

# HydroLynx Systems, Inc.

**Model 5052RD-K  
ALERT2 Receiver/Decoder**

**Instruction Manual**



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## Receiving and Unpacking

Carefully unpack all components and compare to the packing list. Notify HydroLynx Systems immediately concerning any discrepancy. Inspect equipment to detect any damage that may have occurred during shipment. In the event of damage, any claim for loss must be filed immediately with the carrier by the consignee. If the equipment was shipped via Parcel Post or UPS, contact HydroLynx Systems for instructions.

## Returns

If equipment is to be returned to the factory for any reason, call HydroLynx between 8:00 a.m. and 4:00 p.m. Pacific Time to request a Return Authorization Number (RA#). Include with the returned equipment a description of the problem and the name, address, and daytime phone number of the sender. Carefully pack the equipment to prevent damage during the return shipment. Call HydroLynx for packing instructions in the case of delicate or sensitive items. If packing facilities are not available, take the equipment to the nearest Post Office, UPS, or other freight service and obtain assistance with packaging. Please write the RA# on the outside of the box.

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Model 5052RD-K Receiver/Decoder Front Panel with OP1 ALERT1 Receiver/Decoder Option



Model 5052RD-K Receiver/Decoder Back Panel with OP1 ALERT1 Receiver/Decoder Option

## 1.0 INTRODUCTION

### 1.1 General Description

The Model 5052RD-K Receiver/Decoder receives ALERT2 radio data transmissions from remote sites and provides a serial and TCP/IP data output for the base station computer. The Receiver and Decoder are combined in a single desktop enclosure. Rack mount brackets are included.

Model 5052RD-OP1 ALERT1 Receiver/Decoder Option receives ALERT1 radio data transmissions from remote sites and provides a TCP/IP data output to the base station computer. The ALERT1 Receiver and Decoder are mounted inside the 5052RD-K Receiver/Decoder desktop enclosure.

Model 5052RD-OP2 ALERT2 Transmit Option transmits ALERT2 radio data packets to remote sites using an additional transmit radio with its own antenna connector. The ALERT2 Encoder and transmit radio are mounted inside the 5052RD-K Receiver/Decoder desktop enclosure. A GPS antenna and cable are included.

ALERT2 technology has been licensed from Blue Water Design LLC.

### 1.2 Equipment Included

5052RD-K  
Rack mount brackets

### 1.3 Specifications

Enclosure:	Desktop, 19 in. rack mount brackets included
Radio:	ALERT2 RX Ritron DTX-145, VHF
OP1	ALERT1 RX Ritron DTX-145, VHF
OP2	ALERT2 TX Maxon SD-125VE, VHF
Power Required:	12 Vdc
Power Connector:	3 pin MS male
Fuse:	5 Amps
Antenna Connector:	ALERT2 RX BNC male
OP1	ALERT1 RX BNC male
OP2	ALERT2 TX BNC male
	ALERT2 GPS SMA female
Console Connector:	DB9 male
Data Connector:	ALERT2 RJ45 female, DB9 female
OP1	ALERT1 RJ45 female, DB9 female
Data Output:	ALERT2 IND Decoder Format
	ASCII (port 4200) or Binary (port 4201)
OP1	ALERT1 ASCII and Binary (port 2101)
Data Input OP2:	ALERT2 IND Encoder Format (port 4202)
Operating temperature:	-40 to 60 °C
Size:	17 in. x 13 in. x 3.5 in.
Weight:	13 lbs.

## 2.0 INSTALLATION

### 2.1 Site Selection

#### 2.1.1 Antenna

The receiver antenna should be installed at an elevation that is as high as practical. If possible, install the antenna onto a radio tower, tall building, or other tall structure. Refer to Radio Path Survey.

#### 2.1.2 5052RD-K

The 5052RD-K ALERT2 Receiver/Decoder enclosure should be located near the antenna tower to reduce the length of the RF transmission line and the associated RF signal loss. It is recommended that a lightning arrestor with ground lug (optional) be placed between the ALERT2 receiver back panel BNC connector and the antenna to protect against lightning damage.

### 2.2 Connections

All wiring connections are located on the back panel.

- Connect the ALERT2 RX antenna cable to the ALERT2 RX BNC female connector.
- Attach the ground screw to earth ground using a #6 stranded copper wire. The ground lug is provided on the ground screw.
- Attach a computer network cable to the ETHERNET RJ45 ALERT2 connector.
- Attach a computer serial cable to the SERIAL DB9 female ALERT2 connector.
- Connect the AC power supply to the 3-pin 12VDC connector. For best results, connect the power supply to a battery backed system (UPS).

#### 2.2.1 Option 5052RD-OP1 ALERT1 Receiver/Decoder Connections

- Connect the ALERT1 RX antenna cable to the ALERT1 RX BNC female connector. An external antenna cable splitter can be used to share the same receive antenna.
- Attach a computer network cable to the ETHERNET RJ45 ALERT1 connector.
- Attach a computer serial cable to the SERIAL DB9 female ALERT1 connector.

#### 2.2.2 Option 5052RD-OP2 ALERT2 Transmit Connections

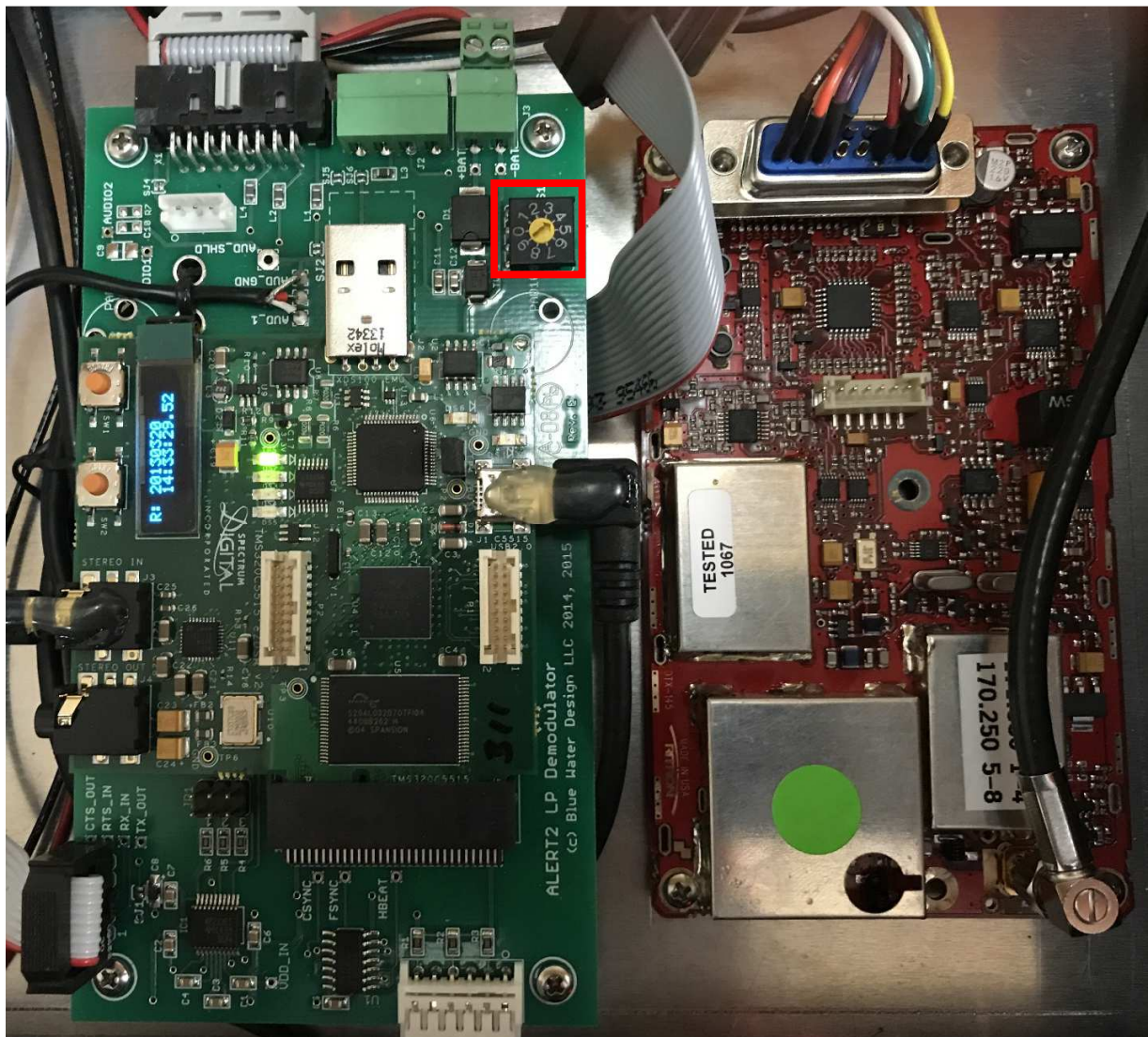
- Connect the ALERT2 TX antenna cable to the ALERT2 TX BNC female connector.
- Connect the ALERT2 GPS antenna cable to the GPS SMA female connector.

## 2.3 Radio Frequency Selection

If the ALERT2 receive radio is programmed with several frequencies, remove the 5052RD-K ALERT2 Receiver/Decoder top cover to change radio frequencies.

### 2.3.1 ALERT2 Receive Radio Frequency Selection

The ALERT2 receive radio frequency is selected on the ALERT2 demodulator board circular DIP switch S1 with the yellow center. Switch positions 0 to 7 correspond to radio channels 1 to 8. The photo below shows switch position 4 which is the radio channel 5.



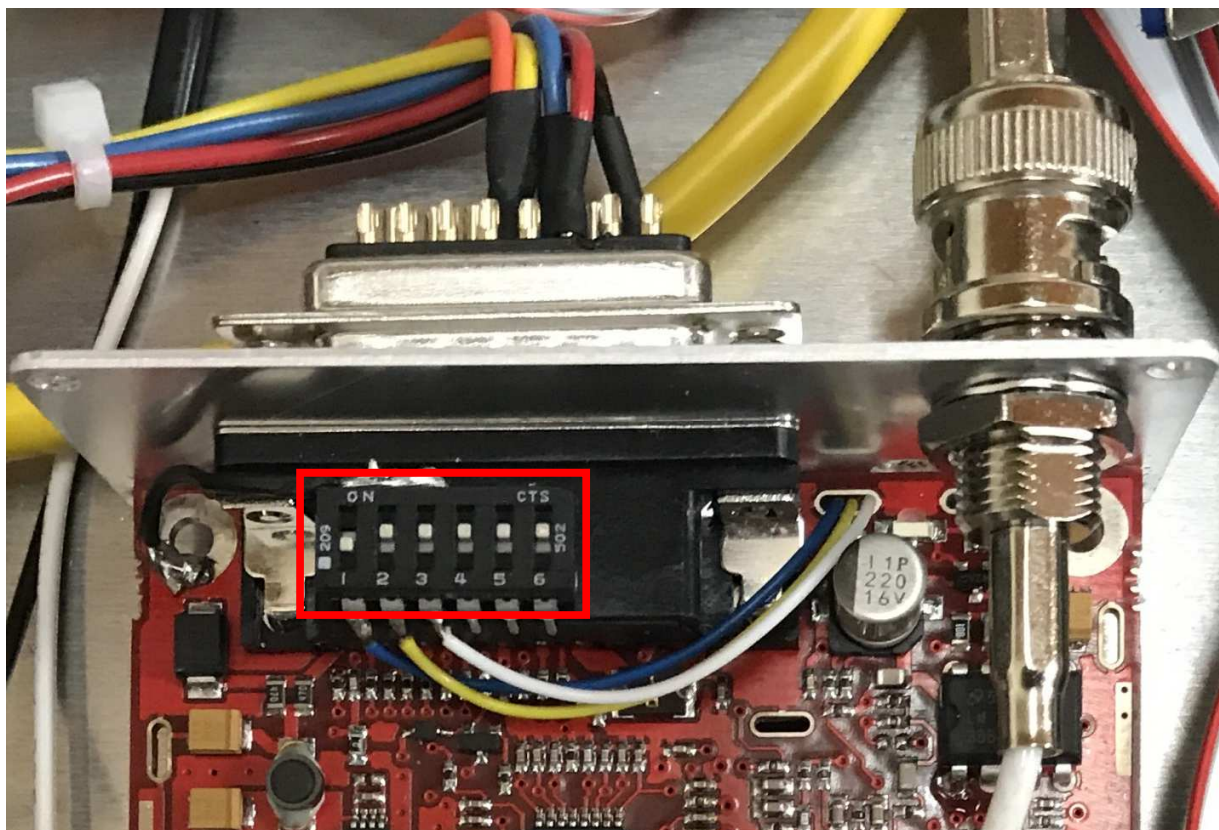


### 2.3.2 ALERT1 Receive Radio Frequency Selection

The ALERT1 receive radio frequency is selected on the 6 position DIP switch inside the radio. You must remove the radio cover to access this switch.

Use the radio frequency label for the switch positions. The photo below has radio channel 2 selected.

	RX	TX	1	2	3	4	5	6	SW
1	169.5000	169.5000	X	X	X	X	X	X	ON OFF
2	170.2750	170.2750	X		X	X	X	X	ON OFF
3	170.3000	170.3000	X	X	X	X	X	X	ON OFF
4	171.0500	171.0500	X	X		X	X	X	ON OFF
5	171.1250	171.1250	X	X	X		X	X	ON OFF
6	171.8250	171.8250	X		X	X	X	X	ON OFF
7	171.9000	171.9000	X	X	X		X	X	ON OFF
8	171.9250	171.9250	X	X	X	X	X	X	ON OFF



### 2.3 Mounting

The 5052RD-K is designed for "desktop" or rack mount installation.

### 3.0 THEORY OF OPERATION

The 5052RD-K ALERT2 Receiver/Decoder receives ALERT2 Airlink Protocol audio signals from the ALERT2 receive radio and decodes these signals into ALERT2 Demodulator & Decoder ASCII and Binary Asynchronous Serial Interface formats. ALERT2 decoder output is through the back panel ETHERNET RJ45 network or SERIAL DB9 female ALERT2 serial connectors.

The ALERT2 decoder output is logged on an SD card which can be accessed through the ALERT2 Decoder Console.

The Receiver/Decoder is powered by a fused 12Vdc power input from a 5030-PS power supply (optional) or 5081-18 12 Vdc 18 AmpHr battery (optional) with 5030-8 battery charger (optional). It is recommended that the power supply be connected to a UPS (Uninterruptible Power Supply) to prevent loss of data during power outages. A power LED on the front panel is on when power is connected. The power input fuse is mounted on the back panel.

The Model 5052RD-OP1 ALERT1 Receiver/Decoder Option receives ALERT1 audio signals from the ALERT1 receive radio and decodes these signals into ALERT1 ASCII and Binary formats. ALERT1 decoder data output is through the back panel ETHERNET RJ45 network or SERIAL DB9 female ALERT1 serial connectors.

The Model 5052RD-OP2 ALERT2 Transmit Option receives ALERT2 IND Encoder & Modulator Asynchronous Binary Serial Interface commands from a base station computer through the back panel ETHERNET RJ45 ALERT2 network connector and transmits ALERT2 Airlink Protocol audio tones through the ALERT2 transmit radio.

#### 3.1 Fused DC input

Fuse is 5 amps.

**CAUTION:** Before replacing the fuse, always unplug DC power supply.

#### 3.2 Power On Light

The power light is lighted whenever DC Power is applied. Check the fuse if the light is off when the unit is plugged into DC Power.

#### 3.3 Radio: Tone and Squelch

##### 3.3.1 ALERT2 Receive Radio

The tone amplitude and squelch levels are factory set.

The audio output is 375 mV RMS with a DC offset or bias of < 3.3 Vdc.

The ALERT2 receive radio operates unsquelched.

### 3.3.2 ALERT1 Receive Radio

The tone amplitude and squelch levels are factory set.

Tone amplitude is 800 mV.

Squelch is set to -113 dB with no receiver amplifier, -106 dB with a receiver amplifier.

## 3.4 Front Panel LEDs

### 3.4.1 ALERT2 LEDs

Two LEDs on the front panel turn on when radio signals are received (BIT SYNC) and decoded (FRAME SYNC). Both LEDs must turn on for a valid ALERT2 receive signal.

### 3.4.2 ALERT1 LED

The ALERT1 Data LED on the front panel flashes when ALERT1 radio signals are received when the Model 5052RD-OP1 ALERT1 Receiver/Decoder Option is installed.

### 3.4.3 ALERT1 SPEAKER

The ALERT1 radio speaker is turned on when the toggle switch is in the down position (towards the word SPEAKER) when the Model 5052RD-OP1 ALERT1 Receiver/Decoder Option is installed.

## 3.5 Input/Output

### 3.5.1 ALERT2 Decoder Console

The ALERT2 decoder can be programmed using the console interface. Program changes include the IP address, NTP servers, Decoder output clients.

The console interface connection is through the back panel ETHERNET RJ45 ALERT2 network connector or SERIAL CONSOLE DB9 male serial connector. Both connections require a login. The default login name is **root** with a password **alert2**. The login name and password can be changed, see Section 4.

The console network connection is made using SSH on default port 22. This can be changed, see Section 4.

The console serial connection is at 115,200 baud, no parity, 8 data bits, no stop bits, no flow control. A NULL modem cable must be used for the serial connection.

### 3.5.2 ALERT2 Decoder Output

ALERT2 decoder output is through the back panel ETHERNET RJ45 network, SERIAL

DB9 female ALERT2, and SERIAL DB9 male CONSOLE serial connectors. ALERT2 Demodulator & Decoder **ASCII** and **Binary** Asynchronous Serial Interface format outputs are provided on the network connection. Only the ALERT2 Demodulator & Decoder **ASCII** Asynchronous Serial Interface format output is provided on the serial connections.

The ALERT2 decoder output serial connection is at 19200 baud, no parity, 8 data bits, no stop bits, no flow control.

The ALERT2 decoder supports multiple server and client network connections. See Section 4 for network client connection programming.

The ALERT2 decoder in server mode listens for TCP/IP network connections from up to 25 base station computers on port 4200 for ALERT2 Decoder ASCII format output and port 4201 for ALERT2 Decoder Binary format output. There is no attempted reconnect for connections lost in server mode.

The ALERT2 decoder in client mode will make TCP/IP network connections with remote base station computer IP addresses and ports. The ALERT2 Receiver/Decoder will attempt a reconnect every 30 seconds.

### 3.5.3 ALERT1 Decoder Output

ALERT1 decoder output is through the back panel ETHERNET RJ45 ALERT1 network and SERIAL DB9 female ALERT1 serial connector when the Model 5052RD-OP1 ALERT1 Receiver/Decoder Option is installed. ALERT1 ASCII and Binary format outputs are provided on the network connection and serial connection.

The ALERT1 decoder output serial connection is at 300 baud, no parity, 8 data bits, no stop bits, no flow control.

The ALERT1 decoder supports multiple server or a single client connections. See Section 4 for network connection programming.

The ALERT1 decoder in server mode listens for TCP/IP network connections from multiple base station computers on port 2101.

The ALERT1 decoder in client mode will make a single TCP/IP network connection with remote base station computer IP address and port.

### 3.5.4 ALERT2 Transmit Input

ALERT2 encoder data input is through the back panel ETHERNET RJ45 ALERT2 network connector when the Model 5052RD-OP2 ALERT2 Transmit Option is installed. The ALERT2 IND Encoder & Modulator Asynchronous Binary Serial Interface format is supported.

## 4.0 Programming

### 4.1 ALERT2 Decoder Programming

The 5052RD-K ALERT2 Receiver/Decoder can be programmed using the console interface. The console interface connection is through the back panel ETHERNET RJ45 ALERT2 network connector or SERIAL DB9 male CONSOLE serial connector. Use a Windows terminal program such as HyperTerminal or PuTTY.

The console network connection is made using SSH on default port 22.

The serial connection is at 115,200 baud, no parity, 8 data bits, no stop bits, no flow control. A NULL modem cable must be used for the serial connection.

Both network and serial connections require a login. The default login name is *root* with a password *alert2*.

#### 4.1.1 ALERT2 Decoder Enable Changes

In operational mode, the ALERT2 decoder file system is read-only. After logging in as **root**, allow changes to be made by making the root file system read-write with the command: **mount / -o remount,rw**

The file system can now be changed by adding, deleting, and editing files. The read-write mode remains in effect until the ALERT2 decoder is rebooted or the file system is remounted as read only.

Reboot with the ALERT2 decoder with the command: **reboot**

Restore the root file system read-only state with the command: **mount / -o remount,ro**

After rebooting you will have to reconnect and log in again.

#### 4.1.2 ALERT2 Decoder Login Password Change

To change the login password, make the file system read-write then execute the command: **passwd**

```
Enter new UNIX password: (Type your new password here, then press [Enter])
```

```
Retype new UNIX password: (Repeat new password here, then press [Enter])  
passwd: password updated successfully
```

#### 4.1.3 ALERT2 Decoder IP Address Change

The ALERT2 Decoder IP address is set by DHCP by default, unless a factory IP setup was requested. To determine the assigned IP address, launch a Windows Command Prompt window and type the command: **arp -a**

```

Administrator: Command Prompt
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\windows\system32>arp -a

Interface: 192.168.1.34 --- 0xb
Internet Address      Physical Address      Type
192.168.1.1           68-7f-74-35-8d-b6    dynamic
192.168.1.6           6c-c2-17-84-cb-70    dynamic
192.168.1.7           00-0f-66-82-8b-b6    dynamic
192.168.1.20          c4-34-6b-67-c2-19    dynamic
192.168.1.24          00-19-d1-2b-04-1f    dynamic
192.168.1.32          00-1c-c0-f7-e3-21    dynamic
192.168.1.35          40-a8-f0-64-53-b5    dynamic
192.168.1.92          00-d0-69-4c-f7-db    dynamic
192.168.1.93          74-55-50-70-cd-4d    dynamic
192.168.1.96          38-63-bb-07-71-b6    dynamic
192.168.1.97          00-23-7d-71-0b-97    dynamic
192.168.1.98          98-e7-f4-b0-d7-c3    dynamic
192.168.1.99          00-1c-c4-74-a6-f7    dynamic
192.168.1.141         c0-bd-d1-45-a5-47    dynamic
192.168.1.147         00-d0-69-4d-4c-2d    dynamic
192.168.1.148         00-40-9d-a2-ae-77    dynamic
192.168.1.149         a4-34-d9-30-4c-bf    dynamic
192.168.1.255         ff-ff-ff-ff-ff-ff    static
224.0.0.2             01-00-5e-00-00-02    static
224.0.0.22           01-00-5e-00-00-16    static
224.0.0.251          01-00-5e-00-00-fb    static
224.0.0.252          01-00-5e-00-00-fc    static
239.255.255.250      01-00-5e-7f-ff-fa    static
255.255.255.255      ff-ff-ff-ff-ff-ff    static

C:\windows\system32>

```

Look for the IP address assigned to the ALERT2 decoder Physical Address which is on the 5052RD-K ALERT2 Receiver/Decoder Test Results sheet on the ALERT2 decoder line and serial number column. For example, the IP address 192.168.1.92 is assigned the Physical Address 00-d0-69-4c-f7-db.

Display the ALERT2 decoder IP and Physical address on the console connection with the command: **ifconfig**. In the eth0 section, the IP address follows inet addr: and the Physical address follows HWaddr. For example:

```

ifconfig[Enter]
eth0      Link encap:Ethernet HWaddr 00:d0:69:4c:f7:db
          inet addr:192.168.1.92 Bcast:192.168.1.255 Mask:255.255.255.0
          inet6 addr: fe80::2d0:69ff:fe4c:f7db/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:359832 errors:2 dropped:0 overruns:0 frame:0
          TX packets:71868 errors:2 dropped:0 overruns:0 carrier:2
          collisions:0 txqueuelen:1000
          RX bytes:26068643 (24.8 MiB) TX bytes:11430596 (10.9 MiB)
          Interrupt:21 Base address:0x4000

lo        Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING MTU:16436 Metric:1

```

```

RX packets:16747 errors:0 dropped:0 overruns:0 frame:0
TX packets:16747 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:34142976 (32.5 MiB) TX bytes:34142976 (32.5 MiB)

```

To change ALERT2 decoder IP address, edit the file: ***/etc/network/interfaces***.

Before editing the file, enable decoder changes by making the file system read-write:  
***mount / -o remount,rw***

Edit the network interface file with the command: ***vi /etc/network/interfaces***

The file below has the IP address assigned by DHCP.

```

# Used by ifup(8) and ifdown(8). See the interfaces(5) manpage or
# /usr/share/doc/ifupdown/examples for more information.

```

```

# We always want the loopback interface.

```

```

#
auto lo
iface lo inet loopback

```

```

# auto eth0
# disable automatic eth0 up/down; it will be handled by
# ifplugd
iface eth0 inet dhcp

```

```

#iface eth0 inet static
# address 192.168.1.92
# netmask 255.255.255.0
# gateway 192.168.1.1

```

To disable DHCP and set a fixed IP address, put a **#** sign at the start of the line:

```

iface eth0 inet dhcp

```

Move to the start of the line, press the **i** key to start insert, type **#** at the start of the line, then press **[Esc]** to quit the insert. The line should look like:

```

#iface eth0 inet dhcp

```

Move to the start of the line:

```

#iface eth0 inet static

```

Move the cursor under the **#** and press the **x** key to delete the character.

```

iface eth0 inet static

```

Continue down the file removing the **#** character at the start of the following lines:

```

iface eth0 inet static
    address 192.168.1.92
    netmask 255.255.255.0
    gateway 192.168.1.1

```

Change the fixed IP address for the ALERT2 decoder on the line:

```

    address 192.168.1.92

```

Position the cursor over the IP address component to change, press **x** to delete a character. Move the cursor after the space following the word address, then press **i** to start insert mode, type the new IP address, then press **[Esc]** to quit the insert. Be careful to leave two spaces at the start of the line.

Change the network mask on the line:

```
netmask 255.255.255.0
```

Change the network gateway IP address on the line:

```
gateway 192.168.1.1
```

Save your changes and quit, type the command: **:wq** (no [Enter] required)

To quit without saving use type the command: **:q!** (no [Enter] required)

Reboot the ALERT2 decoder to make the changes effective. Type the command: **reboot**

Restart your ALERT2 Decoder Console connection and log in again.

#### 4.1.4 ALERT2 Decoder Network Time Sync

The ALERT2 Decoder requires a network time server synchronization to keep its time current to the nearest second. ALERT2 data packets received from the radio are time stamped with the current ALERT2 decoder time when decoding is finished. The base station software uses the ALERT2 decoder receive time to compute the remote station data report time from the data packet time stamp.

The default network time servers use the internet NTP server pool. If the 5052RD-K ALERT2 Receiver/Decoder cannot connect to the internet, you must change to a private time server. To change the time server, edit the file: **/etc/ntp.conf**.

Before editing the file, enable decoder changes by making the file system read-write:

```
mount / -o remount,rw
```

Edit the network interface file with the command: **vi /etc/ntp.conf**

The file below uses the internet NTP server pool.

```
server 127.127.28.0 minpoll 4  
fudge 127.127.28.0 time1 0.200 refid GPS
```

```
server 127.127.28.1 minpoll 4 prefer  
fudge 127.127.28.1 refid PPS
```

```
# Sanity checks  
server 0.pool.ntp.org iburst  
server 1.pool.ntp.org iburst  
server 2.pool.ntp.org iburst  
server 3.pool.ntp.org iburst
```

```
# you should not need to modify the following paths  
driftfile /var/lib/ntp/ntp.drift
```



```
# To deny other machines from changing the
# configuration but allow localhost:
restrict default nomodify nopeer
restrict 127.0.0.1
```

To disable the internet NTP server pool, put a # sign at the start of the lines:

```
server 0.pool.ntp.org iburst
server 1.pool.ntp.org iburst
server 2.pool.ntp.org iburst
server 3.pool.ntp.org iburst
```

Move to the start of each line, press the *i* key to start insert, type # at the start of the line, then press **[Esc]** to quit the insert. The lines should look like:

```
#server 0.pool.ntp.org iburst
#server 1.pool.ntp.org iburst
#server 2.pool.ntp.org iburst
#server 3.pool.ntp.org iburst
```

Move below these lines to a blank line and insert a new line for your private time server IP address. Press the *i* key to start insert, type the following line using your timer server IP address, press [Enter] at the end of the line, then press **[Esc]** to quit the insert.

```
server 192.168.1.24 prefer
```

In the example above the time server IP address is 192.168.1.24

Save your changes and quit, type the command: **:wq** (no [Enter] required)  
To quit without saving use type the command: **:q!** (no [Enter] required)

Reboot the ALERT2 decoder to make the changes effective. Type the command: **reboot**

Restart your ALERT2 Decoder Console connection and log in again.

#### 4.1.5 ALERT2 Decoder Network Client Connections

The ALERT2 Decoder supports up to 25 server connections from base station computers on port 4200 for ASCII format, and port 4201 for Binary format.

Client connections can be added to the ALERT2 Decoder by editing the file: ***/etc/default/alert2client***.

Before editing the file, enable decoder changes by making the file system read-write: ***mount / -o remount,rw***

Edit the network interface file with the command: ***vi /etc/default/alert2client***

```
# This file should contain a list of servers to forward data to,
# one per line. The format looks like:
# ascii|binary hostname:port

# ascii 192.168.1.40:4000 # ascii listener on 192.168.1.40, port 4000
# binary 192.168.1.40:4001 # binary listener on 192.168.1.40, port 4001
```

To add client connections, move the cursor to the bottom of the file on the last blank line, press the *i* key to start insert, type format type (ascii or binary) a space, the IP address followed by a colon (:) then the connection port, **[Enter]** to finish the line, then press **[Esc]** to quit the insert. For example to make an ASCII connection to a client at IP 192.168.1.24 and port 4000 add the line:

```
ascii 192.169.1.24:4000
```

Add one line per client connection.

Save your changes and quit, type the command: **:wq** (no [Enter] required)

To quit without saving use type the command: **:q!** (no [Enter] required)

Reboot the ALERT2 decoder to make the changes effective. Type the command: **reboot**

Restart your ALERT2 Decoder Console connection and log in again.

#### 4.1.6 ALERT2 Decoder SSH port change

The console network connection is made using SSH on port 22 by default. This can be changed to allow firewall routing. To change the ssh port, edit the file: **/etc/ssh/sshd\_config**.

Before editing the file, enable decoder changes by making the file system read-write:  
**mount / -o remount,rw**

Edit the network interface file with the command: **vi /etc/ssh/sshd\_config**

The file below has the ssh port set to the default port 22.

```
# Package generated configuration file
# See the sshd_config(5) manpage for details

# What ports, IPs and protocols we listen for
Port 22
# Use these options to restrict which interfaces/protocols sshd will
bind to
#ListenAddress ::
```

Position the cursor on the number 22 following the word Port on line 5, press **x** twice to delete the number 22. Move the cursor after the space following the word Port then press *i* to start insert mode, type the new IP address, then press **[Esc]** to quit the insert.

```
Port 4203
```

Save your changes and quit, type the command: **:wq** (no [Enter] required)

To quit without saving use type the command: **:q!** (no [Enter] required)

Reboot the ALERT2 decoder to make the changes effective. Type the command: **reboot**

Restart your ALERT2 Decoder Console connection and log in again.

#### 4.1.7 ALERT2 Decoder Host Name

The ALERT2 Decoder host name is defined as **ts4200** by default. Change the host name by adding the file: **/etc/hostname** containing the new host name.

For example, change the ALERT2 decoder name to a2decoder1. Display the current host name with the command: **hostname**

```
hostname[Enter]
ts4200
```

Before creating the file, enable decoder changes by making the file system read-write:

```
mount / -o remount,rw[Enter]
```

Create the hostname file with the **echo** command:

```
echo "a2decoder1" >/etc/hostname[Enter]
```

Reboot the ALERT2 decoder to make the changes effective. Type the command: **reboot**

Restart your ALERT2 Decoder Console connection and log in again.

#### 4.1.8 ALERT2 Decoder Name Servers and Host Names

The ALERT2 Decoder defines its name servers in the file: **/etc/resolv.conf**. Display the current name servers with the command:

```
cat /etc/resolv.conf[Enter]
nameserver 8.8.8.8 # Google Public DNS
nameserver 4.2.2.1 # Level 3, Broomfield, CO
nameserver 4.2.2.2 # Level 3, Broomfield, CO
nameserver 151.197.0.38 # Verizon, Reston, VA
```

If your ALERT2 Decoder is on a private network, it cannot connect to the internet for the name servers. Add your private name server by changing the file: **/etc/resolv.conf**

Before changing the file, enable decoder changes by making the file system read-write:

```
mount / -o remount,rw[Enter]
```

Create the hostname file with the **echo** command:

```
echo "nameserver My.Name.Server.IP" >/etc/resolv.conf[Enter]
```

You can remove the name servers and add your private network host names to the file: **/etc/hosts**.

```
rm /etc/resolv.conf[Enter]
```

```
127.0.0.1 localhost
```

```
# IP6 definitions, do not change.
::1          localhost ip6-localhost ip6-loopback
fe00::0     ip6-localnet
ff00::0     ip6-mcastprefix
ff02::1     ip6-allnodes
ff02::2     ip6-allrouters
```

Edit the host file with the command: ***vi /etc/hosts***

Move the cursor to the line below the last line printed, then press ***i*** to start insert mode, type the host IP address, a space, the host name, then press [Enter] to finish the line. Lines starting with **#** are comments. Continue adding IP addresses and host names until done, then press **[Esc]** to quit the insert. For example:

```
# Local alert2 decoder name, change as needed.
192.168.1.92 a2decoder1

# NovaStar5 servers.
192.168.1.98 novastar5a
192.168.1.99 novastar5b
[Esc]
```

Save your changes and quit, type the command: ***:wq*** (no [Enter] required)  
To quit without saving use type the command: ***:q!*** (no [Enter] required)

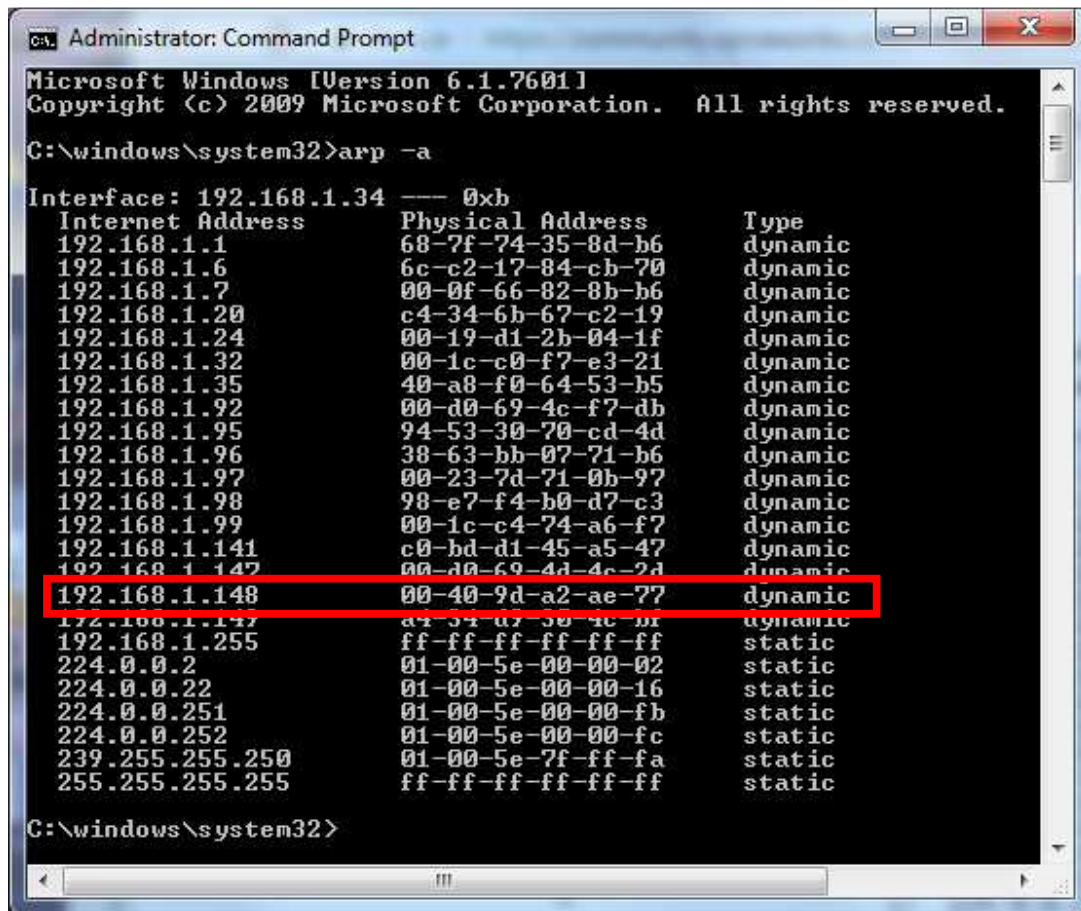
Reboot the ALERT2 decoder to make the changes effective. Type the command: ***reboot***

Restart your ALERT2 Decoder Console connection and log in again.

## 4.2 ALERT1 Decoder Programming

### 4.2.1 ALERT1 Decoder IP Address Change

The ALERT1 Decoder IP address is set by DHCP by default, unless a factory IP setup was requested. To determine the assigned IP address, launch a Windows Command Prompt window and type the command: ***arp -a***



```

Administrator: Command Prompt
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\windows\system32>arp -a

Interface: 192.168.1.34 --- 0xb
Internet Address      Physical Address      Type
192.168.1.1           68-7f-74-35-8d-b6    dynamic
192.168.1.6           6c-c2-17-84-cb-70    dynamic
192.168.1.7           00-0f-66-82-8b-b6    dynamic
192.168.1.20          c4-34-6b-67-c2-19    dynamic
192.168.1.24          00-19-d1-2b-04-1f    dynamic
192.168.1.32          00-1c-c0-f7-e3-21    dynamic
192.168.1.35          40-a8-f0-64-53-b5    dynamic
192.168.1.92          00-d0-69-4c-f7-db    dynamic
192.168.1.95          94-53-30-70-cd-4d    dynamic
192.168.1.96          38-63-bb-07-71-b6    dynamic
192.168.1.97          00-23-7d-71-0b-97    dynamic
192.168.1.98          98-e7-f4-b0-d7-c3    dynamic
192.168.1.99          00-1c-c4-74-a6-f7    dynamic
192.168.1.141         c0-bd-d1-45-a5-47    dynamic
192.168.1.147         00-d0-69-4d-4c-2d    dynamic
192.168.1.148         00-40-9d-a2-ae-77    dynamic
192.168.1.149         a7-37-07-50-1c-01    dynamic
192.168.1.255         ff-ff-ff-ff-ff-ff    static
224.0.0.2             01-00-5e-00-00-02    static
224.0.0.22           01-00-5e-00-00-16    static
224.0.0.251          01-00-5e-00-00-fb    static
224.0.0.252          01-00-5e-00-00-fc    static
239.255.255.250      01-00-5e-7f-ff-fa    static
255.255.255.255      ff-ff-ff-ff-ff-ff    static

C:\windows\system32>

```

Look for the IP address assigned to the ALERT1 Decoder Physical Address which is on the 5052RD-K ALERT2 Receiver/Decoder Test Results sheet on the 5052RD-OP1 ALERT1 Serial to IP line and Serial Number / MAC column. For example, the IP address 192.168.1.148 is assigned the Physical Address 00-40-9d-a2-ae-77.

Use a Windows internet browser to connect to the ALERT1 Decoder by typing the IP address on the browser address line.

Enter the User Name: **root**

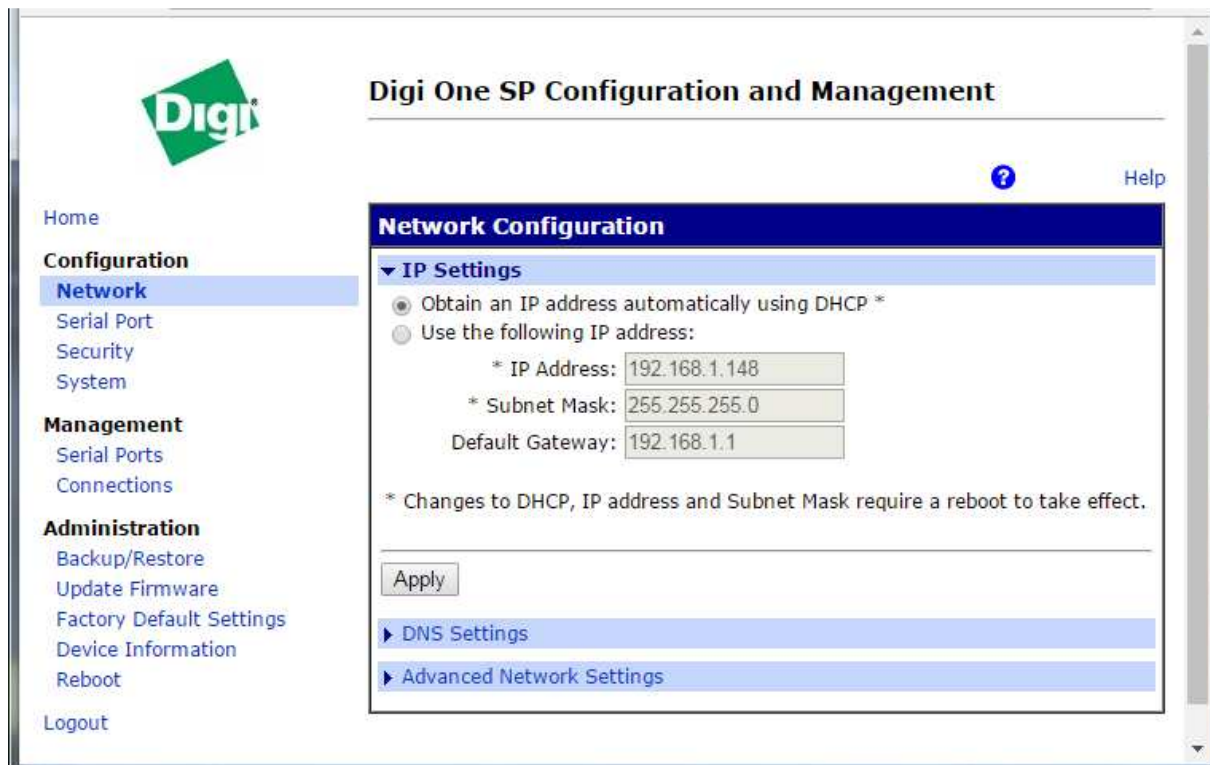
Password: **alert1**

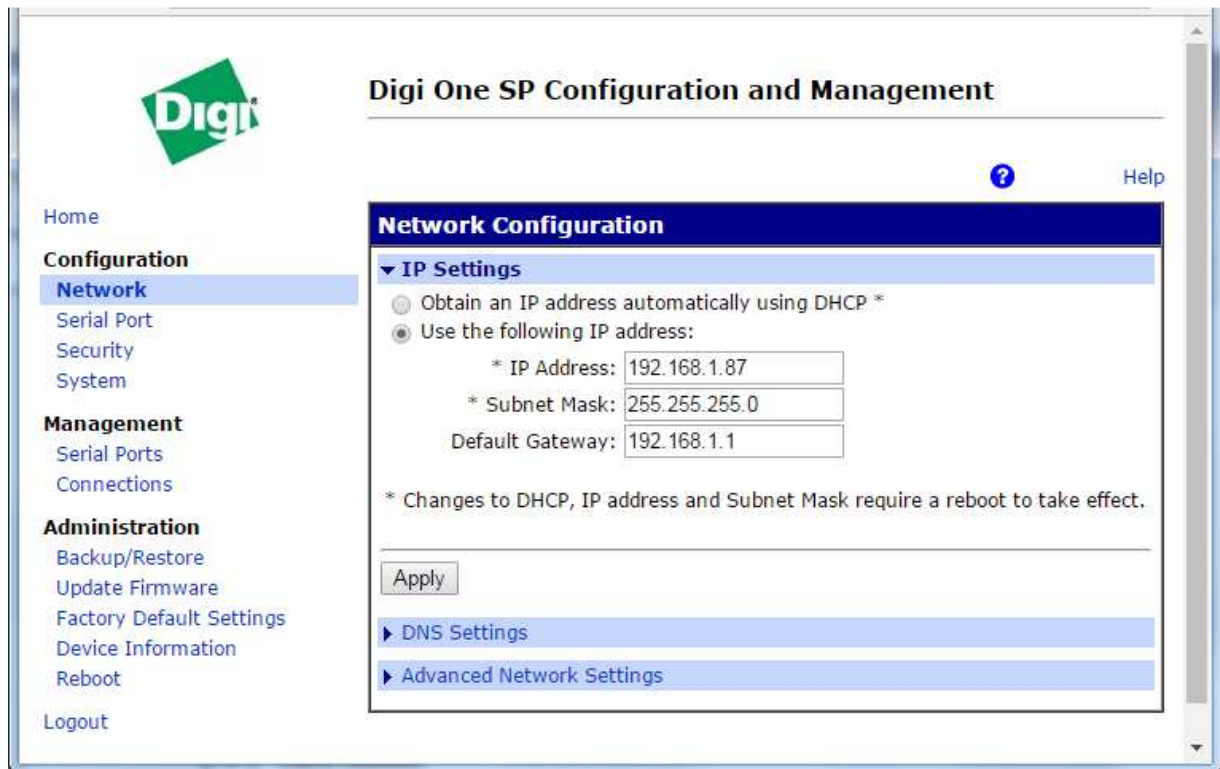
Click Log In.

The ALERT1 Decoder Home page is displayed:

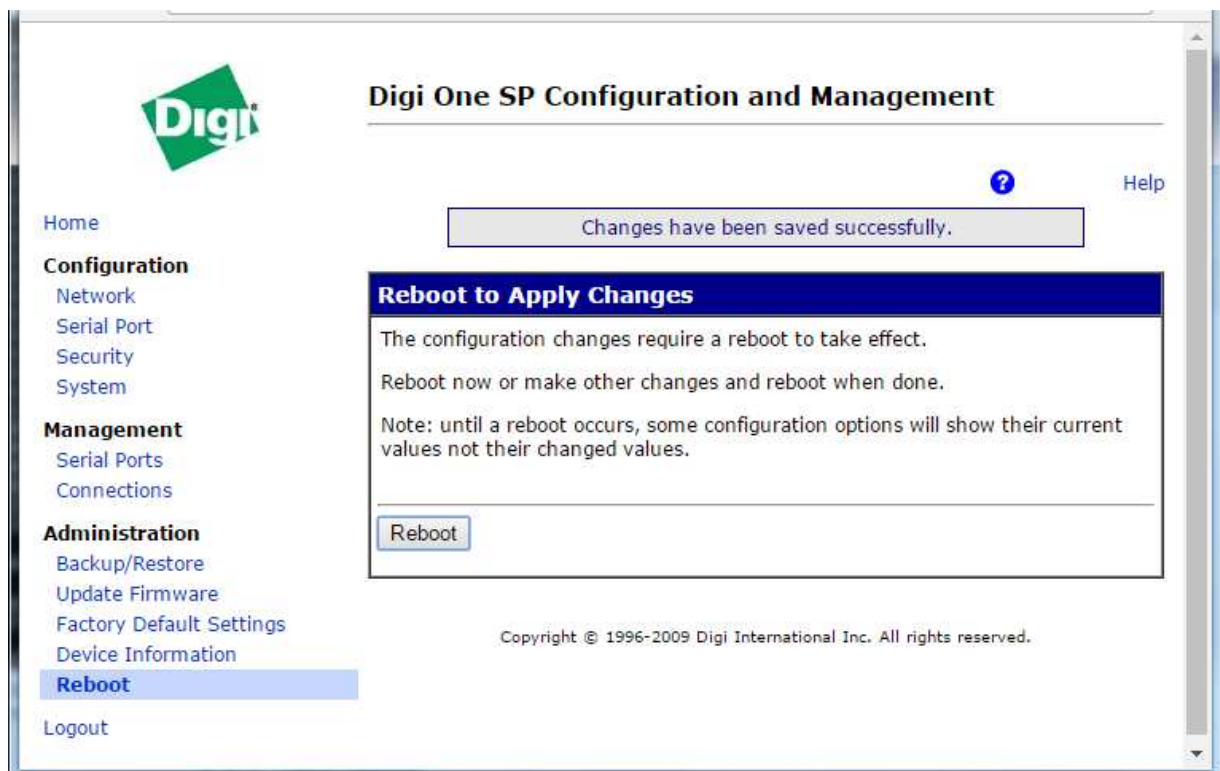


Click the Configuration Network link on the left side of the page to display network configuration. The current network configuration is display:

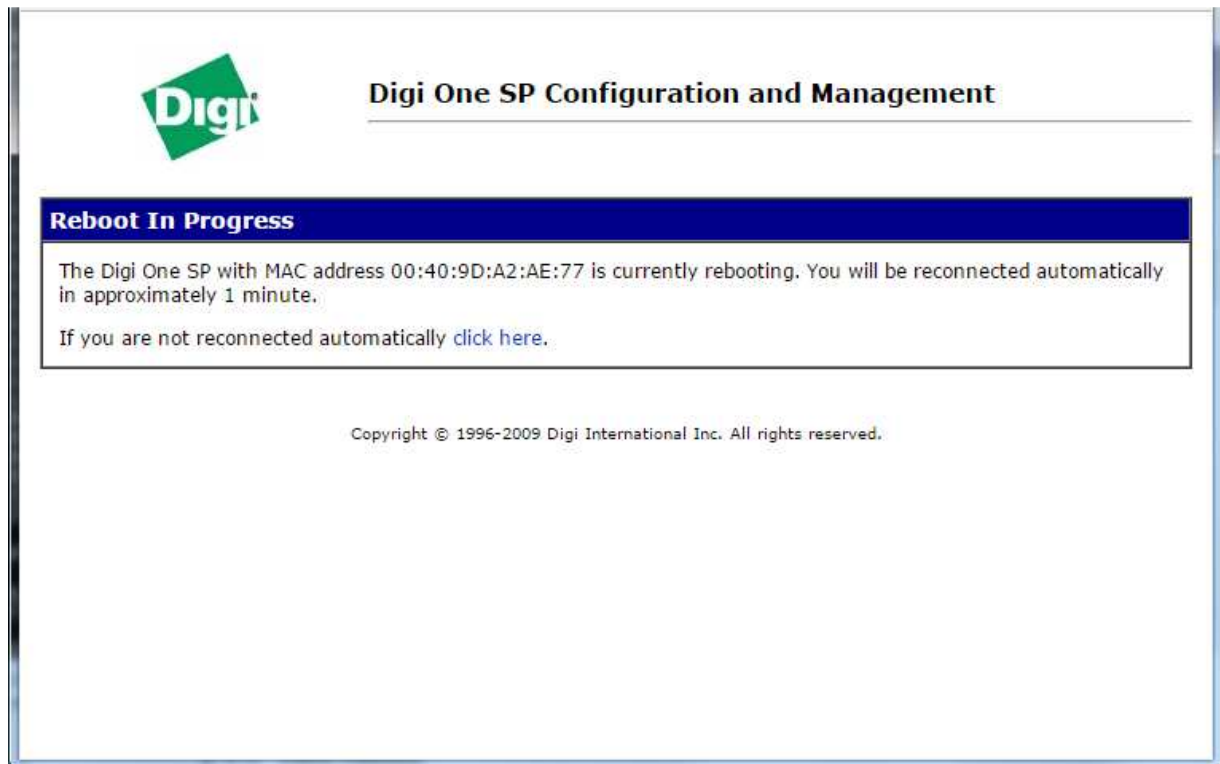




Click the selection to Use the following IP address. Enter the fixed IP Address, Subnet Mask, and Default Gateway. Click Apply. For example, change the IP address to 192.168.1.87.



Click **Reboot**, then wait for the browser to reconnect.



#### 4.2.2 ALERT1 Decoder Login Password Change

Use a Windows internet browser to connect to the ALERT1 Decoder by typing the IP address on the browser address line.

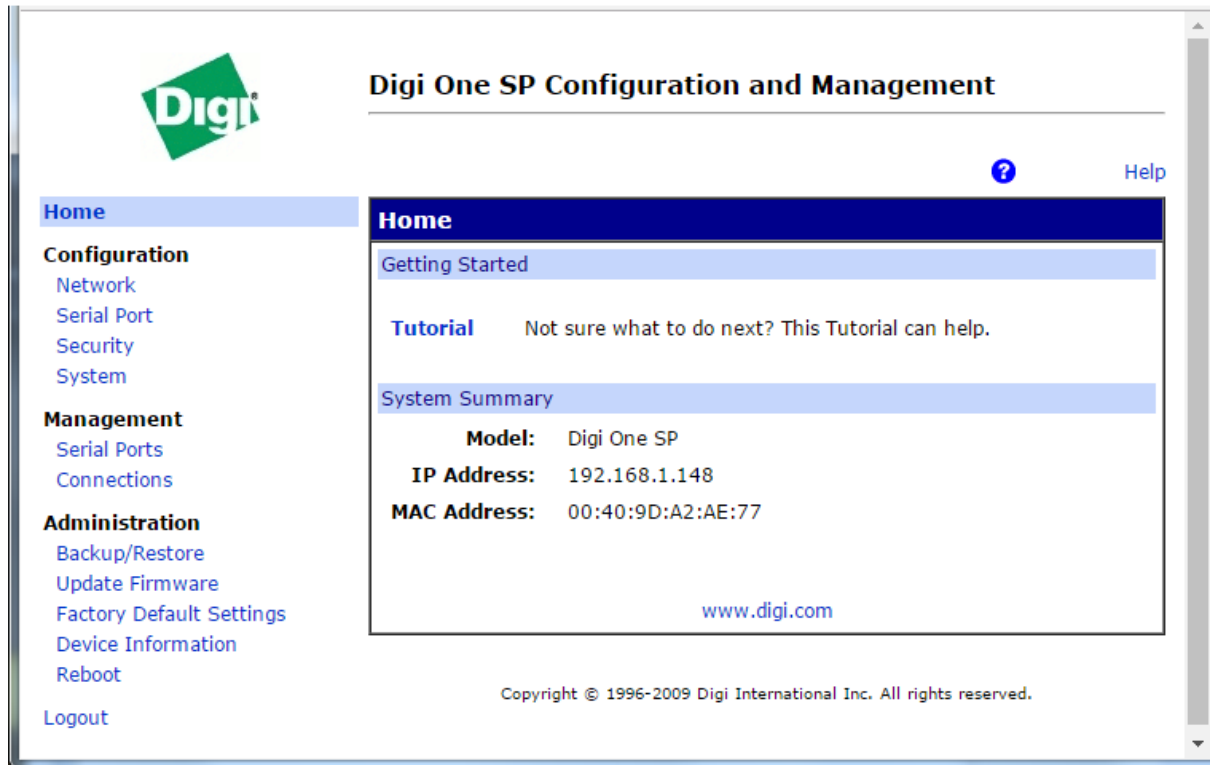
Enter the User Name: **root**

Password: **alert1**

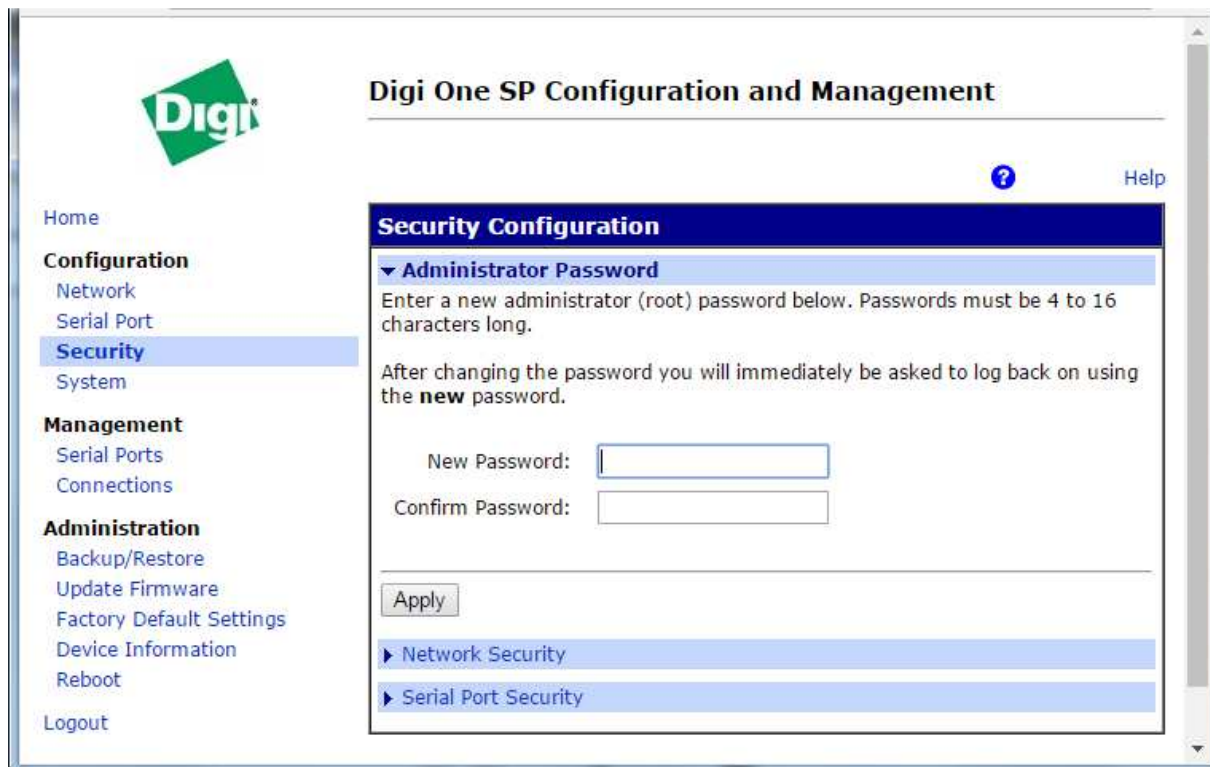
Click Log In.

The ALERT1 Decoder Home page is displayed:





Click the Configuration Security link on the left side of the page to display network configuration. Enter the new login password on this page, confirm, and click Apply.



## 5.0 TESTING and TROUBLESHOOTING

### 5.1 RF Antenna Test

The antenna is tested for reflected power as if it were a transmitter antenna.

- Attach a wattmeter and transmitter to the antenna cable.
- Select the proper slug for reverse power and frequency testing (refer to wattmeter manual).
- Initiate a transmission. The duration of the transmission must be long enough to obtain a stable reading on the wattmeter.
- Compare the measured reading to the antenna system's rated reflected power.

### 5.2 Network Test

- Connect a terminal program with a NULL modem cable to the SERIAL DB9 male CONSOLE connector at 115,200 baud, no parity, 8 data bits, 1 stop bit, no flow control.
- Login as **root**, with password **alert2** (or use changed password).
- Type the command **ifconfig** to display the network IP address. Verify the IP address following the label **inet addr**:

```
ifconfig[Enter]
eth0  Link encap:Ethernet  HWaddr 00:d0:69:4c:f7:db
       inet addr:192.168.1.92  Bcast:192.168.1.255  Mask:255.255.255.0
```

If the IP address is not correct, edit the file /etc/network/interfaces, correct, and reboot.

- Type the command **route** to display the network routing. Verify the gateway IP address on the line with **UG** in the **Flags** column.

```
route[Enter]
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
192.168.1.0 * 255.255.255.0 U 0 0 0 eth0
loopback * 255.0.0.0 U 0 0 0 lo
default 192.168.1.1 0.0.0.0 UG 0 0 0 eth0
```

If the gateway IP address is not correct, edit the file /etc/network/interfaces, correct, and reboot.

- Type the command ping with the gateway IP address to verify connection to the network. Press [CTRL-C] to quit the test.

```
ping 192.168.1.1[Enter]
PING 192.168.1.1 (192.168.1.1) 56(84) bytes of data.
64 bytes from 192.168.1.1: icmp_req=1 ttl=64 time=11.9 ms
64 bytes from 192.168.1.1: icmp_req=2 ttl=64 time=0.560 ms
64 bytes from 192.168.1.1: icmp_req=3 ttl=64 time=0.540 ms
[CTRL-C]
```

If the gateway does not respond check the network cable, router, or firewall.

- Type the command ping with the 8.8.8.8 IP address to verify connection to the internet. Press [CTRL-C] to quit the test.

```
ping 8.8.8.8[Enter]
```

```
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.  
64 bytes from 8.8.8.8: icmp_req=1 ttl=56 time=5.54 ms  
64 bytes from 8.8.8.8: icmp_req=2 ttl=56 time=5.57 ms  
64 bytes from 8.8.8.8: icmp_req=3 ttl=56 time=5.62 ms [CTRL-C]  
[CTRL-C]
```

If the 8.8.8.8 IP does not respond check the router or firewall.

### 5.3 ALERT2 Data Out

- Connect a terminal program to the SERIAL DB9 female ALERT2 connector at 19,200 baud, no parity, 8 data bits, 1 stop bit, no flow control.
- Initiate an ALERT2 transmission to the receiver.
- Verify that the front panel ALERT2 LEDs flash on then off.
- Verify that the ALERT2 decoder output ASCII format strings starting with P and N are displayed.

### 5.4 ALERT2 Data Log

The ALERT2 Decoder ASCII output is written to log files on the SD card.

- Connect to the ALERT2 Decoder CONSOLE through the network using SSH or with a terminal program on the SERIAL DB9 male CONSOLE connector at 115,200 baud, no parity, 8 data bits, 1 stop bit, no flow control.
- Login as **root**, with password **alert2** (or use changed password).

The SD card file system folder name is: **/mnt/sd**.

- Go to the SD card folder and list the log files with the commands  
**cd /mnt/sd[Enter]**  
**ls[Enter]**  
20170427\_0000\_DEFAULT\_20170417\_2220  
20170428\_0000\_DEFAULT\_20170417\_2220  
20170428\_2244\_DEFAULT\_20170428\_2244

A new log file is created every day at 00:00:00 UTC and when the ALERT2 Decoder is rebooted. The log file names are:

**YYYYMMDD\_HHMM\_DEFAULT\_YYYYMMDD\_HHMM**

Where the first YYYYMMDD\_HHMM is the year, month, day, hour, and minute the file was created, and the last YYYYMMDD\_HHMM is the year, month, day, hour, and minute the file was closed.

The log files contain lines in the ALERT2 Decoder ASCII format types P, N, and S. For example:

```

P,0,2017,04,28,00,00,13.191787,24,24,00,18,02,00,10,11,0F,A0,00,14,00,
00,01,06,00,11,00,0A,11,00,03,04,C0,00,0,2,00,8E,0,5107,2851
N,2017,04,28,00,00,13.1918,0,0,0,1,0,0,0,0,0,1,17,4000,0,14,00,00,01,0
6,00,11,00,0A,11,00,03,04,C0,00,00,8E
S,1,27,2017,04,28,19,28,02.917263,73,24,6C,49,28,BD,9E,7E,84,CE,10,3C,
C8,AF,B1,46,7B,0A,9F,D9,5C,68,F3,09,0C,03,-1,*Bad      First      Block,
uncorrectable      bit      errors;      discarding      packet
S,11,2017,04,28,20,00,01,2,1,4,0,0,2,0,0,2,0

```

The first line starting with P is an Airlink packet successfully decoded with FEC. The packet receive time is in fields 3 to 8 as YYYY,MM,DD,hh,mm,ss.ssssss in UTC.

The second line starting with N is the MANT packet extracted from the Airlink P line above. The packet receive time is in fields 2 to 7 as YYYY,MM,DD,hh,mm,ss.ssssss in UTC. The ALERT2 station address, 4000, can be seen in the N line.

The third line starting with S shows a packet was received with errors that could not be corrected.

The fourth line starting with S is a heartbeat message sent by the ALERT2 decoder every hour.

### 5.5 ALERT1 Data Out for OP1 ALERT1 Receiver/Decoder Option

- Connect a terminal program to the SERIAL DB9 female ALERT1 connector at 300 baud, no parity, 8 data bits, 1 stop bit, no flow control.
- Put front panel ALERT1 SPEAKER toggle switch in down position.
- Initiate an ALERT1 transmission to the receiver.
- Verify ALERT1 tones over the speaker.
- Verify that the front panel ALERT1 Data LED flashes on then off.
- Verify that the ALERT1 binary data is displayed; it is not printable.

## 6.0 FORMS AND DRAWINGS

WD100624 5052RD-K Test Results  
VS108642 5052RD-K Chassis, Block Wiring Diagram  
VS108643 5052RD-K Harness, Power, Wiring Diagram  
VS108711 5052RD-K Receiver Splitter, AC Power, Block Wiring Diagram



**5052RD-K Test Results**

Document Number WD100624-1

Customer:	Model	Frequency	Squelch	Serial number / MAC
5052RD-K ALERT2 Chassis	5052RD-K			
5052RD-K ALERT2 Receiver <input type="checkbox"/>	RTR-			
5052RD-K ALERT2 Decoder				
5052RD-OP1 ALERT1 Receiver <input type="checkbox"/>	RTR-			
5052RD-OP1 ALERT1 Serial to IP				
5052RD-OP2 ALERT2 Transmitter <input type="checkbox"/>	RTR-			
Additional Equipment				

**ALERT2 RECEIVER/DECODER CHECK**

By:

Date:

ALERT2 RX <input type="checkbox"/>	ALERT2 PWR LED <input type="checkbox"/>	ALERT2 RX LED <input type="checkbox"/>
ALERT2 Data Serial <input type="checkbox"/>	Baud rate:	Console Baud rate:
ALERT2 Data Network <input type="checkbox"/>	Login:	Password:
DHCP <input type="checkbox"/>	Listen IP:	Listen Port:
Time server:	Client IP:	Client Port:
Subnet:	Gateway:	DNS:

**ALERT1 RECEIVER/DECODER CHECK**

By:

Date:

ALERT1 RX <input type="checkbox"/>	ALERT1 RX Speaker <input type="checkbox"/>	ALERT1 RX LED <input type="checkbox"/>
ALERT1 Data Serial <input type="checkbox"/>	Baud rate:	
ALERT1 Data Network <input type="checkbox"/>	Login:	Password:
DHCP <input type="checkbox"/>	Listen IP:	Listen Port:
Time server:	Client IP:	Client Port:
Subnet:	Gateway:	DNS:

**ALERT2 TRANSMIT CHECK**

By:

Date:

ALERT2 TX <input type="checkbox"/>	ALERT2 TX GPS <input type="checkbox"/>	Modulation:
ALERT2 TX Network <input type="checkbox"/>	Listen IP:	Listen Port:

**MISCELLANEOUS**

By:

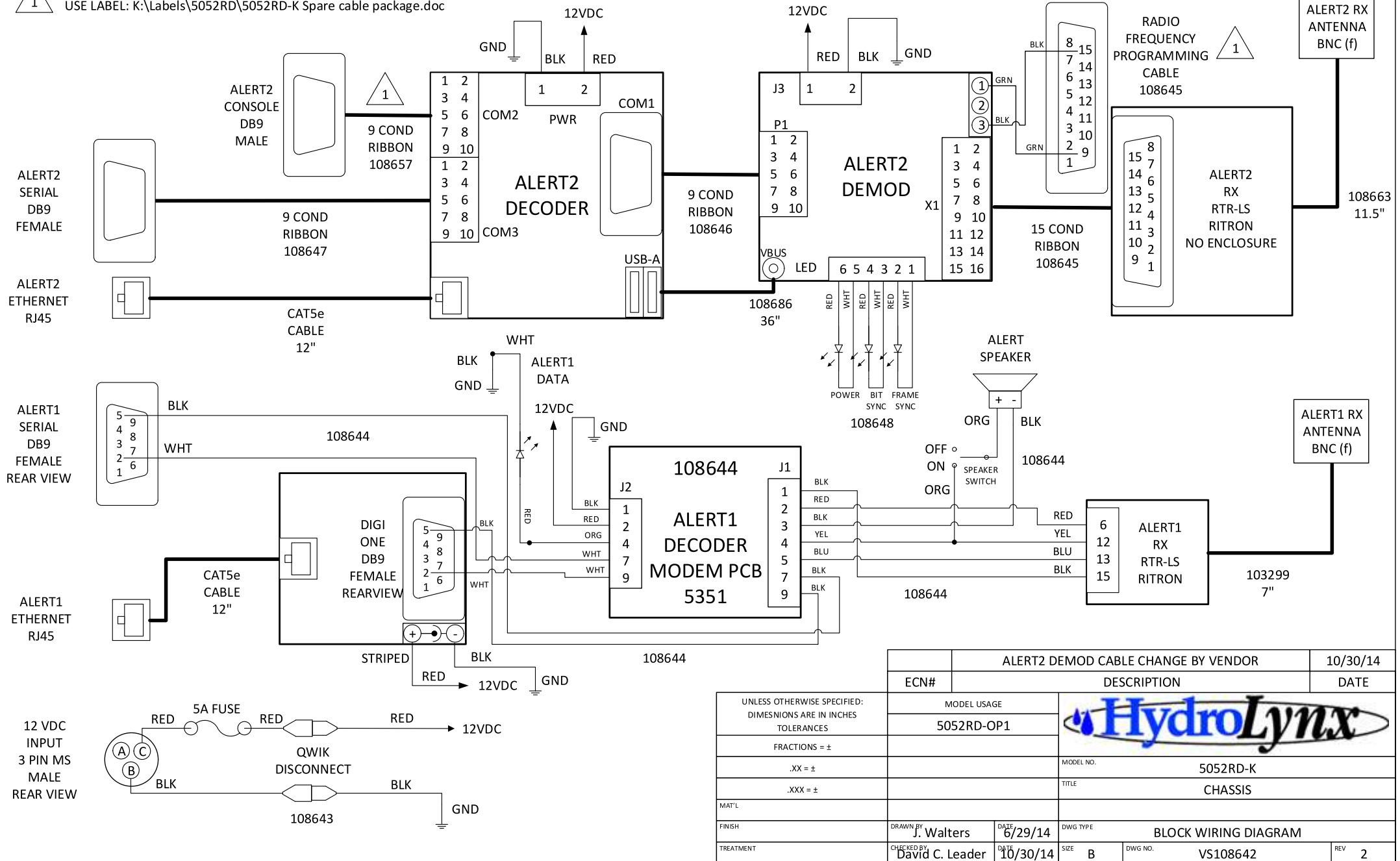
Date:

Power supply <input type="checkbox"/>	Cables <input type="checkbox"/>	Serial Tag <input type="checkbox"/>
---------------------------------------	---------------------------------	-------------------------------------

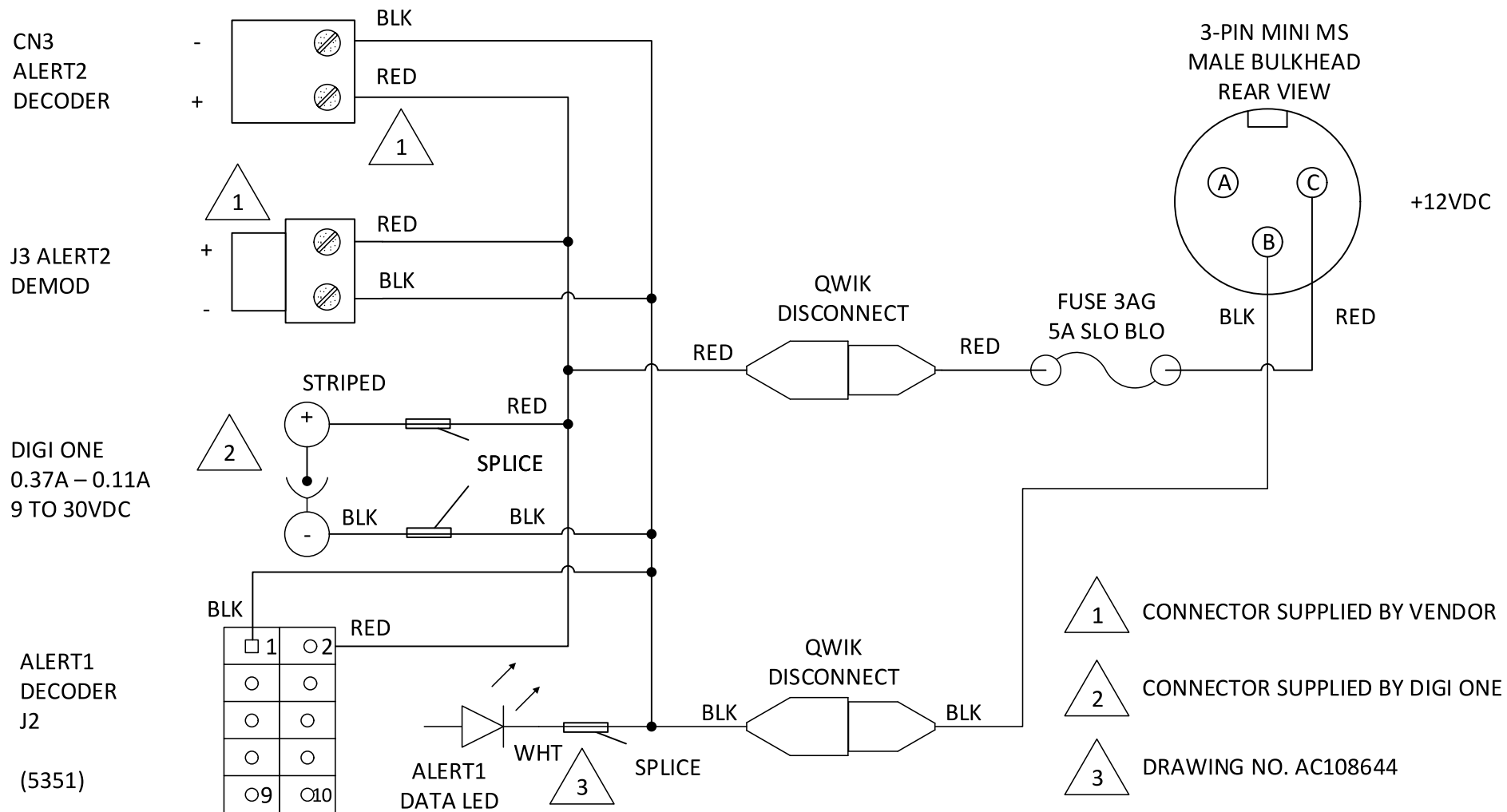
Notes:



SECURE IN PARTS BAG  
USE LABEL: K:\Labels\5052RD\5052RD-K Spare cable package.doc



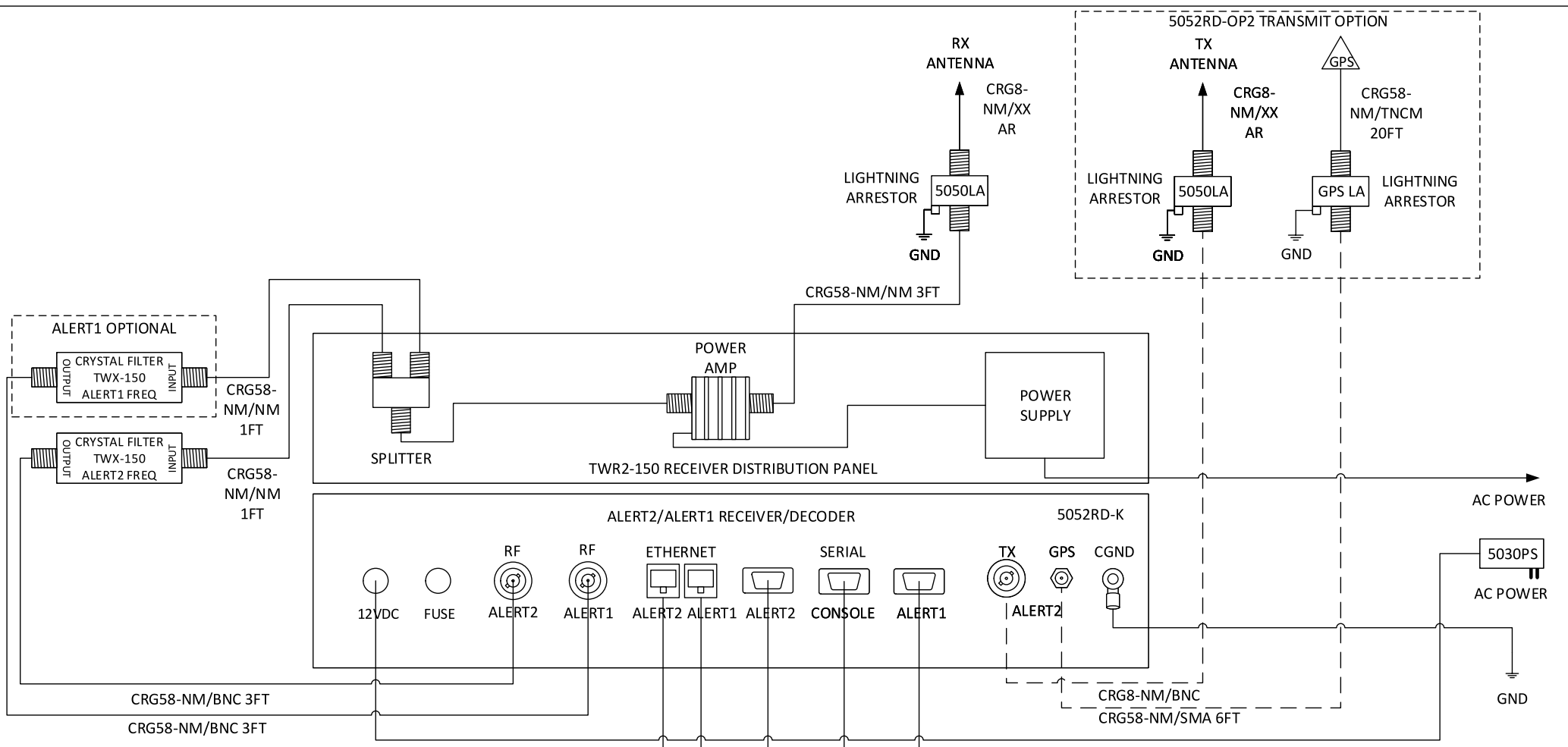
ALERT2 DEMOD CABLE CHANGE BY VENDOR		10/30/14
ECN#	DESCRIPTION	DATE
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES		
FRACTIONS = ±		
.XX = ±		
.XXX = ±		MODEL NO. 5052RD-K
TITLE		CHASSIS
DRAWN BY J. Walters		DATE 6/29/14
CHECKED BY David C. Leader		DATE 10/30/14
DWG TYPE		BLOCK WIRING DIAGRAM
SIZE B	DWG NO. VS108642	REV 2



ECN#	DESCRIPTION	DATE
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES		
MODEL USAGE		
5052RD-OP1		
FRACTIONS = ±		
.XX = ±		
.XXX = ±		
MAT'L		
FINISH		
DRAWN BY J. Walters		
DATE 7/4/14		
DWG TYPE WIRING DIAGRAM		
TREATMENT		
CHECKED BY David C. Leader		
DATE 7/24/14		
SIZE A		
DWG NO. VS108643		
REV 1		







- ← ALERT2 SERIAL CABLE
- ← ALERT2 CONSOLE CABLE
- ← ALERT1 SERIAL CABLE
- ← ALERT2 NETWORK CABLE
- ← ALERT1 NETWORK CABLE

2	ADDED NETWORK CABLES, SERIAL CONSOLE, GND LUG	3/20/17
1	ADDED ALERT2 TRANSMIT OP2	5/15
ECN#	DESCRIPTION	DATE

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES		MODEL USAGE			
FRACTIONS = ±		5052RD-OP1			
.XX = ±		5052RD-OP2			
.XXX = ±					
MATERIAL		MODEL NO.		5052RD-K	
FINISH		TITLE		RECEIVER SPLITTER, AC POWER	
TREATMENT		DRAWN BY David C. Leader	DATE 05/04/15	DWG TYPE BLOCK WIRING DIAGRAM	
		CHECKED BY J. Matteucci	DATE 3/20/17	SIZE B	DWG NO. VS108711
				REV	2