Server Radio Kit

Letter	Component Type
A	Pole-Mount Hardware
B	Wall Pack Transformer
C	Antenna Extension Cable - 50'
D	DIN Rail Mount/Track
E	900Mhz Server Radio
F	Antenna Adapter
G	High Gain Antenna
H	Server to DM-100 Interconnect Cable - 10'
I	DM-100 (Existing)

Figure 1: *Server Kit Components*

Indoor Server Radio Installation

1. Mount the 900Mhz Server Radio (E) and wall pack transformer (B).
2. Feed Interconnect cable (H) between Server Radio (E) and DM-100 (I).

   Warning: Applying Power to the radio without an attached antenna may cause damage!

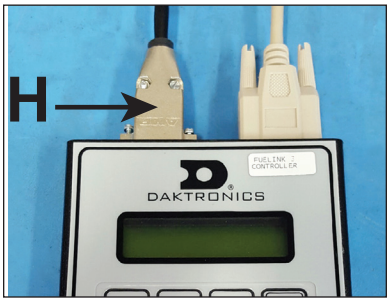

Figure 2: *DM-100 Interconnect Cable*

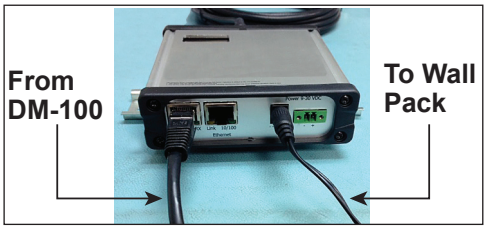

Figure 3: *Server Radio Connections*

Exterior Server Radio Antenna Mounting

1. Mount High Gain Antenna (G) using mounting hardware (A) on the outside of the building housing the server radio. Mount the antenna as high as possible in free air. Locate the antenna within 50 feet of the server radio location. Refer to **Figure 4**.

   There are two antenna mounting options:

   - U bolts for pole mounting
   - Brackets for wall mounting

2. Interconnect the antenna extension cable (C) between the antenna (G) and server radio (E).

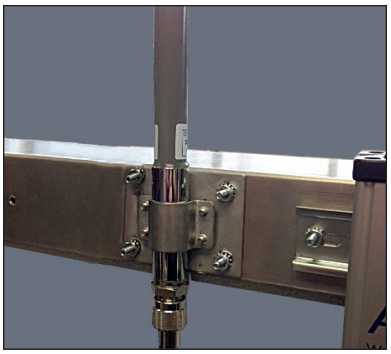

Figure 4: *Mounted Antenna*

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3. Connect the adapter (F) to the antenna (G).
4. Use the tape provided in the mounting kit to wrap and protect the antenna interconnect. Refer to **Figure 5** and **Figure 6**.
5. Connect wall pack transformer (B) to server radio (E).

   Warning: Applying Power to the radio without an attached antenna may cause damage!
6. Record the server radio ID. This is shown during boot up and will be necessary to set up communication to Client radios.

Figure 5: *Adapter Attached to High Gain Antenna*

Figure 6: *Connect Extension Cable to Radio*

Client Radio Installation

Install the client radio using one of the methods below.

1. Mount the Client radio box on the exterior of the display with the antenna directly connected.
2. Mount the Client radio box inside of the overall display structure (hidden) with the 10' bulkhead cable routed to the exterior. Refer to **Figure 7**.
3. Mount the Client radio box within the inside of the Fuelight display.
   - **a.** Mount the antenna in a optimal location that is elevated further off the ground, has improved line of sight to the server radio antenna, and within 10 feet of the client radio. Daktronics provides a 10' antenna extension cable to allow for optimal antenna
   - **b.** Use the same tape on the server antenna terminations on this bulkhead/extension cable termination.
   - **c.** Terminate the antenna cable to the client radio enclosure and attach the antenna.

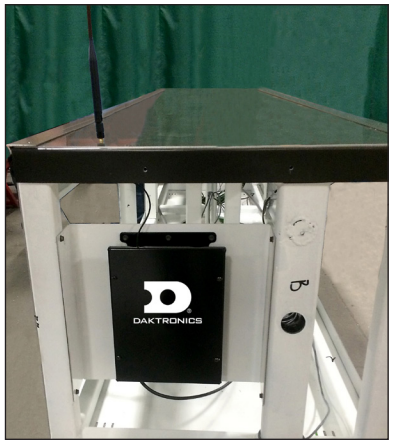

Figure 7: *Radio Enclosure and Antenna*

Figure 8: *Optimum Radio Mounting Location*

Figure 9: *Setting Client Radio Number*

Figure 10: *Power Adapter Harness*

Warning: Applying Power to the radio without an attached antenna may cause damage!

4. Install the power adapter harness W-4582582 that was shipped with the FLXR4 Client Radio. Refer to **Figure 10**.

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Client Radio Set Up

By default, each client defaults to SU#1 and the Network number defaults to a unique ID. Configure each client radio in sequence by completing the following steps:

1. Every client radio must have a unique SU number. Change the client radio number by pressing the reset button, shown in **Figure 9**, for 5 seconds to enter configuration mode.

   The LCD shows display "SU #X". X represents the current client radio number.

2. Press the button to increment the client unit number.
3. Repeat as necessary until reaching the desired client unit number.
   - Client units automatically roll over from 4 to 1.
   - Currently, client radios can be numbered 1-4 only.
4. Wait about 15 seconds until the LCD shows "SU ID set to X". This message remains on the LCD for about 5 seconds.

   After 5 seconds, the LCD shows "CH #Y". Y represents the current channel number (1-18 or Auto).

5. Set the client radio to CH AUTO. The options are CH #1-18 and CH AUTO. On power up, the radio scans through the channels until it finds a server it can talk to.
   - This is the preferred method.
   - The LCD shows "Ch #" set to "X".

Figure 11: *Server Radio ID Number (unique to each site/ server)*

Figure 12: *Set Network Number on Client Radio from Server Radio ID Number*

Notes:

A Network Number is unique for each installation site and prevents networks located close to one another from interfering with each other. For example, if two installations are across the street from one another, one site could be set to network 1 and the other site set to network 2. Each Network Number is unique to each site and is obtained from each Server Radio's Unique ID Number at boot-up or through network login.

Set the network number on Client Radio to the radio ID of the server radio recorded in **Exterior Server Radio Antenna Mounting (p.1)** step 6. Refer to **Figure 11** and **Figure 12**.

6. After 5 seconds, the LCD shows "NET #Y". Y represents the current network number.
   - The network number is 6 digits and pressing the button loops the current digit (indicated by pulsing cursor) 0-9. Refer to **Figure 12**.
   - Wait 5 seconds to move to the next digit.
7. Repeat as necessary until reaching the desired network number.
8. Wait about 15 seconds until the LCD shows "NET # set to Z".

Figure 13: *Client Radio IP Address*

Figure 14: *Client Radio ID*

Figure 15: *Client Subscriber Unit Number*

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9. While the radio reboots, use the following table to note the IP address (**Figure 13**), radio ID number (**Figure 14**), and subscriber unit number (**Figure 15**) for each client which is unique to each site.

Radio IP Address	Radio ID Number	Client Unit Number

Following successful boot up, client units show signal strength.

Note: Signal strength will not show until the server radio is setup with client ID and sequence.

Figure 16: *Bars Show Signal Strength*

Server Radio Set Up

Configure the server radio through a web interface by attaching an Ethernet cable from the radio to a computer and completing the following steps.

1. Click the **Table** tab.
2. Configure the computer's IP address for the same subnet as the radio's IP. Open a web browser and navigate to the radio's IP address (example: http://192.168.0.30).
3. Enter the radio password to gain access to the advanced diagnostics and configuration. The default password is **password**. Refer to **Figure 17**.
4. Click the **Radio** tab. Enter the **radio ID numbers** retrieve from each client server in Step 9 of **Client Radio Set Up (p.3)** and shown in **Figure 14**. Refer to **Figure 18**.
5. Set **TX Power** to **27dBm**. Refer to **Figure 18**.

   Warning: Applying Power to the radio without an attached antenna may cause damage!
6. Click **Apply**. Refer to **Figure 18**.

Note: If communication issues arise, record the Radio RSSI, Radio Total Packets, Radio Failed Packets, and Radio Passed Packets after more than 10

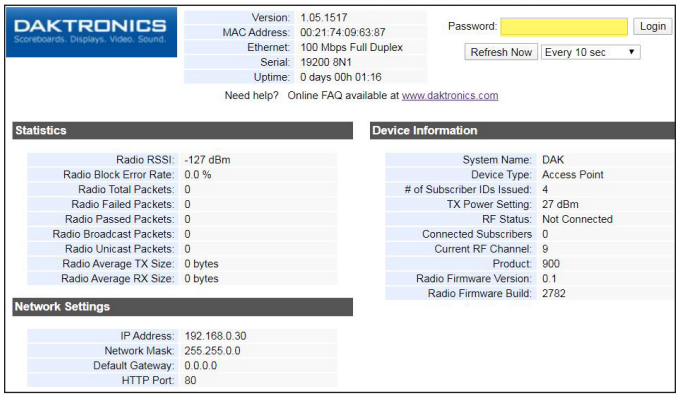

Figure 17: *Open IP Address in Web Browser*

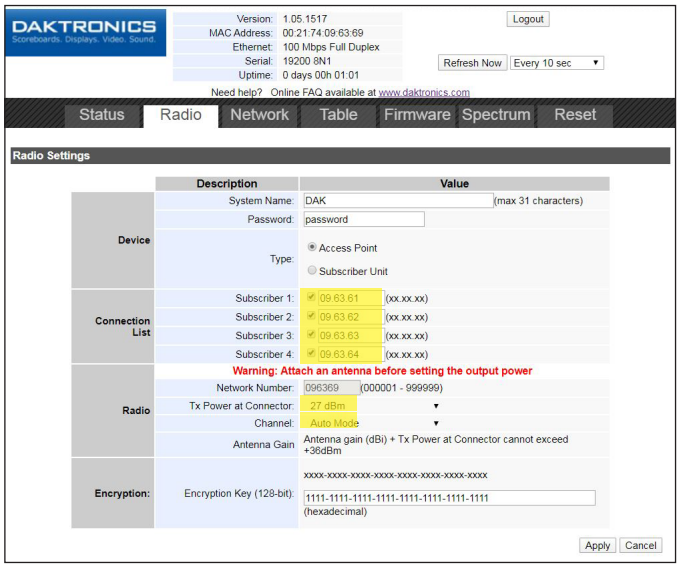

Figure 18: *Radio Tab*

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manual price updates.

Quality of Service

The percentage of data received by each client radio is shown in the Quality of Service area.

1. Verify that the quality of service of each client radio goes to 100. Refer to **Figure 19**.
2. If it does not, check the installation and configuration of the client radio.
3. After all clients are connected and working properly, go back to the **Radio** tab and set the server channel.
4. While logged in to the server, browse to the **Status** tab and record the **current RF channel**. Refer to **Figure 20**.
5. Browse to the **Radio** tab. Refer to **Figure 18**.
6. Select the **RF channel** from Step 4 in the **Channel drop-down** list.
7. Click **Apply**.

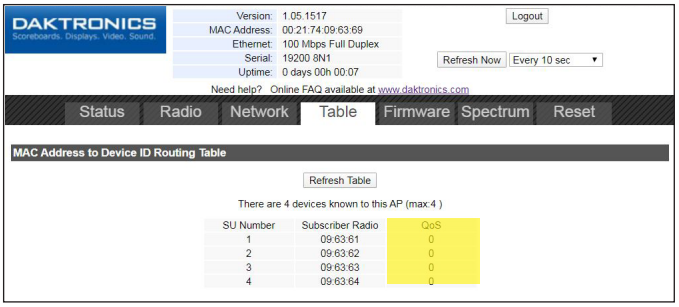

Figure 19: *Table Tab*

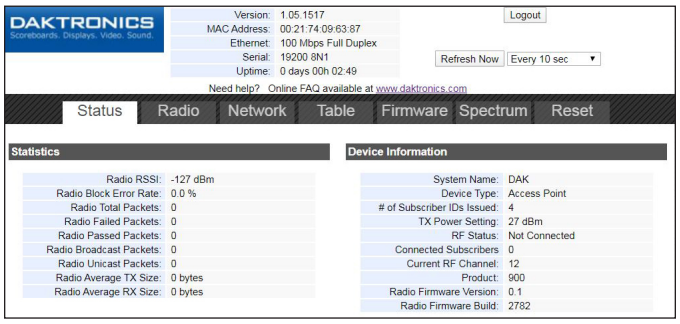

Figure 20: *Status Tab*

Following Configuration

After the system is configured, the server radio searches for client radios. Refer to **Figure 21**.

Figure 22 shows what the server radio displays once one or more client radios are detected and connected.

- The bars show the signal strength received from the client radios. When more than one client radio is connected, this is an average value.
- The number shown below the signal strength bars is a Quality of Service percentage (the percent of data successfully exchanged between server and client radios). When more than one client radio is connected, this is an average value.
- The number of client radios to which the server radio is connected is shown on the right.

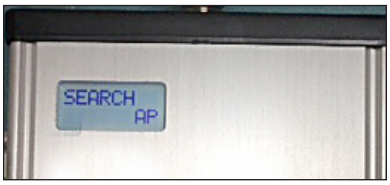

Figure 21: *Server Radio Searching For Client Radios*

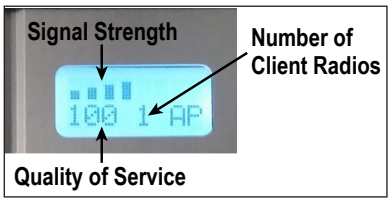

Figure 22: *Server Radio Connected to Client Radios*

RSSI Values

RSSI Values	Signal Strength
-40dBm to -60dBm	Signal Good
-61dBm to -75dBm	Signal Fair

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RSSI Values	Signal Strength
<-76dBm	Signal Poor–Check antennas, antenna cables, locations, height off ground, obstacles, etc.

Verify Connections

1. Verify that the number of connected clients shown on the LCD is correct.
2. Verify the Quality of service eventually goes to 100 (may take a minute or two) and stays there.
3. If either of the above verifications fail, check the installation and configuration.
   - Use the **Quality of Service** section of the **Table** tab to determine which client is having trouble.
   - The RSSI value can be used to determine if the problem is with radio signal strength. This is an average value of strength from all clients. Enable one client at a time to get an RSSI reading for an individual client.

Auto Reset Feature

- The server radio resets every 30 seconds if it does not find any client radios with which to connect.
- A client radio resets every 30 seconds if it does not find a server radio with which to connect.
- The auto reset feature is disabled when there is a connection on the Ethernet port (when connected with a computer).
- On initial setup, it may take a few reset cycles for all the radios to find each other, and the Quality of Service number may take a few minutes to reach 100 percent.

Network and Display Discovery

1. The DM-100 controller automatically begins detecting networks. Each client radio is referred to as a network.
2. The controller discovers each network and detects its displays before moving to the next network.

This process takes a few minutes.

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LCD Screen	
RADIOS DETECTED...	
INITIALIZING DISPLAYS...	
STARTING DISPLAY ADDRESSING...	
STARTING TRANSFER...	
PROCESSING FILE...	
PARSING FILE RESULTS...	
X NETWORKS FOUND	
NETWORK X OF X	
DETECTING DISPLAYS...	
DETECTED SIGN X LINE X	
SENDING CONFIGURATION...	

Set Petroleum Prices

The LCD on the controller defaults to show current display settings on power up. The following text is shown on the LCD.

LCD Screen	Action
LINE - PRICE 1 ↓ $X.XX 9/10 <EDIT> TO MODIFY 1 ↓ $X.XX 9/10	• The display toggles between these two screens. • Press the Up and Down Arrow keys to scroll through the current setting for any of the lines on the display. • Press the ENTER/EDIT key to modify line settings.

See **Section 8** in DD2238839 (Fuelight™ FL-3000 & FL-4500 Series Petroleum Price Display & Cash/Credit Display Manual) or Section 8 in DD2716696 (Fuelight™ FL-3000 & FL-4500 Series 36" AND 48" Petroleum Price Display & Cash/Credit Display Manual) for DM-100 operation instruction.

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FCC Compliance

- FCC ID: R4N-AW900G2LP
- IC ID: 5303A-AW900G2LP

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference
2. This device must accept any interference received, including interference that may cause undesired operation.

RF Exposure

WARNING: This equipment is approved only for mobile and base station transmitting devices. Antenna(s) used for this transmitter must be installed to provide a separation distance of at least 21.05 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

IC RSS-102 RF Exposure Statement

This system has been evaluated for RF Exposure per RSS-102 and is in compliance with the limits specified by Health Canada Safety Code 6. The system must be installed at a minimum separation distance from the antenna to a general bystander of 31.2 cm to maintain compliance with the General Population limits.

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