

Transport Refrigeration

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Market Definition

Transport refrigeration is essential in today's society, to preserve and protect food, drugs and medical supplies for people worldwide.

Transport refrigeration provides transport temperature control solutions for:



Trailers



Large Trucks



Small Trucks



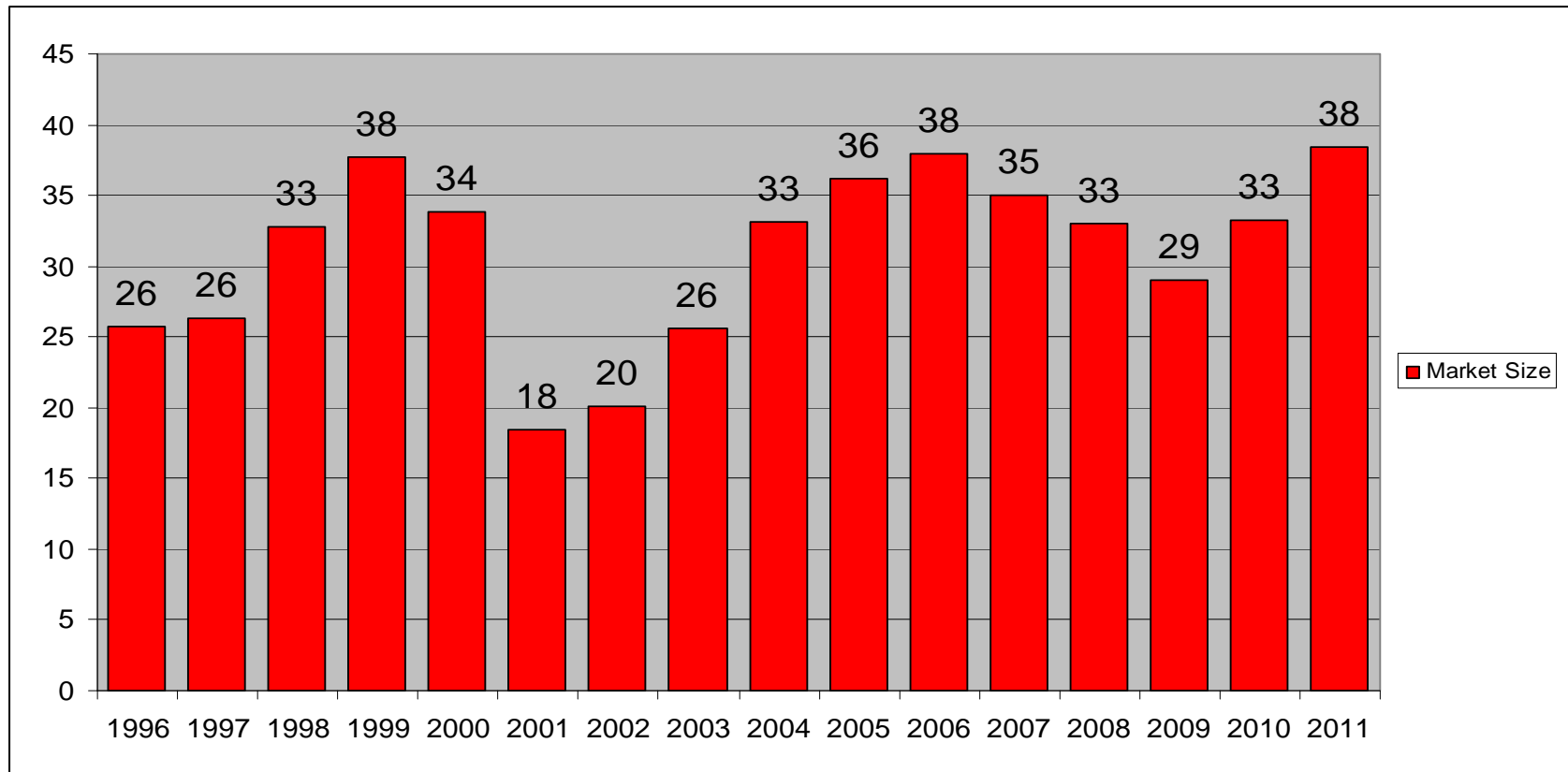
Container



Rail

Economic Forecast

Refrigerated Trailer Demand – North America*



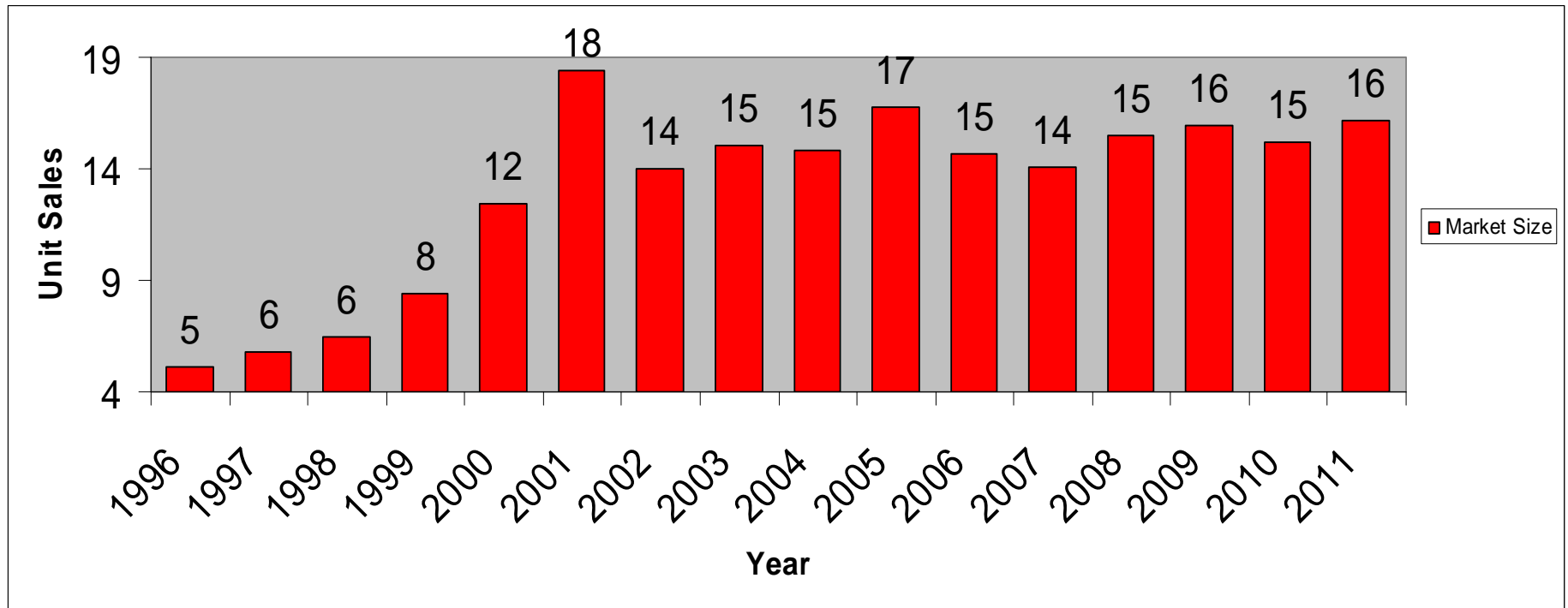
Source: ACT 2006 5 Year Report (Feb. 2006) & Internal Estimates

* Includes Mexico

- Market cycle is 4 to 5 years.

Economic Forecast

Refrigerated Truck Demand – SP & VP Truck North America*

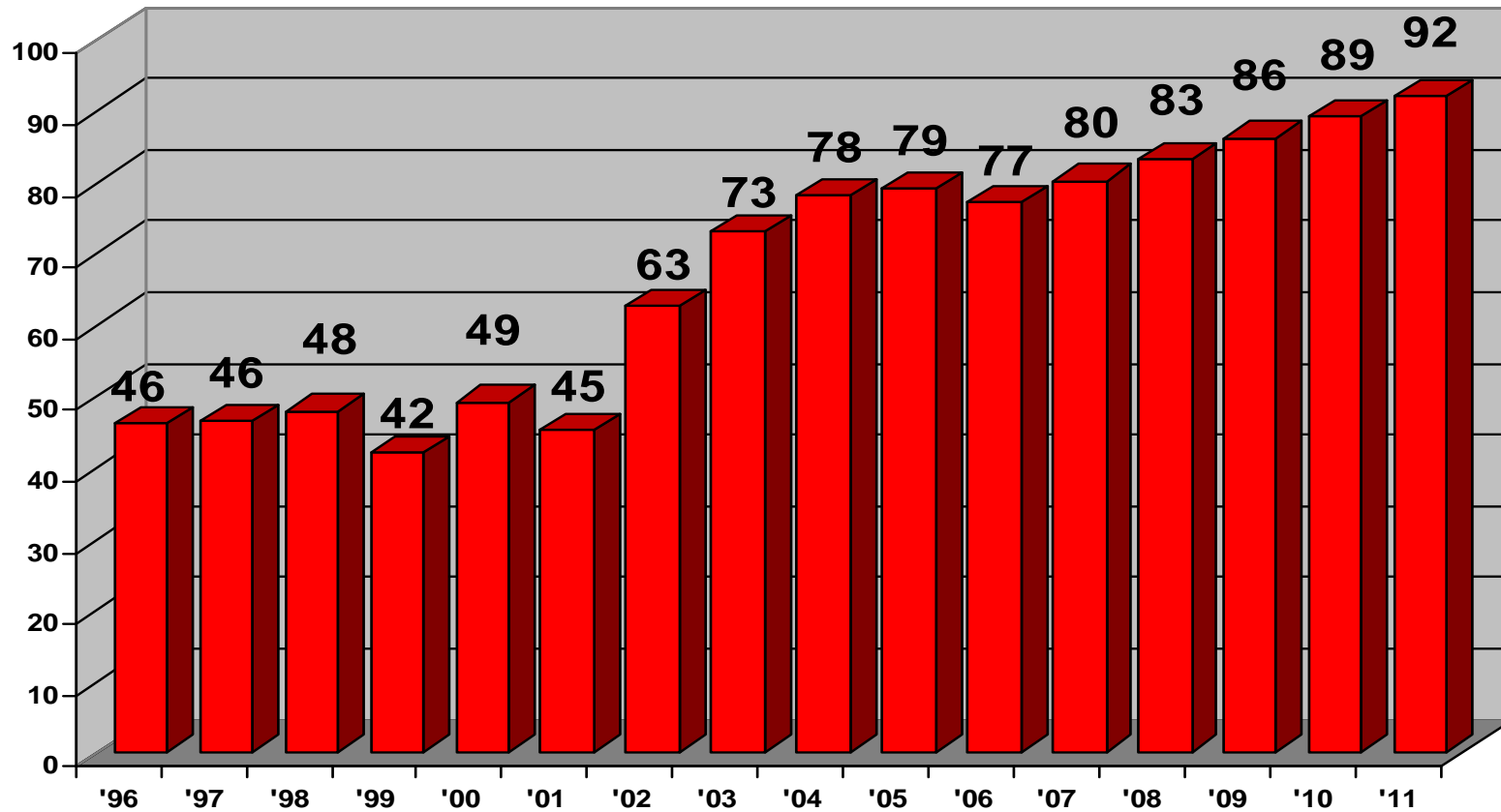


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Economic Forecast

Global Demand for Refrigerated Containers



Source: Container Industry reports

- Swing from bulk refrigerated vessels to reefer containers continue to grow the market for reefers.
- Trade growth increases refer demand.

Rail Market

- 6700 installed population
- Last cycle was 2000-2005
- Based on 10-Year Trade Cycle anticipated Next boom is 2010-2015. CARB Impact could accelerate trade cycle by one year

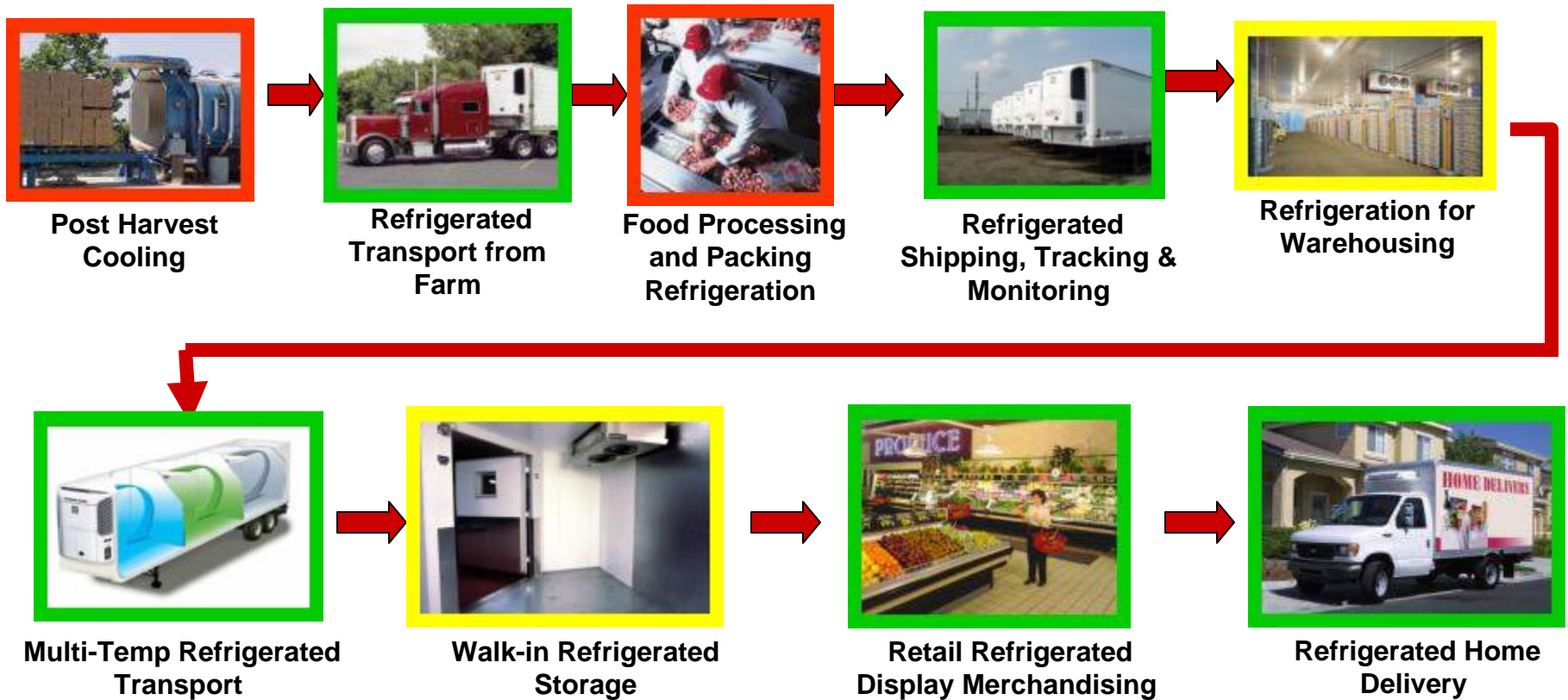


Transport Refrigeration

Keeping It Fresh From Farm To Fork

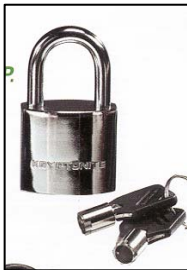


Cold Chain Development



The Cold Chain

- Any organization in the “Food Chain” has responsibilities and exposure to “RISK”
 - Including product (cargo) damage, spoilage, contamination, consumer health issues, security & potential legal responsibility



Food Safety

- **Why Are There Regulations?**

- To ensure foods are **Safe** for consumption

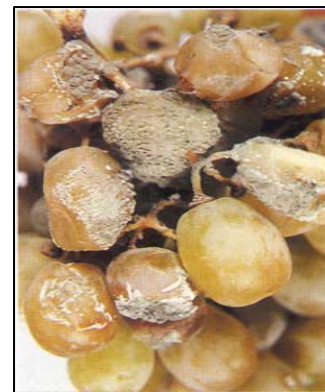
- Preventive Measures help ensure that food is harvested, processed, transported and prepared safely

- **Why Is It Important?**

- Helps prevent **Food Borne Illness** as a result of eating **Bad** food

- **Where Do Food Safety Issues / Concerns Exist?**

- At every step of the “**Food Chain**”



HACCP



- **What Is It?**

- **H**azard **A**nalysis **C**ritical **C**ontrol **P**oint

- A scientific approach to preventing contamination hazards in food & resulting **Food Borne Illness**

- **USDA**

- 1993 - Adopted as **New Regulatory Approach** to help...

- **Control, Reduce** and **Prevent** pathogens in meat, poultry & other food products that carry bacteria which can cause **Food Borne Illness** and / or **Death**

HACCP Pathogen Reduction Rule

- **Places Responsibility:** On food manufacturers and distributors for ensuring *Food Is Safe*
- **Helps Food Companies:** *Compete* more effectively

Source: FDA/USDA, October 2001

Temperature Management

- **Temperature:**

- Has the **Most Significant** effect on maintaining cargo quality
- Must be **'Properly Managed'**
- Even if **Properly Managed**, temperature control **CANNOT** compensate for ***Previously Damaged*** product



- **Ideal Temperatures:**

- Ice Cream -20 °F **Or Lower**
- Beef, Fresh 29-32 °F
- Lettuce, Celery 32 °F
- Pineapple 55 °F
- Bananas, Green 58 °F

Refrigerated Transport Industry Trends

Industry Trends

- 2% biodiesel is commonly used as a lubricity additive in ULSD.
- B5 is approved by most engine manufacturers without modifying the fuel system or maintenance schedule.
- Many engine manufacturers do not ban use of greater than B5 concentrations, but will deny warranty for running with fuel that is out of specification. Users are strongly advised to consult the engine warranty statement.
- BQ9000 is an industry quality control program intended to provide assurance that BD meets established industry standards.
- ASTM 6751, U.S. biodiesel specification, recently adopted an oxidation stability guideline, a modification that has been praised by industry.

Benefits of Biodiesel

- B100 has been observed in engine testing to reduce CO2 emissions by more than 75%, and B20 may reduce CO2 by 15%.
- Biodiesel use also reduces pollutants under the Clean Air Act, such as particulate matter, carbon monoxide, and sulfur dioxide emissions.
- Biodiesel can directly replace petroleum products, as it can be used in conventional diesel engines, making it a renewable fuel that can reduce the country's dependence on imported oil.

Users in Today's Market

- National Biodiesel Board seeks 5% B20 market penetration by 2015.
- The 25 x '25 campaign, a coalition of 350 organizations, has as its goal that 25% of the U.S. energy supply be made-up of renewable fuels by 2025.
- Increasing user interest in approval for B20.
- A very limited number of customers are testing B100, with the view that it is a solution to CARB. Personal opinion is that none will adopt in the timeframe, due to increased cost and reliability issues associated with this option.
- B5 is commonly used, whenever generally available.
- Bottom-line is that high percentage biodiesel will have to make economic sense, or be mandated before any significant players dive in.

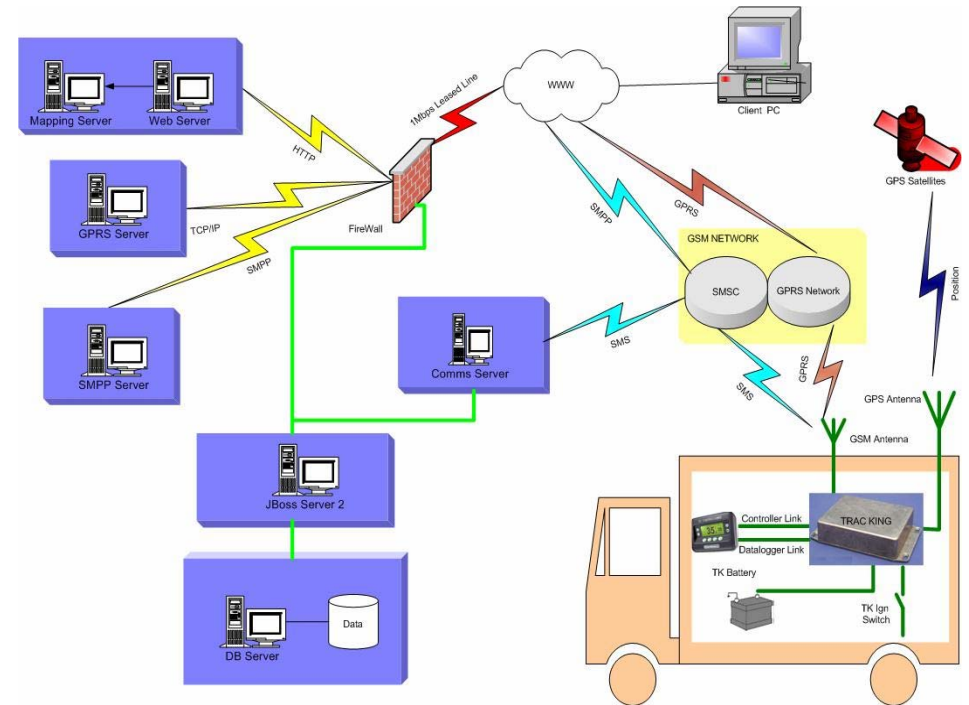
Control System Advances

- Improved driver interface and display panel simplification
- Improved temperature control and fuel saving options
- Improved diagnostics/reliability with service data logging
- Telematics
- Other advances

In the last five years, significant advances have been made in refrigeration control systems.

Telematics

- Input/Output ports for connection of telematics equipment
- Web enabled interface to monitor unit data over the telematics link
- Remote control to clear alarms and change set point



Remote monitoring of trailer location and refrigeration status

Other Advances

- **Firmware flash load**
 - Chip replacements eliminated. Service tool used to update firmware with new features through dealer network.
- **Programmable hour meters**
 - Total hours, diesel hours, electric hours
 - Programmable reminders, such as maintenance or pre trip
- **Electric to diesel automatic switchover**
 - Load loss prevention if electric standby power is lost
- **CAN bus between components**
 - High speed, reliable communications over 4 wires
- **Improved fault tolerance**
 - Multiple backup modes to insure product integrity in case of component failure or system fault

