

Setting up the Wireless Communication on the Apollo Solar Cabinets

The screenshot shows the 'Apollo Solar GSM+WiFi Gateway' web interface. The left sidebar contains navigation options: Overview, Basic Network, WLAN, Advanced Network, Firewall, VPN Tunnel, Administration, Debugging, and Logout. The main content area is divided into two sections: 'System Status' and 'Internet Status'. The 'System Status' section displays the following information:

Router Name	Router
Hardware Version	C11-0223
Firmware Version	Router-4.2.2.3
Router Time	Sun, 09 Jan 2020 08:57:31 +0800 Clock Sync
Uptime	7 days, 18:56:39
Total / Free Memory	60.05 MB / 49.25 MB (82.02%)

The 'Internet Status' section displays the following information:

Connection Type	Cellular Network
MAC Address	34:0A:49:01:20:77
Modem Type	3G-F5521[w-WCDMA/HSPA+
Modem IMEI	85205604708931
Modem Status	Ready
Cellular GP	H3C Wireless
Cellular Network	HSDPA
USB Status	Ready

The screenshot shows the 'APOLLO SOLAR PV System Controller' web interface. The top right corner displays the date and time: 3/24/2017 11:50:06 AM and the serial number: SN 9999. The main content area has a navigation bar with tabs: System, Test Comm, Test DIO, Test ADC, About, and Test DIO. The 'Test Comm' tab is active, showing the following status:

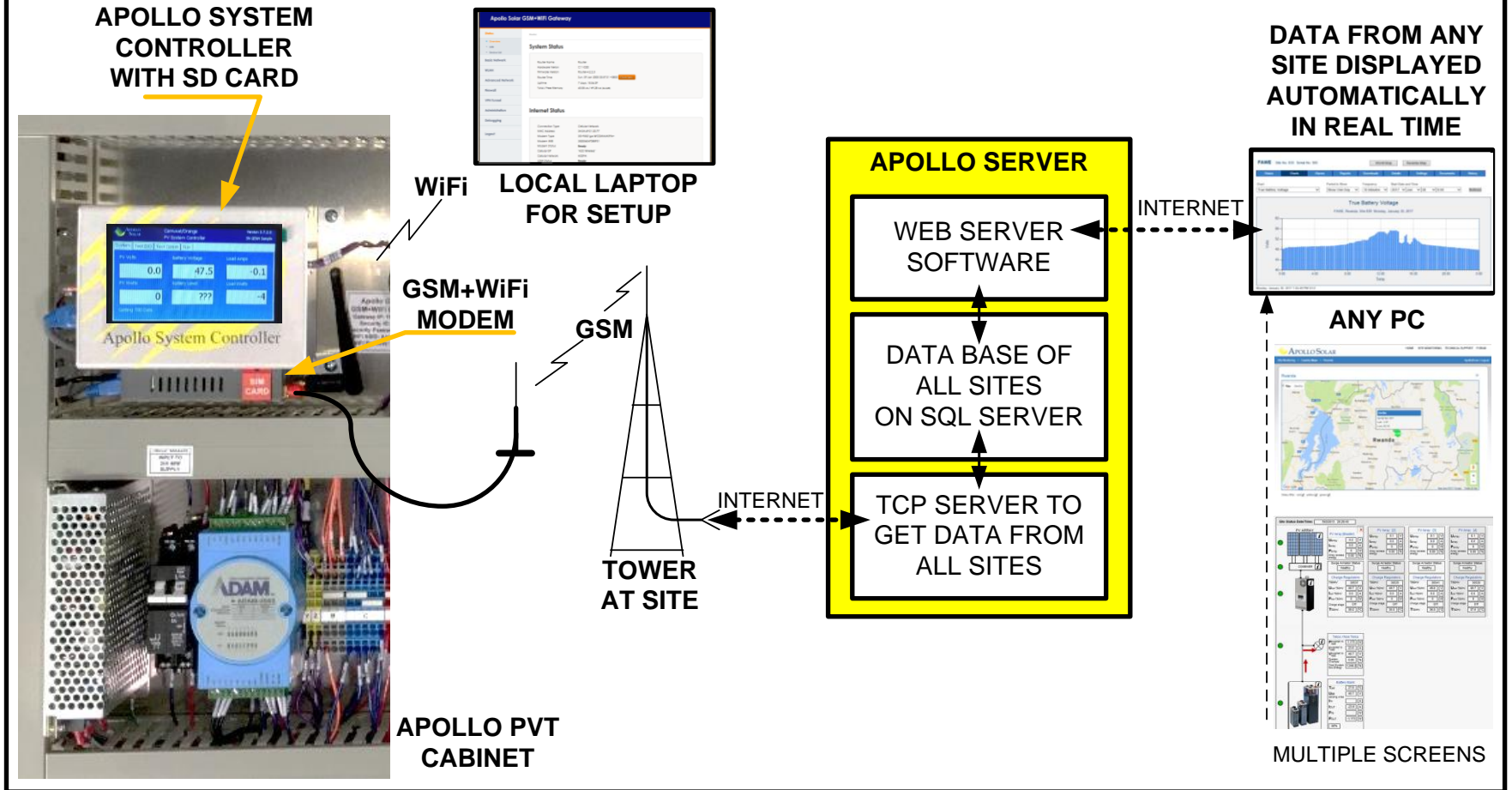
T80 Communications: 1 T80(s) Found

Server Communications: Not OK

There is a 'Test' button and a prompt: 'Press Button to Run Test'.

Apollo Remote Monitoring

APOLLO PVT REMOTE MONITORING SOFTWARE - SYSTEM DIAGRAM



Apollo Solar designed and manufactures all the hardware and has developed the software for the ASC as well as the Server with our own people, so the hardware and software are well integrated and long term support is assured.

The GSM + WiFi Gateway

CONFIGURING THE MODEM TO WORK WITH YOUR MOBILE NETWORK

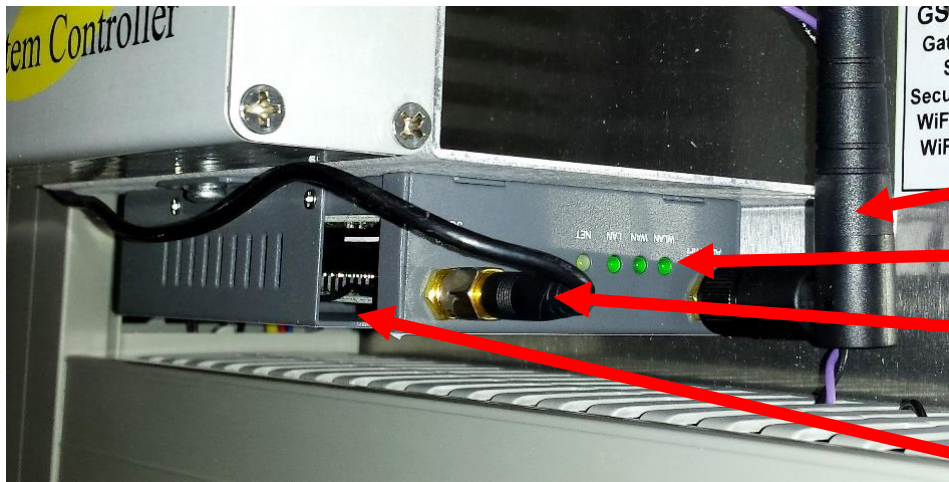
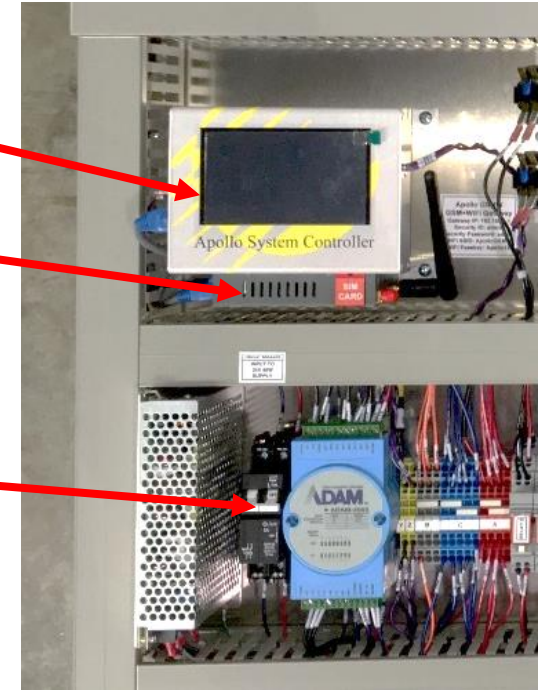
IMPORTANT INSTRUCTIONS

- You will need the proper **SIM card** and **APN number** from your Mobile Carrier.
- Apollo Solar sets up the Administration of the sites on our Server. As soon as you know the details for a site, please email the following to us:
 1. Site Name with exact Latitude and Longitude and time zone
 2. Serial Numbers of the Apollo PVT Cabinet and the T80HVs used at that site
 3. Make, model and size of the PV Array, Batteries and the Load at that site
- Before going into the field to set up the Apollo Remote Monitoring communications, it is wise to test one system from your office.
- Our experience is that each country and often each Carrier has different BTS equipment on their towers so the setup parameters may have to be specialized.
- After the parameters are correct for the first Modem for each Carrier and country, all the rest of the sites are usually the same as the first site.

The GSM + WiFi Gateway or MODEM

THE HARDWARE

- The Apollo System Controller (ASC) with LCD Touch Screen
- The GSM + WiFi Gateway (Modem) showing the WiFi Antenna. The GSM antenna must be mounted outside the cabinet.
- The Circuit Breaker (CB2) which controls 24v power to the ASC and Modem. This must be on for the setup and testing.



- This photo shows the base of the WiFi antenna.
- Status LEDs
- The connection for the external GSM antenna.
- The slot for the SIM CARD.

The GSM + WiFi Gateway

CONFIGURING THE MODEM TO WORK WITH YOUR MOBILE NETWORK (1 of 6)



The Apollo Solar GSM+WiFi Gateway comes with an embedded setup program so any Laptop, tablet or mobile phone with WiFi can be used for configuring.

The SIM Card must be registered with the mobile carrier and inserted behind the small red door in the Modem which is immediately below the Apollo System Controller.

1. Apply power to the Apollo Cabinet and turn Circuit Breaker CB2 on to apply 24 volts to the modem and the ASC.
2. With your Laptop in WiFi range of the modem you will see “ApolloGSMW” show up in the list of available WiFi networks on your Laptop.
3. Connect to the **ApolloGSMW** WiFi network. The Password is **“Apollo13”**.
4. Use your web Browser on the laptop go to address **192.168.1.1**.
5. **The username and password are both “admin”.**
6. The screen shown on the next slide will appear:

* For Example, Modem 192.168.1.1 and ASC 192.168.1.100 or Modem 192.168.2.1 and ASC 192.168.2.100

The GSM + WiFi Gateway

CONFIGURING THE MODEM TO WORK WITH YOUR MOBILE NETWORK (2 of 6)

- The Screen shown at the right will appear on your Laptop.
- Click on **Basic Network**.

The screenshot displays the web interface for the Apollo Solar GSM+WiFi Gateway. The left sidebar contains a navigation menu with the following items: Status, Overview, LAN, Device List, Basic Network (highlighted with a yellow arrow), WLAN, Advanced Network, Firewall, VPN Tunnel, Administration, Debugging, and Logout. The main content area is titled 'Router' and is divided into two sections: 'System Status' and 'Internet Status'.

System Status

Router Name	Router
Hardware Verion	C11-D20
Firmware Version	Router-4.2.2.3
Router Time	Sun, 09 Jan 2000 03:57:31 +0800 Clock Sync.
Uptime	7 days, 18:56:39
Total / Free Memory	60.08 MB / 49.28 MB (82.02%)

Internet Status

Connection Type	Cellular Network
MAC Address	34:0A:69:01:20:77
Modem Type	3G-F5521gw:WCDMA/HSPA+
Modem IMEI	352056047088931
Modem Status	Ready
Cellular ISP	"H2O Wireless"
Cellular Network	HSDPA
USIM Status	Ready

The GSM + WiFi Gateway

CONFIGURING THE MODEM TO WORK WITH YOUR MOBILE NETWORK (3 of 6)

➤ Select the “Cellular” option.

The screenshot displays the web interface for the Apollo Solar GSM+WiFi Gateway. The page title is "Apollo Solar GSM+WiFi Gateway". On the left is a navigation menu with the following items: Status, Basic Network (highlighted in orange), WLAN, Advanced Network, Firewall, VPN Tunnel, Administration, Debugging, and Logout. The "Basic Network" menu is expanded, showing sub-items: WAN, Cellular (selected with a blue dot and a yellow arrow), LAN, DDNS, and Routing. The main content area is titled "Cellular Settings" and contains the following configuration fields:

- Cellular Network Type: F5521gw:WCDMA/HSPA+
- ICMP Check:
- Cellular Traffic Check:
- CIMI Send to: [] : []
- SMS Code: []
- PIN Code: []
- Operator Lock: [] ex:46001
- Dial Number: *99#
- Mode: Auto (dropdown menu)
- APN: att.mvno
- User: []

At the bottom left of the interface, the text "ar.asp" is visible.

The GSM + WiFi Gateway

CONFIGURING THE MODEM TO WORK WITH YOUR MOBILE NETWORK (4 of 6)

- Scroll to bottom of page and enter the APN for your Carrier. Note: this is all lower case.
- If you like, tell us the Carrier and we will find the recommended APN.

- After the APN is entered, hit the **SAVE** button.

The screenshot displays a configuration interface for a GSM + WiFi Gateway. On the left, a sidebar menu includes options like 'Advanced Network', 'Firewall', 'VPN Tunnel', 'Administration', 'Debugging', and 'Logout'. The main area contains several configuration fields: 'CIMI Send to', 'SMS Code', 'PIN Code', 'Operator Lock' (with 'ex:4 001' as a hint), 'Dial Number' (with '*99#' as a hint), 'Mode' (set to 'Auto'), 'APN' (containing 'att.mvnc'), 'User', 'Password', 'Auth Type' (set to 'Auto'), and 'Local IP Address'. At the bottom right, there are 'Save' and 'Cancel' buttons. A yellow arrow points from the 'Save' button to the text 'After the APN is entered, hit the **SAVE** button.' Another yellow arrow points from the text 'enter the APN for your Carrier' to the APN input field.

The GSM + WiFi Gateway

CONFIGURING THE MODEM TO WORK WITH YOUR MOBILE NETWORK (5 of 6)

➤ Scroll back up to the top.

➤ Check to see that your APN was saved.

The screenshot displays the web interface for the Apollo Solar GSM+WiFi Gateway. The page title is "Apollo Solar GSM+WiFi Gateway". On the left, there is a navigation menu with the following items: Status, Basic Network (highlighted in orange), WAN, Cellular (highlighted with a blue dot), LAN, DDNS, Routing, WLAN, Advanced Network, Firewall, VPN Tunnel, Administration, Debugging, and Logout. The main content area is titled "Cellular Settings" and contains the following fields:

Cellular Network Type	F5521gw:WCDMA/HSPA+
ICMP Check	<input type="checkbox"/>
Cellular Traffic Check	<input type="checkbox"/>
CIMI Send to	<input type="text"/> : <input type="text"/>
SMS Code	<input type="text"/>
PIN Code	<input type="text"/>
Operator Lock	<input type="text"/> ex:46001
Dial Number	*99# <input type="text"/>
Mode	Auto <input type="button" value="v"/>
APN	att.mvno <input type="text"/>
User	<input type="text"/>

A yellow arrow points from the text "Check to see that your APN was saved." to the APN field, which contains the value "att.mvno".

The GSM + WiFi Gateway

CONFIGURING THE MODEM TO WORK WITH YOUR MOBILE NETWORK (6 of 6)

- Go back to **Status**.
- If these items are filled in, the connection works.
- After a while the status message will say: **Connected**.
- The **NET LED** on the modem will change from red to flashing green and then to solid green.
- You are done. You can log out and close this program on your laptop.

The screenshot displays the web interface for the Apollo Solar GSM+WiFi Gateway. The left sidebar contains a navigation menu with the following items: Status (highlighted), Overview, LAN, Device List, Basic Network, WLAN, Advanced Network, Firewall, VPN Tunnel, Administration, Debugging, and Logout. The main content area is titled 'Router' and is divided into two sections: 'System Status' and 'Internet Status'.

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Modem Status	Ready
Cellular ISP	"H2O Wireless"
Cellular Network	HSDPA
USIM Status	Ready

Yellow arrows from the text on the left point to the 'Status' menu item, the 'System Status' section, and the 'Modem Status' field in the 'Internet Status' section.

The GSM + WiFi Gateway

TESTING THE MODEM WITH YOUR MOBILE NETWORK

You can test the system to make sure it is connecting to the Internet.

1. Make sure the Laptop is still connected to the ApolloGSMW WiFi network.
2. Use the Laptop search engine to connect to a known Internet site such as Google.
3. If you get to Google, you have proven that the Modem in the PVT Cabinet is connecting through the GSM BTS in the local tower to the Internet.
4. Refer to the Software System Diagram on slide 2 to see these components.
5. Next we will test the full connection into the Apollo Solar server.

The GSM + WiFi Gateway

TESTING THE MODEM WITH YOUR MOBILE NETWORK

Now we will test the full communications loop. The Apollo System Controller (ASC) has a test program which commands the Modem to connect to the local GSM tower. From there, the test data goes over the Internet to the Apollo Server. It will turn around and come all the way back by the same path to the ASC to confirm that the complete Server Communication path is working.

- With the Apollo cabinet powered up, Select **Test Comm** on the ASC screen.
- To start the process, touch the TEST button.
- It will take about 15 seconds to check the internal communications with the T80HVs.
- Then it will take another 15 to 30 seconds to come back with either an OK or NOT OK for the Server link.
- If it is Not OK, recheck the SIM Card and APN settings.

