HM-400
Harvest Data System
DWRB-DOS User's Manual

HarvestMaster™

Field Data Collection Tools

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Chapter 1
Introduction

This manual will guide you through the step-by-step process for using your Double-Wide Regular Bucket (DWRB) System. The system is employed on combines to record the weight and moisture content of grains. A DWRB System aids research scientists by automating data collection. It is designed for use by seed researchers, chemical treatment researchers, and combine operators.

Features

The DWRB System is a powerful, custom-built unit. Major features are as follows:

- Simplified menu structure and menu control, with <ESC> key backing through menus one level at a time.
- Function keys invoke pop-up menu.
- New, flexible field map generator.
- Display positional X-Y relocation upon entry of harvest mode, or with hot-key during harvest.
- Menu selection for renaming field maps.
- Flexible setups for bucket and hopper operation including door actuator signal timers.
- Automatic enable/disable of field printer.

- Enable/disable for hopper door operation on the fly (0 = disable).
- Weigh bucket retare margins are set by the user.
- Upload/download of system setup parameters to/from a host computer (IBM PC Compatible).
- Diagnostics menu to assist in system checkout and troubleshooting.
- *Memory Available* item added to the menu.
- Choice of language (English, French, German, Spanish) for prompts, selectable from the INSTALL menu when the program is loaded to the HarvestMaster Field Computer.
- Keyboard entry of visual observations or notes, in addition to taking harvest data.
- Improved temperature compensation for zero drift of the moisture sensor.
- Improved moisture sensor curve editing.
- Upload/download moisture curves to/from a host computer (IBM PC Compatible).
- User selection of moisture curve when entering harvest mode with ability to change selection part way through the field map.
- Settable *freeze reading* timer for the moisture sensor.
- *Rename* (moisture) *Curve* menu selection.
- Menu selection for moisture curve printing on the field printer.
- New INSTALL program.

The DWRB System is comprised of many essential components. In the paragraphs that follow you will find a brief description of each of these components.

The Field Computer

The Field Computer, when not in use with the DWRB System, functions as a general purpose electronic data recorder/field notebook. Applications include Field Notes Plus and connection to bar code wands for inventory control or electronic calipers for diameter or length measurements.

When the combine is running, the Field Computer is powered externally from the electrical system of the combine. This prevents draining the Field Computer's battery during long usage on the combine.

Note: When using a Pro4000 Field Computer, an externally supplied battery pack must be installed in order for you to have external power.

Manual Override Switches

DWRB System's override switches allow manual bucket control. Four switches are used for individual control of the bucket actuator(s). The fifth switch enables either the manual override switches or the Field Computer to control bucket movement.

Electrical Transient Protection

DWRB System's electrical transient protectors protect against voltage surges. They also protect the system from transient voltage spikes.

Dust-Resistant Enclosure

The placement of the electronics and the printer in an enclosed environment provides a dust-resistant design for the system's components. This provides protection from dust and grain particles, which could cause malfunctions in electrical and mechanical components.

How to Use this Manual

This manual is written and organized in a way to help you find and understand information easily.

Keyboard commands are indicated using brackets that surround the key or keys to be pressed. For example, **<**Enter**>** prompts you to press the Enter key

To execute any single-key command, simply press the designated key and release it. To execute commands that designate more than one key, press the first key; release it, and then press the next designated key. For example, to execute a **<**Blue**>, <**Right**>** command, press the blue key once, release it, and then press the right arrow key.

S*elect* means to scroll to an option using the arrow keys, highlight it and then press <Enter>, unless otherwise instructed. You will then be prompted on what to do next in the directions.

To move forward to the next screen or backward to the previous screen, press **<**Enter**>** to make a selection and take you to the next screen, or press **<**ESC**>** to take you back to the previous screen.

All direct instructions to the user are in a numbered sequence with the directions following the number. This process is illustrated by the instruction below:

1. Follow instructions in their numeric order.

Because installation of the DWRB system is done for you, the installation process is covered in the last chapter of this manual. If you have decided to install the DWRB System, you will want to proceed to *Chapter 7*, and follow the step-by-step instructions.

Keyboard Commands

The following list gives definitions of the key commands and sequences available in the DWRB System. The pictures of the keys at the left are modeled after the Allegro Field PC. The keys on your Field Computer may look different if you are using the Pro4000 Field Computer, but the key commands are the same.

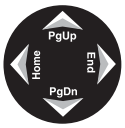
ENTER: Accept individual value and move to the next item or step.

ESC: Escape to next higher menu, or back up to previous screen.

SPACE: Enter a space or blank in text.

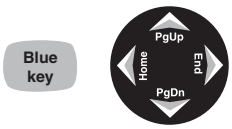
UP ARROW: Move cursor to previous entry/selection item within a screen.

DOWN ARROW: Move cursor to next entry/selection item within a screen.

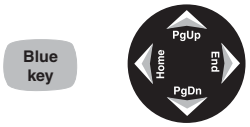


LEFT ARROW: Delete previous character or step backward through available entries for a selection item.

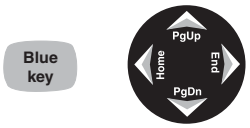
RIGHT ARROW: Step forward through available entries for a selection item.



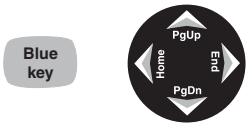
BLUE, LEFT ARROW: Move to the first of the available entries for a selection item. (Press the Blue key once, release it, then press the Left Arrow key).



BLUE, RIGHT ARROW: Move to the last of the available entries for a selection item. (Press the <Shift> key once; release it, then press the <Right> Arrow key).



BLUE, UP ARROW: Move to the top of the menu item list.



BLUE, DOWN ARROW: Move to the bottom of the menu item list.

Function 1 (F1): Reserved - currently not available in the DWRB System.

Function 2 (F2): Reserved - currently not available in the DWRB System.

Function 3 (F3): Reserved - currently not available in the DWRB System.

Function 4 (F4): Reserved - currently not available in the DWRB System.

Function 5 (F5): View Identifiers - displays any extra identifiers for the plot.

Blue, Function 6 (F6): Retare Bucket - when in harvest mode, selection of this function cycles the plot bucket and records a new tare weight measurement for the weigh bucket and test chamber and a new moisture of zero.

Blue, Function 7 (F7): Reserved - currently not available in the DWRB System.

Blue, Function 8 (F8): Show Version Info - shows current version of the Harvest Data System software.

Blue, Function 9 (F9): Set Backlight - allows the user to turn the backlight on or off. Press <Y> for yes or <N> for no to turn the backlight on or off.

Blue, Function 10 (F10): In Harvest mode - Functions Menu - This will bring up the functions menu options that have just been described. In the Menus mode it shows the bucket weights.

Chapter 2
Loading Software & Creating Setups

Loading Software

The distribution diskette (MS-DOS, IBM PC compatible format) contains the programs to install DataLink for Windows on your desktop PC and the Harvest Data software on your Field Computer. The whole installation process takes between 5 and 15 minutes, depending on your level of familiarity with computers.

Before installing the software you need to complete the following:

1. Make sure that your Field Computer is adequately charged.

2. Have your communication cable on hand. The cable connects your Field Computer to your PC and allows your Field Computer and PC to communicate.

Introduction to DataLink

Before installing HM-400 Double-Wide Regular Bucket (DWRB) -DOS on your Field Computer, you must first install DataLink for Windows. DataLink is a communications program that allows your PC and Field Computer to exchange information. You may upload data (transfer data from the Field Computer to the PC) or download data (transfer data from the PC to the Field Computer) using DataLink.

This program is specifically written for Windows 95, 98, 2000, Me or NT operating systems. A copy of this program can be found on a 3 ½ inch disk included in your DWRB packet.

Note: DWRB requires DataLink for Windows version 2.11 or later in order to function correctly. If you have DataLink already installed, make sure it is version 2.11 or later. If not, uninstall DataLink and reinstall it from the diskette that came with the DWRB package.

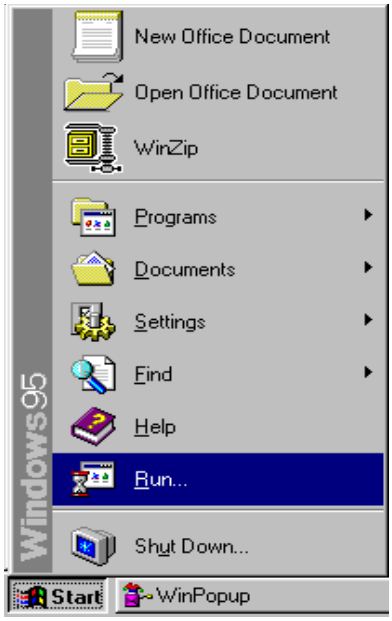
DataLink Installation

To install DataLink complete the following steps:

1. Insert the DataLink for Windows diskette into your 3 ½ inch disk drive.

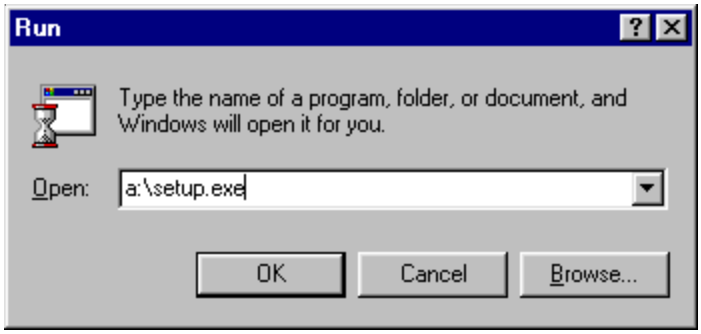
2. Click on <Start> to open the Start menu and select the *Run* option (see Figure 2-1).

Figure 2-1: Select Run Application in Start Menu



3. Type in the 3 ½ inch disk drive location and *Setup.exe* (i.e. A:\Setup.exe) and click <Ok> (see Figure 2-2).

Figure 2-2: Drive Location and Program to Run



4. Read and follow the Windows installation wizard. It will guide you through the remaining procedures for this installation.

The next few pages of this section explain how to use DataLink to install the DWRB software on your desktop PC and your Field Computer.

Installing the DWRB Software to Your Desktop PC

Follow the steps below to install the DWRB software on your desktop PC:

1. Insert the DWRB diskette into the 3 ½ inch disk drive on your PC.

2. Click on <Start> to open the Start menu.

3. Go to the *Programs* folder to open its directory window.

4. Go to the *DataLink for Windows* directory.

5. Click on the *DataLink for Windows* program.

6. In DataLink, click the *Application Install* tab, if you are not already there.

7. Select the location where your application diskette is located (e.g. A:\ or B:\ drive) in the *Select Location* box.

8. Click on *Load Application from DISK* and wait as the files are copied to your PC.

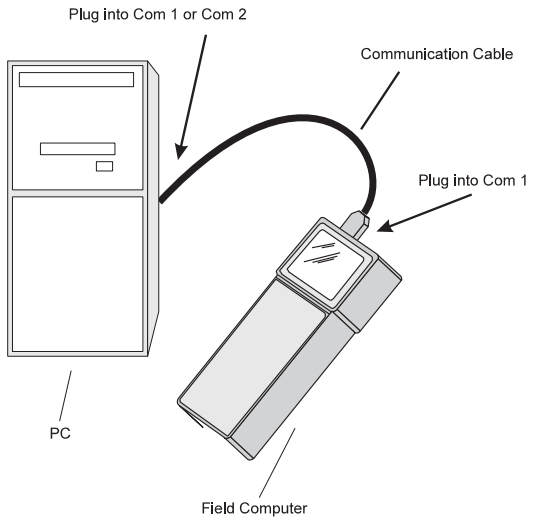
9. DWRB should now be displayed in the *Select Application* pull down menu.

Installing DWRB Software on the Field Computer

To transfer the DWRB software from your PC to your Field Computer complete the following steps:

1. Connect the PC to the Field Computer using the communication cable. To do this, plug the communication cable into one of the serial ports on your computer (preferably COM1).

Figure 2-3: PC to Field Computer Connection



Note: DataLink defaults to communicating via the PC's COM1 port. If you have a mouse or other external device connected to COM1, you need to use COM2. If you choose to use COM2 on your PC, go to the DataLink for Windows Comm Port Setup tab and change the Comm Port setting (see Comm Port Setup in Appendix G).

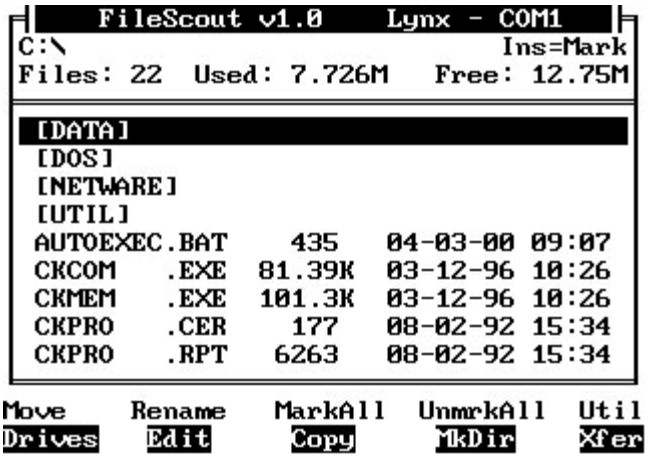
2. To prepare the Field Computer to receive the DWRB-DOS software, turn it on.

3. If you are using an Allegro Field PC, make sure it is booted to DOS mode (see the Allegro User's Manual for detailed information).

Note: Windows CE will not run DOS programs. Do not attempt to run this application with Windows CE.

4. On your Field Computer, get into the communication / file transfer utility. At the DOS prompt (e.g. C:\), type *FS* to run FileScout (Allegro F/PC users) or *PS* to run ProShell (Pro4000 users) and press <Enter>. Figure 2-4 shows and example of the FileScout main screen.

Figure 2-4: FileScout Main Screen



Refer to the Field Computer User's Manual for detailed information about the FileScout or ProShell utilities.

5. Press <F4> to create a new directory.

6. Type in *DWRB* (for Double-Wide Regular Bucket) in the highlighted space after the *Name:* prompt in the top left corner of your Field Computer's screen (this will be the location of the application software) and press <Enter>.

   Note: If you would like, you can install your application on a PC Card. To do this simply change to drive D: then create the directory as outlined above.

7. Use the arrow keys to scroll down and highlight the *DWRB* directory you have just created and press <Enter>.

8. On your PC, check to make sure DWRB is displayed in the *Select Application* box in *DataLink for Windows*. If it is not there, click on the *Select Application* box and select it.

9. Click on <Send Application to Handheld>.

10. Wait while the software is transferred to your Field Computer. Once it stops, DWRB will be installed on your Field Computer.

Booting Directly to DWRB

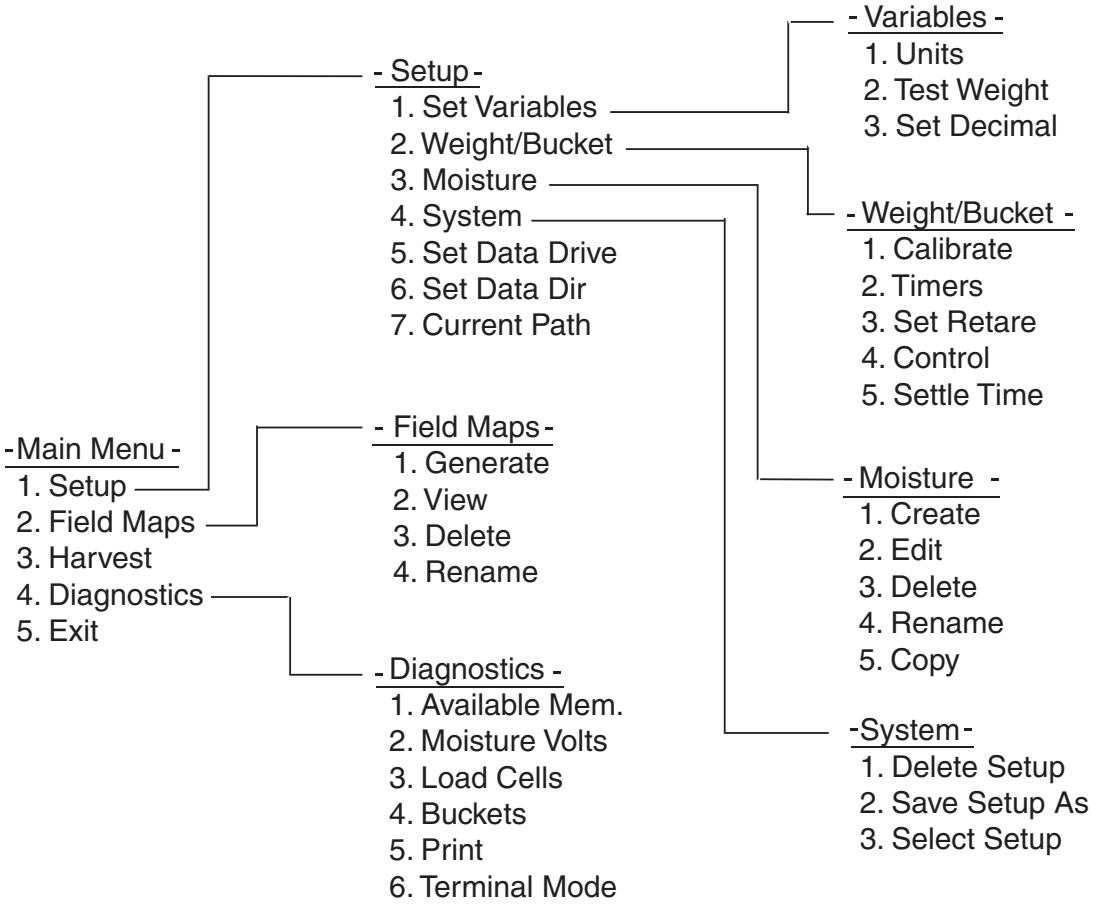
If you would like the system to boot to DWRB automatically, while you are still in FileScout or ProShell, highlight and press <Enter> on the *setbat.exe* file to update your Field Computer's *autoexec.bat* file.

Reboot the Field Computer

The system should run the application automatically on boot-up. After a few seconds the system will display the message *SCCU terminal not found. Turn power OFF and connect SCCU remote.* Do not be alarmed; this message is normal when the Field Computer is not connected to the SCCU. Press <ESC> to go to the Main Menu.

DWRB Menu Structure

The menu shown below presents the various menu options you will use to set up your DWRB System and acquire harvest data with it. You will notice that the menu structure is set up in levels of priority. For example it is recommended to complete the *Setup* menu (option 1) first, and then work from the first sub-menu to the last. When all of the menu options are completed under *Setup*, then go to *Field Maps*, etc.



Moving through the Menu

UP ARROW - causes the previous menu option to be marked.

DOWN ARROW - causes the next menu option to be marked.

ENTER - causes the selection or activation of the marked menu option, or display of a lower level of menu.

ESC - causes exit from current activity, or transition to a higher level of menu.

Answering Yes or No

In certain places during adjustment of system setups, you may be requested to answer *Y* for Yes, or *N* for No. There is no need to spell out the whole word.

Note: Depending on the language of the prompts which you selected when you loaded the program, the Y for Yes may be changed as indicated in the table below:

Letter	Meaning	Language
Y	Yes	English
O	Oui	Francais
J	Ja	Deutsch
S	Si	Español
N	No	All Languages

DWRB Setup Menu

Before proceeding with the set up, make sure that the DataLink software has been installed as explained in the beginning of this chapter. Also, familiarize yourself with the menu structure on page 2-9 to give you an overview of the procedures, activities, and diagnostic functions available.

Set Variables

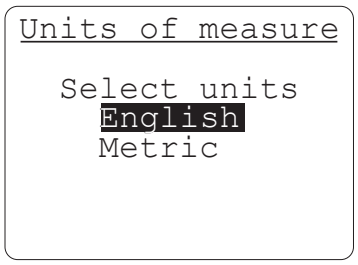
Before harvesting or taking field notes, set up the variables that you will be recording.

Units

To set up the variables complete the following steps:

```
-- MAIN MENU --
1 Setup>
   -- SETUP --
  >1 Set Variables>
      -SET VARIABLES-
     >1 Units
```

1. Select through the *Main Menu* / *Setup* / *Set Variables* screens, select *Units*, and press <Enter>.



2. Scroll up and down to select English or Metric units of measurements, and press <Enter>.

The volumetric weight will read in cubic inches if you choose *English* measurement units, or in cubic centimeters if you choose *Metric* measurement units.

Test Weight

Next, select which of the harvest data variables you wish to record. To do this complete the following steps:

```
-- MAIN MENU --
1 Setup>
  -- SETUP --
 >1 Set Variables>
    -SET VARIABLES-
   >2 Test Weight
```

1. Select through the *Main Menu* / *Setup* / *Set Variables* screens, select *Test Weights*, and press <Enter>.

```
  Select Side

     Left
     Right
```

2. Select the bucket you will be setting the variables for and press <Enter>.

Note: You will need to complete this process for each bucket, the left side and right side.

```
Test Weight Cfg

Is TEST bucket
suspended from
PLOT load cell?

     Yes
     No
```

3. Answer whether the test bucket is suspended from the plot load cell or not.

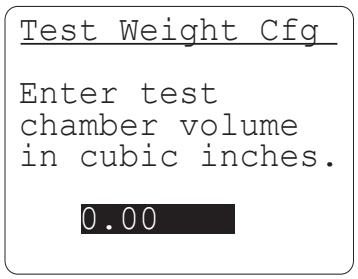
```
Test Weight Cfg

Test weight
conversion

Select function
 <NONE>
 Volumetric Wt
```

4. Select <*NONE*> or *Volumetric Wt*, and press <Enter>.

Selecting <*NONE*> will take you back to the *Variables* menu screen. By selecting *Volumetric Wt* you will need to proceed to step 5.



5. Enter the test chamber volume in cubic inches.

See the chart below for conversion of chamber volume size to cubic inches and cubic centimeters.

Chamber Size	Cubic Inches	Cubic cm.
3 liter	207	3,392
1.5 liter	87.5	1,434

You may have to adjust the cubic inches (or cubic centimeters) slightly depending upon the density of the grain sample. To ensure accurate calibration, complete the following steps:

1. Cycle a known test weight through the system in Harvest mode.

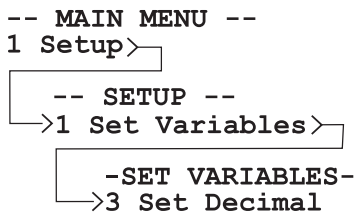
2. Calculate a new volume using the following formula:

$$\text{New volume} = \left(\frac{\text{Combined recorded test weight}}{\text{Actual test weight}}\right) \text{x Current volume}$$

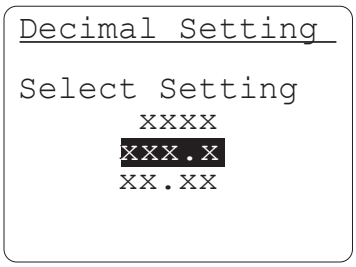
The units of recorded weight are in pounds or kilograms. In English units, the test weight is pounds/bushel. In metric units, the test weight is kilograms/hectoliter.

Set Decimal

The next menu selection allows you to set the decimal position of your harvest data. To do this complete the following steps:



1. Select through the *Main Menu* / *Setup* / *Set Variables* screens, select *Set Decimal*, and press <Enter>.



2. Select the decimal point setting you desire, and press <Enter>.

You will be given the following choices:

xxxx	no decimal point
xxx.x	one digit after the decimal point (default)
xx.xx	two digits after the decimal point

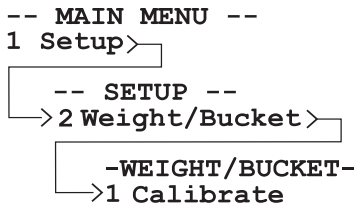
3. You can press <ESC> to return to the *Set Variables* menu.

Weight/Bucket

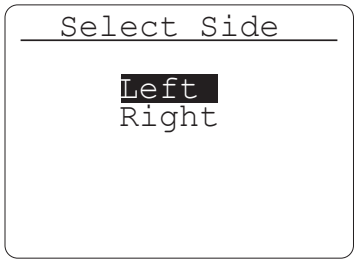
In order to precisely calibrate the plot bucket and test weight load cells, you will need a known weight that you can use to calibrate the weigh bucket and the test chamber weight readings. It's best to use a weight of about 50% of the full scale range of the weighing system, or a weight roughly equal to the largest plot weights that will be harvested (each of the plot and test weights).

Calibrate

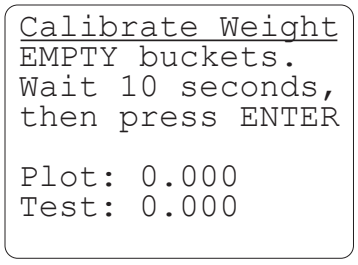
The accuracy of weight measurement of the plot and test weights depends on your performance of these steps, which comprise the system weight calibration. To do this complete the following steps:



1. Select through the *Main Menu* / *Setup* / *Weight/ Bucket* screens, select *Calibrate*, and press <Enter>.

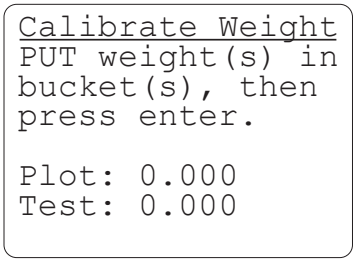


2. Select the bucket you will be calibrating and press <Enter>.



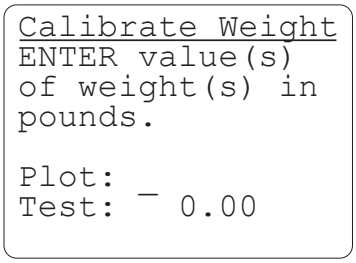
3. Follow the screen prompt to empty the buckets. To do this wait 10 seconds then press <Enter>. This will also register the zero or tare weight values in the memory of the Field Computer.

   The figures showing by the *Plot* and *Test* prompts, in this display, are percent of full scale range of the load cells, and will vary from 0.0 to 100.0.



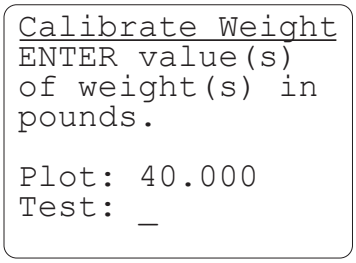
4. Follow the screen prompt to put weights in the bucket and press <Enter>.

The figures you will see on this display, with the buckets empty, represent the percentage of the system weighing range being used by the weight of the plot bucket and test chamber.



5. Enter the plot weight and press <Enter>.

Wait for the percent full scale readings to settle (about 10 seconds).



6. Enter the test weight and press <Enter>.

7. Complete steps 1 - 6 for the other bucket.

This completes the system weight calibration procedures.

Additional Weight Calibration Information

For best calibration accuracy, you should use a calibration weight approximately the same as the plot weights you intend to harvest. If this value is smaller than about 25% of the full scale range of the load cell being used on your system, you should get a smaller capacity load cell for your system.

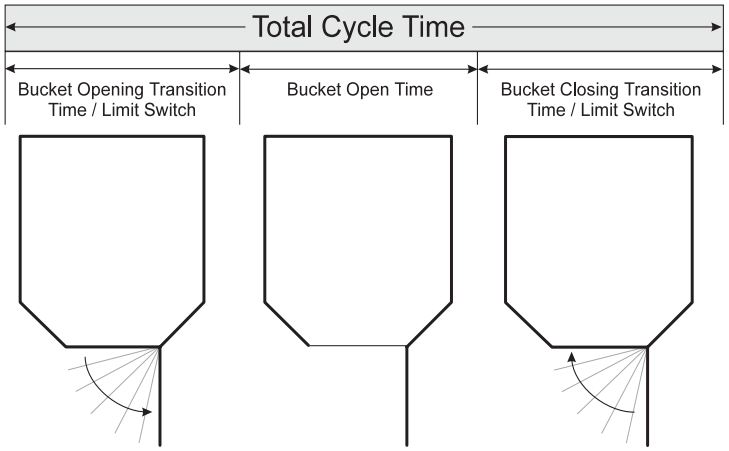
Calibrate the load cells with the combine running to ensure that voltage levels approximate those at harvest. To assure minimum vibration for a more accurate calibration. It is recommended that the thresher should not be running.

Calibration of the load cells is typically a one time exercise, and should only need to be repeated if you change load cells or the electronic recording equipment on your combine. The <F6> key allows you to retare the plot bucket and test chamber during harvest, to account for any dust or trash accumulation on the weighing apparatus.

Timers

Bucket door timers refer to the length of time (in seconds) that each door is open, closed, or in the transition state between open and closed. Total cycle time for an individual bucket is the accumulation of the bucket opening transition time, plus the bucket open time, plus the bucket closing time (see Figure 2-5). The way the DWRB System handles door timers depends upon the type of bucket system.

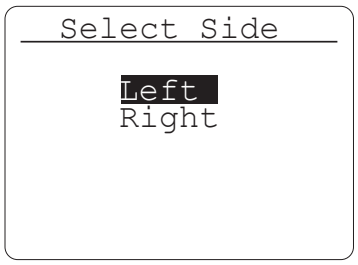
Figure 2-5
Total Cycle Time



For normal operation, leave the readings as they are shown on your Field Computer. If you are altering your operation and need to change the timers, complete the following steps:

```
-- MAIN MENU --
1 Setup>
  -- SETUP --
  2 Weight/Bucket>
    -WEIGHT/BUCKET-
    2 Timers
```

1. Select through the *Main Menu* / *Setup* / *Weight/ Bucket* screens, select *Timers*, and press <Enter>.



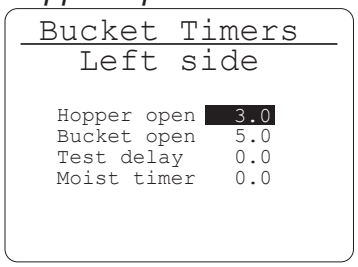
2. Select the bucket you will be calibrating and press <Enter>.

3. Select the desired timer slot or press <Enter> to accept the entered value. Pressing <ESC> will exit you from the *Bucket Timers* screen and save your changes, even if you are in the middle of entering values. What you see is what you save.

4. Complete steps 1 - 3 for the other bucket.

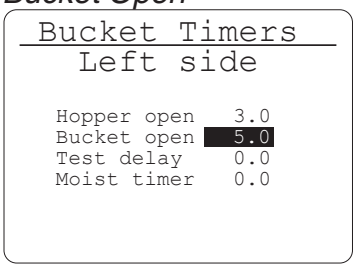
The values are in seconds. The definition for Hopper Open, Bucket Open, Test Delay, and Moist Timer are all explained in the following sections:

Hopper Open



This is the duration, in seconds, the hopper door is open. Set the time to zero if you wish the hopper door to remain open (i.e. the hopper door open signal will remain active all of the time). This may be the case when each plot is taken directly into the weight bucket.

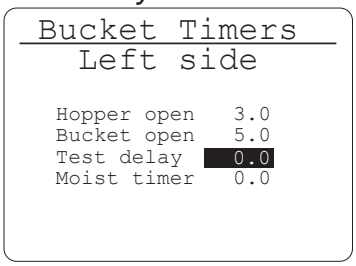
Bucket Open



This is the duration, in seconds, the plot bucket and the test chamber doors stay open. If a limit switch is used in the circuit, such is the case with linear electrical actuators and windshield wiper motor actuators, the active signal will be turned off when the limit switch is actuated.

On pneumatic systems that depend only on the bucket door open signal to hold the door open, the door will close immediately at the expiration of the bucket open timer. For hydraulic actuators, this should be set to the length of time required for the opening stroke.

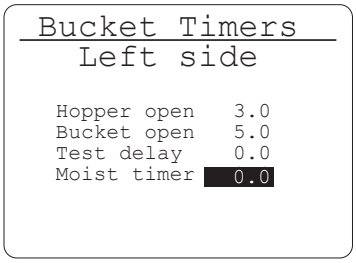
Test Delay



Normally, you will set this entry to zero. If you are harvesting large plots, and the grain buildup in the plot bucket interferes with the readings of the test chamber, you can specify a Test Delay time.

Test Delay time causes the plot weight to be recorded and the plot bucket to be dumped. Test chamber weight and moisture will then be recorded. When the Test Delay time expires the chamber door will open. The Test Delay time must be long enough for the plot door to open and the test weight readings to settle. Three to four seconds is recommended.

Moist Timer

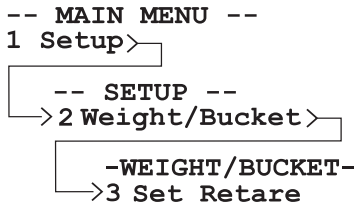


Normally, you would leave this setting at zero. In some situations, users have wished the moisture readings frozen after a set period in the test chamber, to avoid drift due to the packing effect caused by vibrations while the sample is in the test chamber. By using the timer moisture reading consistency can be improved.

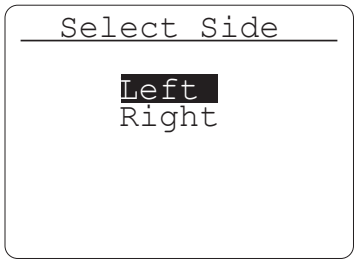
If this is desired, set the value to at least 3 seconds longer than the *Hopper open* time. The moisture readings recorded will all be *locked in* at the same number of seconds after entering the chamber. This is similar to the way most bench top moisture analyzers work.

Set Retare

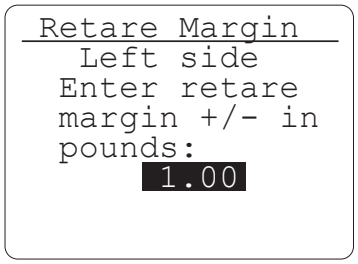
During the harvest activity, the DWRB software checks that the bucket has returned to it's tare weight before closing the plot bucket door. In case it does not return to tare weight (indicating that perhaps grain or trash has lodged in the plot bucket) it prompts you with a message indicating system status, and asking for user input to resolve the problem. The retare margin adjusts the sensitivity of the system for this stop-and-check sequence. To do this, complete the following steps:



1. Select through the *Main Menu* / *Setup* / *Weight/ Bucket* screens, select *Set Retare*, and press <Enter>.



2. Select the bucket you will be calibrating and press <Enter>.



3. Enter the retare margin weight and press <Enter>.

Setting a low weight (high sensitivity) here may cause a frequent warning message and necessitate resolution each time.

The weight will be in pounds (or kilograms) depending on the units of measurement chosen in the *Units* section of the *Set Variables* menu.

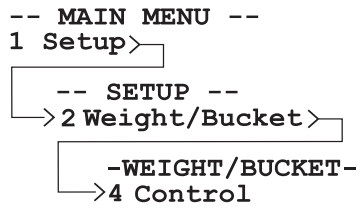
4. Complete steps 1 - 3 for the other bucket.

Control

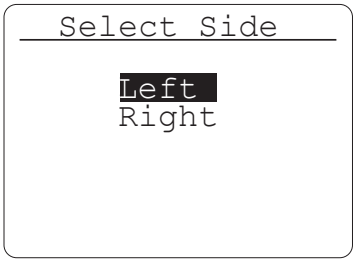
The Control menu allows you to change the bucket setup. The bucket setup controls how the SCCU opens and closes the buckets on the combine. Since different types of bucket actuators require different signals, the following actuator types can be controlled by the software:

- Pneumatic
- Hydraulic
- Electromechanical
- Windshield Wiper

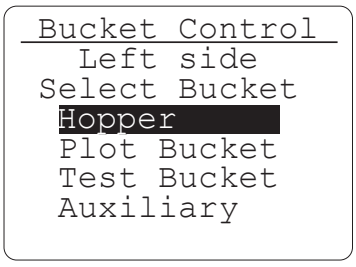
You should verify that your DWRB System has been configured for the correct type of actuator on your combine by completing following steps:



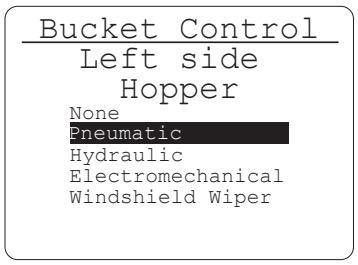
1. Select through the *Main Menu* / *Setup* / *Weight/ Bucket* screens, select *Control*, and press <Enter>.



2. Select the bucket you will be calibrating and press <Enter>.

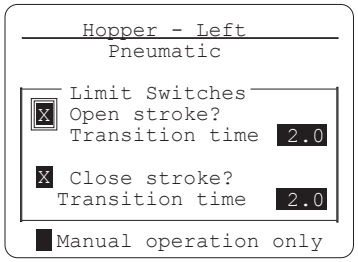


3. Select one of the four bucket selections Hopper (top), Test (middle), Plot (bottom), or Auxiliary and press <Enter> to change a particular bucket's setup, or press <ESC> to save the bucket setup and return to the menu.



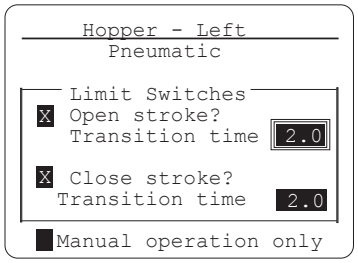
4. Use the arrow keys to select one of the four actuator selections (None, Pneumatic, Hydraulic, Electromechanical, and Windshield Wiper) and press <Enter> to choose an actuator type for the currently selected bucket or press <ESC> to back up to the bucket selection screen.

Now the SCCU needs to know whether or not the actuator for the selected bucket uses a limit switch to end the actuator travel when it is opening the bucket door.



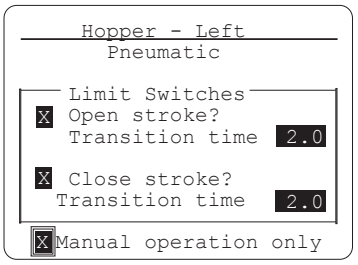
5. Select the *Open* or *Close* stroke *Transition time* option and press <Space Bar> to activate or deactivate the option.

   If the strokes are selected there will be an X in the box on the left side of the stroke option.



6. Select the *Open stroke Transition time* option and enter the amount of time, in seconds, it takes your actuator to completely open the selected bucket.

Selecting *Manual operation only* forces the SCCU to only open or close the selected bucket when the front panel switch for that bucket is activated, regardless of the position of the Auto/Manual switch on the SCCU. You might choose this option if you have connected the Auxiliary actuator to a hopper that redirects grain flow under manual operator control or some other process that requires combine operator interaction. Most applications require a NO in response to this question.



7. Select the *Manual operation only* option and press <Space Bar> to activate or deactivate the option.

If the *Manual operation only* is selected there will be an X in the box on the left side of the option.

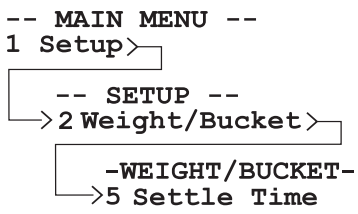
After entering this option, you are returned to the bucket selection screen to continue the bucket setup. Repeat this step for each actuator.

8. Complete steps 1 - 7 for the other bucket.

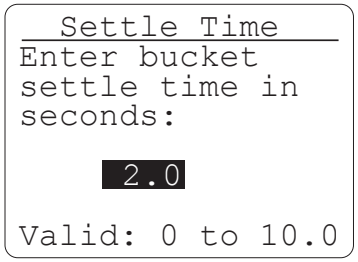
Settle Time

This is the amount of time that the system allows for the buckets to settle after the plot weight door is opened (emptying the plot) and closed. After the settle time has expired the system will check the tare and continue with the next plots data. You may wish to increase this time if you continue to get *Bucket did not retare* messages.

To increase the settle time, complete the following steps:



1. Select through the *Main Menu* / *Setup* / *Weight/ Bucket* screens, select *Settle Time*, and press <Enter>.



2. Select the bucket you will be calibrating and press <Enter>.

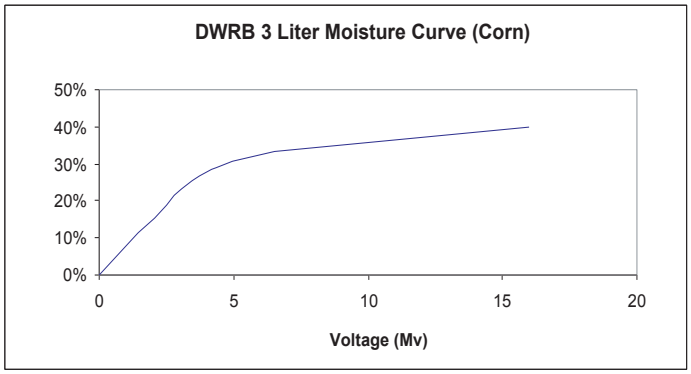
Operation Test

Before you proceed with the operation test, the entire system must be fully operational with the workings of the moisture sensor completely checked out.

Moisture Curve

A grain moisture sensor curve is a set of known data points, which the system refers to when doing a measurement of moisture on a sample of grain. Graphically, it would appear like the graph below. In the memory of the Field Computer, and presented to you for editing, it appears as a table of data, as shown below.

Moist %	MV
0%	0
11.40%	1.46
15.40%	2.04
17.20%	2.28
18.70%	2.48
21.40%	2.81
23.20%	3.04
25.60%	3.48
26.70%	3.73
28.70%	4.2
29.10%	4.35
30.70%	4.94
33.30%	6.5
40.00%	16



Different grain types should each have their own moisture curves. Information on pre-calibrated moisture curves is available. If you would like this information check the Service & Support section on our website at www.harvestmaster.com or contact the HarvestMaster Customer Service Department at (435) 753 - 1881.

Preparation

In preparing to create the moisture curve, complete the following steps:

1. Have at least 3 samples of different moisture content grain available (the DWRB software will accept up to 20 samples for each moisture curve). Mark each sample.

Note: Moisture samples must be at the same ambient temperature as the combine. Creating a moisture curve with warmer or colder samples will adversely affect your calibration.

The required sample sizes need to be at least 6 lbs for the large chamber and at least 3 lbs for the small chamber. We recommended using approximately the same sample size as at the time of harvest. The samples should be as equally spread over the expected range of measurement as possible.

Ideally, they will have been measured multiple times and averaged with a bench top grain moisture tester within about an hour of the current time and will have been sealed in a container between that calibration measurement time and now.

The samples must be large enough to fill the test chamber completely. After recording the sensor reading for each sample, place the sample back in its sealed container to minimize exchange of sample moisture with atmospheric moisture.

2. Plug the Field Computer into the SCCU.

3. Turn on the combine and run the engine and thresher at the speed at which it will be used during harvest.

4. Turn the SCCU power on.

5. Select the *Moist Volts* option in the *Diagnostics* menu to view the raw moisture sensor reading.

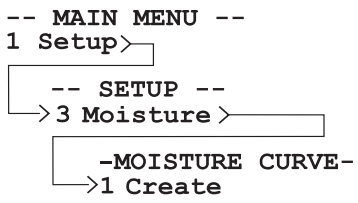
With a moisture sensor present on the system, the relative volts should be stable, and should settle on *0* with an empty test chamber. This reading should increase as you cover the blade completely with your sample.

If the reading is not *0*, then press <F6> to retare the system. (Make sure the chambers are empty before retaring). After retaring, the reading should be *0*.

6. Press <ESC> twice to get back to the Main Menu.

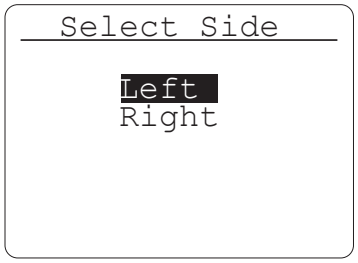
Calibration

After completing the checklist for preparation in the *Operation Test* section of this chapter, the next step is to create and calibrate the moisture sensor curve, to do this complete the following steps:



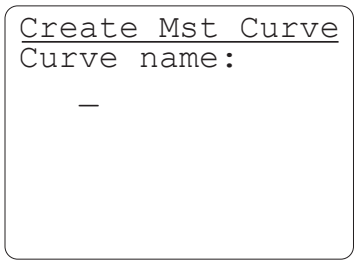
1. Use the arrow keys to scroll through the *Main Menu* / *Setup* / *Moisture Curve* screens, select *Create* and press <Enter>.

   Note: If you change moisture sensors on a Harvest Data System, you must check the calibration for the new sensor.



2. Select the bucket you will be calibrating and press <Enter>.

The first screen requests that you enter a name for the moisture curve. You will be creating a curve for each bucket. Make sure to name the left and right bucket curves the same name.



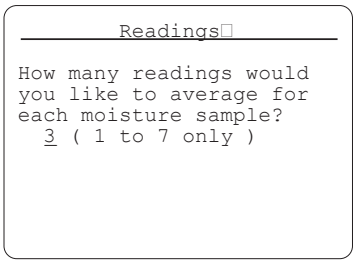
3. Type in the name for the moisture curve you are creating. Moisture curve names can be up to 8 characters long.

Note: Use a name that is similar to the type of grain that the moisture calibration curve is being calculated for; such as CORN, WHEAT, or WET-CORN. We recommend adding the year to the end of the curve name (i.e. CORN01).

Make sure the combine is throttled up with the thresher running at harvest speed. It is very important when creating a moisture curve that you simulate what actually happens in the field. The more consistent your calibration procedures are the more accurate the moisture calibration will be.

When entering points of the curve you just named, you are asked to select one of the moisture curves you have entered (provided that you have included the grain moisture variable in your setups and that it is active when you enter the *Harvest* menu option). Use a name you will remember and not confuse with other names in the system. If you key in a name which is already in use, the Field Computer will ask whether you wish to overwrite the existing file.

4. Switch the SCCU console to *MANUAL*, so that you can operate the top, middle, and bottom gates under manual control. Open all the gates to ensure the system is empty and then close them again.



5. Select the number of readings you will average.

   Note: You will need to catch the sample and repeat the cycle process for each number of reading you do.

The first reading should show a voltage reading. With an empty chamber, it should be *0*. If it is not *0* you will need to retare your bucket by pressing <F6>. When the voltage reading is *0* with an empty chamber, you are ready to proceed with your calibration.

```
Pour Sample #1 into the
moisture chamber and
press ENTER to record.
Reading #1  0.00
Reading #2
Reading #3


Average:
```

6. Follow the prompt to pour the sample in the moisture chamber. Pour your entire sample onto the hopper gate then open the hopper gate. Allow the sample to drop into the constant volume chamber (middle level) then close the hopper gate.

If you are using the *Moisture timer* option:

```
Pour Sample #1 into the
moisture chamber and
press ENTER to record.
Reading #1  0.00
Reading #2  0.00
Reading #3  0.00


Average:    0.00
Press any key . . .
```

6. Wait the amount of time that has been entered and press <Enter> to capture the reading.

Repeat this process as many times as you are prompted to.

The lower left corner of the display shows the average percent of moisture full scale reading produced by this sample of grain. This reading is the same as the reading displayed in the *Diagnostics* menu.

```
 Sample Percent

Enter moisture
percentage for
sample #1:

  _
```

7. Type in the moisture content of this sample, in percent moisture wet weight basis (pct moisture = $MOIST_{wet}$/ ($MOIST_{dry}$ + $MOIST_{wet}$) and press <Enter>.

This is the standard of measure of bench top grain moisture measurement systems.

8. Use the manual switches to open the test and plot chamber doors to pass the sample through. Catch the sample, and store it back in the sealed container.

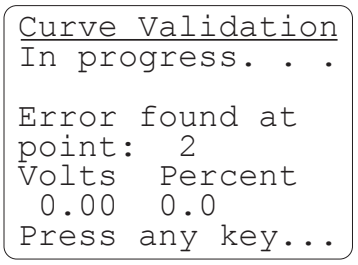
9. Repeat steps 6 - 8 for each different moisture sample you have.

You will want to use an empty test chamber for one of the samples, corresponding to 0 percent moisture.

It does not matter what order you enter the moisture sample. The system will automatically sort them when you are finished.

10. Press <ESC> when all of the samples are entered.

Note: When you select a moisture curve in harvest it will select both the left and right curve. If you did not give the left and right curve the same name, you will not be able to harvest. You will have to rename one for the curves so that they have the same name.



If you get this screen, it means that an error is in your curve data and the moisture data may be adversely effected if you continue. By graphing the curve you will see the points that do not make sense. Be sure to check both the left and right curves.

This completes the moisture sensor calibration. We have found that the left and right moisture curves are very similar on most buckets and the same curve can be used. To use the same curve you have just created, use the copy option in the software to copy it from one side to the other.

Creating a Trial Moisture Sensor Curve

If you have moisture data that you wish to enter through the *Edit Curve* menu option, but do not have a moisture curve name assigned, you still need to use the *Create Curve* menu option to create a trial moisture sensor curve to edit. To create a trial curve, complete the following steps:

1. Connect the Field Computer to the SCCU and power it up as if you were going to calibrate moisture.

Warning:
If you change moisture sensors on a Harvest Data System, you must check your calibrations and adjust if necessary as outlined in the *Setting the Grain Moisture Temp Comp* section of this manual.

This step is only needed to record the current temperature reading.

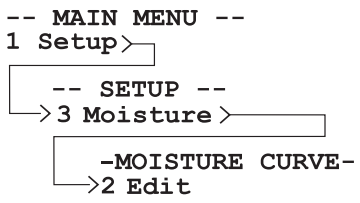
2. Proceed with the steps for *Creating a Moisture Sensor Curve*, under the *Calibration* option, earlier in this section using an empty bucket and 0% moisture for all of the entries.

3. Refer to *Editing a Moisture Curve* below to edit your data.

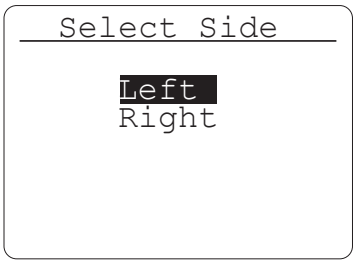
Note: You will need at least two sets of points in order for the curve name to be saved.

Edit

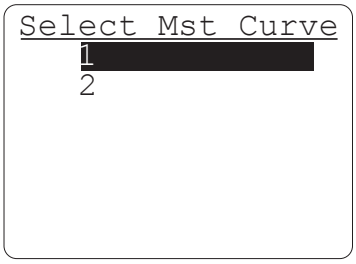
The moisture sensor curve must exist before it is available to edit. If it does not already exist, create it using the steps in the previous sections. If it does exist, you can edit it using the following steps:



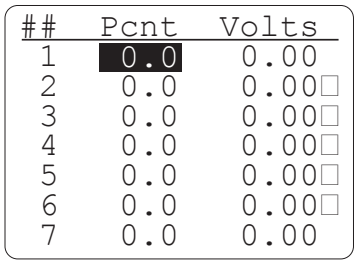
1. Select through the *Main Menu* / *Setup* / *Moisture* screens, select *Edit*, and press <Enter>.



2. Select the bucket you will be calibrating and press <Enter>.



3. Select the moisture curve you will be editing and press <Enter>.



4. Use the arrow keys to select and edit the moisture/volts pairs, type in the numbers, including the decimal point, and press <Enter> to replace the data in the curve.

The arrow key applied after entry of a string of digits causes both the <Enter> function and the cursor to move in the implied direction.

Press <Blue> key + <Right> arrow key to insert a blank line into the curve after the selected line.

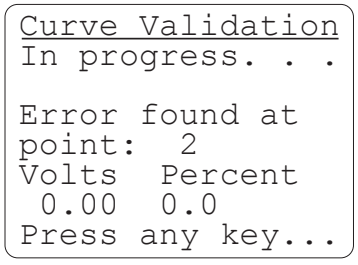
Press <Blue> key + <Left> arrow key to delete the selected line from the curve.

5. Press <ESC> to edit the temperature compensation.

Note: You will need at least two sets of points in order for the curve name to be saved.

The following information and directions will explain the temperature compensation process.

Note: When you select a moisture curve in harvest it will select both the left and right curve. If you did not give the left and right curve the same name, you will not be able to harvest. You will have to rename one for the curves so that they have the same name.



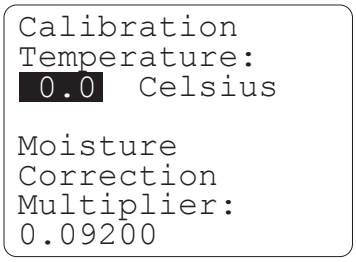
If you get this screen, it means that an error is in your curve data and the moisture data may be adversely effected if you continue. By graphing the curve you will see the points that do not make sense. Be sure to check both the left and right curves.

Setting the Grain Moisture Temperature

Grain moisture readings taken at temperatures different from the temperature that the calibration curve was calibrated, needs to be corrected back to the calibration temperature. The HM-400 Harvest Data System can do this correction automatically. However, you may wish to adjust the correction coefficient.

If you do not want to use temperature compensation set the correction multiplier to 0.0 and press <ESC> to return to the *Moisture* menu.

The temperature compensation screen automatically appears after pressing <ESC> in the *Create Curve* and *Edit Moisture* screen. *Cal Temp:* displays the temperature (in degrees Celsius) at which the system was calibrated. *Mstr Correction Multiplier* displays the % moisture change for each degree Celsius difference between the calibration temperature and the current temperature.



1. Use the arrow keys to go to the curve you would like to change. Select and edit the *Calibration Temp* or *Moisture Correction Multiplier*.

2. Press <Enter> to save the number that has been typed in. Press <ESC> to exit the compensation screen.

Here is an example to illustrate how the moisture compensation works:

For each degree Celsius that the sample is below the temperature at which the system was calibrated, the moisture sensor reads about .092% less moisture. Assuming the calibrations were done at 30° C and the current corn temperature is 10° C, .092 *20, or 1.84%, moisture needs to be added to the measurement to correct for the cooler temperature.

Likewise, if the sample corn temperature was higher than the calibration temperature, a correction would need to be subtracted from the measured value.

The DWRB software does this correction automatically if the moisture correction multiplier has been set correctly.

Changing the calibration temperature from what it was when you did the calibrations will shift your entire curve up or down, depending on if you increase or decrease it.

Note: If your curve is consistently high over the whole range, after harvesting a few plots, you can lower the calibration temperature. Conversely, you can raise the calibration temperature if your moisture is consistently too low. This is an easy way to fine-tune the moisture curve after calibration.

$$\frac{\text{(Actual Moisture - Bucket Moisture)}}{\text{Mstr. Correction Multiplier}} = \text{Change in Temperature}$$

Add or subtract this volume to/from your existing temperature depending on the sign.

The Moisture Correction Multiplier (MCM) is roughly .092 for corn. This may vary slightly for other grains and you may wish to adjust it based on your experience with other grains.

The equation for the moisture correction value for temperature is:

Corr. Moist. = MCM * (Cal Temp - Actual Temp)

From our previous example:

Corr. Moist. = .092 * (30.0 -10.0) = 1.84% moisture

Suppose that the system measured 19.5% moisture before the correction. The final recorded and displayed moisture content would be 19.5 + 1.84 = 21.34% moisture.

Temperature Compensation Summary

Completing the moisture curve calibration includes:

1. Creating and editing the moisture curve (as described earlier in this section).

2. After having entered the moisture curve, press <ESC> to view the moisture compensation parameters. Make sure the correct temperature setting (°C) is showing for *Cal. Temp*:

3. Adjust the Moisture Correction Multiplier as needed for your crop. In the absence of any further information, use 0.092 (corn).

Note: When checking your moisture over a range of temperature, you may need to adjust this correction coefficient up (more compensation) or down (less compensation) accordingly. Remember that the sample and DWRB monitor has to be at the same ambient temperature to get accurate moisture.

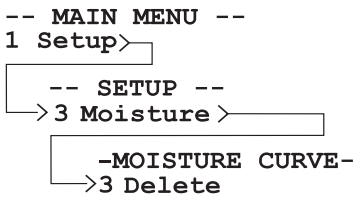
4. Make a note of your numbers for future reference in a field notebook, save and upload your setup file, and print the moisture curve on the Harvest Data printer from the Diagnostics menu.

Moisture Compensation Diagnostics

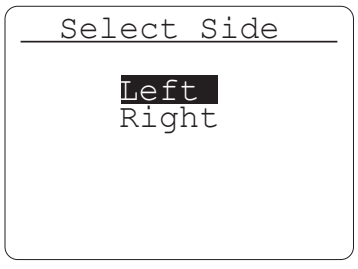
Moisture compensation diagnostics allow you to view the current temperature, the corrected moisture percentage, and the amount of moisture compensation. For the step-by-step instruction on this process go to Chapter 5 page 5 - 2.

Delete

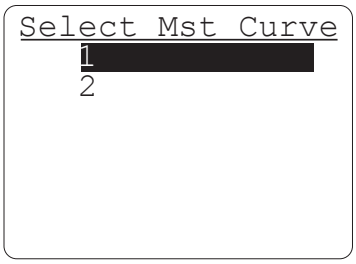
The *Delete* option in the *Moisture Curve* screen is for removing unwanted moisture curves on your Field Computer. To delete moisture curves from your Field Computer complete the following steps:



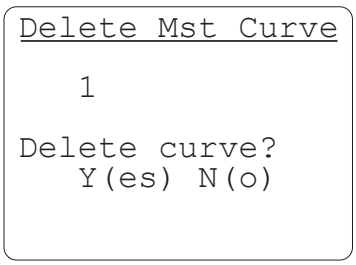
1. Select through the *Main Menu* / *Setup* / *Moisture* screens, select *Delete*, and press <Enter>.



2. Select the bucket you will be deleting from and press <Enter>.



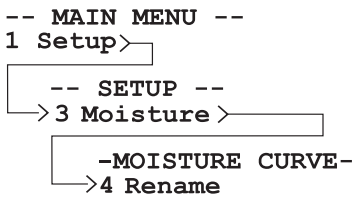
3. Select the moisture curve you will be deleting and press <Enter>.



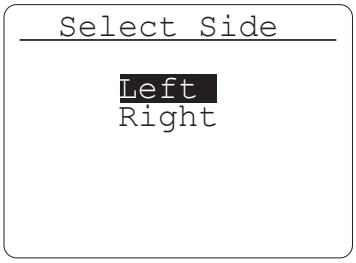
4. Press <Y> for yes to delete the curve, or <N> for no to cancel the deletion process.

Rename

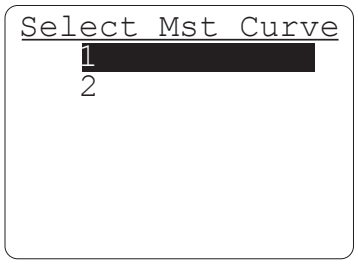
The *Rename* option in the *Moisture Curve* screen is for renaming moisture curves on your Field Computer. To do this complete the following steps:



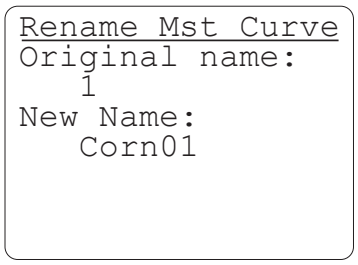
1. Select through the *Main Menu* / *Setup* / *Moisture* screens, select *Rename*, and press <Enter>.



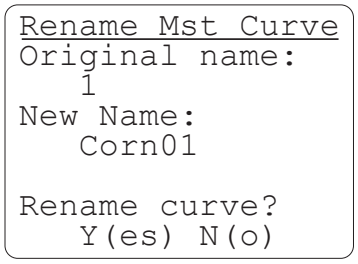
2. Select the bucket you will be renaming from and press <Enter>.



3. Select the moisture curve you will be renaming and press <Enter>.



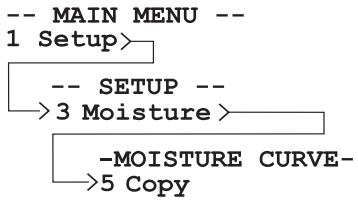
4. Type in the new name of the moisture curve (up to 8 characters long) and press <Enter>.



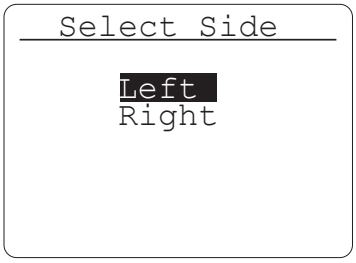
5. Press <Y> for yes to rename the curve, or <N> for no to cancel the renaming process or press <ESC> to return to the *Select Moisture Curve* screen.

Copy

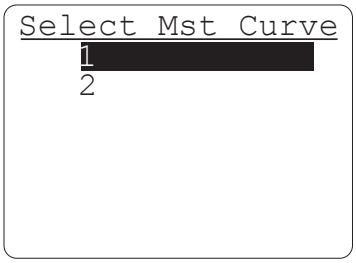
The *Copy* option in the *Moisture Curve* screen is for copying moisture curves on your Field Computer from one bucket to the other. To do this complete the following steps:



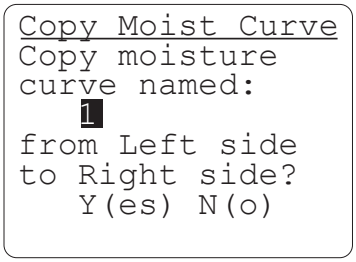
1. Select through the *Main Menu* / *Setup* / *Moisture* screens, select *Copy*, and press <Enter>.



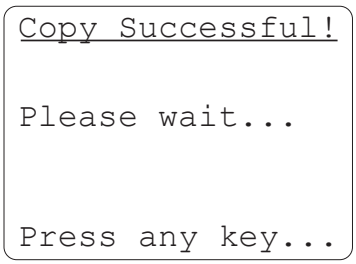
2. Select the bucket you will be copying from and press <Enter>.



3. Select the moisture curve you will be copying and press <Enter>.



4. Press <Y> for yes to copy the curve, or <N> for no to cancel the copying process.



5. Wait until prompted to press any key.

System

The *System* option in the *Setup* menu is currently under reconstruction and is not available with this version of DWRB-DOS.

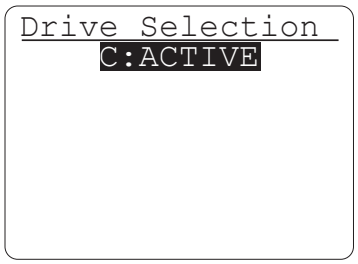
Set Data Drive

The *Set Data Drive* option allows you to choose which drive will store your data. To do this complete the following steps:

```
-- MAIN MENU --
1 Setup>
  -- SETUP --
  >5 Set Data Drive
```

1. Select through the *Main Menu* / *Setup* screens, select *Set Data Drive*, and press <Enter>.

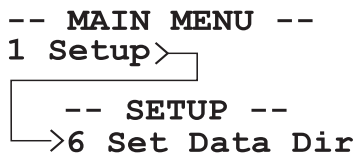
The DWRB software automatically seeks out the available drives on your Field Computer and will display them in the *Drive Selection* screen.



2. Select the desired storage drive and press <Enter>.

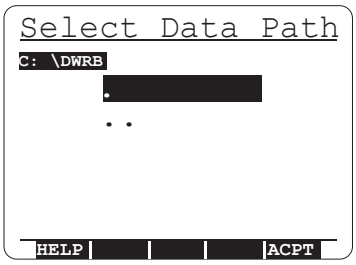
Set Data Directory

The *Set Data Dir* option allows you to choose which directory on that drive will store your data. To do this complete the following steps:



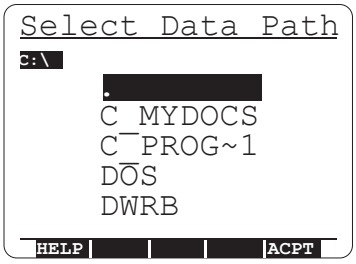
1. Select through the *Main Menu* / *Setup* screens, select *Set Data Dir*, and press <Enter>.

Note: If a directory name is shorter than 8 characters, the entire name is displayed. If a directory name is longer than 8 characters, the first 6 characters are displayed followed by ~1.



2. Use the arrow keys to navigate through and select the desired directory.

The directory you are in will be highlighted in the upper left area of the *Select Data Path* screen.



By selecting the double dots (..) and pressing enter you can move back one directory level. If double dots are not present, you are at the root directory.

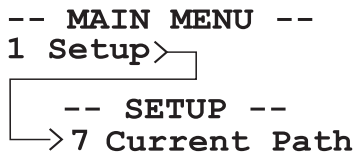
We suggest you use the DWRB directory to store DWRB data.

3. Press <F5> to accept the selected directory.

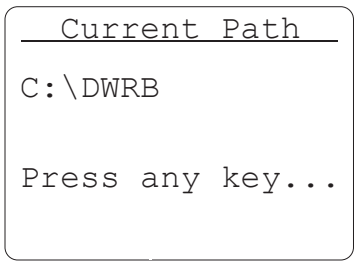
Pressing <Enter> and / or <ESC> without pressing <F5> will not save the directory.

Current Path

The *Current Path* option allows you to check which drive and directory your data is being stored on. To do this complete the following steps:



1. Select through the *Main Menu* / *Setup* screens, select *Current Path*, and press <Enter>.



2. Make sure you have selected the correct drive and directory, and press any key to return to the *Setup* menu.

If the data path is too long to fit on the screen, only the drive and destination directory will be shown with intermediate directories represented by 3 dots. An example is shown below.

C:\...\NAME

Chapter 3
Creating Field Maps

This chapter explains how to prepare field maps for harvesting and how to record harvest data and other user observations.

Field Maps

Field maps are used for note taking and recording data. The *Field Maps* option in the *Main Menu* screen is used to create and manipulate maps of plots within the Field Computer.

Field Maps can also be created on your desktop PC and downloaded to your Field Computer (see *Appendix F* for more details). For best results, we recommend creating the field map directly in DWRB.

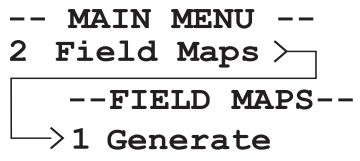
Before you begin to generate field maps, please make sure you have done the following:

- Defined all variables you wish to have associated with the field map you are about to generate.
- Calibrated load cells.
- Generated moisture curves.

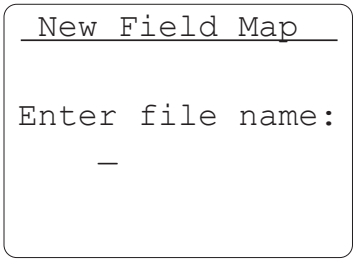
For instruction on generating field maps using your PC, see *Appendix E, Field Maps Generated from ASCII.*

Generate

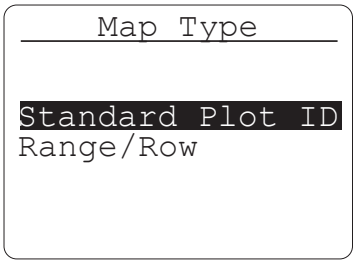
To generate a field map complete the following steps:



1. Select through the *Main Menu* / *Field Maps* screen, select the *Generate* option, and press <Enter>.



2. Type in a name for the map (up to 8 characters long) and press <Enter>.



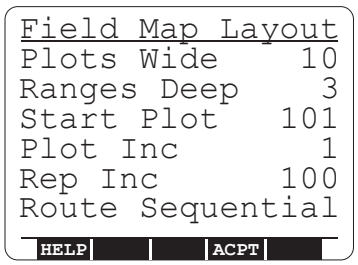
3. Select the *Standard Plot ID* or *Range/Row* option in the *Map Type* screen and press <Enter>.

4. Select the areas that you need to change. Press <F4> to accept all changes and begin generating the map.

See the following two sections, *Standard Plot ID Field Map Layout Options* and *Range/Row Field Map Layout Options* for definitions to these options.

Standard Plot ID Option

When you select the Standard Plot ID map type, a map layout screen is displayed with prompts for the number of plots wide as well as ranges deep. Use the arrow keys to move between fields.



The following are definitions of each map parameter.

Plots Wide

Plots wide are the number of plots, from left to right, to be represented in the map.

Ranges Deep

Ranges deep defines the number of plots from top to bottom that are in the field.

Start Plot

Start plot is the plot number to be placed in the lower left corner of the map. The default is usually 101.

Plot Inc

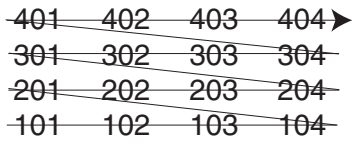
Plot Increment, typically 1, is the counting increment applied to the ones place as the sequencing advances from one entry to the next in a single replication (e.g. 101, 102, 103, etc.).

Rep Inc

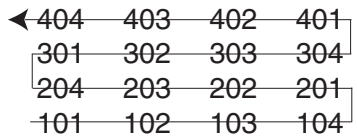
Replication Increment, which is typically 100, uses the hundreds place for denoting replication in the plot number. For example, a Start Value of 101 and Replication Increment of 100 would begin the next replication at 201. However, the Replication Increment may be 1000 if there are more than 99 entries per replication.

Route

Route implies the sequencing of plot numbers sideways across the study field, in the order that plots are usually rated (90 degrees orientation to harvest order, usually). *Sequential* or *Serpentine* are your choices for route patterns.

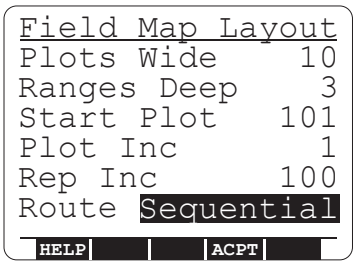


Sequential



Serpentine

To select the desired route pattern complete the following steps:

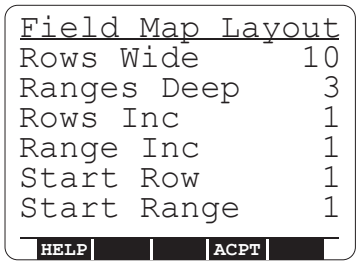


1. Select the *Route* option on the Standard Plot ID *Field Map Layout* screen.

2. Select *Sequential* or *Serpentine* and press <Enter> or <F4> to accept the map layout.

Range/Row Option

When you select the Range/Row map type, a map layout screen is displayed with prompts for the number of rows wide as well as ranges deep. Use the arrow keys to move between fields.



The following are definitions of each map parameter.

Rows Wide

Rows wide defines how many plots wide the field is from left to right.

Ranges Deep

Ranges deep defines the number of plots from top to bottom that are in the field.

Row Inc

Row Increment defines the counting increment of the Field Row. Should always be 1.

Range Inc

Range Increment defines the counting increment of the Field Ranges. It should always be 1.

Start Row

Start row is the row number the map will begin with. It should always be 1.

Start Range

Start range is the range number the map will begin with. It should always be 1.

Note: DWRB will notify you if the map to be generated is too large for the Field Computer. If this happens, try again with smaller dimensions.

```
308  307  306   305  304 303
205  206  207   208  301 302
204  203  202   201  108 107

├──6 plots per range──┤
```

Here is a map resulting from 8 entries, 3 replications, and a layout of 6 plots per range.

```
  Map Creation

In progress. . .

Plot ID:
```

You will be shown a *Map Creation* screen while the map generates, which is usually only a few seconds; even for a fairly large sized map.

```
 Map Generation

Map Generation
was Successful!

Press any key...
```

When the field map is generated, you will see this screen.

```
Not enough space
This field map
requires:
      3520 bytes
Available space
on target drive:
      2400 bytes
```

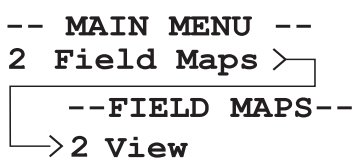
If you try to generate a field map that is too large for the memory available on the Field Computer, you will see this message. Try again with smaller dimensions.

Note: For instruction on downloading field maps from your desktop PC using DataLink for Windows, refer to Appendix F and G in the back of this manual.

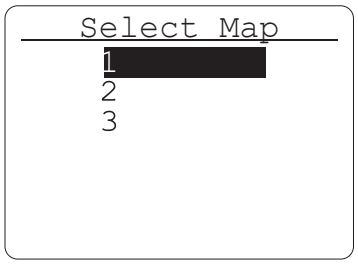
You don't have to pre-generate or download a field map. Once you have defined the harvest, or rating variables, you can go directly to option 3 Harvest on the menu.

View

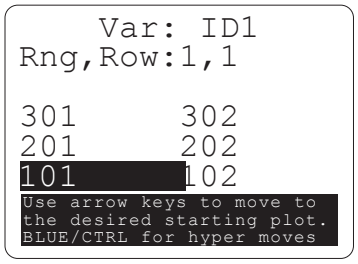
This option produces an X-Y configuration of the selected field map. To view a map complete the following steps:



1. Select through the *Main Menu / Field Maps* screen, select the *View* option, and press <Enter>.

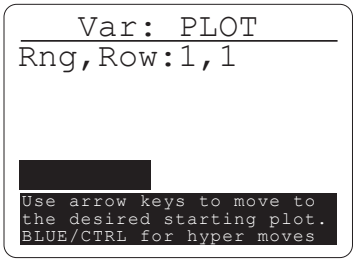


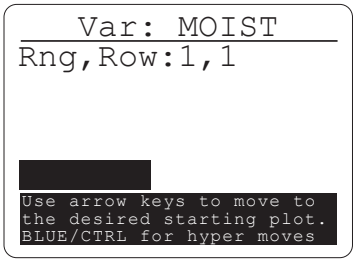
2. Select the field map you want to view and press <Enter>.

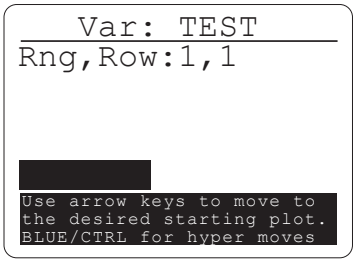


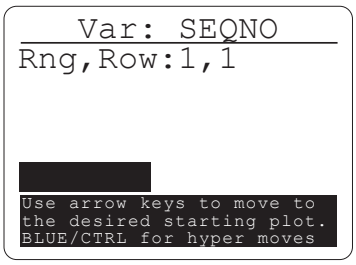
3. Select the portion of the map you wish to see (you may also use <Ctrl> + arrow keys to move all the way to the edges, or <Blue Key> + arrow keys to move twenty plots at a time).

Note: Pressing <Enter> allows you to cycle through each variable in your map.









4. Use the arrow keys to scroll through the harvest variable data (e.g. *Var: PLOT, MOIST, TEST,* and *SEQNO*) as shown to the left.

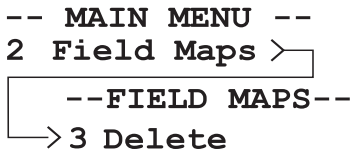
Note: If the identifier is more than 8 alphanumeric characters, when downloading a field map, then the identifier will be broken into groups of 8 characters and placed in multiple identifier holders in the data file.

The block on the display points to the current plot position. As you move the arrow right and up to see the other plots, the display will window over the set of available plots in the map. The <Enter> key will allow you to view any other identifiers associated with the maps as well as all note variables. A label on the bottom of the screen identifies what is being displayed.

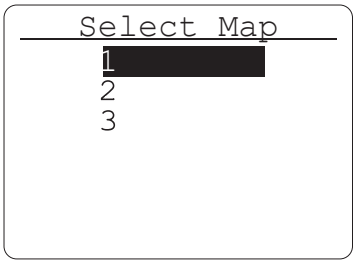
If the identifier is more than 8 alphanumeric characters then the identifier will be broken into groups of 8 characters and placed in multiple identifier holders in the data file.

Delete

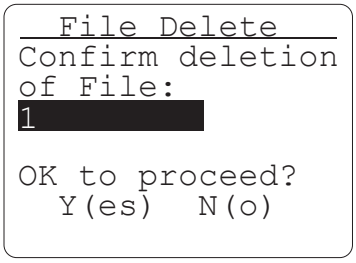
The Delete option will permanently remove generated maps from your Field Computer. To delete maps from your Field Computer complete the following steps:



1. Select through the *Main Menu / Field Maps* screen, select the *Delete* option, and press <Enter>.



2. Select the field map you want to delete in the *Select Map* screen and press <Enter>.

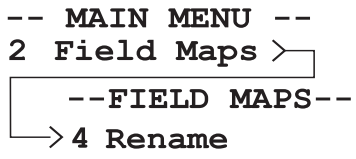


3. Press <Y> for yes to proceed with, or <N> for no to cancel the deletion process in the *File Delete* screen.

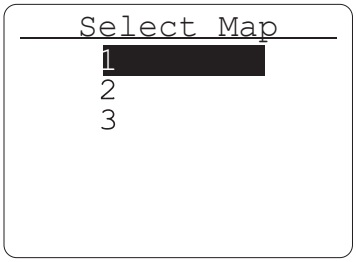
You will then return to the *Field Maps* menu screen.

Rename

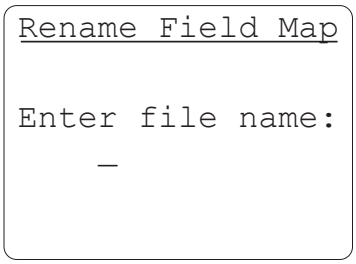
This option will allow you to rename any selected map in your Field Computer. To rename maps stored in your Field Computer complete the following steps:



1. Select through the *Main Menu* / *Field Maps* screen, select the *Rename* option, and press <Enter>.



2. Select the field map you want to rename in the *Select Map* screen and press <Enter>.



3. Type in the new map name (the name can be up to 8 characters long) and press <Enter>.

```
Rename Field Map
Old:1          .DAT
New:North1.DAT


OK to proceed?
  Y(es)  N(o)
```

4. Press <Y> for yes to proceed with, or <N> for no to cancel the renaming process.

Downloading Maps

You can also download maps from your PC. To download a map, complete the following steps:

1. Type in the plot numbers and any associated identifiers in Microsoft Excel or a text editor. Type the numbers in either the 2-D Text format or Harvest Order Space Delimited format.

2. Save the map file in Microsoft Excel or the text editor .

3. Make sure your Field Computer is connected to your PC.

4. Check that you are running the DWRB software on the Field Computer.

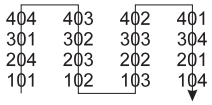
5. Open DataLink for Windows on your PC and click on the *Transfer Files* tab.

6. Click OK on the *Locating Remote* window.

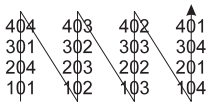
7. Select the proper map file, then click on the right-pointing arrow <→> to begin downloading.

   Note: If you have already selected the Transfer Files tab, press the refresh button <🔄> to connect to the remote without exiting and reentering.

8. If you are downloading a *Harvest Order Space Delimited* map, the *Select Harvest Order* window allows you to set up the width of the field, the number of ranges in the field, and the harvest direction or route that you will take when the field is harvested.



Serpentine



Sequential

9. If you are downloading a 2-D map, the *2-D Map Parameter* window allows you to specify which corner of the map corresponds to range 1, row 1 of the field.

10. Select the appropriate option and click on <Ok>.

11. Click the right-pointing arrow <▶>, to begin downloading.

Note: Always view your maps to ensure that they were downloaded correctly.

Refer to *Appendix F* for more detail about downloading Maps.

Chapter 4
Harvest

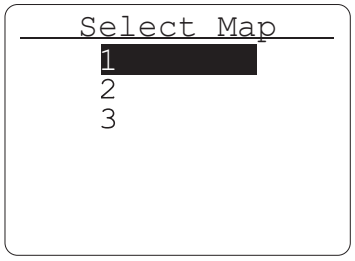
This chapter explains harvest procedure for gathering data and other user observations.

The Harvest Operation

To begin the Harvest operation complete the following steps:

```
-- MAIN MENU --
3 Harvest
```

1. Select *Harvest* option on the *Main Menu* screen, and press <Enter>.

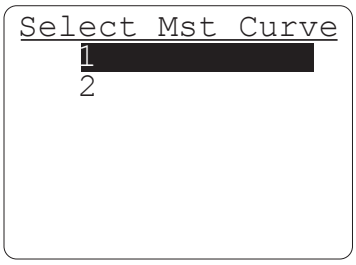


2. Select the field map you want to Harvest in the *Select Map* screen and press <Enter>.

Note: If no maps are available, the system will give you a message that, No map files were found. If this occurs you must create (or download) a map file, or you must change the Data Drive location to where the map files are located, refer to Chapter 3.

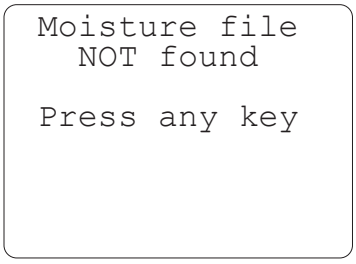
Selecting the Moisture Curve for Harvest

After you have selected the map you will be harvesting from, you will need to select the moisture curve you will be using for the harvest.



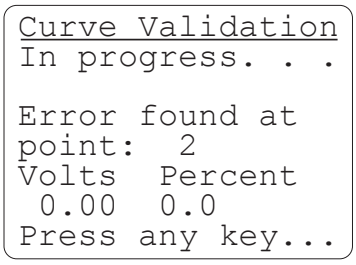
3. Select the moisture curve you want to harvest with.

This can be re-selected each time you enter a field map.



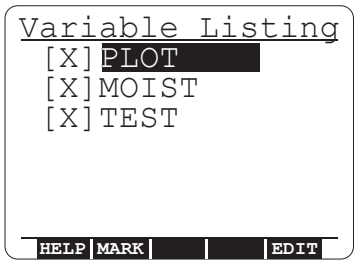
If you get this screen, it means you have not entered any moisture curves. You will need to go back and define a moisture curve (refer to *Chapter 2-26* of this manual).

Note: When you select a moisture curve in harvest it will select both the left and right curve. If you did not give the left and right curve the same name, you will not be able to harvest. You will have to rename one for the curves so that they have the same name.



If you get this screen, it means that an error is in your curve data and the moisture data may be adversely effected if you continue. By graphing the curve you will see the points that do not make sense. Be sure to check both the left and right curves.

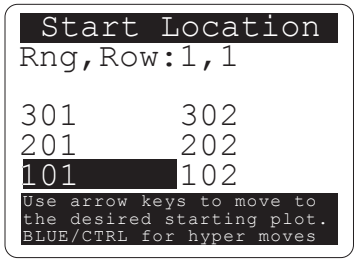
The *Variable Listing* screen displays all the defined variables and whether each variable is active or not.



4. Select *PLOT*, *MOIST*, and/or *TEST* and press <F2> to activate or deactivate the selected variable. An X next to the variable means that it is active.

Note: Variables (e.g. from FieldNotes) cannot be activated during harvest when using the DWRB software application.

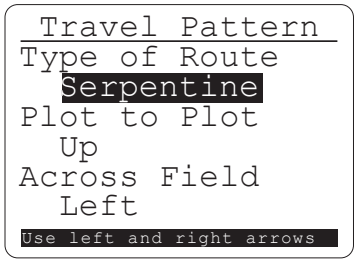
5. Select *PLOT*, *MOIST*, or *TEST* and press <Enter>.



6. Select the *Start Location* plot and press <Enter>.

Selecting Harvest Routes (or Rating Routes)

You will now need to select the travel pattern you will be traveling as you harvest.



7. Select the Type of Route, Plot to Plot Travel direction, and Travel Across Field direction. Use <Enter> or the down arrow key to move to the next travel pattern. Use the left and right arrow keys to choose between options for each travel pattern.

Type of Route

Type of route defines the route through the field that you will be harvesting.

Standard Plot ID

Row				
401	402	403	404	Single Plot ID
301	302	303	304	
201	202	203	204	
101	102	103	104	Range

Range/Row

Row				
4,1	4,2	4,3	4,4	
3,1	3,2	3,3	3,4	
2,1	2,2	2,3	2,4	
1,1	1,2	1,3	1,4	Range

Plot to Plot

The plot to plot is the primary direction that is traveled through the field. These choices are up, left, right, and down.

Across the Field

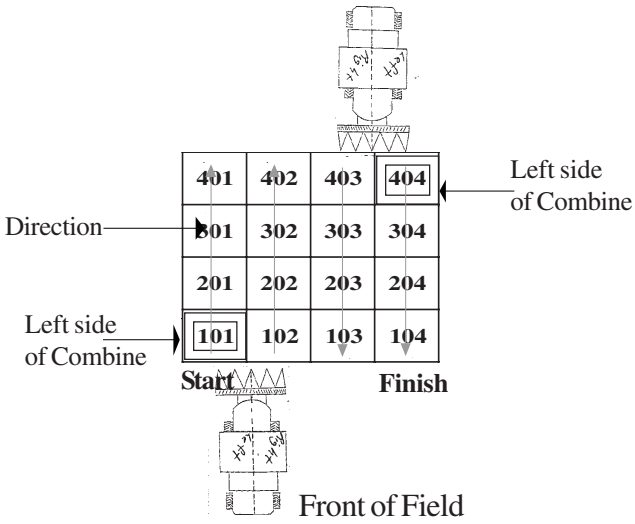
The across the field option is the secondary direction that is traveled through the field. These choices are left and right. The same nomenclature as Plot to Plot travel is used.

Note: Selecting an invalid direction will prompt you of the error.

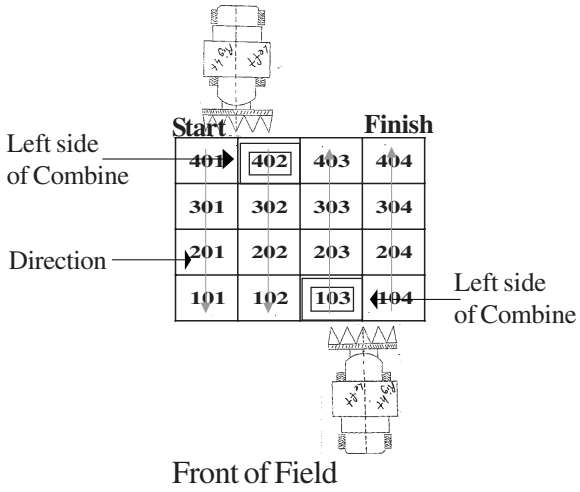
1. Press <F4> to accept your selected Travel Pattern.

For a freshly defined field map, the system will default to the lower left corner of the field. This is normally the starting location.

The diagram below shows a typical starting location relative to the combine's left and right sides.

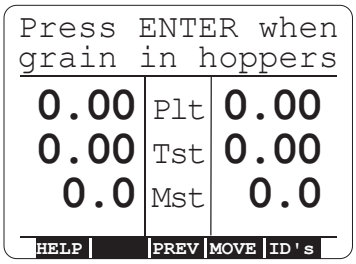


The diagram below demonstrates starting into the field with the starting location at 402 (the lined box around plot# 402) and selecting the harvesting directions as *Plot to Plot: Down* and *Across Field: Right*. Notice that the right side of the combine will be harvesting plot# 401.



Harvesting

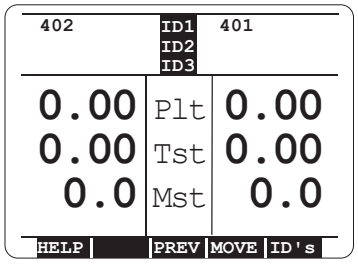
The harvesting will now begin.



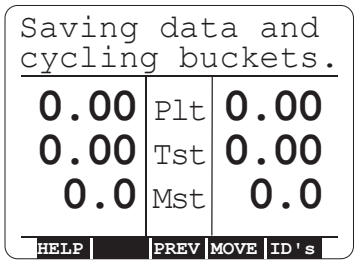
8. Follow the screen prompt and press <Enter> when the grain is in the hoppers.

The screen is split to show information for the left and right bucket. The plot id numbers will be displayed on the screen as you begin to harvest. Plot number 402 will be on the left and 401 on the right which corresponds to the previous selections in the diagram on page 4-6.

Data is recorded as the buckets cycle. You can exit the harvest at any time by pressing <ESC>.



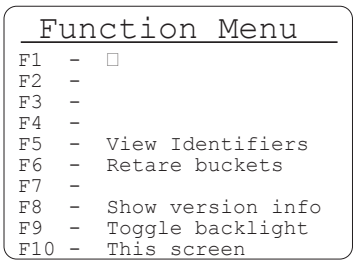
9. Press <Enter> to move to the next plot.



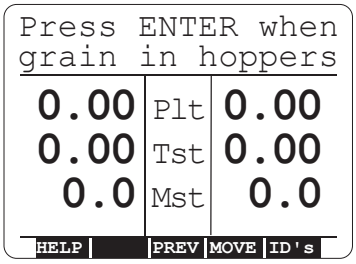
The following screen will then appear and let you know that the Field Computer is saving the data and cycling buckets.

Function Keys

The function keys provide several useful benefits. These functions are especially useful during the collection of data.



Press <F10> to bring up the *Function Menu*.



When in Harvest mode, an abbreviation of the first five functions are listed at the bottom of the screen. These tabs are related to the function keys directly below them on the keypad.

The various functions are selected by pressing their respective function keys at any menu.

F1 - F1 is not available in the double-wide system.

F2 - F2 is not available in the double-wide system.

F3 - F3 is not available in the double-wide system.

F4 - F4 is not available in the double-wide system.

F5 - View Identifiers F5 displays any extra identifiers for the plot.

1. Press <F5> to view extra plot identifiers.

F6 - Retare Buckets

F6 selects a bucket (Left or Right) that you can retare.

The next screen will show for a few seconds while the bucket doors open and close and a new tare weight is being sampled and recorded.

Note: When using F6 to retare bucket, the buckets will empty and the moisture voltage also returns to zero. Do not use F6 when grain is in the moisture chamber.

F7 -

F7 is not available in the double-wide system.

F8 - Show Version Info

F8 displays the current DWRB-DOS software version, the current Fixed Operating System (FOS) version, and the current injected operating system (IOS) version.

The FOS is the operating system that is resident on the HM-400 SCCU. The IOS is on the Field Computer and is injected into the FOS on the SCCU when the two are connected. The IOS essentially tells the FOS how to interact with the Field Computer and other hardware.

An IOS of FOS version will not be displayed unless the Field Computer is attached to the controller and is communicating properly.

F9 - Toggle Backlight

F9 turns the backlight on and off.

When you run the DWRB software, the backlight is automatically turned on.

1. Press <F9> to turn the backlight on or off.

When using the Allegro Field Computer press the <Gold Key> then <F3> key to toggle the backlight on and off from anywhere in the program.

When using the Pro4000 Field Computer press the <Green Key> then the <BS> key to toggle the backlight on and off from anywhere in the program.

Note: When using the Field Computer away from the Harvest Data System Console, turn the backlight off to conserve power, since it creates a significant increase on system power drain.

Viewing Data

Now that you have collected and entered the data into your Field Computer you can now view that information on your PC. This procedure requires the use of DataLink. Refer to *Appendix G: DataLink* for information on retrieving data from the Field Computer.

Viewing Data on your Field Computer

You can view collected data on plotted field maps by viewing created field maps on your Field Computer. To do this complete the process in the *View* section of *Chapter 3: Creating Field Maps*.

Chapter 5
Diagnostics and Exit

Diagnostics

```
  Diagnostics
1 Available Mem.
2 Moisture Volts
3 Load Cells
4 Buckets
5 Print
6 Terminal Mode
```

Diagnostics are provided to aid in troubleshooting.

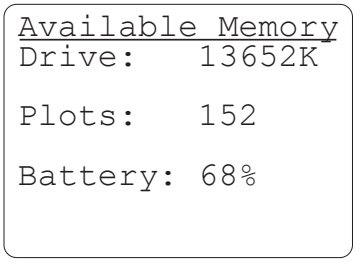
These are the options available in Diagnostics Menu.

Available Memory

This screen allows you to monitor the memory remaining on the active drive.

```
-- MAIN MENU --
4 Diagnostics>
  --DIAGNOSTICS--
 >1 Available Mem.
```

1. Select through the *Main Menu / Diagnostics* screen, select the *Available Memory* option, and press <Enter>.



The *Available Memory* screen gives you the information for drive, plots, and battery.

Drive: The available memory remaining on the active drive.

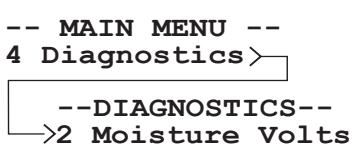
Plots: The number of plots that can be created with the remaining available memory.

Battery: The remaining power left in the battery.

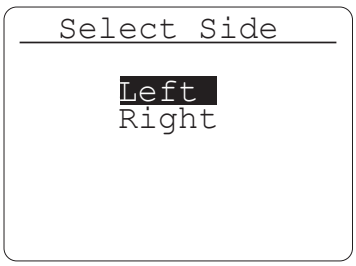
2. Press any key to return to the *Diagnostics* menu.

Moisture Volts

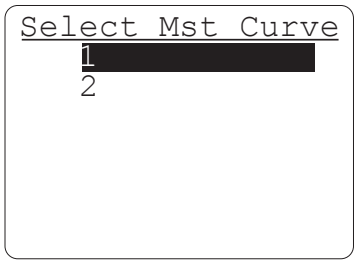
The *Moisture Volts* option displays readings for moisture, relative volts, absolute volts, and temperature.



1. Select through the *Main Menu* / *Diagnostics* screen, select the *Moisture Volts* option, and press <Enter>.

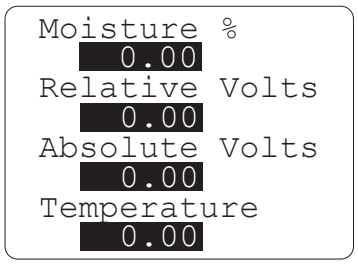


2. Select the bucket you will be viewing from and press <Enter>.



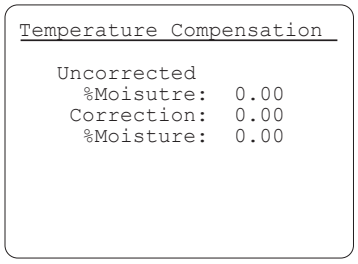
3. Select the moisture curve that you want to look at and press <Enter>.

Note: If no moisture curve is defined, the system will NOT give a moisture percentage.



The first *Moisture Volts* screen displays the current compensated percent moisture reading along with the current temperature (in degrees C). The relative voltage information is a *tared* voltage, which can be used in creating or editing a moisture curve. The absolute voltage information is direct voltage from the sensor and is only used for troubleshooting purposes.

4. Press <Enter>.



The next *Moisture Volts* screen displays the uncorrected percent moisture reading, the correction factor, and the corrected percent moisture reading (moisture reading that has compensated for temperature differential).

*Corr. Factor = Corr. Coef. * (Cal Temp - Actual Temp)*

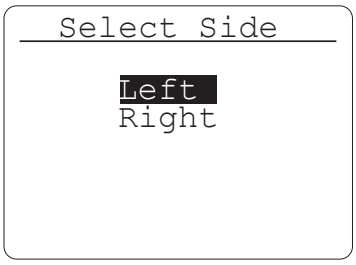
5. Press <Enter> to toggle back and forth between the two moisture diagnostic screens or press <ESC> to exit.

Load Cells

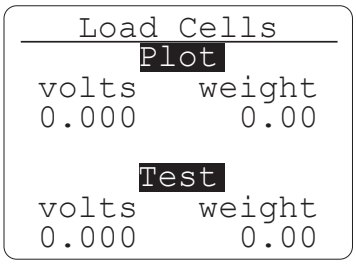
The *Load Cells* option displays the plot and test volts and weights.

```
-- MAIN MENU --
4 Diagnostics>
  --DIAGNOSTICS--
 >3 Load Cells
```

1. Select through the *Main Menu* / *Diagnostics* screen, select the *Load Cells* option, and press <Enter>.



2. Select the bucket you will be viewing from and press <Enter>.



Load Cells displays the volts and calibrated weights of the Plot and Test load cells. Running a known weight over each reveals the accuracy of a load cell.

If the Load Cell is not reading correctly press <F6> to retare or select *Setup* / *Weight/Bucket* screens, select the *Calibrate* option and press <Enter> to calibrate.

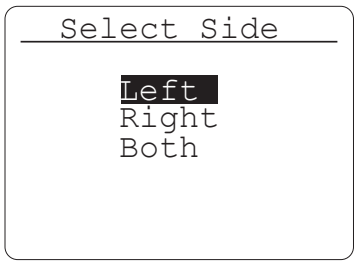
3. Press <ESC> to exit.

Buckets

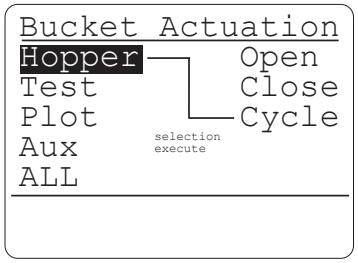
Use this option to test each bucket's actuation. You can test the Hopper, Plot, Test, Auxiliary, or all of these.

```
-- MAIN MENU --
4 Diagnostics>
  --DIAGNOSTICS--
 >4 Buckets
```

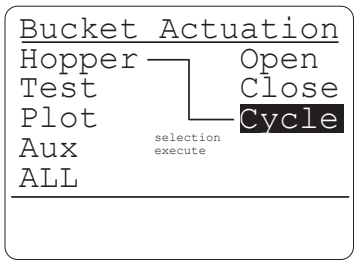
1. Select through the *Main Menu* / *Diagnostics* screen, select *Load Cells*, and press <Enter>.



2. Select the bucket you will be testing from and press <Enter>.



3. Select one of the options in the left-hand column that you would like to test.



4. Select one of the options in the right-hand column that you would like to test.

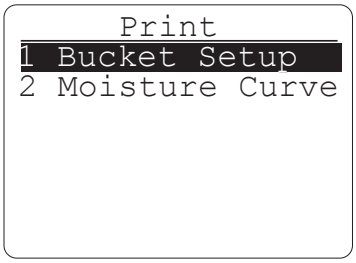
5. Press <Enter> to execute the test, once you have selected the desired selections in both columns.

Print

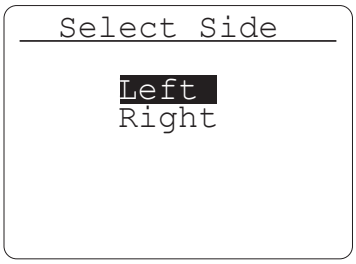
The *Print* option allows you to print the Bucket Setup and/or the Moisture Curve for each bucket.

```
-- MAIN MENU --
4 Diagnostics>
   --DIAGNOSTICS--
  >5 Print
```

1. Select through the *Main Menu* / *Diagnostics* screen, select the *Print* option, and press <Enter>.

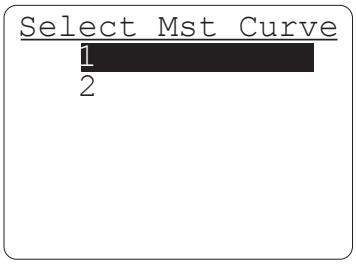


2. Select the option which you want to print and press <Enter>.



3. Select the bucket you will be printing from and press <Enter>.

If you selected Moisture Curve you will have this extra step.



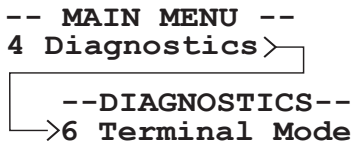
4. Select the moisture curve you want to print and press <Enter>.

Terminal Mode

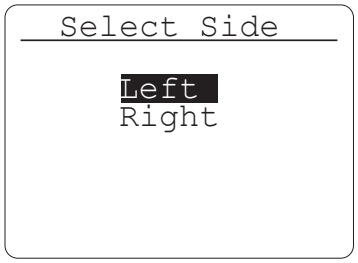
Terminal is a diagnostic tool used mainly for troubleshooting communication problems between the PC and the Field Computer. To test communication between the Field Computer and the PC complete the following steps:

1. Connect the Field Computer to the appropriate Comm Port on the PC.

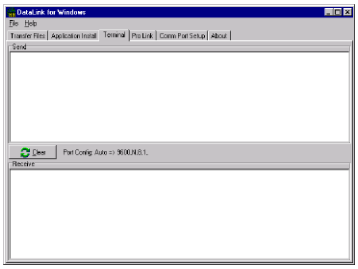
2. Using your PC, open *DataLink* and set it to *Terminal Mode*, or use *Windows Hyper Terminal*.



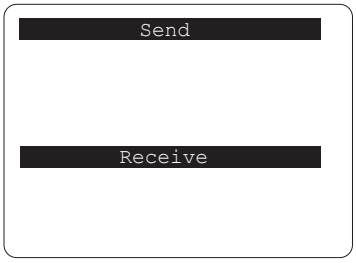
3. Using your Field Computer select through the *Main Menu / Diagnostics* screen, select the *Terminal Mode* option, and press <Enter>.



4. Select the bucket you will be viewing and press <Enter>.



5. Type a test message on your PC. The message should appear in the *Send* window in DataLink and in the *Receive* window on the Field Computer.



6. Type a test message on the Field Computer. The message should appear in the *Send* window of the Field Computer and in the *Receive* window of DataLink.

7. If steps 3 through 6 are accomplished successfully, then the Field Computer and PC are communicating.

8. If these messages do not appear as they should, make sure of the connections to the PC and Field Computer. Make sure the Field Computer is plugged into the same Comm Port as shown on the *Comm Setup* screen. You may also refer to the Troubleshooting chapter of your Field Computer's manual. Then repeat steps 2 - 6 to test if the Field Computer and PC are communicating.

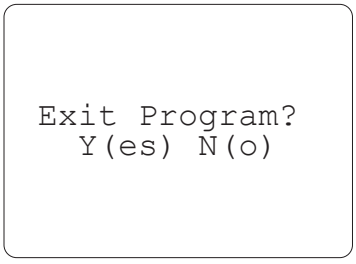
See *Appendix G*, pages G-12 and G-13, for more information.

Exit

The *Exit* option will get you out of the DWRB-DOS program. To exit the DWRB-DOS program complete the following step:

```
-- MAIN MENU --
5 Exit
```

1. Select through the *Main Menu* / *Exit* screen and press <Enter>.



2. Press <Y> for yes to exit the program, or press <N> for no to cancel the exit process.

Chapter 6
Troubleshooting

If you believe you have determined the reason for a problem, refer to *Chapter 2, Software* or *Chapter 7, Installation* for guidance. If it is apparent that your equipment needs to be returned to the factory for repair, an Return Material Authorization (RMA) number will need to be authorized. To receive your RMA number call our customer service department at 435-753-1881 (8 am - 5 pm MST, Monday - Friday).

Symptoms

The following sections in this chapter will cover possible problems you may encounter with your HarvestMaster equipment.

SCCU Power Failure (No Power LED)

If you are having problems with power getting to your SCCU complete the following:

- Check the power cord connection to see that it is plugged into the SCCU correctly.
- Check the power cord connections and polarity to the battery.

- Check the 6 AMP circuit breaker on the back of the SCCU controller. Reset if needed.

- Check the battery voltage (should be no less than 14.0 V with the combine running).

Field Computer Communication Failure with the PC

If you are having problems with your Field Computer connecting to your PC complete the following procedures:

- Check to make sure that you are using the CA-2009 communications cable from HarvestMaster. Any standard RS-232 communications cable will not work. You will need a Null Modem cable to communicate with the Field Computer.

- Check the communications port that has been selected on the PC and/or Field Computer, and make sure it matches the communication port that the Null Modem cable is plugged into.

- Make sure there is no other program installed that is disabling the use of the COM port. For example, when using the Allegro F/PC, Active Sync needs to be disabled so other program can use the COM port. This is done by opening the *ActiveSync* file, selecting *Connection Settings...* and unchecking the *Allow serial cable...to this com port*.

- Make sure that you are following the communication procedures correctly for the Field Computer. Refer to the Field Computer User's Manual, if necessary.

- Try the other communication port on the Field Computer to eliminate a possible hardware problem with the Field Computer.

- Try another PC to verify a possible hardware problem with the PC.

Field Computer Communication Failure with the SCCU

If you are having problems with your Field Computer communicating with your SCCU complete the following procedures:

- Check to see that the SCCU and the Field Computer are off. Then turn on the SCCU and make sure that the Field Computer is powered up with it. When the DWRB program runs, the system should come to the *Main Menu* automatically without pressing any keys. Pressing <F8> should display 3 versions of software. If there is any problems with the above outlined procedures, continue with the following instructions.

- Check to see if the LED's (red and green lights) on the front panel of the SCCU are flashing in the same sequence as when it is first powered up. If they are, the Injected Operating System (IOS) did not load.

  Note: If LED's are not flashing at all, and the power LED is the only one that is illuminated, the problem is in the SCCU HM-401 console. Please call HarvestMaster's customer service department for an RMA.

- Check to make sure that the Field Computer cradle is securely plugged into the SCCU console and the bottom door is latched tightly against the bottom of the cradle.

- Check to make sure that the cradle's 9-pin connector is securely plugged into the communications port #1 on the Field Computer.

- Transfer files from the PC to the Field Computer through the communications port #1 to insure that the port on the Field Computer is operational.

- Make sure your communication ports are turned on in the setup mode on the Field Computer, do this by typing *setup* at DOS C: prompt.

Inaccurate Moisture and Weight Readings

If you are receiving inaccurate moisture and weight readings complete the following procedures:

- Check to see that the Injected Operating System (IOS) is loaded correctly by pressing <F8> to show its version.

- Check the software versions on the Field Computer by pressing <F8>. Make sure that the first number on the Fixed Operating System (FOS) is the same as the first number on the IOS.

  e.g. FOS ver. 3.xxx Dy-Mon-Yr
  IOS ver. 3.xxx Dy-Mon-Yr

  These numbers, FOS 3.3 or ISO 3.2, must match on both the IOS and FOS.

  Note: After turning the system on, it should come to the Main Menu automatically.

- Recalibrate the load cells.

- Check the points in the moisture curve.

- Try retaring your system.

- Check the system control cable connection between the SCCU and the HM-420LF filter box. Inspect the pins on the SCCU and HM-420LF ends for damage or corrosion.

Inaccurate Weight Readings (Moisture is Fine)

If you are receiving inaccurate weight readings complete the following procedures:

- Make sure the shipping stops are disabled (see *Chapter 7, Installation*).
- Make sure the two weigh pan guide pins are installed (see *Chapter 7, Installation*).
- Check the weight calibration as outlined in *Chapter 2, Software, Weight Calibration*.
- Check each individual load cell by selecting *Load Cell* from the *Diagnostics* menu.
- Check the control cable connections for bent, broken, or dirty pins and sockets. Clean with an electrical parts cleaner or tuner cleaner as needed.
- Check cables and hoses for weigh pan interference (must be very loose).
- Select the *Load Cells* option in the *Diagnostics* menu and check to see that the total load cell voltage readings are in the range of .800V (± .5V) with an empty chamber and the weigh pan is in its operation position. When a weight is placed on the chamber, this voltage should increase to a certain point and stabilize. When the weight is removed, the voltage should return to the original voltage level.

To verify which load cell is malfunctioning, place a 4-5 lb. weight above each load cell (one at a time) and watch the total voltage. The problem load cell will not yield readings consistent with the other load cells.

If there is no response on two or more load cells, try unplugging two of the load cells and test one load cell at a time. You may plug one load cell into another port to verify that it is a load cell problem and not a cable or part of the electronics.

No Test Weight (Plot Weight is Fine) or Vice Versa

If you are not receiving any test weight readings, but the plot weight is fine or vise versa, complete the following:

- Check the load cell connection to the HM-420BF break-out-box.
- Check the system control cable connection between the SCCU and the HM-420BF break-out-box. Inspect the pins on the SCCU and HM-420BF ends for damage or corrosion.
- Plug the load cell into another load cell port on the break-out-box to see if the problem follows the load cell.
- Replace the load cell with one that you know is good.

No Test Weight or Plot Weight (Moisture is Fine)

If you are not receiving any test-weight or plot-weight weight readings, but the moisture registers as fine, complete the following procedures:

- Check the system control cable connection between the SCCU and the HM-420BF break-out-box. Inspect the pins on the SCCU and HM-420BF ends for damage or corrosion.

- Using a DC volt-meter, check the load cell excitation at the HM-420BF break-out-box. To do this, disconnect the load cell and insert the red probe of the volt-meter into pin 1 (+5V) and the black probe into pin 5 (Ground). With the SCCU on , the voltage should be approximately 5V. If it is not, proceed with the next step, if not skip the next step.

- Using the DC volt-meter, check the load cell excitation at the HM-401 SCCU. To do this, disconnect the Control Cable from the HM-420BF break-out-box. Insert the red probe into pin 11 and the black probe into pin 15 of the female connector of the System Control Cable. With the SCCU on, the voltage should be approximately 12V.

Note: If either voltage is not present, please call HarvestMaster Customer Service for further instruction.

- Replace the load cells with a known good ones.

Inaccurate Moisture Readings (Weight Readings are Fine)

If you are receiving inaccurate moisture readings, complete the following procedures:

- Check all cable connections from the moisture sensor to the SCCU for dirt or damage.

- Make sure all of the calibration points are entered correctly and that they produce a near linear line when graphed (refer to *Calibrating Moisture* in *Chapter 2* of this manual).

  Note: The combine should be running at the same RPM when calibrating as it is in the field when harvesting. This insures that there are greater than 13V supplied to the SCCU which insures a regulated voltage to the moisture sensor.

- With an empty chamber, make sure the sensor always reads zero volts before calibration. If not, do a retare <F6>. When calibrating, an empty chamber should always produce 0% moisture (which corresponds to 0 volts).

- With an ohm meter, check to see that the sensor chamber has a good ground connection to the back plate of the moisture blade. The chamber is grounded by the two mounting screws threaded into it. If needed, run a ground strap from the back of the moisture blade to the chamber housing.

- Check to make sure the moisture sensor back plate is at the same potential as the SCCU controller. Run a 18 AWG ground wire from the sensor to the SCCU controller bracket.

- Select the *Moisture* option in the *Diagnostics* menu and check the relative moisture volts of each sample to see that they are stable and consistent with the calibration samples.

Bucket Doors Do Not Operate Correctly

If the bucket doors do not open correctly, complete the following procedures:

- Check the System Control Cable connections for bent, broken, or dirty pins. Clean as needed.
- Check the bucket actuator setup in the *Controls* option in the *Weight/Bucket* menu.
- Check the Auto/Manual switch to make sure that it is in the manual mode. Run the actuators in manual mode.
- Make sure the Auto/Manual switch on the front of the SCCU is in Auto mode. In the *Diagnostics* menu run the actuators automatically, one at a time, to see if they operate correctly.
- Check to see that the air pressure is normal (50-85 PSI).
- Check for leaks in the air system.
- Check the compressor for efficiency.
- Check the air filters and coalescing filters to see that they are not restricting air flow.

- If using limit switches, disable them in the *Control* menu option to see if they are causing the actuators to malfunction. Refer to *Control* in the Weight/Bucket of *Chapter 2* of this manual. Use a transition time of at least 0.3 seconds.

- If the limit switches are the problem, enable them one at a time to find the one that is causing the problem.

- With a DC Volt-Meter, check the voltage at the solenoid to make sure that it is approximately 12V when the actuator is enabled.

- Release air pressure using the air supply safety valve and check the gates for binding by sliding them back and forth with your hand.

- Make sure the LEDs on the limit switches correspond to those on the SCCU.

- Adjust limit switches on pneumatic actuators if needed. Refer to the *Connecting the Actuator Control Lines,* in *Chapter 7* of this manual for a description of panel light indications.

- Check to make sure that the chassis ground is connected correctly, when using a windshield wiper motors.

Printer Does not Respond (Power LED is OFF)

If printer is not responding and the power LED is off, complete the following procedures:

- Make sure the SCCU power is turned on.
- Check the cable connections to the SCCU to make sure they are not loose or damaged.
- Check the printer mounting screws to make sure that they are tight.

Printer Does not Respond (Power LED is ON)

If printer is not responding and the power LED is on, complete the following procedures:

- Run the self test and check the parameter settings as outlined in *Chapter 7, Installation, Printer Test and Setup*.
- This is a sign of a printer hardware failure and may need to be sent in for repair.

If you have performed all of the necessary troubleshooting steps and your system is still not operating correctly, please contact our customer service department at 435-753-1881 (8 am - 5 pm MST, Monday - Friday).

Chapter 7
Installation

Requirements for Installation

This chapter explains in detail how to install your Double-Wide Regular Bucket System (DWRB) for the first time. It is important to follow the installation procedures in the order they are presented. If you purchased the system already installed, you can skip this chapter.

Typical time for the DWRB System installation ranges from 5 to 10 hours. This depends on the following type of combine modifications necessary:

- Materials and equipment you have on hand to build brackets and make modifications
- Whether grain delivery and removal systems are in place or have to be added.

For ease of installation, make sure you have the following tools on hand:

- A Phillips-head screwdriver
- A flat-blade screwdriver
- A 1/2" open-ended wrench
- A 9/16" wrench and a 9/16" socket with a 12" (30 cm) extension
- Mounting hole diagram for Harvest Data System Console (see *Appendix C*)

- A power drill with 7/32" and 13/32" bits
- A sharp utility knife
- Connectors and a crimping tool for electrical connections (specified by the type of actuator used)
- Black "ultraviolet resistant" cable ties
- A carpenter level
- Two #28 x 1/4” eye bolts for each load cell
- A 1/2” black wire loom (approx. 20 feet)

Components

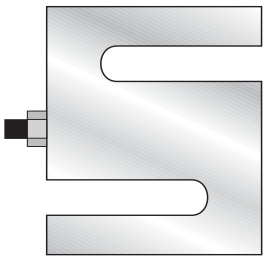
The basic unit of your DWRB System is the control and conditioner unit (SCCU) with its console base (see Figure 7-3).

Electronics Group

The console base accommodates the removable Field Computer data acquisition computer and (optionally) a Harvest Data System FieldPrinter. Together, these components are referred to as the Harvest Data System console. You should have these system components:

- Two system control cables (beige multi-conductor cable with a 37-pin connector on both ends.)
- Two break-out boxes (brown panel with 7 connectors on the front and a 37-pin connector on the bottom).
- Two power cable (black two-conductor cable with a two-pin connector on one end and bare wires on the other end).
- An S-shaped plot-weight load cell for each bucket. If you received two load cells for each bucket, the one with the larger weight rating is the plot-weight load cell (see Figure 7-1).

Figure 7-1 S-shaped plot-weight load cell.



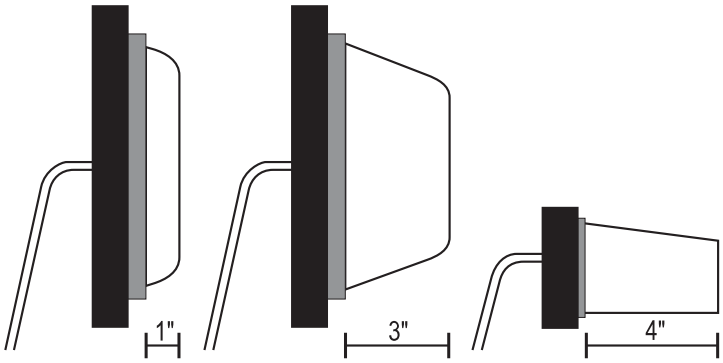
- Four #10-32 x 1/2 threaded mounting bolts and nuts.
- A Field Computer.

Optional Components

The following optional components may include:

- FieldPrinter (see Figure 7-3.)
- Remote ENTER cable.
- A second S-shaped test-weight load cell for each bucket (see Figure 7-1). The test-weight load cell has a smaller weight rating than the plot-weight load cell.
- A 1", 3", or mini 4" grain moisture sensor for each bucket (see Figure 7-2.)

Figure 7-2 1", 3" or mini 4" grain moisture sensor.



Field Computer Inventory

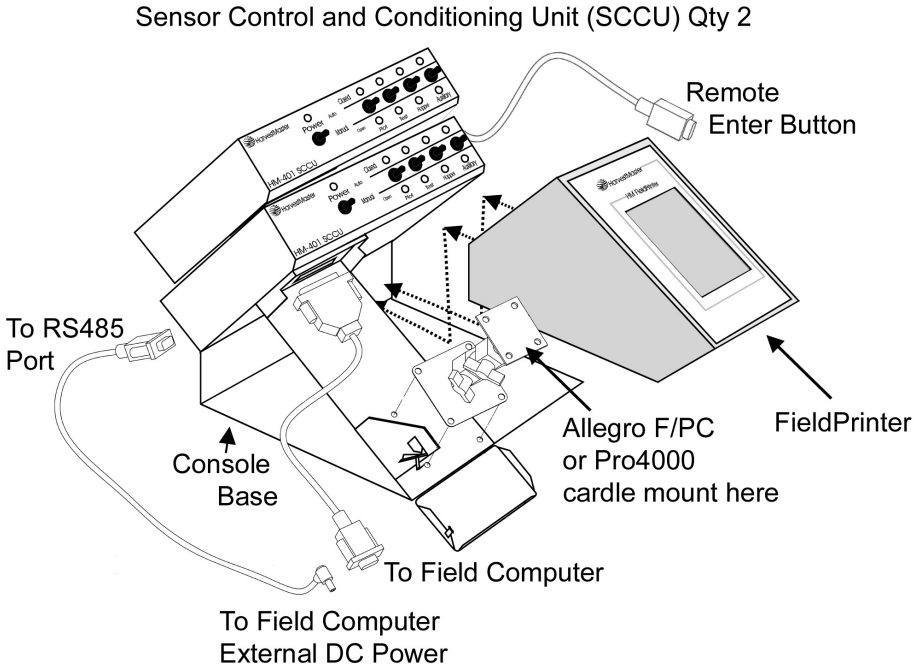
With your Field Computer, you should have the following items:

- Harvest Data System manual and a diskette with the DWRB Harvest Data Application software to be loaded onto the Field Computer.
- DataLink for Windows PC communications program.
- Field Computer operator's manual.
- CA-2009 RS-232 communications cable.
- AC wall mount charger.

1. Inventory the items to be installed.

You should have, at a minimum, all the items shown in Figure 2-3 (with the possible exception of the optional Harvest Data System FieldPrinter and remote ENTER cable).

Figure 7-3
The Harvest Data System Console.



The Field Computer and Harvest Data System FieldPrinter fit into the Harvest Data System console base. The FieldPrinter is an optional component for convenient field use.

Supporting Hardware

Before installing the DWRB System, you should have the following hardware items in place:

- Plot-weight buckets.
- Mounting points for the S-shaped load cells or other load cells should your implementation vary from the suspension shown.

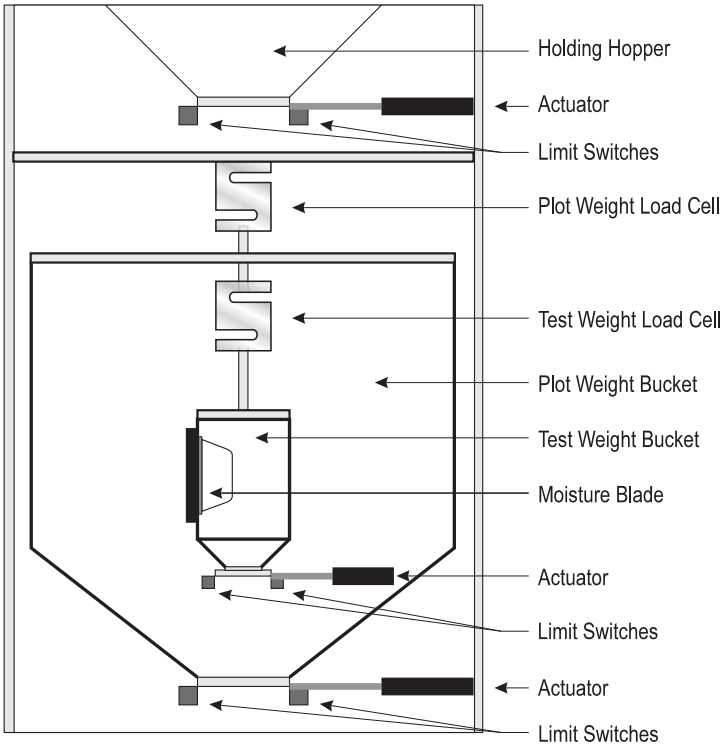
Depending on your requirements, you may also need to have the following items ready:

- A holding hopper for grain (cyclone or holding hopper).
- A moisture sensor chamber with a rectangular port in the side to accept the grain moisture sensor.
- A test-weight/moisture sensor chamber (when used, this will usually incorporate a mounting position for the grain moisture sensor).

Figure 7-4 illustrates placement of the two S-shaped load cells and the moisture sensor in a basic test-harvest system.

1. Make sure the appropriate hardware is in place and ready for the load cells. This includes the plot-weight bucket and, if used, the test-weight/moisture sensor chamber.

Figure 7-4
A Basic Test-Harvest System.



This installation includes a test-chamber load cell as well as a plot-weight load cell; therefore, the assembly includes a test chamber. A moisture sensor is installed in the test chamber in this example.

Mounting the Components

We recommend that you mount your Harvest Data System console on a flat surface. The location should be within arm's reach at a convenient height for the operator. The Field Computer screen needs to be positioned at an easily visible angle. The mounting hardware provided is designed for mounting to a surface that is 1/4" thick or less. To mount the Harvest Data System console on the combine, complete the following steps :

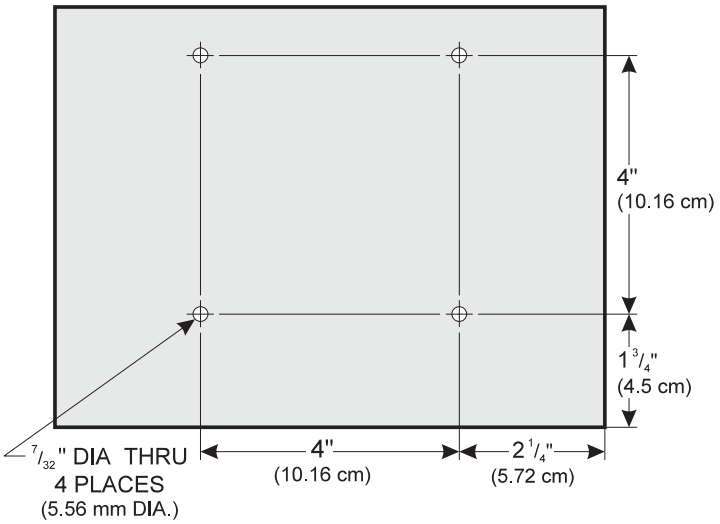
1. Select the location for the Harvest Data System console.

2. Mark where you want the holes drilled on the equipment surface . (Please refer to the dimensioned mounting diagram in Figure 7-5 or Appendix C.)

3. Drill four 7/32" mounting holes on the desired mounting surface.

4. Position the Harvest Data System console over the holes and securely tighten the mounting screws.

Figure 7-5
Bottom of the
HarvestMaster Console.



Secure the Harvest Data System console base directly to the mounting surface using the four screw holes. The threaded mounting screws are #10-32 x 1/2. Nuts are included. Screw holes on the mounting surface should be 7/32" DIA.

Break-out Box Installation

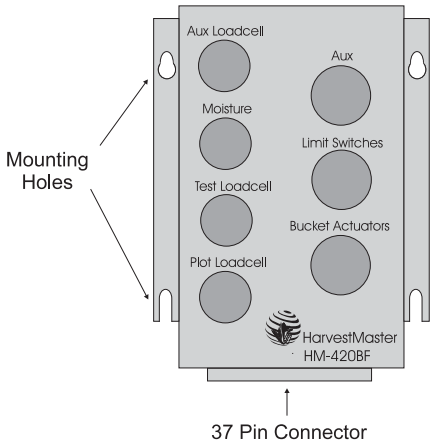
Using the four mounting holes provided, mount the break-out box on the combine within reach of the load cells and actuators. The break-out box is designed to be mounted within 10 - 12 feet of the load cells and actuators. Most load cells and actuators come with more than six feet of cable.

Note: It is recommended to mount the HM-420BF boxes out of the weather. It is commonly mounted inside the combine's cab, but can be mounted under a shield or in a sealed box by the bucket system.

1. Connect the 37-pin connector on the System Control Cable to the 37-pin connector on the break-out box and tighten the thumbscrews securely (see Figure 7-6 below).

2. Connect the sensor, load cell, actuator, and switch cables to the appropriately labeled connectors on the break-out box. Each connector is covered with a protective lid. Lift the lid to expose the connector. Insert the connector end of the correct cable into the socket on the break-out box and twist the locking ring until it is locked and secure.

Figure 7-6
Break-out box



Connecting the Actuator Control Lines

Actuators control the holding hopper, plot-weight bucket, and test and auxiliary chamber doors. Different manufacturers have various types of mechanisms for opening/closing these doors. Some combines have electromechanical linear or windshield wiper actuators without limit switches, while others require limit switches. Combines with hydraulic actuators or pneumatic actuators may or may not use limit switches.

Hydraulic Actuators

Below are steps for installing a double bucket system with one hydraulic valve controlling the Plot and Test actuators on both buckets and one hydraulic valve controlling the Hopper and Wiper actuators on both buckets.

1. Locate the two 12 ft. multi-conductor actuator cables (6-pin).

2. Refer to your solenoid manufacturer's specifications for the location of the positive and negative terminals on the solenoid.

3. Using Table 7-1, connect the Plot actuator wires to the proper terminals on the solenoid.

4. Using the same diagram (Table 7-1), connect the Hopper actuator wires to the appropriate terminals.

5. Run the cable to the location of the HM-420BF filter box and insert the connector end of the actuator cable into the actuators socket of the box connected to the *Left* (bottom) SCCU. Twist the locking ring until secure.

Note: Since one solenoid controls both buckets, they will operate simultaneously.

For all other actuator types (Pneumatic, Electromechanical, Windshield Wiper Motor), use one actuator for each door. Refer to the actuator installation diagrams on this and following pages for wiring instructions.

This setup will allow the buckets to operate independently of one another. To do this complete the following steps:

1. Locate the two 12 ft. multi-conductor actuator control cables.

2. Refer to your actuator manufacturer's specifications to determine the location of the positive and negative terminals on the actuator mechanism.

3. Connect all actuators (maximum of three per bucket) according to Table 7-1.

Table 7-1
Electromechanical and Hydraulic Linear Actuator Cable Connection

Connector Pin Number	System Control Cable Pin Number	Cable Wire Color	Signal	Actuator Connection
1	1	Red	close plot	plot bucket ctrl voltage (+)
2	2	Black	open plot	plot bucket ctrl voltage (-)
3	3	Green	close test	test bucket ctrl voltage (+)
4	4	Brown	open test	test bucket ctrl voltage (-)
5	5	Blue	close hopper	hopper bucket ctrl voltage (+)
6	6	White	open hopper	hopper bucket ctrl voltage (-)

4. Run one cable to one of the break-out boxes. Insert the connector end of the actuator cable into the actuator's socket of the break-out box and twist the locking ring until it is secure. Repeat with the other cable to the other break-out box.

Pneumatic Actuators

If using a pneumatic actuator complete the following steps:

1. Locate the two 12 ft. multi-conductor actuator control cables.

2. Refer to your actuator manufacturer's specifications to determine the location of the positive and negative terminals on the actuator mechanism.

3. Connect all actuators (maximum of three) according to Table 7-2.

Table 7-2
Pneumatic Actuator Connection

Connector Pin Number	System Control Cable Pin Number	Cable Wire Color	Signal	Actuator Connection
1	1	Red	close plot	plot close terminal
2	2	Black	open plot	plot open terminal
3	3	Green	close test	test close terminal
4	4	Brown	open test	test open terminal
5	5	Blue	close hopper	hopper close terminal
6	6	White	open hopper	hopper open terminal

4. Run one cable to one of the break-out boxes. Insert the connector end of the actuator cable into the actuator's socket of the break-out box and twist the locking ring until it is secure. Repeat with the other cable to the other break-out box.

Note: The box the connector is inserted into (left or right), will define that bucket as left or right. It is recommended that you wire the bottom controller to the Left *Bucket and top controller to the* Right *Bucket.*

Windshield Wiper Motors

If using a windshield wiper motor complete the following steps:

1. Locate the two 12 ft. multi-conductor actuator control cables.

2. Connect all actuators (maximum of three) according to Table 7-3 above.

Table 7-3
Windshield Wiper Motor Connection

Connector Pin Number	System Control Cable Pin Number	Cable Wire Color	Signal	Actuator Connection
1	1	Red	close plot	plot park terminal
2	2	Black	open plot	plot low terminal
3	3	Green	close test	test park terminal
4	4	Brown	open test	test low terminal
5	5	Blue	close hopper	hopper park terminal
6	6	White	open hopper	hopper low terminal

3. Run one cable to one of the break-out boxes. Insert the connector end of the actuator cable into the actuator's socket of the break-out box and twist the locking ring until it is secure. Repeat with the other cable to the other break-out box.

Note: The box the connector is inserted into (left or right), will define that bucket as left or right. It is recommended that you wire the bottom controller to the Left *Bucket and top controller to the* Right *Bucket.*

Limit Switch Wiring for Hydraulic Actuators (using one solenoid to control both left and right buckets)

If your weight bucket's actuator does not require limit switches, this section is not applicable to you. Generally, pneumatic and hydraulic actuators do not require limit switches for operation. However, you may wish to install limit switches to give the operator an open/closed indication on the Harvest Data System Console lights even if your system does not require them for operation.

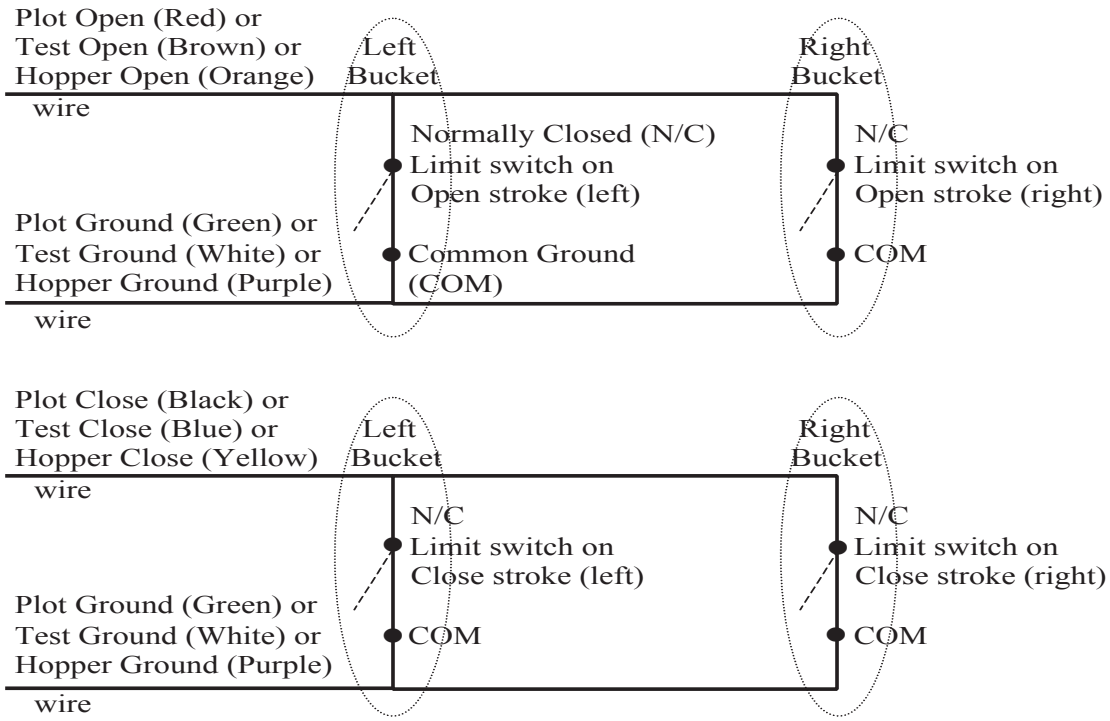
This section explains how to wire limit switches for a double-bucket system with one solenoid controlling both buckets. Use the steps below to install an open and closed limit switch for each bucket. If you do not have an *open* limit switch, ignore that particular step, to do this complete the following steps:

1. Locate one of the 12 ft. multi-conductor limit switch cables (6-pin).

Note: Only one Limit Switch Cable is needed for systems that have one solenoid controlling both left and right buckets.

Refer to Figure 7-7 to connect the limit switch wiring. On some buckets, the plot solenoid controls both the plot door and test door. In this case, the test limit switches are wired into the Plot Limit Switch. Table 7-4 gives the configuration for the open and close limit switches for each actuator. This table can be used with the following diagram.

Figure 7-7
Limit Switch Wiring



Note: Appendix E gives information on each connecting wire. Figure 7-4 gives a description of the components for a basic Regular Bucket system.

2. Install ring or slide terminals (whichever is preferred) onto the ends of each conductor. It is recommended to solder the terminals onto the conductors.

3. After connecting the appropriate limit switch wire to the COM terminal of the left limit switches, run a 20-24 AWG stranded wire from the COM terminal of the left limit switch to the COM terminal on the right limit switch. Repeat this procedure for each door that has limit switches (plot, test, and hopper).

Table 7-4
Pneumatic, Hydraulic, and Electromechanical
Actuator Limit Switch Connection

Connector Pin Number	System Control Cable Pin Number	Cable Wire Color	Signal	Actuator Connection
1	7	Red	plot open	to limit switch activated when plot door is open
2	8	Black	plot close	to limit switch activated when plot door is closed
3	22	Green	plot closed	to ground of both plot limit switches
4	9	Brown	test open	to limit switch activated when test door is open
5	10	Blue	test close	to limit switch activated when test door is closed
6	22	White	test ground	to ground of both test limit switches
7	27	Orange	hopper open	to limit switch activated when hopper door is open
8	28	Yellow	hopper close	to limit switch activated when hopper door is closed
9	22	Purple	hopper ground	to ground of both hopper limit switches

4. After connecting the appropriate limit switch wire to the N/C terminal of the left limit switches, run a 20-24 AWG stranded wire from the N/C terminal of the left limit switch to the N/C terminal on the right limit switch. Repeat this procedure for each door that has limit switches (plot, test, and hopper).

If you do not have any open limit switches, tie the wires back (neatly out of the way) and place them in the wire loom with the other conductors. Do not cut the extra wires off; you may want to add limit switches in the future. Refer to the limit switch connection diagrams in this chapter for wiring instructions for buckets that are configured as two separate bucket systems.

5. Run the cable to the location of the left break-out box (bottom SCCU). Insert the connector end of the actuator cable into the *actuator* socket of the break-out box and twist the locking ring until it is secure.

Note: The actuator cable from the right break-out box is not used with this configuration.

Once installation is complete, tuck all loose wires into a plastic wire loom and fasten securely with plastic ties.

Limit Switch Wiring for Pneumatic, Electromechanical, or Windshield Wiper Motor Actuators (left and right operation independent of each other)

If your plot-weight bucket's actuator does not require limit switches, this section is not applicable to you. Generally, pneumatic and hydraulic actuators do not require limit switches for operation. However, you may wish to install limit switches to give the operator an open/closed indication on the Harvest Data System Console lights even if your system does not require them for operation.

If each of your doors have two limit switches (e.g. electromechanical actuators), complete the following steps:

1. Locate the two 12 ft. multi-conductor limit switch cables (9-pin).

Refer to Table 7-4 to connect the wiring for pneumatic, hydraulic, or electromechanical linear actuators. Table 7-4 presents a configuration of two limit switches. Refer to Table 7-5 to connect the wiring for windshield wiper motors with one external limit switch. *Appendix E* gives instructions for connecting the wires. Figure 7-4 gives a description of the components of a basic Regular Bucket system.

2. Install ring or slide terminals (whichever is preferred) onto the ends of each conductor.

3. On each bucket (left and right), connect the wire indicating the door is open to the N/C terminal on the hopper limit switch. This is the hopper limit switch that is activated when the door is open. Repeat this step for the plot and test limit switches, if available.

4. On each bucket (left and right), connect the wire indicating the door is closed to the N/C terminal on the hopper limit switch. This is the hopper limit switch that is activated when the door is closed. Repeat this step for the plot and test limit switches, if available.

   Note: If the test bucket has no limit switch and is actuated by the same control as the plot bucket, tie the plot closed wire with the test closed wire, the plot open wire with the test open wire, and the plot ground wire with the test ground wire.

5. Connect a 20-24 AWG stranded ground wire between the common COM terminal of both limit switches for the hopper, test, and plot doors of each bucket.

6. On each bucket, connect the ground wire to the common COM terminal of either limit switch set which is tied together (plot, test, and hopper).

7. Run one cable to one of the break-out boxes. Insert the connector end of the actuator cable into the actuators socket of the break-out box and twist the locking ring until secure. Repeat with the other cable to the other break-out box.

Note: The box the connector is inserted into (left or right), will define that bucket as left or right.

If you do not have any open limit switches, tie the wires back, neatly out of the way, and place them in the wire loom with the other conductors. Do not cut the extra wires off, you may want to add limit switches in the future. Refer to the limit switch connection diagrams in this chapter for wiring instructions for buckets that are configured as two separate bucket systems.

Windshield Wiper Limit Switch

If you only have one limit switch, determine whether the door strikes the limit switch when it is open or closed. If the door strikes the limit switch when opening (e.g., windshield wiper motor actuators), complete the following steps:

1. Connect the plot-weight bucket open wire to the N/C side of the limit switch.

2. Connect the ground to the limit switch on the common terminal.

3. Fold the plot-weight bucket closed wire and neatly tuck it into the wire loom. Secure the wire loom with plastic tie straps.

4. Run one cable to one of the break-out boxes. Insert the connector end of the actuator cable into the actuator's socket of the break-out box and twist the locking ring until it is secure. Repeat with the other cable to the other break-out box.

Note: The box the connector is inserted into (left or right), will define that bucket as left or right.

Refer to Table 7-3 for windshield wiper motors. Table 7-5 presents a configuration of one limit switch. *Appendix E* gives instructions for connecting the wires. Once installation is complete, tuck all loose wires into a plastic wire loom and fasten securely with plastic ties.

Table 7-5
Windshield Wiper Limit Switch Connection

Connector Pin Number	System Control Cable Pin Number	Cable Wire Color	Signal	Actuator Connection
1	7	Red	plot open	to plot door limit switch
2	8	Black	NA	not connected
3	22	Green	plot ground	plot limit switch common terminal
4	9	Brown	test open	to test door limit switch
5	10	Blue	NA	not connected
6	23	White	test ground	plot limit switch common terminal
7	27	Orange	hopper open	to hopper door limit switch
8	28	Yellow	NA	not connected
9	22	Purple	hopper ground	plot limit switch common terminal

Auxiliary Connection

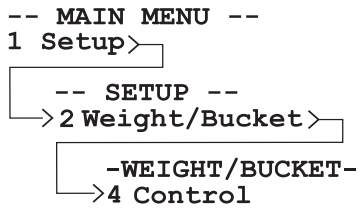
The auxiliary connector is normally not used. If there is another actuator or special function that you would like to control, it is possible by wiring it to this port. An extra 6 ft. of multiconductor control cable is required to do this (see Table 7-6).

Table 7-6
Auxiliary Connection

Connector Pin Number	System Control Cable Pin Number	Cable Wire Color	Signal	Actuator Connection
1	23	Red	aux (+)	auxiliary bucket control voltage (+)
2	24	Black	aux (-)	auxiliary bucket control voltage (-)
3	20	Green	aux open limit switch	to limit switch activated when plot door is open
4	21	Brown	aux close limit switch	to limit switch activated when plot door is closed
5	11	Blue	+12VM	low current excitation
6	22	White	GND	ground

The Harvest Data script file will need to be modified for proper operation. Please consult with a HarvestMaster Customer Service Representative for a quote on your specific modification.

Note: When limit switches are used with the 401 SCCU to cut out actuator power at the end of the stroke, the following must be observed in order for them to operate.



Limit Switch must be selected, by pressing <Y> for yes, in the *Control* menu. You can get to the control by following the path show in the diagram to the left.

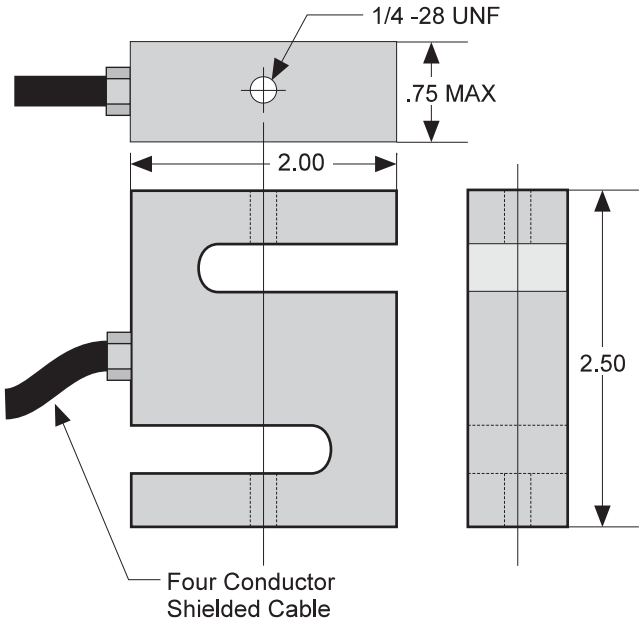
The limit switch must be wired properly. Limit switches are normally closed to ground. The limit switch signal is pulled to +5 volts inside the SCCU via a 100 K resister. The limit switch signal at 5 volts inhibits it's actuator voltage. This line must be pulled to ground in order for the actuator to operate.

Load Cells and Wiring

If the limit switch has been selected in the software menu, and the actuator will not operate, the problem could be that the limit switch signal is not being pulled to ground. This can be checked by shorting the limit switch signal wire to ground and then activating the actuator. Note that the actuator halts simultaneously with the removal of the limit switch signal wire from ground. This is the way the limit switch works. (See *Chapter 6: Troubleshooting* for more details.)

The load cell (or cells) need to be installed next. Generally, S-shaped load cells are used for plot weight and test weight on the DWRB System (see Figure 7-8). The SCCU is designed for load cells with a full bridge (differential output) circuit, providing a full scale output of roughly three millivolts per volt of excitation.

Figure 7-8
Load Cell



If you have two load cells to install, the larger capacity cell is the plot-weight cell. Load capacities are marked on the sides of the cells. For example, you might have a load cell with a 100-pound (45.4 kilogram) capacity and another with a 50-pound capacity. The lesser of the two capacities is the test-weight cell.

Before installing the load cells, complete the following steps:

1. Refer to the manufacturer of your bucket to determine the actual weight of the plot and test buckets with actuators (tare weight).

2. Determine the maximum net weight of a plot by testing or from past experience.

3. Add this to the tare weight of your bucket to decide the load cell capacity required.

Plot-Weight Load Cell

For most applications the plot-weight load cell will be a 100-pound capacity, S-shaped load cell (Model HM-308). Many systems differ in weigh bucket design, however, a typical plot-weight load cell installation is depicted in Figure 2-8, to do this complete the following steps:

1. Suspend the entire plot weight from the plot-weight load cell (the heavier capacity cell, if you have two load cells).

   Note: If you have trouble mounting the load cell, refer to your bucket manufacturer's load cell mounting procedures.

2. Once you have installed the plot-weight load cell, run the cable to the location of the break-out box. Insert the connector end of the Load Cell into the Plot Weight Load Cell Sensor Socket of the break out box and twist the locking ring until it is secure.

3. Repeat the above steps for each bucket.

Note that while the entire plot weight is suspended from the plot-weight load cell, only the test chamber is suspended from the test-weight load cell.

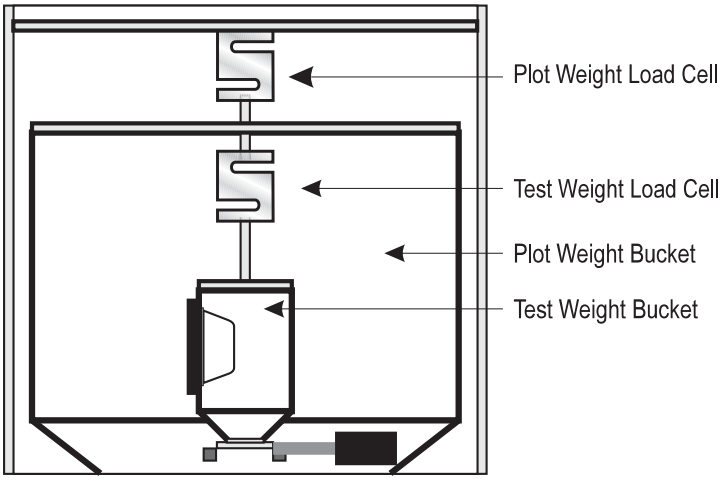
Test-Weight Load Cell

If you did not purchase a test-weight load cell, this section is not applicable to you. The test-weight load cell is typically a 50-pound capacity, S-shaped load cell (Model HM-307).

1. Suspend the test chamber from the test-weight load cell (the lighter of the two load cells).

Figure 7-9 shows a typical test-weight load cell installation. If you have trouble mounting the load cell, refer to your bucket manufacturer's load cell mounting procedures.

Figure 7-9
Load Cell Installation



2. Once you have installed the test-weight load cell, run the cable to the location of the break-out box. Insert the connector end of the load cell into the test-weight load cell sensor socket of the break-out box and twist the locking ring until it is secure.

3. Repeat the above steps for each bucket.

Moisture Sensor Installation

There are three styles of moisture sensors; one inch, three inch, and four inch mini blade. After checking to see which moisture blade you have, refer to the following installation procedure that applies.

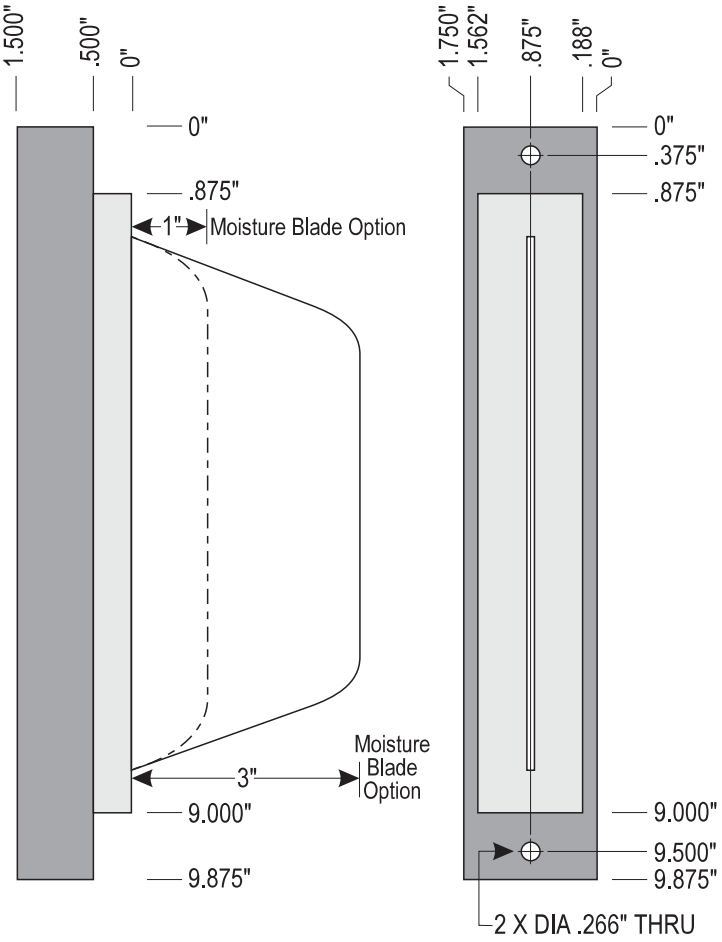


Figure 7-10
The one-inch blade configuration is identical to the three-inch blade configuration, only with the outer two inches of the blade cut off.

1" or 3" Moisture Blade

To install the one inch or three inch moisture sensor blade, complete the following steps:

1. Place the sensor into the pre-cut hole on the weigh bucket.

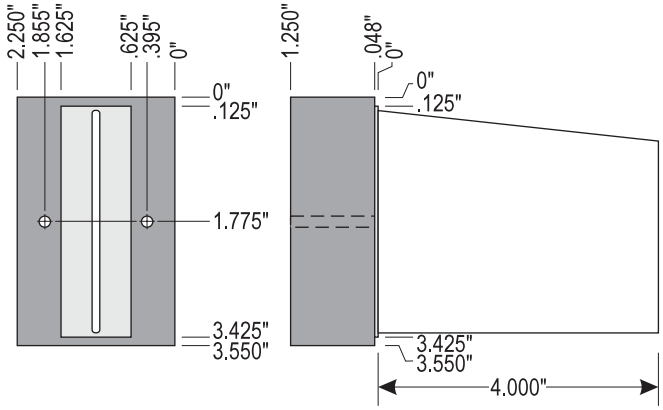
If your bucket manufacturer did not provide a pre-cut slot for the moisture sensor blade, you will need to take the weigh bucket to a machine shop to have the slot cut. The moisture blade should be mounted in a moisture test chamber.

2. Align the sensor's position and tighten the two screws in the holes.

4" Mini-Moisture Blade

To install the four inch style mini moisture sensor, complete the follow steps:

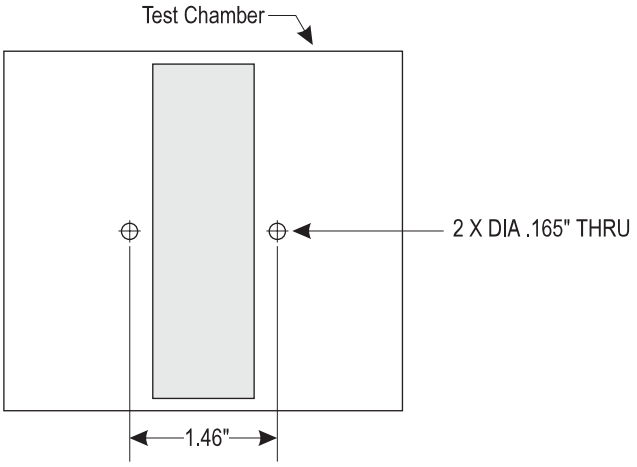
Figure 7-11
4" Mini-Moisture Blade



1. Cut a rectangular slot in the side of the test chamber. The .048" shoulder of the moisture sensor should fit snug against the cut edges.

2. Drill two .165" DIA mounting holes in the appropriate positions (refer to Figure 7-12). Insert the supplied clinch nuts (part # 3343).

Figure 7-12
Test chamber in which the 4" mini moisture blade can be installed.



3. Place the moisture blade into the slot. Make sure the clinch nuts slide into the mounting holes on the blade housing.

4. Tighten the two mounting screws securely.

Final Installation for Moisture Blades

The metal plate on the top of the moisture blade that the mounting bolts rest against *must* have good electrical contact to the test chamber. When mounting the sensor, make sure that the mounting bolts are not insulated by paint or gaskets, etc. To insure a good ground, you may choose to run a 22 AWG stranded wire from the back plate of the housing to the outside wall of the test chamber.

We know that systems do differ. Note Figure 7-13 for an example of a typical moisture sensor installation.

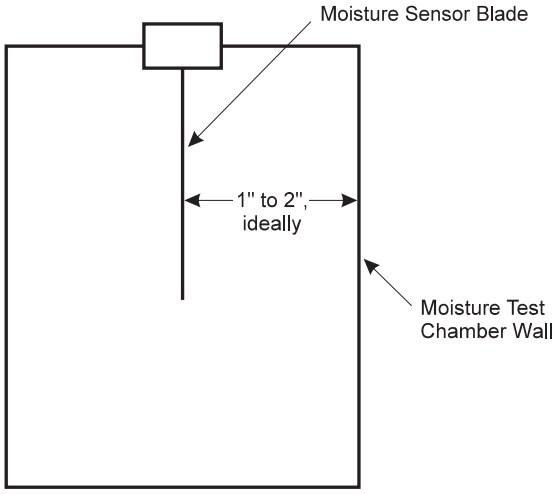


Figure 7-13 Blade-type Moisture Sensor in a Test Chamber (Top View).

The moisture chamber should be rectangular with the metal walls (ground) one to two inches away from, and parallel to, the moisture sensor blade. Greater sensitivity of the sensor results from closer spacing. Use a three-inch blade for greatest sensitivity. For final installation of the moisture sensor blade complete the following steps:

1. Once you have installed the moisture sensor blade, run the cable to the location of the break-out box. Insert the connector end of the moisture sensor cable into the moisture sensor socket of the break-out box and twist the locking ring on until it is secure.

Note: It is not required, but it is recommended to run a short ground wire from the back plate of the moisture sensor to the test chamber wall. It is also recommended to run a 10 AWG stranded wire from a mounting screw on the SCCU console to the back plate of the moisture blade. This will reduce the chance of any electrical interference with moisture readings.

Cable Connection to the SCCU

Next you will need to connect the system control cable and the power cable. The system control cable connects to the break-out box.

System Control Cable Connection

The system control cable ends in a 37-pin connector on both ends. Plug one end into the back of the SCCU and the other end into the bottom of the break-out box (refer to Figure 7-14).

1. Using wire ties, tie the cable in place on the combine so that it will be protected from possible damage.

2. Twist the thumb screws on the connectors to secure the 37-pin connectors to the SCCU and the break-out box.

Power Cable Connection

To connect the power cable, complete the following steps:

1. Attach the pigtail end of the power cable to the combine battery (12V power supply). It is recommended to connect the negative side of the power cable to the end of the ground cable furthest away from the battery (connected to the chassis--refer to figure 7-14). If your system is equipped with a lockout system, this will eliminate any potential problems.

2. Plug the power supply cable into the SCCU, and twist the locking ring to secure the connector to the SCCU.

3. If you haven't done so already, attach the Field Computer DC power plug to the Field Computer's charge port.

You need to make sure the polarity of the positive and negative battery terminal are wired correctly. Reversing the polarity could cause possible hardware damage. Also, the 12V power supply wire is red or white (+). The ground wire is black (-).

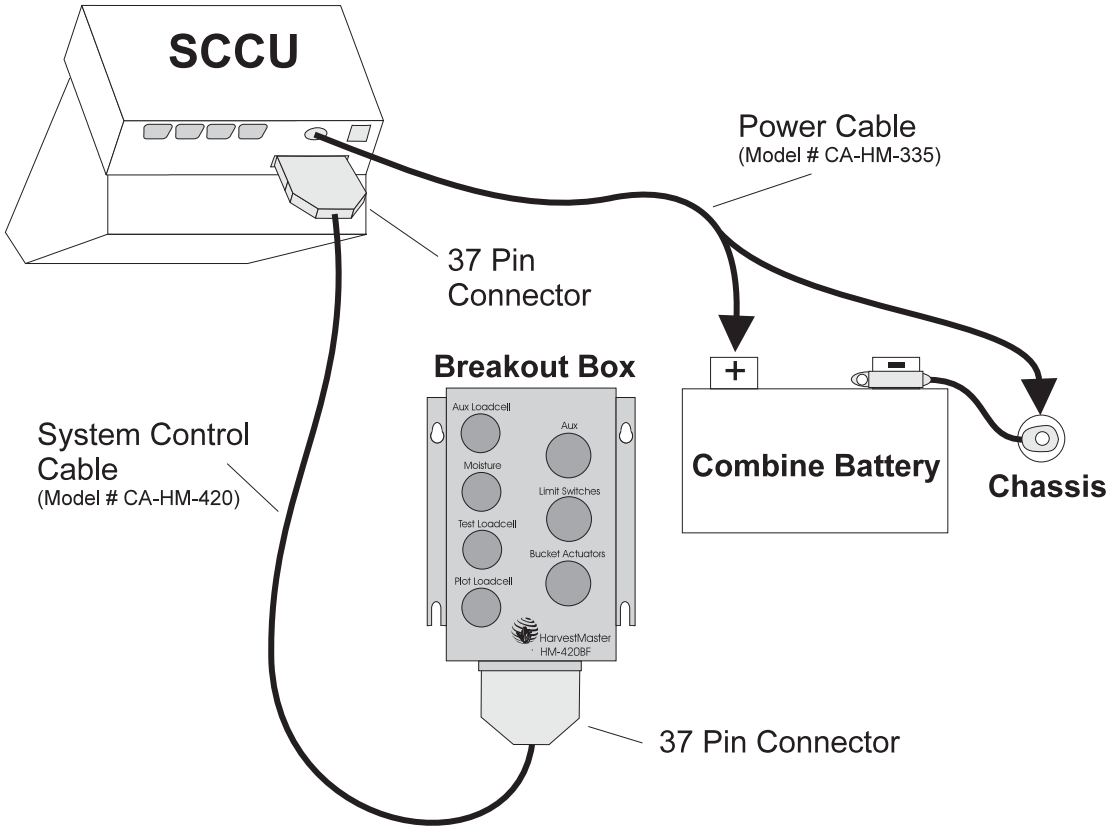


Figure 7-14
Cable Connectors for the SCCU. This shows the connector for the system control cable and the plug for the power cable.

Testing the Manual Operation of the Bucket Doors

Generally, the bucket doors will not be operational until the software has been loaded into the SCCU from a Field Computer or other host. This is necessary because the software carries the bucket actuator configuration information that the SCCU uses to control the driving electronics. You may, however, manually configure the actuators before loading the software and test the bucket operation. To do this complete the following steps:

1. Hold one of the front panel switches active while turning on the *Power* switch to the SCCU (see Table 7-7 for configuration).

Normally, the SCCU is powered on without any of the other switches on the front panel being activated. When this happens, the green and red lights alternately flash until a software configuration is loaded to the SCCU. However, if the Plot, Test, Hopper or Auxiliary switch is held active when power is applied to the SCCU, a default configuration is loaded and the SCCU either opens or closes all of the buckets. The configuration loaded and the action taken depends on the switch held as described in Table 7-7.

Table 7-7
Bucket Action Configuration

Switch Held	Switch Position on Power-Up	Actuator Configuration	Action
ìPlotî	ìOpenî	Windshield Wiper	All buckets open
ìPlotî	ìCloseî	Windshield Wiper	All buckets close
ìTestî	ìOpenî	Electromechanical	All buckets open
ìTestî	ìCloseî	Electromechanical	All buckets close
ìHopperî	ìOpenî	Hydraulic	All buckets open
ìHopperî	ìCloseî	Hydraulic	All buckets close
ìAuxiliaryî	ìOpenî	Pneumatic	All buckets open
ìAuxiliaryî	ìCloseî	Pneumatic	All buckets close

After performing the previous operation and switching the *Auto/Manual* switch to *Manual*, you will be able to use the Plot, Test, Hopper, and Auxiliary switches to run the buckets connected to the SCCU.

If you are performing this operation, only hold one of the switches, either Plot, Test, Hopper, or Auxiliary, when turning on the power and make sure it is the right switch for your actuator type. If you have a mixture of different actuator types, or you are uncomfortable performing the above test, do not use this manual test procedure.

2. Load the software to the host unit.

3. Set the configuration as described starting on page 7-18. Then, load the configuration to the SCCU by connecting it to the host and turning the SCCU on.

When performing the test previously described, if you notice that the system fails to power-up, the doors do not open or close, or something else is amiss, complete the following steps:

1. Go back and check the wiring connections.

2. Check for proper voltage (12 V) at the actuator, including proper polarity for electrical, bi-directional actuators.

Note: Check actuator operation by disconnecting the HarvestMaster actuator cable from the break-out box and touching a live 12V source to the actuator terminal. (Refer to Chapter 6, Troubleshooting for more information.)

Printer, Ribbon, and Paper Installation

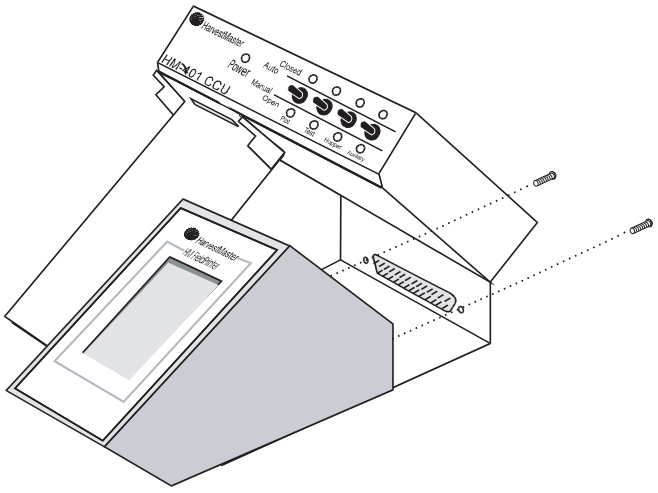
Installing the Printer

Figure 7-15 Installing the Harvest Data System FieldPrinter.

To mount the FieldPrinter in the console, complete the follow steps:

1. Set the FieldPrinter on the right side of the console and slide it back until it mates with the 25-pin sub-D connector (see Figure 7-15).

2. Install two #6-32 x 3/8" screws to secure the FieldPrinter to the console as shown in Figure 7-15.



Note: Make sure the 25-pin connector is seated properly before the mounting screws are tightened.

Installing a Printer Ribbon

The FieldPrinter comes with an Epson ERC-09 ribbon cartridge installed. This ribbon cartridge is available from business supply stores or HarvestMaster. Replace it when the printing becomes difficult to read or after using one complete roll of paper with one ribbon cartridge.

Avoid changing the ribbon cartridge while collecting data since damage could occur to the printhead if the ribbon cartridge is changed during printing. To install a ribbon cartridge into the FieldPrinter, complete the following steps:

1. Make sure the SCCU power switch is in the OFF position.

2. Remove the paper from the printer (refer to page 7-40 for further instruction).

3. You will notice the word *Push* on the right side of the ribbon cartridge. Push down to remove a used cartridge (see Figure 7-16).

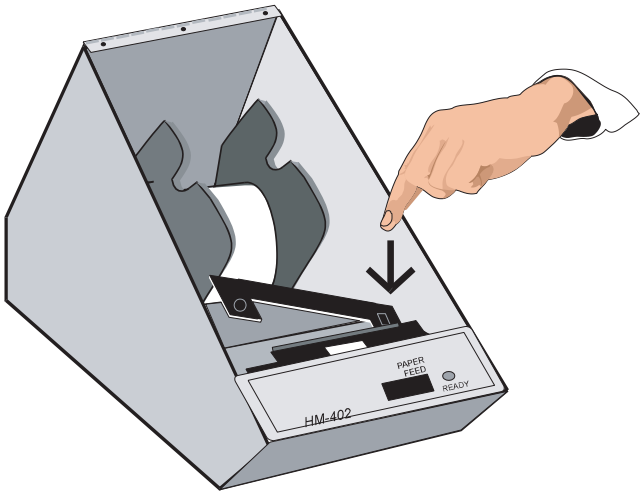


Figure 7-16
Ribbon placement in the Harvest Data System FieldPrinter.

To prevent weak or irregular printing, make sure the ribbon cartridge is firmly inserted. If ribbon ink gets on the printer's case, immediately wipe it off with a cloth.

4. Situate the replacement ribbon cartridge in the same position as the old one. After making sure the ribbon cartridge is properly aligned, press down gently to seat.

You may have to turn the ribbon slightly to get the gears to mesh as you push down on the new ribbon.

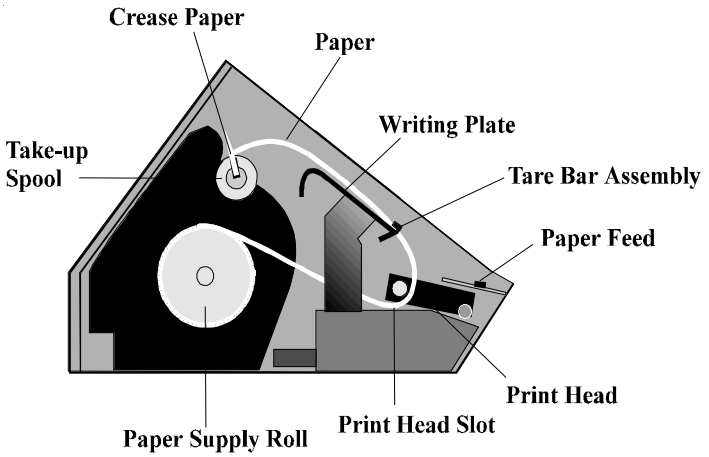
Inserting a Paper Roll

To insert the paper roll, complete the following steps:

1. Make sure the SCCU power switch is in the ON position. The HM-402 does not have a power ON feature. If you are not using it with the HM-400 SCCU, you will need to connect its 12V power source.

2. Insert the paper roll onto the supply spool.

Figure 7-17 Paper Path in the FieldPrinter.



Note: The paper supply roll is rolling toward you as you are facing the front of the printer.

3. Unroll several inches of the paper and cut the edge diagonally to a point on one side.

Note: Be careful not to slide the paper under he print head. There is a V shaped slot the paper must be inserted into in order for it to feed correctly.

4. Slide the end of the paper into the print head slot and gently pull the diagonal point up until the full width of the paper is through the print head.

5. Carefully pull the paper through, or press the *Paper Feed* switch until there is a sufficient amount to start on the take-up spool.

6. Place the excess paper out of the way.

7. Insert the right side of the writing plate under the two screws and then squeeze the left side until it slides under the screw on the left.

8. Feed the end of the paper through the tare bar assembly (see Figure 7-17).

9. Cut the point off of the end of the paper. Fold the end of the paper and crease it, then insert it into the slot in the take-up spool.

10. Roll the take-up spool a few turns to hold the paper in the slot and place the spool into its position in the take-up assembly with the gear on the left side.

11. Turn the take-up spool manually until there are several wraps around the take-up spool.

12. Close the printer's enclosure cover and secure it with the latch.

Removing a Paper Roll

To remove the printed paper roll before the supply roll is empty, complete the following steps:

1. Advance the paper through the FieldPrinter until all printing clears the printhead by using the line feed switch on the printer or press <F5> on the Field Computer.
2. Tear off printed paper above the printhead.
3. Re-insert the paper on the take-up spool as shown on page 7-38.

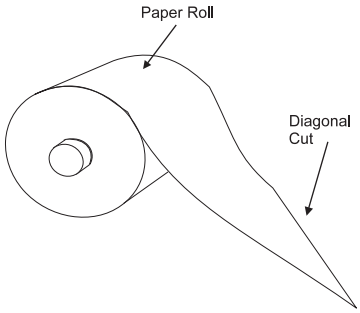
Warning:

Do not pull the paper out of the print head backwards. This could cause damage to the print head.

To replace the supply roll, complete the following steps:

1. Proceed with steps 1 & 2 above.
2. Grab the writing plate with one hand and squeeze the left side until it pops free of the fastening screws.
3. Take the writing plate out of the printer and set it aside.
4. Tear the paper between the supply roll and the printer.
5. Pull the remaining paper through the printer mechanism or advance it with the paper feed switch or press <F5>.
6. Insert a new supply roll as shown by Figure 7-18.

Figure 7-18
Cut the paper diagonally to a point on one side before feeding it through the print head.



Make sure the writing plate is locked into place.

Printer Test and Setup

The HM-402 Printer is tested and set up at the factory. You should not have to make any changes to the setups. However, we have included the following for your information. Using the rocker switch on the printer performs printer tests and setups.

Printer Test

With the power to the HM-402 printer OFF, (the main power switch on the HM-401 controls the power to the printer) press and hold the right side of the rocker switch as you turn the power ON. The printer will print out a list of the configuration as it currently exists and then do a continuous print test. To stop the print test, press either side of the rocker switch.

Accessing the Setup Menu

To access the setup menu, follow these steps:

With the power to the HM-402 printer OFF, (the main power switch on the HM-401 controls the power to the printer) press and hold down the left side of the rocker switch and turn the power to the printer back ON.

Note: *Changing the default setups may cause undesirable print formatting when used with the Harvest Data System. Please take note of the current setups before you make any changes.*

The printer will advance the paper. After the paper advance has stopped, count 3-5 seconds and release the switch. The following will be printed:

***** SETUP MENU *****
CONFIGURE. . . [NEXT/OK]

If you wait less than 3 or more than 5 seconds, *Ready....* may be printed and you will have to start over.

After you access the setup menu, if you press *NEXT* (left side of switch) repeatedly, you will see the following list printed. If you keep pressing *NEXT* (left side) this list repeats itself.

The setup menu contains the following items:

- CONFIGURE menu
- CUSTOM menu
- SET CLOCK menu
- RESET SEQ#

The following pages explain these items and how to customize the printer to your needs.

Configure

The first setup menu item reads:

CONFIGURE. . . [NEXT/OK]

[NEXT/OK] is a visual clue so you know that pressing the left side of the rocker switch will go to the *NEXT* part of the menu and that pressing the right side of the rocker switch will accept (or say *OK* to) what this line of the setup menu says.

With the printer in the setup menu and with *CONFIGURE . . .* *[NEXT/OK]* as the last item printed, press OK (right side) to access the configure menu. The following is printed:

***** SETUP MENU *****
CONFIGURE. . . [NEXT/OK]
***** CONFIGURE MENU *****
LOAD DEFAULTS [NEXT/OK]

Load Defaults

Load Defaults gives you the opportunity to reset the printer to all default settings (shown below).

```
  *** CONFIGURATION MENU ***
  LOAD DEFAULTS          [NEXT/OK]
  BAUD=1200              [NEXT/OK]
* DATA BITS=8            [NEXT/OK]
* STOP BITS=1            [NEXT/OK]
* HSHAKE=BUSY-BUFF       [NEXT/OK]
* COLS=32                [NEXT/OK]
  INVERT=NO              [NEXT/OK]
  FONT=5X7               [NEXT/OK]
  MAG=NONE               [NEXT/OK]
  Ready...
```

** The parallel interface does not have these selections.*

Choose *OK* to do this or *NEXT* to go to the next parameter. The following is printed:

```
*** SETUP MENU ***
CONFIGURE. . .           [NEXT/OK]
*** CONFIGURATION MENU ***
LOAD DEFAULTS            [NEXT/OK]
BAUD=1200                [NEXT/OK]
```

Baud Rate

Baud Rate is the first parameter you can set in the configure menu. The complete list of parameters and their possible values is shown below.

The sample list above shows the current baud rate is 1200. To accept this, press *OK* (right side) or view the next baud rate value by pressing *NEXT* (left side). Press *OK* when the baud rate you want is displayed.

Choose from these baud rates:

300, 600, 1200, 2400, 4800, 9600, 19200

Data Bits

Data Bits is the next parameter. Choose the date bit value the same way baud rate was chosen. Choices are 7 or 8 data bits. If you choose 7 data bits you can select *EVEN* or *ODD* parity. If you choose 8 data bits parity defaults to *NONE*.

Stop Bits

Stops Bits is the third parameter. Choose 1 or 2 stop bits.

Handshake

Handshake is the fourth parameter. Choose from the following settings:

BUSY-LINE
BUSY-BUFFER
XON/XOFF-LINE
XON/XOFF-BUFFER
NONE

Columns

Columns is the fifth parameter. Select the number of characters per line (columns) for this parameter. The choices you have are 24, 32, or 40. Below are samples of each:

24 Column Text
32 Column Text
40 Column Text

Invert

Invert is the sixth parameter. Choose ***YES*** if you want inverted text (upside down) or *NO* if you want non-inverted text (right side up) in your printouts. Below is an example of inverted text:

Inverted Type Sample

Font

Font is the seventh parameter. Choose from a 5 x 5, 5 x 7, or 5 x 8 dot matrix print pattern. The 5 x 5 dot pattern produces only upper case (capital) letters. The other two fonts can output upper and lower case letters.

5 x 5 TYPE IS ALWAYS CAPITALS

5 x 8 Upper and Lower Case

Magnification

Magnification is the last parameter. This refers to the size of printed type from your printer. Your choices (with examples) are:

NONE

NONE

DOUBLE WIDE

DOUBLE WIDE

DOUBLE HIGH

DOUBLE HIGH

DOUBLE WIDE/HIGH

DOUBLE WIDE/HIGH

After you choose one of the magnifications the printer will print *READY...* to show the printer is out of the configuration menu and the setup menu and is ready to print.

Custom

The next setup menu item after *CONFIGURE. . .* is *CUSTOM. . .*. With the printer in the setup menu and with *CUSTOM. . .* as the last item printed, if you press *OK* (right side) the printer will print the following:

```
*** SETUP MENU ***
CONFIGURE. . .                [NEXT/OK]
CUSTOM. . .                   [NEXT/OK]
***** CUSTOM MENU *******
PRINT CUSTOM SETUP  [NEXT/OK]
```

If you press *OK* the printer will print the current custom setup. A sample is shown below:

```
*** SETUP MENU ***
CONFIGURE. . .                [NEXT/OK]
CUSTOM. . .                   [NEXT/OK]
****** CUSTOM MENU *******
PRINT CUSTOM SETUP            [NEXT/OK]
MM/DD/YY  hh:mm ?M DOW        [NEXT/OK]
AUTO T&D=NO                   [NEXT/OK]
AUTO SEQ=NO                   [NEXT/OK]
ZERO=0                        [NEXT/OK]
POUND SIGN=#                  [NEXT/OK]
_(underscore)                 [NEXT/OK]
BUSY INVERT=NO                [NEXT/OK]
ONLINE/OFFLINE=YES            [NEXT/OK]
EXT CH SET=NO                 [NEXT/OK]
PRINT READY=YES               [NEXT/OK]
Ready. . .
```

This manual assumes the time and date option is installed and operation. If you do not have this option you will not see the references to the clock or date listed in most menus.

This printout shows you how each item is currently set. Following is an explanation of each item and the choices you can make for each.

Time/Date Format

Time/Date Format is the first parameter. Choose from the following formats:

This feature is available only on units with the time/date option installed.

MM/DD/YY hh:mm ?M
MM/DD/YY hh:mm ?M DOW
MM/DD/YY hh:mm
MM/DD/YY hh:mm DOW
DD-MM-YY hh:mm ?M
DD-MM-YY hh:mm ?M DOW
DD-MM-YY hh:mm
DD-MM-YY hh:mm DOW
DD/MON/YY hh:mm ?M
DD/MON/YY hh:mm ?M DOW
DD/MON/YY hh:mm
DD/MON/YY hh:mm DOW
NONE

MM = month
DD = day
YY = year
hh= hour
mm=minutes
?M= AM or PM
DOW= day of week

Auto Time and Date

Auto Time and Date is the next parameter. Your choices are:

YES auto print after *CR* (carriage return)
NO do not auto print after *CR*

Auto print of the time and date will not occur unless three seconds has elapsed since the printer has stopped printing.

Auto Sequence Number

Auto Sequence Number is the third parameter. Your choices are:

NO do not auto print sequence number after *CR*
YES do auto print sequence number after *CR*

Auto print of the sequence number will not occur unless three seconds has elapsed since the printer has stopped printing.

Zero

Zero is the fourth parameter. Choose how you want the zero character to look in you printouts. Choose between *0 and 0*.

Pound Sign

Pound Sign is the fifth parameter. Choose to show pound as **#** or as the British pound symbol

_Underscore

Underscore is the sixth parameter. Choose which symbol the same ASCII code will print, an _underscore or a left arrow.

Busy Invert

Busy Invert is seventh parameter. Your choices are:

NO voltage will be in a high state until the unit is busy then voltage level goes low.
YES voltage will be in a low state until the unit is busy then voltage level goes high.

Online/Offline

Online/Offline is eighth. Your choices are:

YES enables the rocker switch to turn the printer offline.
NO disables the ONLINE/OFFLINE ability.

Ext Ch Set is the ninth parameter. This stands for Extended

Ext Ch Set

Character Set. Your choices are:

YES Allows you to use hexadecimal numbers above 80 (true only for 8 data bits).
NO Disables the Extended Character Set ability.

Print Ready

Print Ready is the last parameter. Your choices are:

YES Prints *Ready. . .* upon power up.
NO Disables printing *Ready. . .*

Note: If you choose NO, hold the left side of the rocker switch down for 4-6 seconds to access the setup menu. Begin timing when you connect power to the unit and the red light comes on. The paper feed motor does not run upon power up when Ready. . . is disabled.

Set Clock

Set Clock . . .is the next item in the setup menu.

With the printer in the setup menu and with *SET CLOCK.. .* as the last item printed, if you press *OK* (right side) the printer will print the following:

SET CLOCK. . . [NEXT/OK]
***** SET DATE *** [NEXT/OK]**
Set Year: 01. . . . . [NEXT/OK]

The printer shows the year currently in memory. The 0 is underlined to show the position of the cursor. This is the number which will be incremented if *NEXT* (left side) is pressed. If the number is correct press *OK* (right side) and the following is printed:

SET CLOCK. . . [NEXT/OK]
***** SET DATE *****
Set Year: 01. . . . . .[NEXT/OK]

The cursor now appears over the 2nd position. Press *NEXT* (left side) to increment this number if needed and *OK* if it is right. Continue this sequence of accepting or changing the year, month, day, and DOW (Day Of Week).

SET CLOCK [NEXT/OK]
***** SET DATE *** [NEXT/OK]**
Set Year: 01. . . . . .[NEXT/OK]
Set Year: 01. . . . . .[NEXT/OK]
Set Mon: 08. . . . . .[NEXT/OK]
Set Mon: 08. . . . . .[NEXT/OK]
Set Day: 17. . . . . .[NEXT/OK]
Set Day: 17. . . . . .[NEXT/OK]
Set DOW: 4. . . . . [NEXT/OK]

When you have completed the *Set Date* menu the following is printed automatically:

***** SET TIME *****
Set Hour: 16. . . . . .[NEXT/OK]

Choose *NEXT* (left side) to increment the number or *OK* (right side) to accept the *1*. Repeat this same procedure for hours and minutes as shown below.

***** SET TIME *****
Set Hour: 16. . . . . .[NEXT/OK]
Set Hour: 16. . . . . .[NEXT/OK]
Set Min : 36. . . . . [NEXT/OK]
Set Min : 36. . . . . [NEXT/OK]
Start Clock. . . . . [OK]
Ready. . .

When everything is as you want it, press *OK* and *Start Clock* is printed. Press *OK* (right side) to start the clock. The printer then prints *Ready. . .* showing you that it is out of the setup menu and ready to print.

Reset SEQ#

Reset SEQ # is the last setup menu item. This menu item lets you reset the sequence number. This number is the number of print transactions since the last reset.

With the printer in the setup menu and with *Reset SEQ#* as the last item printed, if you press *OK* (right side) the sequence number will be reset to zero and the printer will print *Ready. . .* showing it is no longer in the setup menu and that the printer is ready to print.

To skip resetting the sequence number to zero, press *NEXT* (left side). ***CONFIGURE. . .*** is printed. Unplug and replug in the printer to return to printing mode. *Ready. . .* is then printed.

Appendix A
Specifications

Measurement Performance

This chapter provides specifications for the components of the DWRB System. For specifications on your Field Computer, refer to the Field Computer User's Manual.

Grain Moisture

Repeatability: Typically ±.5% given constant density and temperature of sample.

Accuracy: Typically ±1%; dependent upon accuracy of user calibration using samples of known moisture content.

Weight

Range: 0-45%

Accuracy: Load cells and electronics measure to within .1% of load cell full scale range (e.g. using a 100 lb load cell, measurements will be accurate to within .1 lb).

Note: Weight measurement accuracy may be degraded due to the friction of weigh bucket against stabilizing guides, etc. and by the motion of the weighing platform. The DWRB System software has a user-adjustable option (Weigh Time) that will allow up to a 5 second running time average of weights to minimize measurement error due to platform motion.

Load Cell Capacities

Plot weight load cell: 50, 100, 200, or 300 lb, or
22.68, 45.36, 90.72, or 136.08 kg
Test weight load cell: 50 or 100 lb or
22.68 or 45.36 kg

System Power Requirement

12 volts DC (automotive)
.5 amp typical
6 amp maximum (depends on actuators being driven)

Physical Dimensions

SCCU Size: 12" x 8.75" x 7.75"

Environmental

Operating Temperature Range

System: 0 to +50° C (+32 to +122° F)
Printer: +5 to +45° C (+41 to +113° F)

Storage Temperature Range

System: -20 to +70° C (-4 to +158° F)
Printer: -20 to +70° C (-4 to +158° F)

Humidity Range

0-95% relative, non-condensing

Accessories

Load Cells

Temperature range: -18 to +66° C (-0.4 to +151° F)

Cable length: 20’

Moisture Sensor

Temperature range: 0 to +45° C (+32 to +113° F)

Cable length: 10’

Pneumatic Tool Lubricant

Ingersoll-Rand:

Class I air tool lubricant / non-synthetic
Petroleum based
CAS# 64742-65-0
SAE-10 (90SSU)
Safety Data Sheet available upon request

Kil Frost Pneumatic Anti-Freeze Lubricant:

SAE-10 (90SSU)
Safety Data Sheet available upon request

Note: Kil Frost is not an additive. It should not be mixed with ordinary tool oils and the tool reservoir must be emptied before use so that its de-icing & extreme pressure properties are not impaired.

Printer

Interface-Serial	BAUD rate - 2400 (300, 600, 1200, 2400, 4800, 9600, 19200 available) Voltage Levels - RS-232C: -9 to 9V Busy Signal - Clear to Send (CTS) 20mA current loop
Character Buffering	1.5 Kb
Print Method	Impact dot matrix
Character Spacing	24 Column: 12.8 Characters/inch 32 Column: 17 Characters/inch 40 Column: 21 Characters/inch
Print Speed	130 lines per minute for 24 column 110 lines per minute for 32 and 40 column
Paper	Tabletop: 2.25”Wx2.75”D; 0.44” I.D. Large Roll - 12,500 lines Small Roll - 3,000 lines
Power	1.5 Watts (idle), 15 Watts maximum while printing
DC Voltage	Optional 9-12 VDC 140 mA idle, 1 amp with 100% printing, 5.5 Amp peak with 100% printing

Operating Temperature

+5 Deg C to +40 Deg C, or +41 Deg F to +104 Deg F

Print Head Life

1,500,000 lines mean character before failure.

Ribbon Life

Black - 200,000 characters
Purple - 250,000 characters

Communications

Wiring Diagram

Pin #	Signal	DTE Direction	Description
2	Transmitted Data (TD)	From Printer	Printer data output line.
5	Clear To Send (CTS)	From Printer	Signal (equivalent to BUSY) indicating that the printer is ready for operation and can receive data.
7	Signal Ground (SG)	----------	Signal Ground
9	Paper Take-up Volt. (PTG)	From Printer	Paper Take-up solenoid supply voltage.
10	Digital Out (DO1)	From Printer	Digital output pulse to control the paper take-up.
12	Paper Take-up Grnd. (PTG)	----------	Pins 12,19, and 22 are Paper Take-up Ground.
19	Paper Take-up Grnd. (PTG)	----------	
22	Paper Take-up Grnd. (PTG)	----------	
25	+12 Volt Print Supp. (VSB)	From Printer	Printer Supply Voltage (12 VDC).

Appendix B
Pro4000 External Input Battery Pack

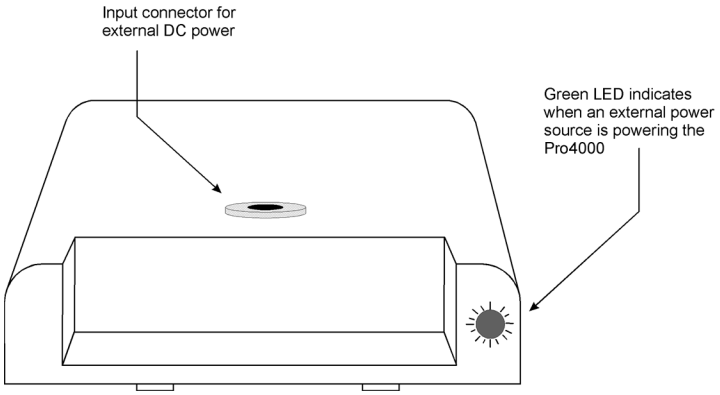
Overview

This accessory for the Pro4000 is to allow the Pro4000 to be powered continuously from an external power source. The input voltage can range from 10 volts on the low end and 27 volts on the high end. It is constructed in a standard battery pack for the Pro4000. This will power all models of Pro4000.

This pack contains one set of battery cells and a voltage regulating power supply circuit. The battery cells have the same capacity as the standard battery pack (model PW-2003). The power supply circuit regulates the input voltage down to the same level as a fully charged battery. This power supply circuit is a switching regulator that develops very little heat, and is thus more efficient. This means that when connected to an input voltage of 12 volts or more, the Pro4000 will appear to draw less current from the external source than stated in the manual. The current will go down proportionally as the voltage is raised above 10 volts.

The batteries in this pack are continuously trickle charged to maintain their charge. This trickle charge is at a low rate, so that the battery will never be over charged and damaged. When the battery pack is not connected to an external power source, and the batteries become drained, it takes about 24 hours to charge if you connect it back to the vehicle power. The battery can also be placed on the SmartCharger to charge the batteries in a shorter period of time without damage to the power supply section of the pack. While the pack is installed on a Pro4000 you can charge the battery overnight (12-14 hrs) using the standard wall charger.

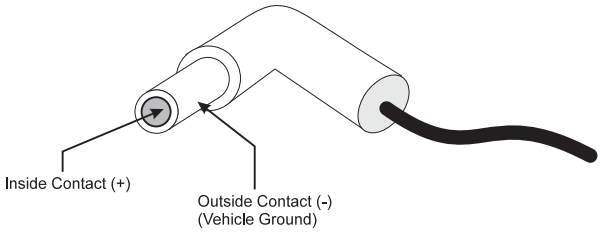
It is normal for the External Input Battery Pack to become warm during use. It should not get hot.



The green LED lights up when an external source is supplying power to the Pro4000. After connecting an external power source, check to see that the LED is lit.

External Input Battery Pack Specifications

Input Voltage Range:	10VDC - 27 VDC
Trickle Charge Current:	Approx. 50 mA (when battery is fully charged)
Battery Charge Time:	approx. 24 hours
Input Power Connector:	DC power jack 5.5mm/2.5mm

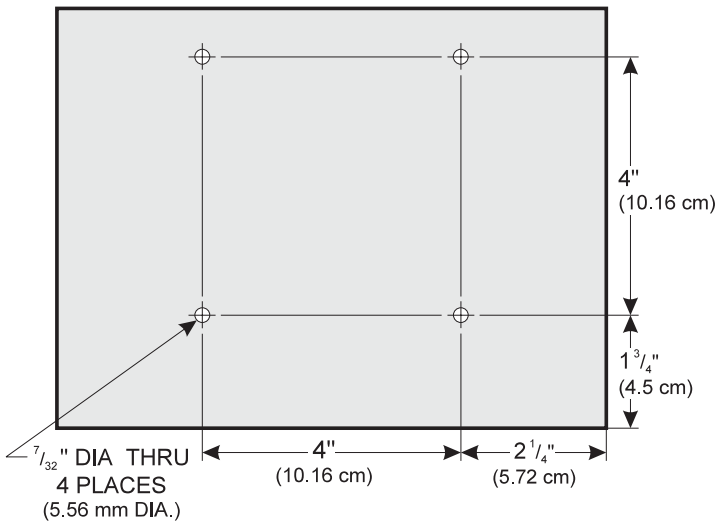


Battery Pack Size:	6.4" x 3.7" x 0.9"
Battery Pack Weight:	13 oz.
Operating Temperature:	-22 to +130 deg F (-30 to +54 deg C)

Appendix C
Mounting Diagrams

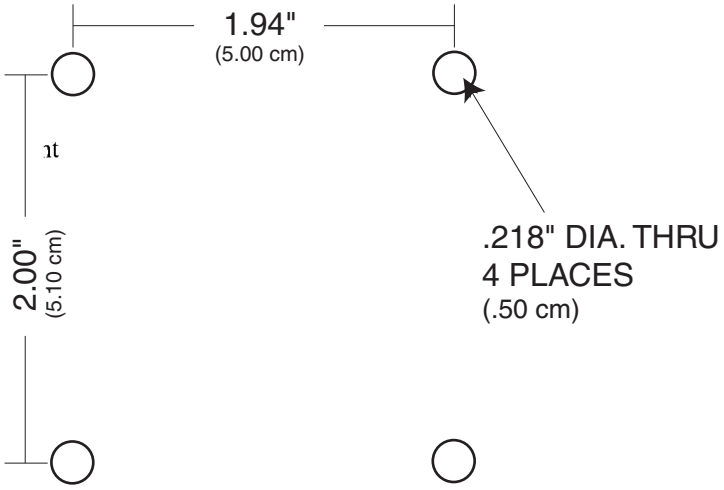
Console Mounting Diagram

This drawing shows hole placement for mounting the Harvest Data System console to the mounting base on a combine.



Field Computer Cradle Mounting Diagram

This drawing shows placement for mounting the Field Computer cradle away from the SCCU.



Actual Size

Appendix D
General Care and Warranty

Maintenance

It is important to protect your HarvestMaster hardware from constant battering of the elements. They are built sturdy to withstand abuse from the elements but with constant battering from the elements your HarvestMaster products does need to be taken care of. Here are some general care tips.

Harsh Weather

If your Harvest Data System console is mounted in a location that is exposed to the elements, we recommend removing or covering the Harvest Data System console during inclement weather. If the winter in your area is quite cold, remove the Harvest Data System console during cold months. It is best to store your system in a warm, dry environment.

We recommend that the Harvest Data System be returned to the factory once every two or three years (depending on field usage) for recalibration and a system check up.

SCCU

The electronics console can be left on the combine if it is enclosed in a cab; however, we recommended the SCCU console be stored at a temperature above freezing. For combines that are stored outside, it is recommended that you remove the console and store it inside. You should cover any open connectors that are exposed to the outside elements.

Printer

The printer mechanism should last about three years under heavy usage. When the printer mechanism fails, you will need to have a new print head installed. Contact HarvestMaster's Customer Service Department for an Return Materials Authorization (RMA) number before sending the printer in for repair.

Be sure to mount the printer on a flat surface (no greater than 10 degrees of angle) to avoid failure of the take-up assembly.

The printer's cartridge ribbon needs to be replaced when the printing becomes faint or difficult to read. For instructions on replacing the cartridge ribbon, refer to *Chapter 7, Installing a Ribbon*.

Field Computer

The Field Computer is a factory-sealed unit. There are no internal, user-serviceable parts. If the Field Computer is opened or in any other way tampered with , the system should be sent back to the factory for inspection.

The PC card cover and battery door (Allegro Field PC only) allow the unit to be exposed to the elements. Operation without these doors or with these doors not properly fastened will void all warranties associated with the unit. Make sure all doors remain intact and secure during operation or storage.

The plastic keyboard cover can be removed from the Allegro F/PC for periodic cleaning. Please see the Allegro F/PC User's Manual for more detailed instructions.

During the off season, we recommend you store the Field Computer in a clean, dry environment.

Return for Repair Procedure

In the event that your Harvest Data System needs repairs, contact HarvestMaster's Customer Service Department for a Returned Materials Authorization (RMA) number. Please have the following information ready when you call:

- Serial Number
- Model Number
- Name and Company/University/Agency
- Phone and Fax Numbers
- Clear description of problem
- Purchase Order Number and Billing Address

Under the *Premium Support Agreement*, HarvestMaster will ship you a replacement loaner Next Day Federal Express or UPS Red. To avoid any problems in the return procedure, complete the following steps:

1. Once you receive the loaner unit, package your equipment (if the existing box is still good) in the same box and ship it Federal Express, Next Day Air Mail, or UPS Red.

2. Fill out the shipping and RMA forms that were included with your loaner equipment and include a description of the failure. The more information you can supply concerning the malfunction and the circumstances under which it occurred, the quicker our technicians can complete the repair.

3. Package the unit properly to avoid shipping damage.

4. Write the RMA# on the package you ship.

Your equipment will be repaired and returned to you. After receiving your repaired equipment, you will be authorized a period in which to return the loaner unit before you will be billed for it. There is an annual *service and support* fee that allows you to have this service. Please call for detailed information and pricing.

Limited Warranty

Hardware

All products manufactured by HarvestMaster, when properly installed, calibrated, and operated in accordance with instruction manuals accompanying the hardware and used for the purpose for which the hardware was designed shall be free from defects in materials and workmanship for a period of one (1) year from the date of shipment.

In the event a defect in materials or workmanship is discovered and reported to HarvestMaster within the one year period, HarvestMaster will at its option repair the defect or replace the defective product. HarvestMaster's obligation hereunder will be limited to such repair or replacement.

The customer shall have the responsibility to ship the defective equipment to HarvestMaster with all cost of shipment prepaid. After repair or replacement HarvestMaster will, at their own expense, ship the replacement or repaired item back to the customer using the same type of carrier.

Software

Software products which are designed by HarvestMaster for use with a hardware product, when properly installed on that hardware product, are warranted to the end user not to fail to execute their programming instructions due to defects in materials or workmanship for a period of one year from date of delivery.

If HarvestMaster receives notice of such defects during the one year warranty period, HarvestMaster shall, at its option, repair or replace the defective software media.

The warranties provided herein do not apply in the case of improper or inadequate maintenance or in the case of repair by any person not previously authorized in writing by HarvestMaster to do such maintenance or make such repairs.

These warranties likewise do not apply where the products have been operated outside the environmental specification of the product, where software products other than those specified by HarvestMaster have been used, or where attempts at software interface have been made by any person not previously authorized by HarvestMaster to perform such interfacing operations.

Disclaimer of Warranties

The warranties set forth herein are in lieu of all other warranties of HarvestMaster, whether written, oral or implied. HarvestMaster makes no warranties regarding its products (hardware or software), including without limitation warranties as to merchantability, fitness for a particular purpose, any warranty arising from course of performance, course of dealing or usage of trade whether any of the foregoing warranties are either expressed or implied.

HarvestMaster specifically makes no warranties as to the suitability of its products for any particular application. HarvestMaster shall in no event be liable for special, incidental, or consequential damages in connection with or arising out of the furnishing, performance or use of any product covered by this agreement whether such claim is based upon warranty (express or implied), contract, strict liability, negligence or otherwise.

Updates or Modifications

HarvestMaster shall be under no obligation to update or modify its products except as herein noted to correct program errors. Furthermore, the customer agrees that all representations and warranties contained herein shall be immediately null and void in the event of any modification, alteration or change in or to any product affected by or on behalf of the customer except for a change made by HarvestMaster or other direction supervision thereof.

Removal of Serial Number

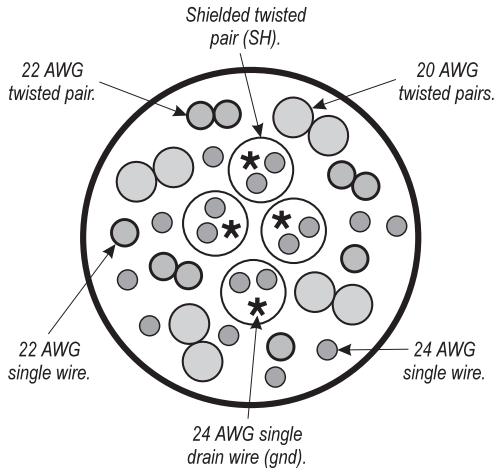
Removal of the HarvestMaster serial number label from an instrument will void any warranty on the said instrument. HarvestMaster will not repair or update an instrument and return it to an individual if the instrument is without the said serial number label.

Extended Warranties

HarvestMaster offers a variety of warranty options to extend coverage beyond the standard warranty. Contact HarvestMaster Customer Service Department for details at (435) 753-1881 (8 am - 5 pm MST, Monday - Friday).

Appendix E
Cable Wiring

HM-420 37-pin System Control Cable



In a standard system control cable there are:

- four pairs of shielded cables
- four 20 AWG twisted pairs
- nine 24 AWG single wires
- three 22 AWG twisted pairs
- two 22 AWG single wires
- four 24 AWG single drain wires for the shielded twisted pairs

Connector Wire Codes - Standard

Pin	Wire Name
1	bottom gate actuator (+)
2	bottom gate actuator (-)
3	middle gate actuator (+)
4	middle gate actuator (-)
5	top gate actuator (+)
6	top gate actuator (-)
7	bottom gate “open” sense
8	bottom gate “closed” sense
9	middle gate “open” sense
10	middle gate “closed” sense
11	moisture sensor excitation (12V reg.)
12	moisture sensor control
13	moisture sensor shield
14	load cell signal (B+)
15	load cell signal (B-)
16	load cell “B” shield
17	load cell “B” excitation (+)
18	load cell “A1+A2” shield
19	load cell “A1+A2” excitation (+)
20	speed sense input
21	grain level sense input
22	sensor ground

Pin	Wire Name
23	auxiliary output or compressor relay (+)
24	auxiliary output or compressor relay (-)
25	slope and motion sensor ground (-)
26	slope and motion sensor excitation (+)
27	top gate “open” sense
28	top gate “closed” sense
29	slope and motion sensor signal (+)
30	slope and motion sensor shield
31	slope and motion sensor signal (-)
32	moisture sensor signal (+)
33	moisture sensor signal (-)
34	load cell “B” ground
35	load cell signal + (A1 + A2)
36	load cell signal - (A1 + A2)
37	load cell “A1+A2” ground

Helps

- Pins 1-6 and 23-24 are 20-gauge outer wires for actuator drivers.
- Shielded pairs for sensors are on pins 14 and 15, 32 and 33, 35 and 36, and 29 and 31.

Load Cell Connector Wiring

These cables come pre-wired. The following information on wiring configurations are included for reference only.

Plot Weight Load Cell

System Control Cable Pin #	Signal Name	Break-Out Box Pin #
35	plot weight load cell signal (+)	3
36	plot weight load cell signal (-)	4
19	plot weight load cell excitation (+)	1
37	plot weight load cell excitation (-)	5
18	plot weight load cell shield	6
	no connection	2

Test Chamber Load Cell

System Control Cable Pin #	Signal Name	Break-Out Box Pin #
14	test chamber load cell signal (+)	3
15	test chamber load cell signal (-)	4
17	test chamber load cell excitation (+)	1
34	test chamber load cell excitation (-)	5
16	test chamber load cell shield	6
	no connection	2

Auxiliary Load Cell

System Control Cable Pin #	Signal Name	Break-Out Box Pin #
29	aux load cell signal (+)	3
31	aux load cell signal (-)	4
26	aux load cell excitation (+)	1
25	aux load cell excitation (-)	5
30	aux load cell shield	6
	no connection	2

Moisture Sensor Connector Wiring

These cables come pre-wired. The following information on wiring configurations are included for reference only.

System Control Cable Pin #	Signal Name	Break-Out Box Pin #
32	moisture sensor signal (+)	3
33	moisture sensor signal (-)	4
12	moisture sensor control	5
11	moisture sensor excitation (12V reg.)	1
13	moisture sensor shield & ground	6
	no connection	2

25-pin Host Port

This cable comes pre-wired. The following information on wiring configurations are included for reference only.

9-pin Socket	Signal Name	25-pin Socket
1	N/C	
2	RXD (red)	2
3	TXD (green)	3
4	DTR	20
5	GND	7
6	DSR	6
7	RTS	
8	CTS	
9	N/C	

RS-232 Expansion Ports

These cable come pre-wired. The following information on wiring configurations are included for reference only.

Barcode Wand

SCCU 9-pin Socket	Signal Name
1	External Switch Input
2	Wand RXD
3	TXD
4	DTR
5	Ground
6	N/C
7	Wand RTS
8	Wand CTS
9	+5VM

Printer

SCCU 9-pin Socket	Signal Name	25-pin Socket
1	N/C	1
2	RXD	3
3	TXD	2
4	12 VSB	9
4	12 VSB	25
5	Printer Ground	7
5	Printer Ground	12
6	Printer Take-up	10
7	RTS	4
8	CTS	5
9	N/C	

HVD

SCCU 9-pin Socket	Signal Name
1	N/C
2	RXD
3	TXD
4	+12VBSP
5	Ground
6	N/C
7	N/C
8	CTS
9	+5VM

RS-485

SCCU 9-pin Socket	Signal Name
1	N/C
2	RS485 Low
3	RS485 High
4	+12VBSP
5	Ground
6	N/C
7	N/C
8	N/C
9	N/C

Appendix F
Fieldmaps Generated from ASCII

A field map to be downloaded to the Field Computer and into the Harvest Data software consists of an ASCII file. An ASCII file is simply a DOS text file. It is created on a PC with a text editor, a word processor in non-document mode or DOS text mode, or it may be created in a spreadsheet and saved in tab delimited, space delimited, or CSV (comma delimited) format.

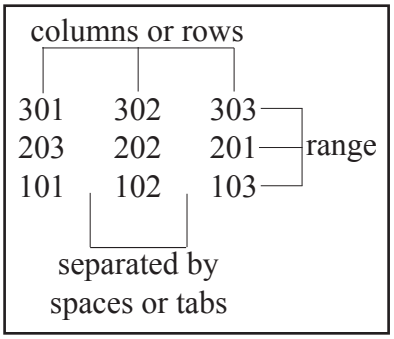
ASCII File Formats

The Harvest Data software version 3.x accepts two distinct ASCII file formats to load as maps to the Field Computer: Two-Dimensional Text Representation and Harvest Order Space Delimited format. Both of these formats are discussed in this section.

Two-Dimensional Text Representation

A two-dimensional (2-D) text map consists of rows and columns of plot identifiers separated by spaces or tabs (see Figure F-1).

Figure F-1
Two-Dimensional Text File



The identifiers consist of up to 8 alphanumeric characters. If the identifier is more than 8 alphanumeric characters, it will be broken into groups of 8 characters and placed in multiple identifier holders in the data file.

There is no header information included in the file and each row ends with an ASCII carriage return/line feed pair. Each plot may have one or more identifiers (see either Figure F-2 or F-3). The map to be downloaded should be entered into a text file.

Figure F-2
Field Map with only one Identifier per Plot

310	309	308	307	306
301	302	303	304	305
210	209	208	207	206
201	202	203	204	205
110	109	108	107	106
101	102	103	104	105

Figure F-3
Field Map with more than one Identifier per Plot

304,study1	303,study1	302,study1	000,study2
203,study1	204,study1	301,study1	303,study2
202,study1	201,study1	104,study1	302,study2
101,study1	102,study1	103,study1	204,study2
304,study3	303,study3	302,study3	203,study2
203,study3	204,study3	301,study3	105,study2
202,study3	201,study3	104,study3	104,study2
101,study3	102,study3	103,study3	101,study2

These maps can be generated using a spreadsheet program such as Microsoft Excel. To do this, place each plot ID in a separate cell, separating more than one ID with a comma. Save the file as a *Tab Delimited* file. Use a text editor (such as NotePad) to check the layout before downloading it.

After downloading the field map and collecting field data, you can upload the data file back to your PC. When viewed in the text editor on the PC (see Figure F-4).

Figure F-4
Uploaded Field Map as viewed in a text editor

[ID1	ID2	Plot	MoistÖ]
101	study3	14.2	5.4
102	study3	14.4	5.8
103	study3	12.8	4.5
101	study3	17.4	6.5

If there are portions of a field that have border rows or rocks, these should be marked with an easily identified word or group of words (see Figure F-5). Do not leave holes or unfinished rows in the map.

Figure F-5
Complete Map File with Associated Identifiers

xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
border	301	302	303	304	border
border	201	202	rocks	204	border
border	101	102	rocks	104	border
xxxx	xxxx	xxxx	xxxx	xxxx	xxxx

The incomplete map will cause abnormal behavior if loaded (see Figure F-6).

Figure F-6
Incomplete Map File Identification

301	304			
201	202	203	204	
101		103	104	border
001		003		

Harvest Order Space Delimited

The second type of map file is the Harvest Order Space Delimited. It may be generated in Microsoft Excel or a DOS text editor. This is done by entering the plot numbers (and any associated identifiers) in the order that they will be harvested (see Figure F-7).

Figure F-7
Downloaded Field Map from a Harvest Order Space Delimited file

310	309	308	307	306
301	302	303	304	305
210	209	208	207	206
201	202	203	204	205
110	109	108	107	106
101	102	103	104	105

The Harvest Order Space Delimited file could be generated by typing each plot in sequential order into Microsoft Excel or a text editor. When using Microsoft Excel, enter each identifier into a separate cell. If any identifiers are missing fill in the empty cells with x's. After creating your map in harvest order (from top to bottom), save the file in CSV format. Use a text editor to check the layout before downloading. Figure F-8 shows the order that the field map in the figure before was entered.

Figure F-8
Harvest order Space Delimited Map as entered into Microsoft Excel or a text editor

```
101
110
201
201
301
310
102
109
202
209
etc.
```

If you are walking in a field that has more than one study, enter the plots with a comma, separating the study identifier (see Figure F-9 and F-10).

Figure F-9
Field Map with more than one Identifier per Plot

Study 611123

304	303	302	000	305
203	204	301	303	304
202	201	104	302	301
101	102	103	204	205

Study 845223

304	303	302	203	202
203	204	301	105	201
202	201	104	104	103
101	102	103	101	102

Study 799971

Figure F-10
Map with Multiple Plot Identifiers as entered into Microsoft Excel or a text editor

Plot# Identifier, Study Identifier
101,799971
202,799971
203,799971
304,799971
101,611123
202,611123
203,611123
304,611123
303,611123
204,611123
201,611123
102,611123
303,799971 (etc.)

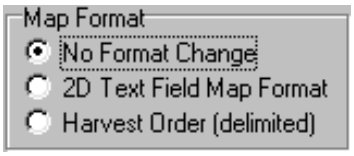
No Format Change

The *No Format Change* option directly transfers a file to the Field Computer. This is generally only used when downloading setup files.

The Field Computer must be running the DWRB software and connected to the PC through the communication cable before you can download maps.

You must select a format before downloading a map file into the Field Computer. This tells the DWRB software how to interpret the field map file you are about to download (see Figure F-11).

Figure F-11
Map Format Selections



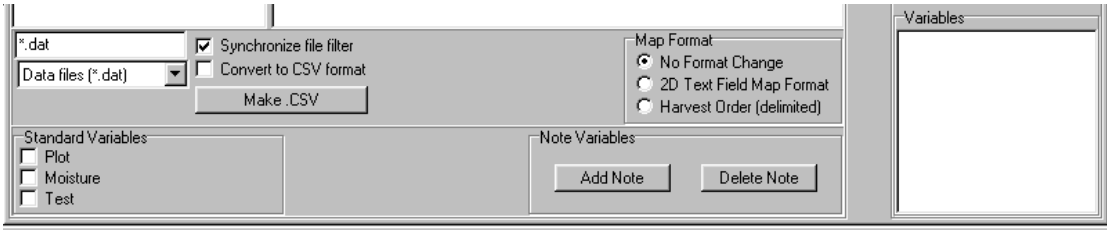
Downloading Maps

The active variables set on the Field Computer, such as Plot Wt, Moisture, Test Wt, and any note variables will be used to set up the map file during the transfer process to the Field Computer. Any variables that you would like associated with the map will need to be set up before the transfer begins. Make sure the remote field corp. is hooked up properly. To select variables complete the following steps:

1. Open DataLink and select the *Transfer Files* tab.

2. Select the standard variables you wish to record. If you would like to add note variables (such as stand counts), select *Add Note* then type in the name of the desired note. The variable options are shown in the bottom half of your screen (see Figure F-12).

Figure F-12
Variable Options Location



The variables that you have selected are displayed in the *Variables* box at the bottom right of your screen. To download a map, complete the following steps:

1. Type in the plot numbers and any associated identifiers in Microsoft Excel or a text editor. Type the numbers in either the 2-D Text format or Harvest Order Space Delimited format.

2. Save the map file as ASCII/Tab Delimited in Microsoft Excel or the text editor .

3. Make sure your Field Computer is connected to your PC.

4. Check that you are running the DWRB software on the Field Computer.

5. Open DataLink for Windows on your PC and click on the *Transfer Files* tab.

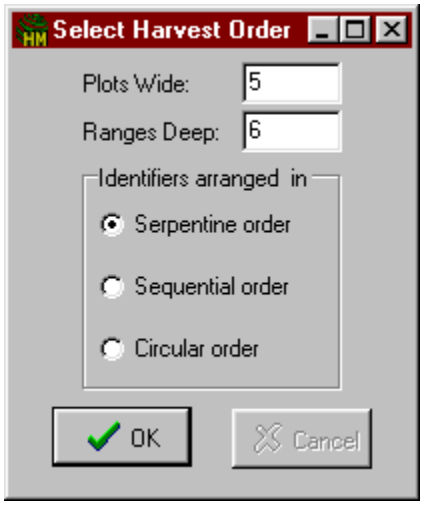
6. Click OK on the *Locating Remote* window.

7. Select the proper map file, then click on the right-pointing arrow <→> to begin downloading.

   Note: If you have already selected the Transfer Files tab, press the refresh button <↻> to connect to the remote without exiting and reentering.

8. If you are downloading a *Harvest Order Space Delimited* map, you will be presented the window in Figure F-13.

Figure F-13
Select Harvest Order window

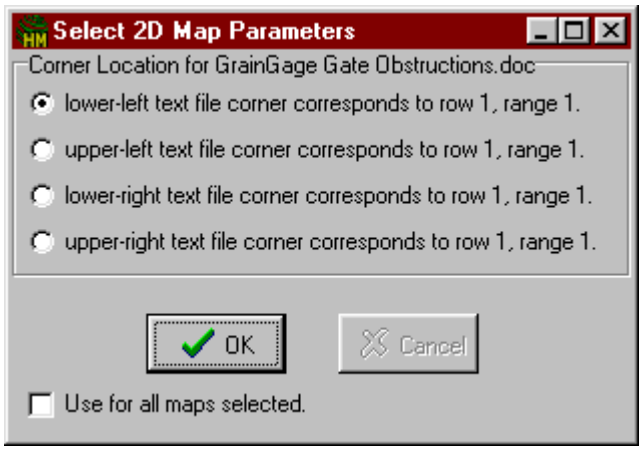


The *Select Harvest Order* window allows you to set up the width of the field, the number of ranges in the field, and the harvest direction or route that you will take when the field is harvested. The two available harvest routes are shown in Figure F-14.

Figure F-14
Available harvest routes

9. If you are downloading a 2-D map, you will be presented with the window in Figure F-15. The *2-D Map Parameter* window allows you to specify which corner of the map corresponds to range 1, row 1 of the field.

Figure F-15
Select 2-D Map Parameter window



10. Select the appropriate option and click on <Ok>.

11. Click the right-pointing arrow <→>, to begin downloading.

Note: Always view your maps to ensure that they were downloaded correctly.

Appendix G
Additional DataLink Information

Other Functions of DataLink

DataLink can be used with a number of other HarvestMaster programs. This section offers additional information about DataLink functions that are both associated and not associated with DWRB.

Registry Error

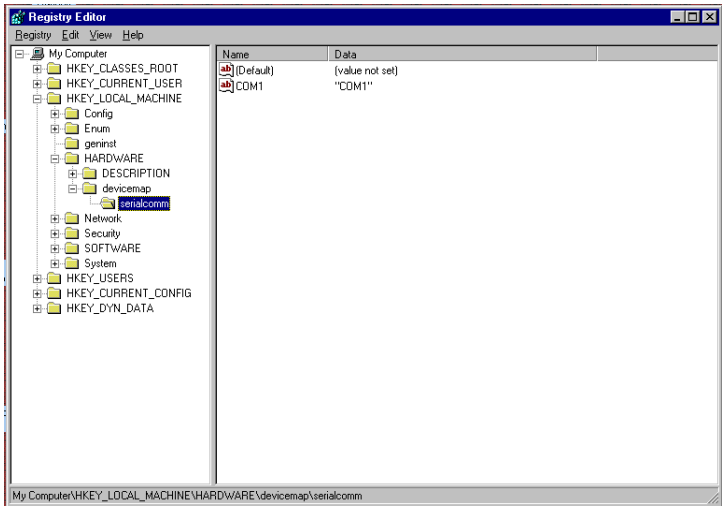
If, after running DataLink, you receive the following message: *Serial Port Information Not Available in Registry*, you need to update the registry on your PC. To update the registry complete the following steps:

1. Click on <Start> to open the Start menu and select *Run...*.

2. Type in *regedit* in the *Open* text box. Click on <Ok> to run the *Registry Editor*.

3. Navigate to the following path: *Hardware* / *Devicemap* / *Serialcomm*. Figure G-1 shows how your registry should look. Make sure the items shown on the right side of the screen are listed in your registry.

Figure G-1
Registry Edit Navigation Path



4. If you do not see these items, select the *Hardware* folder, go to the *Edit* menu and click on it. Go to *New* and then click on *Key*. Name the new key *Devicemap* and press <Enter>.

5. Select the new *Devicemap* folder and go to *Edit,* then to *New,* and then to *Key* again. Name this key *Serialcomm*.

6. Open the *Serialcomm* folder then go to the *Edit* menu and choose *New*, then *String Value*. Name the new string *COM1*.

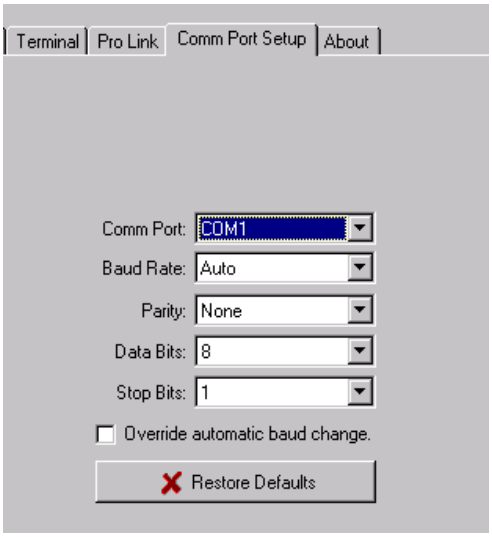
7. Select *COM1* and go to the Edit menu and choose *Modify*. Type in *COM1* as your value data.

8. Your registry will now look like Figure G-1.

Communication Port Setup

If the PC and the Field Computer did not communicate, the communication port settings may need to be changed. To change the communication port settings, click the *Comm Port Setup* tab in DataLink to open the Comm Port Setup window (see Figure G-2).

Figure G-2
Comm Port Setup: Default Setting



To make the correct selection for your communication setup, change the settings in the *Comm Port Setup* window. For example, if the Field Computer is connected to COM2, select *COM2* from the *Comm Port* pull down window.

DataLink automatically sets the optimum baud rate for data and map transfers (9600) and ProLink transfers (115k). If you must use a different baud rate, click the box beside *Override automatic baud change* so a check appears. DataLink will now exclusively use whichever baud rate you select. Click on the arrow at the right end of the *Baud Rate* box to reveal the pull-down menu. Then select your desired setting.

Note: Changing the baud rate from Auto may adversely affect the system communication performance. Use the Restore Defaults button to reset customized settings to their original values.

For additional help on diagnosing communication problems, refer to *Help* option in your *DataLink for Windows* program.

The ProLink and Terminal sections of this appendix are not associated with DWRB but are functions of DataLink. We have included this information for your benefit as a DataLink user manual in case you desire to use these options with other HarvestMaster software you have purchased.

Transferring Files

Using DataLink, you can transfer map files and data files between the PC and the Field Computer with a click of a button. To transfer files to and from the Field Computer complete the following the steps:

1. Make sure your Field Computer is on and in the DWRB *Main Menu* screen.

2. On your PC, click on <Start> to open the Start menu.
3. Go to the *Programs* folder.

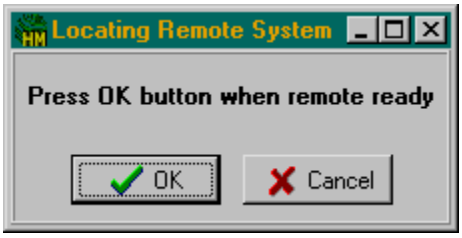
4. Select the *DataLink for Windows* directory.

5. Click on the *DataLink for Windows* program.

6. Click on the *Transfer Files* tab if it is not already in the foreground.

7. Click <OK> in the *Locating Remote System* box (see Figure G-3) if the Field Computer is on, connected, and running the application software.

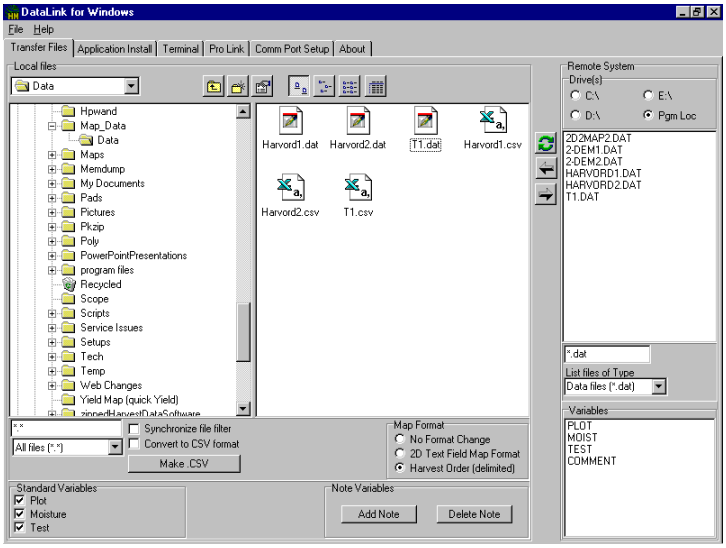
Figure G-3
Locating Remote System OK/Cancel Box



Note: If you are having problems with communication, check your COM Port setting and communication cables.

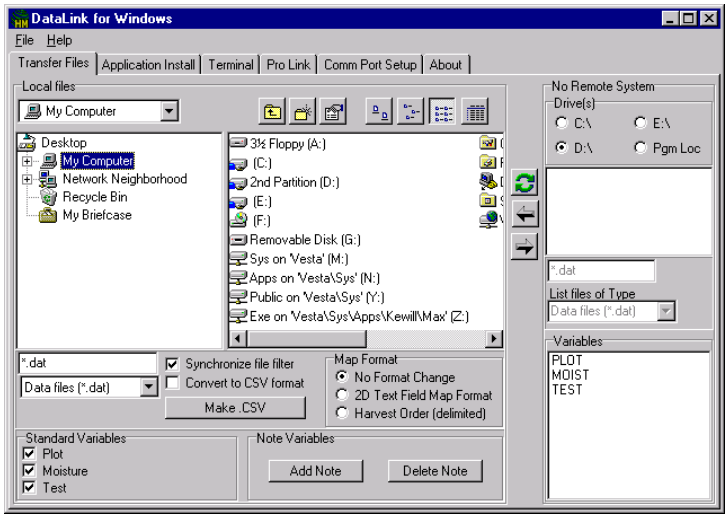
If the Field Computer is connected correctly and the communication setups are set correctly, the files from your Field Computer will be displayed in the *Remote System* box on the right side of the DataLink screen, and your PC directory and files will be displayed on the left side (see Figure G-4).

Figure G-4
DataLink Transfer Files Tab Connected to the Field Computer



If it does not connect, *No Remote System* will be the title of the box on the right side of the DataLink window (see Figure G-5). Double check to make sure your Field Computer is running in DWRB.

Figure G-5
DataLink Transfer Files Tab Not Connected to the Field Computer



The *Synchronize File Filter* option will make one file filter active. Disabling this option will allow two filters to be active, one for your PC (left side of screen) and one for your Field Computer (right side of screen).

8. Select the download format (*Map Format*) to correspond with the type of file you are downloading. See Section 4 of this manual for details on the map download options (i.e. *2-D Text Field Map* format and *Harvest Order (delimited)* format).

   Note: The option, Convert to CSV format will convert data files to a comma-separated format which is best used when importing into programs such as Microsoft Excel.

9. Make sure all the variables you desire are displayed in the *Variables* box in the lower right corner of DataLink's *Transfer Files* window, for example Plot, Moist, and Test. If they are not displayed, complete the steps in the following paragraphs:

   Go to the *Standard Variables* section in the bottom left corner of DataLink's *Transfer Files* window to select your desired variables.

   Click on the empty white box, in front of the variable you desire, so that a check mark appears. The selected variable(s) will also appear in the *Variables* box in the lower right corner of DataLink's *Transfer File*s window.

   Note: When downloading maps, it is required that you download the variables with it. Once downloaded, you will not be allowed to add or modify any variables associated with that map.

Transferring Files from PC to Field Computer

10. Highlight the file(s) you would like to transfer to the Field Computer and click on the right-pointing arrow to start the download process.

Transferring Files from Field Computer to PC

11. Make sure the correct drive is selected in the *Remote System* box of DataLink's *Transfer Files* window (for example C:\, E:\, D:\, or Pgm Loc). If you have not changed your current drive in the DWRB program, the default setting will be the program location. To change the drive, complete the following step:

    Click on the white circle in front of your desired drive in the *Remote System* section. A dot will appear in the circle of the drive you have selected. Your data files are viewed in the *Remote System* box on the right side of your screen.

12. Highlight the file(s) to be transferred to your PC, and click on the left-pointing arrow <  > to start the upload process. A file that has been uploaded to your PC can be viewed or edited by highlighting the file and right-clicking on it. This will send the file to your preferred editor.

13. To upload more than one file, highlight the first file, then hold down the <Shift> key and select the last, or use the <Ctrl> key to highlight separate files.

Note: Refer to the Help option in DataLink for Windows for specific information on transferring files.

For additional *Transfer Files* window options go to the *ProLink* section on page 5-10 of this chapter.

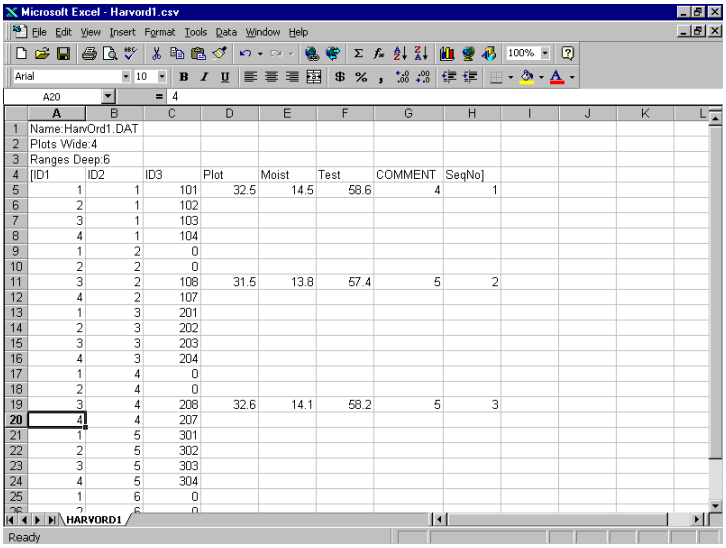
Convert to CSV Option

When the *Convert to CSV* option is not selected, the system will upload the data in a standard *Tab delimited Text* format. When the *Convert to CSV* option is selected, the system will automatically open the file with any program you would like.

Note: Comma separated format files can automatically be imported to Excel. Using My Computer, it is possible to change the file types (under VIEW) to allow your system to automatically open the file with any program you would like.

When you double click on the file that you would like to open, the system should automatically start the program and import the data for you (see Figure G-6).

Figure G-6
Automatic Start and Import to Microsoft Excel



Viewing data lets you scroll back through a set of collected data using the arrow keys to move from range to range and row to row within the selected field.

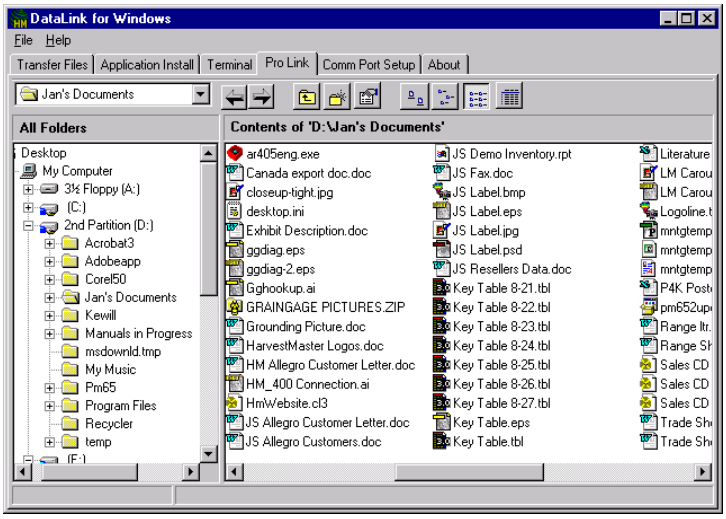
To transfer CSV files from your PC to your Field Computer select either *2-D Text Field Map Format* or *Harvest Order (delimited)*, located in the *Map Format* of DataLink's *Transfer Files* window.

ProLink

ProLink is a file transfer program generally used for files not associated with the DWRB application software (e.g. custom DOS programs). To start ProLink, choose the ProLink tab in DataLink for Windows (see Figure G-7).

Note: This utility can only be used with DOS Field Computers such as the Pro4000 or Allegro Field PC. ProShell (Pro4000) or File Scout (Allegro) must be running on the Field Computer (refer to your Field Computer's User's Manual for details).

Figure G-7
DataLink for Windows
ProLink Tab



Sending Files from PC to Field Computer

To send files to the Field Computer make sure your Field Computer is running FileScout or ProShell, and complete the following steps:

1. Select the appropriate drive, on your PC, by clicking on the pull-down menu located above the *All Folders* box.

2. Navigate through the folders in the left-hand *All Folders* box.

3. Double-click on the folder you want to open. Files within that folder will appear in the right-hand window.

4. Select the file(s) you wish to send. To send more than one file, highlight the first file, then hold down the <Shift> key and select the last, or use the <Ctrl> key to highlight separate files.

5. Click the Right Arrow <→> to open the *Transmission Progress* window.

6. Click <Send> to initiate communication.

7. The *Transmission Progress* window shows the current file in transit, its progress, and the overall progress. Click <Cancel> to stop the transfer. When finished the *Transmission Progress* will exit and you will be back at DataLink's *ProLink* window.

Receiving Files from Field Computer to PC

To receive files from the Field Computer complete the following steps:

1. On the PC, select the appropriate drive from the pull-down menu at the top of the screen.

2. Navigate through the folders in the left-hand *All Folders* box.

3. Double-click on the folder you want to open. Files within that folder will appear in the right-hand window. A received file will be placed in the lowest-ranking open folder.

   Mark multiple files, in FileScout or ProShell, on your Field Computer by using the INS key. On your Field Computer press <F5> to transfer or send files.

4. Click the Left Arrow <  >. The *Receive File Progress* window will appear.

5. Click <Receive> to initiate communication. (If the files are not sent within 10 seconds, DataLink will time out and the communication transfer will need to be restarted.)

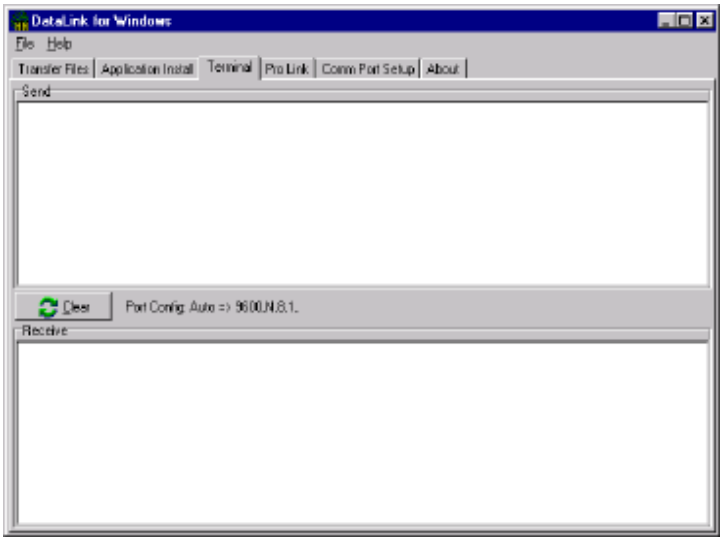
6. The *Transmission Progress* window shows the current file in transit, its progress, and the overall progress. Click Cancel to stop the transfer.

Note: Make sure the entire file was uploaded before deleting the file on your Field Computer.

Terminal

Terminal is a diagnostic tool used mainly for troubleshooting communication problems between the PC and the Field Computer. In DataLink, select the *Terminal* tab (see Figure G-8). For this option to work, both DataLink and the Field Computer must be in terminal mode. (Refer to your Field Computer User's Manual for information on how to set it to terminal mode.)

Figure G-8
DataLink for Windows
Terminal Tab



Communication between PC and Field Computer

To test communication between the Field Computer and the desktop PC complete the following the steps:

1. Connect the Field Computer to the appropriate comm port on the PC using a communication cable.

2. Set DataLink your Field Computer and PC to terminal mode.

3. Type a test message on your PC. The message should appear in the Send window in DataLink and in the Receive screen on the Field Computer.

4. Type a test message on the Field Computer. The message should appear in the Send screen of the Field Computer and in the Receive window of DataLink.

5. If steps 3 and 4 are accomplished successfully, then the Field Computer and desktop PC are communicating.

6. If these messages do not appear as they should, make sure the connections to the PC and Field Computer are correct. Make sure the Field Computer is plugged into the same comm port as shown on the *Comm Port Setup* screen. You may also refer to your Field Computer User's Manual, then repeat steps 2 through 4 to check communication.

Double-Wide Regular Bucket
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