



## **APPLICATION NOTE**

October 22, 2008

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### VIDEO TRANSMISSION OVER CELLULAR NETWORK

# **CONFIGURING A TELULAR SX7 FWT FOR USE WITH A BOSCH VIP X1 ENCODER**

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## Scope

This application note covers the basic setup requirements and procedures to transmit video over the cellular network using the Telular SX7 series Fixed Wireless Terminal (FWT) and the Bosch VIP X1 MPEG 4 encoder.

## Considerations

- The Telular SX7 FWT is certified for use on the AT&T and Sprint PCS wireless networks. Although the application note has been developed using the Sprint PCS service, the use of other wireless carriers should be very similar, provided they support mobile terminated IP sessions.
- Wireless service may vary and also be limited, based on available coverage and other conditions outside Telular's control. Consult with the wireless carrier to verify the capabilities of the wireless service before selection.
- The Telular SX7 FWT complies with the standards for 3G wireless broadband speeds (GSM/UMTS); however, the SX7 cannot control the bandwidth that the wireless carrier will provide at any given time. In addition, be aware that this application may utilize a considerable amount of data, so check with your service provider for billing and limitation details before deployment.

## Overview

This application note covers the following Configurations:

- **Main Configuration (Video Streaming):** Will set up the SX7 and Bosch device to work together to transmit video the cellular network.
- **Optional Configuration I (JPEG Posting):** Used in conjunction with the Main Configuration scheme, it will set up the Bosch device to post JPEGs to a FTP server in addition to video streaming.
- **Optional Configuration II (USB HDD Recording):** Used in conjunction with the Main Configuration scheme, it will set up the Bosch device to record to a connected USB HDD in addition to video streaming.
- **Optional Configuration III (SX7 Remote Management):** Used in conjunction with the Main Configuration scheme, it will set up the SX7 unit to be managed remotely in addition to video streaming.

**NOTE:** *Optional Configurations I, II, and III can be independently added to the main configuration based on the desired application's requirements.*

For each configuration listed above, the following items will be covered:

- Equipment, Software and Service Requirements
- Initial Physical Setup
- System Setup Procedures
- Final Connection Layout

## MAIN CONFIGURATION: VIDEO STREAMING

### Requirements

#### Equipment:

1. Telular FWT model SX7T or SX7M (see product data sheet)
2. Bosch VIP series video encoder model X1
3. Simple Hub/Router
4. Connection Cables: RJ45 and 75Ω video cable
5. Computer with RJ45 connection

**NOTE: SX7 FWT and Bosch VIP X1 must be set to 'Factory Default' conditions.**

#### Software:

1. Microsoft Internet Explorer
  - a. Active X must be enabled
  - b. Java must be installed

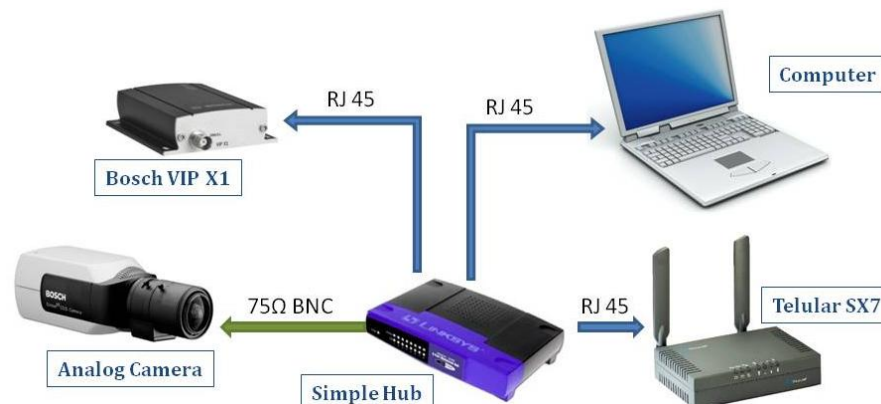
**NOTE: Certain components in other browsers (e.g. Firefox) may cause the system to not work as it should.**

#### Service:

1. Data plan (unlimited data plan recommended)
2. Mobile IP Terminated sessions support
3. Fixed IP or Dynamic DNS account (DynDNS.com service is used in this note)
4. Obtain Context APN (supplied by wireless provider)

### Initial Physical Setup:

1. Connect the devices as follows:
  - a. Connect a PC to the Hub/Router
  - b. Connect the Telular SX7 to the Hub/Router
  - c. Connect the Bosch VIP X1 to the Hub/Router
  - d. Connect Analog Camera to the Bosch VIP X1
  - e. Ensure all equipment is turned on/booted



## System Setup Procedures

### SX7:

#### Local Subnet Setup:

1. Open <http://192.168.1.1>
  - a. User name: 'telular'
  - b. Password: '1234'
2. Click on 'Setup' (left menu)
3. Change 'IP Address' field, to be used as gateway for the encoder (i.e. 192.168.0.2)
4. Set 'Timezone' appropriately
5. Set 'Time Server' to 'Default SNTP Server'
6. Click on 'Save'

**Note:** A 'Restart' button will appear after clicking 'Save', do not click on it until told to do so.

#### Enable Internet Connection:

1. Click on 'Wireless WAN' (top menu)
2. Set 'PSD Auto Connect' to 'Always On'
3. Click on 'Save'

#### Dynamic DNS Setup:

1. Click on 'DDNS' (top menu)
2. Set 'DDNS Service' to 'DynDNS'
3. A new set of text fields will appear:
  - a. Enter DynDNS username in 'User Name' field
  - b. Enter DynDNS password in 'Password' field
  - c. Enter the Host name chosen with DynDNS in the 'Host Name' field
4. Click on 'Save'

#### Port Forwarding:

1. Click on 'Network' (left menu)
2. Click on 'Firewall/Filters' (top menu)
3. Set 'Firewall (SPI)' to 'Disable'
4. Click on 'Save'
5. Click on 'Port Forwarding' (top menu)
6. First line
  - a. Enter a descriptive application name for the HTTP port in the 'Application Name' field

**NOTES:** This has no bearing on the application but makes it easy for you to reference later. You can setup only HTTP or HTTPS but this note, we will setup both.

- b. Enter the desired port number in both of the 'Ext. Port' fields
- c. Check 'Protocol TCP' and/or 'Protocol UDP'

**NOTE:** UDP streaming capability is network dependent so availability varies by carrier.

- d. Enter the last Octet of the Bosch VIP X1 in the 'IP Address' field
- e. Check 'Enable'
7. Second line and subsequent
  - a. This depends on how your application is configured but should be similar to setting up the first line.
8. Click on 'Save'
9. Click on 'Restart'

#### Verify SX7 Status:

1. The Device will restart itself. Wait approximately a minute or two, then close Internet Explorer
2. Re-open the browser to <http://192.168.0.2>
3. You will be prompted to log in again
  - a. User name: 'telular'
  - b. Password: '1234'
4. Click on 'Status' (left menu)
5. Note that 'DDNS Status' is displaying 'Server Updated Successfully'

### Bosch VIP X1:

#### Initial Setup:

1. Open <http://192.168.0.1>

**Note:** Pop-ups should be enabled. Also, install any ActiveX components required.

2. Click on 'Settings' (top menu)
3. Click on 'General Settings' (left menu)
4. Click on 'Password' (left sub-menu)
  - a. Type '1234' for 'Password'
  - b. Type '1234' for 'Confirm Password'
  - c. Click 'Set'
5. Click on 'Time Server' (left sub-menu)
6. You will be prompted to log in:
  - a. Type 'user' for 'User name'
  - b. Type '1234' for 'Password'
  - c. Click 'OK'

7. You are now at the Time Server Settings
  - a. Set 'Unit time Zone' appropriately
  - b. Type '129.6.15.28' for the 'Time server IP address'
  - c. Select 'SNTP server' for 'Time server type'

### Display Settings:

1. Click on 'Display Settings' (left menu)
2. Click on 'Camera name' (left sub-menu)
  - a. Enter name for 'Camera 1' (if desired)
  - b. Click 'Set'
3. Click on 'Display stamping' (left sub-menu)
  - a. Set 'Camera name stamping' (if desired)
  - b. Set 'Time stamping' (if desired)
  - c. Click 'Set'
4. Click on 'Encoder settings' (left menu)
5. Click on 'MPEG-4 encoder' (left sub-menu)
6. For this note, 'Stream 1' is set as follows:
7. For this note, 'Stream 1' is set as follows:
  - a. Click on 'Stream 1' tab
  - b. Change 'Target data rate' to '400'
  - c. Change 'Encoding Interval' to '1'
  - d. Change 'Video resolution' to 'CIF'
  - e. Click on 'Details'
  - f. Change 'Max. data rate' to '440'
  - g. Click 'Set' (at bottom of screen)

- h. If a 'Profile in Use' window pops up, click 'OK'
8. For this note, 'Stream 2' is set as follows
  - a. Click on 'Stream 2' tab
  - b. Change 'Active profile' to 'High Resolution (4 CIF/D1)'
  - c. Click 'Set' (at top of screen)

**NOTE: Refresh rate and stream quality are subject to network capabilities. Reducing the image quality will result in a better stream.**

### Network Settings:

1. Click on 'Service Settings' (left menu)
2. Click on 'Network' (left sub-menu)
3. Click 'Details'
4. Change 'Gateway address' to '192.168.0.2'
5. Set 'Video Transmission' to 'TCP (HTTP Port)'
6. Set 'HTTP browser port' to your desired port (i.e. '10000')

**NOTE: The port availability is network dependent.**

7. Click 'Set' (bottom of page)
8. A message indicating the new IP address will appear, click 'OK'
9. Click on any of the links labeled 'Reboot after 'Set' necessary'

### Final Connection Layout:

1. Disconnect the test setup, and plug the Ethernet cable from the encoder (Bosch VIP) directly into the SX7.
2. From another computer connected to the Internet, point your browser to: <http://yourDynDNS/> (or <http://yourDynDNS:10000/> depending on the port being used)
3. After a short wait for the browser to load the Java components, you should see the live stream from the camera.
4. After the devices have been configured, devices must be left connected as follows:



## OPTIONAL CONFIGURATION I: JPEG POSTING

### Requirements

#### Service:

In addition to the services necessary for Video Streaming, FTP Server access is required (IP address, user name and password).

### Initial Physical Setup

Connect the devices same as for Video Streaming Initial Setup, or as follows:



### System Setup Procedures

#### Bosch VIP X1:

1. If rebooted, wait approximately a minute and close browser.
2. Reopen browser and point to Encoder IP address: <http://192.168.0.1:10000/>
3. Click on 'Encoder settings' (left menu)
4. Click on 'JPEG Posting' (left sub-menu)
5. For this note, 'JPEG Posting' is set as follows:
  - a. Select 'Large (704x576/480)' as the 'JPEG format'
  - b. Select 'Date/time suffix' as the 'File name'
  - c. Change the 'JPEG posting interval' to the time (seconds) in between posted pictures
  - d. Input the IP address for the FTP Server to be used, in the 'FTP server IP address' field
  - e. Input the username for the FTP Server used in the 'FTP server login' field
  - f. Input the password for the FTP Server used in the 'FTP server password' field
  - g. If a specific path is to be used (i.e. specific folder within the server), input the path in the 'Path on FTP server' field

### Final Connection Layout:

1. Disconnect the test setup, and plug the Ethernet cable from the encoder (Bosch VIP) directly into the SX7 (refer to Video Streaming Final Connection Layout).
2. After a few minutes, connect to your FTP Server and verify that images are being posted.
3. After the devices have been configured, devices must be left connected as follows:



## OPTIONAL CONFIGURATION II: USB HDD RECORDING

### Requirements

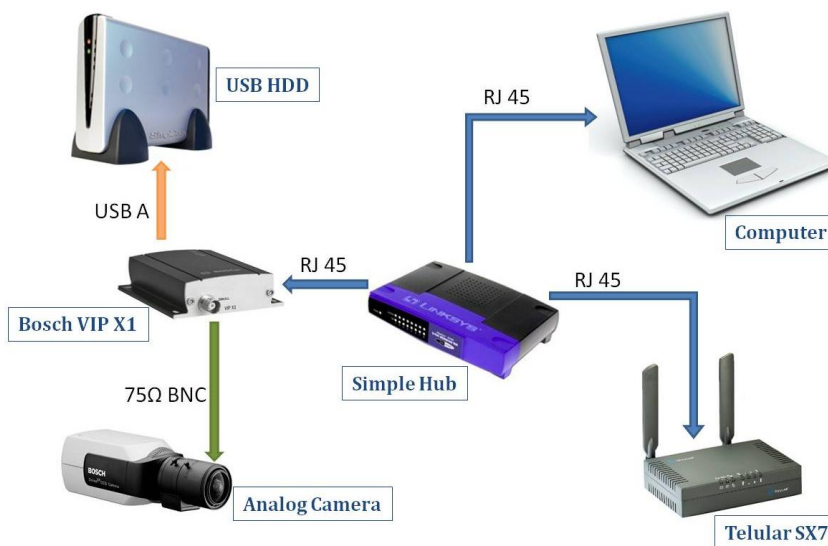
#### Equipment:

In addition to the equipment necessary for Video Streaming, a USB Hard Disk Drive (HDD) is required (along with the appropriate USB cable for connection).

### Initial Physical Setup:

Connect the devices same as for Video Streaming Initial Setup, and in addition:

- a. Connect USB HDD to the Bosch VIP X1 (make sure it is also powered up)



### System Setup Procedures

#### Bosch VIP X1:

1. If rebooted, wait approximately a minute and close browser.
2. Reopen browser and point to Encoder IP address: <http://192.168.0.1:10000/>
3. Click on 'Recording Settings' (left menu)
4. Click on 'Storage medium' (left sub-menu)
  - a. Select 'USB Hard Disk' as the 'Type'
  - b. Click 'Set'
  - c. Once you do this, a new link labeled 'RECORDINGS' will appear in the top menu
5. Click on 'Partitioning'
  - a. Click on 'Create partition'
  - b. A new screen will pop up
    - i. Choose '1' for 'Number of new partitions'
    - ii. Click 'Next>>'
    - iii. Click 'Next>>'
    - iv. Click 'Next>>'
    - v. Click 'Next>>'
    - vi. Check the 'Use remaining size' box
    - vii. Click 'Finish'
6. Click on 'Recording profiles' (left sub-menu)
  - a. Under the 'Day' tab:
    - i. Change 'Standard Profile' to 'High resolution (4CIF/D1)'
    - ii. Change 'Encoder' to 'Stream 2'
    - iii. Click 'Set'
  - b. Do the same for subsequent tabs as desired
7. Click on 'Recording Scheduler' (left sub-menu)
  - a. Select the appropriate time schedule.
  - b. Click 'Start'

## Final Connection Layout:

1. Disconnect the test setup, and plug the Ethernet cable from the encoder (Bosch VIP) directly into the SX7.
2. After the devices have been configured, devices must be left connected as follows:



## OPTIONAL CONFIGURATION III: SX7 Remote Management

### Initial Physical Setup:

Connect the devices same as any of the previous Initial Setups that include the SX7, or as follows:



### System Setup Procedures

#### **Bosch VIP X1:**

1. Click on 'Administration'
2. Enter the desired Device Manager User Name
3. Enter the desired Device Manager Password
4. Confirm Password
5. Select 'Enable' for 'Remote Web Management' field
6. Enter the desired port number for remote web management (defaulted at 8080)
8. Click on 'Save'
9. Click on 'Restart'

### Final Connection Layout:

1. Disconnect the initial physical setup, and return to any of the final connection layouts listed above based on the application desired.
2. From another computer connected to the Internet, point your browser to: <http://yourDDNS:8080/> and verify that remote management is working.

#### TELULAR CORPORATION