and to be free from defects in material and workmanship for a period of two (2) years from date of delivery as evidenced by the Verint Systems packing slip or other transportation receipt. Products showing damage by misuse or abnormal conditions of operation, or which have been modified by Buyer or repaired or altered outside Verint Systems factory without a specific authorization from Verint Systems shall be excluded from this warranty. Verint Systems shall in no event be responsible for incidental or consequential damages including without limitation, personal injury or property damage.

The warranty becomes void if the product is altered in any way.

Verint Systems responsibility under this warranty shall be to repair or replace, at its option, defective work or returned parts with transportation charges to Verint Systems factory paid by Buyer and return paid by Verint Systems. If Verint Systems determines that the Product is not defective within the terms of the warranty, Buyer shall pay all handling and transportation costs. Verint Systems may, at its option, elect to correct any warranty defects by sending its supervisory or technical representative, at its expense, to customer's plant or location.

Since Verint Systems has no control over conditions of use, no warranty is made or implied as to suitability for customer's intended use. There are no warranties, expressed or implied, except as stated herein. This limitation on warranties shall not be modified by verbal representations.

Equipment shipped ex works Verint Systems factory shall become the property of Buyer, upon transfer to the common carrier. Buyer shall communicate directly with the carrier by immediately requesting carrier's inspection upon evidence of damage in shipment.

Buyer must obtain a return materials authorization (RMA) number and shipping instructions from Verint Systems prior to returning any product under warranty. Do not return any Verint Systems product to the factory until RMA and shipping instructions are received.

1

Overview

The S1100 is a professional video transmission product designed for the CCTV (closed circuit television) market. It allows digital video transmission over license-free and licensed bands. It delivers high-quality MPEG-4-based video at 30 frames per second in NTSC (25 in PAL). This wireless system is built on open standards to provide long-term investment protection.



Note: The S1100 devices require professional installation.

About the S1100

Each S1100 system consists of a video transmitter (-T) and a video receiver (-R) device. Unless otherwise specified, the word *S1100* refers to any of these devices.

Each device is configured to operate, right out of the box, with the most popular camera data port configuration (4800 baud, 8 data bits, no parity, 1 stop bit).

The S1100 covers the 2.4 GHz and 5 GHz frequency bands in North America and Europe. It also covers the 4.9 GHz public safety band in North America.

You can buy 12V DC and 24V AC devices. A device pair does not need to have the same input voltage.

Security

Every S1100 device comes with the SDCF (SmartSight Distributed Coordinated Function) security feature. This proprietary MAC (Media Access Control) protocol uses AES encryption with key rotation over the wireless link to secure the audio and video communication between the devices.

Video

The S1100-R device has one video output. The S1100-T has one video input with two encoders; by default, only one encoder is available.

The video frame rate of the edge device can be:

- NTSC—1 to 7, 10, 15, or 30 frames per second (fps)
- PAL—1 to 6, 8, 12, or 25 fps

The S1100 devices can have the following video resolutions and maximum frame rates (in frames per second):

Resolution	Number of columns		Number of lines		Maximum frame rate	
	NTSC/PAL	NTSC	PAL	NTSC	PAL	
QCIF	176	128	144	30	25	
CIF	352	240	288	30	25	
2CIF	352	384	448	30	25	
2CIFH	704	240	288	30	25	
4CIF	704	480	576	15	12	
<i>All lines</i>	352	480	576	30	25	
2/3 D1	480	480	576	15/30 *	12/25 *	
VGA	640	480	576	15/30 *	12/25 *	

* Without noise, I/Os, and other factors affecting quality, the device can achieve the highest frame rate.

Shipment

Your S1100 shipment contains the following items:

- The requested transmitter and receiver, each coming with an integrated patch antenna (with a gain of 8.5 dBi in the 2.4 GHz band or 13 dBi in the 4.9 and 5 GHz bands)
- Two wall mount bracket sets, already installed on the devices
- Two pole mount bracket sets
- Two cable assemblies for video, power, and serial port (*CAB9P*)
- The *Utilities* CD containing the documentation and release notes for the device
- The *Nextiva S1100 Installation Guide*
- This user guide

The shipment may also contain the following options:

- One or two high-gain antennas

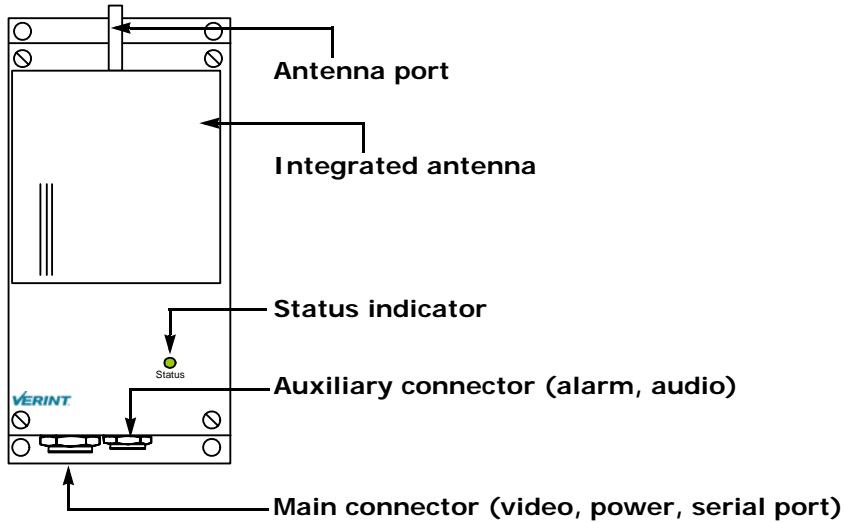
Warning: When choosing antennas, you must ensure that the combined transmission power of the device and antenna does not exceed the maximum power established by your country's regulations. For more information, see page 17.

- One or two junction boxes (*JBOX*)
- One or two alarm/audio cable assemblies (*CAB8P*)
- One or two power supplies

Note: If you are using power supplies other than those supplied by Verint, you need to ensure that they have a minimum capacity of 1A (12V DC) or 30 VA (24V AC).

Casing Description

The S1100 electronics are enclosed in a weather-tight cast aluminum module. All cable entries are mounted on the underside of the module to maintain its weatherproof properties. The front panel integrates one bicolor visual indicator that illustrates the operational state of the device.



2

System and RF Planning

For best operation, you must carefully plan the setup and location of your radio systems and antennas. Planning is especially required if you want to install many systems in the same area, in order to prevent radio interference between the colocated devices. In all cases, follow the recognized RF installation practices.

One radio system is a receiver and a transmitter using the same wireless passkey.

Frequency Bands and Channels

The S1100 supports communications in the following frequency bands, in North America and Europe:

- 2.4 GHz OFDM, also known as 802.11g
- 4.9 GHz OFDM, a public safety band available in North America only
- 5 GHz OFDM, also known as 802.11a

2.4 GHz Band

The 2.4 GHz band provides 11 channels in North America and 13 in Europe. In these two regions, only channels 1, 6, and 11 are independent (that is, non-overlapping). All these channels are for indoor or outdoor use. The center frequencies of the channels are:

Channel	Frequency (GHz)	Channel	Frequency (GHz)
1	2.412	8	2.447
2	2.417	9	2.452
3	2.422	10	2.457
4	2.427	11	2.462
5	2.432	12	2.467 (Europe only)
6	2.437	13	2.472 (Europe only)
7	2.442		

4.9 GHz Band

The 4.9 GHz band is a licensed band for entities providing public safety services focused on the protection of life, health, or property in North America. This band provides license holders with an interference-free, secure channel for robust and secure broadband technologies, including wireless video surveillance systems.

For more detailed information concerning the regulations governing licensing and use of frequencies in the 4.9 GHz band, see Subpart Y of the FCC document, Memorandum Opinion and Order and Third Report and Order at:

http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-03-99A1.pdf

The 4.9 GHz band has a width of 50 MHz (4940 to 4990 MHz). Since the standard channel width is 20 MHz, only two independent channels can co-exist in the band. However, the S1100 supports channel fragmentation, allowing narrower channels of 5 MHz and 10 MHz. You can have up to four independent channels with a 10 MHz width, and up to 10 with a 5 MHz width. All these channels are for indoor or outdoor use. For more information about channel fragmentation, see page 45.

The available channels are:

Channel	Frequency (GHz)	Channel width
3	4.9425	5 MHz
6	4.9475	5 MHz
7	4.9525	5 MHz or 10 MHz
7	4.950	20 MHz
8	4.9575	5 MHz
9	4.9625	5 MHz or 10 MHz
10	4.9675	5 MHz
11	4.9725	5 MHz or 10 MHz
11	4.970	20 MHz
12	4.9775	5 MHz
13	4.9825	5 MHz or 10 MHz
16	4.9875	5 MHz

5 GHz Band

In the 5 GHz band, the number of available channels and sub-bands vary depending on the country of operation.

Most European countries adhere to the DFS (Dynamic Frequency Selection) and TPC (Transmit Power Control) regulations established by the European Telecommunications Standards Institute (ETSI); these regulations apply to the 5 GHz frequency band only. To know which bands are available in your country of operation and whether your country adheres to DFS and TPC, refer to the *Wireless Frequency Plan* document located on the Verint Video Intelligence Solutions extranet (Technical Support, then Downloads, then Utilities and Tools).

In North America, five channels are available in the 5 GHz band, all independent and for indoor or outdoor use. The center frequencies of these channels are:

Channel	Frequency (GHz)
149	5.745
153	5.765
157	5.785
161	5.805
165	5.825

In Europe, the 11 independent channels, for indoor or outdoor use, are:

Channel	Frequency (GHz)	Channel	Frequency (GHz)
100	5.50	124	5.62
104	5.52	128	5.64
108	5.54	132	5.66
112	5.56	136	5.68
116	5.58	140	5.70
120	5.60		

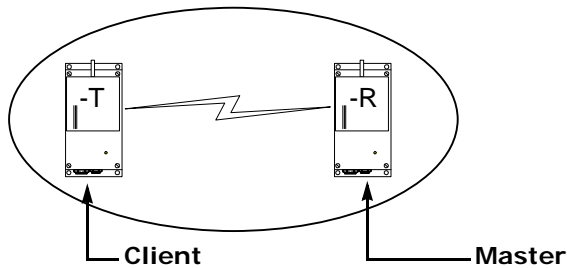
Wireless Cells

A wireless network is designed such that information can travel back and forth between two points without the need for wires. Wireless devices are grouped into *wireless cells*. The devices in a cell communicate together on the same frequency channel and share the same wireless passkey.

The S1100 automatically adjusts the transmission speed with the current RF conditions.

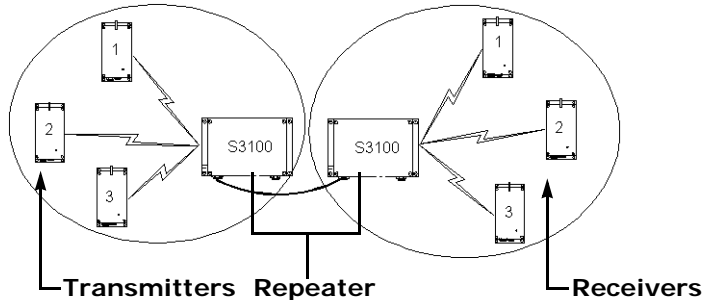
You can use the S1100 devices in two types of applications:

- Point-to-point system, which requires a single wireless cell:



The S1100 receiver is the SDCF master, and the transmitter is the client.

- Point-to-point repeater, which is the combination of two wireless cells:



When planning your wireless systems, you have to take into account the firmware versions of the involved devices:

- The two S1100 devices making up a pair must have the same firmware version.
- In a point-to-point repeater, it is recommended that the S1100 devices have the same firmware versions as their associated S3100 master.

In a point-to-point repeater, you update the firmware the following way:

1. Update the firmware of all S1100 pairs, starting with the remote device.
2. Change the IP address of the computer running SConfigurator (refer to the *Nextiva S3100 Series User Guide*).
3. Update the firmware of the two S3100 devices.

TPC

If the country of operation of the S1100 device requires conformity to the TPC (Transmit Power Control) regulations, the transmission power of its radio is automatically reduced by 3 dB before leaving the Verint factory. However, in case of a weak wireless link (that is, a link with an RF margin of less than 15 dB), you have the opportunity to use the maximum transmission power (see page 36).

DFS

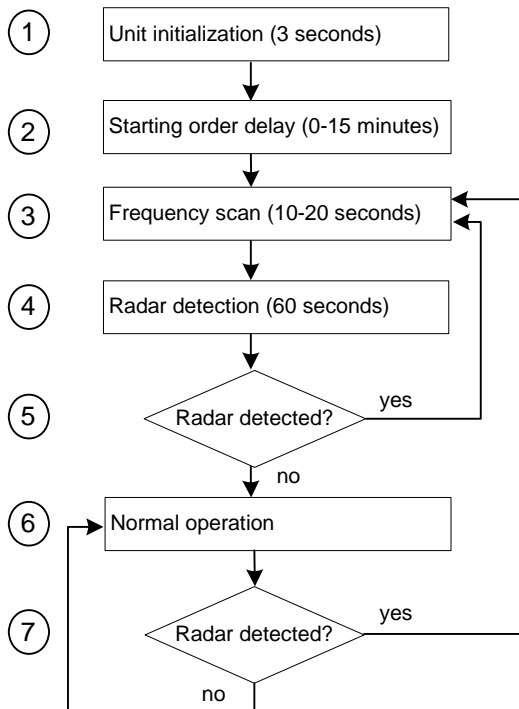
To follow the DFS (Dynamic Frequency Selection) regulations specified by ETSI for the selected country, it is the master device that performs the tasks relative to frequency channel selection and radar detection. In other words, you cannot choose the frequency channel on which the edge device will run.

The automatic selection of the frequency channel limits the number and the configuration of the wireless cells. Furthermore, when colocating many cells, all masters must “see” each other.

Note: DFS is required only in the 5 GHz band.

You should start the master first, then power the client when the other device is in normal operation.

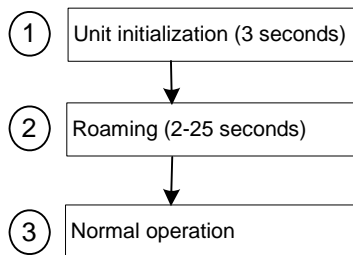
A master device in DFS mode goes through the following sequence when booting up:



1. The device goes through the standard startup procedure.

2. The starting order delay ensures that colocated masters will not select a frequency channel at the same time, therefore minimizing the possibility that they choose the same one. For more information about the starting order, see page 36.
3. The device scans the available frequencies (based on the selected country) and automatically selects a channel. In the selection process, channels already used by colocated masters will be discarded at first.
4. The device listens for 60 seconds on the selected channel to detect possible radar interference.
5. If a radar is detected on the channel, the device returns to the scan process. Otherwise, it continues its bootup procedure.
6. The device runs normally.
7. If a radar is detected, the device immediately goes back to the scan process to select another channel.

The boot sequence of client (transmitter) devices is:



1. The device goes through the standard startup procedure.
2. The device roams through the channels in the available frequency bands to locate its master.
3. When the master is located, the client device runs normally on the selected frequency channel.

Colocated Systems

When installing colocated systems, you have to carefully plan the position of the devices in order to prevent radio interference. You can operate many wireless cells in the same location, provided you follow guidelines relative to frequency band and channel, distance, wireless passkey, and location.

Regarding frequency channel, you cannot manually select one in the 5.40–5.725 GHz band in Europe; for the detailed procedure, see page 13.

The wireless passkeys of colocated cells must be different from one another, regardless of their frequency channels.

Distance Limitations

The distance limitations between devices are:

- The minimum distance between two devices is 3 feet (1 meter), regardless of the band or channel used.
- To avoid material damages, you must never power any two devices while their antennas are facing one another with a distance of less than 10 feet (3 meters).
- If using adjacent channels, see page 67 for the recommendations on the minimum distances to respect.
- To reduce radio interference possibilities between two adjacent frequency channels, ensure that the maximum margin between the emission of the two wireless cells is 25 dB; for more information, see Appendix F on page 67.

2.4 GHz Band

In the 2.4 GHz band in North America and Europe, you can use the three independent channels (1, 6, and 11) to colocate wireless cells.

Up to Three Point-to-Point Systems

As long as you follow the recognized RF installation practices, you can colocate three S1100 point-to-point systems without special consideration for antenna placement and type. You simply have to:

1. Assign a unique wireless passkey to each system.
2. Assign channel 1 to one system, channel 6 to the second system, and channel 11 to the last system. For example:

Device	Channel	Wireless passkey
S1100-T 1	1	1dfi340mndpha23v
S1100-R 1	1	1dfi340mndpha23v
S1100-T 2	6	pvaeodmq820pasqs
S1100-R 2	6	pvaeodmq820pasqs
S1100-T 3	11	moxsa41o0s3n7azx
S1100-R 3	11	moxsa41o0s3n7azx

Up to Six Point-to-Point Systems (< 180° Coverage)

You can install up to six S1100 receivers on the same side of a building or on the same mast, with their antennas pointing within the same direction (within a 180° angle of each other). You have to:

1. Assign a unique wireless passkey for each system.

- Assign the same channel to two adjacent pairs of devices. Assign the channels in the following order: 1, 11, 6.

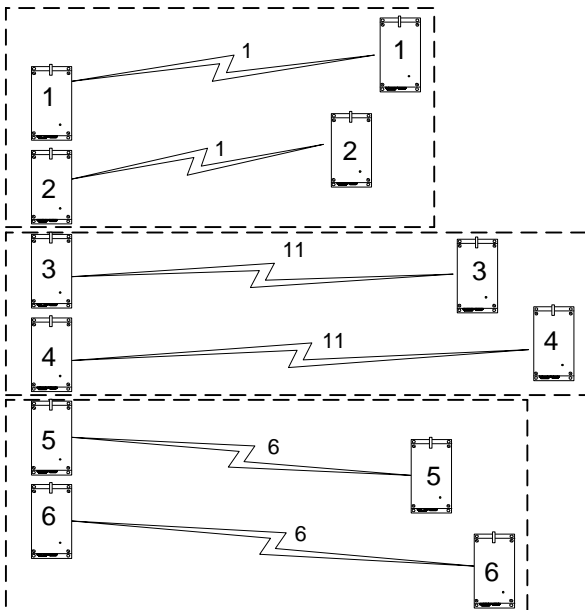
For example:

Device	Channel	Wireless passkey
S1100-T 1	1	1570fullummtlh2k
S1100-R 1	1	1570fullummtlh2k
S1100-T 2	1	270citehullj8y2h
S1100-R 2	1	270citehullj8y2h
S1100-T 3	11	yyypu76lelep11
S1100-R 3	11	yyypu76lelep11
S1100-T 4	11	jyjyjypkpkpkbxbx
S1100-R 4	11	jyjyjypkpkpkbxbx
S1100-T 5	6	zxcvbnmlkjhgfsa
S1100-R 5	6	zxcvbnmlkjhgfsa
S1100-T 6	6	qwertyuioplkjghf
S1100-R 6	6	qwertyuioplkjghf

- Set the RF bit rate of each system sharing a channel to a high enough value to accommodate the cumulative video throughput configured in both systems.

This higher value is required because the systems sharing the same channel will also share the available radio channel bandwidth.

- Install the individual receivers that share a channel as close as possible to each other; do the same for the two corresponding transmitters. All devices sharing a channel must have a clear RF line of sight to each other (that is, no "hidden node"); they must also "hear" each other. For instance, transmitter 1 must be able to hear both receivers and transmitter 2.



If the distance between the transmitters sharing a channel is greater than 300 feet (91.5 meters), call the Verint Video Intelligence Solutions Support group for help.

4.9 GHz Band in North America

Depending on the channel width (20, 10, or 5 MHz), you can colocate 2, 4, or 10 point-to-point systems respectively. As long as you follow the recognized RF installation practices, you can install these systems in colocation mode, on the same pole or on different sides of a building, without sharing channels. For the available channels in each of the three scenarios, see page 7.

You need to:

1. Ensure that there is a 25 dB separation between two adjacent frequency channels. For more information, see page 67.
2. Assign a unique wireless passkey to each system.
3. Assign an available channel to each required system.

5 GHz Band in North America

All channels in the 5 GHz band are independent.

Up to Five Point-to-Point Systems

As long as you follow the recognized RF installation practices, you can install up to five S1100 point-to-point systems in colocation mode, on the same pole or on different sides of a building, without sharing channels.

You need to:

1. Assign a unique wireless passkey to each system.
2. Assign an available channel to each required system.

Up to 10 Point-to-Point Systems (< 180° Coverage)

You can install up to 10 S1100 receivers on the same side of a building or on the same mast. To do so, the receivers must be pointing within the same direction (within 180° direction of each other).

For the installation steps, adapt the procedure described on page 11, “Up to Six Point-to-Point Systems (< 180° Coverage)”, with the 5 GHz band data.

5 GHz Band in Europe

The maximum number of colocated cells corresponds to the number of channels in the available frequency bands that can be used outdoors. For instance, in most countries of Western Europe, you can have up to 11 colocated cells in the 5.40–5.725 GHz band. However, because the master devices must see each other in a DFS context, the variety of supported setups is limited.

In this context, you can easily install up to five cells. By respecting the following steps, you can assume that the cells will not share the same frequency channel, making the complete bandwidth available for each one. You have to:

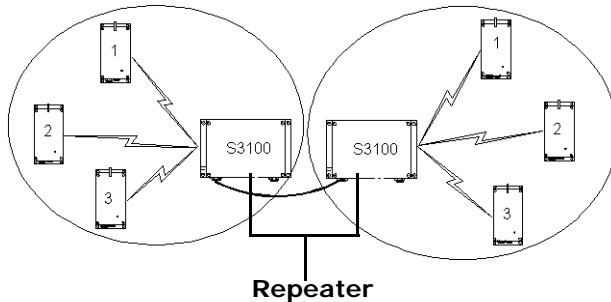
1. Assign a different wireless passkey to each cell.
2. Ensure that all S1100 masters “see” one another. For the procedure, see Appendix E on page 63.
3. Position the devices so that there is at least 3 feet (1 meter) between each antenna.
4. In each master device, set a different starting order: 1 for the first device, 2 for the device next to it, 3 for the third one, and so on.

Installing more than five cells in the 5.40–5.725 GHz band requires the use of adjacent channels. This situation demands greater distances between the antennas to reduce potential radio interference. Therefore, you should contact the Verint Video Intelligence Solutions project engineering group for assistance.

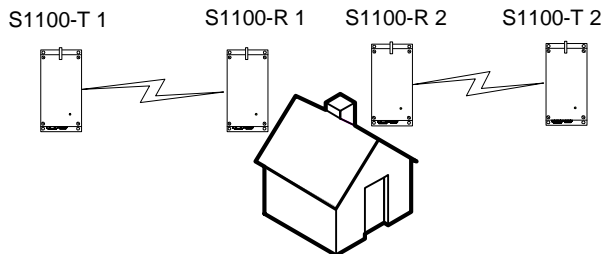
Supported Setups

The following colocated systems are supported in the 5.40–5.725 GHz band:

- A point-to-point repeater for one or more pairs of S1100 devices, with or without hidden nodes. Both master devices see each other.



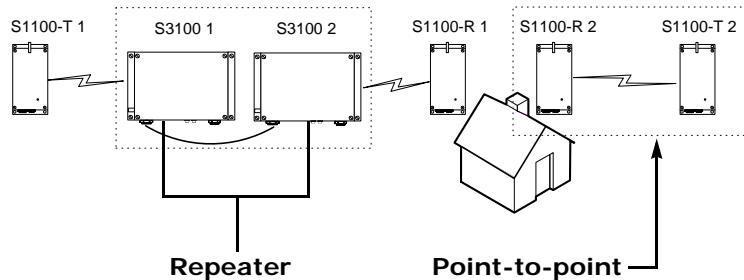
- Multiple point-to-point applications. The S1100 master devices (the receivers) see each other.



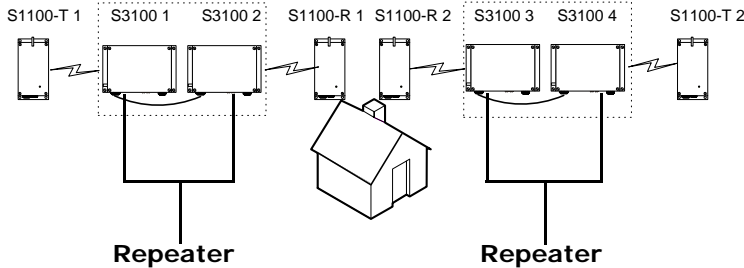
Unsupported Setups

You cannot install the following colocated systems in the 5 GHz band in Europe:

- A point-to-point repeater with a point-to-point link. In this setup, two masters do not see each other, S3100 2 and S1100-R 2, while the two receivers do.



- Multiple point-to-point repeaters. The S3100 2 and S3100 3 masters do not see each other, while the two receivers do.



RF Planning

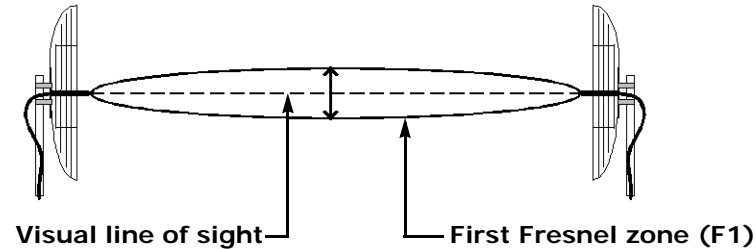
Successful operation of a wireless link depends on proper RF path planning and antenna installation. You have to install the devices in such a way that there is a clear RF line of sight between the two antennas.

Location Evaluation

The path between the two antennas must be free of obstacles that could disturb propagation. For very short link distances—less than 500 feet (152 meters)—you may be able to establish a working link despite partial path obstruction. However, radio waves will be in part absorbed and in part diffracted by the obstacles, therefore affecting link reliability. Because the reliability of such an installation is highly unpredictable, Verint does not recommend it. A path free of any obstacle is called an *RF line-of-sight path*.

To establish an RF line-of-sight path, you must take into account the beam width of the radio signal transmitted between the two antennas. This beam width is an elliptical area immediately surrounding the visual line of sight. It varies in thickness depending on the length of the line of sight; the longer the length, the thicker the beam width becomes.

The region outlined by the signal beam width is known as the *first Fresnel zone*. The Fresnel zone is always thicker at the mid-point between the two antennas. Therefore what appears to be a perfect line-of-sight path between the base and a remote station may not be adequate for a radio signal; this is the difference between “visual” and “RF” line of sight.



In practice, it has been determined that a radio path can be considered an RF line-of-sight path if it has a clear opening through 60% of the first Fresnel zone (or *0.6 F1*). Here are values for 0.6 F1 for various signal path distances and frequency bands:

Distance (mi./km)	2.45 GHz (feet/m)	4.9 GHz (feet/m)	5.3 GHz (feet/m)	5.8 GHz (feet/m)	Earth curvature effect (feet/m)
1 / 1.6	14 / 4.2	9.8 / 3.0	9.5 / 2.9	8.9 / 2.7	0
4 / 6.5	27 / 8.4	19.5 / 5.9	18.7 / 5.7	18 / 5.5	2 / 0.6
7 / 11.3	37 / 11	25.8 / 7.9	25 / 7.6	23.6 / 7.2	6 / 1.8
15 / 24	53 / 16	37.8 / 11.5	36.4 / 11.1	35 / 10.6	29 / 8.8

For distances under seven miles, the earth curvature effect is negligible. However, for greater distances, you need to consider it in your calculations; for instance, for a 15-mile link in the 2.4 GHz band, the two antennas must be located 82 feet higher than the highest obstacle in the RF line of sight between them (that is, 53 feet for the Fresnel zone plus 29 feet for the earth curvature effect). For help, consult the Verint Video Intelligence Solutions Support group.

A common problem encountered in the field and related to the 0.6 F1 clearance rule is building obstruction. The proposed visual path may just barely clear a building but the RF line of sight will not. In such a case, the signal will be partially absorbed and diffracted. Increasing the height of the two antennas or the gain of the antennas are the only alternatives to improve the link quality.

Note: At 2.4, 4.9, and 5 GHz, radio waves are highly attenuated by dense foliage. A link established in the fall or winter season may be adversely affected in the spring and summertime, if it is established below tree level.

Antenna Requirements

Verint offers many antennas to meet various distance requirements. You need to consider many factors when choosing an antenna, including the distance to cover, the RF bit rate, the radiated power (EIRP), and the frequency band. For systems located in North America on the 5 GHz band, you can use the *Wireless System Margin Calculator* located on the Verint Video Intelligence Solutions extranet (Technical Support, then Downloads, then Utilities and Tools).

The combined transmission power of the device and antenna must not exceed the maximum value established by your country's regulations. To ensure that this maximum is not exceeded, enter the gain of the chosen antenna in the Configuration Assistant (Wireless section). The device will automatically take it into account and adjust its own transmission power accordingly at startup.

Note: Connecting an antenna with a gain higher than the calculated value contravenes your country's regulations. It is your responsibility to ensure that you respect the regulations in place.

The maximum antenna gain supported to meet local regulations are:

Location	Band	Antenna gain
Europe	2.4 GHz	8.5 dBi
	5 GHz	13 dBi
North America	2.4 GHz	8.5 dBi
	2.4 GHz	16 dBi
	4.9 GHz	13 dBi
	5 GHz	18 dBi

The antennas certified by Verint are:

- ANT-WP8-24/S: 8.5 dBi gain, 2.4 GHz band, 65° beamwidth, patch antenna with 3-foot (1-meter) SMA-SMA cable
- ANT-WP13-5x/S: 13 dBi gain, 5.25-5.85 GHz band, 40° beamwidth, patch antenna SMA/F connector
- ANT-WP13-49-5x/S: 13 dBi gain, 4.9-5.85 GHz band, 40° beamwidth, patch antenna SMA/F connector
- ANT-WP16-24/S: 16dBi gain, 2.4 GHz band, 27° beamwidth, patch antenna with 3-foot (1-meter) SMA-N cable
- ANT-WP18-5x/S: 18 dBi gain, 5.25-5.85 GHz band, 18° beamwidth, patch antenna with 3-foot (1-meter) SMA-N cable

Interference

In most countries, the 2.4 GHz band is not regulated by a government agency; this absence of frequency coordination can result in interference between various systems. For instance, if a link with an RF line of sight is subject to excessive video delay and very low frame rate (or possibly breakdown of video images), it could be due to interference. Fortunately, you have ways of adapting your setup to avoid interference:

- RF channel selection—The S1100 has 11 or 13 channels to choose from. In case of interference, it is recommended to change channel until you find a clean one.
- Antenna selection—Replacement of the integrated antenna by a higher gain one can significantly lower the interference from other radio systems. Replace the antenna if switching channels does not correct the problem or if all channels must be used to colocate several systems.

There should not be any interference in the 4.9 GHz band, since it is a licensed band with limited usage to public safety.

The 5 GHz band is less cluttered than the 2.4 GHz band, resulting in less potential interference from other wireless systems.

RF Exposure Considerations

In order to comply with the RF exposure requirements of CFR 47 part 15 in North America, the devices must be installed in such a way as to allow a minimum separation distance of 12 inches (30 cm) between antennas and persons nearby.

3

Configuring and Installing the Device

The steps required to prepare your S1100 device for operation are:

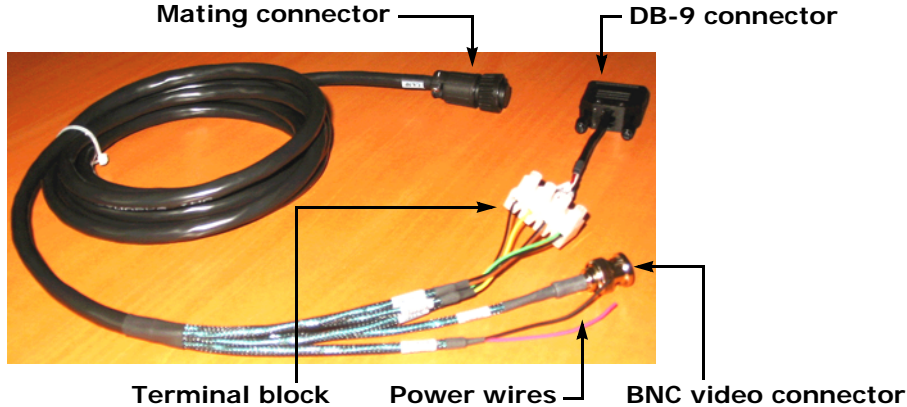
- Basic configuration
- Physical installation in its final location
- Alarm and audio configuration, if required

Two types of applications are covered:

- Point-to-point system between a transmitter and a receiver
- Point-to-point repeater, with the S3100-RP devices

Cable for Power, Video, and Serial Data

The supplied CAB9P cable assembly is used for video, power, and serial port connection.



For the detailed pinout, see page 54.

Serial Port

The S1100 integrates one multipurpose serial port. This port is used for system configuration and data communication: pan-tilt-zoom (PTZ), access control, or other. By default, the port automatically detects if it is connected to an RS-232 or RS-422/485 serial device.

The CAB9P cable is supplied with a female DB-9 plug enabling RS-232 connections. However, most PTZ cameras, keyboards, and similar devices use RS-422/485 connections. Therefore, you will have to adapt the CAB9P cable for its different uses:

- During the configuration process of the S1100, you need to access a computer, so the DB-9 connector is required for RS-232 communication.
- Later, when installing the device in its final location, you will likely want to connect it to RS-422/485 equipment, therefore requiring changes on the cable. You should keep the DB-9 connector on the cable for later use.

Warning: At any time there must be only one serial device connected to the S1100 device. For instance, when configuring the device, you must unplug any RS-422/485 device.

Power

Use the red and black wire pair of the CAB9P cable to connect the S1100 device to an external power supply.

To power an S1100 device:

1. In 12V DC, the red wire is for input and the black wire is for power ground.
 - a. Twist together the black power wire of the cable and the wire with the dashed white lines of the supplied power supply.
 - b. Twist together the red power wire of the cable and the other power supply wire.
2. In 24V AC, both wires are used for power. Connect the two power wires of the cable to the screws labelled 1 and 3 on the power supply; it does not matter which wire goes on which screw.

Computer Requirements

The minimum hardware and software requirements for the host computer needed to configure the edge device are:

- An Ethernet network card
- A serial port (not through a USB converter)
- Administrator rights on the computer
- Internet Explorer 5.0 or higher
- Windows 2000 Service Pack 2 or higher, or Windows XP Service Pack 2

Configuring a Point-to-Point System

To configure a point-to-point system, you connect one device (typically the receiver) to a computer then specify a series of parameters that apply to both devices. Then you check if RF communication works properly between the two devices.

To configure a device pair:

1. In a lab, unpack the receiver and the transmitter and set them on a table.

Warning: To avoid material damages, you must never power any two devices while their antennas are facing one another with a distance of less than 10 feet (3 meters).
2. Unpack the two cable assemblies (CAB9P) and connect each one to the main connector of a device.
3. On the receiver, connect the DB-9 plug at the other end of the CAB9P cable to a COM port on your computer.
4. Power the receiver using the red and black wires of its CAB9P cable.

For a description of the boot sequence in a DFS context, see page 9.
5. When the boot sequence of the receiver is completed, power the transmitter using the red and black wires of its cable.

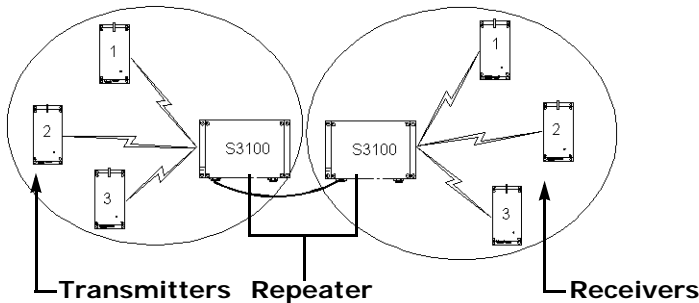
3: Configuring and Installing the Device

6. Using the Configuration Assistant tool, perform a basic setup on the pair of devices (see page 33).
 - Ensure that the repeater mode is disabled.
 - Enter the wireless passkey of the devices.
7. Connect the external antennas, monitor, and camera to the devices; ensure that RF and video communication works properly in your wireless system.

The initial configuration is now complete for the two devices. You can now install them in their final location (see page 23).

Configuring a Point-to-Point Repeater

A point-to-point repeater is used as a range extender for wireless links, when you need a device to retransmit the signals coming from one or many S1100 transmitters to their corresponding receivers. The S3100-RP repeater is made up of two S3100 devices.



To configure a point-to-point repeater:

1. Configure the S1100 pair:

Warning: You must complete the configuration of the S1100 devices before powering up an S3100 device.

- a. In a lab, unpack the receiver and the transmitter and set them on a table.

Warning: To avoid material damages, you must never power any two devices while their antennas are facing one another with a distance of less than 10 feet (3 meters).

- b. Unpack the two cable assemblies (CAB9P) and connect each one to the main connector of a device.
- c. On the receiver, connect the DB-9 plug at the other end of the CAB9P cable to a COM port on your computer.
- d. Power the receiver using the red and black wires of its CAB9P cable.

For a description of the boot sequence in a DFS context, see page 9.

- e. When the boot sequence of the receiver is completed, power the transmitter using the red and black wires of its cable.

- f. Using the Configuration Assistant tool, perform a basic setup on the pair of devices (see page 33).

- Enable the repeater mode.
- Enter a different wireless passkey for each device.

As soon as these settings are saved, the devices are not communicating anymore, since they have different wireless passkeys. The RF and video communication will be re-established after the repeater is fully configured.

2. Configure the two S3100 devices making up the repeater. For the procedure, refer to the *Nextiva S3100-RP Installation Guide*.

You can now install the devices in their final location.

Installing the Equipment

After configuring successfully your S1100 devices, you are ready to install them in their final location. The installation procedure can include the setup of external antennas.

To optimize your system radio performance, carefully review the site planning information presented in Chapter 2 on page 5.

Installing the S1100 Devices

The installation procedure is the same for all devices, regardless of their usage (with or without a repeater).

Warning: When installing colocated wireless systems, you have to take into account the distance limitations listed on page 11.

Warning: Always mount the device with the mating connectors pointing downwards. Otherwise moisture may penetrate the device; the associated repair costs would not be covered by the warranty.

To install an S1100 device:

1. To install a device on a light pole or mast, use the pole mount brackets and stainless steel clamps provided with your shipment. For wall mounting, use the side brackets already installed on the device.
2. If you are installing the S1100 equipment in a lightning prone environment or in a site where large AC mains power fluctuations are a common occurrence, add additional external surge protection to all vulnerable connections.

In such environments, vulnerable connections are those that run for a long distance between the S1100 device and the connected equipment. For more information, see the "Surge Protection" appendix on page 61.

3. If the S1100 equipment will be directly exposed to the sun in an environment likely to reach 122°F (50°C), install a sun shield.

A derate of 13°F (7°C) is required to protect the equipment.

4. If required, install an external antenna on the device (see page 27).

3: Configuring and Installing the Device

5. Apply the supplied silicone grease on the mating connector of the CAB9P cable and on the main connector of the device. For the detailed procedure, refer to the leaflet shipped with the cable.

Warning: Failure to apply the grease will void the warranty.

6. Connect the CAB9P cable to the S1100.

To properly install the cable connector on the device, you have to turn until you feel a positive click.

7. Plug the BNC video connector of the CAB9P cable on the target device (camera or monitor).
8. If required, perform the serial connection to the target device (see page 24).
9. If you are using a junction box (*JBOX* code), route all wires to it first; then route the wires from the box to the target device.
10. Carefully align the antenna of each S1100 device with that of its corresponding device (S1100 or S3100) so that they have a clear RF line of sight.

11. Power up the device.

Here is a pole mount installation of an S1100 device with a PTZ camera:



Performing the RS-422/485 Serial Connection

The Nextiva edge devices support only the RS-232, RS-422, and RS-485 asynchronous protocols. For any other protocol, you may need a converter.

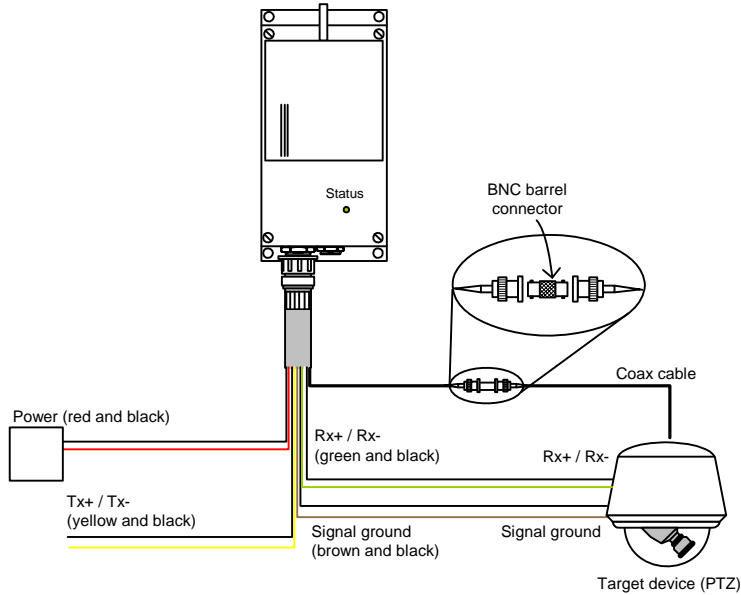
Warning: At any time there must be only one serial peripheral connected to the edge device. For instance, when configuring the device through a COM port of the computer, you must unplug any RS-422/485 peripheral.

RS-422/485

You use the CAB9P cable to properly connect the device to an RS-422 or RS-485 peripheral. Here is the wiring scheme for the four-wire RS-422 or RS-485 protocol:

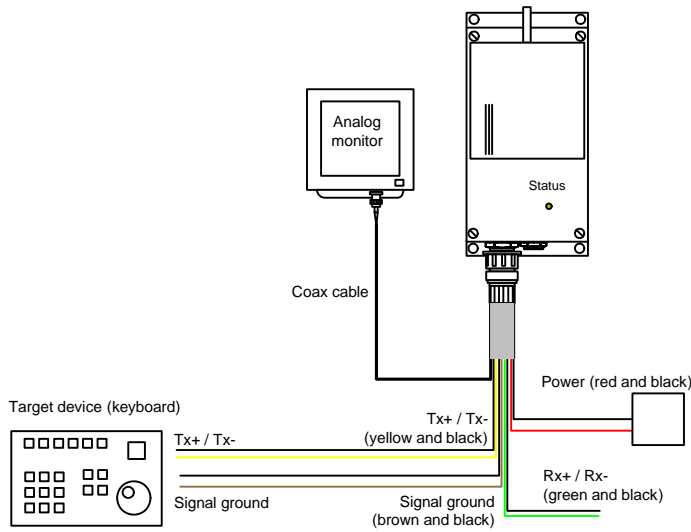
Cable			Peripheral
Signal name	Wire pair	Wire color	Signal name
Rx+	green/black	green	Rx+
Rx-		black	Rx-
Tx+	yellow/black	yellow	Tx+
Tx-		black	Tx-
Signal ground	brown/black	brown	Signal ground
Signal ground		black	Signal ground

These connections apply on both transmitter and receiver devices. For example, here is an S1100 transmitter connected to a PTZ camera in an RS-422 2-wire context:



3: Configuring and Installing the Device

The corresponding receiver side is:



For a two-wire, half-duplex RS-485 connection:

1. Use the following wiring scheme on both devices:

Cable	Signal name	Wire pair	Wire color	Peripheral	Signal name
	Data+	green/black	green		Data+
	Data-		black		Data-
	Signal ground	brown/black	brown		Signal ground
	Signal ground		black		Signal ground

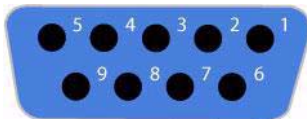
2. Set the operating mode to RS-485 2 Wires and the line driver to RS-422 (for details, see page 37).

RS-232

For an RS-232 connection, use the following wiring scheme to plug the device to the peripheral, using the DB-9 connector on the CAB9P cable:

DB-9 pin number	Cable signal name
2	RxD
3	TxD
5	Signal ground
7	RTS
8	CTS

The numbering of the pins on the DB-9 connector is:



Adding an Antenna

If you bought a high gain antenna, install it after the device is in place. The antennas provided by Verint are designed to be mounted on a mast or pole of 2–3 inch (5–7.5 cm) diameter.

To install an external antenna:

Warning: Even if you are using an external antenna, do not remove the integrated one; otherwise the warranty becomes void.

1. Install the antenna above the S1100 device. If you bought your antenna from Verint, use the supplied pole mount bracket.
2. Screw the SMA connector of the antenna cable to the S1100 antenna port and tighten it with a 0.25 inch (0.6 cm) wrench.

Warning: Do not over-tighten to avoid damaging the connector. The recommended torque is 8 lb-in. (100 N-cm). You could use a calibrated SMA torque wrench (for instance, from the Pasternack company, available at www.pasternack.com).

3. Apply two or three layers of electrical tape around all RF connections.

The antenna cable and connectors are weather-tight; however, vibration caused by the wind will over time loosen the connectors and reduce the efficiency of the gaskets. The electrical tape will prevent this situation.

4. Carefully align the antenna with that of the other device so that both have a clear RF line of sight.

Configuring the I/Os

To program alarms or use the audio features of the device, you need the CAB8P cable assembly. For detailed pinout information, see page 55.

The S1100 supports two inputs and one output. Each signal has a dedicated purpose:

- Input 1—Either a transparent alarm link with the output relay (default) or PTL (push-to-listen) audio transmission mode. To switch between the two, see page 37.
- Input 2—Push-to-talk (PTT) audio transmission mode.
- Output—Relay for the input 1 signal in alarm mode.

You cannot program audio control and alarms at the same time, since input 1 is used in both contexts.

Audio

The S1100 device supports two audio modes: full duplex and half-duplex bidirectional audio (that is, PTT/PTL).

In full duplex, audio is played continuously; the I/Os are available for alarms.

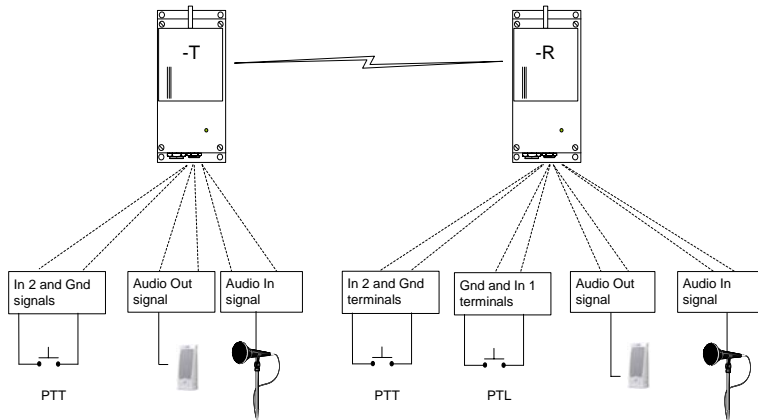
3: Configuring and Installing the Device

The PTT/PTL transmission mode uses the I/O pins; therefore, you cannot program alarms and PTT/PTL at the same time. PTT/PTL requires a specific hardware configuration:

- To activate the audio reception circuit (for PTL) on receiver devices, you have to short the alarm input 1 dry contact and the alarm ground signal. You cannot activate PTL on transmitters. Remember to change the input 1 setting for audio use in the Configuration Assistant (see page 37).
- To activate the audio transmission channel (for PTT), you must trigger an activation switch (for example, a button) that is based on the shorting of the alarm input 2 and alarm ground signals.

If both the transmitter's and receiver's PTT switches are activated at the same time, the receiver will have precedence: Audio will be transferred from the receiver to the transmitter. If the receiver's PTL and PTT functions are activated at the same time, PTT will be activated and PTL will be ignored.

Here is a typical PTT/PTL application:



Regardless of the audio mode (PTT/PTL or full duplex), you need to connect the audio equipment on both devices:

- You plug the audio input signal of the device to the Line-out connector on a pre-amplifier. Then you plug a microphone on the pre-amplifier.
- You plug the audio output signal of the device to the Line-in connector on an amplifier. Then you plug a speaker on the amplifier.

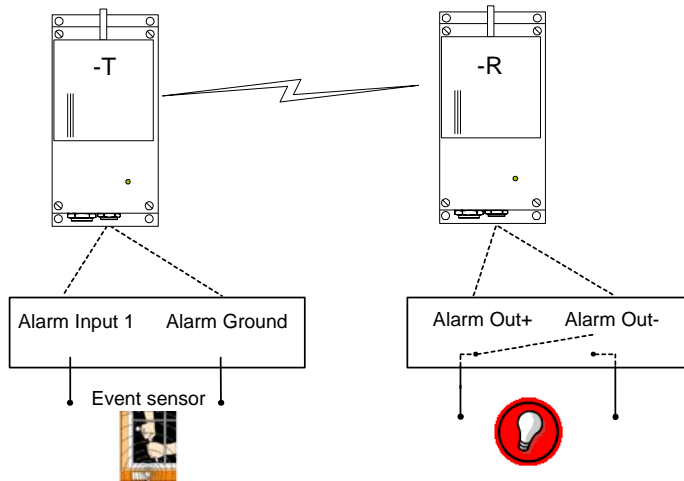
The audio input/output specifications are:

Mode	Gain	Impedance	Frequency range
Input	-20 to -3 dBV	30 kohm	300–3600 Hz
Output	-45 to -3 dBV	8 ohms min.	

Alarms

The receiver and transmitter devices can generate alarms (or events). Typically, an alarm will be generated on a transmitter and acknowledged on a receiver.

To generate an alarm on a transmitter, you short the input 1 dry contact and the alarm ground. The relay output on the receiver is configured to close the contact between the two output pins (up to 48V at 100 mA) upon alarm activation.



Performing a Hardware Reset

You can perform a hardware reset on the device. This operation will assign the factory default settings to the device (listed in Appendix A on page 51). All user-defined values will be lost.

Following a reset, you may need to reprogram the S1100 device for proper operation with the other device.

To perform a hardware reset:

1. Power down the device.
2. Short the TxD and CTS wires together.
If required, check the DB-9 pinout on page 54.
3. Power up the device and wait until the normal boot-up sequence is completed.
4. Remove the short on the TxD and CTS pins.

The device is ready for use with the factory default settings.

Status LED

The system status LED is a bicolor (green-red) LED providing detailed information on the current state of the device.

Condition	Indication	-T	-R
Green blink every sec.	The device is looking for a frequency channel.		✓
Steady red for 5 sec.	The device is powering up.	✓	✓
Flashing green (3 sec. intervals)	The firmware has started, but RF communication is not established.	✓	✓
Flashing green (1 sec. intervals)	The firmware has started, RF communication is established, but no video is transmitted.	✓	
	The firmware has started, RF communication is established, but no video is received.		✓
Flashing green (0.2 sec. intervals)	The firmware has started, RF communication is established, and video is transmitted.	✓	
	The firmware has started, RF communication is established, and video is received.		✓
Three consecutive red blinks every 2 sec.	No video source is detected and no video is transmitted.	✓	
Flashing green-red (1 sec. intervals)	The device is undergoing a firmware update or is in backup mode.	✓	✓
One red blink	A video packet is lost. In the worst case, it could flash at 5 Hz.		✓

The following power-up conditions on the system status LED are abnormal:

- LED not lit—Check the power supply and cabling. If power is available and the LED stays off, call Verint Video Intelligence Solutions customer service for assistance.
- Steady red LED persisting more than 10 seconds—There is an internal error that prevents the device from starting normally. Power down the device, wait 30 seconds, then power it up. If the condition persists, call Verint Video Intelligence Solutions customer service.
- Flashing green-red LED not during a firmware update—The device requires a new firmware with a serial connection.

4

Using the Configuration Assistant

The S1100 devices come with a proprietary setup tool called the *Configuration Assistant*. This tool also allows you to see the status of your devices.

Getting Started

You find the Configuration Assistant executable file (`ConfigurationAssistant.exe`) on the *Utilities* CD shipped with your devices and in the firmware file downloaded from the Verint Video Intelligence Solutions extranet (Technical Support, then Downloads, then Firmware Upgrades).

With this software tool, you configure the transmitter and receiver S1100 devices in a single operation. In a repeater context, you will need SConfigurator, another Verint tool, to configure the S3100-RP devices.

To install the Configuration Assistant:

- Copy the executable file of the Configuration Assistant to the hard disk of your computer.

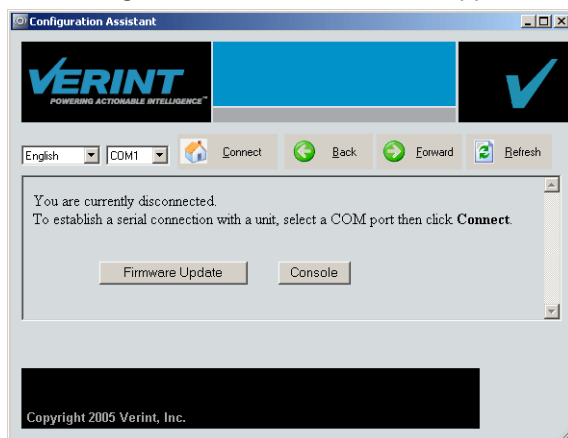
To get started with the Configuration Assistant:

1. Ensure that the receiver is connected to a COM port of your computer using the DB-9 end of the supplied CAB9P serial cable.

Warning: You need to disable any program using this COM port prior to starting this procedure.

2. Ensure that both S1100 devices are running.
3. In Windows Explorer, start the `ConfigurationAssistant.exe` program.

The Configuration Assistant window appears.



4. Ensure that the proper COM port name is displayed in the toolbar.

- To establish the connection with the device, click **Connect**.

The main Configuration Assistant window appears.

Unit Information		
	Transmitter	Receiver
Manufacturer	Verint Video Solutions	Verint Video Solutions
Product Type	S1100-NA	S1100-NA
Unit Name	Default	Default
Firmware Version	4.00- build 251	4.00- build 251
Serial Number	000b6b-4e0d3a	000b6b-4f475d
Uptime	00:02:11	00:01:54
	<input type="button" value="Reboot"/> <input type="button" value="Load Default"/> <input type="button" value="Update Firmware"/>	<input type="button" value="Reboot"/> <input type="button" value="Load Default"/> <input type="button" value="Update Firmware"/>
<input type="button" value="Quick Setup"/> <input type="button" value="Advanced Setup"/> <input type="button" value="Console"/>		

- To display a help string in the bottom section of the window, providing more information on a parameter or button, move the mouse over it.
- To browse back in the sequence of accessed data panes, if applicable, click **Back**.
- To browse forward in the sequence of accessed data panes, if applicable, click **Forward**.
- To update the display of information, click **Refresh**.
- To disconnect the Configuration Assistant from the device, click **Disconnect**.

Performing a Basic Configuration

You can easily set up your radio system by providing a minimal set of parameters.

The Video Quality parameter represents a predefined set of video settings. Here are the three available sets:

Parameter	High	Medium	Low
Resolution	All lines	CIF	CIF
Frame rate	25	25	12
Bit rate (kbps)	3000	1400	900
Min. quantizer	3	2	2
Max. quantizer	15	15	15
Input filter	Low	Low	Medium
Deblocking filter	On	On	On

To perform a basic configuration:

1. At the bottom of the Unit Information pane, click **Quick Setup**.

The Quick Setup pane appears.

	Transmitter	Receiver
Unit Name	SQA VTU	SQA VRU
Country	UNITED_KINGDOM	
Repeater Mode	Disabled	
Passkey	
Video Quality	High	

Save Cancel

2. Select the country of operation of the pair of devices.

You must assign the proper country to comply to the DFS/TPC regulations, if applicable, and to use the proper set of frequency channels.

3. If your devices are part of a repeater system, enable the repeater mode.

4. Change the wireless passkey of the devices:

- If the devices form a point-to-point system, enter the passkey common to the transmitter and receiver.
- If the devices are in repeater mode, enter two different passkeys.

5. Assign a meaningful name to the devices.

6. Perform other changes, if required.

7. Click **Save**.

If there is a functional RF communication between the devices, the Configuration Assistant sends the relevant parameters to the transmitter. Otherwise, a message appears, asking you to connect the transmitter to the COM port of the computer.

The devices reboot.

Performing an Advanced Configuration

In addition to the quick setup pane, you have access to a more elaborate set of parameters. You can use them to fine tune the configuration of your devices, for instance if you are colocalizing many systems or troubleshooting your devices with a customer service specialist. You have access to the following configuration parameters:

■ General	■ Audio	■ Video
■ Wireless	■ Serial port	

To perform an advanced configuration:

1. At the bottom of the Unit Information pane, click **Advanced Setup**.
2. Perform the necessary changes.
3. Click **Save**.

If there is a functional RF communication between the devices, the Configuration Assistant sends the relevant parameters to the transmitter. Otherwise, a message appears, asking you to connect the transmitter to the COM port of the computer.

The devices reboot.

General

The general parameter is:

General		
	Transmitter	Receiver
Unit Name	SQA VTU	SQA VRU

Wireless

The available wireless parameters are:

Wireless		
	Transmitter	Receiver
Country	UNITED_STATES	
Repeater Mode	Disabled	
Passkey	
Pair Number	1	
RF Band	public safety 4.9GHz	
Channel	Auto	
Channel Bandwidth	20MHz	
Bit Rate	Auto	
Starting Order	1	
Antenna Gain	13	13
Transmit Power Scale	Maximum	Maximum
Sensitivity Threshold	Normal	Normal

Here is additional information on some of these parameters:

- Repeater Mode—If you set the mode to Enabled, you will need to use the SConfigurator tool, instead of the Configuration Assistant, to subsequently change any wireless parameter; otherwise, the repeater will not work properly. For more information, page 40.
- Pair Number—You need to assign a unique pair number to the devices being configured when more than one pair are used with the same S3100-RP repeater.
- RF Band—If the 4.9 GHz band is selected, the Channel Bandwidth parameter is available.

- **Channel**—If your devices are operating in a DFS environment, you cannot manually select the frequency channel; in this context, the displayed value is Auto. In a non-DFS environment, you can either manually select a channel or choose the automatic channel selection.
- **Channel Bandwidth**—In the 4.9 GHz public safety band, you can change the width of the frequency channel, to be able to install more systems in the same area. Possible values are 5 MHz, 10 MHz, and 20 MHz (default). The list of available channels vary depending on the chosen bandwidth.
- **Bit Rate**—The Auto value represents the best possible value (with an RF margin of 15 dB) automatically assigned when the connection was established with the other device. It is the default value.

Once the device is operating properly, Verint strongly recommends to change the configured bit rate from Auto to the actual bit rate of the connection. This way, the wireless communication will be more stable in the presence of changing atmospheric conditions or other RF interferers. To know the actual bit rate of the connection, look in the Wireless Status window (see page 38). If the quality of the RF link degrades severely, the actual bit rate could be lower that the manually configured one.

The available bit rates vary depending on the frequency band:

Band	Channel bandwidth	Bit rates (Mbps)
2.4 GHz	N/A	6, 9, 12, 18, 24, 36, 48, and 54
4.9 GHz	5 MHz	1.5, 2.25, 3, 4.5, 6, 9, 12, and 13.5
	10 MHz	3, 4.5, 6, 9, 12, 18, 24, and 27
	20 MHz	6, 9, 12, 18, 24, 36, 48, and 54
5 GHz	N/A	6, 9, 12, 18, 24, 36, 48, and 54

- **Starting Order**—At the beginning of the boot sequence in a DFS context, the receiver device waits a specific number of seconds based on the value of this parameter. This wait period will ensure that no two receivers will start at the same time and select the same frequency channel. The starting order delay is: $(order - 1)$ multiplied by 80 seconds.

The default starting order is 1; every colocated system should have a different value for this parameter.

This parameter takes effect only when the RF channel is set to Auto.

- **Antenna Gain**—If you use an external antenna with your device, it is important to enter its gain in the Configuration Assistant. This way, the device will be able to automatically change its transmission power so that the total power (device and antenna) does not exceed the maximum value established by your country's regulations.
- **Transmit Power Scale**—The available values for the emitting power are:
 - Maximum
 - 50%—The power is reduced by 3 dB.
 - 25%—The power is reduced by 6 dB.
 - 12.5%—The power is reduced by 9 dB.
 - Minimum—The power is set at 3 dBm.

- Sensitivity Threshold—Reducing the sensitivity of the radio enables unwanted “noise” to be filtered out. A safe value is 10 dB below the current received signal level (displayed in the wireless connection status; see page 38). The default value, Normal, represents the most sensitive context. You must be careful not to reduce the sensitivity to a level where the device would not “hear” its legitimate correspondent.

Video

The video parameters are:

Video		
	Transmitter	Receiver
Standard	PAL	
Quality	High	
Resolution	All Lines	
Frame Rate	25	
Bit Rate (kbps)	3000	
Min. Quantizer	3	
Max. Quantizer	15	
Input Filter	Low	
Deblocking Filter	Enabled	

If the content of the Quality box is Low, Medium, or High, the next parameters are unavailable. To change these parameters manually, you have to select the Custom quality.

Audio

The audio parameters are:

Audio		
	Transmitter	Receiver
State	PTT/PTL (alarms disabled)	
Compression	Ulaw	
Input Type	Line-In	Line-In

Serial Port

The serial port parameters allowing communication with the target equipment (camera, monitor, and so on) are:

Serial Port		
	Transmitter	Receiver
Bit Rate	4800	4800
Parity	None	None
Line Driver	RS-422	Auto (Highly recommended)
RS-422/485 Operating Mode	RS-422 4 Wires	RS-422 4 Wires

If the line driver is forced to the RS-422 setting, you may lose access to the Configuration Assistant since most connections with computers are performed with the RS-232 protocol. To gain access to the Configuration Assistant in this context, you would have to use an RS-422 to RS-232 converter, use an RS-422 port on your computer, or perform a hardware reset (described on page 29).

Checking the Connection Statuses

The main Configuration Assistant window presents the general connection statuses of the pair of devices.

Connection Status			
		Transmitter	Receiver
Wireless	More...	-29 dBm, Excellent	
Video	More...	PAL, Video input detected	
Audio	More...	Disabled	
Serial Port	More...	4800,8,N,1	4800,8,N,1

You can get more details by clicking the corresponding More button.

Wireless

The specifics of the wireless status are:

Wireless Status		
	Transmitter	Receiver
Connection Status	Connected	
Communication Quality	Excellent	Excellent
Current Channel	60	60
Signal Level	-44 dBm	-45 dBm
Tx Bit Rate	36 Mbps	36 Mbps
Rx Bit Rate	36 Mbps	36 Mbps
RF Margin	Excellent (32 dB)	Excellent (32 dB)
Sensitivity Threshold	-80 dBm	-80 dBm

Manual Refresh Refresh Now
 Automatic Refresh every Seconds

Video

The specifics of the video status are:

Video Status	
Streaming State	Enabled
Current Frame Rate	15 fps
Current Bit Rate	791 kbps
Current Quantizer (*100)	300
Average Frame Rate	14 fps
Average Bit Rate	835 kbps
Average Quantizer (*100)	361
Total Frames	146971 frames
Total KB	868775 KB
Total I-Frame Requests	3
Total Frames Skipped	12
Video Input	Signal detected

Manual Refresh Refresh Now
 Automatic Refresh every Seconds

Audio

The specifics of the audio status are:

Audio Status		
	Transmitter	Receiver
Audio In Clipping	No	No
Audio Out Clipping	No	Yes
Audio Out Bytes Received	0	0

Manual Refresh Refresh Now
 Automatic Refresh every Seconds

Serial Port

The specifics of the serial port status are:

Serial Port Status		
	Transmitter	Receiver
Line Driver	RS-422/485	Auto
Bytes Sent	0	190049
Bytes Received	0	20684
Errors	0	0
Breaks Received	0	25
Framing Errors	0	25
Parity Errors	0	0

Manual Refresh Refresh Now
 Automatic Refresh every Seconds

Repeater Consideration

If your S1100 devices are part of a running point-to-point repeater, you must use the SConfigurator tool, instead of the Configuration Assistant, to change the wireless parameters; otherwise, the repeater will not work properly. For more information about SConfigurator, refer to its user guide.

To access the S1100 devices with SConfigurator, you need to temporarily change the IP address of your computer. The temporary address must be in the 192.168.135.255 subnet. The procedure varies depending on your operating system (Windows 2000 or Windows XP).

The recommended temporary IP settings are:

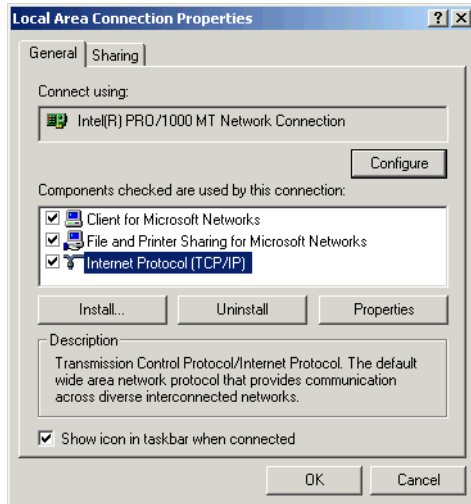
- IP address: 192.168.135.2
- Subnet mask: 255.255.0.0
- Default gateway: 192.168.135.1

To change the IP address under Windows 2000:

1. From the desktop, right-click **My Network Places**, then choose **Properties**.
The Network and Dial-up Connections window appears.
2. Double-click **Local Area Connection**.
The Local Area Connection Status window appears.

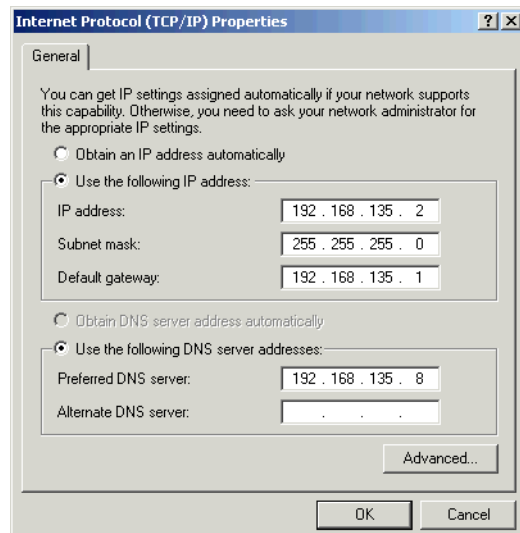
3. Click **Properties**.

The Local Area Connection Properties window appears.



4. In the component list, select **Internet Protocol (TCP/IP)**, then click **Properties**.

The Internet Protocol (TCP/IP) Properties window appears.



5. If **Use the following IP address** is selected, write down the information displayed in the box: the IP address, the subnet mask, and the default gateway.

You will need these addresses to put back your computer in its initial state once the configuration process is completed.

6. If **Obtain an IP address automatically** is selected, click **Use the following IP address**.

7. Enter the desired IP settings (temporary or initial).

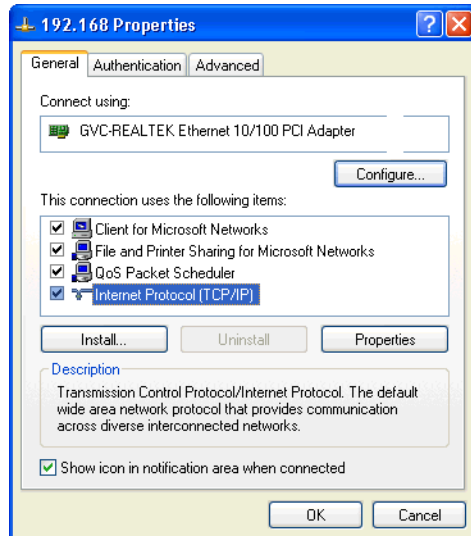
8. Click **OK** to close all windows.

4: Using the Configuration Assistant

To change the IP address under Windows XP:

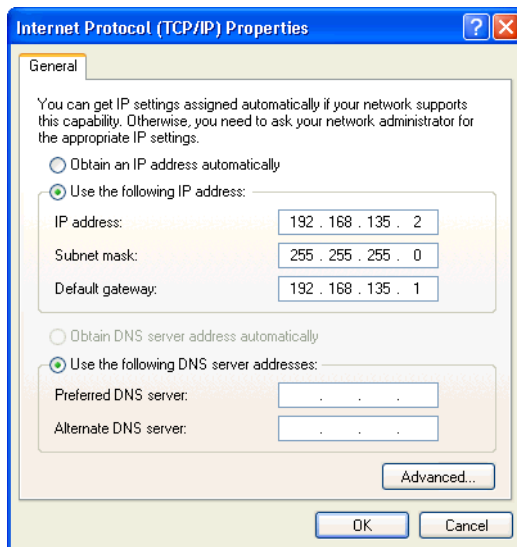
1. In the Windows Start menu, select **Control Panel**.
2. If the classic view is enabled, select **Network Selection**. In the category view, select **Network and Internet Connections**, then **Network Connections**.
3. Double-click your active LAN or Internet connection.
4. Click **Properties**.

A Properties window appears.



5. In the General tab, select the **Internet Protocol (TCP/IP)** item, then click **Properties**.

The Internet Protocol (TCP/IP) Properties window appears.



6. If **Use the following IP address** is selected, write down the information displayed in the box: the IP address, the subnet mask, and the default gateway.

You will need these addresses to put back your computer in its initial state once the configuration process is completed.

7. If **Obtain an IP address automatically** is selected, click **Use the following IP address**.
8. Enter the desired IP settings (temporary or initial).
9. Click **OK** to close all windows.

Updating the Firmware

You use the Configuration Assistant to update the firmware of your S1100 device. You can download the latest firmware file from the Verint Video Intelligence Solutions extranet (Technical Support, then Downloads, then Firmware Upgrades).

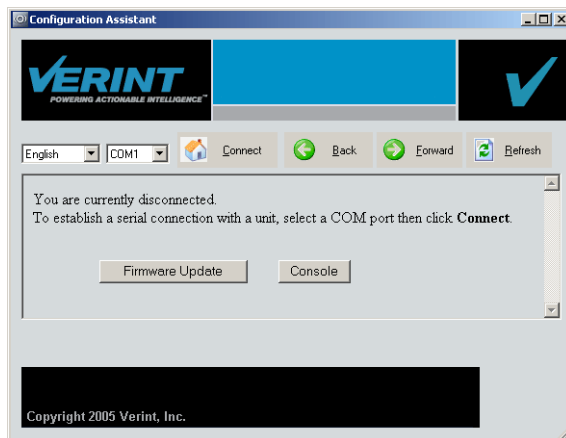
You can update the firmware of both devices making up the S1100 system in a single operation, provided the RF link is stable. You should connect the receiver (the *local* device) to the computer, then start by updating the firmware of the transmitter (the *remote* device).

The firmware files have the `.mih`, `.xh`, `.zxh`, or `.vf` extension.

To update the firmware:

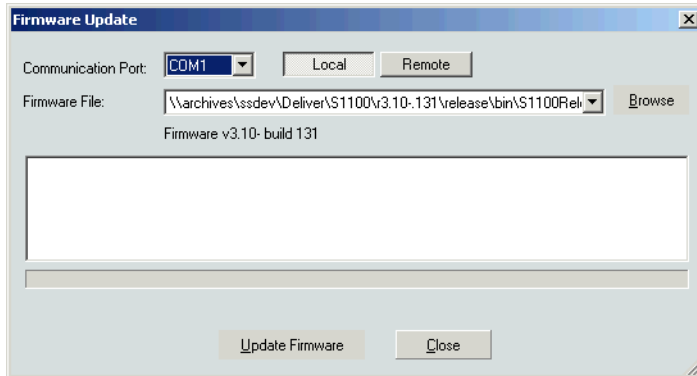
1. Ensure that the receiver device is connected to a COM port of your computer using the DB-9 end of the CAB9P serial cable.
2. Start the Configuration Assistant.

The Configuration Assistant window appears.



3. Click **Firmware Update**.

The Firmware Update window appears.



4. In the Communication Port box, select the COM port used.
5. Click **Remote**.
6. Click **Browse**, then select the desired firmware file.
7. Click **Update Firmware**.

The update process of the remote device starts. It may take several minutes to complete.

If a communication problem occurs during the remote update, you may get the following message: "Firmware update failed. ** Do not reboot the unit! ** Restart the remote firmware update as soon as possible." You have to restart the procedure immediately. If you reboot the device before proceeding with the update procedure, it will stop responding and you will have to upgrade its firmware using the serial port.

8. When the remote procedure is completed, click **Local**, then **Update Firmware**.

The update process of the local device starts. It may take several minutes to complete.

The most frequently displayed messages include:

Serial communication is ready. The Configuration Assistant has opened the communication port. The connection is ready to be used.

Serial communication is not ready. The Configuration Assistant cannot open the communication port. Check to see if you are using the correct COM port or if it is being used by another application.

Starting firmware upload. The update process has begun.

Firmware upgrade request sent. The Configuration Assistant has made a request to the S1100 device for update.

Reception timed-out. Verify that serial cable is properly connected. Check the quality of the cable assembly. If the problem persists, contact Verint Video Intelligence Solutions customer service.

Communication established. The Configuration Assistant is now communicating with the device.

Reception timed-out. Retry attempt. The established connection has been broken. A disconnected cable may be the cause.

Communication aborted. Max retries reached. The “Reception timed-out. Retry attempt” problem is unresolved after the 10th attempt, so communication is aborted. Check that the cable is not damaged and is properly installed. If the problem persists, contact Verint Video Intelligence Solutions customer service.

Firmware upload in progress. The update process is in progress.

Firmware upload done. The update process has been completed successfully.

Invalid firmware file. Select a valid file. If the problem persists, contact Verint Video Intelligence Solutions customer service to obtain a valid file.

Accessing the CLI of the Device

You may need to access the command line interface (CLI) of a device to perform troubleshooting tasks. The CLI is hierarchically organized, with menus, sub-menus, and individual options representing configuration parameters.

The S1100 device allows you to perform site surveys on your RF network. A site survey scans all frequency channels, evaluate the interference level in each channel, and allows you to choose the channel with the less interference. You can perform the following operations relative to RF site surveys:

- Specify the number of consecutive surveys to perform
- Start and stop a site survey
- Look at the last survey report
- Reset the survey database

To access the CLI, you need a serial connection between the computer and the device.

To access the CLI of a device:

1. Connect the desired device to the computer using the CAB9P serial cable.
2. Start the Configuration Assistant.
3. Under the Unit Information pane, in the main Configuration Assistant window, click **Console**.

The CLI of the device appears in the Console window.

```
*****
Main Menu
-----
Menus:
1) Serial Port
2) Access Management
3) Network
4) Wireless Communication
5) System Status
6) Advanced

Commands:
s) Save Settings
r) Reboot System
l) Load Default Configuration
q) Quit
*****
```

4: Using the Configuration Assistant

The CLI has a timeout that is triggered after three minutes of inactivity. When the timeout occurs:

- You lose access to the command line.
 - The “Thank you for using the Verint CLI” message appears at the command line.
 - The Console window becomes disabled.
 - The Disconnect button switches to Connect.
4. To reactivate the CLI after a timeout, click **Connect**.
 5. To work through the CLI menu structure, follow these guidelines:
 - To execute a command or open a menu, type in the corresponding letter or number, then press **Enter**.
 - To return to the previous menu, enter **p**.
 6. To end the CLI work session:
 - a. Save the settings by entering **s** at the main menu, then pressing **Enter**.
 - b. Exit the CLI by entering **q** at the main menu, then pressing **Enter**.Depending on the changed settings, the device may perform a soft boot.

To conduct site surveys:

1. From the main menu, choose **Advanced > Communication Status and Statistics > Wireless Status**, then press **Enter**.

```
*****
Advanced \ Communication Status and Statistics \ Wireless Status
-----
Parameters:
NIC Name           : AT5004X CH9 A,B,G 2.4-5.8 GHz
NIC MAC Address    : 00-0B-6B-57-22-A9
Current Channel    : 6 (2437 MHz)
Current TX Rate    : 54 Mb/s
Current RX Rate    : 54 Mb/s
Average Signal Level : -50 dBm
Current SCF Connection Status: Connected to 00-0B-6B-2F-F8-E5
RF Communication Quality : |>>>>>>>>>| EXCELLENT
RF Margin          : |>>>>>>>>>| EXCELLENT (22dB)
Current EIRP       : 31 dBm
Maximum EIRP allowed : 36 dBm
Indoor/Outdoor RF Regulation : Indoor/Outdoor FCCA FCC1
1) Site survey iteration : 1

Commands:
1) Display link(s) Info
s) Start/Stop Site Survey
v) Visualize Last Site Survey Report
r) Reset Site Survey data base
p) Previous Menu
*****
```

2. Perform the required operations.

Note: During the site survey execution, the RF link will be momentarily broken (duration varies depending on the number of iterations). The link is automatically restored when the survey is finished.

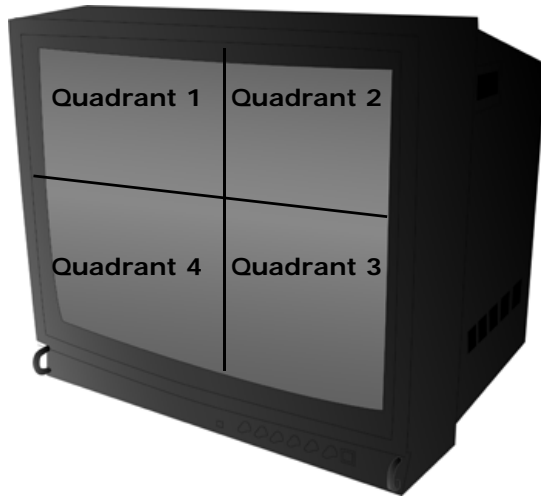
3. Enter **p** until you are in the main menu.
4. Enter **q** to exit.

5

Understanding the On-Screen Display

The S1100 receiver devices display information on a video monitor.

The on-screen display (OSD) information presented on the video monitor can be broken down into four quadrants as follows:



Quadrant 1 is unused.

In a working environment (that is, when a transmitter is sending video data to a receiver), if a camera suddenly gets disconnected from a transmitter, quadrants 1 and 4 turn to red and quadrants 2 and 3 become blue/black.

Quadrant 2: Nextiva Logo

In quadrant 2, when the device is powering up, the Nextiva logo will be displayed for 30 seconds.

Quadrant 3: Receiver Settings

Quadrant 3 displays basic configuration details of the receiver, including firmware version, serial port, and RF data. This information is displayed for 30 seconds every time the connection is established with the transmitter. For example:

```
VRU Local Unit
S1100
Ver: 4.00- build 251
Comm: 4800, 8, N, 1 422f-d
RF Status: Connected
RF Channel: Auto
RF Bit Rate: 6 Mbps
Pair Number: N/A
Country: UNITED_KINGDOM
```

Here is the description of the Comm line:

Serial port	Description
4800	Bit rate
8	Number of data bits
N	Parity: None
1	Number of stop bits
422f-d	Line driver

Quadrant 4: Transmitter Settings

Quadrant 4 displays basic S1100-T configuration details, including firmware version, serial port, and RF data. This information is displayed for 30 seconds every time the connection is established with the receiver. For example:

```
VTU Remote Unit
S1100
Ver: 4.00- build 251
Comm: 4800, 8, N, 1 422f-d
RF Channel: Auto
RF Bit Rate: 6 Mbps
Country: UNITED_KINGDOM
```


A

Factory Default Configuration

A: Factory Default Configuration

The S1100 is programmed at the factory with the following configuration:

Type	Configuration
Serial port	<ul style="list-style-type: none"> ■ Bit rate: 4800 bauds ■ Data bits: 8 ■ Parity: none ■ Stop bit: 1 ■ Line driver: auto-detected ■ RS-422/485 operating mode: RS-422 4 Wires
Video settings (North America)	<ul style="list-style-type: none"> ■ Standard: NTSC ■ Quality: high ■ Resolution: All lines (352 x 480) ■ Target frame rate: 30 fps ■ Target bit rate: 3000 kbps ■ Minimum quantizer: 3 ■ Maximum quantizer: 24 ■ Input filter: low ■ Deblocking filter: on
Video settings (Europe)	<ul style="list-style-type: none"> ■ Standard: PAL ■ Quality: high ■ Resolution: All lines (352 x 576) ■ Target frame rate: 25 fps ■ Target bit rate: 3000 kbps ■ Minimum quantizer: 3 ■ Maximum quantizer: 24 ■ Input filter: low ■ Deblocking filter: on
Wireless Communication (North America)	<ul style="list-style-type: none"> ■ Wireless passkey: ABCDEFGHIJKLMNOP ■ Frequency band: 802.11a (5 GHz OFDM) ■ Channel: Auto ■ Tx bit rate: Auto ■ Antenna gain: 13 dBi ■ Country: USA ■ Tx power scale: Maximum
Wireless Communication (Europe)	<ul style="list-style-type: none"> ■ Wireless passkey: ABCDEFGHIJKLMNOP ■ Frequency band: 802.11a (5 GHz OFDM) ■ Channel: Auto ■ Tx bit rate: Auto ■ Antenna gain: 13 dBi ■ Country: United Kingdom ■ Tx power scale: 50% (-3 dB)

B

Cable Connections

The wireless devices use the following two cables:

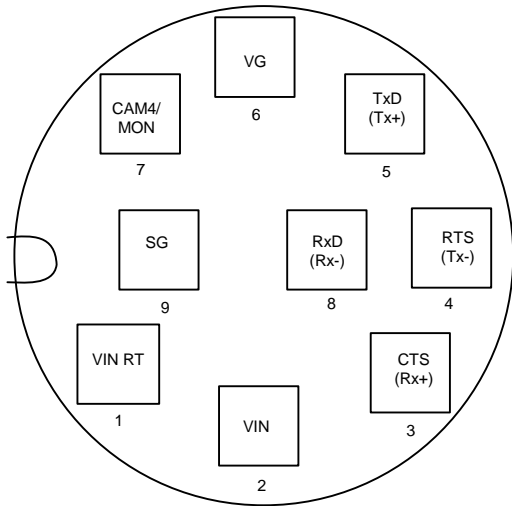
- CAB9P—Power, video, and serial data communication
- CAB8P—Audio and alarms

Note: To determine the Rx and Tx pins of your equipment, see Appendix C on page 57.

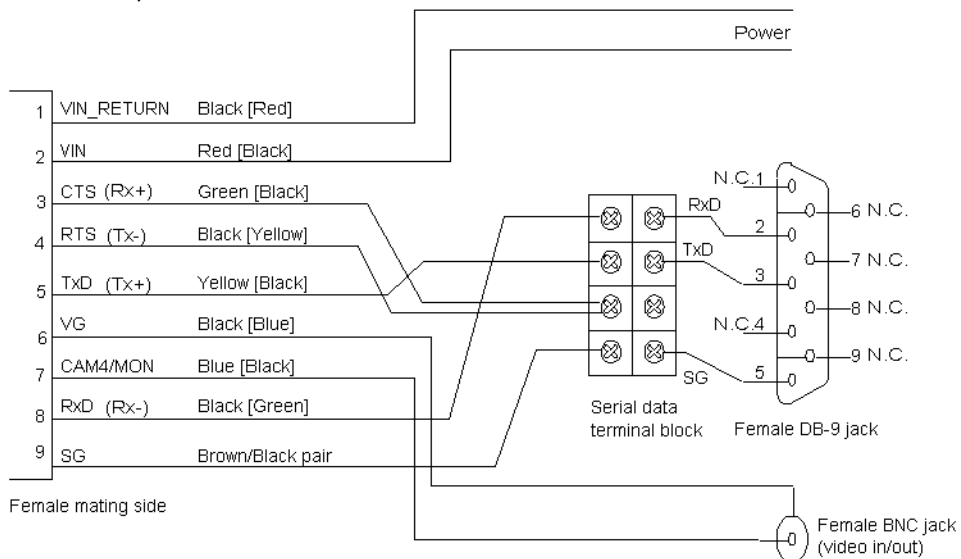
CAB9P

The CAB9P cable supplied with the wireless devices is used for power, video, and serial communication (that is, PTZ data with the RS-422/485 protocol, or RS-232 communication with the DB-9 connector).

The mating side view of the cable is, using the RS-232 signal terminology:



Here is the pinout of the CAB9P cable:



where:

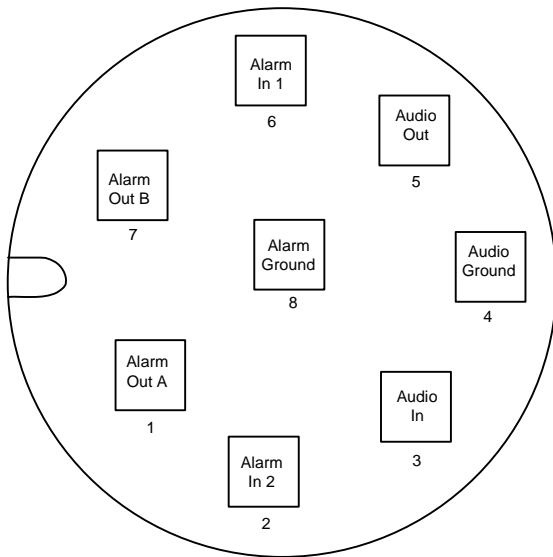
- The RS-422/485 signal terminology is enclosed in parentheses.
- The other wire of each twisted pair is enclosed in square brackets.
- N.C. means *not connected*.

Based on the pinout, the wiring scheme for an RS-232 connection to a computer is:

Cable	Wire pair	Wire color	Computer
Signal name			Signal name
CTS	green/black	green	not connected
RxD		black	RxD
TxD	yellow/black	yellow	TxD
RTS		black	not connected
SG	brown/black	brown	SG
SG		black	SG

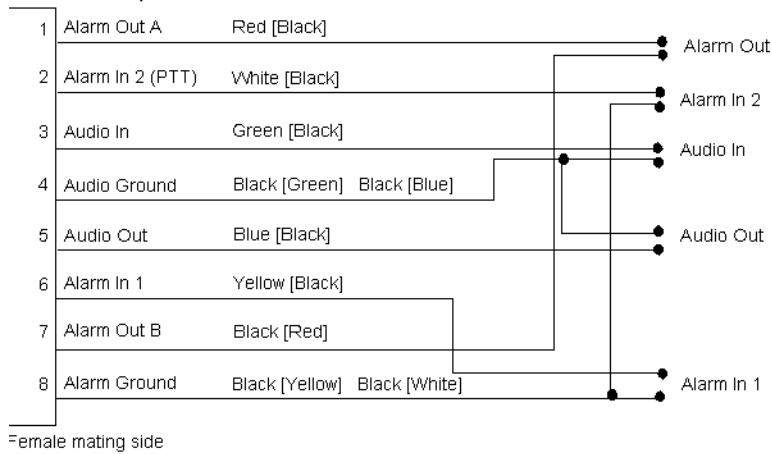
CAB8P

The CAB8P cable is used for audio and alarms. The mating side view of the cable is:



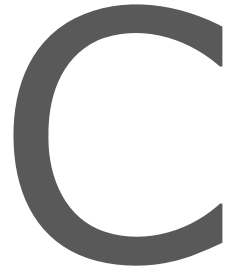
B: Cable Connections

Here is its pinout:



where:

- The other wire of the twisted pair is enclosed in square brackets.



DTE and DCE Connections

Before connecting a Nextiva edge device to other RS-232 serial equipment, you need to determine if they are DTE (data terminal equipment) or DCE (data communication equipment).

Here are examples of both equipment types:

- DCE—Nextiva edge devices, modems
- DTE—Computers, switches, multiplexers, cameras, keyboards

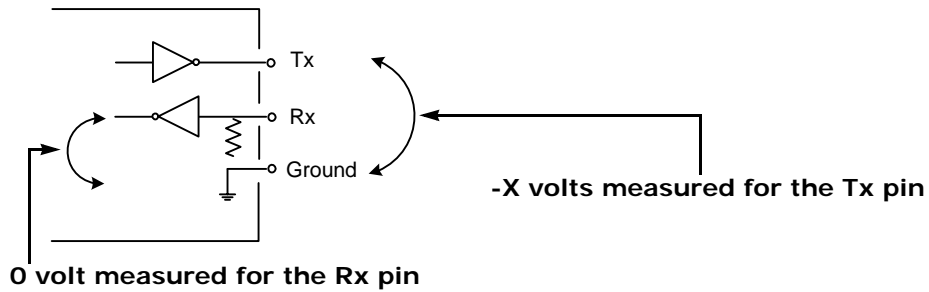
In the following descriptions:

- Voltage is measured when no data is transferred on the Rx and Tx pins.
- *-X volts* represents a negative voltage value.

Data Terminal Equipment

DTE modules have the following electrical-level setup:

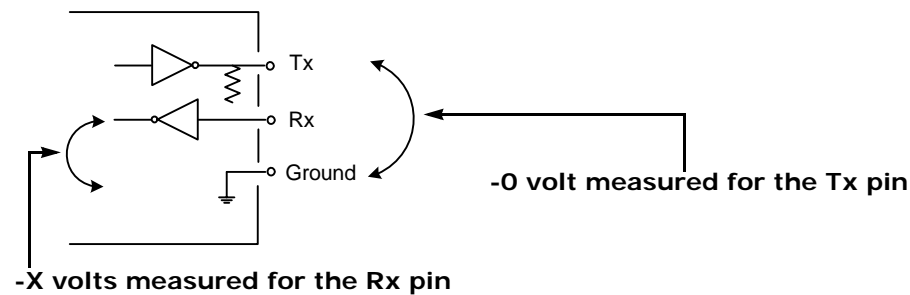
Pin number on the DB9 connector	Signal	Measured voltage
3	Tx	-X volts
2	Rx	0 volt



Data Communication Equipment

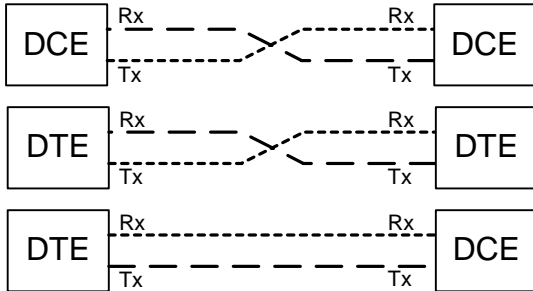
DCE modules have the following electrical-level setup:

Pin number on the DB9 connector	Signal	Measured voltage
3	Tx	0 volt
2	Rx	-X volts



Connecting DTE and DCE

When connecting two modules of the same type, you have to cross the data wires to create proper communication. On the other hand, when connecting a DTE with a DCE, a straight cable is required.





Surge Protection

Voltage and current surges can be induced by lightning strikes or power line transients. In the real world, under the right circumstances, these surges can reach sufficiently high levels to damage almost any electronic equipment. Therefore you need to add protection to your devices.

D: Surge Protection

The S1100 provides basic surge protection on all electrical lines for both the transmitter and receiver devices. If you are installing the equipment in a lightning prone or heavy lightning environment, or in a site where large AC mains power fluctuations are a common occurrence, Verint strongly recommends that you add additional external surge protection to all vulnerable connections. Vulnerable connections are those that run for a long distance between the S1100 device and the connected equipment.

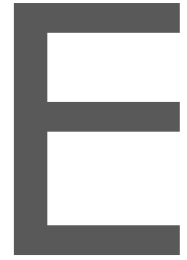
The video camera is usually within a short distance of the S1100 transmitter; the S1100 interface cable can be routed directly into the camera housing. Therefore, the video line (and the serial port if using a PTZ camera) will seldom need additional protection. The power feed usually runs down the mounting mast or wall for more than 20 feet (7.6 meters); it is a good candidate for additional protection in a surge prone environment. This protection will benefit both the camera and the device.

The monitoring and control station is usually far away from the S1100 receiver. In a surge prone environment, the video output and serial port connections of the device are the most vulnerable to large AC mains variations. Whether you add external protection or not, always ensure that you ground reference the serial port connection of the device by plugging its brown/black wires to the serial port ground of the target equipment in the control room. Failure to do so severely reduces the performance of the internal protection circuits of the device.

Excellent international sources for external surge protection equipment and general surge and lightning protection information are:

- Polyphaser Corporation—www.polyphaser.com
- Citel inc.—www.citelprotection.com
- Transtector—www.transtector.com

For the curious mind, a surge protector helps to clamp the surge to safe levels and divert its energy to the earthing point, preventing device damage. Experienced installers know that an effective surge protection must be installed with proper earthing and grounding.



RF Contact between Masters

If the country of operation of your devices requires DFS compliance, you must ensure that the master devices (S3100 and S1100-R) in colocated cells “see” one another in their permanent location. Such a contact means that RF communication can be performed between each pair of masters, therefore preventing them to choose the same frequency channel.

Apply the following procedure to ensure that *MasterA* sees *MasterB*. You will have to access the command line interface (CLI) of at least one master. For more information about the CLI, refer to Chapter 4 in the *Nextiva S3100 Series User Guide* or to Chapter 4 in the *Nextiva S1100 User Guide*.

To ensure that two master devices see each other:

1. Take down the device name of MasterB.

This name is displayed in the SConfigurator Units tab, in the Unit Information pane of the Configuration Assistant, or in the Advanced > VSIP menu of the CLI.

2. Shut down MasterB, then power it up.

3. Wait until MasterB has selected a frequency channel. To ensure that a channel is selected:

- If MasterB is an S3100, go in the **Advanced > Communication Status and Statistics > Wireless Status** menu of the CLI. Wait until the value of Current SCF Connection Status is **Connected to X Clients and Y Slaves**.

```
*****
Advanced \ Communication Status and Statistics \ Wireless Status
-----
Parameters:
NIC Name           : AT5001 WIS CM6 A,B,G 2.4-5.8 GHz
NIC MAC Address    : 00-0B-6B-30-FA-42
Current Channel    : 56 (5280 MHz)
Current TX Rate    : 36 Mb/s
Current RX Rate    : 36 Mb/s
Average Signal Level : -53 dBm
Current SCF Connection Status: Connected to 1 Client and 0 Slave

RF Communication Quality : N/A
RF Margin                 : N/A
Current EIRP              : 17 dBm
Maximum EIRP allowed     : 30 dBm
Indoor/Outdoor RF Regulation : Indoor/Outdoor FCCA FCC1

Commands:
1) Display link(s) Info
v) Visualize Last Site Survey Report
w) Initiate One-Time Site Survey
p) Previous Menu
*****
```

- If MasterB is an S1100, go in the **Wireless Status** window of the Configuration Assistant. Wait until the connection status is **Not Connected** or **Connected**; these statuses occur after **Radar Detection**.

Wireless Status	
	Transmitter Receiver
Connection Status	Connected

- If you do not have access to the connection status of MasterB, wait for the following time period: (starting order of MasterB - 1) multiplied by 80 seconds.
4. Perform a site survey in MasterA:
 - a. Open the CLI of the device.
 - a. Go in the **Advanced > Communication Status and Statistics > Wireless Status** menu.
 - b. Execute the **Initiate One-Time Site Survey** command.

- c. To see the progress of the operation, press **Enter** every second.

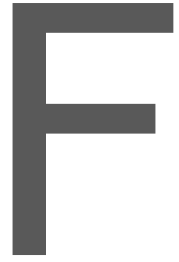
The site survey is completed when the value of Current SCF Connection Status returns to **Connected to X Clients and Y Slaves**, after having gone to **Site survey (100% completed)**.

- d. Execute the **Visualize Last Site Survey Report** command.
- e. Check that the MasterB name is listed as the Unit Name of one of the channels. You may need to scroll up the CLI window to see the beginning of the survey data.

For example, in the following site survey, MasterB has a visual connection with the MasterA device. If the MasterB name is not displayed in the site survey, it means that the two masters cannot see each other.

Last Site Survey Report, 4372 seconds old

```
Channel(1) Cost: 41
Age  Interf.  Source MAC      Master MAC/      Rx  Unit Name/
(s)  Type      Source MAC      802.11 BSSID     (dBm) 802.11 SSID
-----
  11 SPCF MSTR 00-0B-6B-30-2A-46 00-0B-6B-30-2A-46 -54  MasterB
```

Separation Between Devices Using Adjacent Channels

Wireless interference can occur between wireless cells using adjacent frequency channels (for example, channels 149 and 153 in the 5 GHz band). Therefore, it is preferable to avoid using adjacent channels. However, if your setup requires you to, you must follow specific guidelines regarding minimum distances between antennas and signal level margin.

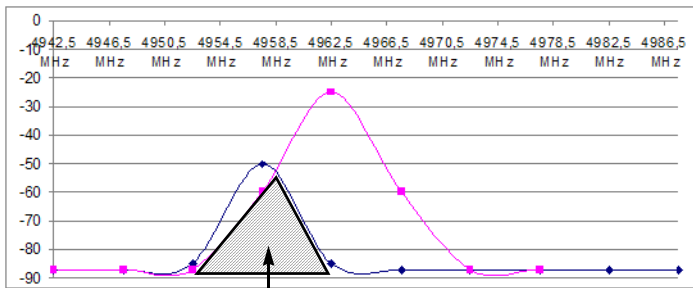
Note: In the 2.4 GHz band, the adjacent channel term applies only to the three independent channels (1, 6, and 11).

If using adjacent frequency channels in a non-DFS environment, you should respect guidelines relative to the minimum separation between device antennas, to avoid interference.

To reduce radio interference possibilities between two adjacent channels, you should ensure that the maximum margin between the emission of the two wireless cells is 25 dB. To meet this objective, perform a site survey and apply minimum distance guidelines.

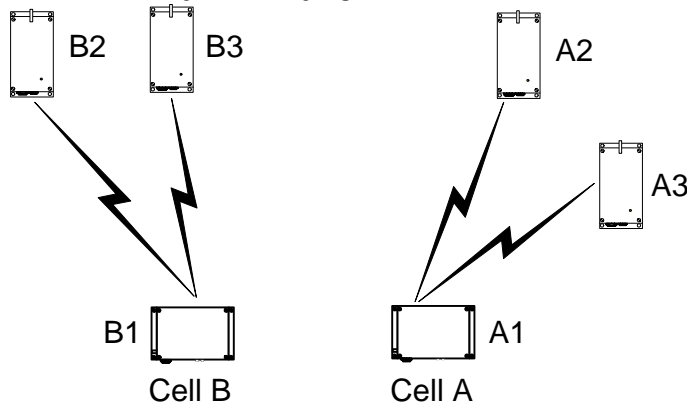
Performing a Site Survey

The difference in signal level between two adjacent cells must be less than or equal to 25 dB. If this margin is higher than 25 dB, there will be too much interference in the two adjacent wireless cells. To calculate this margin, you need to perform a site survey; for more information, see page 45. Here is an example of a 25 dB margin between channels 8 and 9 in the 4.9 GHz band:



Interference between the two channels

Consider the following setup in the 4.9 GHz band with 5-MHz bandwidth, where Cell B uses channel 6 and you are trying to add Cell A on channel 3 (adjacent to channel 6):



To determine if this setup is feasible, you need to conduct a site survey on device A1 (the master device in Cell A), then calculate the margin between the two cells. During the site survey, device A1 will find the other five devices. With the provided signal levels, you need to check if $S_2 - S_1 \leq 25$ dB, where:

- S_1 is the lowest signal level in the wireless cell of the device performing the site survey (A1 in the example).
- S_2 is the highest signal level in the adjacent cell (Cell B in the example).

To calculate the emission margin between two adjacent wireless cells:

1. Open SConfigurator, then go to the **Units** tab.
2. Select the master device in the wireless cell you are adding, then click **Telnet**.
3. From the main menu of the command line interface (CLI), choose **Advanced > Communication Status and Statistics > Wireless Status**, then press **Enter**.

```
*****
Advanced \ Communication Status and Statistics \ Wireless Status
-----
Parameters:
  NIC Name           : AT5006X DCMA-82 A,B,G 2.4,4.9,5.x GHz
  NIC MAC Address    : 00-0B-6B-2F-F8-E5
  Current Channel    : 7 (4950 MHz) 20 MHz channel bandwidth
  Current TX Rate    : 6 Mb/s
  Current RX Rate    : 6 Mb/s
  Average Signal Level : -65 dBm
  Current SCF Connection Status: Connected to 1 Client and 1 Slave

  RF Communication Quality : N/A
  RF Margin                : N/A
  Current EIRP             : 34 dBm
  Maximum EIRP allowed    : 42 dBm
  Indoor/Outdoor RF Regulation : Indoor/Outdoor FCCA FCC1
  1) Site survey iteration : 1

Commands:
1) Display link(s) Info
s) Start/Stop Site Survey
v) Visualize Last Site Survey Report
r) Reset Site Survey data base
p) Previous Menu
*****
```

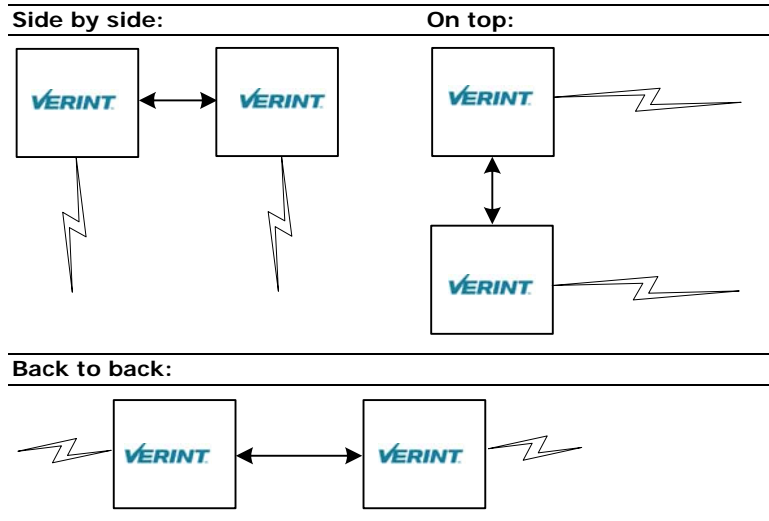
4. For a thorough scan, specify 60 site survey iterations.
5. Start the site survey operation.

Note: During the execution, the RF link will be momentarily broken (duration varies depending on the number of iterations). The link is automatically restored when the survey is finished.

Minimum Distances

To respect the 25 dB margin between two adjacent channels, in addition to performing a site survey, you can use guidelines relative to minimum distances between the wireless devices. By respecting them, you can assume that there will not be radio interference between the devices.

Three physical setups are covered:



The minimum separation between devices using adjacent channels is:

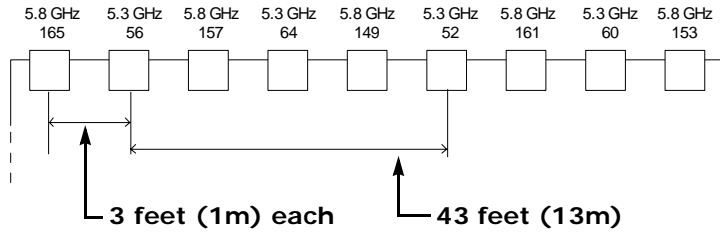
Setup	5 GHz (13-dBi antenna with 40° beam width)	4.9 GHz (13-dBi antenna with 40° beam width)	2.4 GHz (8.5-dBi antenna with 60° beam width)
Side by side	43 feet (13m)	36.1 feet (11m)	55.8 feet (17m)
On top	13 feet (4m)	6.6 feet (2m)	6.2 feet (1.9m)
Back to back	7.8 feet (2.4m)	13.1 feet (4m)	15.7 feet (4.8m)

If you are using other antennas with narrower beam widths, the distances may be reduced. For assistance, contact the Verint Video Intelligence Solutions Support group.

F: Separation Between Devices Using Adjacent Channels

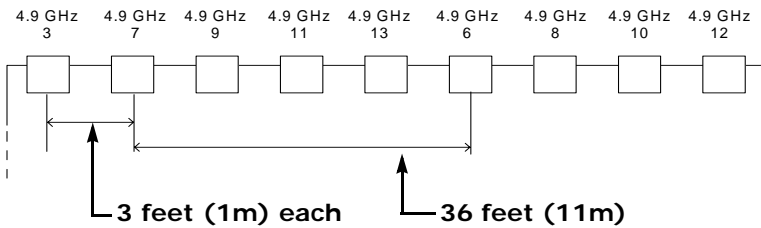
The following deployment scenarios respect these limitations:

- Using only 5 GHz channels, all on the same side of a building:



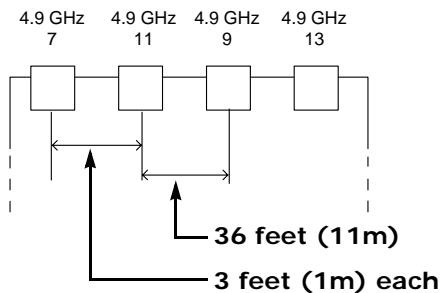
Notice that the devices using the adjacent channels 52 and 56 are separated by the prescribed 43 feet (13m). However, you can intersperse other devices in-between, as long as they do not use adjacent channels. This way, you can increase the device density without encountering interference problems.

- In the 4.9 GHz band, using only 5 MHz channels, all on the same side of a building:



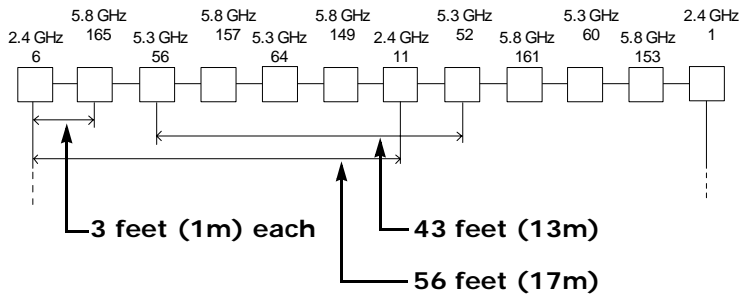
Notice that the devices using the adjacent channels 7 and 6 are separated by the prescribed 36 feet (11m). However, you can intersperse other devices in-between, as long as they do not use adjacent channels. This way, you can increase the device density without encountering interference problems.

- In the 4.9 GHz band, using only 10 MHz channels, all on the same side of a building:



Since only four channels are available, it is unavoidable that two adjacent channels are positioned next to each other.

- Using 5 GHz and 2.4 GHz channels, all on the same side of a building:



The devices using the adjacent channels 6 and 11 in the 2.4 GHz are separated by the prescribed 56 feet (17m).



DFS and False Radar Detection

Nextiva wireless devices operating in the European Union must adhere to the Dynamic Frequency Selection (DFS) standard; this standard forces any RF transmitter to change frequency channels if radar activity is detected on the current operating channel. If two colocated wireless cells are communicating on adjacent channels, it is possible that the interference between the two systems causes false radar detections. This side-effect is a well-known industry-wide problem. New features in the wireless devices help minimize the occurrence of false detection events.

To avoid false radar detection caused by an adjacent channel, the signal level of an potential interfering device on the first adjacent channel must not exceed -50 dB, -36 dB on the second channel, and -32 dB on the third channel; for example, if you use channel 100, 104 is the first adjacent channel, 108 the second channel, and 112 is the third channel.

The design of wireless systems in a DFS context becomes difficult because not only can the master devices cause an interference, but the clients and slaves on an adjacent channel can also generate interferences that can cause false radar detection. There should be a reduced number of cells available to limit the amount of possible false radar detections; it is strongly suggested to limit the number of colocated cells to six.

The new features that help reduce the possibility of false detection events are:

■ **Half Channel Selection**

This new parameter of the command line interface (CLI) eliminates the possibility of using adjacent channels. Enable this feature on all masters (S3100, S1100-R) in a new installation to avoid the potential conflict of having two masters on adjacent channels. By default this feature is disabled.

If this option is enabled, the channel list becomes:

100(DFS), 108(DFS), 116(DFS), 124(DFS), 132(DFS), 140(DFS), 254(Auto DFS/TPC)

The full channel list is:

100(DFS), 104(DFS), 108(DFS), 112(DFS), 116(DFS), 120(DFS), 124(DFS), 128(DFS), 132(DFS), 136(DFS), 140(DFS), 254(Auto DFS/TPC)

In the CLI: Wireless Communication > Advanced Wireless Setup > DFS/TPC Adjacent Channel Removal

■ **Slave Radar Detection Management**

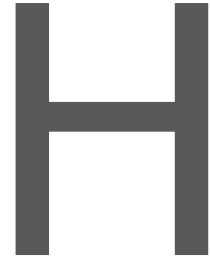
A new CLI parameter allows you to disable radar detection on slave or client devices, therefore reducing the number of nodes that can detect radars. In a typical DFS environment, the slave or client can detect a radar and alert its master to change the frequency channel. This situation can cause a major problem because it increases the number of nodes that can detect radars.

The default value is Disabled, meaning that the slave/client does not detect radars; in this case, the slave/client EIRP is reduced from 30 to 23 dBm.

In the CLI: Wireless Communication > Advanced Wireless Setup > Enable Radar Detection on Slave

■ **Manual Channel Selection**

You can now select the initial frequency channel that will be used by the master, with SConfigurator or the CLI. This new feature does not disable radar detection on master devices. This process will still take place and if a radar is detected, the device will go through the regular DFS process (stop transmission on the channel, block this channel for 30 minutes, and select a new channel in the available channel list).



S1100 Technical Specifications

Here are the S1100 technical specifications:

Network	RF interface	SDCF
	Modulation	OFDM
	Encryption	128-bit AES
	Data rate (max. burst rate)	6, 9, 12, 18, 24, 36, 48, and 54 Mbps
	Security	SSL-based authentication
Video	Compression	MPEG-4-based
	Frame rate	NTSC: 1–30 fps programmable (60 fields per second) PAL: 1–25 fps programmable (50 fields per second)
	Input	1 composite, 1 Vpp into 75 ohms (NTSC/PAL)
	Output	1 composite, 1 Vpp into 75 ohms (NTSC/PAL)
Serial Port	Operating mode	Transparent: supports any asynchronous PTZ serial protocol
	Electrical level	Auto-sensing RS-232 or RS-422/485
Alarm and Audio	Alarm input	2 dry contact inputs (1 mA max.)
	Alarm output	1 relay contact output (up to 48V at 100 mA)
	Bidirectional audio	Input: -20 to -3 dBV into 30 kohm Output: -45 to -3 dBV into 8 ohms min.
Power	Input voltage	24V AC +/- 10% 12V DC +/- 10% (optional)
	Consumption	28 VA at 24V AC 12W (970 mA at 12V DC)
Physical	Enclosure	NEMA 4X/IP 66 powder coat painted die-cast aluminum with wall mounting brackets
	Size	9.0L x 3.9W x 3.8H inches (230L x 100W x 96H mm)
	Weight	3.6 lb (1.65 kg)
	Environment	-22°F to 122°F (-30°C to 50°C)
	Humidity	100% at 122°F (50°C)
Certification/ Regulation	USA	FCC part 15 (subparts B and E)
	Canada	Industry Canada RSS-210, RSS-139, and ICES-003
	Europe	CE marked EN 300 328-2 V1.2.1 (2001-12) EN 301 893 V1.2.3 (2003-08) EN 301 489-01 V1.4.1 (2002-08) EN 301 489-17 V1.2.1 (2002-08) EN 60950:2000 Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 (RoHS)

Glossary

This glossary is common to the Nextiva line of edge device products.

Access Point A communication hub for connecting wireless edge devices (S1100w) to a wired LAN. The Nextiva access point is the S3100 product.

AES (Advanced Encryption Standard) An encryption standard used in the WPA2 authentication method.

APIPA (Automatic Private IP Addressing) A feature of Windows-based operating systems that enables a device to automatically assign itself an IP address when there is no Dynamic Host Configuration Protocol (DHCP) server available to perform that function. Also known as *AutoIP*.

Bridge See *Wireless Bridge*.

Camera, IP See *S2500e, S2600e Series, or S2700e Series*.

CCTV (cLosed Circuit Television) A television system in which signals are not publicly distributed; cameras are connected to television monitors in a limited area such as a store, an office building, or on a college campus. CCTV is commonly used in surveillance systems.

CIF (Common Intermediate Format) A video format that easily supports both NTSC and PAL signals. Many CIF flavors are available, including CIF, QCIF, 2CIF, and 4CIF. Each flavor corresponds to a specific number of lines and columns per video frame.

CLI (command line interface) A textual user interface in which the user responds to a prompt by typing a command.

Codec (Coder/Decoder) A device that encodes or decodes a signal.

Configuration Assistant A proprietary graphical program used to configure and update the firmware of the S1100 edge devices.

DCE (Data Communication Equipment) In an RS-232 communication channel, a device that connects to the RS-232 interface. Nextiva edge devices and modems are DCE.

Decoder See *Receiver*.

DHCP (Dynamic Host Configuration Protocol) A communication protocol that lets network administrators manage centrally and automate the assignment of Internet Protocol (IP) addresses in a network.

DTE (Data Terminal Equipment) In an RS-232 communication channel, the device to which the RS-232 interface connects. Computers, switches, multiplexers, cameras, and keyboards are DTE.

DVR (Digital Video Recorder) A device (usually a computer) that acts like a VCR in that it has the ability to record and play back video images. The DVR takes the feed from a camera and records it into a digital format on a storage device which is most commonly the hard drive.

Edge Device A Nextiva device transmitting or receiving video signals through an IP network. The devices can be wireless or wired; some transmitters are IP cameras.

Encoder See *Transmitter*.

Ethernet A local area network (LAN) architecture using a bus or star topology and supporting data transfer rates of 10, 100, and 1000 Mbps. It is one of the most widely implemented LAN standards. The 802.11 protocols are often referred to as "wireless Ethernet."

Firmware Software stored in read-only memory (ROM) or programmable ROM (PROM), therefore becoming a permanent part of a computing device.

IP (Internet Protocol) The network layer for the TCP/IP protocol suite widely used on Ethernet networks.

IP Camera See *S2500e*, *S2600e Series*, or *S2700e Series*.

LAN (Local Area Network) A computer network that spans a relatively small area. A LAN can connect workstations, personal computers, and surveillance equipment (like edge devices). See also *WAN*.

MPEG-4 A graphics and video lossy compression algorithm standard that is derived from MPEG-1, MPEG-2, and H.263. MPEG-4 extends these earlier algorithms with synthesis of speech and video, fractal compression, computer visualization, and artificial intelligence-based image processing techniques.

Multicast Communication between a sender and multiple receivers on a network; the devices can be located across multiple subnets, but not through the Internet. Multicast is a set of protocols using UDP/IP for transport.

Multiport S17XXe Series The series of wired video transmitters designed for a variety of video monitoring and surveillance applications in which a high concentration of cameras terminates within the same area. The transmitters in the series offer 4, 8, 12, or 24 video inputs. Some models offer onboard video analytics capabilities.

nDVR A video management and storage software sold by Verint. This graphical product is used in conjunction with wired and wireless edge devices.

Nextiva The powerful, enterprise-class video management platform and suite of applications from Verint that helps enhance security and improve performance. Nextiva simplifies the management of large scale, distributed video operations and promotes efficient use of network resources.

NTSC (National Television Standards Committee) The North American standard (525-line interlaced raster-scanned video) for the generation, transmission, and reception of television signals. In addition to North America, the NTSC standard is used in Central America, a number of South American countries, and some Asian countries, including Japan. Compare with *PAL*.

NTP (Network Time Protocol) A protocol designed to synchronize the clocks of devices over a network.

OSD (On-screen Display) Status information displayed on the video monitor connected to a receiver edge device.

PAL (Phase Alternation by Line) A television signal standard (625 lines) used in the United Kingdom, much of western Europe, several South American countries, some Middle East and Asian countries, several African countries, Australia, New Zealand, and other Pacific island countries. Compare with *NTSC*.

PEAP (Protected Extensible Authentication Protocol)—A method to securely transmit authentication information, including passwords, over a wireless network.

PSK (Pre-Shared Key) A mode of the WPA and WPA2 security protocols, designed for home and small office networks that cannot afford the cost and complexity of an authentication server. It is also known as *personal mode*.

PTL (Push-To-Listen) In a two-way system, the communication mode in which the listener must push a button while listening.

PTT (push-To-Talk) In a two-way system, the communication mode in which the talker must push a button while talking.

PTZ Camera (Pan-Tilt-Zoom) An electronic camera that can be rotated left, right, up, or down as well as zoomed in to get a magnified view of an object or area. A PTZ camera monitors a larger area than a fixed camera.

QoS (Quality of Service) A set of low-level networking protocols giving higher priority to more important data flows while ensuring that the less important ones do not fail.

Receiver A device converting a digital video signal into an analog form. Also called *decoder*.

Repeater A range extender for wireless links. The Nextiva repeater is the S3100-RP product, made up of two devices.

RF (Radio Frequency) Any frequency within the electromagnetic spectrum associated with radio wave propagation. When a modulated signal is supplied to an antenna, an electromagnetic field is created that is able to propagate through space. Many wireless technologies are based on RF field propagation.

RS-232 A standard interface approved by the Electronic Industries Alliance (EIA) for connecting serial devices.

RS-422 A standard interface approved by the Electronic Industries Alliance (EIA) for connecting serial devices, designed to replace the older RS-232 standard because it supports higher data rates and greater immunity to electrical interference.

RS-485 An Electronics Industry Alliance (EIA) standard for multipoint communications.

S1100 The series of secure outdoor wireless video systems (one receiver and one transmitter per system) covering the 2.4 and 5 GHz bands in North America and Europe, and the public safety 4.9 GHz band in North America.

S1100w The outdoor wireless video transmitter covering the 2.4 and 5 GHz bands in North America and Europe, and the public safety 4.9 GHz band in North America.

S1500e Series The series of wired edge devices (receivers and transmitters) designed for video monitoring and surveillance over IP networks. The transmitters in the series offer from one to eight video inputs; the series proposes two receivers with one and four video outputs.

S1700e Series The series of wired video transmitters designed for video monitoring and surveillance over IP networks, offering DVD-quality video and power over Ethernet. The transmitter in the series offers one video input and web access.

S17XXe Series (Multiport) The series of wired video transmitters designed for a variety of video monitoring and surveillance applications in which a high concentration of cameras terminates within the same area. The transmitters in the series offer 4, 8, 12, or 24 video inputs. Some models offer onboard video analytics capabilities.

S1900e Series The highly compact, single-input video transmitter designed for video monitoring and surveillance over IP networks, offering various video qualities and functionality sets, as well as web access for configuration and live viewing. The series includes one receiver, the S1970e-R (displaying up to four video streams), and three transmitters, the S1900e-AS (with onboard analytics capabilities), the S1950e (a cost optimized solution), and the S1970e (for better video performance).

S1900e-Vicon The board holding the S1900e compact IP technology, to be included into Vicon SurveyorVFT dome cameras.

S2500e The MPEG-4-compliant professional IP camera integrating a video sensor and an Ethernet encoder in the same compact enclosure.

S2600e Series The set of professional IP cameras with a super wide range for excellent quality in high-contrast environments. These MPEG-4-compliant cameras integrate a video sensor and an Ethernet encoder in the same compact enclosure. The series includes color, day/night, and analytics-ready cameras. All models provide web access for configuration and live viewing.

S2700e Series The set of high-resolution, IP mini-dome cameras with triple axis lens rotation for flexible installation, and low lux sensitivity for crisp clear images in a variety of lighting conditions. The S2700e cameras offer DVD-quality video and web access for configuration and live viewing. The models are separate for NTSC and PAL; for each video standard, there are two models: indoor and vandal-resistant.

S3100 Series The set of multipurpose outdoor, wireless, digital video products. The series includes the S3100 (for access point systems), S3100-BR (for wireless bridge applications), and S3100-RP (for point-to-point, point-to-multipoint, and wireless bridge repeaters). The S3100 series covers the 2.4 and 5 GHz bands in North America and Europe, and the public safety 4.9 GHz band in North America

SConfigurator A proprietary graphical program used to configure and update the firmware of edge devices.

Serial Port An interface that can be used for serial communication, in which only one bit is transmitted at a time. A serial port is a general-purpose interface that can be used for almost any type of device.

SSL (Secure Sockets Layer) A commonly used protocol for transmitting private documents via the Internet. SSL works by using a public key to encrypt data that is transferred over the SSL connection. The SSL protocol secures the following data: I/O, serial port, and VSIP communication; it does not apply to audio and video transmission.

TKIP (Temporal Key Integrity Protocol)—A security protocol used in the WPA authentication method.

TLS (Transport Layer Security)—A cryptographic protocol that provide secure communications on a wireless network.

Transceiver (Transmitter/Receiver) A device that both transmits and receives analog or digital signals.

Transmitter A device sending video signals captured with a connected camera to a receiver. The transmitter converts the analog signal into a digital form before transmitting it. Also called *encoder*.

TTLS (Tunneled Transport Layer Security)—A cryptographic protocol that creates a secure TLS tunnel.

VSIP (Video Services over IP) A proprietary communication protocol for sending messages between a computer and a Nextiva edge device, or between two devices.

WAN (Wide Area Network) A computer network that spans a relatively large geographical area. Typically, a WAN consists of two or more local area networks (LANs).

WEP (Wired Equivalent Privacy) A security protocol for wireless local area networks (WLANs) defined in the 802.11b standard. It is designed to afford wireless networks the same level of protection as a comparable wired network.

Wireless Bridge A link between two networks, wired or wireless. The Nextiva wireless bridge is the S3100-BR product, made up of two devices.

Wireless Cell A group of wireless devices that communicate together on the same radio frequency channel and share the same wireless passkey.

Wireless Transmission A technology in which electronic devices send information to receivers using radio waves rather than wiring.

WPA (Wi-Fi Protected Access version 1) An authentication method to secure wireless systems. It is the successor of WEP. WPA implements the majority of the IEEE 802.11i standard.

WPA2 (Wi-Fi Protected Access version 2) An authentication method that implements the full 802.11i standard, but will not work with some older network cards. It is also known as *802.11i*.

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Compliance

Compliance

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the effective isotropic radiated power (EIRP) is not more than that required for successful communication.

Note: The S1100 devices require professional installation. They should be installed in a location that would prevent the general population from approaching from 3 feet (1 meter) of the radiating element.

USA

The FCC IDs are VKHCM9S1100S3100 and NKRDCMA82.

This device complies with parts 15 and 90 of the FCC (Federal Communications Commission) rules (see <http://www.fcc.gov/>).

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation of the device.

This equipment has been tested and found to comply with the limits for Class B Digital Device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in residential installation. This equipment generates and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the S1100 device
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

Any changes or modifications not expressly approved by Verint Systems Inc. could void the user's authority to operate the equipment.

Canada

The IC ID is 7286A-CM9S1100.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.

Italia

L'uso di questo apparato in Italia è regolamentato da:

- D.Lgs 1.8.2003, n.259, articoli 104 (attività soggette ad autorizzazione generale) e 105 (libero uso), per uso privato;
- D.M. 28.5.03, per la fornitura al pubblico dell'accesso alle reti e ai servizi di telecomunicazioni (R-LAN or R-LAN and Hiperlan).

Europe

Declaration of Conformity
<p>Manufacturer: Verint Systems Inc. 1800 Berlier Laval, Québec H7L 4S4 Canada</p> <p>Declares under sole responsibility that the product: Product name: Wireless video transceiver Model number: S1100</p> <p>To which this declaration relates is in conformity with the following standards or other documents:</p> <p>R&TTE Directive 1999/5/EC EN 300 328-2 V1.2.1 (2001-12) EN 301 893 V1.3.1 EN 301 489-01 V1.4.1 (2002-08) EN 301 489-17 V1.2.1 (2002-08) EN 60950:2000</p> <p>Verint hereby declares that the equipment specified above conforms to the above Directive(s) and Standard(s).</p> <p>May 6th, 2004 Laval, Canada</p> <p>For the official signed declaration of conformity, visit http://www.verint.com/video_solutions/section2a.cfm?article_level2_category_id=17&article_level2a_id=289.</p>

Turkey

Declaration of Conformity

Manufacturer:

Verint Systems Inc.
1800 Berlier
Laval, Québec
H7L 4S4
Canada

Declares under sole responsibility that the product:

Product name: Wireless video transceiver
Model number: S1100

To which this declaration relates is in conformity with the following standards or other documents:

R&TTE Directive 1999/5/EC

EN 300 328-2 V1.2.1 (2001-12)
EN 301 489-01 V1.4.1 (2002-08)
EN 301 489-17 V1.2.1 (2002-08)
EN 60950:2000

Verint hereby declares that the equipment specified above conforms to the above Directive(s) and Standard(s).

December 14th, 2004
Laval, Canada

For the official signed declaration of conformity, visit

http://www.verint.com/video_solutions/section2a.cfm?article_level2_category_id=17&article_level2_a_id=289.

RoHS Declaration of Compliance

June 14th, 2006

Verint believes in the importance of conducting our business in a manner that will help protect the environment as well as our employees, customers, and the public.

To that end, we are committed to bringing our existing and future product lines into EU RoHS Directive compliance.

Thus, as of July 1 2006, the following product, S1100, will comply with the DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 (RoHS) regarding the restriction of the use of certain hazardous substances in electrical and electronic equipment.

The S1100 product will not exceed the maximum concentrations of 0.1% by weight in homogenous materials for lead, hex chrome, mercury, PBB, PBDE, and 0.01% for cadmium. In addition, the S1100 product will qualify for the "lead in servers solders" exemption as set forth in the Directive.

This declaration is provided based on reasonable inquiry of our suppliers and represents our actual knowledge based on the information provided by our suppliers.

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