Field Service Manual
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Sprint Installation and programming of Sierra Wireless Aircards and Associated Routers.

Author:
Richard Steele
Data Communication Services
866-267-0245 x901

3569 Drennon
Campbellsburg, KY. 40011

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This document is meant for field service and marketing personnel of Data Communication Services. It is not meant for general distribution. It contains information gleaned from personal experiences with cellular data services and serves as an aid in the initial programming of those services.

This document is very much in its infancy and the reader will note many areas where further testing and evaluation are required.

Please submit any corrections or modifications to the author for future inclusion.

This is a step by step procedure document outlining the steps to be followed to initially activate, program and install a Sierra Wireless Aircard into a supported router.

The document contains information on the following products.
Sierra Wireless Aircard AC580.
Sierra Wireless Aircard AC595.
Sierra Wireless Aircard 595U (USB)
Kyocera KR-1 router.
Linksys WRT54G3G-ST router.

Please note. Sprint PCS network covers the 1850-1990MHz PCS band.

Please note. The Sierra Wireless Aircard AC595 will support Sprint's Revision A network. All router OEM's are working on firmware upgrades to their routers to support the AC595. Availability of such firmware is undetermined. The AC580 will not support Sprint's Revision A network.

Please note: Preliminary testing finds that the AC580 AirCard is able to deliver 75% of the downlink and 50% of uplink of an AC595 AirCard. In practical terms the AC595 AirCard has seen a great improvement over uplink performance. We have measured the AC580 AirCard at several EV-DO sites and find its uplink at 70-100Kbps in the Kentucky region. Rule of thumb for normal browsing requires 20Kbps uplink. Surprisingly latency is marginally better on the AC580 Aircard than the AC595 AirCard. The added advantage of the AC595 AirCard would come in its ability to support additional file transmit capacity rather than increased active users. Interestingly we have also noted that bandwidth and latency is better at the urban rural boundary rather than internal to the totally urban environments in Louisville and Lexington.

Please note: The AC595 AirCard has been found to be an exceptional card for reception in fringe areas. The AC595U does not have the same reception capabilities and should only be used in areas of confirmed Rev A coverage.

Please note; The AC595 and AC595U drivers are incompatible. The laptop will have to be re-booted between usage of either one of these hardware gateways.

Please note: EV-DO sites in Kentucky, Indiana, and Ohio are either EV-DO Revision 0 or EV-DO Revision A as of this writing. Sprint plans to deploy EV-DO Revision A with target bandwidth of 3Mbps downlink by 1Mbps uplink starting in Ohio (Cincinnati/Columbus) spring of 2007 followed by Louisville, Indianapolis by summer 2007. They will also continue to roll out Revision 0 to the more rural cell sites in the same time frame with further upgrades to follow. No other cellular provider has such aggressive bandwidth plans in this region.

Target customers for the Sprint product offering fall into the following segments:
- Road warriors that travel to cities with unpredictable 802.11 coverage; and, into rural settings where no other broadband offerings are available other than cellular

coverage. Such customers will able to use their laptops at broadband speeds across much of the continental United States.

- Residential users that are unable to acquire DSL or cable broadband services at the near fringes of metropolitan areas or located near Interstate freeways. Such a client base today is served by fixed wireless and satellite offerings. If the client is able to receive Sprint's EV-DO revision 0 service then they are a prime candidate for a cellular product offering instead of satellite. If the client is able to receive Sprint's EV-DO revision A service then they are a prime candidate for a cellular, or cellular plus router, product offering instead of satellite, microwave, DSL, or cable.
- Corporate users that are in an EV-DO Revision A footprint that have interest in our redundant bandwidth product offerings in conjunction with satellite or as a replacement for the satellite link.

For comparison testing use the following speed test site:
www.sprint.com/speedtest

Programming overview

After a customer order Field Services will pull from stock the necessary hardware products to meet the order requirements.

1. Record all product registration numbers on the Service Order.
2. Activate all cellular AirCards.
3. Program the AirCards using a service laptop with the latest Sprint dashboard software. (Use the appropriate dashboard offering with the appropriate card.)
4. Upgrade the firmware on all routers and program them for Sprint service.
   a. Check Sprint.com/downloads for firmware for any AirCard – also the Linksys router firmware can be found here – but not the Kyocera.
5. Insert, test, and verify the AirCard functions in the router.

Key point: Router firmware upgrade and AirCard programming occur separately until all units are ready. Inserting an un-programmed AirCard into a router can cause the router PROM to be loaded with incorrect information requiring a POST reset procedure. Only marry the two products together once all programming and upgrades have been completed.

Key Point: Sprint dashboard product provided with the AC595 works also with the AC580. The newest Sprint Communications Manager does not support Rev 0 cards.

The AirCard 595 is supported on MacOS X v10.4. Go to SierraWireless.com > Support AC595 and download Watcher Lite. The disk image (.dmg) file will support Powerbook G4 systems with PCMCIA slots. (Novatel S620, 720, AC580, AC595, AC595U) are also supported. Refer to sprint.com/downloads and MacOS for further details.)

Step by step instructions PCMCIA AirCard or USB AirCard

If using a USB product – the connection made to the computer will be through a USB connection rather than a PCMCIA slot. Also, most manufacturers do not recommend the use of USB hubs with their USB products.

1. Remove the CD-ROM from the provided Sprint AirCard product.
2. Install the Sprint dashboard and drivers onto the target laptop.
3. Restart laptop.
4. Launch Sprint PCS Connection Manager (dashboard). Indication: No device…
5. Insert the AirCard into an open PCMCIA slot. Indication: Updating hardware…
   a. Dashboard is loading programming and service information into the AirCard.
   b. Several cycles may occur.
   c. Once complete the Sprint Activation Wizard will launch.
6. Enter activation (lock) code (MSL#).
   a. If provided lock code does not work try either 6285 or the last four digits of the provided phone number (MDN).
7. Enter phone number (MDN) with no dashes or punctuation. Also enter the MSID (IMSI_S).
   a. Dashboard will indicate: Updating user profile…
   b. AirCard is updated with authentication information.
   c. Dashboard will indicate: Resetting modem…
   d. Dashboard will indicate: Disconnected when completed.
8. From the dashboard press the GO button
   a. Dashboard will indicate: Authenticating…
   b. Dashboard will indicate: Connected when PCMCIA establishes cellular connection.
9. From the dashboard press sequence: Menu > Software Updates > Check Now
   a. Download updates and POST (Power On System Test) any hardware required.
10. From the dashboard press sequence: Menu > Device Info
    a. Review and record all service info on the Service Order.
    b. Record "Network device signal" and "Network Service" if work is performed at customer location.
11. From the dashboard press sequence: Menu > Settings > Sprint PCS Vision – Sierra Wireless.
12. Select from Roam Mode the Sprint radio button if able.
13. Launch testmy.net and perform dual test.
    a. Record bandwidth numbers on Service Order.
14. Launch PING –n 20 www.cpe-labs.com and record average latency on Service Order
15. From the dashboard press the STOP button
16. Exit dashboard.
17. Windows tray safely remove USB drivers for Aircard, bottom entry first.

a. Note: A true USB product may or may not have drivers that require this step. One may be able to proceed to the next step.

18. Remove PCMCIA card.

Step by step instructions Kyocera KR-1 router
Kyocera support line: 888-351-5353 open 7x24
The KR-1 does not support the AC595 or AC595U. The only Rev A card supported is the Novatel S720.

1. Do not put card in router at this point.
2. Download the latest firmware version for the KR-1 from support.dlink.com
   a. http://support.dlink.com/products/view.asp?productid=KR%2D1
   b. Current recommendation is RK1008
   c. This will download as a .bix file
3. POST router.
4. Set up laptop for LAN address 192.168.0.2 255.255.255.0
5. Connect Cat5 patch cable between laptop and any router switch port.
6. Browse to http://192.168.0.1
7. Enter user name "admin" and no password.
8. Select Status
   a. In Device Information make sure Firmware is RK1006 and above. We have successfully tested with version RK1008.
9. Upgrade firmware to desired level.
   a. Tools > Firmware > Browse
   b. Select the proper .bix file.
   c. Press the Apply radio button.
10. Select Status.
    a. Confirm firmware version
    b. Note proper AirCard product identifier
11. Power down router.
12. Insert programmed AirCard done in earlier steps.
13. POST KR-1.
    a. Status light will be red during POST.
    b. Status light will go out during cellular authorization process.
    c. Status lights when ready will be solid green for Power, Status, WAN. Blinking green for WLAN.
14. Browse to http://192.168.0.1
    a. Check all final values
    b. Note Signal Strength
    c. If no IP address depress Connect button.
    d. Light indications should be solid green for Power. Blinking green for WLAN.
    e. Perform any post install tests.

Kyocera Reset Sequence.

1. Paperclip depress reset button for 10 seconds.
2. Hold reset button in for all of the following steps.
3. Pull power holding reset for 30 seconds to reset PROM.
4. POST with reset for 10 seconds.

5. Pull power with reset in
6. Release reset button
7. Wait 5 minutes
8. POST

Step by step instructions Linksys WRT54G3G-ST router
Linksys support line: 800-546-5797 open 7x24

1. Do not put card in router at this point.
2. NOTE: Linksys has varying degrees of support denial dealing with this product offering. They OEM'ed the device for Sprint but expect Sprint to provide all support. This is not the best situation.
    a. Download the latest firmware version for the WRTG54G3G-ST from sprint.com/downloads.
        i. Select your operating system from the pull down menu. Use Windows XP when in doubt and realize this may change in the future as the router does not fit this menu selection structure.
        ii. Select the Firmware upgrade for the WRT65G3G-ST router by saving the .bin file to disk
        iii. Extract the firmware from the .zip file if required.
3. POST router.
4. Set up laptop for LAN address 192.168.1.2 255.255.255.0
5. Connect Cat5 patch cable between laptop and any router switch port.
6. Browse to http://192.168.1.1
7. Enter blank user name and password "admin".
8. Check the Firmware Version at the top bar. We have tested the following stipulations:
    a. Firmware Version 2.00.4 supports AirCard 595 but not AirCard 580
    b. An unknown firmware version prior to 2.00.4 supports the AirCard 580.
    c. Version 2.00.9 is considered to be the base support level as it supports both AC580 and AC595.
9. Select Administration tab and then Firmware Upgrade if an upgrade is required for the AirCard to be used.
    a. Browse to the .bin file of the firmware desired.
    b. Select the Upgrade button.
    c. Once complete the Upgrade is successful, rebooting… will be displayed
    d. Check the router top line for the proper firmware version.
10. Power down the router.
11. Insert programmed AirCard done in earlier steps.
12. POST WRT54G3G-ST.
    a. Power, Wireless, then WAN light will blink during POST.
    b. AirCard should light red then green or blue.
    c. When WAN light goes solid blue the AirCard is activated on the Sprint network and a WAN connection is established.
13. Browse to http://192.168.1.1
    a. Check all final values
    b. Perform any post install tests.

WRT54G3G-ST Reset Sequence.

1. Paperclip depress reset button for 30 seconds.

NOTE: The router must go through POST to detect model of AirCard inserted.

Step by step instructions D-Link DIR-450 router
D-Link support line: 877-453-5465 open 6AM to 6PM Pacific Time.

2. Do not put card in router at this point.
3. POST router.
4. Set up laptop for LAN address 192.168.0.2 255.255.255.0
5. Connect Cat5 patch cable between laptop and any router switch port.
6. Browse to http://192.168.0.1
7. Enter user name "admin" and blank password.
8. Begin Aircard selection on router (If firmware upgrade needed go to next step.
    a. After log onto router from the Setup screen select Manual Configure.
    b. In the WWAN section pull down select the proper ISP Card.
    c. Save Settings
    d. Once menu "Settings Saved" displayed, power down router.
9. Check the Firmware Version at the top bar. We have tested the following variations:
    a. Hardware Version: A1 Firmware Version 1.01 supports AirCard 595 & 580.
10. Select Tools tab and then Firmware if an upgrade is required for the AirCard to be used.
    a. Browse to the firmware file of the firmware desired.
    b. Select the Save Settings button.
    c. Once complete the Upgrade is successful, "The device is restarting…" will be displayed.
    d. After POST establish browser connection and check the router top line for the proper firmware version.
11. Power down the router.
12. Insert programmed AirCard done in earlier steps.
13. POST DIR-450.
    a. Power light will be tinted red during POST.
    b. AirCard should light red then green or blue.
    c. When Aircard WAN light goes solid blue the AirCard is activated on the Sprint network and a WAN connection is established.
14. Browse to http://192.168.0.1 to begin Aircard selection on router (If done previously go to sub step (e).)
    a. After log onto router from the Setup screen select Manual Configure.
    b. In the WWAN section pull down select the proper ISP Card.
    c. Save Settings
    d. It may be required to POST the router again.
    e. Check all final values
    f. Perform any post install tests.

DIR-450 Reset Sequence.

1. Power down the DIR-450.

2. Paperclip depress reset button, holding down for 10 seconds during POST sequence.
3. Once released power light will alternate blue/red.
4. Browse to 192.168.0.1 and you should see the crash recovery page displaying only "Firmware Upgrade". You may have to hit the browser refresh button several times to clear any in system version of the login page.
5. Browse select the firmware to load then Send.

Codes

The Sprint dashboard provides several "hidden" menu screens. All are accessible by hovering the cursor over the "GO" button and entering the following commands in all capital leters.
##DATA (You will need the MSL lock code to enter this programming mode.)
##DEBUG (all of the nitty-gritty details of your network connection including latitude/longitude and temperature at the tower.)

EVDOforums.com is an address you can go to for information on these menus.

Sierra Wireless Debug Log

In folder Program Files>Sprint>Sprint PCS Connection Manager
There is a DebugLog appliction file.

To start a debug log launch the debug log application before you launch the PC based
Sprint Communications Manager (dashboard).
Launch Wordpad
Once the error is encountered Save the log file
Screen capture by using PrtScrn windows key
Paste the screen capture into Wordpad.
Then close everything down

Email the log file to CMLOGS@SPRINT.COM