NEW LEADER

HIGHWAY EQUIPMENT COMPANY

GENERAL MANUAL FOR MODEL

NEW LEADER 7

SAFETY GUIDELINES
INSTALLATION
OPERATION
TROUBLESHOOTING
PARTS LIST

This unit may have been built with <u>SPECIAL FEATURES</u>. Provide <u>SERIAL NUMBER</u> when ordering parts.

SERIAL NO. _____

IMPORTANT: READ THE SAFETY GUIDELINES AND ALL INSTRUCTIONS CAREFULLY BEFORE OPERATING

HIGHWAY EQUIPMENT COMPANY – NEW LEADER DIVISION
1330 76TH AVE SW, CEDAR RAPIDS, IOWA 52404-7052
PH. (319) 363-8281 www.highwayequipment.com FAX (319) 632-3081

NEW LEADER

MODEL "7"

SERIAL NUMBER_____

MANUAL NUMBER: 304009-A

EFFECTIVE: 7/2006 – Version 4.0

HIGHWAY EQUIPMENT COMPANY
1330 76TH AVE SW
CEDAR RAPIDS, IOWA 52404-7052

PHONE (319) 363-8281 ***FAX (319) 632-3081***

www.highwayequipment.com

BUILDING THE BEST SINCE 1939

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INSERT CURRENT
NEW LEADER WARRANTY

PREFACE

PLEASE! ALWAYS THINK SAFETY FIRST!!

The purpose of this manual is to familiarize the person (or persons) using this unit with the information necessary to properly install, operate, and maintain this system. These instructions cannot replace the following: the fundamental knowledge that must be possessed by the installer or operator, the knowledge of a qualified person, or the clear thinking necessary to install and operate this equipment. Since the life of any machine depends largely upon the care it is given, we suggest that this manual be read thoroughly and referred to frequently. If for any reason you do not understand the instructions, please call your authorized dealer or our Cedar Rapids, Iowa, Product Support Department at (319) 363-8281.

It has been our experience that by following these installation instructions, and by observing the operation of the spreader, you will have sufficient understanding of the machine enabling you to troubleshoot and correct all normal problems that you may encounter. Again, we urge you to call your authorized dealer or our Cedar Rapids Product Support Department if you find the unit is not operating properly, or if you are having trouble with repairs, installation, or removal of this machine.

We urge you to protect your investment by using genuine HECO parts and our authorized dealers for all work other than routine care and adjustments.

Highway Equipment Company reserves the right to make alterations or modifications to this equipment at any time. The manufacturer shall not be obligated to make such changes to machines already in the field.

This Safety Section should be read thoroughly and referred to frequently.

ACCIDENTS HURT !!!

ACCIDENTS COST !!!

ACCIDENTS CAN BE AVOIDED !!!

SAFETY

TAKE NOTE! THIS SAFETY ALERT SYMBOL FOUND THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY AND THAT OF OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.

In this manual and on the safety signs placed on the unit, the words "DANGER," "WARNING," "CAUTION," and "IMPORTANT" are used to indicate the following:

DANGER	Indicates an imminently hazardous situation that, if not avoided, WILL result in death or serious injury. This signal word is to be limited to the most extreme situations and typically for machine components that, for functional purposes, cannot be guarded.
WARNING	Indicates a potentially hazardous situation that, if not avoided, COULD result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.
CAUTION	Indicates a potentially hazardous situation that, if not avoided, MAY result in minor or moderate injury. It may also be used to alert against unsafe practices.
IMPORTANT!	Is used for informational purposes in areas which may involve damage or deterioration to equipment, including data loss, but generally would not involve the potential for personal injury.
NOTE:	Provides additional information to simplify a procedure or clarify a process.

The need for safety cannot be stressed strongly enough in this manual. At Highway Equipment Company, we urge you to make safety your top priority when operating any equipment. We firmly advise that anyone allowed to operate this machine be thoroughly trained and tested, to prove they understand the fundamentals of safe operation.

The following guidelines are intended to cover general usage and to assist you in avoiding accidents. There will be times when you will run into situations that are not covered in this section. At those times the best standard to use is common sense. If in doubt about the results of performing an action or deleting an item from the system, backup all files to the external storage card prior to proceeding. If, at any time, you have a question concerning these guidelines, please call your authorized dealer or our factory at (319) 363-8281.

GENERAL DESCRIPTION

The "7" controller is designed to control the application rate of dry fertilizer and ag-lime for up to three bins. Each conveyor can be independently controlled from the comfort of the cab. The controller can program and store jobs for each bin with personalized names, products and other settings. Information regarding the rate, ground speed, spinner speed, conveyor speed, product density and product applied is easily accessed and customer configurable.

The display can be transferred between vehicles to make the most of your investment; the optional RAM mount makes this easy and simplifies adjustments as well. The "7" display has a weather tight enclosure designed for the agricultural industry's harsh environment.
NOTE: Card door slot must be fully closed for the "7" display to remain weather tight.

Variable rate and as–applied mapping can be done with the "7". Variable rate applications are performed by reading prescription files. VRT files are transferred from the flashcard to the job file for applications. Internal memory records GPS and logs data collected during application.

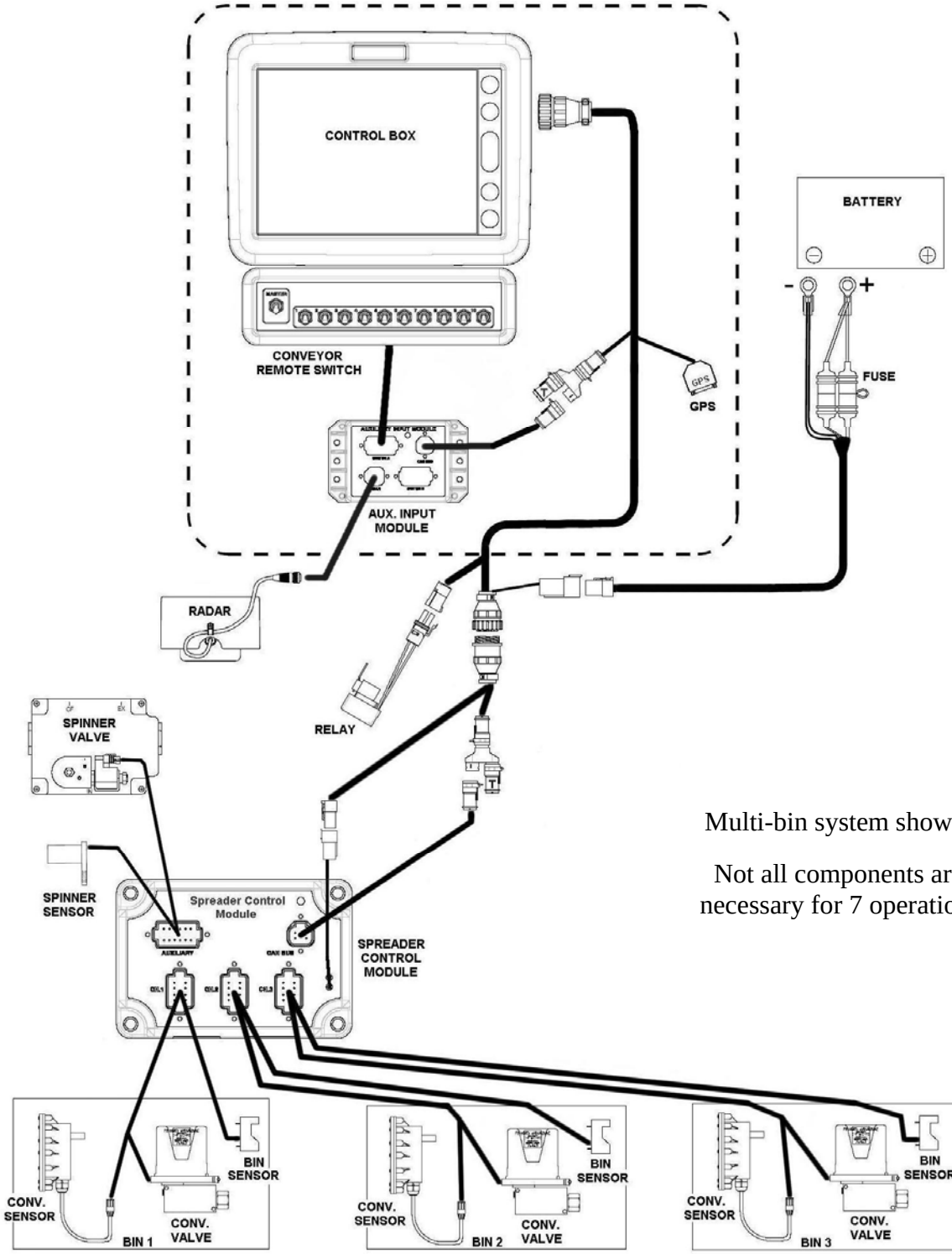
The New Leader "7" System can be modified to control liquid spray systems. Contact *Ag Leader Technology, Inc*. at (515) 535-5363 or www.agleader.com to find the nearest dealer. They can assist you with purchasing the module and harness for this option.

This product is intended for commercial use only.

INSTALLATION INSTRUCTIONS

GENERAL SYSTEM LAYOUT

The diagram below shows typical components, cables and available options of the "7".



Multi-bin system shown.

Not all components are necessary for 7 operation.

System Layout

INSTALLATION INSTRUCTIONS CONTINUED

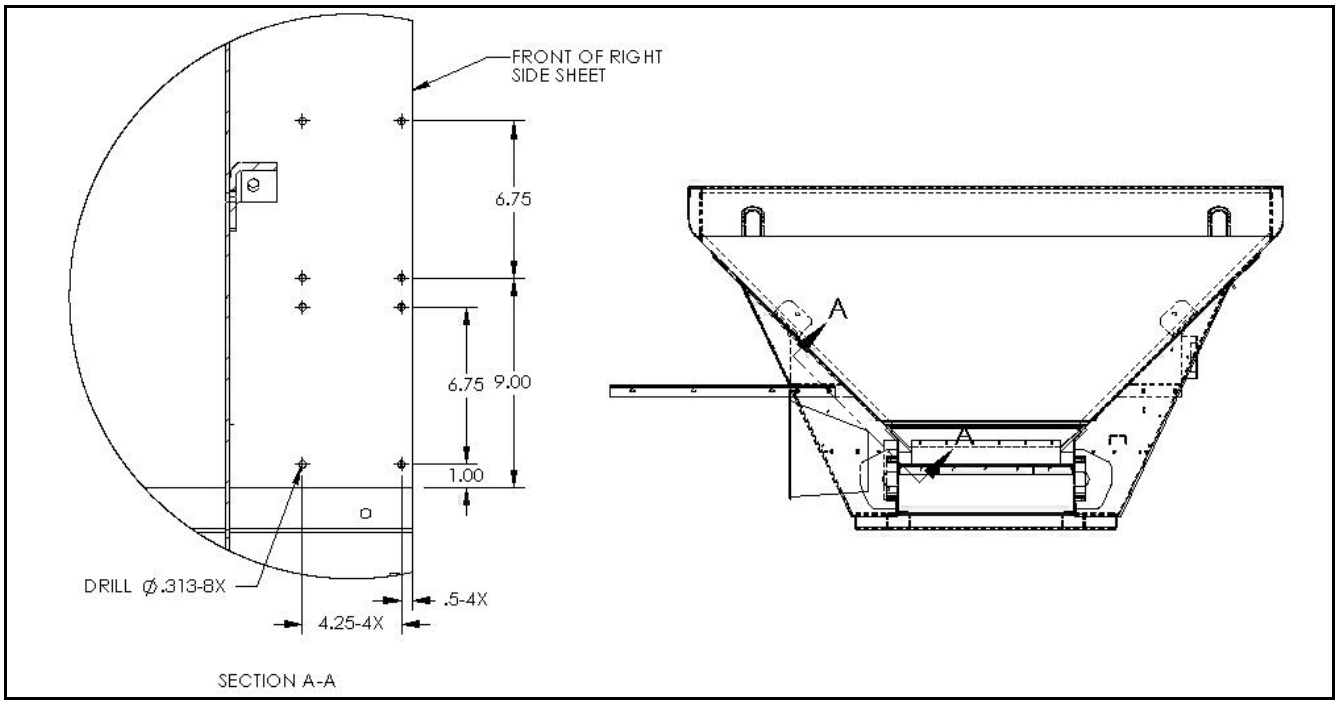
CONSOLE AND CABLING

CAUTION	All holes in the truck cab walls, floor and firewall for control wires, hoses and cables are to be grommeted, plugged and sealed to prevent entrance of engine fumes, dust, dirt, water and noise.

CAUTION	Make sure drill will not puncture gas tank or harm any other obstruction before drilling holes.

Mount control box to secure support inside vehicle cab, accessible to operator without obstructing or diverting normal driving view. Avoid interference between console and shifting lever or any other vehicle controls. Allow room behind console to permit easy access to cable connections. Console should be mounted out of direct sunlight and installed as far from any two-way radios as possible.

Mount auxiliary input module in cab in a suitable location out of the operator's way. Allow room for cable service loops. Mount spreader module to right side sheet in front of endgate. If holes have not been drilled, see Side Sheet Modification illustration below.



Side Sheet Modification

After mounting all other system components, connect control cables to the modules (see System Layout illustration on previous page). Be careful to route all wire harnesses where they will be protected from pinching, rubbing, sharp edges and exhaust systems. Use sufficient tie wraps to fasten the harnesses securely.

Make sure all components are connected. Attach power cable to battery. Connect red conductor with fuse holder to battery positive and black conductor to ground.

INSTALLATION INSTRUCTIONS CONTINUED

IMPORTANT!	Connect welders ground directly to one of the items being welded anytime an arc welder is used on the vehicle or anything connected to the vehicle. Disconnect power cable from control box! Failure to do so can result in damage to components on both the vehicle and/or spreader, in which case the warranty will be null and void by manufacturer.

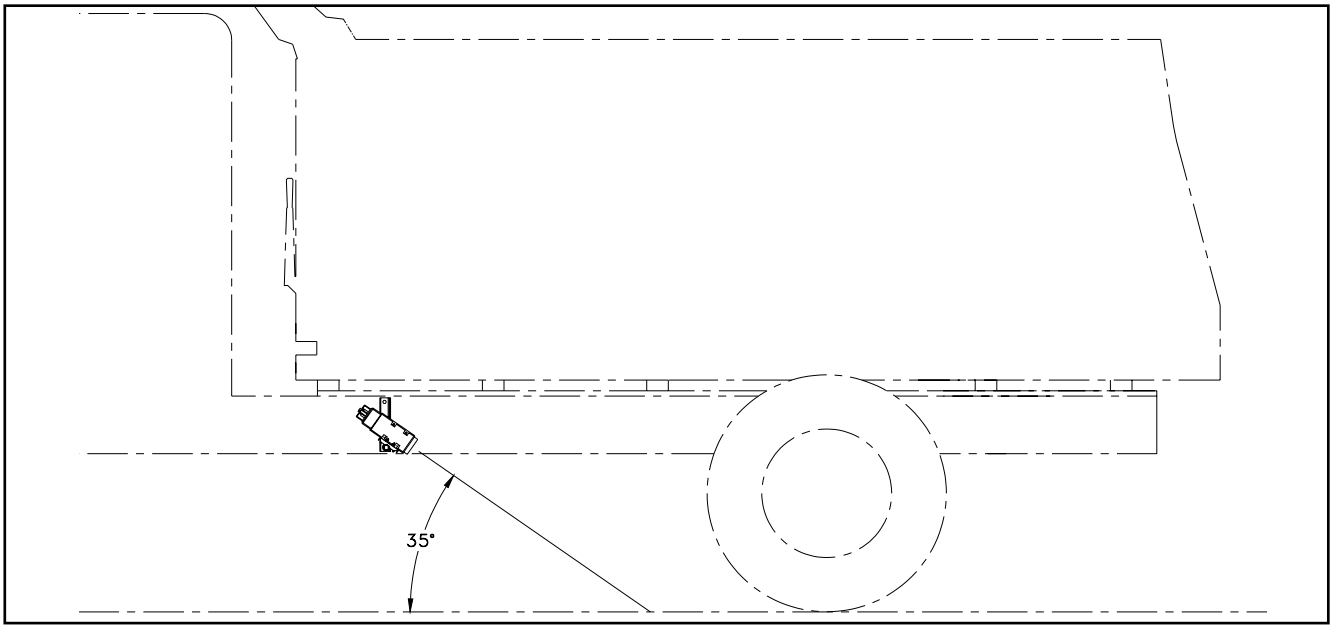
SPINNER SENSOR

The spinner sensor must be mounted under the right-hand spinner disc in the holes provided. Rotate the disc so that one of the cap screws is directly above the sensor. Position the sensor 1/8-inch or less below the cap screw and tighten the sensor hardware. If the distance between the sensor and the spinner cap screw is more than 1/8 inch, the sensor may not get a good RPM reading.

RADAR

The mounting of the radar unit will vary with the type of vehicle. The mounting kit supplied uses an "L" shaped bracket and mounting plate. There is also a plate mounting bracket drawing that can be used to fabricate a bolt-on version. Refer to the installation instructions included with the radar for more information.

The radar should be mounted facing rearward and at a 35° angle horizontally as shown below.



Radar Mounting Angle

CONSOLE OVERVIEW

SYSTEM USES

- AutoSwath control
- Multiple product application
- Mapping and logging product application
- Granular fertilizer application
- Mapping of all field boundaries, sub-boundaries, waterways and terraces
- Optional Liquid spray system control
- Optional Autopilot steering control

SYSTEM FEATURES

- Large 10.4 inch display
- Sunlight-readable screen
- Large internal memory
- Rugged sealed enclosure
- Adjustable volume control
- Compatible with most NMEA GPS receivers
- Direct access keys give you one-touch access to home, setup, summary/report, and run screens
- DirectCommand product control using industry-standard CAN-bus interface

DATA CARD USAGE

The "7" uses a compact flash card for transferring data in and out of the display. The system is compatible with all current card sizes, with a minimum of 64 MB recommended.

IMPORTANT!	If in doubt about the results of performing an action or deleting an item from the system, backup all files to the external data card prior to proceeding.

COLOR TOUCH SCREEN

The "7" display features a 10.4 inch color touch screen display. The touch screen provides easy and intuitive navigation through the screens without the need for an external keypad or mouse device. Key things to remember if you are new to using a touch screen device are:

1. Do not use sharp objects to operate the touch screen, this could result in damage to the display. A finger tip is the recommended method of operation.
2. Do not use harsh chemicals to clean the touch screen. Use a damp soft cloth or an anti-static wipe made specifically for cleaning computer displays to clean the screen and "7" enclosure.
3. A gentle touch, about 1/2 second in duration, is all that's required to operate the touch screen correctly. Quick, firm taps will not provide faster navigation through the system.

CONSOLE OVERVIEW CONTINUED

CAN-BUS TECHNOLOGY

The "7" system uses Controller Area Network (CAN) technology. CAN systems are comprised of modules with high speed processors, connected through high-speed communication cables. CAN technology's benefits include greater ability to configure and expand the system, compatibility, simpler installs with less wiring and increased system dependability.

SYSTEM UPGRADES

Required software updates will be available free for download from www.HighwayEquipment.com. These updates will improve the performance of your "7" system. Occasionally, major releases will be made available that have significant product feature additions or enhancements. These optional software updates may have an additional fee associated with them.

DISPLAY HARDWARE

Rear View - "7" Display

IMPORTANT!
Data loss may occur if "7" is shutdown improperly. Turn display off by touching "Shutdown" button on home screen.

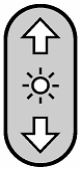
Item	Description
1) Compact Flash Card Slot	The compact flash card slot has a sensor that lets the display know whether the door is open or closed. An on-screen alert will indicate when the card can safely be removed if the door is opened. The "7" display comes with an industrial grade compact flash card that's required to transfer files to a desktop computer.
2) Speaker	The built in speaker is used for audible warnings. The speaker volume can be adjusted through the console setup.
3) 28-Pin Connector	The round 28-pin connector contains CAN, RS232 serial and system power and ground connections.
4) Power/Reset Switch	The power/reset switch controls the "7" system's power when connected to a continuous power supply. If the display stops responding, press this switch for five seconds to restart the system.

CONSOLE OVERVIEW CONTINUED

SYSTEM NAVIGATION BUTTONS

The System Navigation buttons on the right edge of the "7" display are used to move between different areas within the system. These buttons are always present regardless of the current mode of operation.

System Navigation Buttons

Navigation Buttons	Description
1) Home	Press to access Home screen on the "7" display. Options available at Home screen are Copy to Card, Upgrade System, User Guide and Shut Down.
2) Setup	Press to access Setup menus and wizards used for system configuration. General setup item groups include Grower-Field Management, Field Notes, Console, GPS and Application configurations.
3)  Brightness	Press Brightness Control to set display back light intensity to fit current lighting conditions.
4) Summary	Press to display Summary screen showing data for the current field operation.
5) Run	Press to launch Run screen. The Run screen provides control of all field operations and data logging.

GETTING STARTED

ENTERING DATA INTO THE "7"

The following tools allow users to enter data.

Keyboard

An on-screen keyboard is made available when needed during setup processes. Press the keyboard icon button to access alphanumeric keyboard

Numeric Keypad

An on-screen keypad is made available for changing configuration setting and calibration numbers. Press the keypad icon button to access the numeric keypad.

HOME – OVERVIEW

OVERVIEW

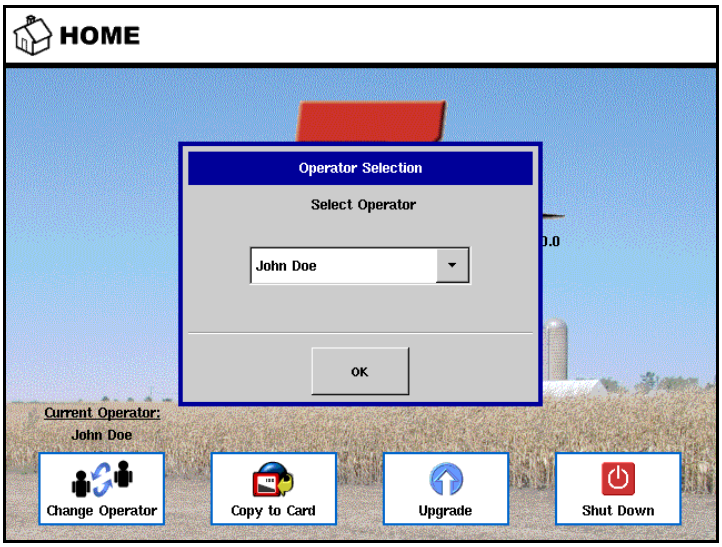
Home Screen

Home Button	Description
	Press to select operator from drop-down list.
	Press to copy log files to memory card and remove from display's memory.
	Press to upgrade software from memory card or computer.
	Press to shutdown "7" controller.

HOME – USER GUIDE & CHANGE OPERATOR

CHANGE OPERATOR

Press Change Operator button to select operator from drop-down list. For information on adding operators, see *Operator* in "Setup – Grower-Field Management" section.



Change Operator Screen

NOTE: The operator information will be displayed on application summary reports.

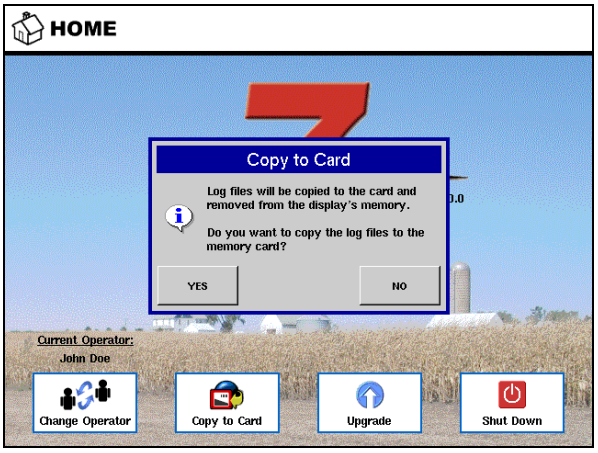
HOME – COPY TO CARD

COPY TO CARD

Insert memory card and press Copy to Card button to copy log files to card. If a card is not present, a display will appear requesting a card be inserted. The following warning will appear when a card is installed:

IMPORTANT!	Copy to Card – Log files will be copied to the card and removed from the display's memory. Do you want to copy the log files to the memory card? YES/NO

The "7" will display when files have been successfully copied.



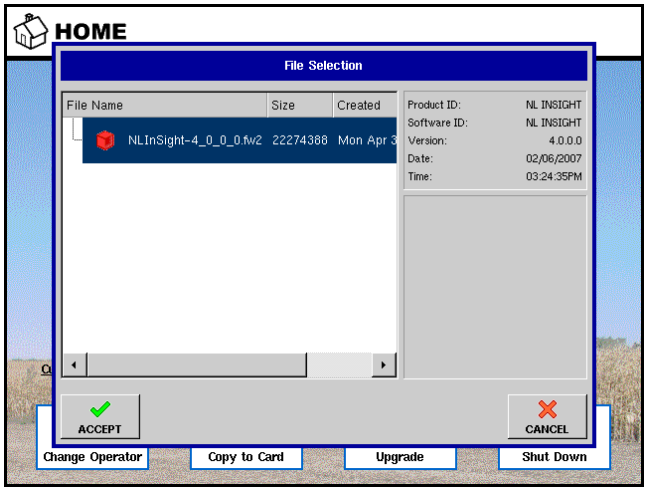
Copy to Card Screen

HOME – UPGRADE & SHUTDOWN

UPGRADE

Press Upgrade button to upgrade software from memory card or computer. Select file name for upgrade and press **Accept**. The "7" will display when the system has been successfully upgraded.

IMPORTANT!	Create a backup file before upgrading the software. See *Memory* in "Setup – Console" section for instructions.



Upgrade Screen

NL7 / Module Firmware Versions

The following files should be saved on the compact flash card, from Highway Equipment Company's website, for updating the NL7 display and CAN module.

Upgrade Instructions

Instructions for updating the CAN-bus Module:

When updating the CAN-bus module they must be connected to the NL7.

1. Save the modules firmware on the compact flash card.
2. Verify that the NL7 is attached to the module that you wish to update. The module LED light should be flashing green to verify communication.
3. Turn off the NL7 display, and then insert the compact flash card, close the door, and then power up the display.
4. Press the **UPGRADE** button.
5. Select the **DryNL-1.4.2.0.fw2** extension.
6. After selecting the upgrade file for the module press **ACCEPT**
7. The NL7 will ask you to verify the upgrade press **YES**
8. At this point wait for the NL7 to update the module. **It is important not to lose power while performing this update.**

HOME – UPGRADE & SHUTDOWN

UPGRADE

Use the following steps to upgrade the NL7

1. Copy the latest upgrade file to your compact flash card.
2. Insert the compact flash card in the NL7, close the door, and power up the display.
3. Press the **SETUP** button, **CONSOLE**, then **MEMORY** and then press the **CREAT BACKUP FILE**. When the message "Do you wish to back up all data to the card?" appears, press **YES.** This will save all information you have logged or entered in the NL7 to the compact flash card.
4. When the "Backup is Complete" message appears, press **OK**
5. Press the **HOME** button, and then press the **UPGRADE** button.
6. When the upgrade dialog box appears, select the NL7 upgrade, then press **ACCEPT.**
7. Please wait while the NL7 starts the upgrade process.
8. A window will appear stating that the NL7 is ready to upgrade and will warn, "Do not disconnect power". Press **OK.**
9. After a few seconds, the NL7 will appear to power down, and a black screen will appear. The NL7 will progress through 7 steps, and then display the text "Rebooting for phase 2 of install".
10. Once the screen is blank, press the power button on the display.
11. The NL7 will power up in the Service Mode and Phase 2 of the upgrade will start.
12. After Phase 2 has completed it will once again power down.
13. The upgrade is now complete, power the NL7 back on. Press the power button to use the NL7.

SHUT DOWN

Press Shut Down button to power down "7" controller.

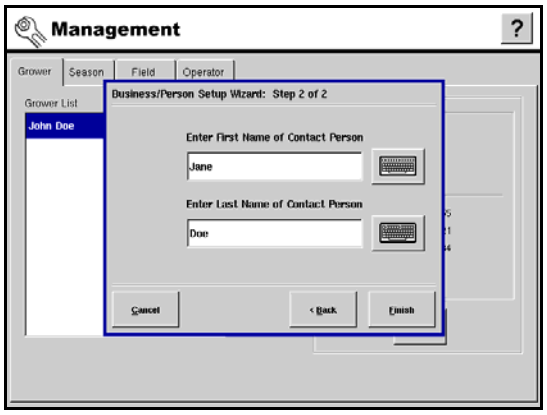
Shut Down Screen

SETUP – OVERVIEW

OVERVIEW

Setup Wizard Use

Setup of most of the "7" System is performed using wizards. Wizards are a series of on-screen dialogs that allow the user to move through the setup process in an easy to follow step-by-step manner.



Setup Wizard Dialog Example

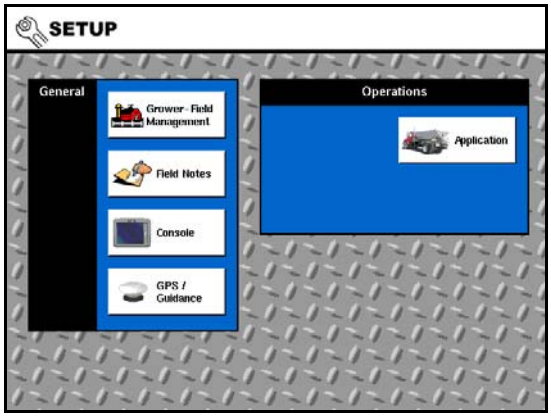
System Functionality

Most of the Run screen's functionality is not available until the setup process is completed. Prior to setup, the Run Screen will look like the following figure. The only information available before setup is under the **SYSTEM** button.

Run Screen Prior to System Setup

SETUP – GENERAL – OVERVIEW

GENERAL SETUP OVERVIEW



Main Setup Screen

This section covers General Setup, common to all operations of the "7" System. Press each of the buttons in the General Setup section of the "7" display to access Setup screens and wizards. Basic functions of the General Setup buttons are described below. Specific details can be found in each respective section of this manual.

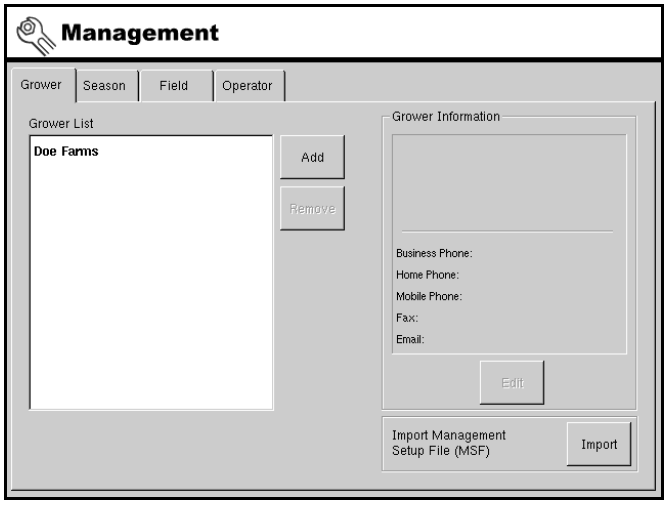
Setup Button	Description
Grower-Field Management	Press to access Management screen where Grower, Season, Field and machine Operator are setup and edited.
Field Notes	Press to access Field Note function setup. This tool allows mapping and data logging of marker points during field operations while in the run screen.
Console	Press to access date/time, unit of measure and owner information settings; unlock optional features purchased with the system; as well as perform basic memory and external storage card maintenance.
GPS	Press to configure TSIP GPS receivers and lightbars. NOTE: Refer to "Setup – GPS" section of this manual for settings and compatibility information.

SETUP – GROWER–FIELD MANAGEMENT – OVERVIEW

GROWER–FIELD MANAGEMENT

Data Storage Overview

Data entered under Grower-Field Management is linked and stored for use within the "7" System and desktop GIS software packages. An on-screen keyboard is made available as needed when performing actions like naming Growers and Fields.



Setup Tab	Description
Grower	The Grower tab is used to setup the businesses or people that own one or more farms.
Season	The Season tab is used to setup the crop season. The Season is defined as the calendar year that the crop, relating to the current field operation, will be harvested.
Field	The Field tab is used to setup fields and relating information.
Operator	The Operator tab is used to setup machine operator and CCA license information.

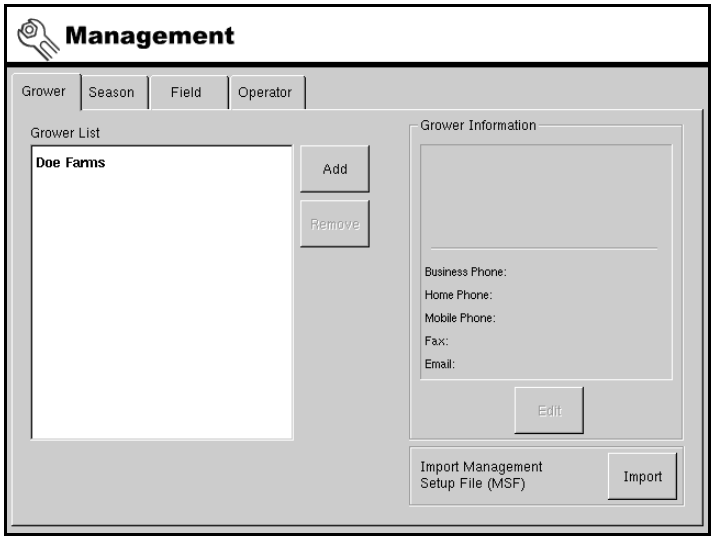
SETUP – GROWER–FIELD MANAGEMENT – GROWER

Grower

Overview

The Grower is a global setting referring to the business or person for which the system is in operation. Enter each Grower business name. When fields are setup within the system they can be linked to specific growers.

Contact information can also be entered for each Grower. The Grower information will be passed into mapping software for automatic Grower setup within desktop software.



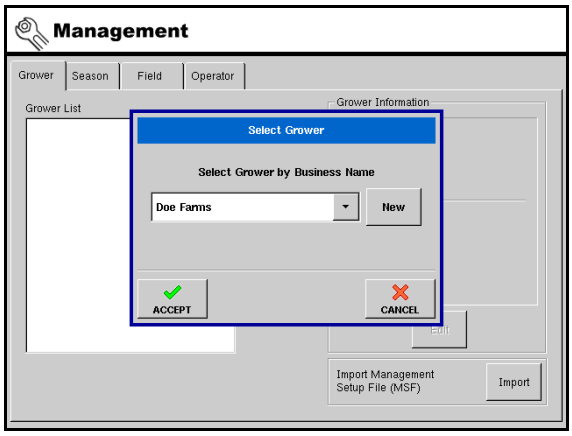
Grower Management Screen

Item	Description
Grower List	Displays all Growers configured within the "7" System.
Add	Press to launch software wizard used to create a new grower.
Remove	Select entry in the Grower list and press to remove. The following warning will appear:
	IMPORTANT! Remove Grower – This will delete the grower and all fields and regions belonging to the grower. Are you sure? ACCEPT/CANCEL
Grower Information	Displays optional information that is stored for a specific Grower.
Edit	Press to access a data entry screen for adding or editing optional Grower information.

SETUP – GROWER–FIELD MANAGEMENT – GROWER

Adding A New Grower

Select Grower



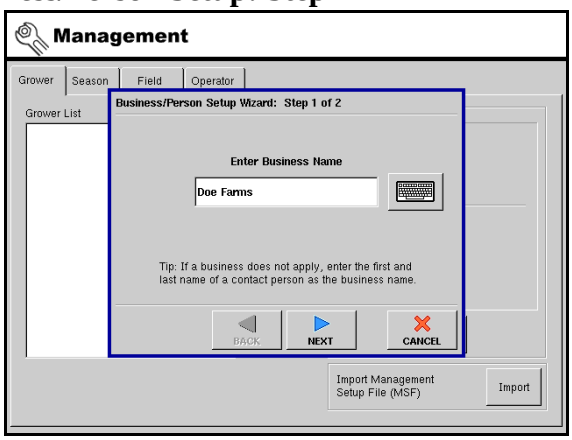
To setup a new Grower:

Press **Add** button on Grower screen and the Select Grower dialog is shown. The drop down list displays all businesses and operators setup within the system and makes them available for selection as a Grower.

To add Grower information, if Grower is not in the system as a business contact or operator:

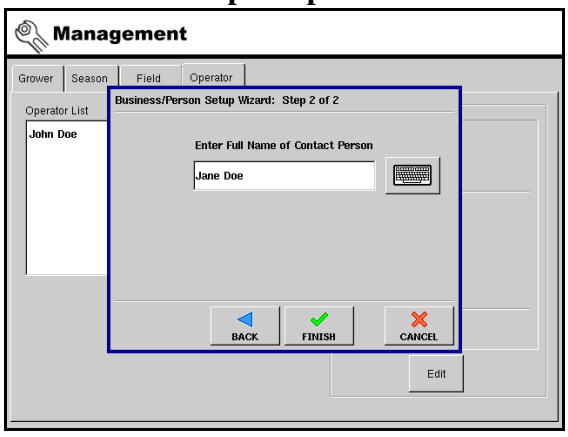
Press **New** button.

Business/Person Setup: Step 1



The first step of the setup process asks that a Business Name be entered into the system since Growers are usually business or farm owners. Enter Business Name and press **Next** to proceed.
NOTE: If the Grower is not the business or farm owner, enter the Grower's first and last name as a Business Name.

Business/Person Setup: Step 2

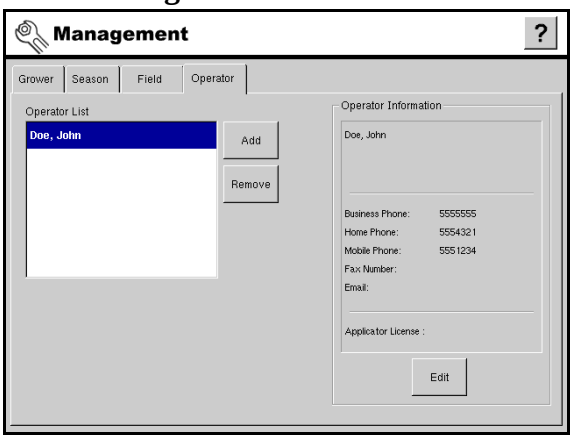


Enter first and last name of Grower's contact person and press **Finish** to complete new Grower setup.

SETUP – GROWER–FIELD MANAGEMENT – GROWER

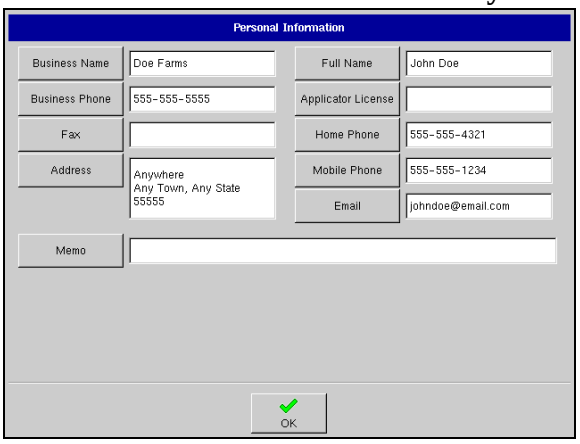
Adding or Editing Grower Personal Information

Step 1: Accessing the Edit Screen



Select Grower from Grower List and press **Edit** button to enter or edit data displayed in Grower Information frame.

Step 2: Personal Information Data Entry



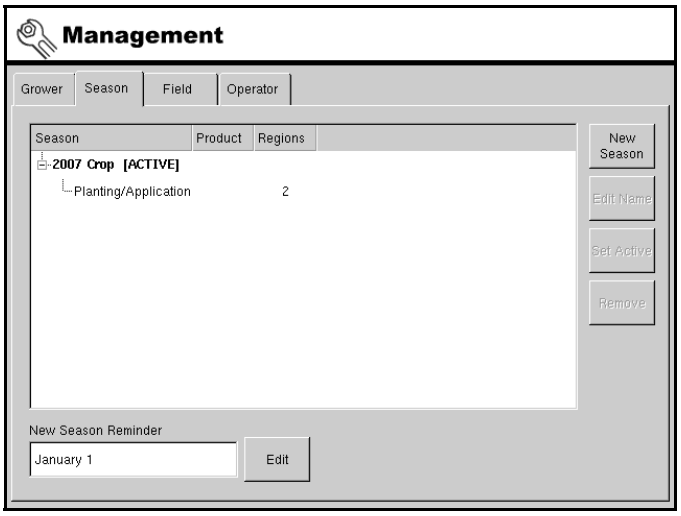
Press desired control button and the on-screen keyboard or numeric keypad will appear to allow data entry into the system.

Press **OK** to complete edit process.

SETUP – GROWER–FIELD MANAGEMENT – SEASON

Season

A season is defined as the calendar year the crop will be harvested. Creating a season and setting it to active is required prior to the system logging any data.



Season Setup Screen

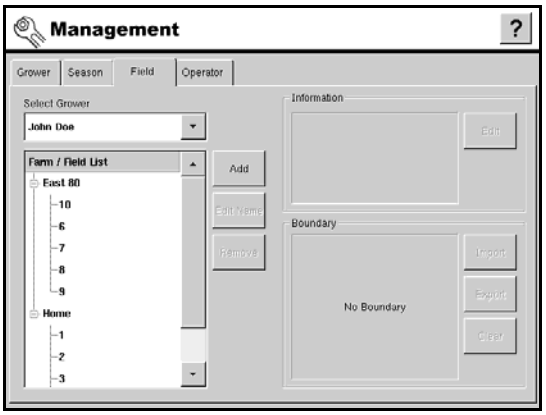
Item	Description
Summary list box	Displays a list of seasons setup in the "7" display.
New Season	Press to create a new season. When a new season is created, it is set to active by default.
Edit Name	Select season from summary list and press to edit name of season.
Set Active	Select season from summary list and press to set to active season. All data is logged to the active season.
Remove	Select season from summary list and press to remove season. The following warning will appear:
	IMPORTANT! Remove Operation – Removing this will delete all maps and regions of application operations in this season. ACCEPT/CANCEL
New Season Reminder	Press to set date for the system to prompt user to create a new season.

SETUP – GROWER–FIELD MANAGEMENT – FIELD

Field

Overview

A field consists of one or more outer boundaries. Each outer boundary can contain inner boundaries as needed to define any combination of roadways, waterways, building sites or bodies of water.

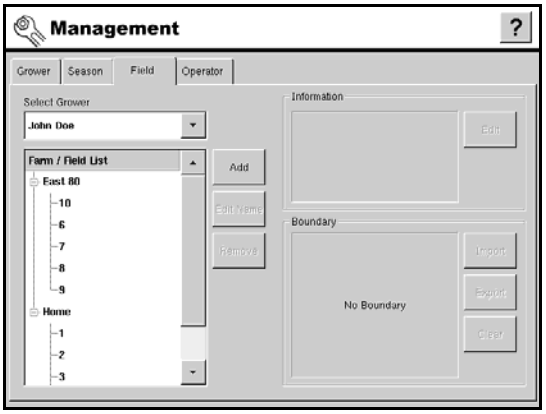


Field Setup Screen

Display Areas and Buttons	Description	
Select Grower	Use to select which grower's fields to display in the Farm/Field list..	
Farm/Field List	Displays a list of all farms and fields associated with the selected grower.	
Add	Press to launch the new field creation wizard.	
Edit Name	Select item from Farm/Field list and press to edit name.	
Remove	Select item from Farm/Field list and press to remove item. The following warning will appear:	
	IMPORTANT!	Delete Field – This will delete the field and all the regions that are associated to the field. Are you sure? YES/NO
Information Frame	Displays grower's name when farm is selected from Farm/Field list. Displays text describing location of field when field is selected from Farm/Field list.	

SETUP – GROWER–FIELD MANAGEMENT – FIELD

Information



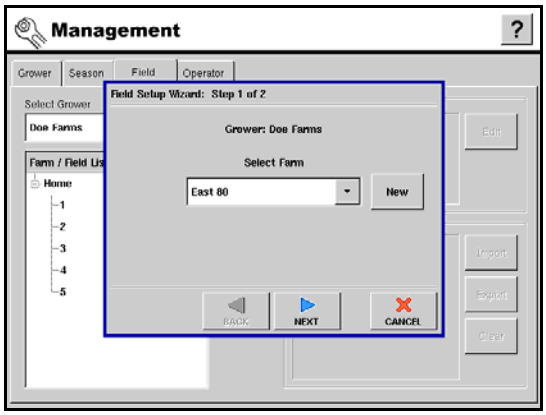
Field Setup Screen

Display Areas and Buttons	Description	
Edit	Select a field in the Farm/Field list and press to add or edit information stored.	
Boundary Frame	Displays collected boundaries and total area for a selected field from the Farm/Field list.	
Import	Press to import a field boundary from the external storage card.	
Export	Press to export a selected field boundary to the external storage card.	
Clear	Press to delete a field boundary from the system. The following warning will appear:	
	IMPORTANT!	Clear Boundary – Are you sure you want to delete the boundary for this field? This operation cannot be undone. ACCEPT/CANCEL

SETUP – GROWER–FIELD MANAGEMENT – FIELD

Adding a New Field

Step 1: Select Farm

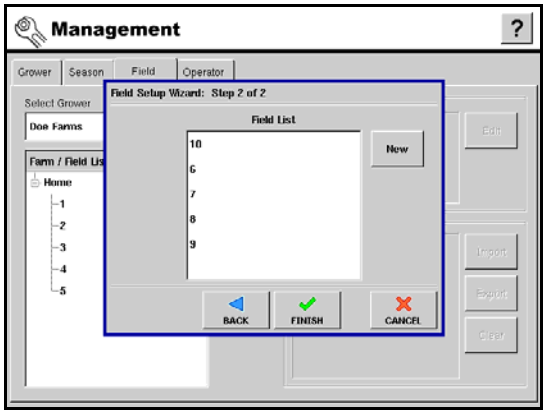


To add a new field:

Select desired Farm from drop down list or press **New** button and use keyboard to enter Farm name.

Press **Next**.

Step 2: Add Field Name



Press **New** button and use keyboard to enter new Field name. More than one field may be created at this time.

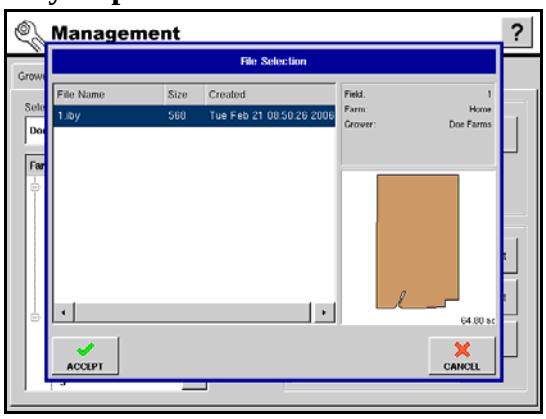
Press **Finish**.

SETUP – GROWER–FIELD MANAGEMENT – FIELD

Importing/Exporting Boundaries

Boundaries can be created with the "7" display or imported from desktop GIS software. Boundary files created in the "7" display can also be exported for use in desktop mapping software. Information on Boundary types can be found under *Field Boundary* in "Run – Map" section.

Boundary Import

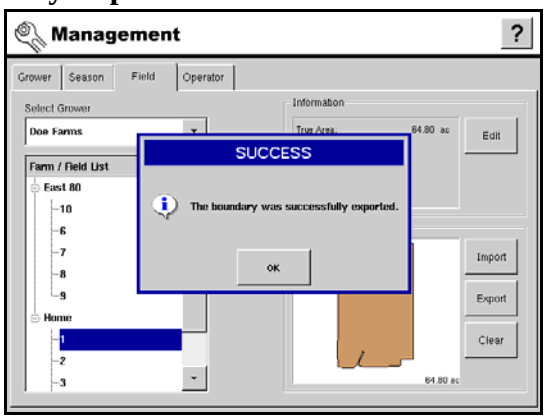


To import a boundary from the external data card:

Select desired field from Farm/Field list and press **Import** button.

Select desired file and press **Accept** to complete import process.

Boundary Export



To export a boundary to the external data card:

Select desired field from Farm/Field list and press **Export** button. A window will appear when the boundary has successfully exported.

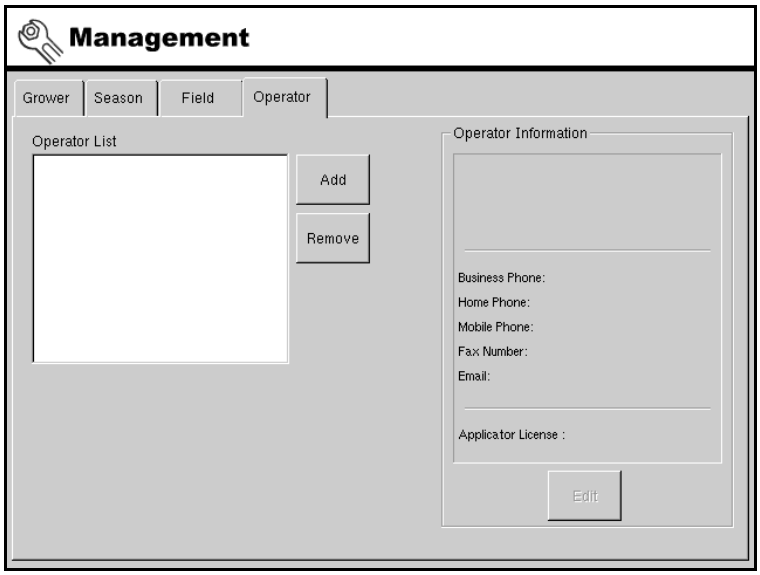
Press **OK**.

SETUP – GROWER–FIELD MANAGEMENT – OPERATOR

Operator

Overview

A machine operator must be selected at initial startup of "7" display and can be changed as needed from the Home screen.



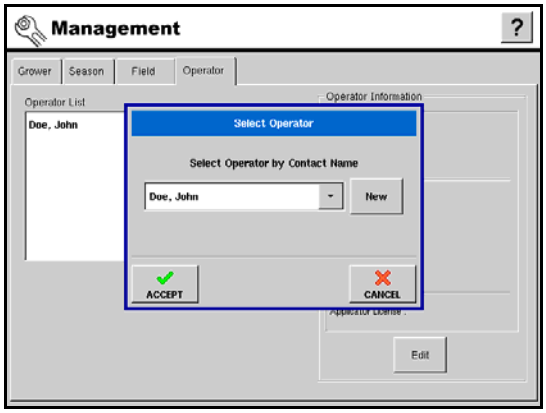
Operator Setup Screen

Item	Description
Operator List	Displays a list of all machine operators configured within "7" System.
Add	Press to add a new machine operator to the system. The first and last names of people entered as contact information for a business or grower will be made available for selection from a list. New people can be added by following the setup wizard steps.
Remove	Select name from Operator list and press to remove name. The following warning will appear:
	IMPORTANT! Remove Operator – Removing the operator will remove all data when this operator was active. Are you sure? ACCEPT/CANCEL
Operator Information Frame	Displays all information stored within the system for the selected entry in the Operator List.
Edit	Select name from Operator list and press to edit stored information.

SETUP – GROWER–FIELD MANAGEMENT – OPERATOR

Adding A New Operator

Select Operator



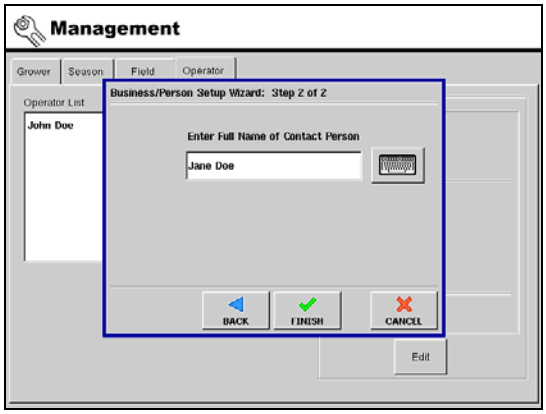
To setup a new Operator:

Press **Add** button on Operator screen and the Select Operator dialog is shown. The drop down list displays all people setup within the system and makes them available for selection as an Operator.

To add Operator information if Operator is not in the system as a business or farm contact:

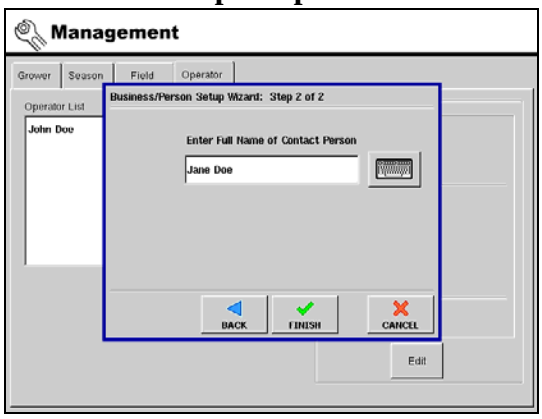
Press **New** button.

Business/Person Setup: Step 1



The first step of the setup process asks that a Business Name be entered into the system since Operators are directly related to a Business or Farm owner. Enter Business Name and press **Next** to proceed.
NOTE: If the Operator is not the primary contact for an existing business or farm, enter the contact's first and last name as a Business Name.

Business/Person Setup: Step 2

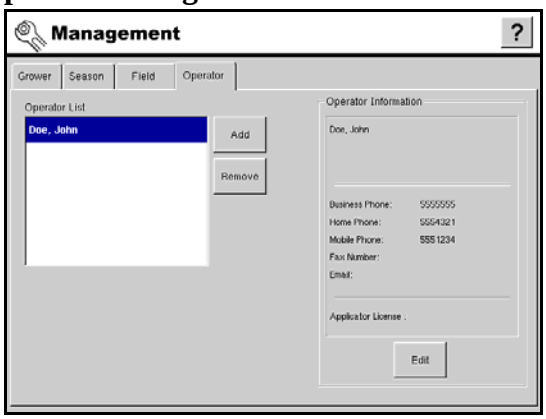


Enter Operator's first and last name and press **Finish** to complete new Operator setup.

SETUP – GROWER–FIELD MANAGEMENT – OPERATOR

Operator Personal Information

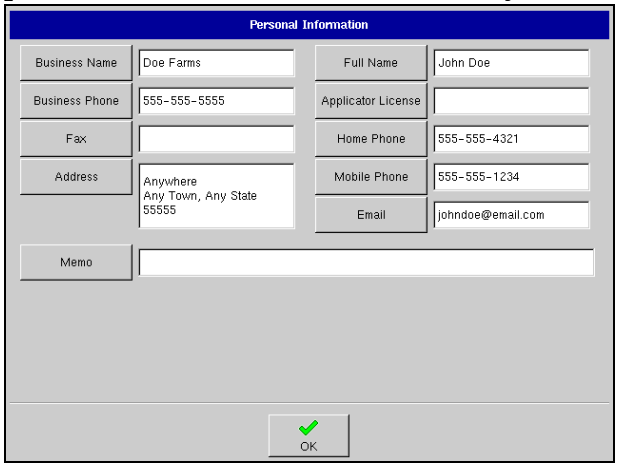
Step 1: Accessing the Edit Screen



To enter or edit data displayed in Operator Information frame:

Select Operator from Operator List and press **Edit** button.

Step 2: Personal Information Data Entry



Press desired control button and the on-screen keyboard or numeric keypad will appear to allow data entry into the system.

Press **OK** to complete edit process.

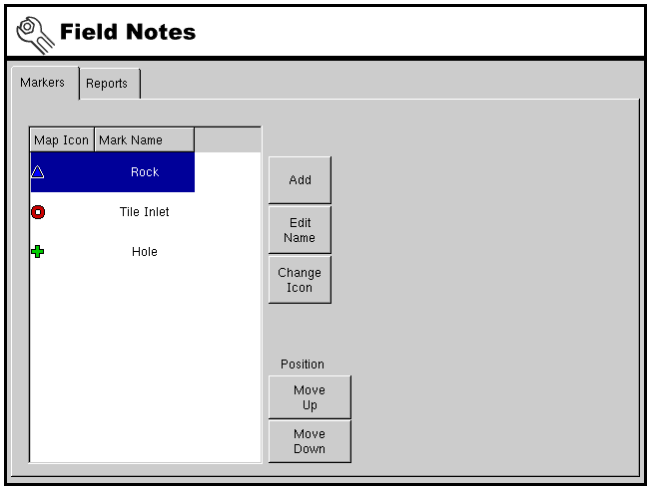
SETUP – FIELD NOTES – MARKERS

FIELD NOTES

Markers

Overview

Markers are a collection of object points that are available on the Field Notes tab of the run screen. As the name suggests, markers allow mapping points to identify specific features within a field.



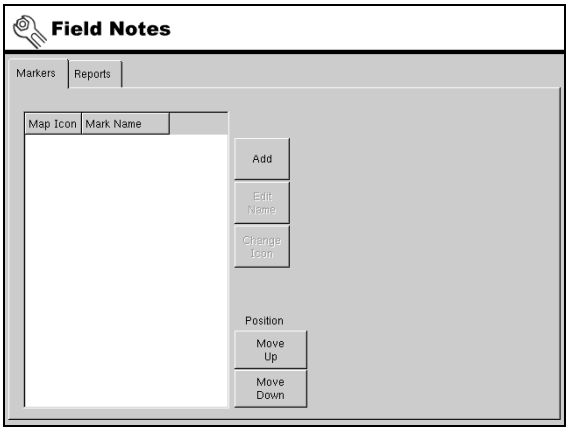
Field Notes Setup Screen

Item	Description
Markers List	Displays all markers and the icon in use for each marker.
Add	Press to display keyboard screen to create and name a new marker.
Edit Name	Press to display keyboard screen to edit selected marker's name.
Change Icon	Press to change icon of any selected marker.
Move Up	Press to move selected marker up one position in the markers list and change the order they're displayed on Run Screen.
Move Down	Press to move selected marker down one position in the markers list and change the order they're displayed on Run Screen.

SETUP – FIELD NOTES – MARKERS

Creating a New Marker

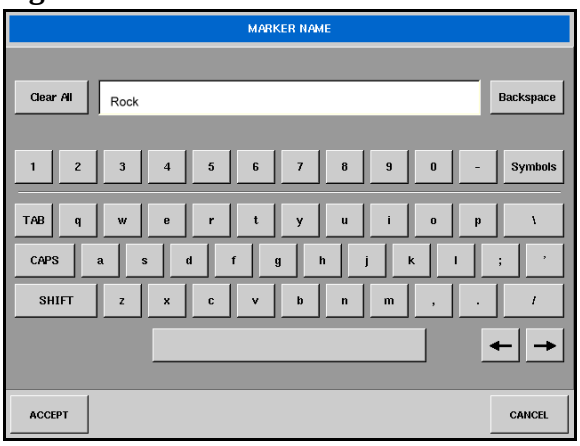
No Markers



To setup Markers within the "7" System:

Field Notes screen prior to any markers being configured.

Adding A Marker

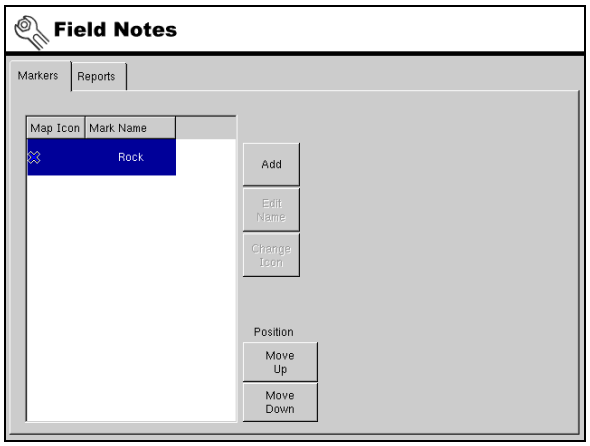


Press **ADD** button on Field Notes setup screen to launch on screen keyboard.

Enter any combination of letters, numbers, and symbols up to 10 characters to be used as the name for the new Marker.

Press **ACCEPT** button to finish adding Marker to system.

New Marker Added

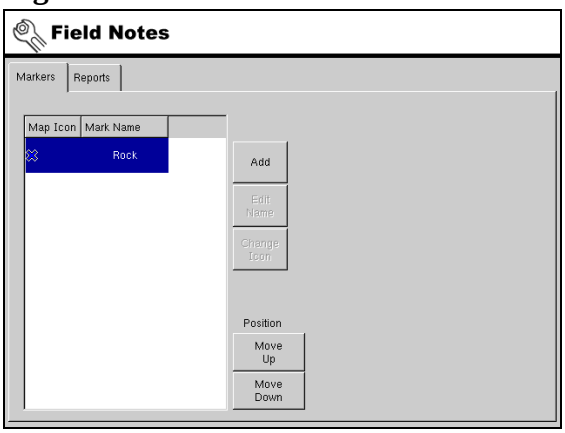


Field Notes setup screen after adding a Marker named Rock.

SETUP – FIELD NOTES – MARKERS

Editing Marker Names

Existing Marker Name

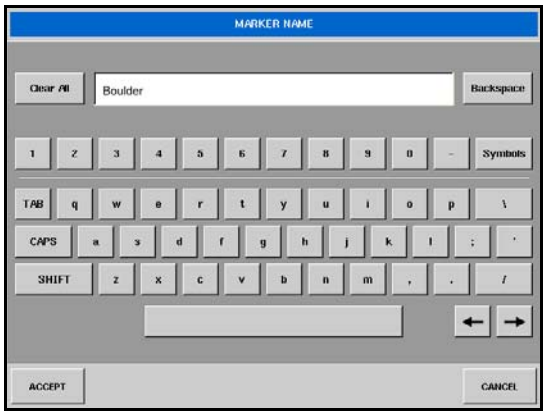


To rename a Field Notes Marker:

Field Notes screen with existing Marker named Rock.

Select Rock from list and press **EDIT NAME** button to rename Marker.

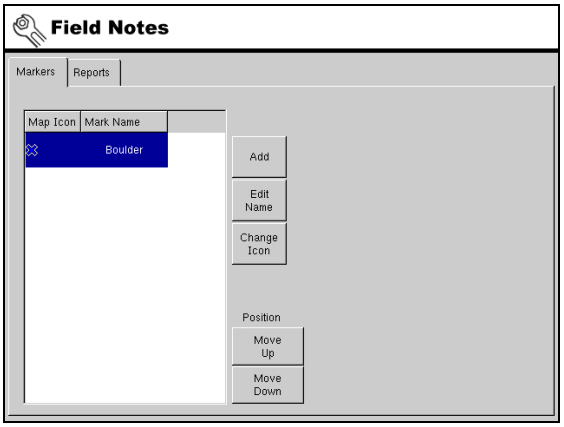
Edit Marker Name



Enter new name for existing Marker.

Press **ACCEPT** to save change.

New Marker Name



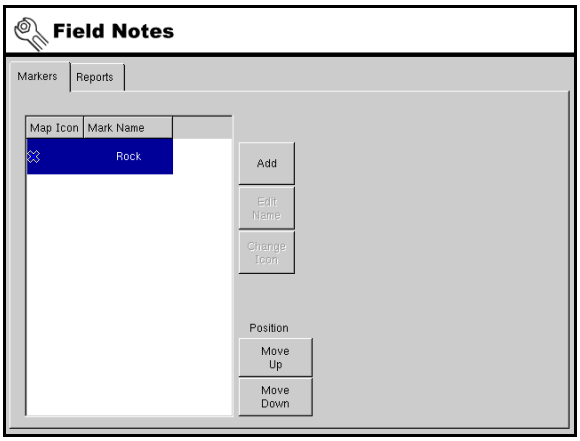
Field Notes screen with Marker renamed to Boulder.

SETUP – FIELD NOTES – MARKERS

Changing A Marker Icon

✖ is the default icon for all new Markers.

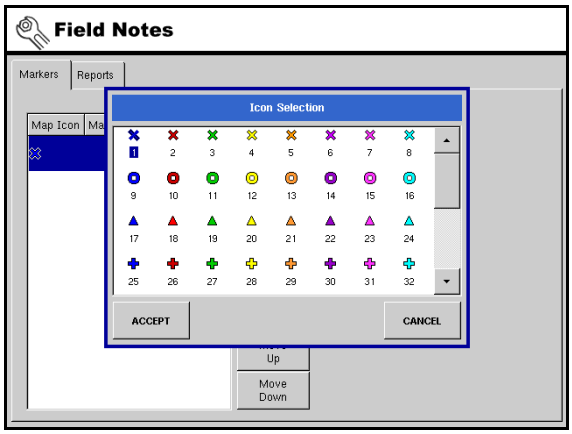
Select Marker To Edit



To change the icon for a Marker:

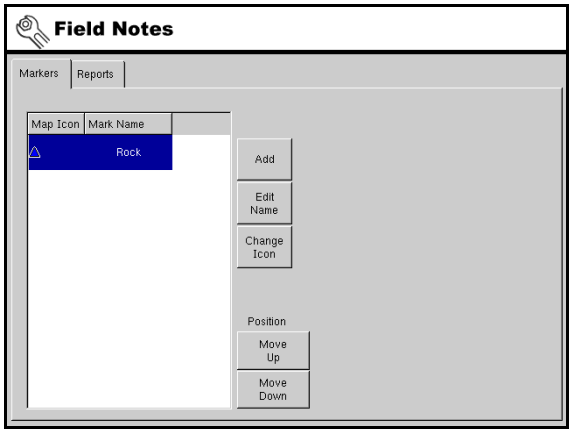
Select desired Marker from the list and press **CHANGE ICON** button.

Select New Icon



Select desired icon from the list and press **ACCEPT** to save change.

Setup Screen With New Marker



Field Notes setup after changing rock icon.

SETUP – FIELD NOTES – REPORTS

Application Reports

Product Application Smart Report™

The "7" Smart Report provides a simple method to create printed documentation of all in-field product application events. Content of each Smart Report is appropriate to the product and equipment used during that specific application event.

Smart Report File Format

Product application reports are created in Adobe Acrobat *.pdf file format. The Adobe Reader software, required to view and print application reports, comes pre-installed on most computers. Adobe Reader is available for download at no charge at www.adobe.com.

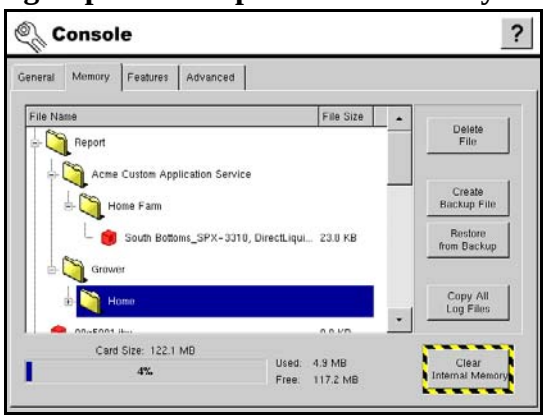
Smart Report File Storage

Product application reports are automatically stored on the external data card when the report is created. Reports are named using the following information provided by the "7" system:

- Field Name
- Configuration Name
- Unique ID #
- Date of most recent product application

IMPORTANT!	Warnings are given by the system prior to the files being deleted from the storage card. Deleted data **can not** be recovered from the card.

Viewing Reports: Setup\Console\Memory



A file browser is located on the Memory tab of Console Setup. Folders and files can be deleted from the storage card by using the **Delete File** function at this screen.

All application reports are stored in a common folder named **Report** on the root of the external storage card.

Sub-folders are automatically created as needed for each grower and field as reports are created.

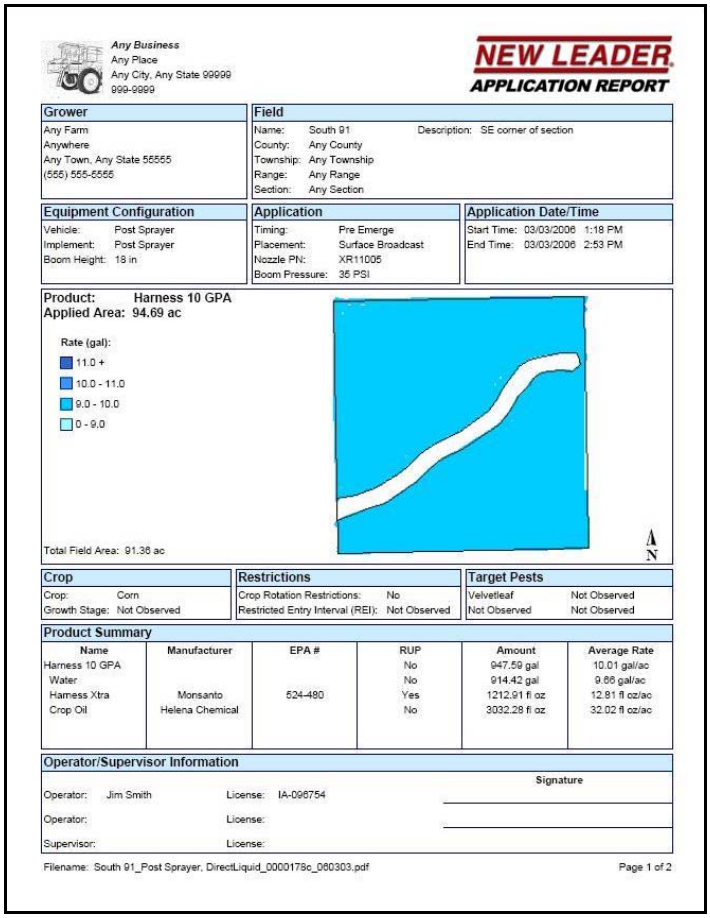
SETUP – FIELD NOTES – REPORTS

Control Channel Report Content

The content of all "7" product application reports is divided into two distinct groups:
1.) Field and product control channel information
2.) Field region summary data

Specific field and product control channel information is at the front of the report. A page is generated for each channel of product control.

Control Channel Content



Any Business
Any Place
Any City, Any State 99999
999-9999

NEW LEADER
APPLICATION REPORT

Grower	Field
Any Farm Anywhere Any Town, Any State 55555 (555) 555-5555	Name: South 91 Description: SE corner of section County: Any County Township: Any Township Range: Any Range Section: Any Section

Equipment Configuration	Application	Application Date/Time
Vehicle: Post Sprayer Implement: Post Sprayer Boom Height: 18 in	Timing: Pre Emerge Placement: Surface Broadcast Nozzle PN: XR11005 Boom Pressure: 35 PSI	Start Time: 03/03/2006 1:18 PM End Time: 03/03/2006 2:53 PM

Product: Harness 10 GPA
Applied Area: 94.69 ac

Rate (gal):
11.0 +
10.0 - 11.0
9.0 - 10.0
0 - 9.0

Total Field Area: 91.36 ac

N

Crop	Restrictions	Target Pests
Crop: Corn Growth Stage: Not Observed	Crop Rotation Restrictions: No Restricted Entry Interval (REI): Not Observed	Velvetleaf Not Observed Not Observed Not Observed

Product Summary

Name	Manufacturer	EPA #	RUP	Amount	Average Rate
Harness 10 GPA			No	947.59 gal	10.01 gal/ac
Water			No	914.42 gal	9.66 gal/ac
Harness Xtra	Monsanto	524-480	Yes	1212.91 fl oz	12.81 fl oz/ac
Crop Oil	Helena Chemical		No	3032.28 fl oz	32.02 fl oz/ac

Operator/Supervisor Information

			Signature
Operator:	Jim Smith	License: IA-096754	
Operator:		License:	
Supervisor:		License:	

Filename: South 91_Post Sprayer, DirectLiquid_000017Sc_060303.pdf Page 1 of 2

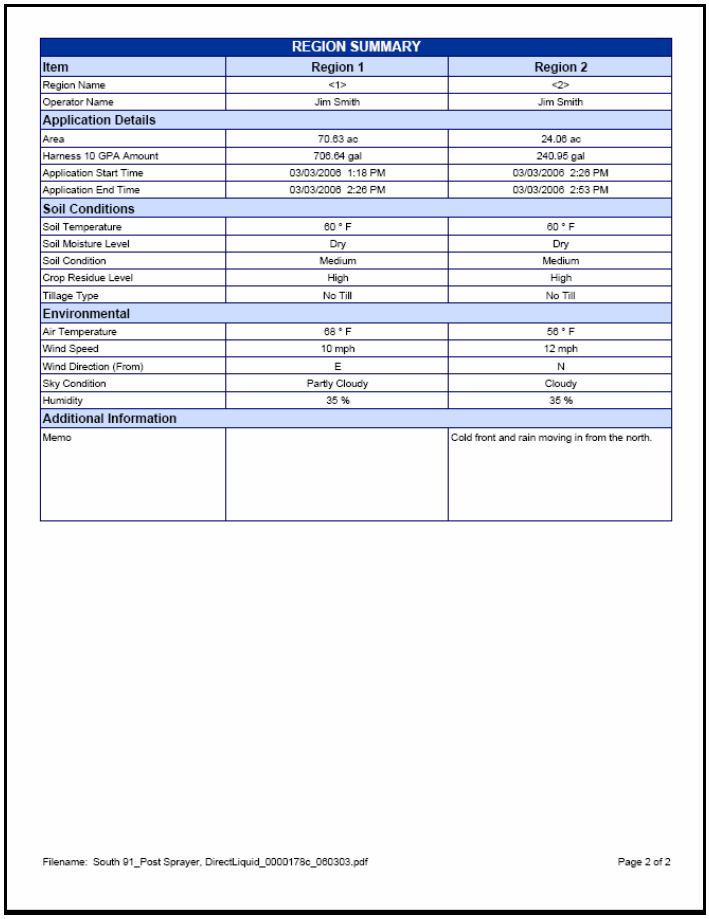
- Service Provider Information
- Grower Information
- Field Information
- Equipment Configuration Information
- Application Information
- Date/Time Information
- Crop Information
- Rotation Restrictions and REI
- Multiple Target Pests
- Applied Product Information
- Operator and Supervisor Information

SETUP – FIELD NOTES – REPORTS

Regional Summary Report Content

Field region summary data is at the back of the report. Multiple regions can be created as needed in each field. Each region can document changes in weather and other critical information. Changes in temperature, weather and machine operators may be logged simply by creating a new field region. Additional regional summary pages are created as needed if more than two field regions are created for an individual field.

Regional Summary Information



REGION SUMMARY		
Item	**Region 1**	**Region 2**
Region Name	<1>	<2>
Operator Name	Jim Smith	Jim Smith
Application Details		
Area	70.63 ac	24.06 ac
Harness 10 GPA Amount	706.64 gal	240.95 gal
Application Start Time	03/03/2006 1:18 PM	03/03/2006 2:28 PM
Application End Time	03/03/2006 2:26 PM	03/03/2006 2:53 PM
Soil Conditions		
Soil Temperature	60 ° F	60 ° F
Soil Moisture Level	Dry	Dry
Soil Condition	Medium	Medium
Crop Residue Level	High	High
Tillage Type	No Till	No Till
Environmental		
Air Temperature	68 ° F	56 ° F
Wind Speed	10 mph	12 mph
Wind Direction (From)	E	N
Sky Condition	Partly Cloudy	Cloudy
Humidity	35 %	35 %
Additional Information		
Memo		Cold front and rain moving in from the north.

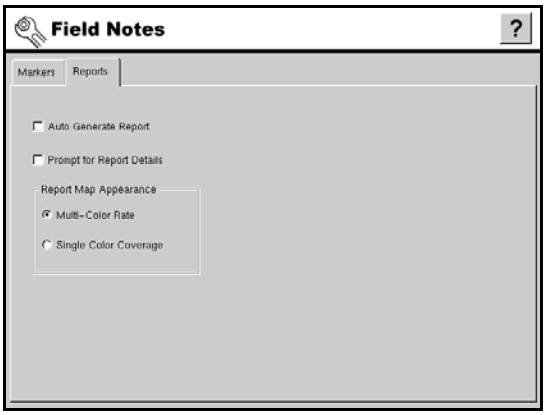
Filename: South 91_Post Sprayer, DirectLiquid_0000178c_060303.pdf Page 2 of 2

- Region Name
- Machine Operator by Region
- Applied Area
- Applied Volume
- Application Start/Stop Time and Date
- Soil Condition Information
- Environmental Information
- Region Text Memo

SETUP – FIELD NOTES – REPORTS

Report Settings

Settings and options contained on the Reports tab of the Field Notes setup determine the behavior of the "7" system at the Run Screen during the process of creating application reports.



Application Report Settings and Options

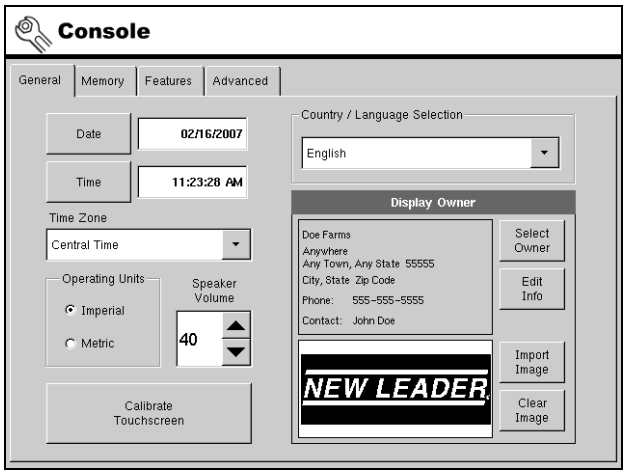
Report Option Setting	Description
Auto Generate Report	Check this option to have the "7" system automatically generate an application report every time the field is changed at the run screen during application control.
Prompt for Report Details	Check this option to have the "7" system automatically launch the region summary data collection dialog each time a new region is created at the run screen during application rate control.
Report Map Appearance	**Multi-Color Rate** – Select this option to have application reports display application maps using rate legend as displayed on run screen. **Single Color Coverage –** Select this option to have application reports display single color product coverage maps.

SETUP – CONSOLE – GENERAL

CONSOLE

General Tab

The General tab contains settings for date, time, volume, touch screen calibration and "7" display owner information.



Console Setup Screen

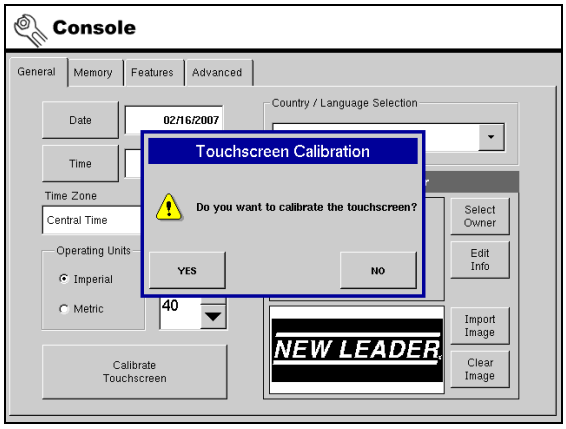
Item	Description
Date	Press to set current date.
Time	Press to set current time.
Time Zone	Select correct time zone for your area from drop down list.
Operating Units	Select between Imperial or Metric units for calibration and control settings.
Speaker Volume	Press arrows to set volume of display speaker.
Calibrate Touchscreen	Press to launch touch screen calibration wizard.
Display Owner	Set up a Display Owner and/or edit owner's personal information. Display Owner information is used in product application reporting feature of application rate control.

SETUP – CONSOLE – GENERAL

Touch Screen Calibration

IMPORTANT!	DO NOT use sharp objects to operate the touch screen or the display may be damaged.

Confirm Touchscreen Calibration



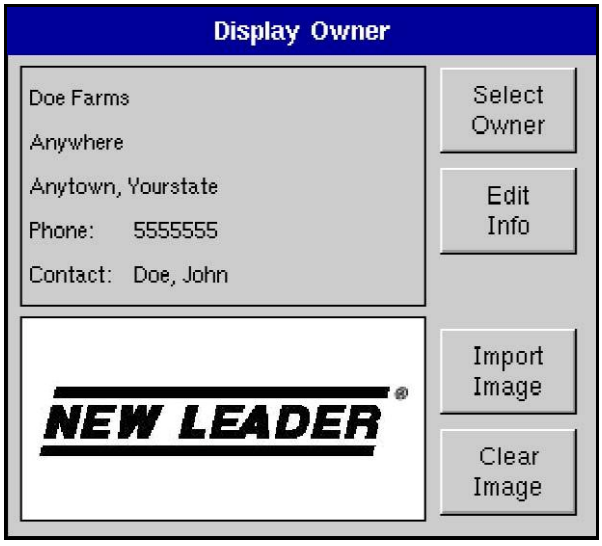
Press **YES** to start touchscreen calibration process.

Calibration Wizard

Follow the on-screen instructions to calibrate the touchscreen.

SETUP – CONSOLE – GENERAL

Display Owner



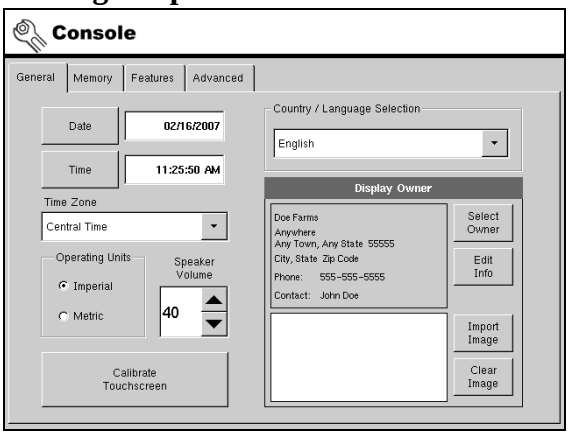
Display Owner Setup

Item	Description
Select Owner	Press to display a list of all farm and business contacts setup in system. Select an existing person/business or create a new one to be used as the Display Owner.
Edit Info	Press to edit or add personal information for Display Owner.
Import Image	Press to import the image file displayed with the Display Owner information on application reports. The system currently supports BMP and PNG file formats with a maximum size of 200 pixels wide x 100 pixels tall.
Clear Image	Press to delete Display Owner image.

SETUP – CONSOLE – GENERAL

Display Owner Image Import

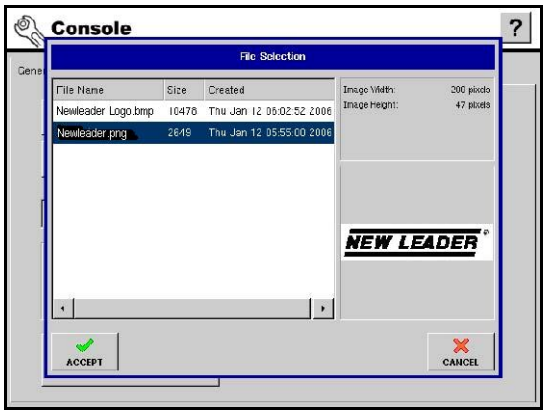
Before Image Import



To import a Display Owner image:

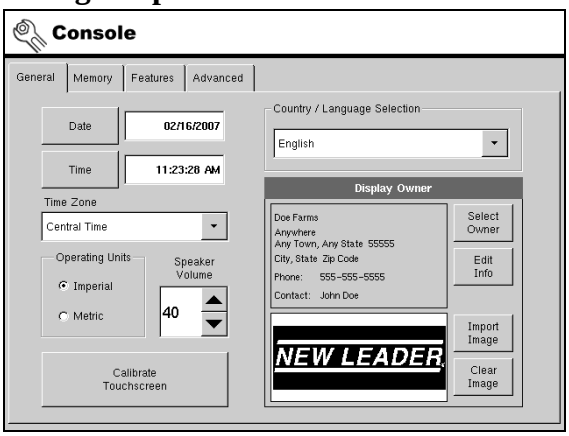
Console General setup screen prior to a Display Owner image being imported.

Image File Selection



Press the **Import Image** button the dialog at the left is displayed to allow the selection of a file to import. Press the **ACCEPT** button to import the selected file.

After Image Import

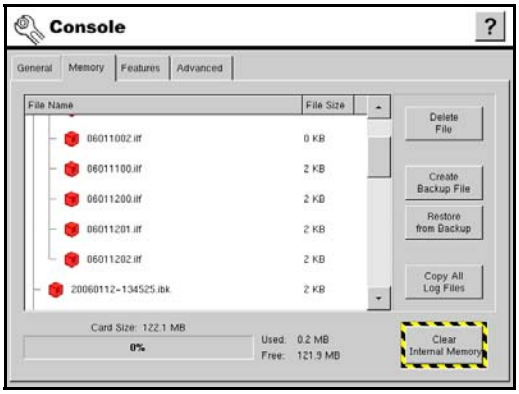


Console General setup screen after importing a Display Owner image.

SETUP – CONSOLE – MEMORY

Memory Card Tab

The Memory tab of the Console setup provides tools to manage logged data, configuration backup files and external data card files.



Memory Card Management Screen

IMPORTANT!	"7" display will be returned to "new out of box" unconfigured state when memory is cleared.

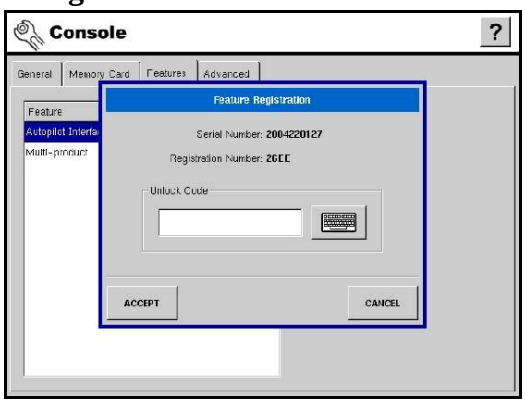
Item	Description
Delete File	Press to delete a selected file from the external memory card.
Create Backup File	Press to create a backup file of all configuration settings, products, and Grower-Field Management data structure on the external memory card. Backup files are created with the .ibk file.
Restore from Backup	Press to restore a backup file from the external data card to the internal memory of the "7" display.
Copy All Log Files	Press to copy all logged data to the external memory card. Log files are created with the .ilf file extension.
Clear Internal Memory	Press to clear display's internal memory. The following warning will appear:
	IMPORTANT! Clear Memory – Creating a backup file on the memory card is recommended before clearing memory. Do you want to create a backup? YES/NO If NO is pressed another warning will appear: Are you sure you want to clear all data? YES/NO

SETUP – CONSOLE – FEATURES

Features Tab

Optional features for the "7" System can be enabled by purchasing an unlock code from your local New Leader dealer.

Unlocking Features



To unlock optional features:

Select desired feature from on-screen list and press **Unlock** button.

Unlock codes are unique to each "7" display serial number and the feature registration number. You must supply these numbers to your local New Leader dealer when purchasing unlock codes.

Enter unlock code using on-screen keyboard and press **ACCEPT** to enable feature.

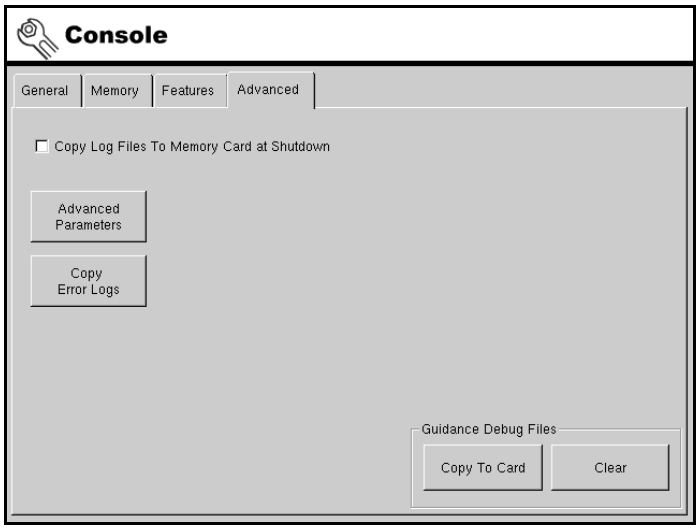
Factory set features are as follows:

Single Product Controller	
AutoSwath	Enabled
Multi-product	OFF
Autopilot	OFF
Multi-Product Controller	
AutoSwath	Enabled
Multi-product	Enabled
Autopilot	OFF

SETUP – CONSOLE – ADVANCED

Advanced Tab

IMPORTANT!	All functionality on Advanced tab is reserved for engineering use. DO NOT change any setting on this screen without specific instruction from Highway Equipment Company or your New Leader dealer.



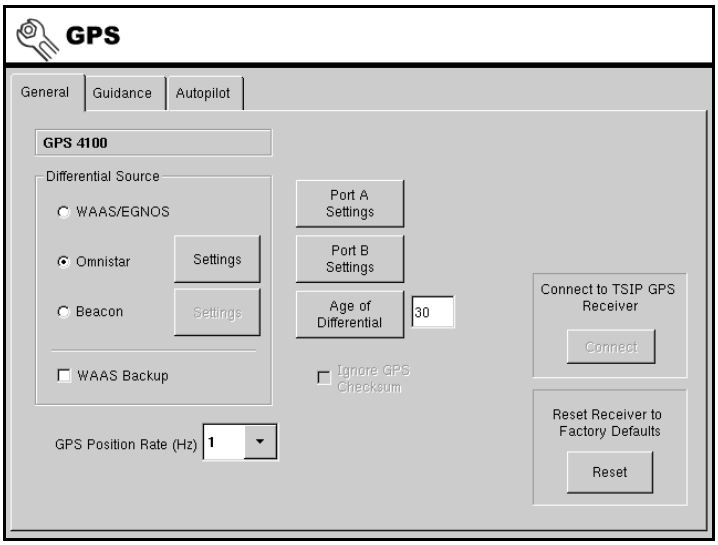
SETUP – GPS – OVERVIEW

GPS

Overview

The GPS settings only apply to "7" Systems connected to one of the New Leader approved TSIP receiver/lightbar combinations. These setting do not apply when using EZ-Guide Plus or EZ-Steer products.

The settings contained on the Autopilot tab only apply to "7" Systems connected to optional Trimble Autopilot systems with a navigation controller. Contact *Ag Leader Technology, Inc*. at (515) 535-5363 or www.agleader.com to find the nearest dealer. They can assist you with optional Autopilot products.

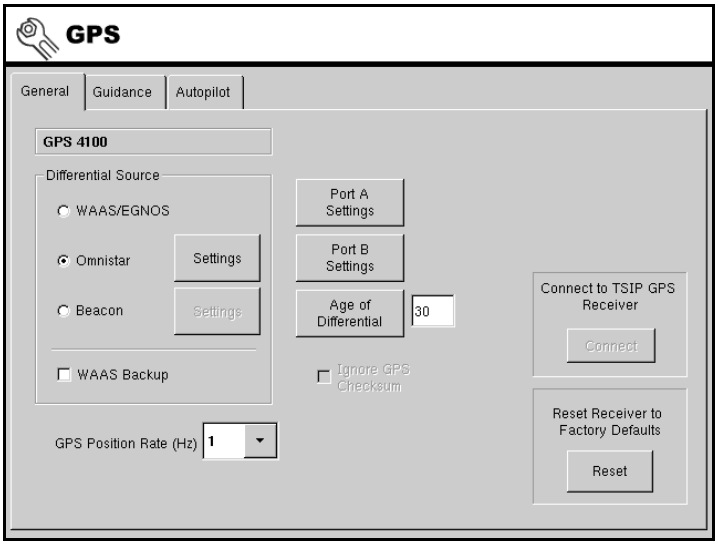


GPS & Autopilot Configuration Tabs

SETUP – GPS – GENERAL

General

General GPS settings relate to choosing differential source and NMEA messages output by the DGPS-Ag Leader GPS 1100.



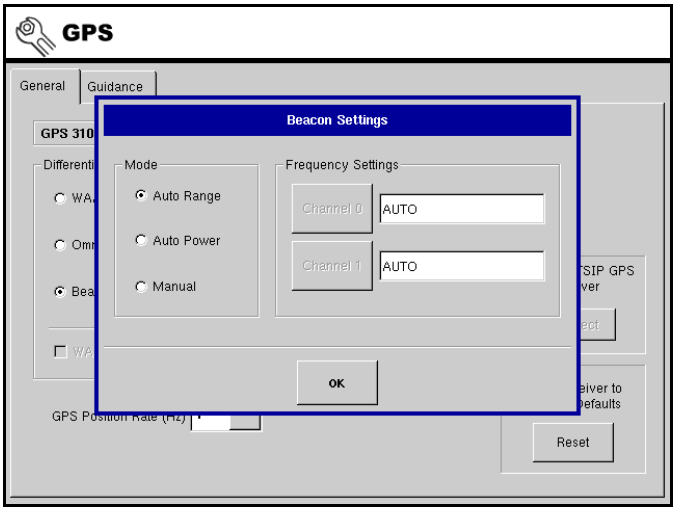
GPS General Setup Tab

Setting	Description
Differential Source	Select choice of WAAS/EGNOS, Satellite (Omnistar, Thales) or Beacon (Coast Guard) differential sources.
WAAS Backup	Check **WAAS Backup** selection to automatically switch receiver to WAAS in the event of signal loss when using Satellite or Beacon differential.
NMEA Messages	Select **GGA** (position) and **VTG** (speed) messages for use with the "7" System located under the **Port A** button.
Ignore GPS Checksum	Check this to ignore intermittent GPS message errors.
Age of Differential	Displays elapsed time since reception of last differential correction signal.
Reset Receiver to Factory Defaults	Press to restore TSIP receiver settings to the factory default. NOTE: Differential settings and NMEA messages will need to be configured for system to function properly after resetting factory defaults.
Connect to TSIP GPS Receiver	Configure TSIP GPS receiver through the display.

SETUP – GPS – BEACON DIFFERENTIAL

Beacon Differential

There are three methods of determining the specific Beacon tower the GPS system uses for differential corrections.



Beacon Differential Setup Screen

Setting	Description
Mode	Select method GPS receiver uses to select a Beacon tower location and differential signal: **Auto Range** – Uses frequency for closest Beacon differential tower. **Auto Power –** Uses strongest available Beacon differential signal. **Manual –** Uses manually configured Beacon Frequency Settings.
Frequency Settings	Enter frequencies for use with **Manual** mode selection.

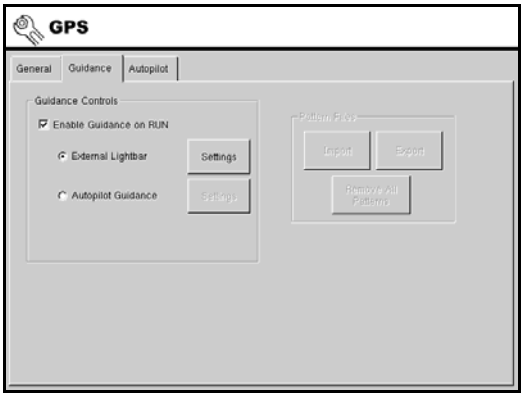
SETUP – GPS – TSIP LIGHTBAR

Guidance

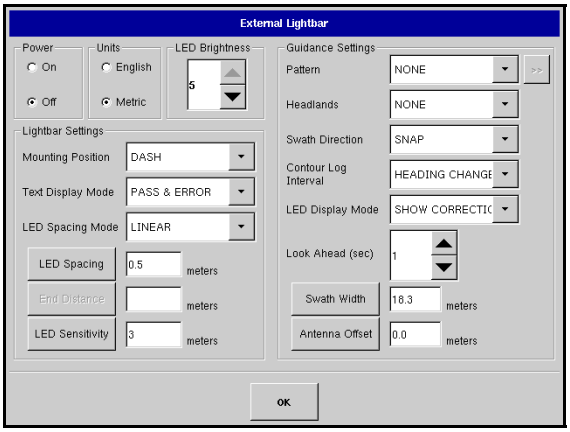
The "7" display is able to control a New Leader lightbar that hooks up to a New Leader DGPS-5000.

Guidance Controls – External Lightbar Settings

Enable Guidance on RUN: Check the **Enable Guidance on RUN** button and then select the **External Lightbar** button. Press the **Settings** button and press the **OK** button when the appropriate settings are selected.



Power, Units & LED Brightness



The Power, Units and LED Brightness frames are external lightbar settings.

The Power frame controls lightbar power through the display since there is no power switch on the lightbar.

Select **English** or **Metric** in the Units frame to set units the lightbar uses.

The LED Brightness frame adjusts brightness of the lightbar readout using up and down arrow keys.

Lightbar Settings

The Lightbar Settings frame is used to setup the lightbar for a specific application.

Mounting Position: Ceiling mounting of the lightbar requires that it be inverted. Select Ceiling to invert the text for reading.

Text Display Mode:

No Text – No text is displayed on the screen.
Pass & Error – Provides pass number and error from center of swath.

SETUP – GPS – TSIP LIGHTBAR

GPS Status – Displays GPS and Differential information on the text screen.
Pass Number – Displays the current pass number for that field.
Start Line Distance – Displays distance from start of pass (increasing).
End Line Distance – Displays distance from end of pass (decreasing).
True Heading – Displays actual degree heading from True North.
X Track Err – Displays error between current position and swath.
Heading Err – Displays degree error for the heading from the center of swath.
Ground Speed – Displays ground speed only.
Pass & Speed – Provides pass number and ground speed.
Demo Mode – Used for demonstration only, cycles power on and off.
Curve Arrows – Displays arrows indicating direction and magnitude of correction, more arrows indicate a sharper turn for curved modes only.
Pts On Curve – Displays number of points that have been logged on the pass.

LED Spacing Mode: Use Linear or Scaled settings to set spacing interval of lightbar LED's.
Linear – Set lightbar to show off-line distance on a line, i.e. a setting of one foot off line from the center of the swath will be represented by one LED, the second LED will represent two feet, etc.
Scaled – Sets the first 10 LED's each side of the lightbar on a linear scale. The outer 7 LED's on each side are scaled to represent an end value setting.

LED Spacing: This setting establishes LED spacing distance. If the setting is 3 feet, the LED slides one unit to the left or right for every 3 feet off line.
NOTE: The smaller the LED spacing, the more precise guidance the lightbar will provide.

End Distance: This setting is used when LED Spacing Mode is set to Scaled. This value cannot be smaller than the LED spacing value multiplied by 17 (there are 17 LEDs on each side of the lightbar).

LED Sensitivity: This setting controls sensitivity of the PAUSE function. It only affects the large center LED of the lightbar, which changes color as you approach headlands or the Pause/Resume point.
NOTE: LED sensitivity should be set larger as ground speed increases.

Guidance Settings

The Guidance settings include settings used for setup of the guidance pattern.

Pattern: Determines which guidance pattern is driven.
None: Configures straight line guidance parallel to the beginning and end of first swath driven.
Curve Spiral: Use this curve setting to drive spirals or closed rings.
Curve: Activates last curve following. Positions are logged during current swath. The next swath is parallel to the previous swath driven.
Skip Pass: Provides parallel guidance in a racetrack pattern with a user specified swath skip. This setting is for equipment with a large turn radius.
A+ Heading: Allows establishing a reference line from True North.

SETUP – GPS – TSIP LIGHTBAR

Headlands: Determines type of headland used.

None: In this mode, swath lengths are infinite. The center LED remains one color, never changing to indicate end of swath.

C-Clamp: Field ends are sprayed as headlands, so parallel passes may be used with minimal overlap.

Curved: Logs irregular boundary shapes for guidance.

Closed: Defines headlands with a series of user entered points. The last point connects to the first point to form a closed loop.

A-B End Zones: A & B points mark the center of the boundary swath. When the system is inside the boundary area the center LED illuminates green and outside the boundary area it's red.

Swath Direction: This setting determines whether the swath is manually or automatically incremented.

Auto: Automatically increments in the direction turned after the first swath. The swath increments when the vehicle turns more than 110 degrees.

Right: Swaths are manually incremented to the right of the A-B line.

Left: Swaths are manually incremented to the left of the A-B line.

Snap: The default setting—automatically increments swath number to the closest swath. (Not available with Pass Skip and Curve following.)

Contour Log Interval: Select Swath Change or Heading Change. Heading Change is the default and recommended setting, logging a reference point whenever the heading changes slightly.

LED Display Mode: Select Show Error or Show Correction to determine which direction from center of lightbar the LEDs light to indicate off-line error.

Show Error: Displays extent and direction of error between current position and swath line. Steer vehicle to "pull" lights back to center of lightbar.

Show Correction: Displays extent and direction of the necessary correction to match the swath line. Steer vehicle by "chasing" lights left or right.

Look-Ahead: This value allows the system to account for system delays, including operator response time. The default setting is 3 seconds.

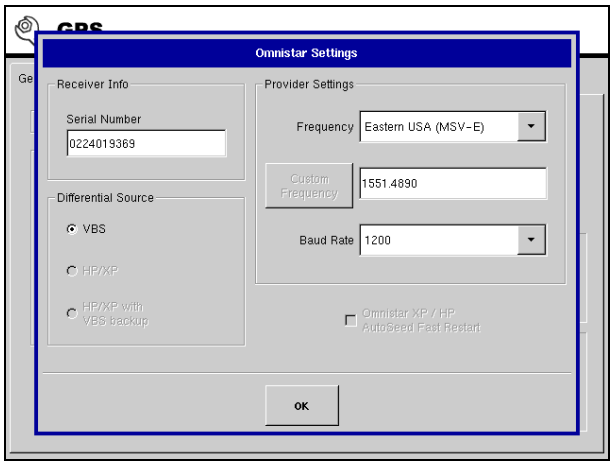
Swath Width: Adjust in .5 foot increments from 1 to 999 feet. Set swath width to 1 foot less than the actual swath width to reduce skip or set it to 1 foot more than actual to reduce overlap.

Antenna Offset: The distance from the antenna, ahead or behind the spinner so guidance information is referenced to the spinner instead of the antenna. It is adjusted in .5 foot increments from 0 to100 feet. The antenna must be placed along vehicle's centerline. Negative numbers are used for a spinner in front of the antenna, positive numbers are for a spinner behind the antenna.

SETUP – GPS – SATELLITE DIFFERENTIAL

Satellite Differential

The use of satellite differential requires purchase of a subscription from one of the service providers listed below. Settings related to using satellite differential correction vary based upon service provider and the unit's geographic location. Specific information is available from the differential service provider.

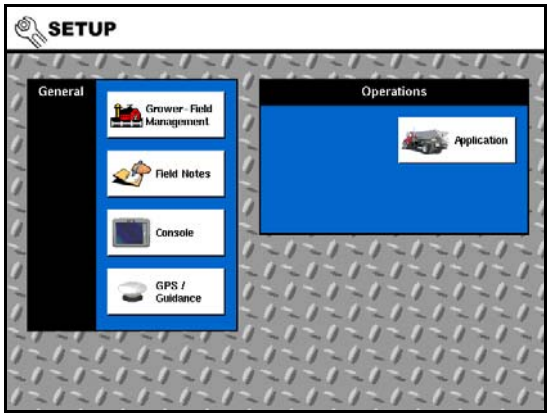


Satellite Differential Setup Screen

Provider	Location	Contact Information
OmniStar	North & South America	1-888-883-8476 1-713-785-5850
	Europe & North Africa	31-70-317-0900
	Australia & Asia	61-8-9322-5295
	Southern Africa	27-21-552-0535
Thales (Racal)	North America	1-888-434-7757
	Australia & Asia	1-800-802-573
	Europe	44-1493-857011
	Central & Southern Africa	++27-21-704-1600
	Middle East & Western CIS	++9712-554817

SETUP – OPERATIONS – OVERVIEW

OPERATIONS SETUP OVERVIEW



Main Setup Screen

Setup Button	Description
Application	Press to access setup of product application logging, mapping and rate control configurations.

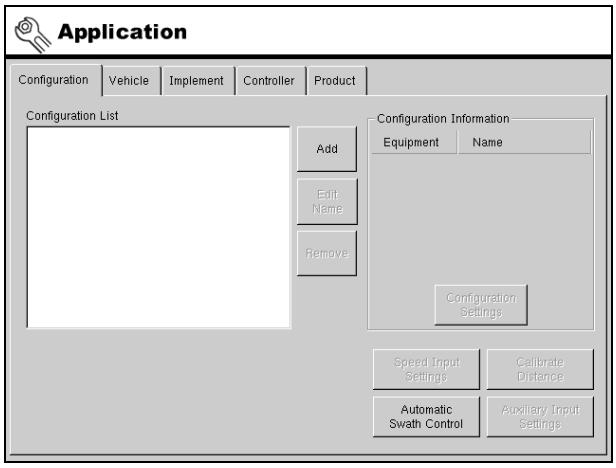
SETUP – APPLICATION – OVERVIEW

APPLICATION

Overview

The Application setup tabs contain settings necessary to configure the system for logging, mapping and rate control of granular products. The combination of Vehicle, Implement and Controller are referred to as a **Configuration** within the "7" System. Detailed information on the Configuration setup process is under *Configuration* in "Setup – Application" section.

Advanced settings must be entered for each operating configuration after they are setup. Detailed information on advanced settings is under *Advanced Settings* in "Setup – Application" section.



Product Application Setup –
Prior To Configuration

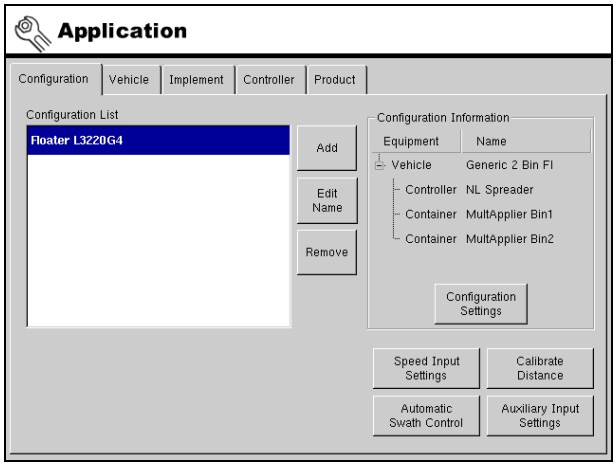
Application Setup Tab	Description
Configuration	Add and edit operating configurations. Configuration examples: • Self propelled spreader with PWM valve rate control. • Self propelled spreader with dual bin MultApplier spreader.
Vehicle	Add and edit vehicle configurations.
Implement	Add and edit implement configurations.
Controller	Add and edit product control channels.
Product	Add and edit crop nutrient and protection products. Contains a list of pre-defined products and allows configuration of fertilizer blends.

SETUP – APPLICATION – CONFIGURATION

Configuration

A **Configuration** must be setup to have Run screen operating capabilities. This is done in a step-by-step manner using an on-screen wizard to create Vehicle, Implement and Controller combinations. **Vehicles**, **Implements** and **Controllers** can be created individually from each tab if desired.

Overview



Operating Configuration Tab

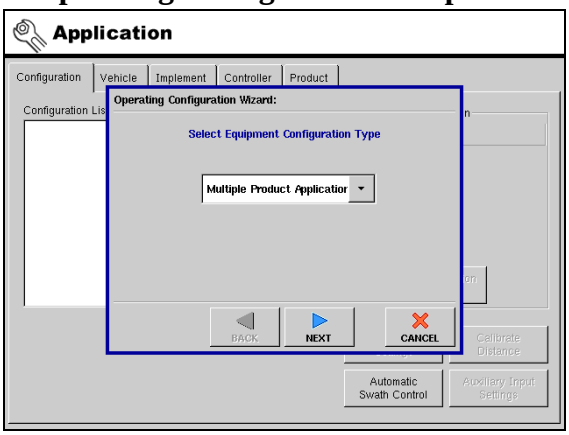
Item	Description	
Add	Press to launch software wizard to add a new configuration item.	
Edit Name	Select configuration from list and press to edit with the on-screen keyboard.	
Remove	Select configuration from list and press to remove. The following warning will appear:	
	IMPORTANT!	Remove Configuration – This Configuration and Regions logged with this Configuration will be deleted. Vehicle and Implement will not be deleted. Are you sure? ACCEPT/CANCEL

Details on other **Configuration** buttons are under *Configuration Settings* in "Setup – Application" section.

SETUP – APPLICATION – CONFIGURATION

Product Configuration Setup – Vehicle

Step1: Operating Configuration Setup

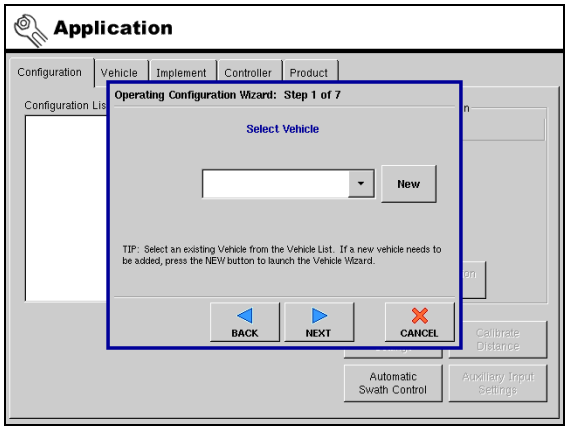


To configure a New Leader control system:

Press **Add** button and select **Single Product Application** or **Multiple Product Application** from on-screen dialog.

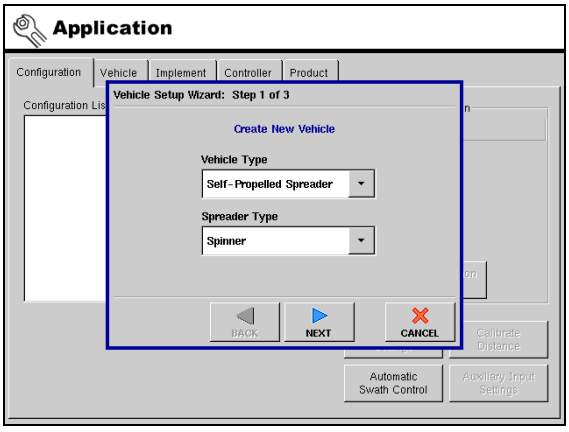
Press **Next** to continue.

Step 2: Operating Configuration Setup



Press **New** to create a new vehicle.

Step 3: Operating Configuration Setup



Select **Self-Propelled Spreader** from the Vehicle Type list.

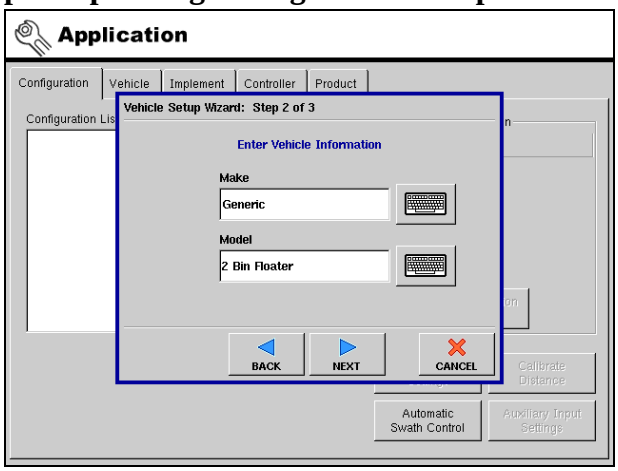
Select **Spinner** from Spreader Type list.

Press **Next** to continue.

SETUP – APPLICATION – CONFIGURATION

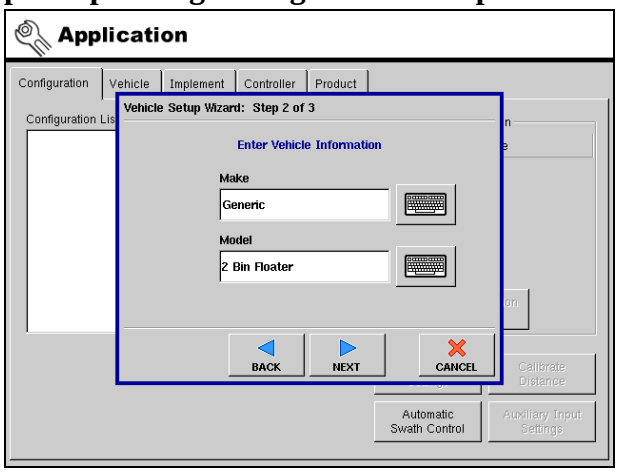
Product Configuration Setup – Name Vehicle

Step 4: Operating Configuration Setup



Use on-screen keyboard to enter Vehicle Make and Model.

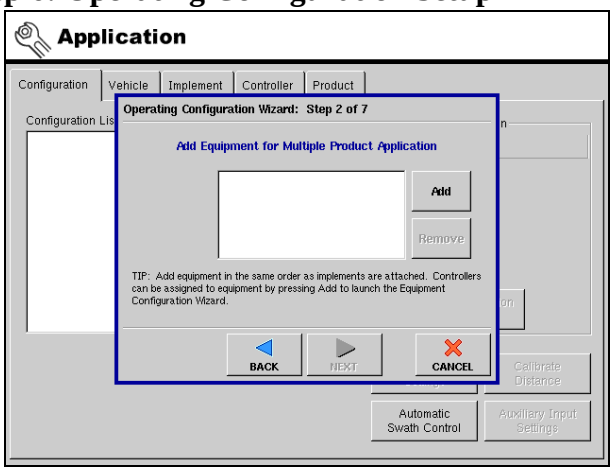
Step 5: Operating Configuration Setup



The "7" combines Vehicle Make and Model for use as a Vehicle Name. Press keyboard button to edit name as desired.

Press **Finish** to complete Vehicle setup and continue configuration process.

Step 6: Operating Configuration Setup

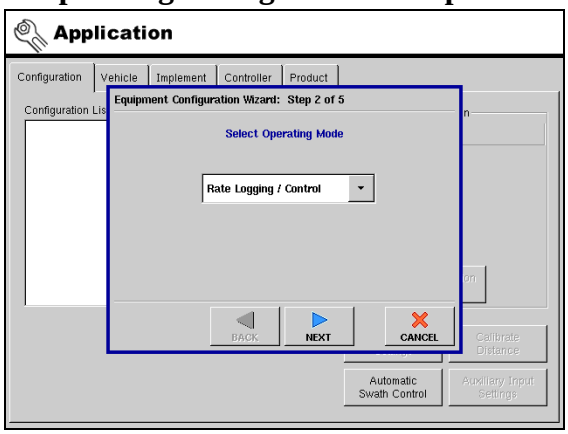


Press **Add** to start adding equipment and controls for application.

SETUP – APPLICATION – CONFIGURATION

Product Configuration Setup – Controller

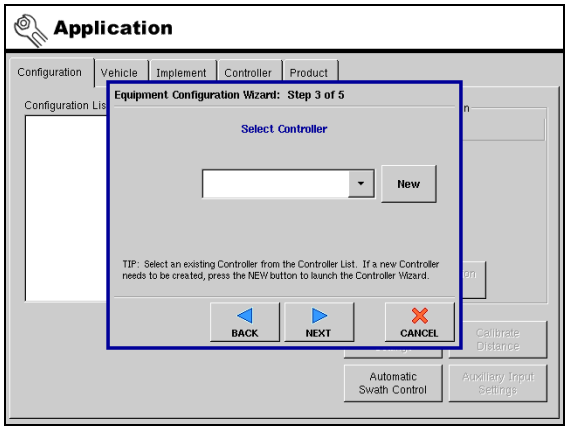
Step7: Operating Configuration Setup



Select **Rate Logging/Control** from drop down list.

Press **Next** to continue.

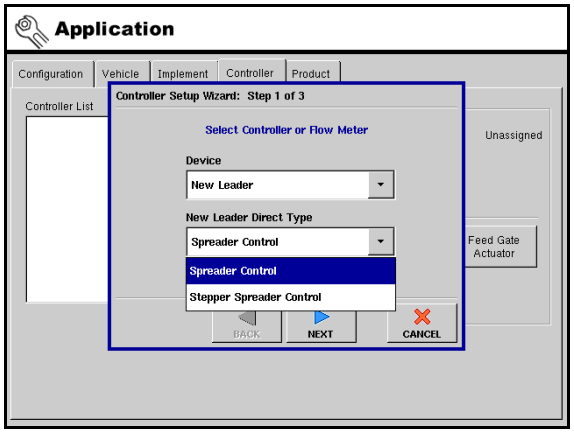
Step 8: Operating Configuration Setup



Press **New** to setup product control system.

Press **Next** to continue.

Step 9: Operating Configuration Setup



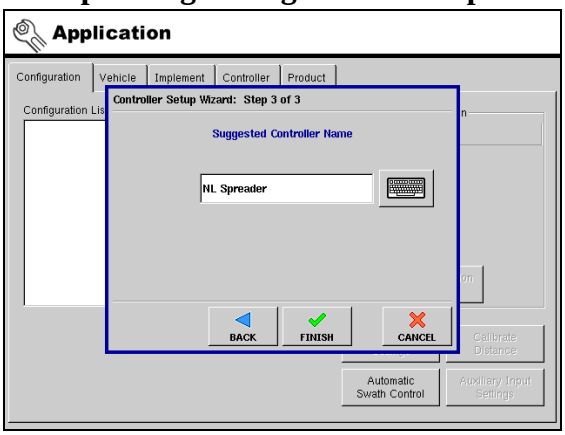
Select **Device** and **New Leader Direct Type**.

Press **Next** to continue.

SETUP – APPLICATION – CONFIGURATION

Product Configuration Setup – Channel 1

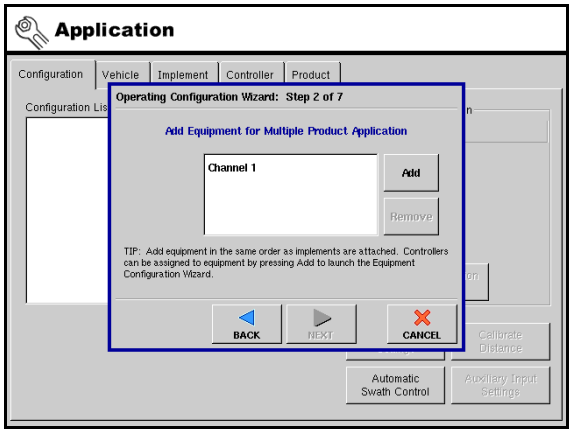
Step 10: Operating Configuration Setup



NL Spreader is the default name for the New Leader "7" controller. Press keyboard button to edit name as desired.

Press **Finish** to complete Controller setup and continue with configuration process.

Step 11: Operating Configuration Setup



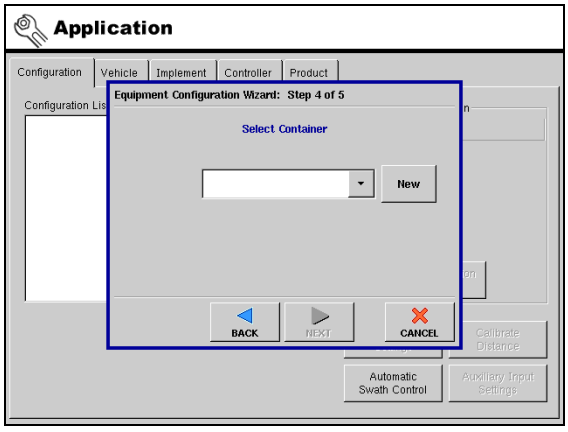
Select first product control channel to be used. This is determined by which ports the rate control wiring harnesses are plugged into on the New Leader spreader control module. Recommended harness hookup is as follows:

Channel 1 – Bin 1/Main Bin
Channel 2 – Bin 2/MultApplier Insert
Channel 3 – Bin 3/Insert 2

The system will default to **Channel 1**.

Press **Next** to accept this setting and continue.

Step 12: Operating Configuration Setup

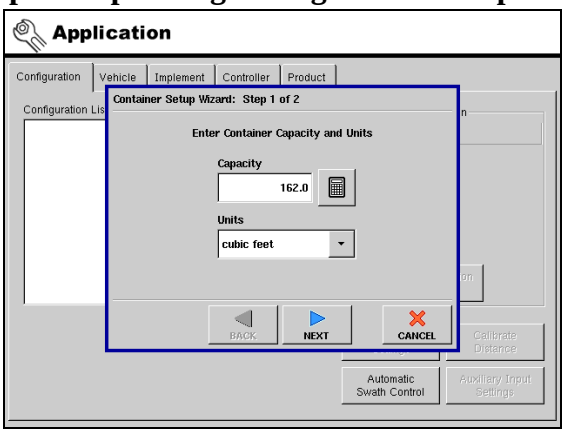


Press **New** to add a product **Container** (spreader bin) to the system.

SETUP – APPLICATION – CONFIGURATION

Product Configuration Setup – Container (Bin) 1

Step 13: Operating Configuration Setup

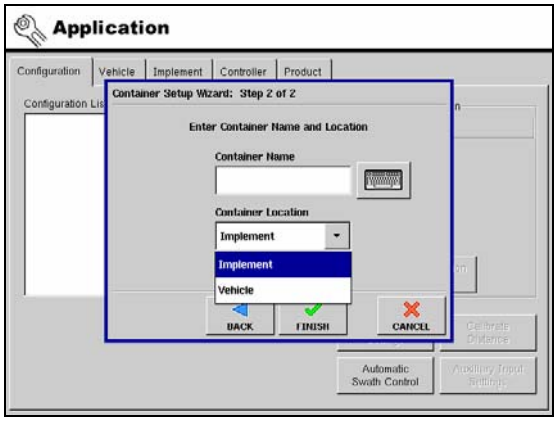


Enter container **Capacity** using on-screen keypad. This is the size of the bin in cubic feet or meters.

Select **Units** used to determine **Capacity** of bin.

Press **Next** to continue.

Step 14: Operating Configuration



Use on-screen keyboard to name the **Container**.

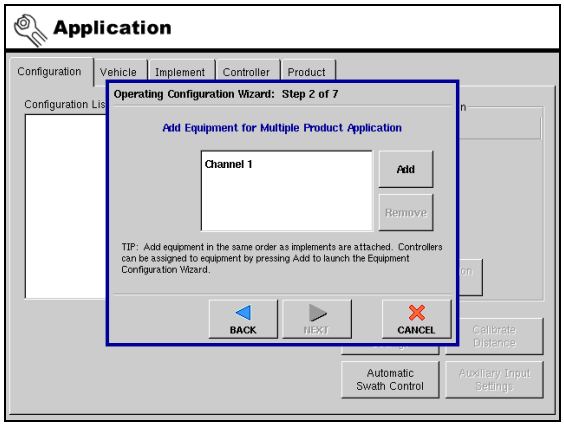
Example Names:

- Bin 1
- Main Bin

Select implement or vehicle from Container Location drop-down list.

Press **Finish** to complete **Container** setup process.

Step 16: Operating Configuration Setup



If configuring system for single product application, skip to Step 27.

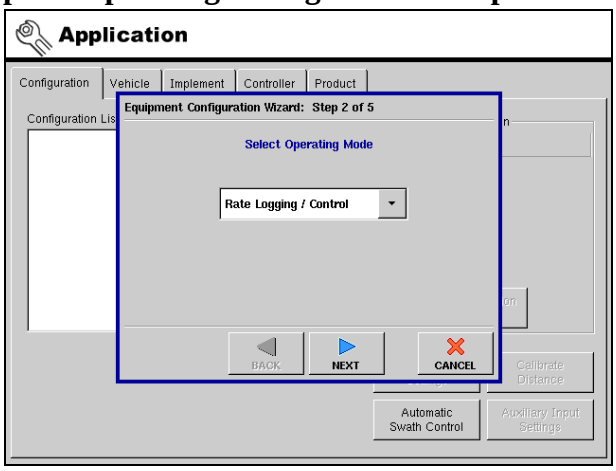
For multi-product configuration setup:

Press **Add** to add equipment and controls for the second product control channel.

SETUP – APPLICATION – CONFIGURATION

Product Configuration Setup – Channel 2

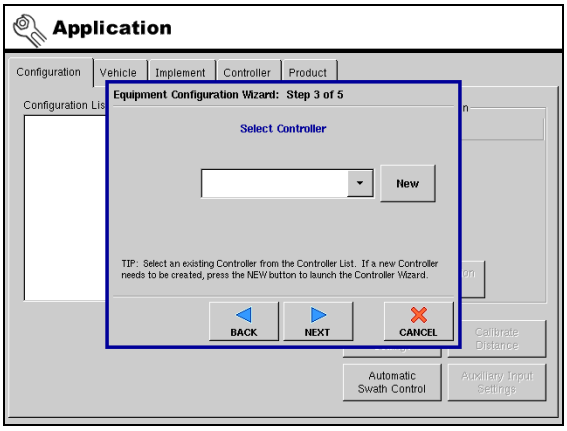
Step 17: Operating Configuration Setup



Select **Rate Logging/Control** from drop down list.

Press **Next** to continue.

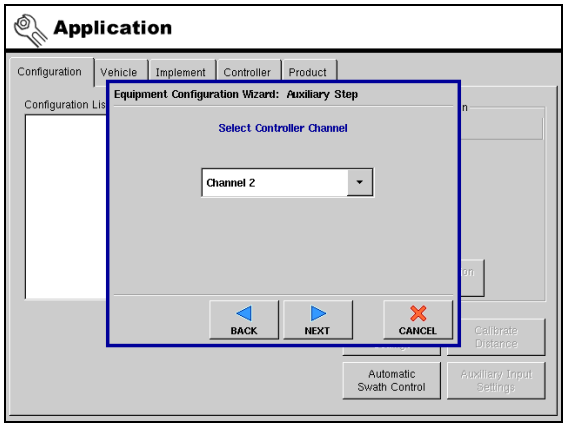
Step 18: Operating Configuration Setup



Select same controller setup during channel 1 configuration, NL Spreader, unless it was renamed.

Press **Next** to continue.

Step 19: Operating Configuration Setup



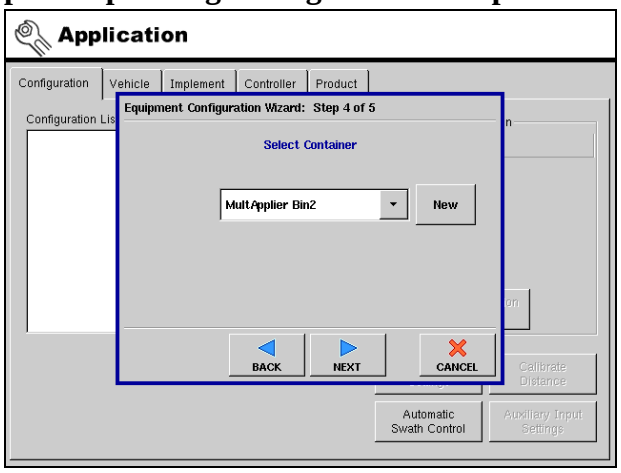
Select second product control channel used on New Leader spreader control module. The system will default to **Channel 2**.

Press **Next** to accept this setting and continue.

SETUP – APPLICATION – CONFIGURATION

Product Configuration Setup – Channel 2

Step 20: Operating Configuration Setup



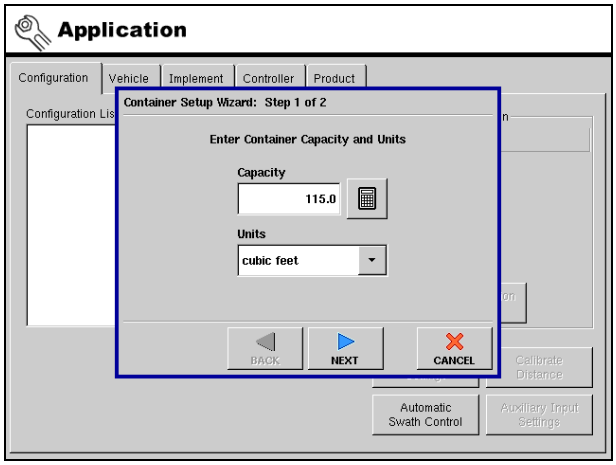
Use on-screen keyboard to name the **Container.**

Example Names:

- Bin 2
- MultApplier Insert

Select implement or vehicle from Container Location drop-down list.

Step 21: Operating Configuration Setup

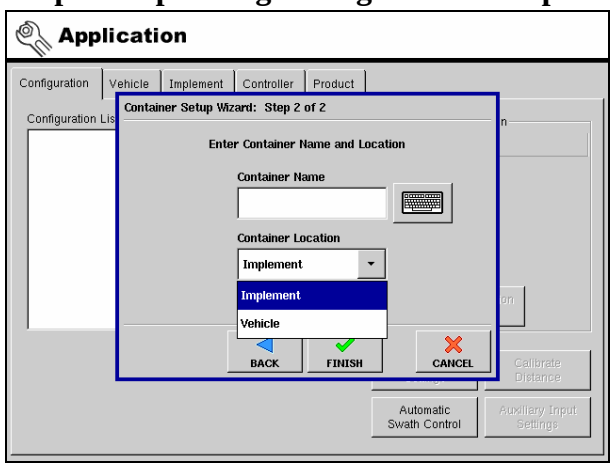


Enter container **Capacity** using on-screen keypad. This is the size of the bin in cubic feet or meters.

Select **Units** used to determine **Capacity** of bin.

Press **Next** to continue.

Step 22: Operating Configuration Setup



Use on-screen keyboard to name the **Container**.

Example Names:

- Bin 1
- Main Bin

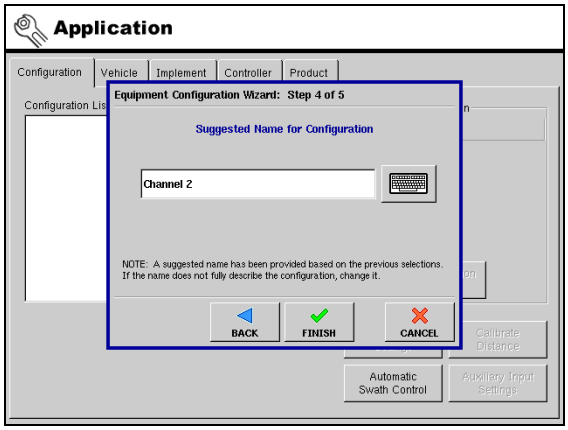
Select implement or vehicle from Container Location drop-down list.

Press **Finish** to complete **Container** setup process.

SETUP – APPLICATION – CONFIGURATION

Product Configuration Setup – Container (Bin) 2

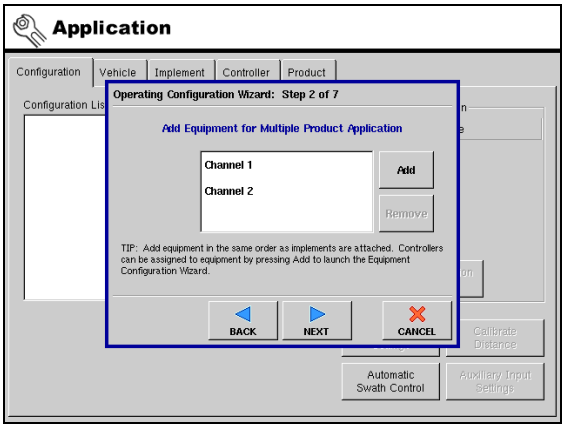
Step 23: Operating Configuration Setup



The "7" System combines information entered to create the control channel configuration name. Use on-screen keyboard to edit name as desired.

Press **FINISH** to complete channel 2 configuration and continue setup process.

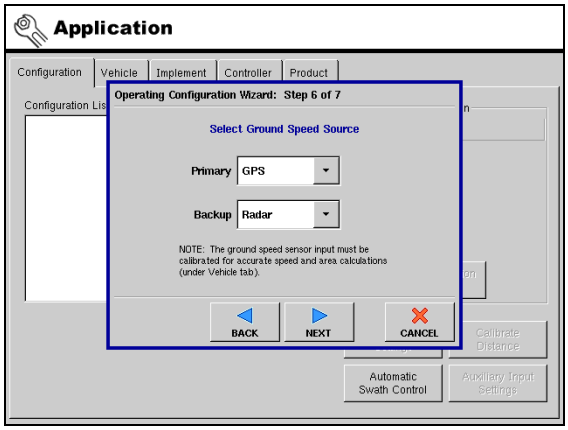
Step 24: Operating Configuration Setup



To configure a third channel, repeat Steps 17 through 25 accordingly.

Equipment setup screen after completing product control channel 1 and 2 configurations.

Step 25: Operating Configuration Setup



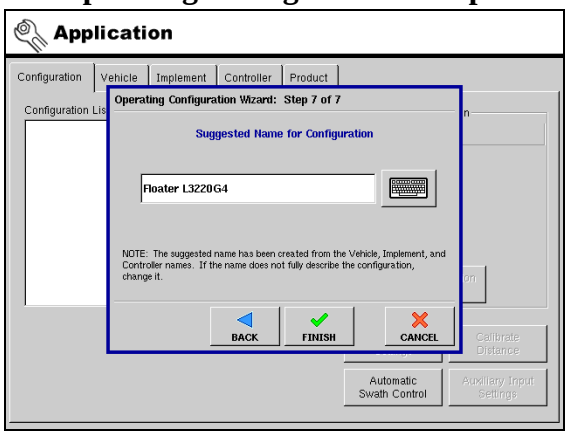
Select **Primary** and **Backup** speed input sources from lists.

Press **Accept**.

SETUP – APPLICATION – CONFIGURATION

Product Configuration Setup – Speed Input & Name Operating Configuration

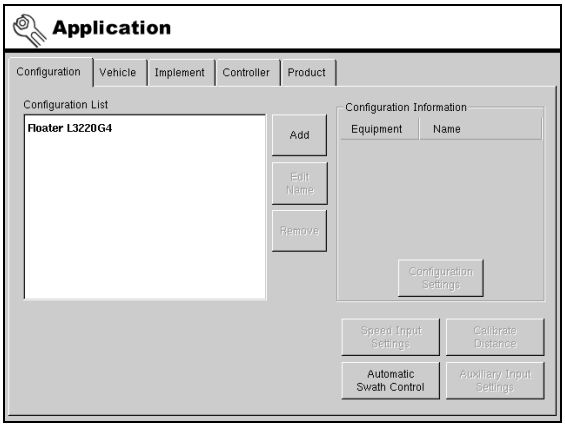
Step 26: Operating Configuration Setup



Use on-screen keyboard to create name as desired.

Press **Finish** to complete wizard setup process.

Step 27: Operating Configuration Setup



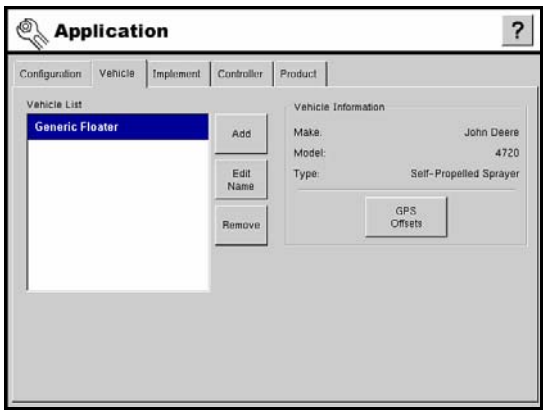
Application Configuration tab after completing primary setup wizard for single and multi-product application control systems.

SETUP – APPLICATION – VEHICLE

Vehicle

Overview

The **Vehicle** tab provides functionality for setting up and configuring additional vehicles. The vehicle list shows all vehicles that have been created and are available to use.



Vehicle Setup Tab

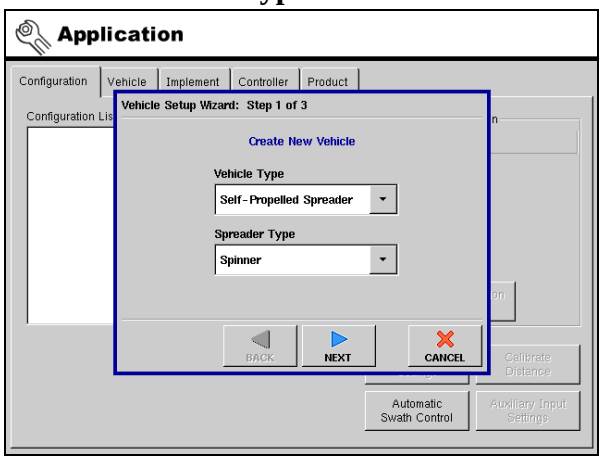
Button	Description	
Add	Press to add a new Vehicle using on-screen wizard.	
Edit Name	Select Vehicle from list and press to edit with on-screen keyboard.	
Remove	Select Vehicle from list and press to remove. The following warning will appear:	
	IMPORTANT!	Remove Vehicle – This will delete the vehicle and all regions and configurations using the vehicle. Are you sure? ACCEPT/CANCEL

Details on other **Vehicle** buttons are under *Vehicle Settings* in "Setup – Application" section.

SETUP – APPLICATION – VEHICLE

Adding a New Vehicle

Step 1: Choose Vehicle Type



To add a new Vehicle:

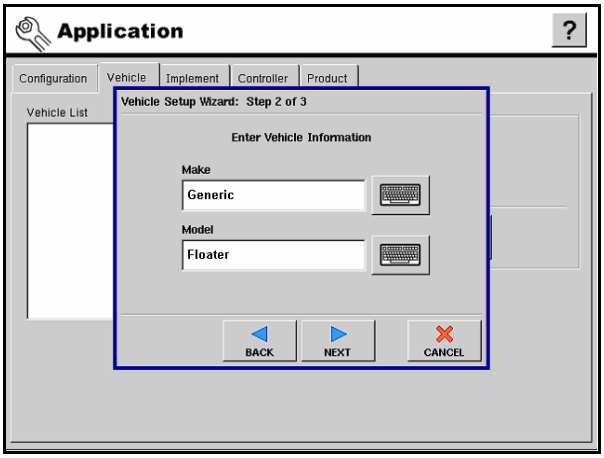
Press **Add** button.

Select **Self-Propelled Spreader** from the Vehicle Type list.

Select **Spinner** from Spreader Type list.

Press **Next**.

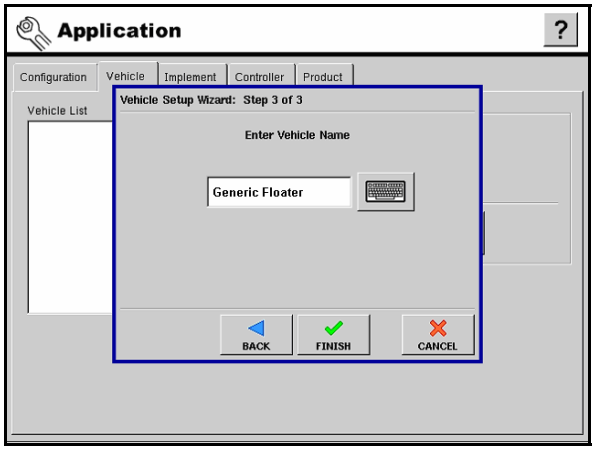
Step 2: Enter Vehicle Make and Model



Use on-screen keyboard to enter Vehicle Make and Model.

Press **Next**.

Step 3: Enter Name



Press keyboard button to edit Vehicle Name as desired.

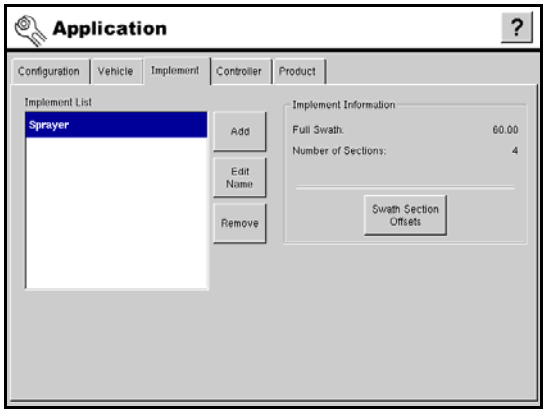
Press **Finish**.

SETUP – APPLICATION – IMPLEMENT

Implement

Overview

The **Implement** tab provides functionality for setting up and configuring implements. The implement list shows all implements that have been setup and are available for use in new configurations.



Implement Configuration Tab

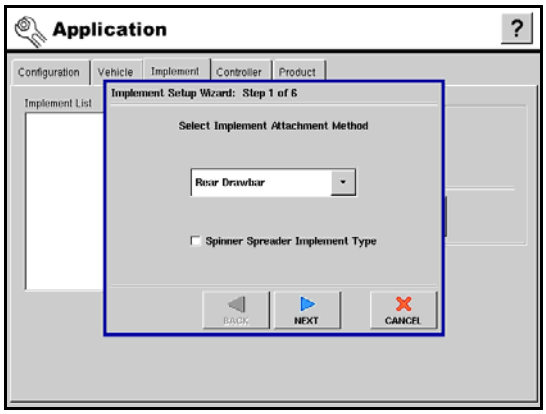
Button	Description	
Add	Press to add a new Implement using software wizard.	
Edit Name	Select Implement from list and press to edit with on-screen keyboard.	
Remove	Select Implement from list and press to remove. The following warning will appear:	
	IMPORTANT!	Remove Implement – This will delete the implement all regions and configurations using the implement. Are you sure? ACCEPT/CANCEL

Details on other **Implement** buttons are under *Implement Settings* in "Setup – Application" section.

SETUP – APPLICATION – IMPLEMENT

Adding an Implement

Step 1: Select Attachment Method



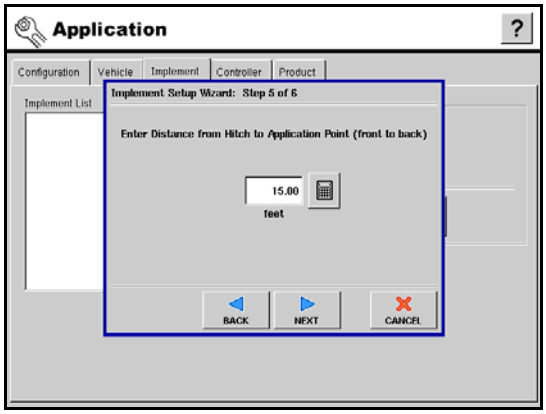
To add a new Implement:

Select **Implement Attachment Method** from drop down list.

Check **Spinner Spreader Implement Type** box.

Press **Next**.

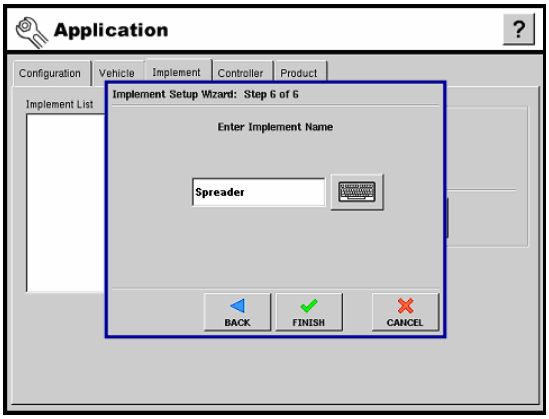
Step 2: Enter Distance From Hitch



Enter distance from hitch to application point using keypad.

Press **Next**.

Step 6: Enter the Implement Name



Press keyboard button to enter a name for the implement.

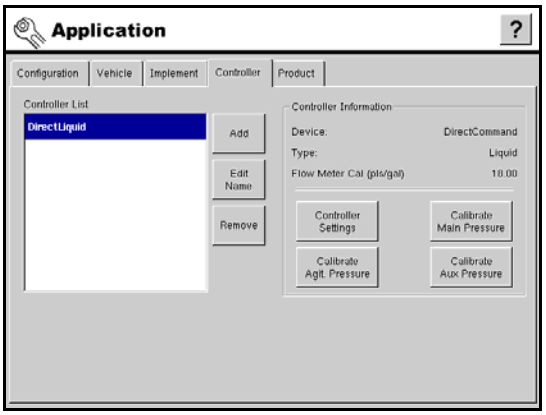
Press **Finish**.

SETUP – APPLICATION – CONTROLLER

Controller

Overview

The **Controller** tab is used to configure controllers used for product application.



Controller Configuration Tab

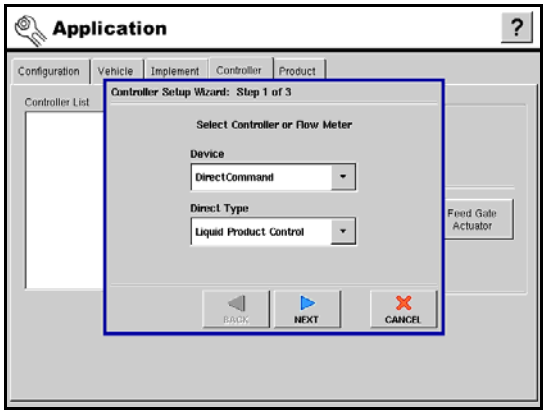
Button	Description
Add	Press to add a new Controller using on-screen wizard.
Edit Name	Select Controller from list and press to edit with on-screen keyboard.
Remove	Select Controller from list and press to remove. The following warning will appear:
	IMPORTANT! This will delete the controller and all regions and configurations using the controller. Are you sure? ACCEPT/CANCEL

Details on other **Controller** buttons are under *Controller Settings* in "Setup – Application" section.

SETUP – APPLICATION – CONTROLLER

Adding a New Controller

Step 1: Select Controller



To add a new Controller:

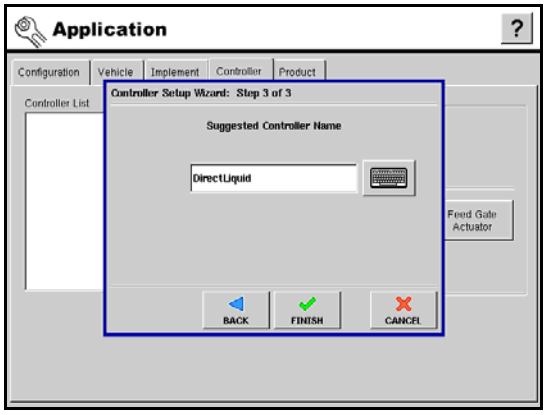
Press **Add** button on Controller tab.

Select **New Leader** from **Device** drop down list.

Select **Spreader Control** from **New Leader Direct Type** list.

Press **Next**.

Step 2: Finish



NL Spreader is the default name for the New Leader "7" controller. Press keyboard button to edit name as desired.

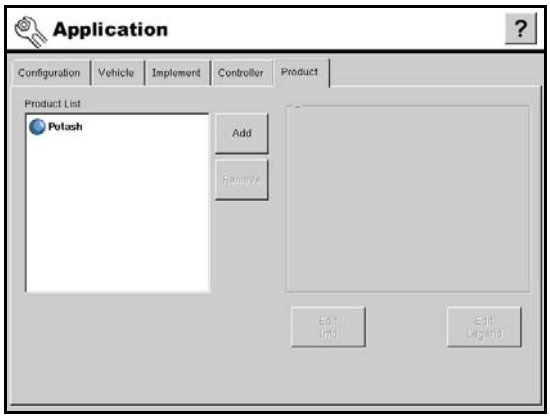
Press **Finish**.

SETUP – APPLICATION – PRODUCT

Product

Overview – Product Tab

The **Product** tab is used to configure crop nutrient and protection products. The "7" system requires that products be setup prior to performing any field application. Products are configured in a step-by-step manner using an on-screen wizard.



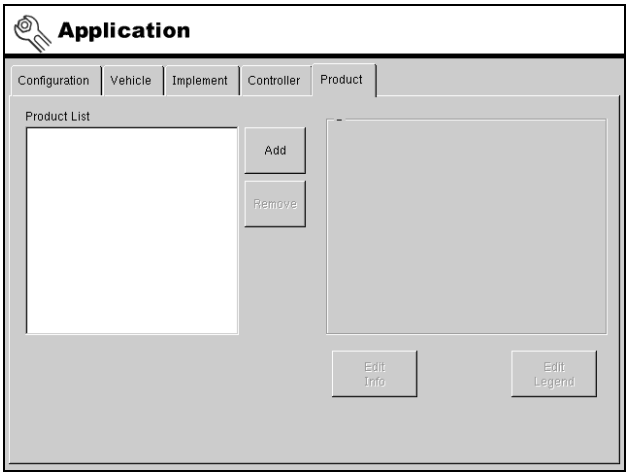
Product Configuration Tab

Button	Description	
Add	Press to add a new Product or Product Mix using on-screen wizard.	
Remove	Select Product from list and press to remove. The following warning will appear:	
	IMPORTANT!	Remove Product – This will delete the product and all regions using the product. Are you sure? ACCEPT/CANCEL

Details on other **Product** buttons are under *Product Settings* in "Setup – Application" section.

SETUP – APPLICATION – PRODUCT

Overview – Product Types



Product Setup Options

Product Type	Description
Pre-defined	The "7" comes with a pre-defined set of commonly used fertilizer products. N-P-K percentages and default product densities are stored with each product.
Single Component	Press **ADD PRODUCT** button to setup single component products. Setup allows creation of fertilizers, pesticides, defoliants, growth regulators and product carriers.
Dry Blend	Press **ADD PRODUCT MIX** button to create products with a combination of dry components. This also allows the addition of liquid components to dry products to create "impregnated fertilizer blends".

SETUP – APPLICATION – PRODUCT

Single Component Product Types

Single component products of any of the pre-defined types described below can be created and added to the "7" Product List. After initial setup, single component products can be used individually or combined to create dry blends.

Item	Description
Fertilizer	The system allows adding three different types of granular fertilizers to the Product List. • Pre-defined fertilizers • User defined N-P-K fertilizers • Other
Herbicide	The system allows adding non-fertilizer products of the pre-defined types at the left. Product setup between the types is similar. During the setup process, the system allows the user to input the following information. • Controlling units • EPA # • RUP indication • Manufacturer and product names
Insecticide	
Fungicide	
Nematicide	
Rodenticide	
Defoliant	
Growth Regulator	
Adjuvant	
Carrier	

SETUP – APPLICATION – PRODUCT

Single Component Fertilizer Products

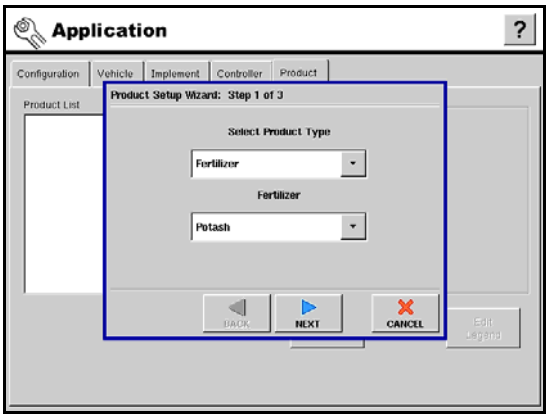
Single component fertilizers of the following types can be setup within the "7" system. These components can later be combined to create dry blends.

Fertilizer Type	Description
Pre-defined	The "7" system has many of the commonly used fertilizers pre-defined within the system. N-P-K content and default density are stored with each product name. Product density is the only attribute of a pre-defined fertilizer that can be edited. The following pre-defined products are setup within the system. • Anhydrous Ammonia • 28%, 30%, & 32% UAN • Ammonium Polyphosphate • Ammonium Nitrate • Ammonium Phosphate • DAP • MAP • Ammonium Sulfate • Urea • Potash • Triple Superphosphate • Ordinary Superphosphate • Potassium Nitrate • Ag Lime • Pell Lime
User defined N-P-K	The "7" system allows setting up fertilizer based upon N-P-K content of the product. • Controlling units • N-P-K percentages by weight • Product density • Product name
Other	Other granular products can be setup that are not based upon N-P-K content of the product. Examples are: • Sulfur • Zinc • Lime • Magnesium

SETUP – APPLICATION – PRODUCT

Adding a New Single Component Product

Step 1: Select Product

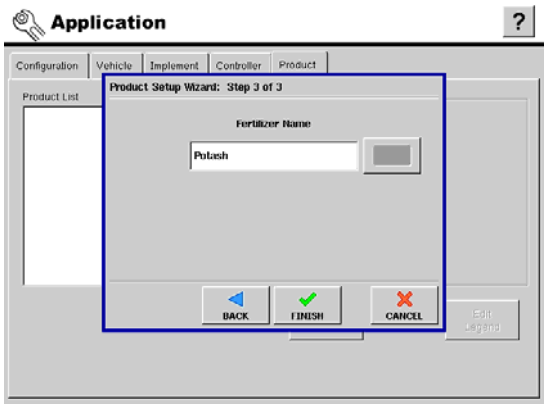


Press **Add** button on Product tab to setup a new product.

Select **Product Type** from drop down list. If Fertilizer, select type from bottom list. (Bottom list is only active if fertilizer is selected from Product Type list.)

Press **Next**.

Step 2: Finish



Press keyboard button to enter name for Product.

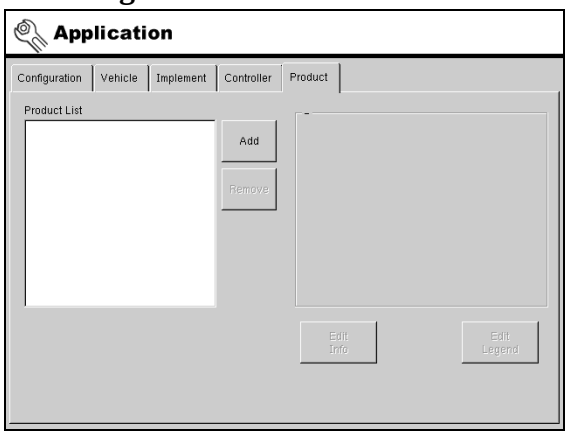
Press **Finish**.

SETUP – APPLICATION – PRODUCT

Dry Blend Setup

Dry fertilizer blends are setup using the on-screen wizard. A dry blend can contain up to seven individual products.

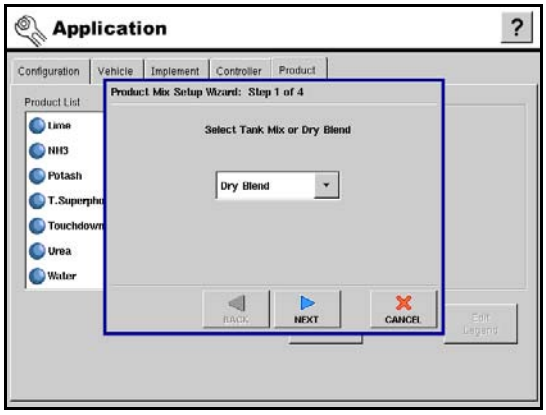
Step1: Adding A Product Mix



Press **Add** button on Product tab.

Press **ADD PRODUCT MIX** button to start setup of dry product blend.

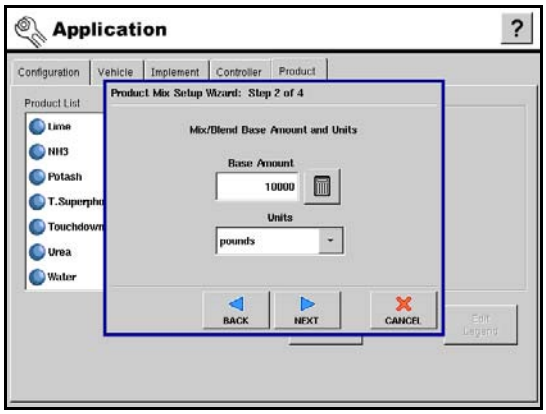
Step 2: Creating A Dry Blend



Select **Dry Blend** from drop down list.

Press **NEXT**.

Step 3: Base Amount And Units Selection



Press keypad to enter total **Base Amount** of combined products in spreader.
NOTE: This is the total amount of the product created in the batch.

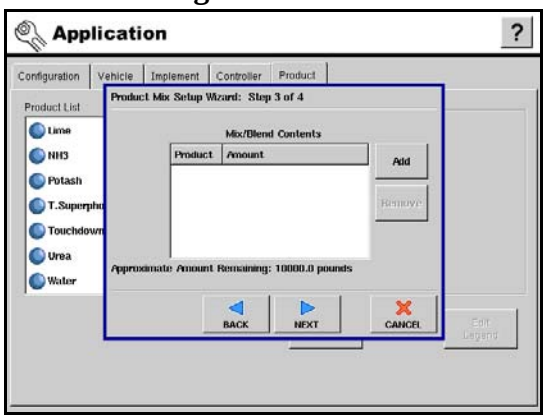
Select **Units** used to determine Product amount.

Press **Next**.

SETUP – APPLICATION – PRODUCT

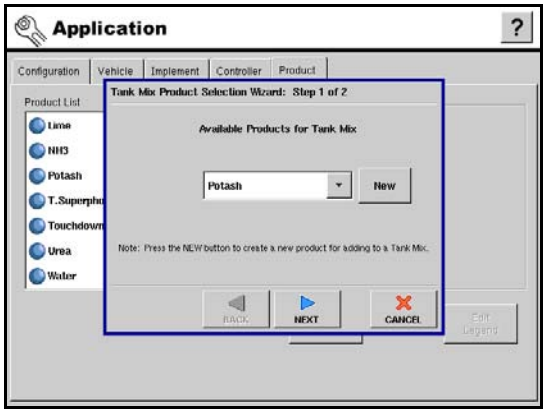
Dry Blend Setup – First Product

Step 4: Start Adding Products



Press **Add** button to add first Product to fertilizer blend.
NOTE: Liquid herbicides setup within the system can be added to created an impregnated blend product.

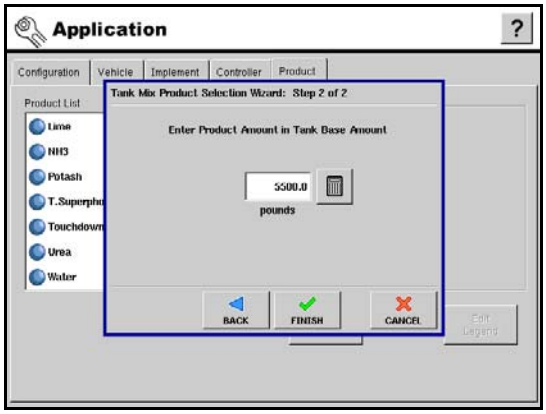
Step 5: Select Product



Select desired **Product** from drop down list. New products can be setup at this time by pressing **New** button.

Press **NEXT**.

Step 6: 1st Product Amount



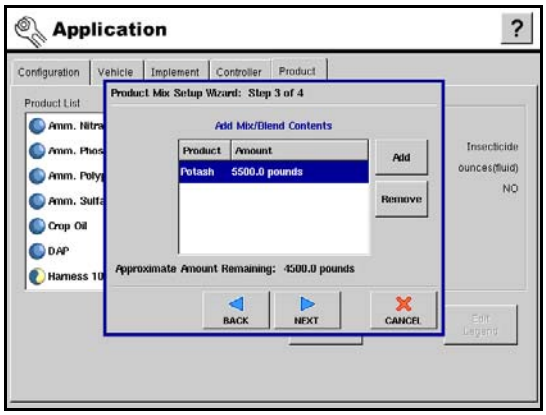
Press keyboard to enter first **Product Amount**.

Press **FINISH** to complete process of adding first product.

SETUP – APPLICATION – PRODUCT

Dry Blend Setup – Additional Products

Step 7: Add Additional Products

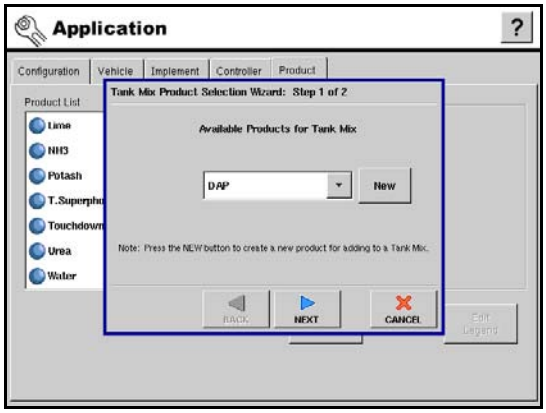


A dry mix can contain up to seven individual products.

Press **Add** to add an additional product.

NOTE: The remaining base amount available after adding products is shown at the bottom of the Mix/Blend Contents screen.

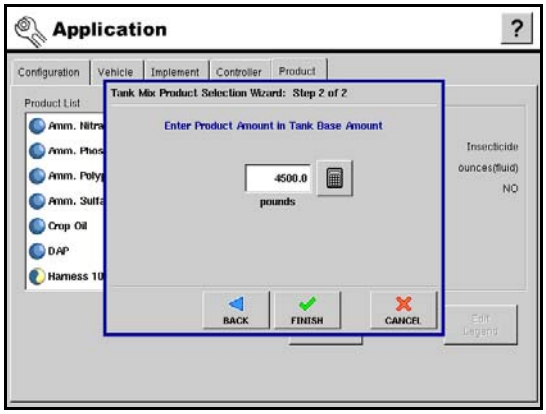
Step 8: Select Additional Products



Select **Product** from drop down list.

Press **NEXT**.

Step 9: Set Product Amount



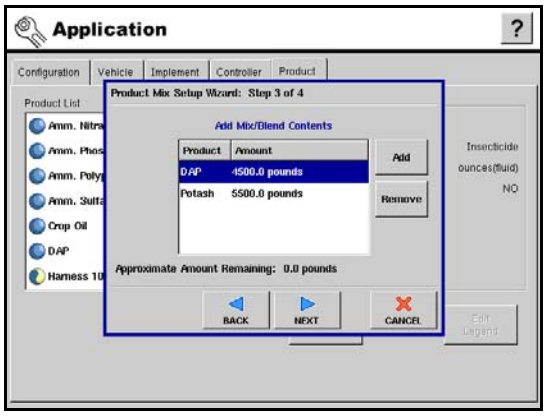
Press keyboard to enter individual **Product Amount**.

Press **FINISH** to complete process of adding second product.

SETUP – APPLICATION – PRODUCT

Dry Blend Setup – Naming Product

Step 10: Second Product Added

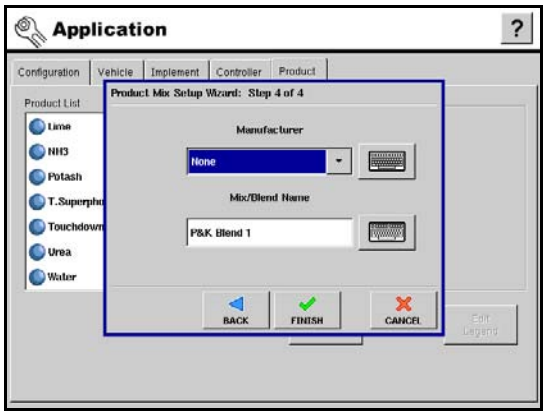


Screen at left shows Mix/Blend Contents with two products.

Repeat adding products as desired. Total amount of all products added should equal Base Amount entered.
(Bottom of Mix/Blend Contents screen Approximate Amount Remaining should read 0.0.)

Press **NEXT** after final blend product has been added.

Step 11: Name Blend

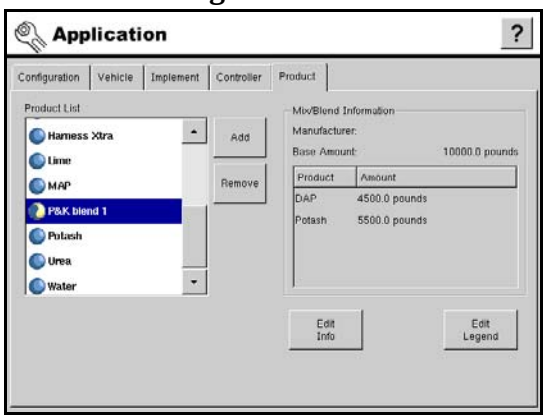


Press keyboard to enter **Manufacturer** name if applicable.

Use on-screen keyboard to enter product **Mix/Blend Name**.

Press **FINISH** to complete process of setting up dry blend.

Step 12: List Showing New Blend



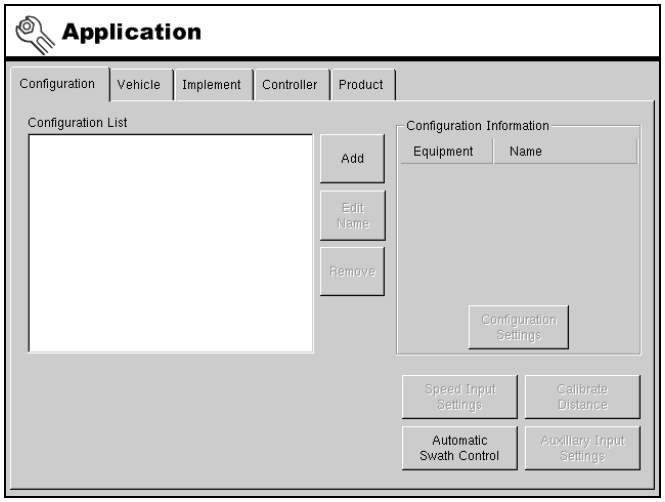
Screen at left shows Product tab with new dry blend as a selection in the Product List.

NOTE: Select a dry blend product to view individual components and amounts in Mix/Blend Information frame.

SETUP – APPLICATION – ADVANCED SETTINGS

Advanced Settings Overview

After completing the process of setting up a **Configuration**, advanced settings must be made. These settings, accessed from each of the main tabs, allow customization of product control and applied data mapping specific to an application control system. Settings for each of the tabs are outlined below.



Application Setup Tabs – Prior to Configuration

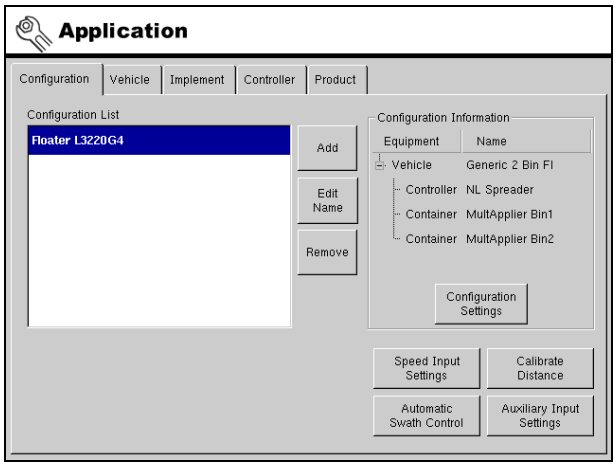
Item	Description
Configuration	Settings include speed input source and various equipment configuration controls.
Vehicle	Settings include GPS mount and product dispensing locations, used by the system for mapping, product control and Automatic Swath Control operation.
Implement	Settings include locations for product distribution and swath.
Controller	Settings include product control valve and response threshold values.
Product	Settings include customization of map legend appearance and values.

SETUP – APPLICATION – CONFIGURATION SETTINGS

Configuration Advanced Settings

Overview

Select configuration from list to access Configuration Advanced Settings outlined in table below.



Configuration Setup Tab –
After Configuration Setup

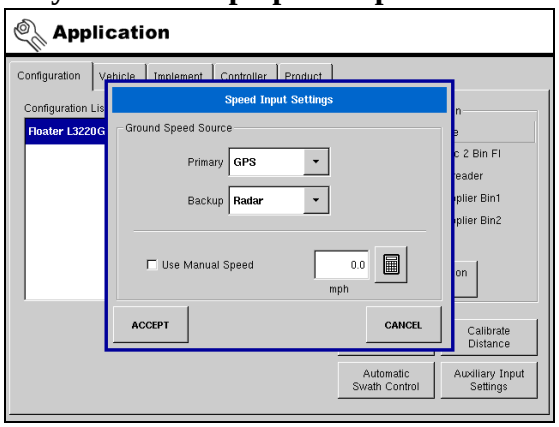
Item	Description
Configuration Settings	Press to display and edit product control settings specific to a vehicle, implement, controller combination.
Speed Input Settings	Press to select speed input device and manual speed setting.
Automatic Swath Control	Press to display and edit automatic swath control settings.
Calibrate Distance	Press to launch speed sensor calibration wizard.
Auxiliary Input Settings	Press to display master switch input setting. **IMPORTANT!** Do not change from default setting of **Standard** unless remote switch or pedal is installed.

SETUP – APPLICATION – CONFIGURATION SETTINGS

Speed Input Settings

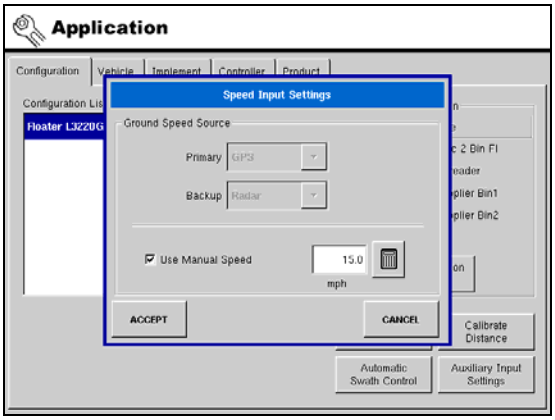
Select **Configuration** from list and press **Speed Input Settings** button to access related settings. These settings are specific to that combination of **Vehicle**, **Implement** and **Controller**.

Primary And Backup Speed Inputs



The "7" uses GPS as a primary speed input by default and a choice of radar, wheel or track sensor as backup. The backup option is not available when radar, wheel or track sensor is selected as the primary speed input.

Manual Speed Settings

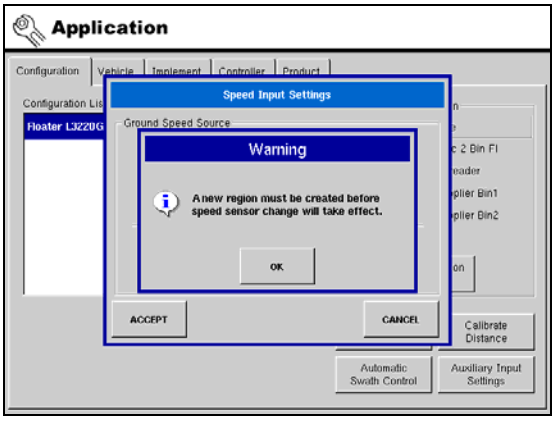


If neither primary or backup speed input devices are functioning properly, check the **Use Manual Speed** option and enter desired simulated speed.

IMPORTANT!

The Manual Speed input setting can result in under or over application of product. The "7" System will perform as if the vehicle is traveling at the manual speed until another option is selected.

Warning - Changing Speed Input Selections



If the Primary speed input selection is changed, the following warning will appear:

IMPORTANT!

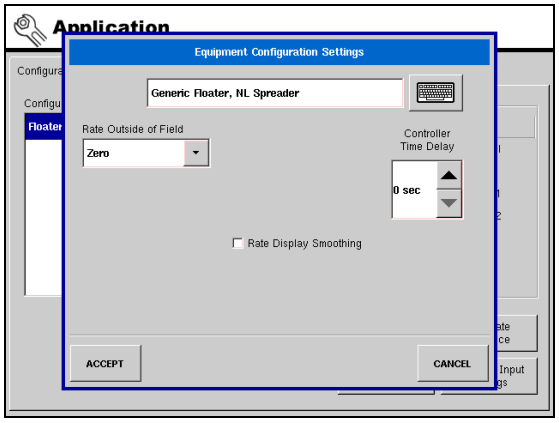
A new region must be created before speed sensor change will take effect.

The system will not log data properly until this occurs.

SETUP – APPLICATION – CONFIGURATION SETTINGS

Configuration Settings

Equipment Configuration



Select **Configuration** from list and press **Configuration Settings** button to access related settings. These settings are specific to that combination of **Vehicle**, **Implement** and **Controller**.

Select an operating configuration and press **Configuration Settings** button to display screen at left. Implement and controller name for configuration are displayed at lower left. Settings related to controller operation for the configuration are displayed on the right.

Item	Description
Rate Outside of Field	Select product control channel (conveyor) behavior when exit field boundary: • **Zero** = Product application will turn off when field boundary is exited. • **Last Good** = Product application will continue at the last value used by the control system when field boundary is exited. • **TGT Default** = Product will be applied at the default rate setting.
Rate Display Smoothing	This setting determines how feedback from the control channel rate sensor will display on run screen. When checked, the system will display target rate when application rate is within 10% of target rate setting. When unchecked, the system will display raw feedback from rate sensor.
Controller Time Delay	This setting compensates for any delay in the control system when changing between different product flow rates. Typical setting is 0–1 seconds.

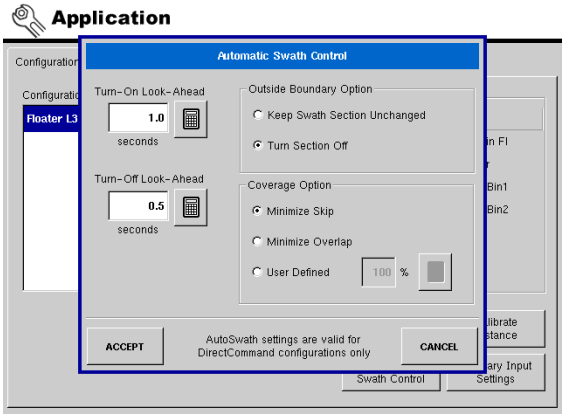
SETUP – APPLICATION – CONFIGURATION SETTINGS

Automatic Swath Control

Select a **Configuration** from the list and press the **Automatic Swath Control** button to access the related settings. These settings are specific to that combination of **Vehicle**, **Implement** and **Controller**.

The **Automatic Swath Control** feature turns swath sections off and on automatically based upon the following conditions:

- Entering and exiting internal and external field boundaries.
- Entering and exiting mapped product recommendation areas.
- Entering and exiting previously applied areas within a field.



Automatic Swath Control Settings

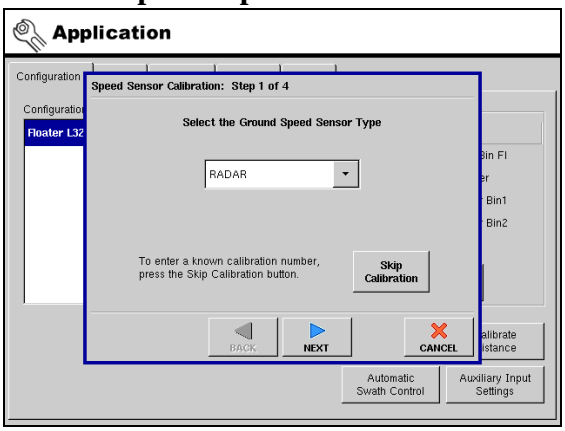
Item	Description
Turn-On Look-Ahead	This setting determines how far ahead the system looks to turn swath section(s) on. It compensates for delay in the product control system when spinners are turned on.
Turn-Off Look-Ahead	This setting determines how far ahead the system looks to turn swath section(s) off. It compensates for delay in the product control system when spinners are turned off.
Outside Boundary Option	This selection controls system action when a swath section exits a field boundary or prescription mapped area.

SETUP – APPLICATION – CONFIGURATION SETTINGS

Calibrate Distance

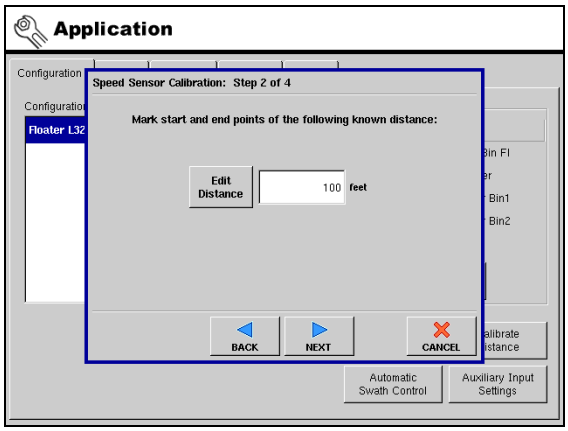
Select a **Configuration** from the list and press **Calibrate Distance** button to calibrate radar or wheel speed sensor. This calibration is specific to that combination of **Vehicle, Implement** and **Controller**.

Step1: Select Speed Input



Select sensor type to calibrate and press **NEXT** to continue.

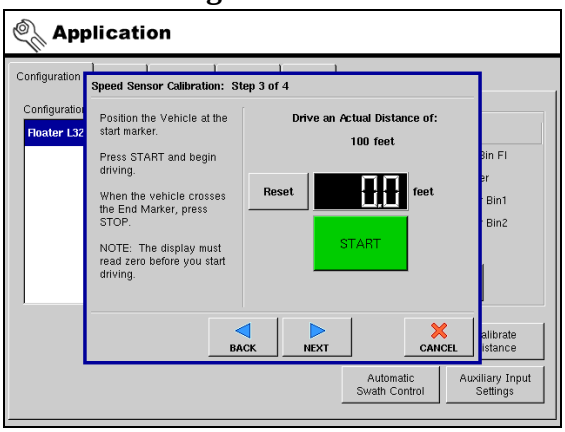
Step 2: Calibration Distance



The system defaults to a distance of 100 feet (meters) for calibration. Press **Edit Distance** to change if needed. This value must match the actual distance of the course driven for calibration.

Press **NEXT** to continue.

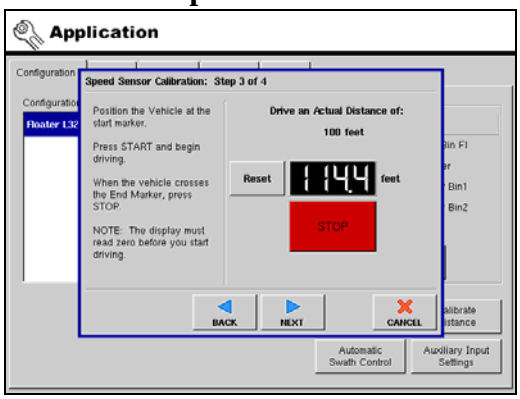
Step 3: Start Driving Course



Follow on-screen directions and press **START** to begin calibration process.

SETUP – APPLICATION – CONFIGURATION SETTINGS

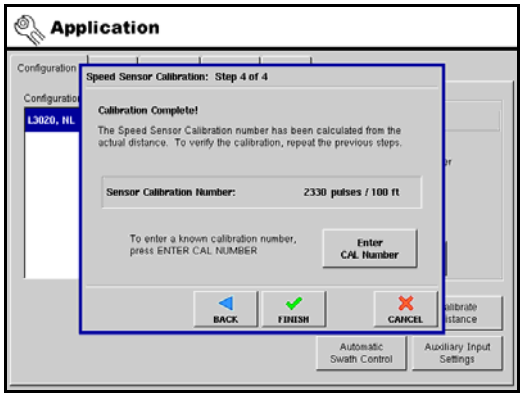
Step 4: Course Completed



Drive vehicle over the measured course and press **STOP**.

Press **NEXT** to continue to final step.

Step 5: Calibration Completed



Press **FINISH** to complete calibration and store the calculated value.

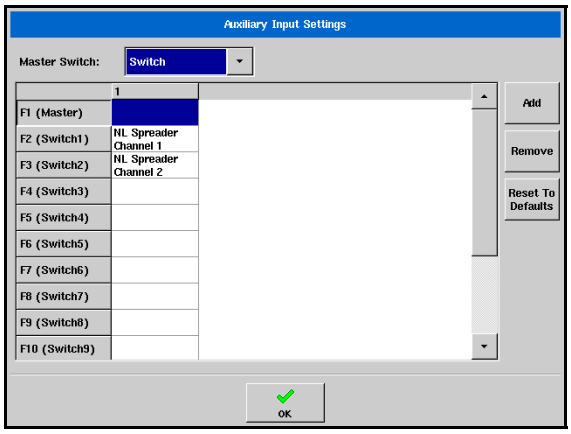
NOTE: Calibration settings can be manually adjusted by pressing **Enter CAL Number** and making small changes to the setting.

SETUP – APPLICATION – CONFIGURATION SETTINGS

Auxiliary Input Settings

The master switch input setting defaults to **Standard**. Select **Optional** to control the system's master on/off status by a remote or floor mounted switch.

IMPORTANT!	The master switch on the multi-switch box will not operate the conveyor(s) if the Auxiliary Input Setting is set to Optional.



SETUP – APPLICATION – VEHICLE SETTINGS

Vehicle Advanced Settings

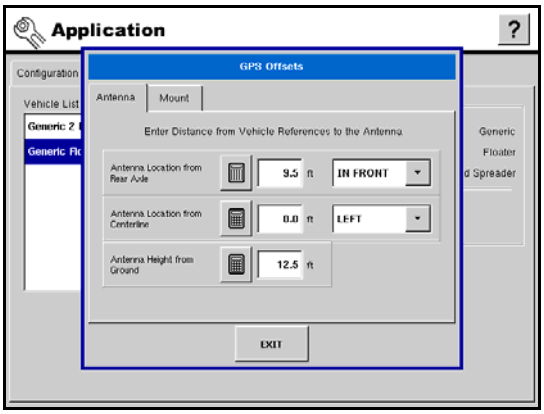
GPS Offsets – Overview

Item	Description
GPS Offsets	Press to enter location of GPS antenna in relation to the vehicle and product placement or implement mounting positions as applicable.

GPS Offsets – Antenna

IMPORTANT!	Accurate measuring is essential to ensure proper machine performance.

GPS Offsets: Antenna



Select Vehicle from list and press **GPS Offsets** to edit settings. Select Antenna tab.

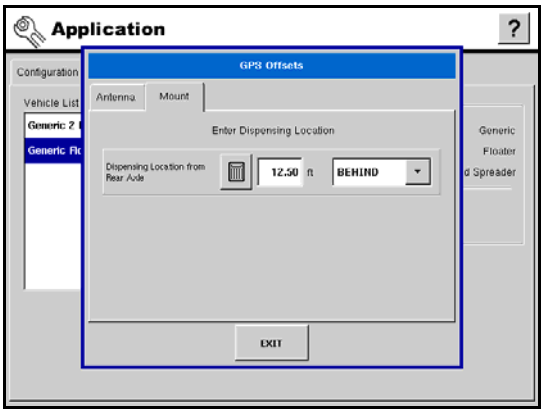
Press keypads to enter the following antenna measurements:

1. Horizontal distance from GPS antenna to rear axle. Specify **IN FRONT** or **BEHIND** rear axle.
2. Horizontal distance from GPS antenna to vehicle centerline.
   Specify **LEFT** of **RIGHT** of vehicle centerline.
3. Vertical height of antenna from ground.

SETUP – APPLICATION – VEHICLE SETTINGS

GPS Offsets – Mount or Hitch Location

GPS Offsets: Mount



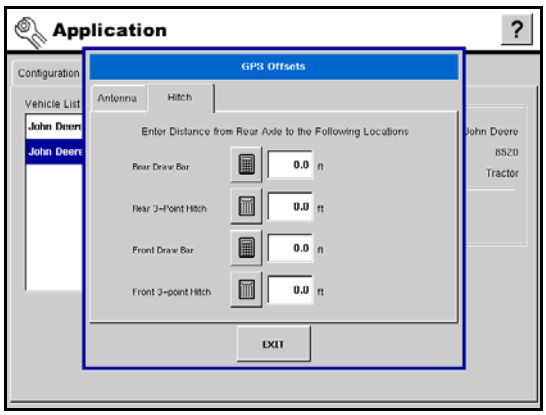
Select Mount tab if a self-propelled vehicle is selected.
NOTE: Mount tab is not available if self-propelled vehicle is not selected.

Press keypad to enter measurement from rear axle to location product is dispensed from the machine.

Select direction of offset: **IN FRONT** or **BEHIND** rear axle.

Press **Exit**.

GPS Offsets: Hitch



Select Hitch tab if a pull behind or mounted implement vehicle is selected.
NOTE: Hitch tab is not available if pull behind or mounted vehicle is not selected.

Press keypad to enter measurement from rear axle to the appropriate hitch mounting location on the tractor:

- Rear Draw Bar
- Rear 3-Point Hitch
- Front Draw Bar
- Front 3-Point Hitch.

SETUP – APPLICATION – IMPLEMENT SETTINGS

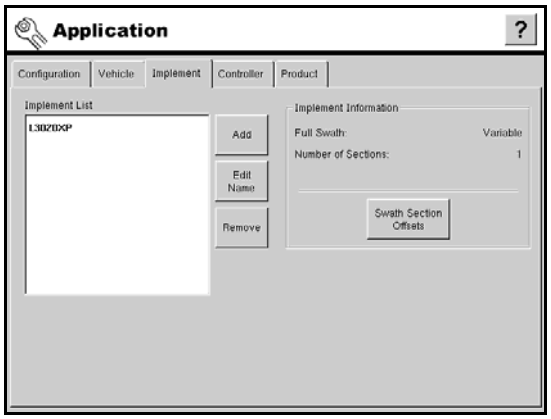
Implement Advanced Settings

Swath Section Offsets – Overview

Item	Description
Swath Section Offsets	Press to enter swath section offsets and, on trailer mount spreaders, the distance from application point (spinner) center to truck hitch and front hitch to rear hitch.

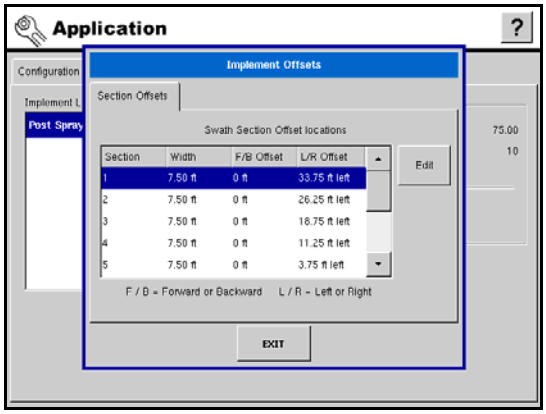
Swath Section Offsets – Editing Settings

Step1



Select Implement from list and press **Swath Section Offsets** to edit settings.

Step 2

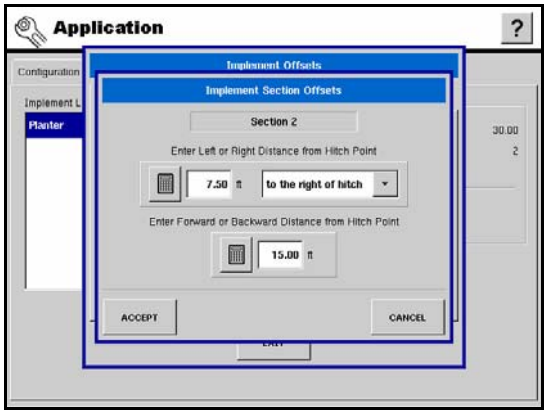


Select section from list and press **Edit** to modify offset values.

SETUP – APPLICATION – IMPLEMENT SETTINGS

IMPORTANT! Accurate measuring is essential to ensure proper machine performance.

Step 3



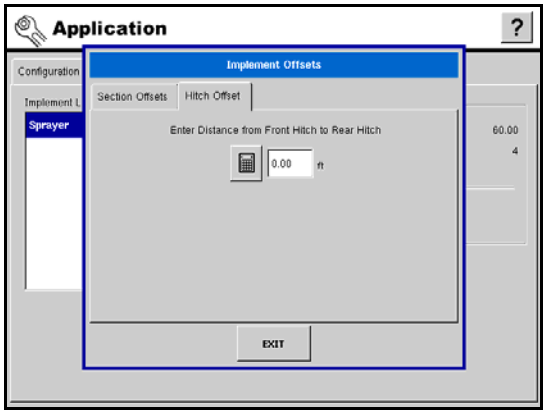
Press keypad to enter horizontal measurement from vehicle centerline to swath width center. Specify **to the left** or **to the right** of hitch.

Press keypad to enter horizontal fore-aft distance from hitch point to swath width center.
NOTE: This option is not present if self-propelled vehicle is selected.

Press **Accept** to save changes.

Press **Exit**.

Step 4



Use keypad to enter distance from front hitch to rear hitch point if applicable.
NOTE: Hitch Offset tab is not available if self-propelled vehicle is selected.

Press **Exit**.

SETUP – APPLICATION – CONTROLLER SETTINGS

Controller Advanced Settings

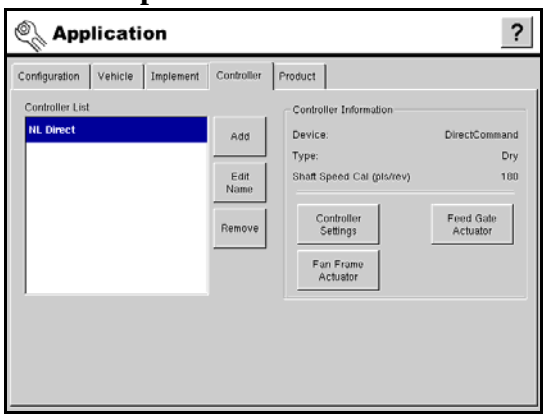
Overview

The Advanced Controller Settings determine hydraulic control valve performance for the conveyors and spinner.

Item	Description
Controller Settings	Press to edit settings for spinner and three independent conveyors.

Controller Settings

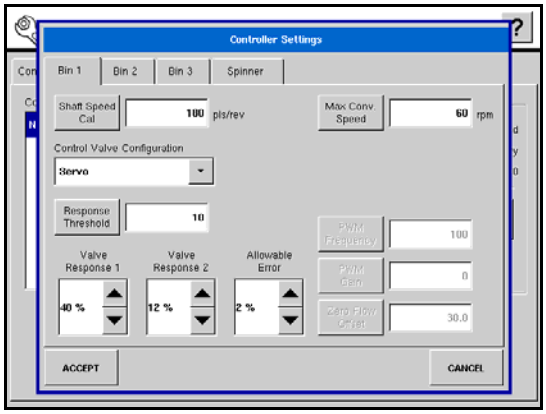
Controller Setup Screen



Select Controller from list and press **Controller Settings** to access the advanced setting screens.

SETUP – APPLICATION – CONTROLLER SETTINGS

Conveyor Control Screens

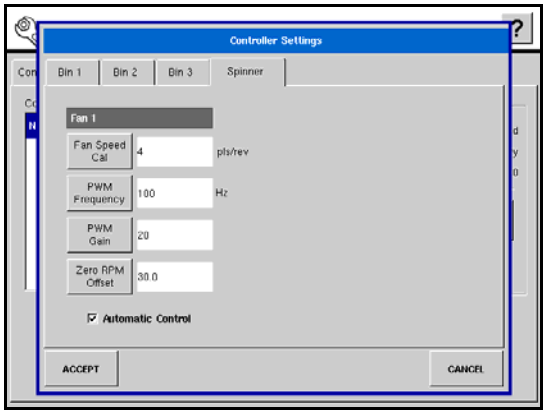


The screen at left shows default settings for the conveyor control hydraulic servo valves. Default settings are the same for all product control channels. Minor adjustment may be required for proper performance of individual applicators.

Maximum conveyor speed settings for each unit, in Revolutions Per Minute (RPM), are as follows:

L2020G4 – 40 RPM	7020 – 50 RPM
L3020G4 – 50 RPM	L3020XP – 60 RPM
L3220G4 – 50 RPM	MultApplier – 60 RPM

Spinner Control Screen



The screen at left shows default settings for the optional PWM spinner speed control valve.

Press **Fan Speed Cal** and enter the number of fins per spinner.

Un-check **Automatic Control** if PWM is not installed.

SETUP – APPLICATION – PRODUCT SETTINGS

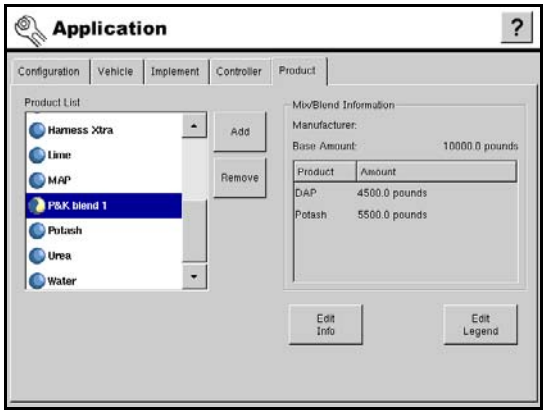
Product Advanced Settings

Edit Legend

The Advanced Products Settings determine product application appearance on the map.

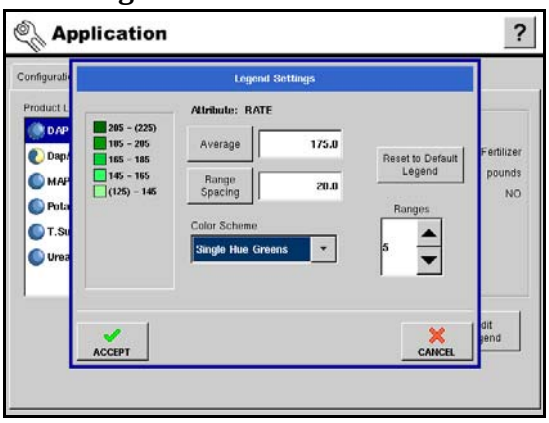
Item	Description
Edit Legend	Press to edit legend for product appearance on map.

Product Setup Screen



Select Product from list and press **Edit Legend** to access the advanced setting screens.

Legend Settings Screens



The screen at left shows default settings for the map legend. Default settings are the same for all products. Change values and colors as desired.

Press **ACCEPT** to save changes.

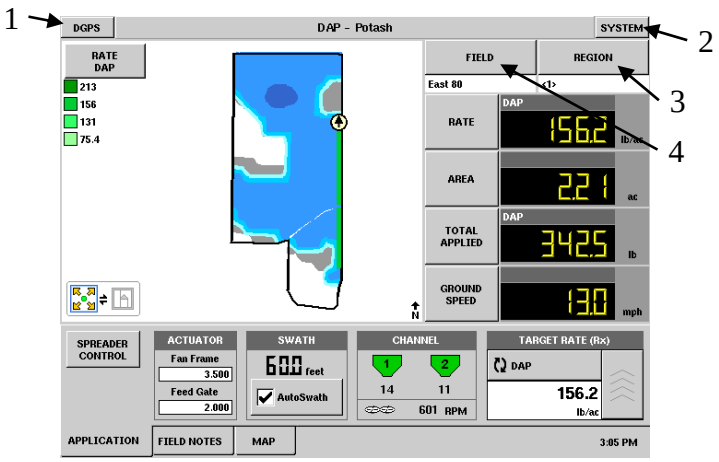
RUN – OVERVIEW – COMMAND BUTTONS

IMPORTANT! Run screen functionality is not present until a configuration is setup.

OVERVIEW

Run Screen Command Buttons

Run screen command buttons are present on the run screen regardless of the current mode of operation.



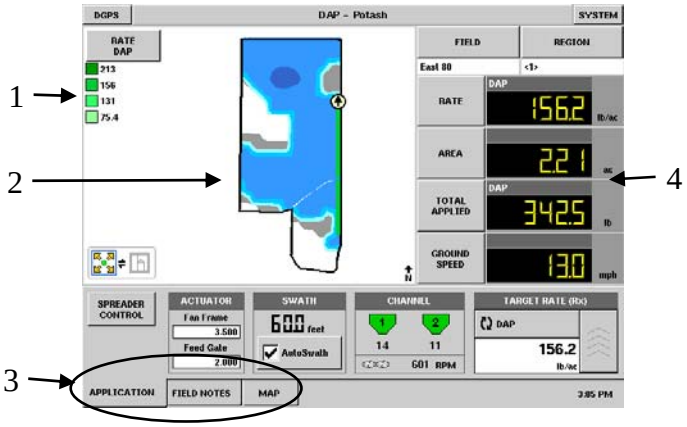
Run Screen – Command Buttons

Run Screen Buttons	Description
1) DGPS	Displays quality of GPS signal in use by the system. If both differential and GPS signals are available, this button will display **DGPS**. If GPS is available without differential correction, the button will display **GPS**. If neither GPS or differential signal is available, two dashed lines **(--)** will be displayed on the button. Press **DGPS** button to display detailed GPS and differential correction information.
2) SYSTEM	Press to launch information screens that include various tabbed pages for display of system operating status. These pages include statistics on memory usage, diagnostics and readings from various sensors and system components connected to the "7" display.
3) REGION	A region is used to subdivide a field into smaller sections. A new region can be created any time a field operation is being performed. To change between or add a new region to a field, press **REGION** button and follow on screen instructions.
4) FIELD	The Field currently being logged is shown below the **FIELD** button. To change Fields, press **FIELD** button and select desired Field. Operating Configurations and Products are also selected during this process. NOTE: For more information on Field setup, see *Fields* in "Setup – Grower-Field Management" section of this manual.

RUN – OVERVIEW – DISPLAY AREA

Run Screen Display Area

The display area of the run screen remains constant between different modes of operation.

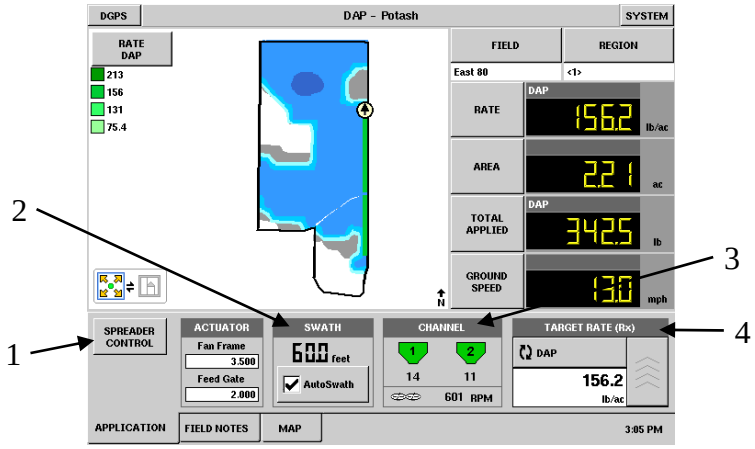


Run Screen – Display Area

Run Screen Display Areas	Description
1) Legend	This area displays a choice of legends configured to the type of field activity taking place. Press the legend to create and save custom legends.
2) Map Area	This area displays map options available in the "7". Depending on current field activity, one or more of the following maps are made available: • Field boundaries • Field note marks • Prescription maps • Applied rates • Product coverage • Reference maps • Load/Clear Rx Zoom and pan by touching the map, then touching the appropriate icon.
3) Control Tabs	Each Control Tab displays content specific to the current mode of operation. Examples of various tab functionality include using the Field Note feature, viewing and setting product control parameters and interaction with a New Leader Lightbar.
4) Run Screen Display Items	This area displays the user's choice of four different data items. Any of the four display items can be changed by pressing on that item and choosing a different data item from a pop-up list that includes: • Rate • Area • Total applied • Ground speed • Area per hour • Distance • Flow • Spinner RPM • Container Level

RUN – OVERVIEW – APPLICATION

Application Tab

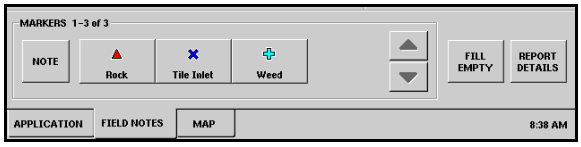


Run Screen – Application Mode

Run Screen Application Mode		Description
1)	Spreader Control	Press to display and edit spreader control settings.
2)	Swath Control	Displays active spread pattern width. Select Auto Swath to spread product automatically when vehicle enters boundary. NOTE: Auto Swath does not require a boundary map but it is highly recommended.
3)	Channel Operation	Displays status of channel/conveyor operation for each channel setup in the current configuration. The bin is green when channel is operating and product is being applied; it's grey when not operating.
4)	Target Rate	This area displays application rate for selected product. Press product button to switch between different product configurations. Press arrow buttons to change target rate using a preset rate change.

RUN – OVERVIEW – FIELD NOTES

Field Notes Tab



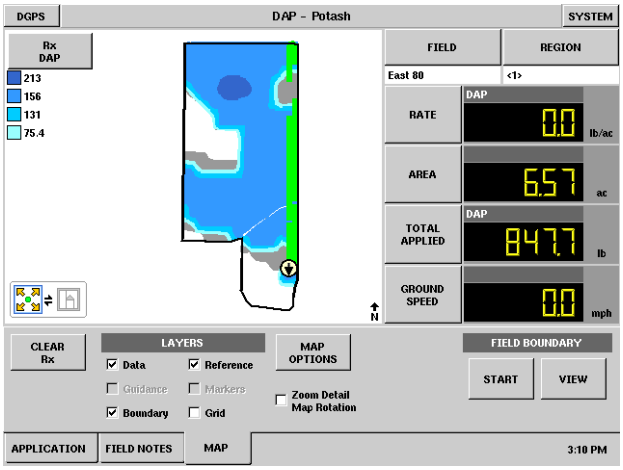
The Field Notes tab allows markers to be placed on the map. For details on how to create these markers see *Creating a New Marker* in "Setup – Field Notes" section. These marks are spot marks, meaning only one spot will be marked in the field per button press.

The field notes tab also provides an area to take notes on the field, watch your container volume and enter items into a report.

Item	Description
FILL EMPTY	Press to note spreader was filled or emptied and the product amount.
REPORT DETAILS	Press to view and enter report details and memos regarding general conditions and specific channel setup(s) for the current application.
NOTE	Press to add notes about field markers.

RUN – OVERVIEW – MAP

Map Tab



Button	Description
LOAD REFERENCE	This allows loading of a non-editable background map from another operation. To load, highlight desired operation in list and select attribute to map. Press accept.
CLEAR REFERENCE	The clear reference button is not active until a reference map is loaded. This will clear current reference map and set button back to load option.
MAP OPTIONS	The map options button clears map or field note marks. Select clear map option to clear all data for the active operation and field. Select clear marks option to clear all marks for the active field.
START	Press start button to display a screen that allows boundary type selection. For more details see *Start Field Boundary* in "Run – Map" section.
STOP	The stop button stops the current boundary and is only active after a boundary has been started. Press accept to keep or cancel to reject.
VIEW	View is active while there is not a new boundary being made. It allows you to see all inner and outer boundaries together along with their type and area. Select a boundary and press Remove Selected to remove a single boundary or press Clear All to remove all boundaries.
PAUSE RESUME	The pause button is only active during creation of a boundary. Press pause to stop logging the boundary while driving around something. The button changes to resume when pressed. Press Resume to snap a straight line in the boundary from where pause was pressed.

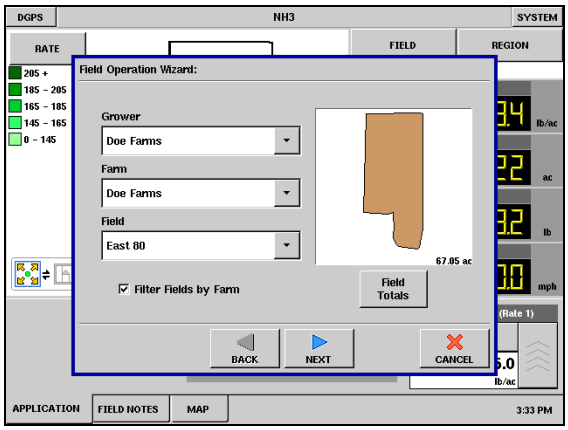
RUN – FIELD OPERATION

FIELD (REGION) OPERATION SETUP

Product Application

A Field Operation must be setup at the Run Screen to begin application of product in a field. This process is similar regardless of the type of field operation currently taking place.

Typical Run Screen

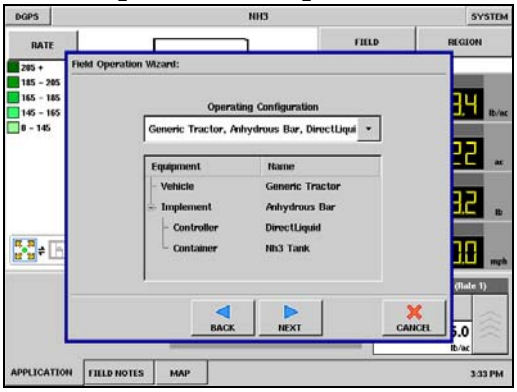


View of Run Screen prior to start of Field Operation wizard.

To setup an Operating Configuration for an application (example uses anhydrous ammonia):

Press **FIELD** button to launch Field Operation wizard. The Field Operation wizard includes Region setup. To setup a Region only, press **REGION** button and skip to step 5 on next page.

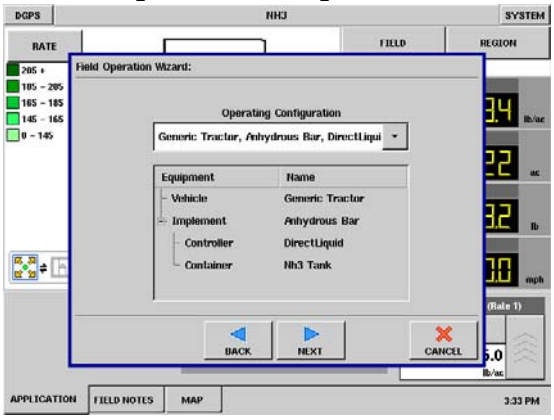
Step 1: Field Operation Setup



Choose field for product application by selecting from the **Grower**, **Farm** and **Field** lists.
NOTE: Unchecking the **Filter Fields by Farm** box will display all fields in the **Field** list regardless of its farm association.

Press **NEXT** to continue.

Step 2: Field Operation Setup



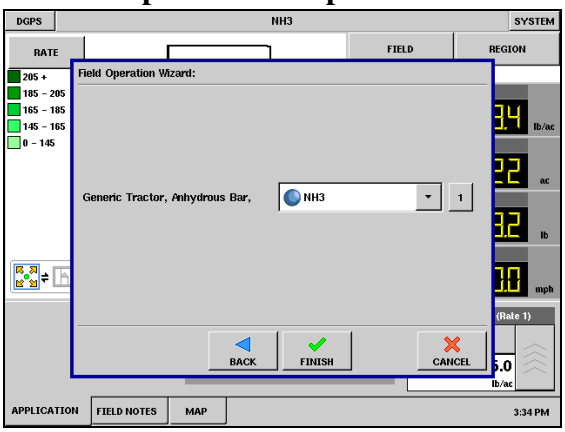
Select Operating Configuration that relates to the equipment in use.

Press **NEXT** to continue.

RUN – FIELD OPERATION

Product Selection

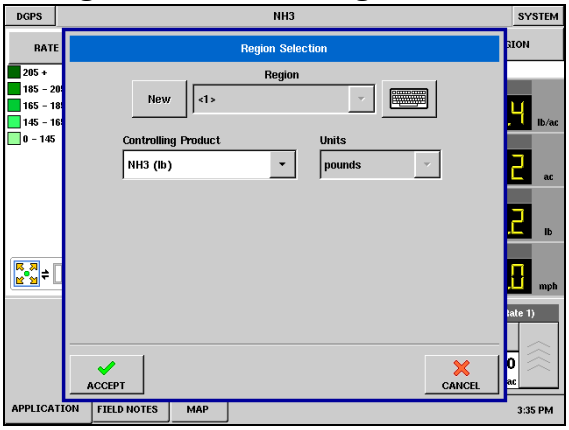
Step 3: Field Operation Setup



Select the correct product from the list for each channel of product control.

Press **FINISH** to complete Field Operation portion of the setup wizard.

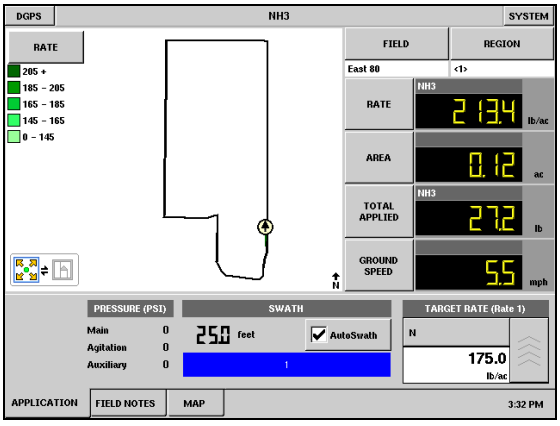
Step 4: Region And Controlling Units Selection



A region is an area within a field (detailed in "Setup – Grower-Field Management"). A field is a collection of one or more regions. Press on-screen keyboard to change region name if desired.

The system controls application based on product and units as defined in product setup. The user has the option to control application based upon N-P-K nutrient value of the product by selecting from the **Controlling Product** list. Select appropriate **Units** for the product from the list.

Step 5: Setup Completed



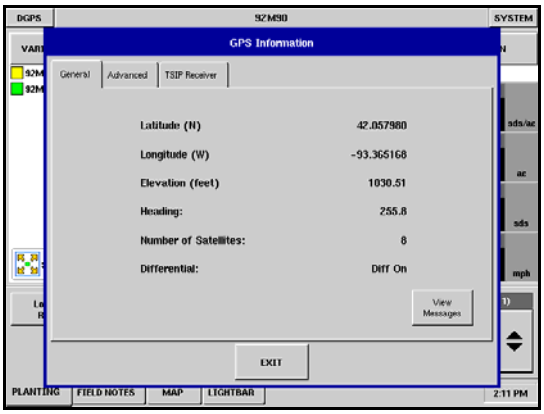
View of Run Screen with Field Operation configured and ready for product application.

RUN – DGPS

DGPS

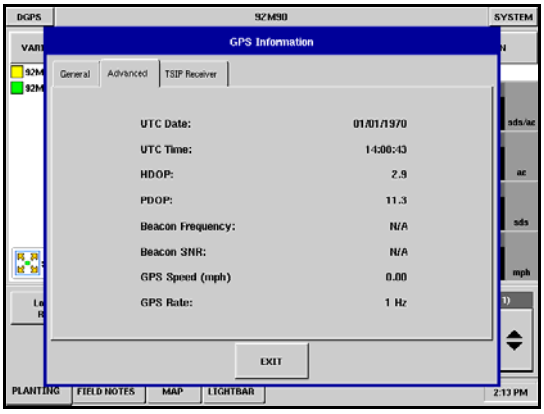
Tabs under the **DGPS** button display detailed information about the GPS signal and receiver.

General Tab



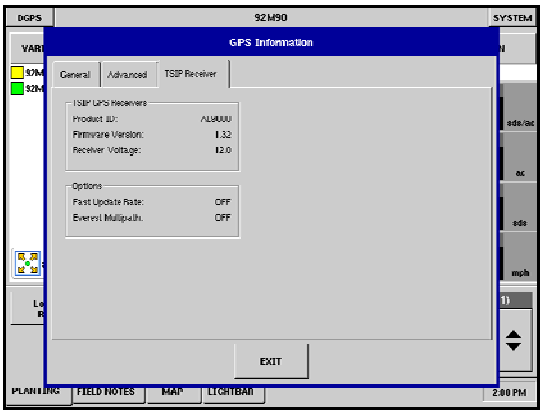
The general tab displays current position (latitude and longitude), elevation, direction of travel (heading), number of satellites currently being used by the receiver and differential status. The differential status will display its source if differential is acquired and a TSIP receiver is being used. To view the messages coming from the receiver press the **View Messages** button.

Advanced Tab



The advanced tab displays more diagnostic information about the GPS receiver. The Universal date and time, position errors (HDOP, PDOP), GPS speed and update rate are displayed for receivers. If the receiver is using Beacon as its differential source, the frequency and signal to noise ratio (SNR) will be displayed.

TSIP Receiver Tab



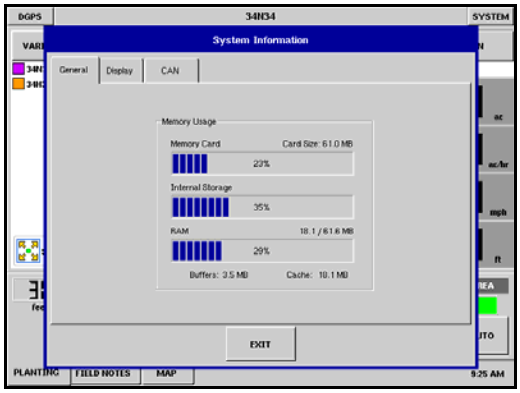
If a TSIP receiver is being used, the TSIP Receiver tab will display its diagnostic's. The receiver's product I.D., firmware version and voltage are displayed in the top frame. The options frame displays whether fast update rate or Everest multi-path are enabled.

RUN – SYSTEM

SYSTEM

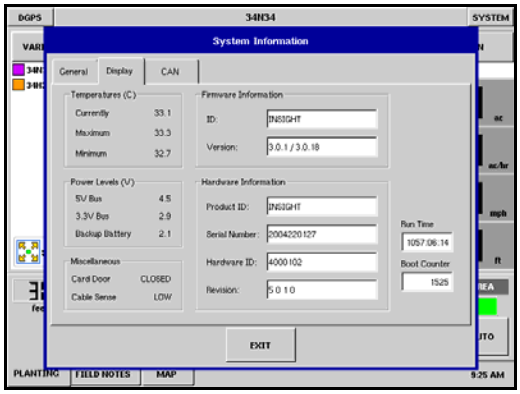
The system button displays system diagnostics.

General Tab



The general tab contains information about the memory card and display internal memory. The progress bars display percentage of used memory.

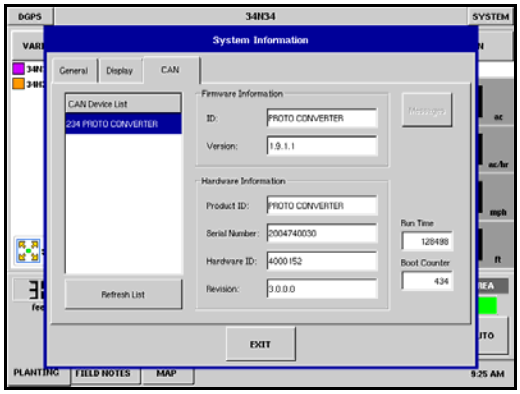
Display Tab



The display tab shows general and diagnostic information about the "7" display.

- The firmware and hardware information frames display version numbers for the display and it's internal hardware.
- The temperatures frame displays information about the internal temperatures of the display.
- The power levels frame shows voltage in the CAN cabling and the backup battery inside the display. The backup battery insures a clean shutdown if power is lost to the display.
- The Miscellaneous frame displays Card Door status and sensing of cables.
- The run time box shows how long the display has been run in hours, minutes and seconds.
- The boot counter shows how many times the "7" has been turned on.

CAN Tab



The CAN Device List displays the modules that are on the CAN Bus. To refresh the list and see if any new modules are recognized press the **Refresh List** button. The firmware and hardware information frames display the firmware and hardware versions for the selected module. The run time box shows how long the module has been run and the boot counter box shows how many times the module has been started up.

* LAM Diag, Spreader Diag, Liquid Diag, & Input Diag not shown.

RUN – APPLICATION – PRESCRIPTIONS

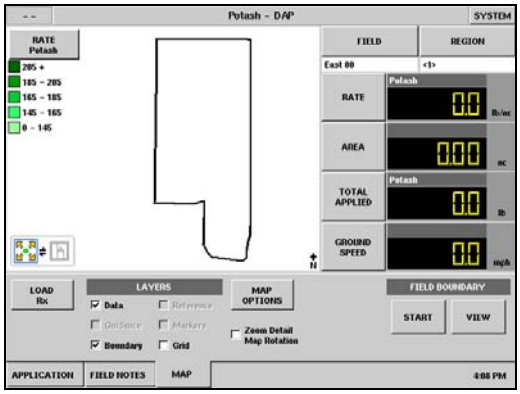
APPLICATION

Load Rx

Variable Rate File Basics

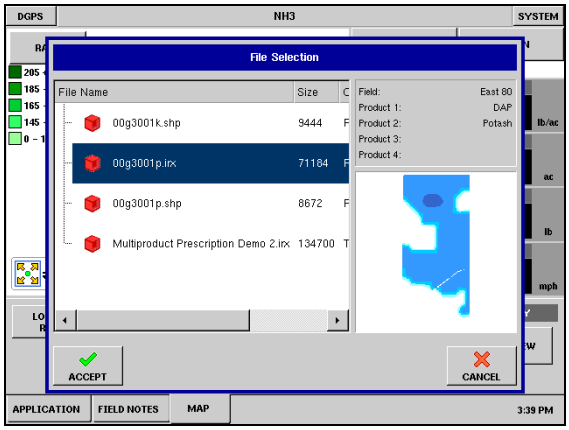
The "7" system supports applying product based upon GPS referenced recommendation files. Product recommendation files are stored on **root** (not placed inside any folders) of the external storage card. Variable rate application files are loaded from the Application Tab of the Run Screen. When a Rx file is loaded, the system defaults to controlling product application based upon the target rates from the Rx file.

Loading Prescription Files



Press the **LOAD Rx** on the Application tab of the Run Screen to load a variable rate prescription file.

Selecting Rx Files

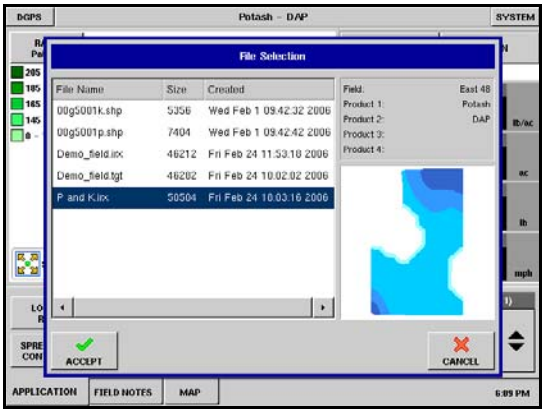


The file selection dialog shown at left displays all product recommendation files that are available for selection from the external storage card.
NOTE: All Rx files must be stored on the root of the external data card. If Rx files are placed inside a folder on the card they will not be shown for selection.

RUN – APPLICATION – PRESCRIPTIONS

Rx File Formats

The "7" system supports the use of three different variable rate file formats. Descriptions of each of these file formats is outlined below.



File Selection Dialog

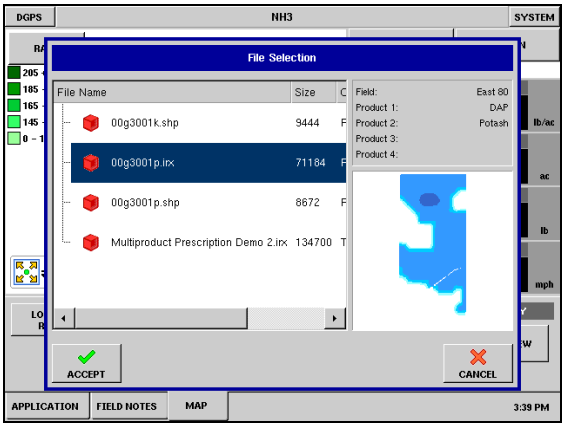
Rx File Format	Description
*.irx ("7" Rx File)	The *.irx file is a new format designed specifically for use in the "7" system. The *.irx file supports multiple product recommendations in a single file.
*.tgt (Target File)	The *.tgt file format is limited to one product recommendation per file.
*.shp, *.dbf, *.shx (Shape Files)	What is commonly called a shape file is actually a collection of three different files. All three of the files are required and must be present on the external storage card for the system to use shape file groups for variable rate product application. A single "shape file" can contain recommendation rates for multiple products.

RUN – APPLICATION – PRESCRIPTIONS

Irx File Use

A single *.irx file can contain recommendation rates for multiple products.

Step 1: Rx File Selection

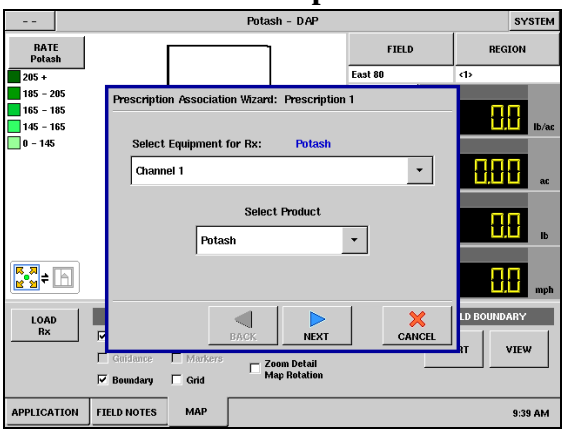


Press **LOAD Rx** on Application tab of Run Screen to load a variable rate prescription file.

Select the desired *.irx file from the File Selection list.

Press **Accept**.

Step 2: Select Product Component



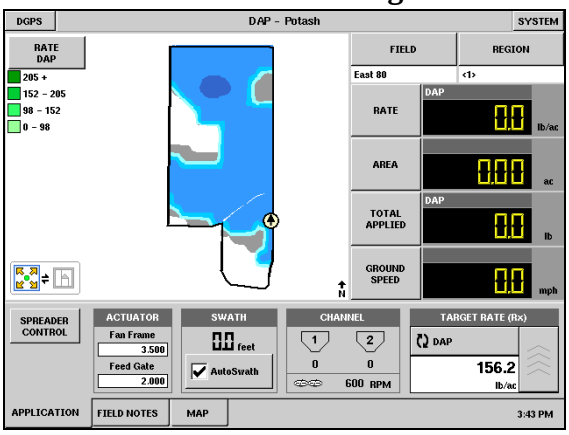
Select the control channel that will dispense the product (potash in this instance) from the top list.

Select the product, corresponding to the units for which the Rx map was exported, from the bottom list box. Example: The map could have been made to represent pounds of potash or pounds of actual potassium (K).

Press **Finish** to continue.

If a multi-product file is being used, repeat this step for all channels of product control.

Step 3: Run Screen After Loading Rx File



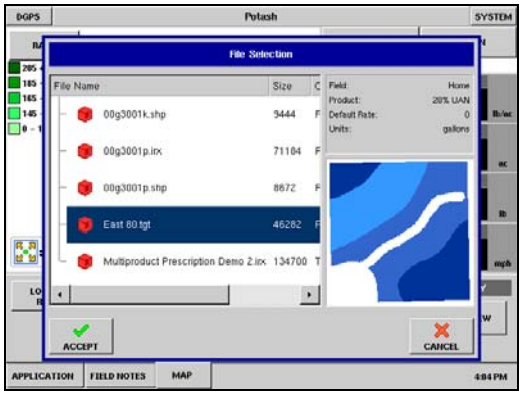
Run Screen shown at left after loading a product recommendation file for potash.

RUN – APPLICATION – PRESCRIPTIONS

Tgt File Use

The "7" system can use the *.tgt file format for controlling single product variable rate application.

Step 1: Rx File Selection

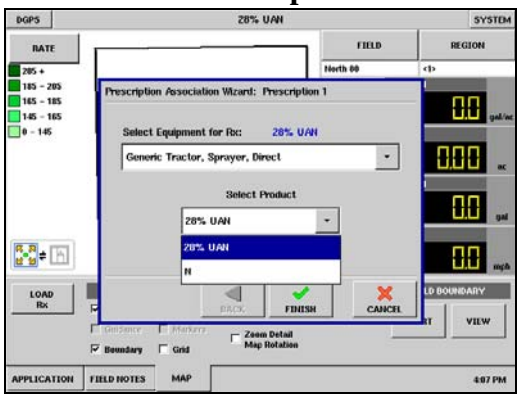


Press **LOAD Rx** on Application tab of Map Tab to load a variable rate prescription file.

Select the desired *.tgt file from the File Selection list.

Press **Accept**.

Step 2: Select Product Component

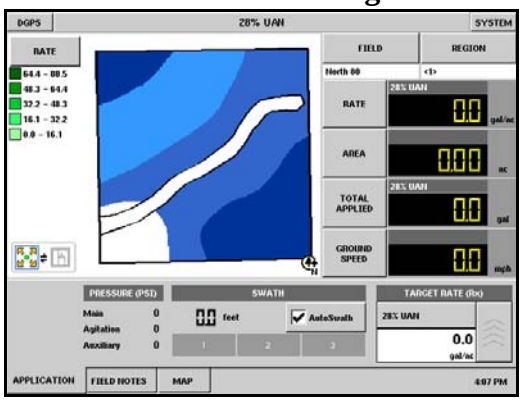


Select the control channel that will dispense the product (28% in this instance) from the top list.

Select the product, corresponding to the units for which the Rx map was exported, from the bottom list box. Example: The map could have been made to represent gallons of 28% UAN or pounds of actual nitrogen.

Press **Finish** to continue.

Step 3: Run Screen After Loading Rx File

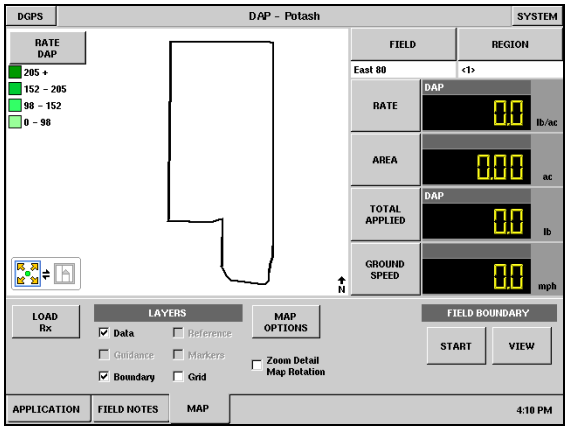


Run Screen shown at left after loading a product recommendation file for 28% UAN.

RUN – APPLICATION – PRESCRIPTIONS

Shape File Conversion

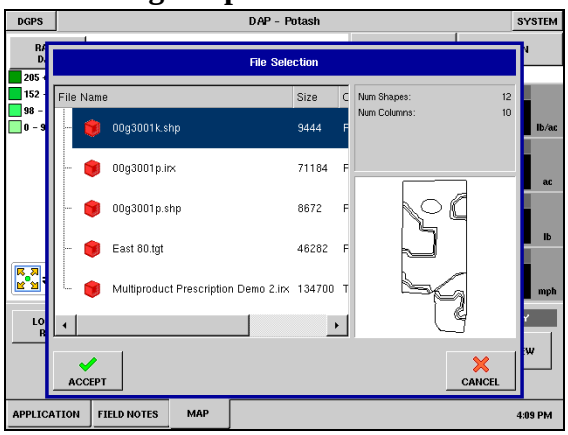
Step 1: Run Screen



View of Run Screen prior to loading a prescription map file.

Press **LOAD RX** to start process of converting a shape file group to an *.irx file.

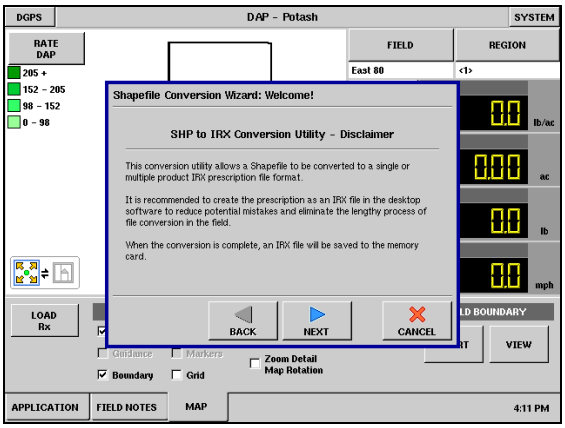
Step 2: Selecting Shape File



Select desired file for conversion.

Press **ACCEPT** to continue.

Step 3: Screen Instructions

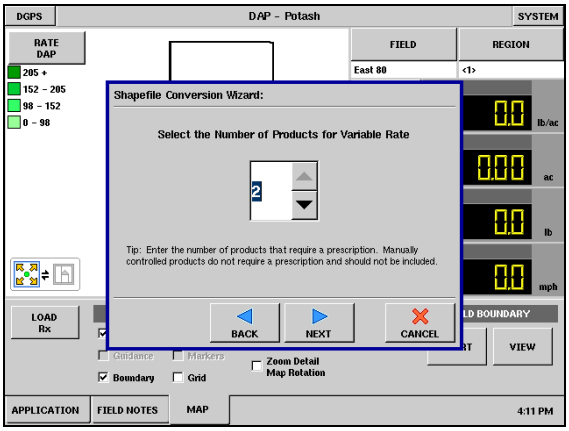


Read instructions and disclaimer regarding shape file conversion process. Knowledge of the column name containing the product recommendation is required to complete this process.

Press **NEXT** to continue.

RUN – APPLICATION – PRESCRIPTIONS

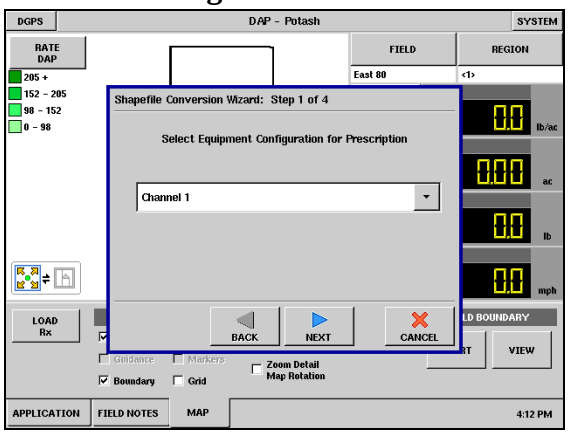
Step 4: Select Shape File



Press arrow buttons to select number of products to be applied (shape files to be converted).

Press **NEXT** to continue.

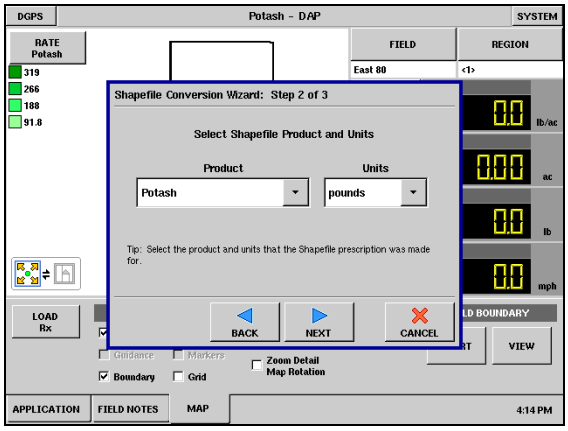
Step 5: Select Configuration



Select Configuration (Bin) from which product will be applied for the selected Prescription file.

Press **NEXT** to continue.

Step 6: Product And Units Selection



Select the Product for which the Rx map was exported from the drop-down list
NOTE: In this example, the recommendation could have been generated to represent units of Potash or K.

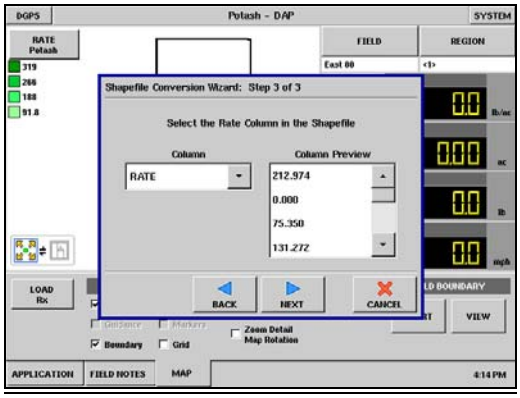
Select controlling Units for product application.

Press **NEXT** to continue.

RUN – APPLICATION – PRESCRIPTIONS

IMPORTANT!	Selection of the wrong data column or unit will result in misapplication of product.

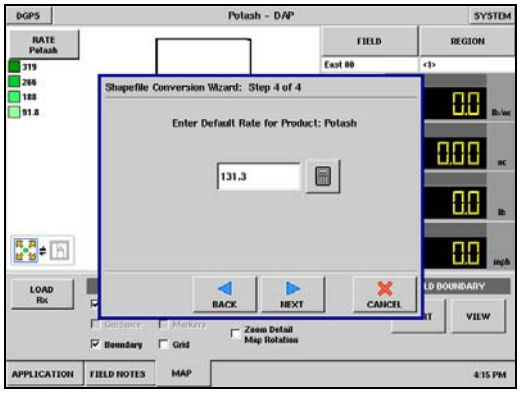
Step 7: Select Data From Shape File



Select the Column that contains the product application recommendation rate from the drop-down list on the left. The list on the right shows sample data from the selected column. (This selection is dependent on shape file creation software.)

Press **NEXT** to continue.

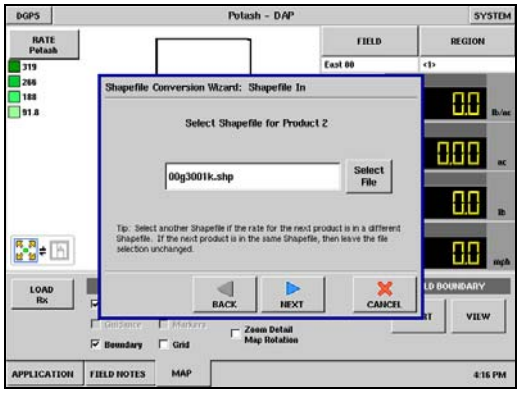
Step 8: Default Rate Setting



The system assigns a default rate. Press the keyboard to edit the value as desired.
NOTE: The default rate is only used during product application when the vehicle exits a mapped field area if the Rate Outside of Field selection is set to "TGT Default". This setting is located under Setup\Application\Configuration Settings\Edit Settings.

Press **NEXT** to continue.

Step 9: Additional Product Shape File Selection



Press **Select File** button to convert additional product shape files.

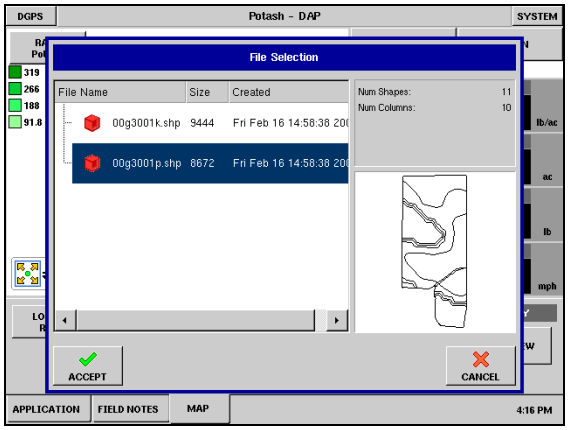
IMPORTANT!

Failure to complete file selection process for each product will cause the initial file selected to be used to apply additional products. The proper file must be selected for each product applied. Otherwise, misapplication of product will occur.

Press **NEXT** to continue.

RUN – APPLICATION – PRESCRIPTIONS

Step 10: Selecting Shape File



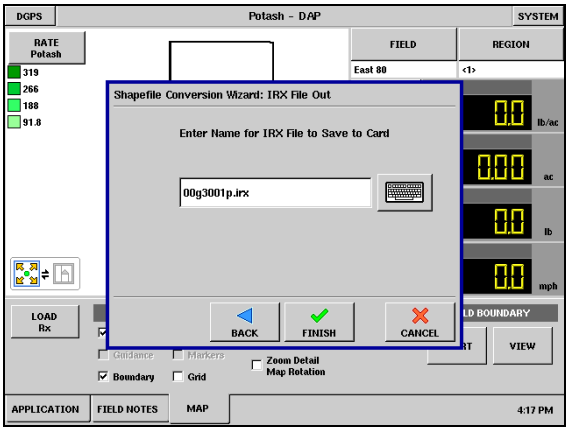
Select desired file for conversion.

Press **ACCEPT** to continue.

Repeat steps 5 through 8 for second product.

Repeat steps 9 and 10 for each additional product.

Step 11: Name New IRX File

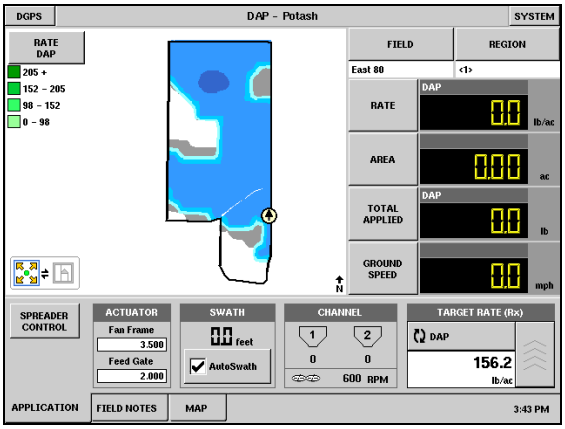


Press keyboard to rename newly created *.irx file if desired.

Press **FINISH** to complete shape file conversion.

NOTE: *.irx file should be used for subsequent applications of these products in this field.

Step 12: Conversion Completed



View of Run Screen showing product recommendation file.

RUN – APPLICATION – SPREADER CONTROL

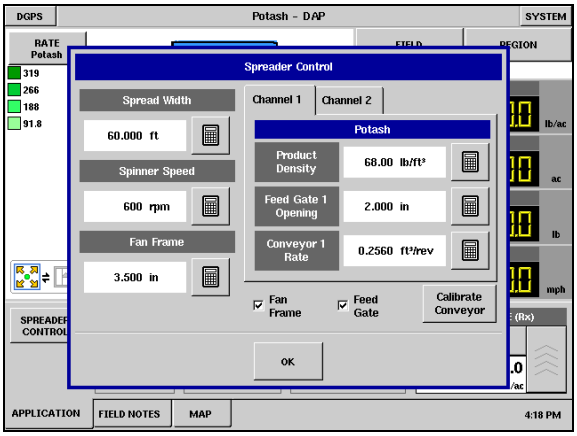
Spreader Control

Overview

This section covers spreader calibration settings. Refer to the applicator setup and spread pattern testing manuals to understand each settings impact on accurate product application and machine performance.

IMPORTANT!	The Spread Width, Spinner Speed and Fan Frame settings can only be accurately determined by performing a spread pattern catch test. The Conveyor Rate setting can only be determined using Calibrate Conveyor function.

Spreader Screen for Single Product Granular Application



IMPORTANT!	Changing Spreader Control settings in the "7" display does not make the needed adjustments on the spreader unless indicated below. Actual spreader settings must be verified, and "7" values changed accordingly, prior to product application.

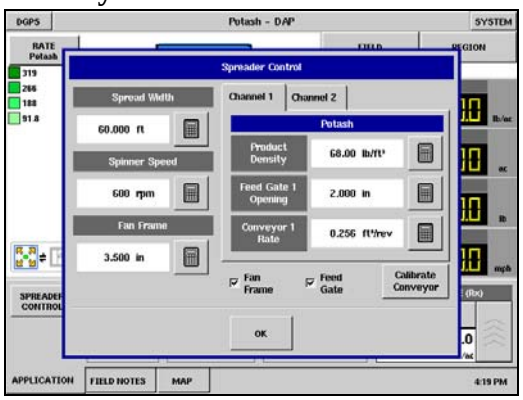
Setting	Description
Spread Width	Represents the effective width of material being applied.
Spinner Speed	Represents the spinner speed required for accurate product placement in relation to the spread width setting. NOTE: The spinner speed will be controlled automatically based upon this setting when system uses optional PWM spinner speed control valve.
Fan Frame	Represents the fan frame position required for accurate product placement in relation to the spread width setting.
Product Density	Density of product as measured by an appropriate scale.
Feed Gate 1 Opening	Represents the feedgate opening being used for product application. Measure the depth of product on conveyor to ensure accurate feedgate setting value.
Conveyor 1 Rate	Represents the volume of product dispensed during one revolution of the conveyor drive shaft.

RUN – APPLICATION – SPREADER CONTROL

Conveyor Calibration

This section outlines the conveyor discharge calibration process for a granular product control channel. This process must be performed for each control channel of the equipment configuration.

Step1: Conveyor Calibration



Press **Calibrate Conveyor** to start the Conveyor Rate calibration routine.

Step 2: Conveyor Calibration

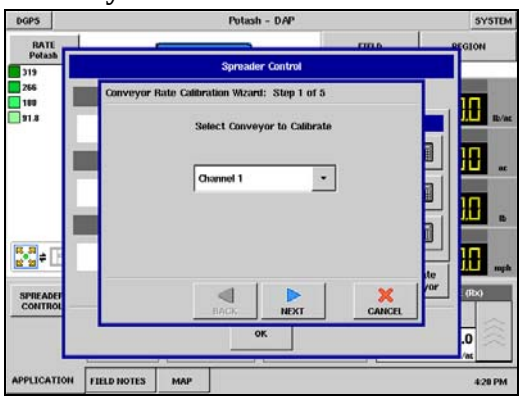
The system will present a warning to disable the spinner hydraulic circuit.

WARNING

Manually disable or shut off the spinner hydraulic circuit. If spinner runs unexpectedly, injury could occur.

Press **OK** to continue after hydraulic circuit is disabled.

Step 3: Conveyor Calibration

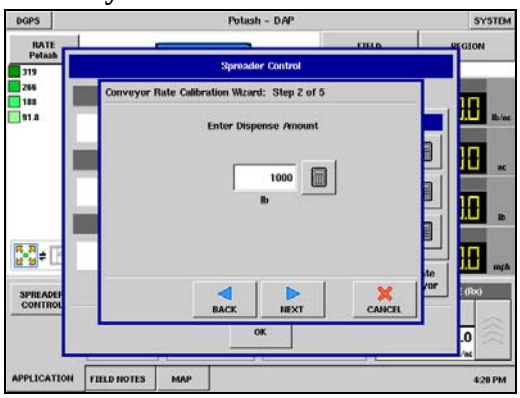


On multiple product machines, select the product control channel to be calibrated.

Press **NEXT** to continue.

RUN – APPLICATION – SPREADER CONTROL

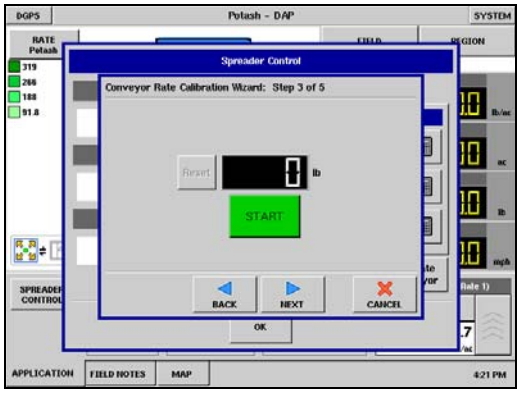
Step 4: Conveyor Calibration



Enter desired target amount of product to dispense (500 pounds minimum).

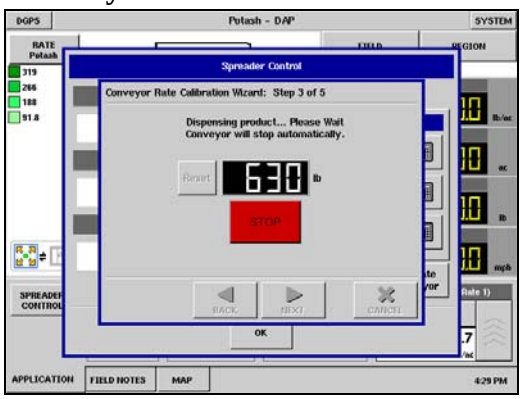
Press **NEXT** to continue.

Step 5: Conveyor Calibration



Press **START** to begin dispensing product.

Step 6: Conveyor Calibration

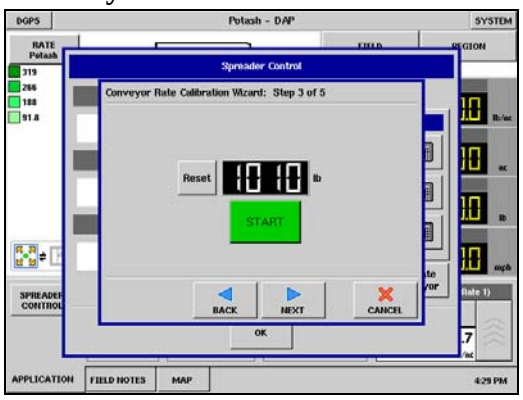


The conveyor will stop when the system perceives the target amount of product has been dispensed.

STOP can be pressed at any time to manually shut off the conveyor.

RUN – APPLICATION – SPREADER CONTROL

Step 7: Conveyor Calibration

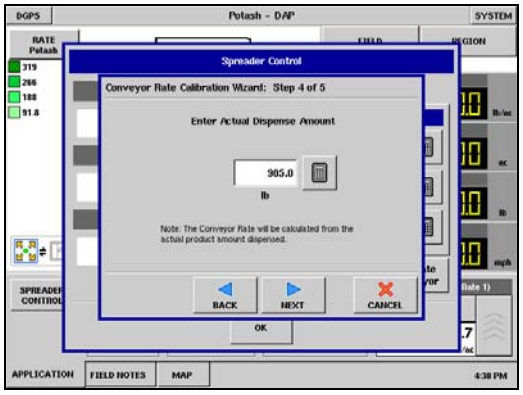


Screen after dispensing perceived target amount.

This value can be reset and the process started again for a larger sample size if desired.

Press **NEXT** to continue.

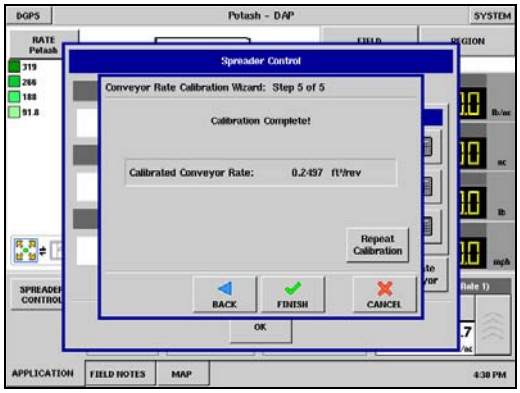
Step 8: Conveyor Calibration



Enter actual weight of product dispensed.

Press **NEXT** to continue.

Step 9: Conveyor Calibration



Screen displaying new calibration number.

- Press **CANCEL** to exit calibration without saving the value.
- Press **Repeat Calibration** to begin the process again.
- Press **FINISH** to save the value and exit the calibration routine.

RUN – APPLICATION – SPREADER CONTROL

⚠	**WARNING**	Make sure spinner is free of material before restarting the spinner hydraulic circuit.

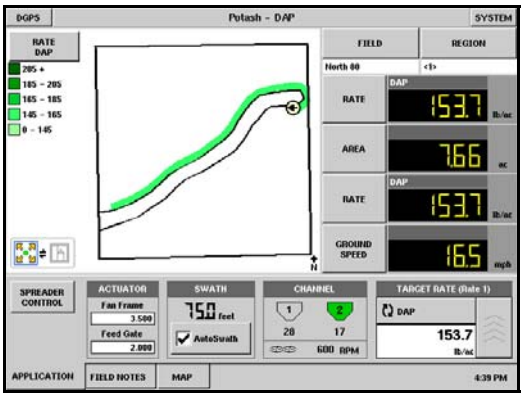
Completing Conveyor Calibration

A warning will display when exiting the calibration wizard instructing the user to return spinner control hydraulic circuit to a field ready condition.

RUN – APPLICATION – SWATH CONTROL

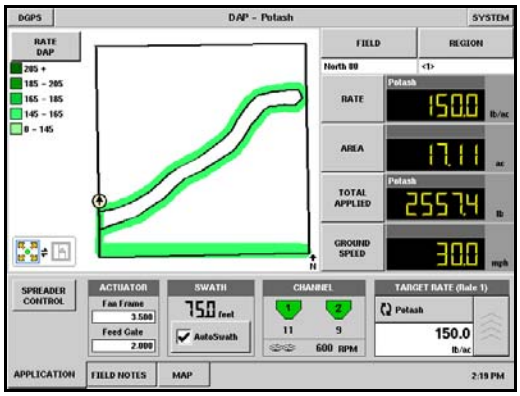
Swath Control

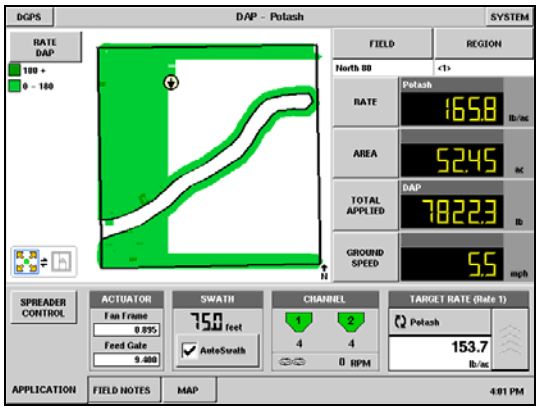
Check the Auto Swath box to allow the system to control product application automatically.



The Auto Swath feature for Direct Command will automatically turn the spreader on and off when an inner or outer boundary, or a previously applied area is crossed. Although Auto Swath does not require a boundary, it is strongly recommended.

NOTE: The spreader will stop application when the swath is completely out of the rate area and will start again as soon as any of the swath is in the rate area.

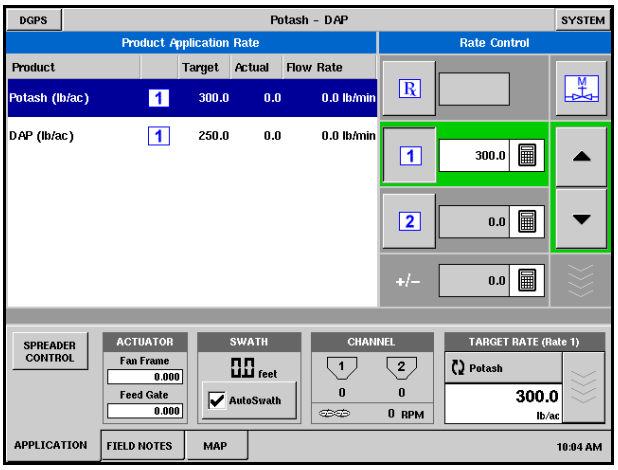




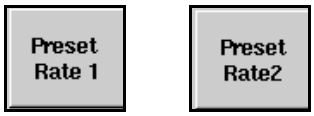
RUN – APPLICATION – TARGET RATE

Target Rate

Press the located at the lower right on the run screen to open the **Target Rate** settings screen.



Application Target Rate Screen

Item	Description
	Control product application based on target rates read from a GPS referenced prescription map.
	Control product application based on one of two user defined preset target rates. When **Preset Rate 1** or **Preset Rate 2** is selected, target application rate can be incremented up or down by pressing on the arrow keys below the **Manual Valve Control** button.
	Control product flow volume/minute manually without corrections for ground speed or active swath width. Press the up or down arrows to change product flow volume/minute. This product flow rate will be maintained until **Rx Rate**, **Preset Rate 1** or **Preset Rate 2** is selected.
	This area is used to set the application rate change for selected product. Press +/- and calculator button to enter appropriate quantity.

IMPORTANT!	Manual Valve Control use could result in misapplication of product.

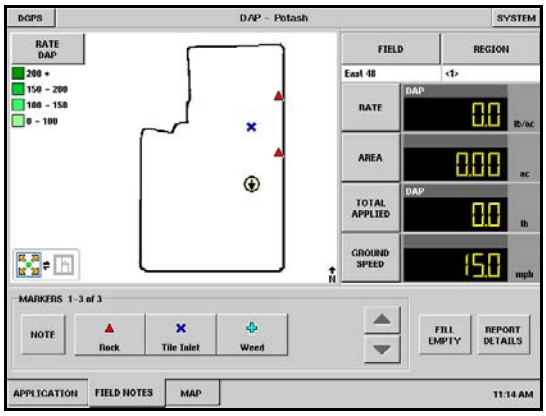
RUN – FIELD NOTES

FIELD NOTES

Markers

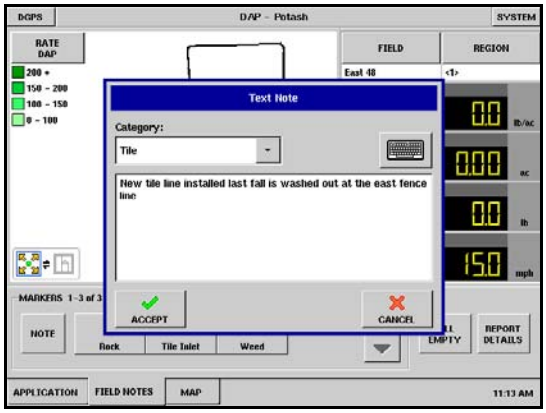
The Field Notes tab contains functionality to mark points and attach text memos to points in a field at the Run Screen. The Field Notes information is stored in the "7" data log file for use desktop GIS software.

Markers Created At Run Screen



Press a Markers button to map points data in the field. The example at left shows a field with two rocks and one tile inlet mapped. Markers are defined under *Markers* in "Setup – Field Notes" section.

Field Notes Text Memo



Press **NOTE** button to launch on-screen dialog that attaches a text memo to the current field location.

Multiple text memo items can be created in each field.

Select type of Text Note from items in Category list box. Pre-defined types available are: General, Pest, Weed, Field and Tile.

Press keyboard to enter text note.

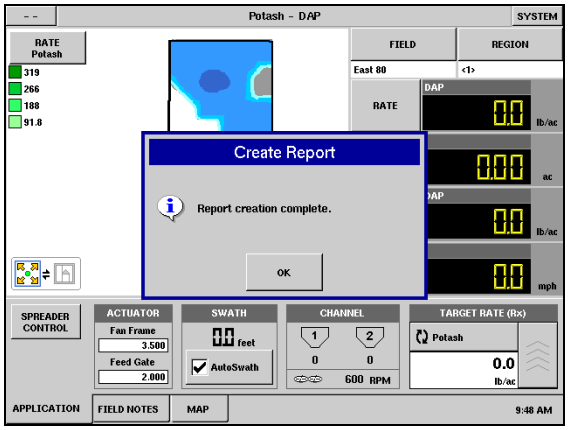
Press **ACCEPT** to finish.

RUN – FIELD NOTES

Application Reports

Auto Generate Reports

Report Details - General



To have the "7" system automatically generate application reports:

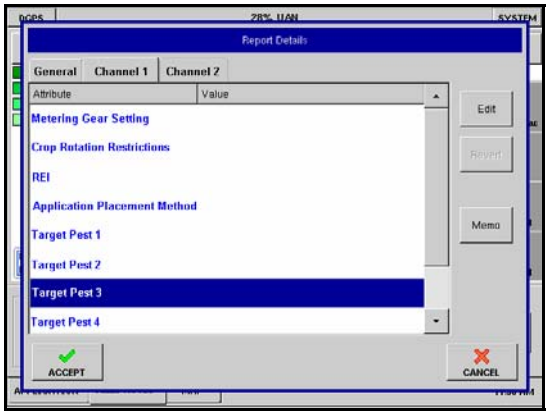
Select both Auto Generate Report and Prompt for Report Details under Setup\Field Notes\Reports.

The **Report Details** screen shown at left will display when a new product application is started and each time a new region is created. Select the report item and press the **Edit** button to change the information.

Select the **General** tab to enter the following:

- Crop information
- Application timing
- Weather information
- Soil condition

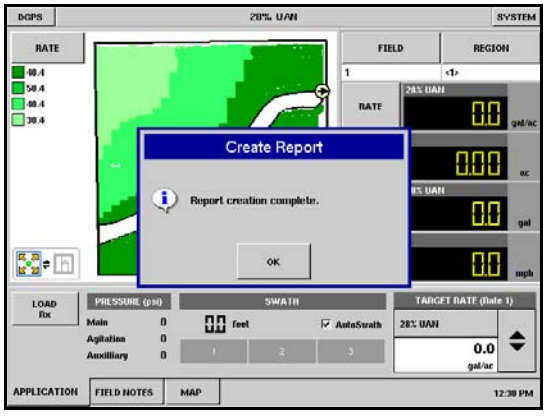
Report Details - Configuration



An **Equipment Configuration** tab will be present for each control channel setup for the current configuration. Select a channel to enter the following:

- Machine and equipment information
- Product REI and rotation restriction
- Application placement method
- Up to four target pests for the product being used

Report Completed



All common information (blue text) is entered at the same time when multiple control channels are in use. Multiple instances of data can be entered by creating new regions within the field. For example: multiple instances of weather data may be entered when a product application is completed over the course of multiple days.

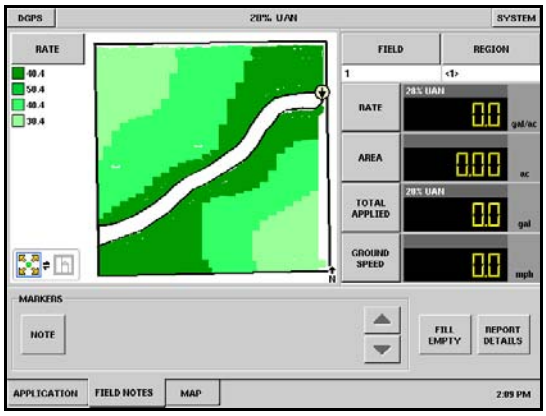
An application report will be saved to the external memory card each time the field operation is changed. This file is in pdf format. The "7" will display when file has been successfully saved to card.

Press **OK** to start setting up a new field operation.

RUN – FIELD NOTES

Manually Create Reports

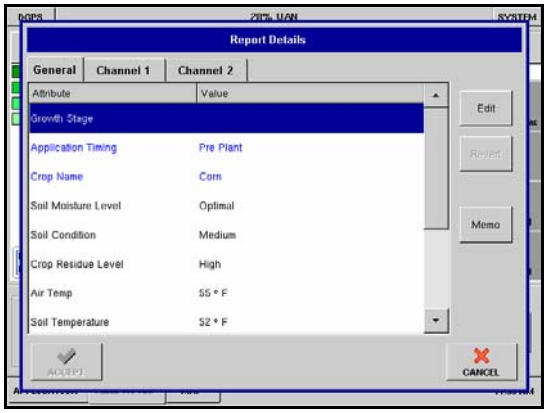
Step 1: Field Note Tab



To manually create an application report:

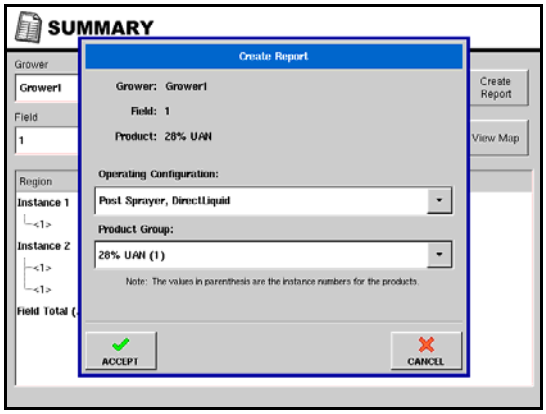
Press **REPORT DETAILS** button on Field Notes screen.

Step 2: Report Details Dialog



Enter report information and press **ACCEPT** to store the information in the "7" system and return to the Run Screen.

Report Generated At The Run Screen



Manual creation of individual reports is done at the Summary Screen. Select the correct **Grower** and **Field** from the drop-down lists and press **Create Report**.

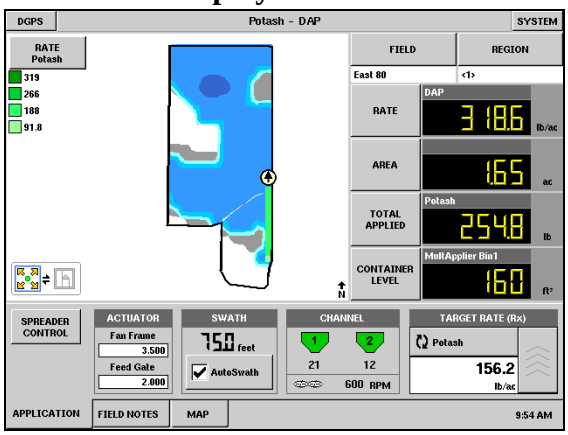
Select **Operating Configuration** and **Product Group** from drop-down lists.

Press **ACCEPT** to save application report to external memory card. This file is in pdf format. The "7" will display when file has been successfully saved to card.

RUN – FIELD NOTES

Container (Bin) Level Tracking

Container Level Display Item

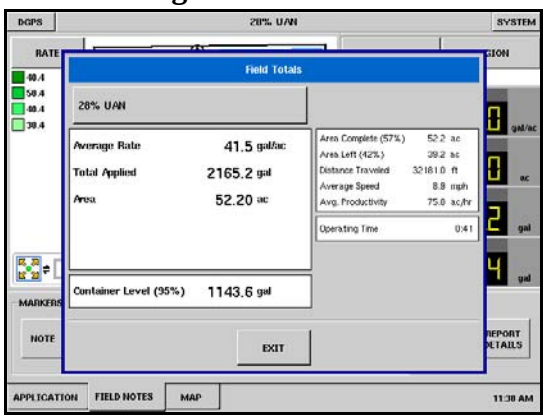


To monitor product level:

Press **FILL EMPTY** button on Field Notes tab.

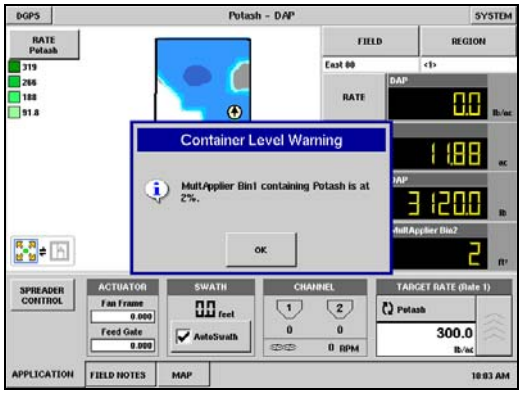
View of Run screen with **CONTAINER LEVEL** as a display item.

Field Totals Dialog



Press the **FIELD** button while data is being logged in the field to show **Field Totals** dialog.

Low Container Level Warning

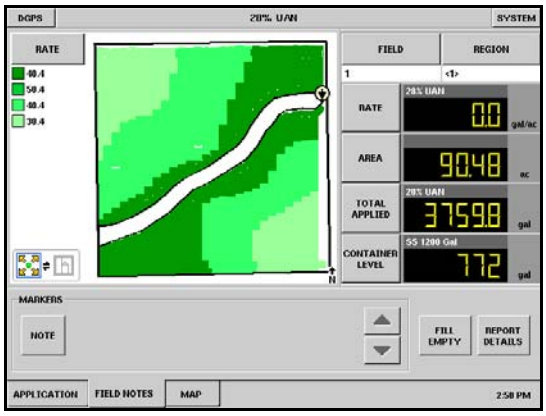


Container Level Warning appears when product in bin is down to 10% of the container capacity.
NOTE: Optional bin sensor provides same warning when product falls below sensor.

RUN – FIELD NOTES

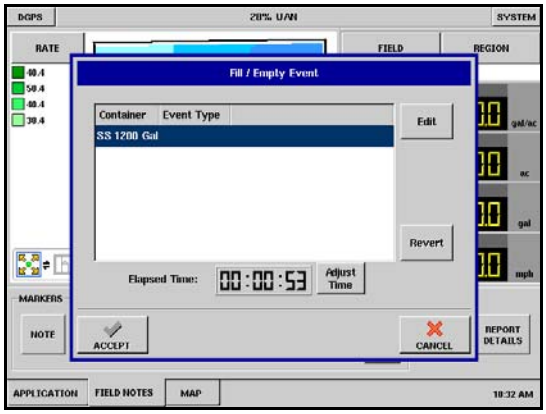
Fill/Empty Events

Step 1: Field Notes Tab



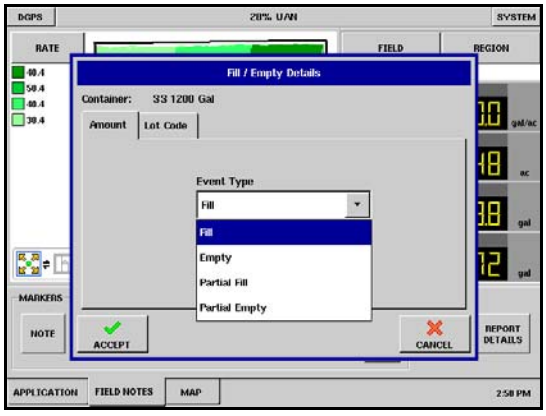
Press **FILL EMPTY** button to display container Fill Empty Event screen.

Step 2: Fill /Empty Event Dialog



Select container and press **EDIT** to change container level.

Step 3: Fill/Empty Types



Select one of the following from drop-down list:

Fill: Fill bin to maximum level.

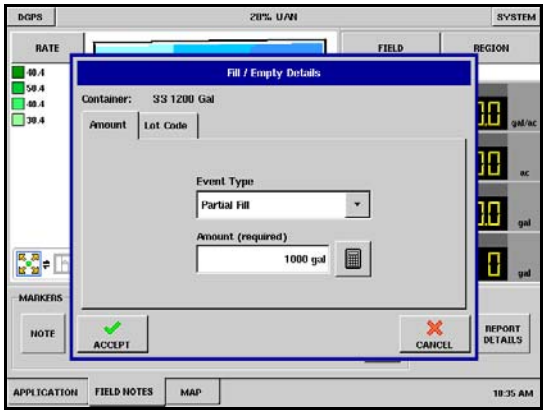
Empty: Remove all remaining volume from bin.

Partial Fill: Add a volume to a bin to bring the bin level to some point less than full.

Partial Empty: Remove a portion of the remaining volume in the bin.

RUN – FIELD NOTES

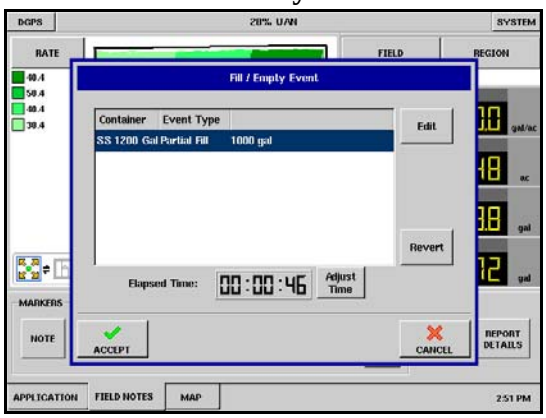
Step 4 :Partial Fill Event



Enter Amount if Partial Fill or Partial Empty Event.

Press **ACCEPT** to continue

Step 5: Fill Event Summary



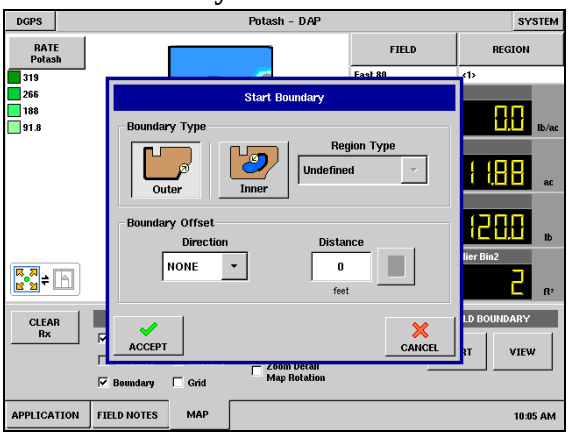
Fill/Empty Event screen shown at left after adding a partial fill.

Press **ACCEPT** to return to Run Screen.

RUN – MAP

FIELD BOUNDARY

Start Field Boundary



To create a Field Boundary:

Press Start under Field Boundary.

Select either **Outer** or **Inner** Boundary Type. If Inner boundary is selected, a Region Type may be selected. The Region Type describes what the Inner boundary is surrounding.

The Boundary Offset creates the boundary at a specified distance away from the GPS antenna. Select **Direction** of offset and press keypad to enter **Distance** from antenna.

Press **Accept**.

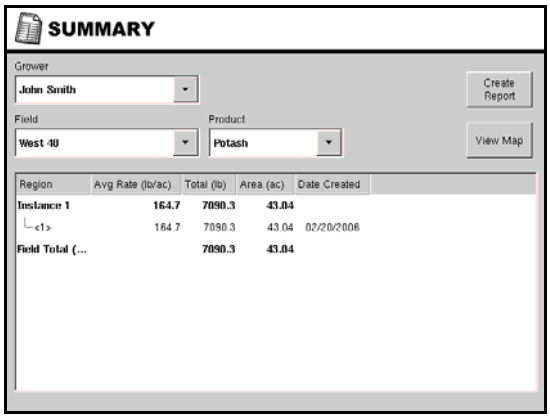
MAP OPTIONS

Item	Description
Clear Map	Press to clear the map from the current operation. The following warning will appear:
	IMPORTANT! Clear Map – Are you sure you want to clear this map? This operation cannot be undone. ACCEPT/CANCEL
Clear Marks	Press to clear all field marks from the current operation map. The following warning will appear:
	IMPORTANT! Clear Marks – Are you sure you want to clear field marks? This operation cannot be undone. ACCEPT/CANCEL

SUMMARY

OVERVIEW

View data summary reports of specific applications for selected Grower, Field and Product.



Summary Screen

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Summary Button	Description
Create Report	Press Create Report to save report for a specified application to an external memory card. This report will be saved in .pdf format.
View Map	Press View Map to view rate and coverage map for a specified application.

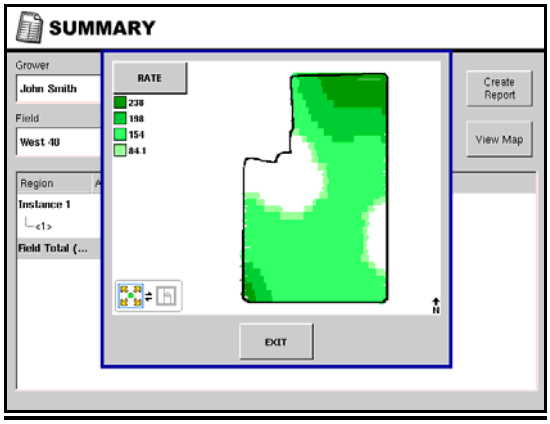
SUMMARY

CREATE REPORT

See *Manually Create Reports* in "Run – Field Notes" section for detailed step-by-step instructions.

VIEW MAP

Select Grower, Field and Product from drop-down lists and press View Map to view rate and coverage map for specified application.

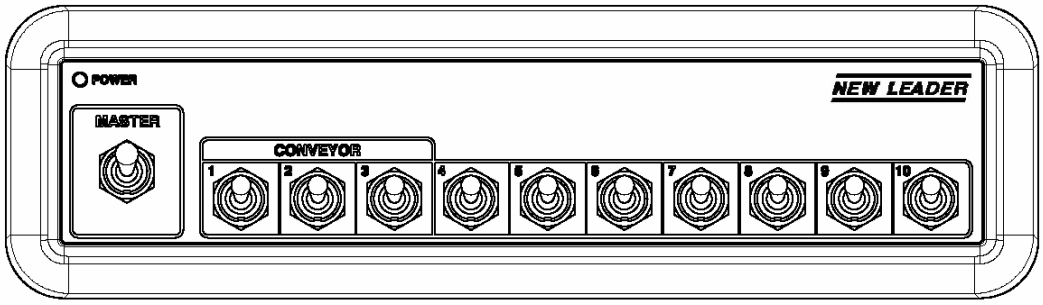


View Map Screen

OPERATING PROCEDURES

REMOTE SWITCH

The "7" conveyor switch, or an optional remote conveyor switch or pedal, is used to control conveyor operation. The up position turns conveyor on. The down position turns conveyor off.



Multi-Channel Switch

To operate conveyors with the multi-channel switch:

Individually
a) Turn on MASTER switch.
b) CONVEYOR 1 switch controls Channel 1 (main) conveyor.
c) CONVEYOR 2 switch controls Channel 2 (insert) conveyor.
d) CONVEYOR 3 switch controls Channel 3 conveyor.

Together
a) Turn on corresponding CONVEYOR switches.
b) Use MASTER switch to control all conveyors in On position.

To operate conveyors with an optional remote switch or pedal, see *Auxiliary Input Settings* in "Setup – Application – Configuration Settings" section.

TROUBLESHOOTING

Problem:	Cause/Solution:
Power switch is turned ON, display is blank	1. Check fuse. 2. Check battery connections. 3. Check cable connections at modules and console. 4. Check vehicle battery.
Display is difficult to read	1. Adjust backlight brightness. 2. Temperature below –20°C, allow unit to warm. 3. Temperature above 60°C, cool console.
Conveyor starts to run when PTO is engaged	1. Faulty motorized valve. Check valve adjustment. 2. Check cable connections. 3. Faulty module. Contact dealer. 4. Make sure hydraulic pump flow is not too high. 5. Faulty radar. Check for ground speed on main screen.
Conveyor does not run when PTO is engaged	1. Check cable connections. 2. Check configuration setting application rate and width. 3. No ground speed. Check for speed on main screen.
No spinner RPM	1. PTO not engaged. 2. Check spinner sensor cable connections. 3. Check spinner sensor clearance to bolt head of fins. Clearance must be 1/8" or less. 4. Faulty sensor. Contact dealer. 5. Faulty PWM coil. Set spinner control valve manually per Appendix Y. 6. Spinner valve type setting under the Settings – Application - Controller screen is set to "Manual" instead of PWM.
Spinner speed will not stay constant at the target speed	1. Requires optional PWM spinner valve. 2. Check that "Spinner valve type" setting is not "Manual." Change to "PWM". 3. Engine RPM variations @ lower RPMs does not provide enough hydraulic flow to the valve – keep engine speed high enough to provide adequate flow. 4. Check for intermittent operation of speed sensor. 5. Check cable connections. 6. Faulty PWM spool valve. Set spinner control valve manually per Appendix Y.

TROUBLESHOOTING CONTINUED

Problem:	Cause/Solution:
Application rate per acre is incorrect	1. Check that actual feedgate opening matches active configuration setting. 2. Check that actual spread width and driving centers match active configuration setting. 3. Check that actual density of product matches active configuration setting. 4. Check radar calibration and verify ground speed reading. 5. If operating in "Manual", verify vehicle ground speed. 6. Verify rate is correct. 7. Calibrated CFR is incorrect, calibrate conveyor.
DGPS-5000 connected but no "DGPS" displayed.	1. Check cable connection between the auxiliary input module and the antenna. Be sure Lightbar and Antenna connection are not backwards. 2. Vehicle is inside or antenna is mounted in a position that obstructs it from the sky.

INSTRUCTIONS FOR ORDERING PARTS

Order from the **AUTHORIZED DEALER** in your area.

1. **Always give the pertinent model and serial number.**

2. **Give part name, part number and the quantity required.**

3. **Give the correct address to where the parts are to be shipped, and the carrier if there is a preference.**

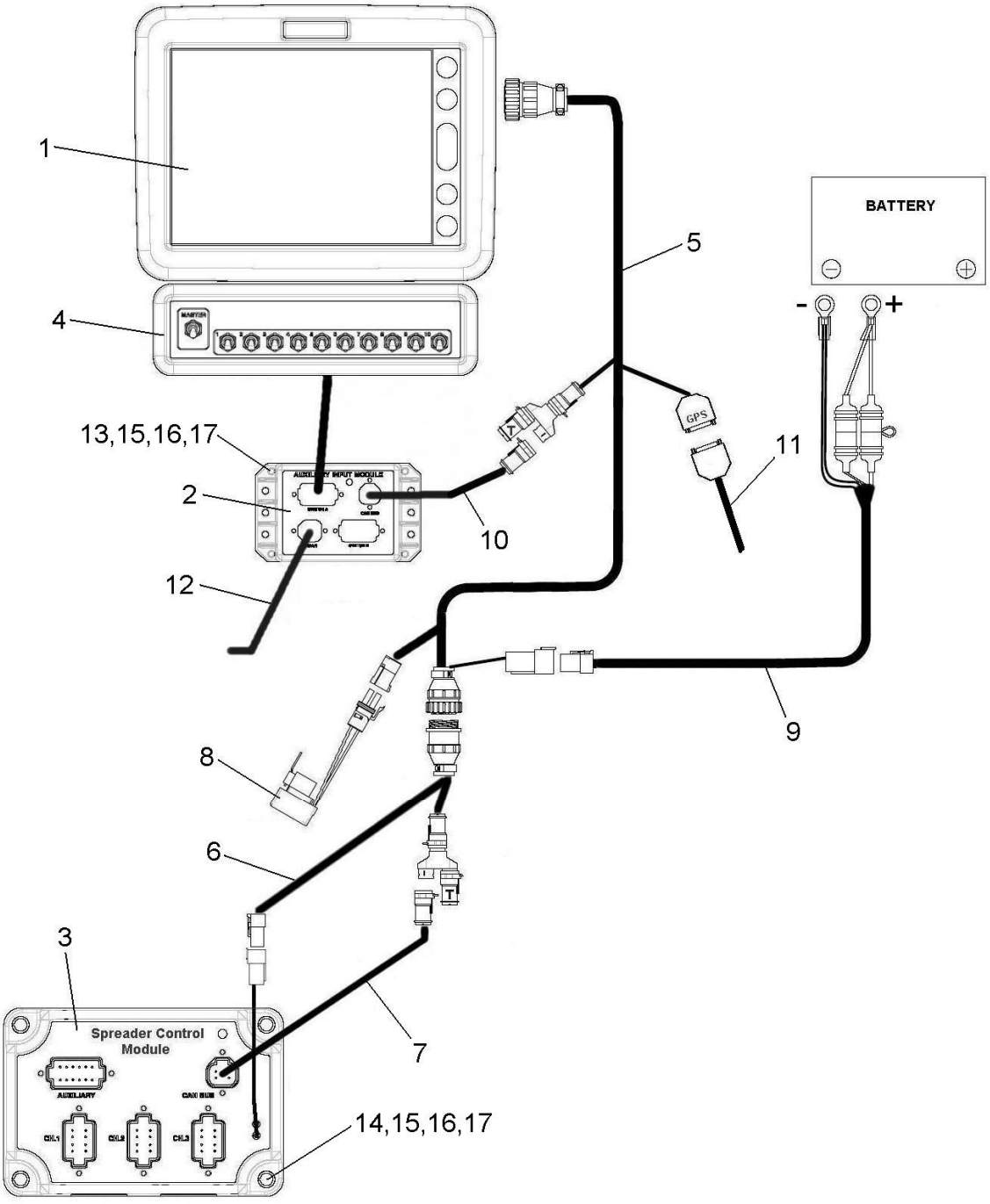
Unless claims for shortages or errors are made immediately upon receipt of goods they will not be considered. Any part returns should be directed through the dealer from which they were purchased.

When broken goods are received, a full description of the damage should be made by the carrier agent on the freight bill. If this description is insisted upon, full damage can always be collected from the transportation company.

No responsibility is assumed for delay or damage to merchandise while in transit. Our responsibility ceases upon delivery of shipment to the transportation company from whom a receipt is received showing that shipment was in good condition when delivered to them, therefore, claims (if any) should be filed with the transportation company and not with Highway Equipment Company.

If your claims are not being handled (by the transportation company) to your satisfaction, please call the Parts Manager at Highway Equipment Company (319-363-8281) for assistance.

NL7 – KIT


1
4
13,15,16,17
2
10
12
5
BATTERY
-
+
GPS
11
9
8
6
3
Spreader Control Module
7
14,15,16,17

NL7 – KIT CONTINUED

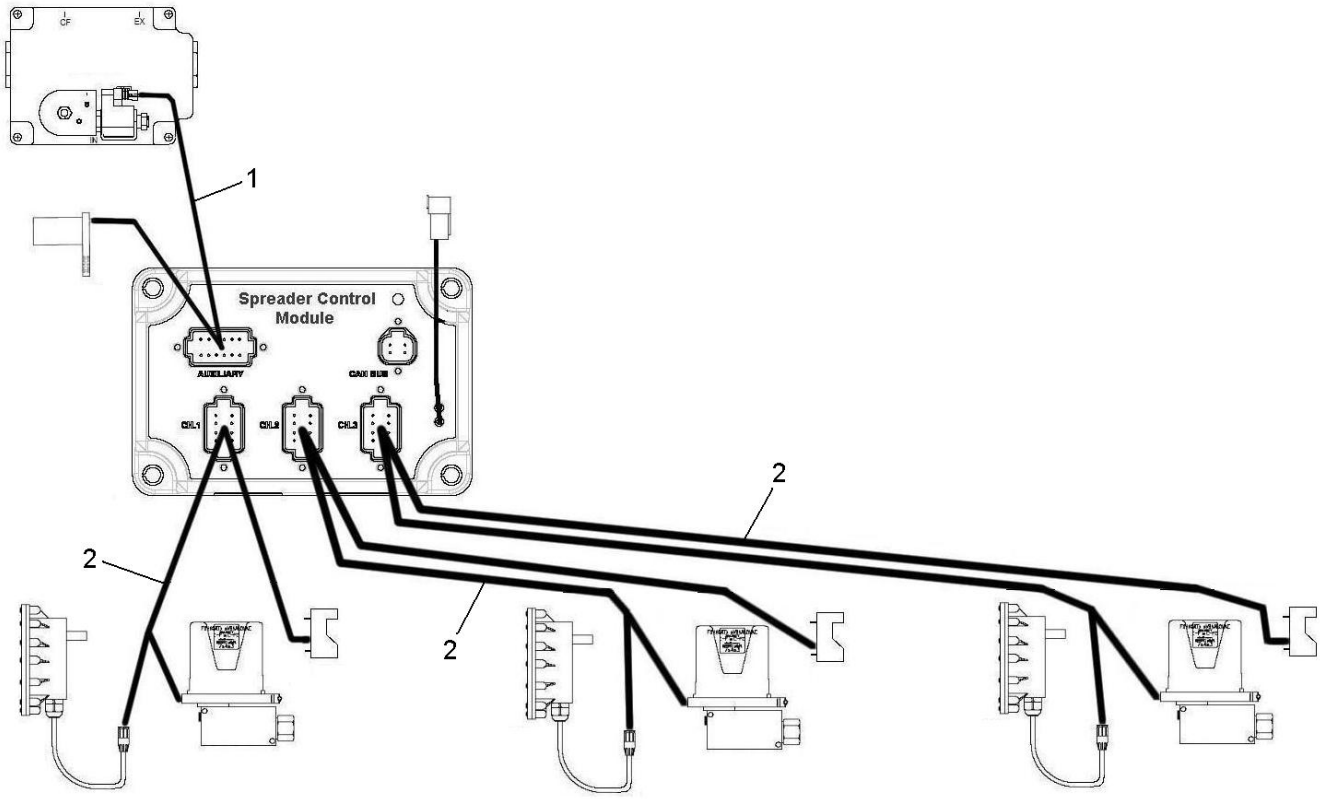
ITEM	PART NO.	DESCRIPTION	QTY
	* 303885	NL7 – Kit Single, Includes 1–17	
	303886	NL7 – Kit Multi-Bin, Includes 1–17	
	303883	Hardware – Kit Spreader Module, Includes 13–17	
1	* 303898	Display – Kit NL7, Single	1
	303899	Display – Kit NL7, Multi-Bin	1
	303910	SMS	1
	303918	Bracket – Post Base/Ceiling	1
	303921	Handle – Display	1
	303923	Bracket – Monitor Plastic	1
	303924	U-Bracket – Assembly Plastic	1
	304007	Flashcard – CF 128 MB	1
	303897	Display – Electronic NL7	1
	304008	Install – Kit Bracket	1
	303913	Instructions – Install Mount	1
	303914	Knob – 1/4-20 Insert	1
	20282	Bolt – Carriage 1/4NC x 5-1/2 GR 2	1
	56312	Screw – Phillips Pan M6-1.0 x 16 SS	4
	207112	Washer – Lock 1/4	4
	303912	Unlock – Multi Product, 303899 Only	1
2	303900	Module – Auxiliary Input	1
3	303878	Module – Spreader	1
4	* 303894	Switch – Master, Single	1
	303909	Switch – Kit, Multiple	1
	304013	Hardware – Kit Switch	1
	304015	Bracket – Angle Switch	2
	20911	Screw – Hex #14 x 3/4	4
	56312	Screw – Phlps Pan M6-1.0 x 16 SS	4
	20710	Washer – Lock 1/4	6
	304014	Bracket – Switch Box Multi-Bin	1
	303906	Console – Switch Multi-Bin	1
5	303901	Cable – Display Harness	1
6	303893	Cable – Implement 1’	1
7	303891	Cable – Canbus Stub 8”	1
8	303905	Relay – Power Control	1
9	303896	Cable – Power Main	1

NL7 – KIT CONTINUED

ITEM	PART NO.	DESCRIPTION	QTY
10	303904	Cable – Canbus Stub 1’	1
11	303902	Cable – Null Modem	1
12	303908	Cable – Radar DJ	1
13	36393	Cap Screw – 1/4NC x 3/4 SS	4
14	41669	Cap Screw – 1/4NC x 1-3/4 SS	4
15	36423	Washer – Flat 1/4 SS	8
16	36418	Washer – Lock 1/4 SS	8
17	36412	Nut – Hex 1/4NC SS	8
18	* 304033-AA	Cable – Power Extension 12’	AR
	* 304033-AB	Cable – Power Extension 24’	AR
19	* 305293	Cable – Power Supply	AR

* - Not Shown AR – As Required

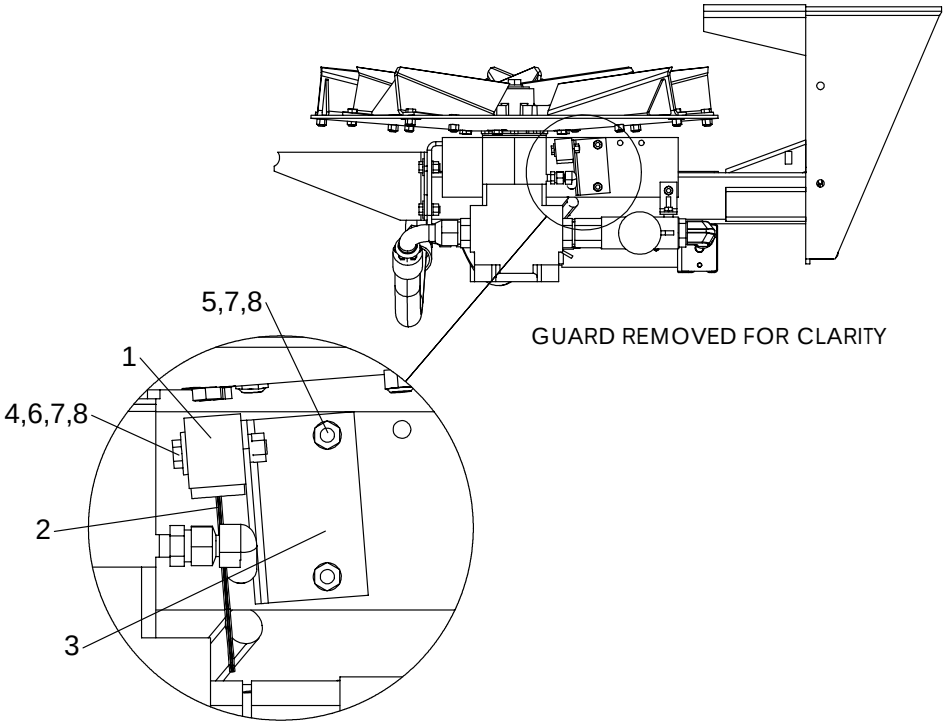
CABLES



ITEM	PART NO.	DESCRIPTION	QTY
1	303880	Cable – Spinner	1
2	* 303881	Cable – Conveyor, DJ Encoder	AR
	* 304024	Cable – Conveyor, Raven Encoder	AR
	303882	Cable – Conveyor w/ Bin Sensor, DJ Enc.	AR
	304025	Cable – Conveyor w/ Bin Sensor, Raven Enc.	AR
3	* 304023	Cable – Spinner Extension, Optional	1

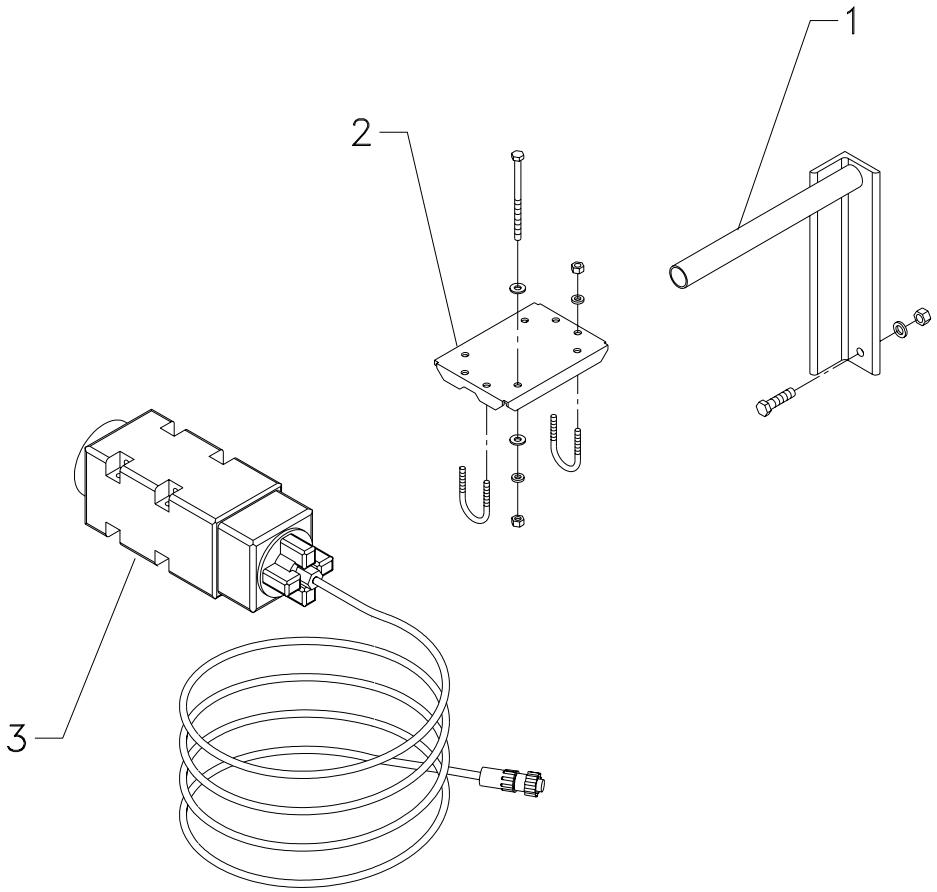
* - Not Shown AR – As Required

SPINNER SENSOR



ITEM	PART NO.	DESCRIPTION	QTY
	97310	Sensor – Kit Spinner	
1	89011	Sensor – Assembly	1
2	89009	Cable – Sensor Extension	1
3	86672	Bracket	1
4	42448	Cap Screw – 1/4 x 1-1/2 SS	2
5	36393	Cap Screw – 1/4 x 3/4 SS	2
6	36423	Washer – Flat 1/4 SS	2
7	36418	Washer – Lock 1/4 SS	4
8	36412	Nut – Hex 1/4 SS	4

RADAR ASSEMBLY



ITEM	PART NO.	DESCRIPTION	QTY
	79857	Radar Velocity Sensor Kit	1
1	79860	"L" Pipe Mounting Bracket Kit	1
		Bracket – Mounting, "L" Pipe	1
		Cap Screw – 3/8-16 x 1 1/2	2
		Washer – Lock, 3/8	2
		Nut – Hex, 3/8-16	2
2	79859	Mounting Bracket Kit	1
		Bracket - Mounting	1
		U-Bolt	2
		Cap Screw – 1/4-20 x 4	4
		Washer – Flat, 1/4	8
		Washer – Lock, 1/4	8
		Nut – Hex, 1/4-20	8
3	79858	Sensor Kit	1
		Sensor	1
		Installation Instructions	1

REMOTE SWITCHES

ITEM	PART NO.	DESCRIPTION	QTY
	* 304020	Switch – Remote Auxiliary	1
	* 304022	Pedal – Kit Foot Switch	1
	304021	Switch – Foot	1
	304031	Instructions – Install Pedal	1
	56341	Screw – Self Tapping #10 x 3/4 SS	1
	56342	Screw – Self Tapping #10 x 1-1/4 SS	1

RAM MOUNT

ITEM	PART NO.	DESCRIPTION	QTY
	* 304032	Mount – Kit Ram 9” Arm, Includes 1–7	1
1	304028	Arm – Ram 9” Double 1.5” Socket	1
2	304027	Base – Ram 3-5/8” Square w/ 1.5” Ball	1
3	304026	Base – Ram 2 x 6-1/4” w/ 1.5” Ball	1
4	56323	Screw – Machine M6-1.0 x 16	4
5	56322	Screw – Self Tapping Type F 1/4-20 x 3/4	4
6	20710	Washer – Lock 1/4	4
7	304029	Bit – Drill .203 Steel Jobber	1

APPENDIX X

THEORETICAL CFR

This CFR is the theoretical volume of product dispensed for each revolution of the conveyor shaft with a gate setting of one inch. The units of measure are cubic feet per revolution per inch of gate opening (metric units are cubic centimeters per revolution per centimeter of gate opening).

Refer to the tables below for the initial setting only. Actual Conveyor Rate setting can only be determined using Calibrate Conveyor function. See *Conveyor Calibration* under Run – Application – Spreader Control to Calibrate CFR for an accurate setting.
NOTE: Every machine will have a slightly different performance and every product will have a slightly different flow characteristic. Calibrate conveyor for each control channel/bin every time new product is to be dispensed.

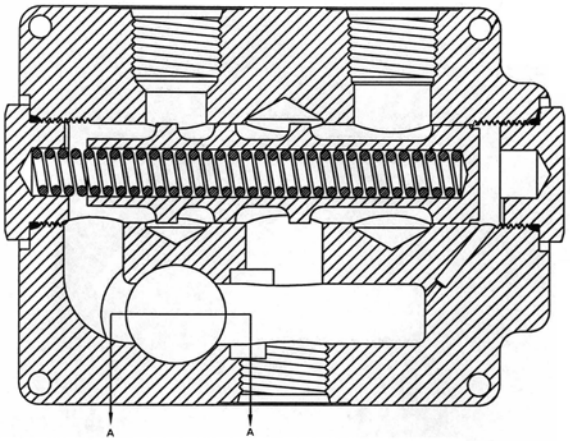
Theoretical Conveyor Rate Values		
Conveyor Rate	**Conveyor Type**	**Model**
.144 cu. ft/rev	BOC	MultApplier
.0364 cu. ft/rev	Yellow Meter Wheel	MicroBin
.192 cu. ft/rev	Chain & BOC	L2020G4
.237 cu. ft/rev	Belt	L2020G4
.256 cu. ft/rev	Chain & BOC	L3020G4
.256 cu. ft/rev	Chain & BOC	L3020XP
.256 cu. ft/rev	Chain & BOC	L3220G4
.305 cu. ft/rev	Belt	L3030G4
.305 cu. ft/rev	Chain & BOC	L7020
.361 cu. ft/rev	Chain	L7000

Theoretical Conveyor Rate Values (metric)		
Conveyor Rate	**Conveyor Type**	**Model**
1605 cu. cm/rev	BOC	MultApplier
406 cu. cm/rev	Yellow Meter Wheel	MicroBin
2140 cu. cm/rev	Chain & BOC	L2020G4
2641 cu. cm/rev	Belt	L2020G4
2853 cu. cm/rev	Chain & BOC	L3020G4
2853 cu. cm/rev	Chain & BOC	L3020XP
2853 cu. cm/rev	Chain & BOC	L3220G4
3399 cu. cm/rev	Belt	L3030G4
3399 cu. cm/rev	Chain & BOC	L7020
4023 cu. cm/rev	Chain	L7000

APPENDIX Y

PWM VALVE MANUAL OVERRIDE

40 GPM PWM Valve

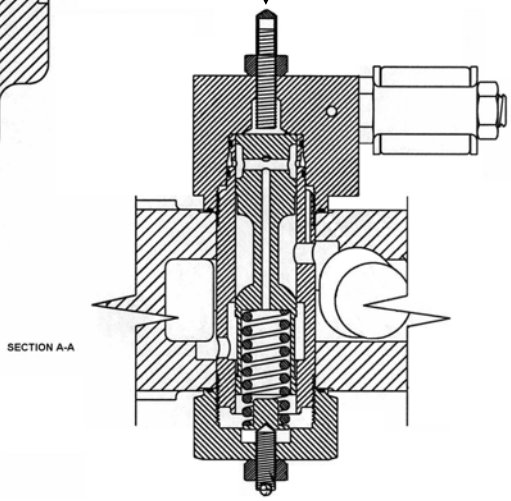


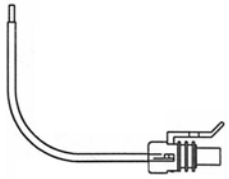
Manual Override

Cartridge p/n 38576-AA

Coil p/n 38576-AB

O-Ring p/n 38576-AC



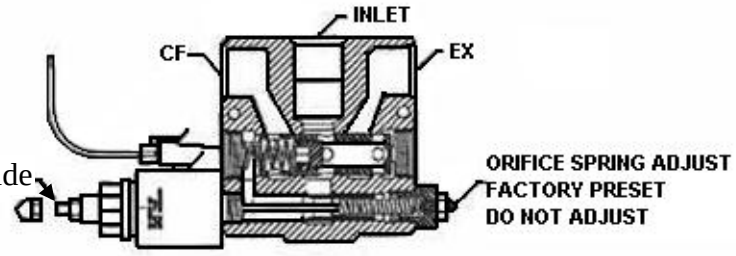


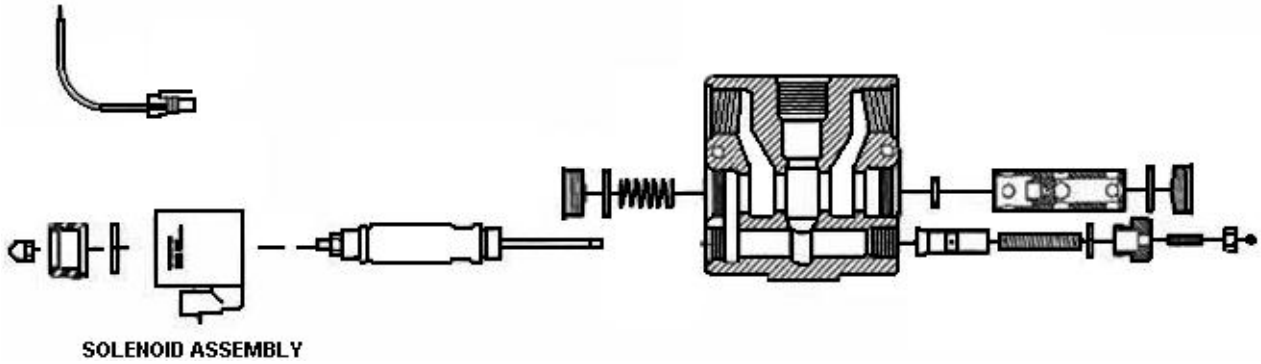
30 GPM PWM Valve

Cartridge p/n 56290

Coil p/n 56289

Manual override





APPENDIX Y CONTINUED

1. Unplug PWM valve (spinners should stop).
2. Loosen lock nut on override stem. See illustrations on previous page.
3. Turn stem in clockwise. This should increase spinner speed.
4. Turn stem back out, counterclockwise, until spinners stop.
5. Tighten lock nut while maintaining stem position.

If control over PWM valve can be maintained with manual control, then replace cartridge and/or coil.

If control over PWM valve cannot be maintained with manual control, then replace valve.

APPENDIX Z

ENGLISH/METRIC CONVERSION

US TO METRIC

1 Acre	=	0.405 Hectares
1 Mile	=	1.61 Kilometers
1 Foot	=	0.305 Meters
1 Inch	=	2.54 Centimeters
1 US Gallon	=	3.785 Liters
1 Fluid Ounce	=	29.57 Milliliters
1 Pound	=	0.454 Kilogram
1 Cubic Foot (ft3)	=	0.028 Cubic Meters (M3)
1 Pound per Gallon	=	119.68 Grams per Liter
1 US Gallon per Acre	=	9.35 Liters per Hectare

METRIC TO US

1 Hectare	=	2.471 Acres
1 Kilometer	=	0.62 Miles
1 Meter	=	3.28 Feet
1 Centimeter	=	0.394 Inches
1 Liter	=	0.2642 Gallons
1 Milliliter	=	0.034 Fluid Ounces
1 Kilogram	=	2.205 Pounds
1 Cubic Meter	=	35.31 Cubic Feet
1 Kilogram per Liter	=	8.36 Pounds per Gallon
1 Liter per Hectare	=	0.107 Gallons per Acre