Router Cradlepoint IBR-200

<u>Description</u>: Cradlepoint IBR200 Router with 4G LTE Cat-1 modem for kiosk use

The Cradlepoint IBR200 is the latest connectivity option for our kiosks as of June, 2018. It is available as a Verizon kit (RBDX01622-01) and as a Sprint kit (RBDX01622-02). Please note these very similar part numbers, the only difference will be the last digit. The unit model name in the upper right corner of the Cradlepoint bottom label will also denote either VZ or SP within the model name.

The kits will include the router, power supply and an antenna barrel adapter (all three pieces). As with previous Cradlepoint units, we continue to try to provide:

- Better connectivity performance.
  - Commercial quality construction designed for 24/7 operations.
  - Embedded high performance Sierra Wireless internal 4G LTE Cat-1 modem.
  - Internal WiFi option (disabled for PCI compliance).
  - Single ethernet port.
  - Dual antenna option.

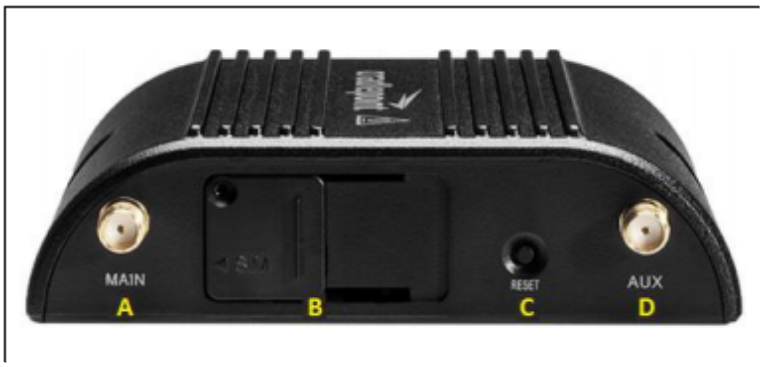
    Note – Redbox kiosks typically employ a single antenna. A second antenna may be a future option. It is not implemented at this time.
- If used with a secure antenna, a kiosk will need an antenna extension cable, RDBX01144. This is separately ordered. Comms recommends carrying a few of these cables as spare parts.

Note – this cable is NOT part of the kit, and is ordered separately. If you connect a secure antenna to the Comms unit, this extension cable is a necessity if the secure antenna does not come with one.

- Improved management and administration options via Cradlepoint NetCloud Manager (NCM).

  o All Cradlepoint IBR200 units will be connected, configured and managed by our Cradlepoint NCM account settings.

1. Hardware Overview - Introduction



Antenna/SIM door - side view

A. Primary antenna port (MAIN)

- Female SMA.

B. SIM door

SIM Door is required to be fully closed for modem to function.

C. Reset button

Press and hold 10-15 seconds for router reset.

D. Secondary antenna port (AUX)

Ethernet/Power - side view

1. 2.4 GHz WiFi antenna connector
    - Male SMA, Not used.

2. Power LED
    - Redbox default = Solid **Green**

3. WiFi LED
    - Redbox default=OFF

4. WAN connectivity LED
    - Redbox default = Solid **Green**

5. Antenna Signal Strength
    - Redbox default = **Blue** (1-4 bars)

6. USB port
7. Ethernet port
8. 4-pin power supply connector

Power supply

12V/1.0A DC. 6’ cord.

The plug is a 4 prong, clip-in style that utilizes a
pinch release clip that holds the plug in place.

Note on the IBR200 Power Supply: This PS is only rated at 1.0 amp. As such it should not be used with previously deployed IBR650 routers as it is underpowered for that router type. Though, the existing IBR650 power supply (12V/1.5A) that is already deployed to many kiosks (and is our replacement power supply) is fully compatible and safe to deploy with the IBR200.

2. Hardware Details - ports, buttons, switches

WAN Antenna Ports: (A,D)
o A and D are the main 4G LTE antenna connections. Redbox’s traditionally only use 1 antenna,which should be connected to the “MAIN” (A) port.
SIM Door: (B)
o The SIM door covers the SIM and has a contact switch that requires the door to be fully closed for the router to utilize the modem. There is no power switch for the IBR200, so when it is plugged in, it is on. That said, if the SIM door is NOT closed, the modem will NOT function. Close the SIM door for the modem to initialize.
Reset Button: (C)
o Refer to the troubleshooting section for directions on implementing a router reset.
WiFi antenna: (1)
o The 2.4 GHz antenna port is for the disabled WiFi radio and need not be used.
Power LED: (2)

o The power light should always be solid green when plugged in. There is no separate power switch, the light is always on when plugged in.

- Green: Indicates the Cradlepoint is being supplied power.
- Orange: Indicates there is some internal software in error or needing attention. Contact MS or comms@redbox.com for this condition.

WiFi LED: (3)

o After receiving the online configuration from NCM, the WiFi light should be OFF.
o If the WiFi light is not off, there may be an issue with the NCM configuration. Please verify NCM connectivity and/or contact Machine Support.

WAN function LED: (4)

o The Wide Area Network is the carrier network the modem connects to. This light will vary from blinking to solid and may be either green, orange or red.

- Red: No connection is being attempted, or an error has occurred.
- Orange (Solid): Modem is recognized, not connecting to tower.
- Orange (Blinking): Modem is dialing out to cell tower.
- Green (Blinking): Modem is negotiating connection with cell tower.
- Green (Solid): Modem is connected with cell tower.
- OFF: Modem is not detected or connected.

o Further troubleshooting for connectivity can be found in the troubleshooting section or contact Machine Support.

Antenna Signal Strength indicators: (5)

o Below are the signal percentage breakdown and how that percentage is represented via the blue LED's on the router:

- 0% - 12% = 1st LED flashing
- 12% - 25% = 1st LED solid
- 25% - 38% = 1st LED solid and 2nd LED flashing
- 38% - 50% = 1st LED and 2nd LED's solid
- 50% - 62% = 1st and 2nd LED's solid and 3rd LED flashing
- 62% - 75% = 1st, 2nd and 3rd LED's solid
- 75% - 88% = 1st, 2nd and 3rd LED's solid and 4th LED flashing
- 88% - 100% = all 4 LED's solid

USB port: (6)

o The USB port is available for use in firmware flashing or alternative modem use.
o Redbox will not employ the USB for typical use. The firmware will be managed by the Cradlepoint NCM system.

LAN 10/100 Ethernet port: (7)

o LAN 10/100 Ethernet port (10Mbps or 100Mbps rated).

o LEDs should be green and can be either solid or flashing to indicate connectivity and/or data traffic.

4-pin power supply connector: (8)

o GPIO capable 4-pin power connector.

- 2 pins are for router power, 2 pins are reserved for software use.

Power Supply:

o The 4-Pin power supply plug is keyed to insert a specific and proper way, if the lock tab is missing, the power supply should be replaced.

3. Settings, Setup and Installation

A. Router physical install

To prepare for the installation of the Cradlepoint router, route the three (3) cables required by the router to the upper left of the kiosk. (Antenna, Ethernet, Power).

1. Pull the three together and create a pig-tale with the Ethernet and Power cable at the same length (allow 10-12 inches of play).

2. The Antenna cable should then extend out an additional 8-10 inches.

3. The entire pig-tale should allow freedom of movement and provide for easier installation and accessibility for inspection of all sides.

The final resting point of the router should be in the channel to the left of the encoder. There is no need and you should not use any type of adhesive (tape, velcro, etc.) To secure the router to any other part of the kiosk.

Installation of the router following the steps above is straight forward. There are only three connections to make; Antenna, Power and Ethernet cable. All of these connections either clip-in or screw together and all should feel solid. Be sure your pig-tale cable setup is secured away from any kiosk movement and operation of the kiosk does not pose a threat to the wiring of the Comms unit.

B. Kiosk PC setup

This unit takes advantage of DHCP. Our kiosk PCs must also be configured properly. If you are not familiar with changing kiosk network settings, please follow these instructions:

1. Log into the kiosk Redbox desktop, click on NETWORK SETTINGS.

2. RIGHT click the Local Area Connection, select the Properties menu.

3. DOUBLE click Internet Protocol (TCP/IP) 4. Make sure on the General tab that:

    a. “Obtain an IP address automatically” is the chosen option

    b. “Obtain DNS server address automatically” is the chosen option.

    c. It should look like the screen to the left.

5. Once done, click on the OK buttons till the windows are closed out.

6. Continue with the router installation, the kiosk PC is ready to go.

When the PC is connected to the router, the router will provide the PC its own unique IP address. If the router is connected to and configured properly by NCM, the WiFi light will be off. When this is the case, the PC will be assigned an IP address in the

192.168.11.200–209 range. This is not necessary to know for general operation of the kiosk, but is good to know if ever attempting to troubleshoot connectivity or to verify network settings.

C. Router interface/software access:

Using a browser, we can log directly into the router to accomplish several tasks or troubleshooting if needed or desired. For the most part, a NCM managed router will not need any changes made and access to the local interface will probably not be needed. If it is needed, with the router ON and connected to the kiosk PC, start a secure browser session from the kiosk's Redbox desktop application. Depending on the router LED lights, follow one of the below procedures:

Router WiFi light is OFF

(proper Redbox NCM configuration)

Router WiFi light is ON

(Improper or No Redbox NCM configuration)

1. On the URL address line, enter the IP address: 192.168.11.1. Press enter and the router login page should appear.

1. On the URL address line, enter the IP address: 192.168.0.1. Press enter and the router login page should appear.

2. At the login screen, the router will ask for a username / password … they are:
    - field / 2r3db0x-c3ll
    - note it contains a zero, not the letter “O”

2. At the login screen, the router will ask for a username / password … they are:
    - admin / Default password

The default password is labeled on the underside of the router. Typically it is the last 8 characters of the unit MAC address and starts with “44”

If the second (WiFi light ON) method is successful, the router must be added to NCM before being deployed for kiosk use. Please take the necessary steps or contact Machine Support for assistance in getting this completed before leaving the kiosk. Kiosk routers should have the WiFi LED Off.

Upon getting access to the router software, the "First Time Setup Wizard" page may appear. To skip that page with NO changes, please click on the Dashboard menu selection on the left side of the screen. From this page several details can be seen including router and modem information, connection status and signal strength. Once you are into the router software, some of the things you can accomplish include verifying NCM connectivity, software updates, viewing system logs and more. Information on completing some of these tasks will be in the sections to follow.

4. Troubleshooting

Within this section we will cover some of the basics and advanced steps in resolving communication issues. It is not all inclusive and beyond these steps, there is always assistance from Machine Support to help with resolving communication issues.

The IBR200 unit is a 4G ONLY unit. There is no 3G radio capability within the unit, as the Verizon 3G network will be discontinued after Dec. 31, 2019. The Sprint 3G network will be discontinued sometime in the future, but its sunset date is not yet announced. Regardless, we are converting all our Verizon kiosks to 4G capability through 2018-2019.

While Redbox and Cradlepoint are confident that the IBR200 units will perform as good as or better than previous wireless communication solutions, there are many factors that affect performance and some unexpected problems may arise. With the changing of field laptops to field "tablets", there is a reduction in the traditional ability to troubleshoot devices on site, as tablets lack the ethernet port needed to connect directly to a router. That said, if there is any need for troubleshooting of any specific unit, Comms urges the field team to communicate with Machine Support to get assistance.

A. Router not connecting / No data transfer

There could be multiple reasons for the router not connecting. Or, appear as a "false positive" connection, but not passing data traffic. We will cover some of the common ones.

1. No power to router
    - This is self-explanatory, check power connections until there are lights on router.
    - Test a second power supply and if need be replace power supply.

2. SIM door not closed
    - SIM door needs to be fully closed for the internal modem to connect. The router will power on and otherwise seem to function, but the WAN light will blink red and all 4 antenna signal lights will blink blue together in a synchronous fashion if the SIM door switch is detected "open".

3. No Signal/poor signal
    - This one is a bit harder, but start by checking antenna connections and the antenna cable to make sure it is intact. Are you in a sufficient service area? This is one that may need you to actually log into the router via the desktop interface/secure browser to determine the actual signal, cause and possible solution. Call MS, or follow the steps for checking router logs further on in this TSB.
    - Use of a "booster" is NOT recommended for 4G routers. The old school boosters that Redbox implemented years ago (and some to this day) boost the frequencies that are not currently part of the 4G network. Often they can obscure or degrade the 4G signals that the router does need to receive to connect. Comms does not recommend the use of boosters with 4G devices. Removal of the booster would be a first step in diagnosing a connectivity issue.

4. No data transfer / Deactivated or defective SIM / Wrong SIM / Unable to ping out
    - The kiosk networking MUST be set to DHCP (Obtain IP address automatically) for the kiosk to properly communicate with the IBR200 router. If it is not, the router will connect, but the PC will appear to not pass data. Ping attempts will fail.
        - Using the command line ("DOS prompt" on the Redbox desktop) type the command: "ipconfig" (no quotes). The return will give you the IP address of the default gateway and the IPv4 address of your PC. The Default Gateway should read as 192.168.11.1 PC's IPv4 address should be 192.168.11.(200-209).

    - If the above is true, the PC is setup correctly.
    - If the above is anything different, either DHCP is not set, there is an ethernet failure or the router does not have the proper NCM configuration and might not be connected online.
- If the unit sits unused long enough the SIM may go inactive or be deactivated. This is rare, but is also able to be addressed. Though, it may take 24 hours to fix. This one is a bit harder to diagnose, as the router will look like it is otherwise connected properly, but it will not be passing any data. Via command prompt, one will be unable to ping out to public websites, (i.e. "ping google.com" will fail with 0 returns) and the router logs will indicate a failure to connect to NetCloud servers. If you suspect the router is otherwise fine, but you or MS have verified in the router and/or the logs a very specific set of errors, contact the Comms team at comms@redbox.com for assistance.

B. Firmware and Preferred Roaming Lists (PRL) updates

First, a note on PRL updates: SIM based, 4G LTE capable routers DO NOT implement or use PRLs and do not have or need PRL updates. SIM based connectivity is more consistent, with less "outages" due to tower work or backhaul network changes that has, in times past, presented some challenges.

At the initial release, the NCOS firmware installed on all IBR200 units will be 6.5.0. All IBR200 units will be added and should maintain connectivity with Cradlepoint NCM software. Therefore, the router firmware, software and settings will be managed via our NCM account. Once in NCM, a router can be moved freely from kiosk to kiosk and it will update its kiosk name in the NCM system so long as the kiosk PC is setup for DHCP. If an IBR200 router is pulled for any issue and later tested and approved for redeployment, no reset is needed. Just deploy the router to the new kiosk.

All firmware or software upgrades or changes will be managed through NCM. There should be no need for any manual firmware updates unless specifically approved and under the direction and supervision of the Comms team or via Machine Support.

C. Router Reset:

Router resets can accomplished if one believes it is necessary to clear some type of unknown error. Be cautioned though, if a router is reset, it will need to reconnect to the network to receive its configuration, otherwise it cannot be left connected to the

kiosk PC with the WiFi light on. A router will not reset if it is in the process of boot up. Power on the router, wait 90 seconds and then attempt a reset.

1. Press and hold the reset button.

2. The antenna lights will flash through a count of 10 seconds.

3. After the antenna lights blink for 10 seconds, watch the WiFi and WAN light. They will flash together twice.

4. After the double blink, you can release the reset button.

This entire process only takes about 15 seconds. After the router resets and reboots, the WiFi light will be on and it WILL BE ACTIVE (in default mode). Once the router reconnects to NCM, it will receive the Redbox configuration again, and the WiFi light will turn off. If it does not or cannot connect to receive the configuration and the WiFi light remains on, the router cannot be deployed into a kiosk.

D. Signal Strength and Antennas

Another key piece to good wireless communications is, of course, the signal. If there is no signal, there will be no communications. If the signal is greatly degraded, the communications will also act accordingly. Once that kiosk door is closed, almost all radio frequency (RF) energy is blocked and any signal that is received inside the kiosk is most likely one that has been reflected several times over and is greatly degraded. It is important that our antennas be external to the kiosk that our antenna cables are in good condition and our connections solid. Periodic review of your antennas when opportunity exists is a great way to make sure your wireless connection will stay solid and dependable. The Secure antenna is located on a specific part of the kiosk, so not much adjustment is possible with that type. The typical Wilson “301” or “whip” antenna that comes with each kiosk does have some leeway on where it is placed. Typically, that antenna will get the best signal square in the middle of the top of the kiosk (if not blocked by some light box. Basically, that antenna needs a “ground plane” of metal around it that is about a 10-12” radius. This ground plane provides a much needed aspect to the antenna to reflect RF signal to it properly. For more information, feel free to look up the wiki on “ground plane”

Looking at just the signal strength indicator on the router is only one way of determining signal quality. It gives little indication regarding the specifics of signal

strength and other quality aspects of the signal reception. To find more information, one can log into the router and pull data, if desired. Further, the router should be connected to our NCM account and a record of the device signal over time is available if there are questions about the signal at any particular kiosk. Either way, if more information is desired, feel free to contact the Comms team: comms@redbox.com Otherwise, contact MS about troubleshooting or for further Comms assistance.

Regardless of the values found regarding signal levels, the primary goal is that the unit is connected and passing data traffic. The Comms team has noted and tested very poor values yet the router still maintained an active, valid connection. If you feel improvements need to be made, reach out to MS for troubleshooting. If they feel Comms needs to be involved, they will escalate the issue to Comms and it will be reviewed on and kiosk-by-kiosk basis.

E. RMAs / Ordering Additional Units

If the steps herein did not fix the issue and you believe you have a defective or faulty unit that needs returned, the desired and acceptable means of tagging a router for RMA return is to include the provided "toe-tag" simply and loosely attached to the router. We respectfully request that the tag not have "excessive" windings of the metal tie to secure it. One or two simple "twists" will secure it and make it much easier to remove when it comes back for RMA processing. All tags need to be removed when they are received at Parts. Cooperation in making this easier is appreciated.

Please do not write on, cross out, block or inhibit the effectiveness of any barcode or label. Please do not write "bad" or "broken" on the device, or in any other way deface, mar, or mark the surface of the router. Please do not use tape to attach anything to or block any port on the router. Finally, please do not use any adhesives of any type as it can and does mar the surface in addition to being difficult to remove. Further, if someone has applied tape, Velcro, or some adhesive to the router, please remove it before sending it back to Parts. 90%+ of returned routers are refurbished or found to be perfectly fine and there is a cost associated with restoring the exterior surface of the routers before repackaging for reuse.

If you need a replacement/RMA or additional IBR200s, both Verizon and Sprint units are available through the proper Ops channels and processes or RMA procedures. Those specific procedures are available from your supervisor.

Cradlepoint IBR200 router:

Verizon kit: (available Q2, 2018)	RDBX01622-01
Sprint kit: (available Q1, 2019)	RDBX01622-02