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)

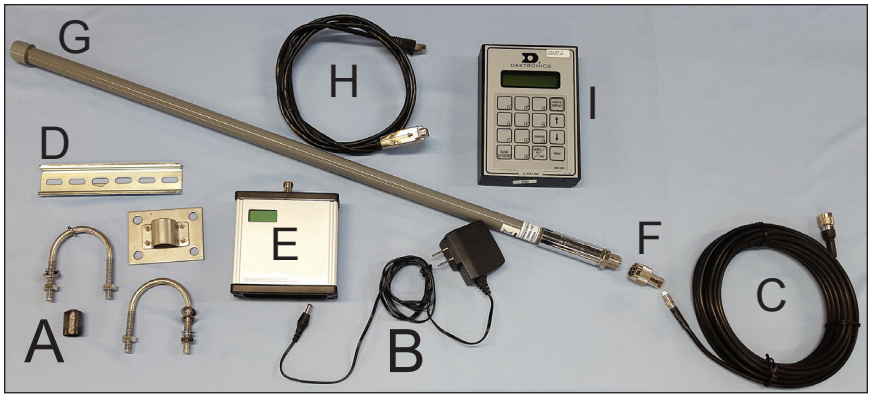

Figure 1: *Server Kit Components*

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!

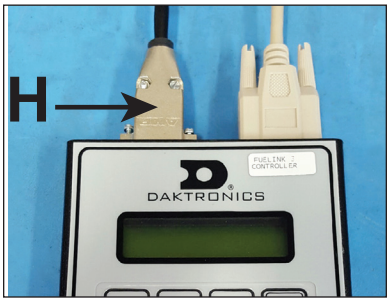

Figure 2: *New DM-100 Interconnect Cable*

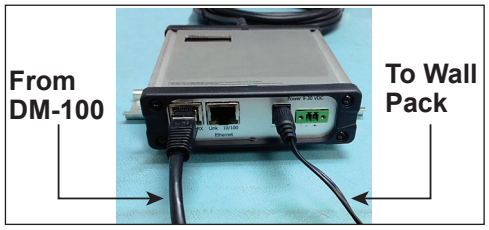

Figure 3: *Server Radio Connections*

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

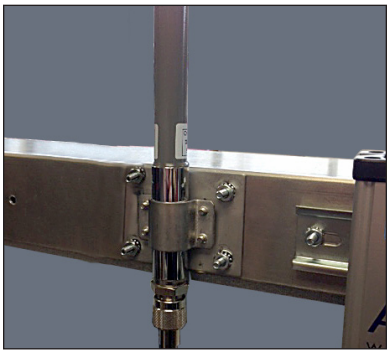

Figure 4: *Mounted Antenna*

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

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 routed to the exterior.
3. Mount the Client radio box within the inside of the Fuelight display, as shown in **Figure 7**.

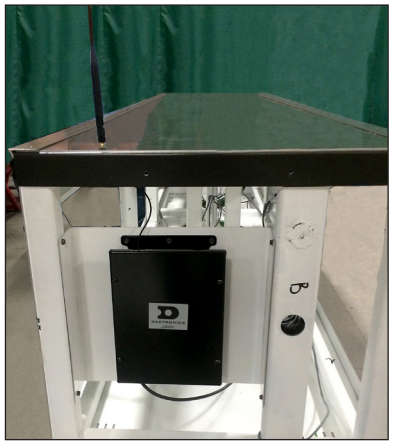

Figure 7: *New Radio Enclosure and New Antenna*

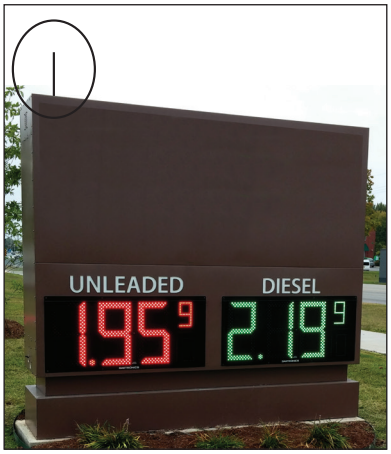

Figure 8: *Optimum Radio Mounting Location*

   a. Mount the antenna in a optimal location, as shown in **Figure 8**, 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 placement.

   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.

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

Client Radio Set Up

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

1. 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.

Figure 9: *Setting 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 8 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 "NET #Y". Y represents the current network number.

> **Note:** A Network Number is a unique channel 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.

5. Press the reset button to increment the network number.
6. Repeat as necessary until reaching the desired network number.
7. Wait about 15 seconds until the LCD shows "NET # set to Z".
8. While the radio reboots, use the following table to note the firmware version, IP address, radio ID number, and serial number for each client.

Figure 10: *Client Radio Firmware Version*

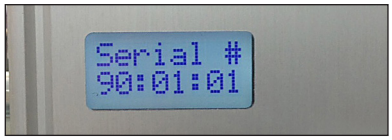

Figure 11: *Client Radio Serial Number*

Figure 12: *Client Radio ID*

Figure 13: *Client Radio Number*

Figure 14: *Client Radio IP Address*

Radio ID	Subscriber Unit Number	IP Address

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 15: *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. 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).
2. Enter the radio password to gain access to the advanced diagnostics and configuration. The default password is password.
3. Enter radio ID numbers.
4. Enter the Network Number.
5. Set TX Power to 27dBm.

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

> **Note:** If communication issues arise, record the Radio RSSI, Radio Total Packets, Radio Failed Packets, and Radio Passed Packets after more than 10 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.
2. If it does not, check the installation and configuration of the client radio.

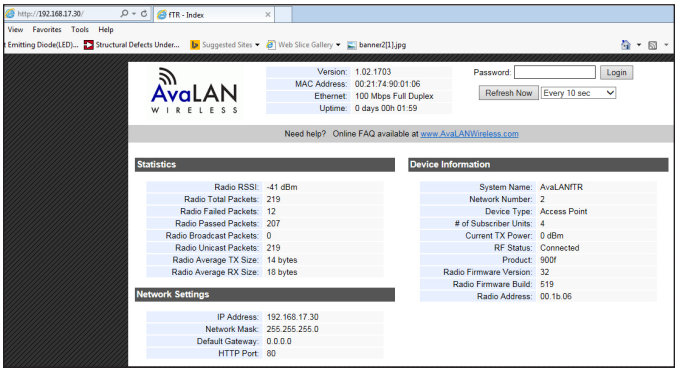

Figure 16: *Open IP Address in Web Browser*

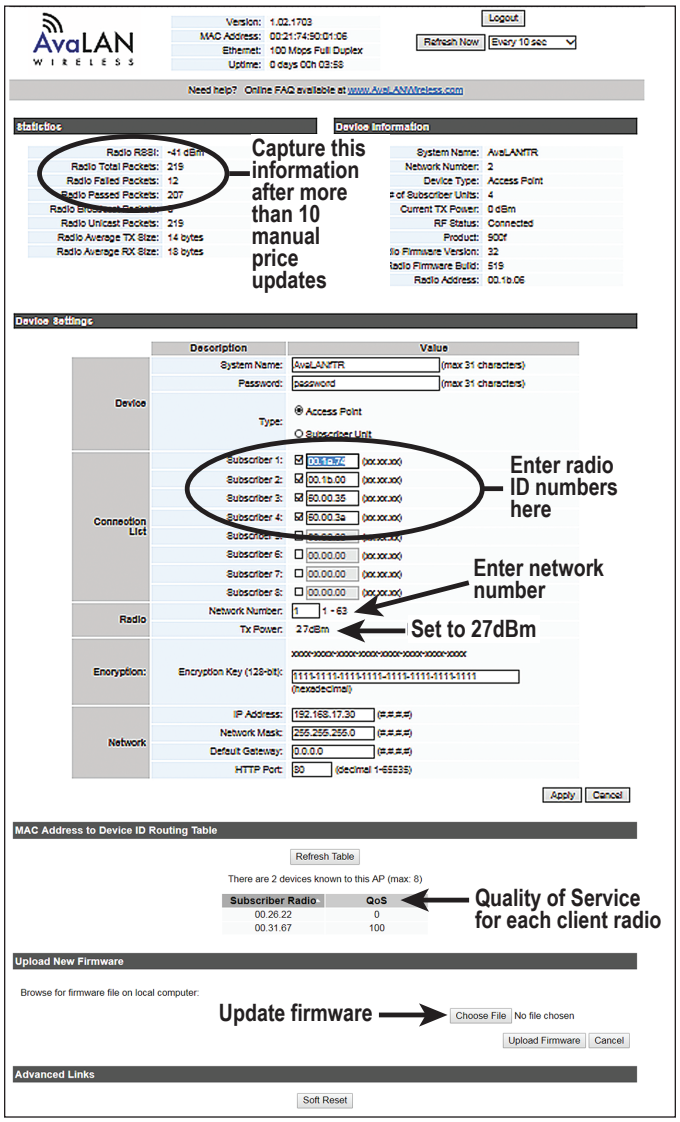

Figure 17: *Configure Server Radio*

Following Configuration

After the system is configured, the server radio searches for client radios. Refer to **Figure 18**.

Figure 19 shows what the server radio displays once one or more client radios are detected and connected.

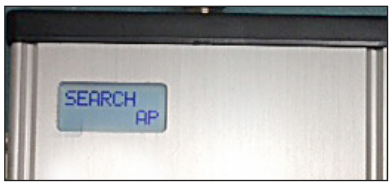

Figure 18: *Server Radio Searching For Client Radios*

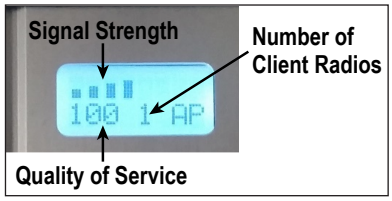

Figure 19: *Server Radio Connected to Client Radios*

- 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.

RSSI Values

RSSI Values	Signal Strength
-40dBm to -60dBm	Signal Good
-61dBm to -75dBm	Signal Fair
<-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.
    - The Quality of Service section of the server configuration page can be used 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

- Radios with firmware version 2187 and higher have an 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 controller automatically begins detecting networks. Each client radio is referred to as a network.

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2. The controller discovers each network and detects its displays before moving on to the next network.

This process takes a few minutes.

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 handheld 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 Antenna Gain Restriction

The DNT900 has been designed to operate with any dipole antenna of up to 5.1 dBi of gain, or any Yagi of up to 6.1 dBi gain. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

IC RSS-210 Detachable Antenna Gain Restriction

This device has been designed to operate with the antennas listed below. Antennas not included in this list or having a gain greater than 6.1 dB are strictly prohibited for use with this device. The required antenna impedance is 50 ohms:

- Dipole Antenna, 5 dBi Murata
- Yagi Directional Antenna, 6.1 dBi
- Patch Antenna, 2 dBi

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