Network Irrigation Controller
"NIC"
Cropping & Areas
Version EM.6

USERS MANUAL

CHERRY CREEK SYSTEMS
Greenhouse Equipment Specialists

Table of Contents

Description: ***Page:***

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Dear Customer:

We would like to thank you for taking a bold step in greenhouse irrigation by purchasing our "Area Cropping" program! Although it might appear to be very complex: the greatest possible care went into making this program as user friendly as possible while still keeping all the functionality that you have come to expect.

There have been many changes to our new program for our Network Irrigation Controller. We believe that once you become familiar with all that this new program has to offer you will be extremely pleased with how easily manageable irrigating your crops has become.

We would welcome and encourage you to make suggestions as to how we can improve this Users Manual. It is our intent to provide you with the highest quality equipment and state-of-the-art watering systems, as well as first rate technical follow up support.

If it is the 1st time setting up the Boom, then it is advisable that you follow this order in working through the manual:

1. ***Key Concepts***
2. ***Initial Power Up***
3. ***Diagnostics***
4. ***Setup***

Again, thank you for your business and we look forward to assisting you in any way we can. Please feel free to give us a call, or contact us via email.

Sincerely,

Cherry Creek Systems Team

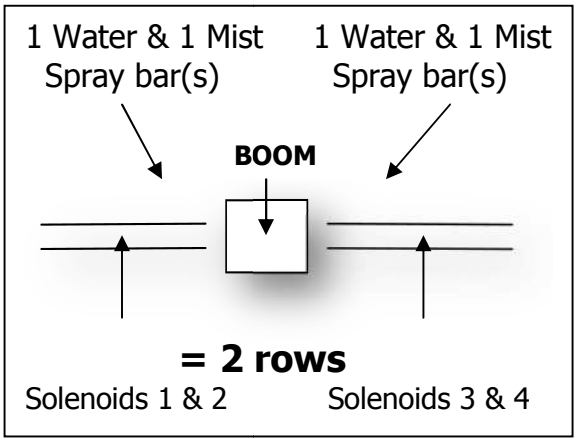
Key Concepts
*** Read this First! ***

It is advisable that this order is followed when working through the manual and setting up your boom:

1. Key Concepts
2. Initial Power Up
3. Diagnostics
4. Setup

Row:

A run in the greenhouse; usually left or right of the center aisle. It can also be defined as the number of solenoid "groupings" that are in the bay. If there are 4 bench runs across the width of the bay, then each bench could be assigned its own row (1 mist & 1 water solenoid per row). In the example on the right, there are two rows in the bay with an end walkway.



Area:

An Area is a given distance within the bay (example: 0.00 Ft to 110.00 Ft) that needs to be watered or misted by the boom. Areas are programmed by the user depending on the needed requirements. See example below, page 5:

Crop:

Just as the name suggests! This allows the user to combine multiple "Areas" into one "Crop" to minimize information input. In the Example, Areas 1 and 3 on the right side (Row 1) might be a crop.

Time Zone:

This is a given period of time. Your NIC uses a 24 hour format:

1:00 PM = 13:00
12:00 AM = 00:00
10:00 AM = 10:00
10:00 PM = 22:00

Keypad:

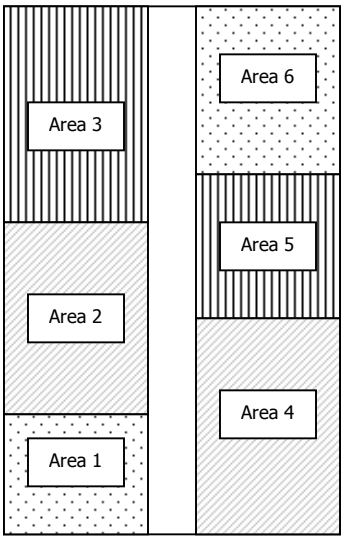
0-9 = Data Entry
E = Enter or Exit
B = Up / Increase
F = Down / Decrease
C = Left / Forward
D = Right / Back

Set Up and Cropping:

Basically, there are 4 steps:

1. Set up how many rows you have
2. Set up areas in each row
3. Assign a crop to each area
4. Give the boom crop watering instructions

It's easy!



= Crop 1 (areas 3 and 5)

= Crop 2 (areas 2 and 4)

= Crop 3 (areas 1 and 6)

Let's say you have 3 Crops, as laid out in the greenhouse above. *Even though Crop 1 is in 2 different areas, you don't have to input 2 different programs*. You simply give Crop 1 watering instructions, and both programmed areas under Crop 1 will be receiving the same watering regimens!

Main Menu:

**** To get to the main menu from almost anywhere, press "E" repeatedly. This manual starts from the main menu to get to the other menus. ****

1=AUTO	2=MANUAL
3=SETUP CROPS & SITE	
4=GLOBAL NET CROPS	
NIC-EM.6	23:59:59

Other Definitions:

FPM: Feet-Per-Minute; the speed that the Boom uses as a reference.
Acceleration: Speed setting that the Boom will "take off" when starting a programmed irrigation cycle, or as the Boom turns around to initiate another pass.
Deceleration: The setting that will allow the Boom to slow down as it approaches the end of the bay or the programmed turn-around point.
Go-To Speed: Speed that the Boom will travel to its programmed destination.
End Speed: Speed that the boom will travel at the last few feet of the "CROP".
SSW: Step / Stop / Water (described on page 4)
SSW Speed: Speed that the Boom will travel between "stop points" when using the Step / Stop / Water feature.
Markers: "Checkpoints" in the bay that will help to maintain the Booms calibration (there is a menu that will allow the user to see the number of Markers and their distance).
Idler Diameter: Diameter of the wheel that is used for the speed and motion sensing.
Configuration: Defined as "Rows", this set-up will allow each series of solenoids to be assigned to a function
(ex: solenoids 1 & 3 = WATER; solenoids 2 & 4 = MIST; etc.)
Global Solenoids: Allows for multiple solenoids to be turned on in unison without having to assign the valves to a function.
Walk & Water: Allows user to walk with Boom and turn on and off solenoid valves at needed distances and water without having to program a "Crop".

External Switch Definitions

- **SW1** – **Home / Away / Marker** magnetic sense switches **(mandatory)**.

The Boom will stop at the programmed distance after the home or away sensor detects a magnet. This keeps the calibration of the Home & Away positions.
Used to save the position in which the Markers magnet(s) are detected. The stored position will define a "checkpoint" for the controller to keep its position accurate if it ever gets lost between Markers.

- **SW2** – **Absolute End-of-Bay** magnetic sense switch.

The Boom will stop after this sensor detects a magnet. This is used as a safety so that the Boom cannot overshoot the ends of the bay.

- **SW3** – **Unused** Switch input. *Call Cherry Creek for clarification*

- **SW4** – **Collision Switch**. This switch input must be closed at all times to allow the Boom to run. The inputs may be connected to an object detection (IR Sensor) or Collision Switch that will open the normally closed circuit when an object is detected in the path of the boom. A simple jumper wire between the SW4 & GRD terminal connections may be used keep the switch permanently closed which will allow the boom to run.

- **SW5 & SW6** – **Remote Auto Start Switches.** Used in conjunction w/ a 24VAC Relay to start the Boom "Remotely" via an Environmental Control System (Priva, Argus, Wadsworth, etc.).

- **SW7** – **Remote Home Switch.** Used to move the Boom in the Home direction with a remote switch. The remote away switch (SW8) is required to operate the boom in the remote mode. Refer to SW8 description for the operation and function of SW7.

- **SW8** - **Remote Away Switch.** Used to move the boom in the away direction with a remote switch. If the boom is in the main or manual menu the boom may be moved using the remote home and away switch option. When the boom is stopped, pressing the home or away switch will start the boom moving at 10 Feet Per Minute (FPM) in the respective direction. Pressing the same switch again will increase the speed by 10FPM. If the switch is pressed repetitively the speed may be increased up to 150FPM. To stop the boom, press the other switch once.

- **IN / GRD / +NRV - Proximity sensor.** Used for the Booms Speed, Distance and Motion sensing. Gets its 18V+ power from +NRV.

Updates and New Features

Network Irrigation Controller EM.6 "Areas"

AREAS vs. JOBS:
One of our best features of this new program is the change in the architecture. Instead of "Jobs" (magnets that need to constantly be moved and readjusted when a crop moves or gets replaced by another crop) we now use "Areas" and "Rows" (a programmed distance that can be changed and rearranged at any time, easily and trouble-free).

SMART BOOM MOVEMENT:
The booms move only to the areas that need to be watered. It no longer has to go from one end of the bay to another (Home to Away, then back to Home) every time it makes one pass. It no longer has to rest at the "Home" position. This saves wear and tear on the Boom and its parts.

STEP/STOP/WATER:
Another very useful tool is the Step, Stop & Water function. It has the ability to move the boom to a user defined distance, then stop & water for a programmed amount of time, then move onto the next user defined distance and continue. For example: you can set-up large 12" pots in a checker-board pattern @ 18" centers, have the boom start at the first row of pots and start the irrigation "Area", then move to every row of pots and continue watering in the same fashion.

WALK AND WATER:
We have added the possibility to walk beside your boom and water your crops by the press of a button (optional remote hand-held controller). You can simply walk the boom to the Area that needs to be watered and turn on the solenoid(s).

MULTIPLE CROP ACTIVATION BY COMPUTER:
It is now possible to start irrigating your crops using inputs from *ARGUS™, PRIVA™ or OGLEVEE™* or any other environmental controls. Please talk to your Cherry Creek representative for more details on our Network Accumulator.

MULTIPLE TIMES PERIODS (ZONES) FOR CROPS:
You now have the option of assigning each crop up to Six (6) time periods or "Zones" for irrigation. For example you can have Crop #1 water from 7:00 – 10:00 then again at 13:00 – 15:00 without reprogramming every time.

Initial Power Up

Some Basic site information must be entered into the controller before you can begin irrigating crops. Pressing keys "1" through "F" will take you through the setup menus. When the Network Irrigation Controller (NIC) is first plugged in or after it is RESET you will be prompted to do an ***initial setup.***
The opening screen shows the version of NIC and the website address.

NIC-EM.6 http://www
.cherrycreeksystems.com
FOR INFORMATION.
ANY KEY TO CONTINUE

Configuration

*** At Initial Start-up (first time plugging in the controller), it is best to go thru the Diagnostics Menu ***first*** to test all of the functions of the Boom, then move to Set-up (Configuration) ***

Configuration will have to be done after a Reset. Reset by pressing "0" and "F" at the same time and then entering the reset code **4273;** or by pressing Reset button labeled Reset inside the controller box, located on the Main Board to the left of the Display.

Press any key "1-F" to continue. "0" bypasses the Configuration Set-up

CONTROLLER HAS TO BE
CONFIGURED FOR SITE
BEFORE USE. PRESS
1-F KEY TO CONFIGURE

Pressing "0" once will bypass the Configuration Menus.
Pressing "F" repeatedly will scroll thru the Set-Up menus until the main menu is reached, where Diagnostics and Set-Up can be completed.

Diagnostics

If it is the 1st time setting up the Boom, it is highly recommended that you go through the diagnostic menu, BEFORE YOU CONFIGURE YOUR BOOM. This process will insure all of the inputs are functioning properly and that nothing was damaged during shipping.

Note: From most any menu on your new NIC, you can get back to the Main Menu by pressing the "E" key repeatedly.

1. From Main menu, press 3
2. From Setup menu press 2

Diagnostics Menu:

1= KEY	2 = SW-IN
3= SOL	4 = MOTOR
5=MARKERS	6 =STOP SW
7=	E = EXIT

Keypad test

(Main Menu, Press 3, Press 2, Press 1)

Quick Menu/ Keypad Number Reference

In this menu you can press each key to check if all the keys are working.

1. From the Main menu press 3
2. From the Setup menu press 2
3. From the Diagnostics menu press 1 (KEY):

KEYPAD DIAGNOSTIC.
TO END PRESS E TWICE
KEY NUMBER = F

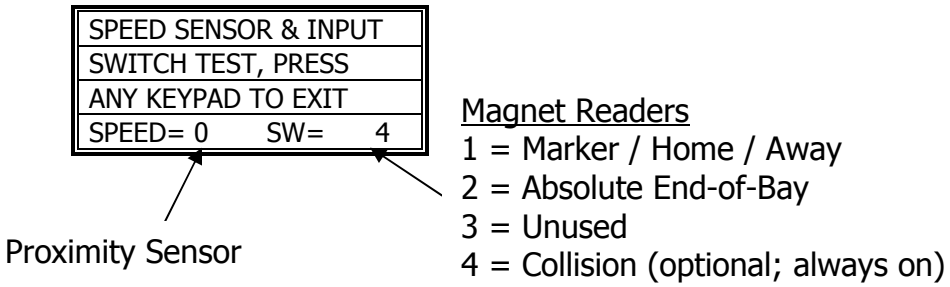
4. Press any keys on the keypad to see them displayed on the display.
5. Press the "E" key repeatedly to return to Main menu.

Testing your inputs (sensors)

(Main, 3, 2, 2)

In this menu you can check to see if the booms Proximity (speed) Sensor and Magnet Readers are working properly.

1. From the Main menu press 3
2. From the Setup menu press 2
3. From the Diagnostics menu press 2 (SW-IN):



4. **Proximity Sensor** – For the speed sensor, gently push the boom. As you are pushing, look behind the "SPEED=0" and you should see it alternate between "1" and "0".

5. **Magnet Readers** – You should have 2 magnet readers on your boom. Marker / Home / Away & the Emergency End-of Bay. The Marker / Home / Away will be on one side of the boom (pointed at the rail) and the End-of-Bay Sensor will be on the other side (again, pointed at the rail). To check readers 1 & 2 wave a magnet in front of each one. You should see the display show a "1" or "2". Switch "4" will always appear, unless the Collision Sensor is used.

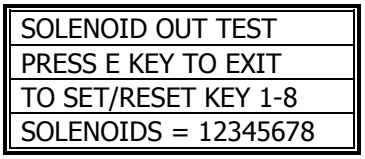
   ** For more information on the switch failures please reference the "Trouble Shooting" page for more info **

6. Press the "E" key repeatedly to return to Main menu

Solenoids

(Main, 3, 2, 3)

1. From the Main menu press 3
2. From the Setup menu press 2
3. From the Diagnostics menu press 3 (SOL):



4. Press the "1" through "8" keys to alternately turn on and off the respective solenoid valves.
5. Press the "E" key repeatedly to return to Main menu

Motor test

(Main, 3, 2, 4)

1. From the Main menu press 3
2. From the Setup menu press 2
3. From the Diagnostics menu press 4 (MOTOR):

MOTOR MOTION TEST
PRESS A=HOME B=AWAY
PRESS E KEY TO EXIT
SPEED(5-150) = 020

4. Use the "0" through "9" keys to enter a speed from 5 – 150 FPM (Feet Per Minute). * Recommended Speed: 25-50 FPM for testing *
5. Press the "A" or "B" key to move the boom either home or away**.**

NORM DIAG MOTOR MOVE
NORMAL A=HOME B=AWAY
PRESS E KEY TO EXIT
SPEED (5-150) = 020

6. Press the "E" key repeatedly to return to Main menu

Markers

(Main, 3, 2, 5)

1. From the Main menu press 3
2. From the Setup menu press 2
3. From the Diagnostics menu press 5 (MARKERS):

MARKER RECALIBRATION
BOOM WILL SEARCH IN
DIRECTION = AWAY
E =FIND F =CHANGE DIR

4. Press "F" to change direction of travel. The boom will search for the nearest "Marker" in that direction.
5. Press "E" and send the boom to search for the nearest "Marker". The screen will display the following:

MARKER RECALIBRATION
CAUTION!
BOOM IS LOOOKING FOR
NEXT MARKER

6. The boom will travel in the assigned direction and search for the nearest "Marker". This will enable the boom to see a "Marker" checkpoint and find its bearings and get back into calibration with the bay.

MARKER RECALIBRATION
MOVING AT 30 FPM
ANY NUMBER = PAUSE
B = FASTER F= SLOWER

7. Pressing "B" will increase speed (it is highly recommended that during calibration, the boom doesn't travel faster than 80 FPM). Pressing "F" will decrease speed.
8. Pressing any number key will pause the Marker Recalibration. This is used once calibration has been started, and it needs to be paused, without starting over.

BAY LENGTH AT 030FPM
--*- PAUSED -*-*-*
CONTINUE = ANY KEY
EXIT = F KEY

9. When the boom hits the first "Marker" that it sees, in which ever direction it was told to travel, it will prompt this screen:

ENTER CORRECT MARKER
AT MARKER NUMBER 01
PRESS E TO EXIT AND
SET CURRENT LOCATION

10. Enter the correct "Marker" number that the boom should be seeing, and press "E" to enter and save to "Marker" number.
11. The screen will return to the Diagnostics menu.

Emergency "Absolute End-of-Bay" Stop Switch

(Main, 3, 2, 6)

1. From the Main menu press 3
2. From the Setup menu press 2
3. From the Diagnostics menu press 6 (STOP SW):

USE SW2 TO DETECT
ABSOLUTE END-OF-BAY
EMERGANCY STOPS? NO
E = ACCEPT F = CHANGE

4. The "End of Bay Emergency Stop" prompt will appear. Press "E" to leave as programmed (NO, by default) or press "F" to change. Then "E" to Enter.
    - *This function will enable SW-2 (switch input #2), which will stop the boom at a set magnet if it over shoots its target stop points.*

Setup

If you are setting up for the first time, please go through your *diagnostics* menu first, before proceeding with Setup.

Clock

(Main, 3, 3, 1)

1. From Main menu press 3
2. From Setup menu press 3
3. Enter Pass Code (0000 by Default)
4. From the Site, Rows, and Bay, menu, press 1 (CLOCK)

TIME VARIABLE= 23:59
ENTER 24 HOUR FORMAT
E = ENTER NEW TIME
NEW TIME VAR.= 00:00

5. To zero the time, press the "0" key several times.
6. Use the "0" through "9" keys to enter the current time on the bottom row.
7. Press the "E" several times to return to main menu.

Idler Diameter Menu

(Main, 3, 3, 2, 1)

1. From Main menu press 3
2. From Setup menu press 3
3. Enter Pass Code (0000 by Default)
4. From the Site, Rows, and Bay menu press 2 (SITE)

** This screen will appear, press any key to continue **

WARNING!!! CHANGING
IDLER OR DISTANCE
WILL RESULT IN LOSS
OF CROP PROGRAM DATA

5. The Site Menu will appear.

1 =IDLER 2 =CONFIGER
3 =INITIAL 4 =BAY LENGTH
5 =LOCATE 6 =
7 = MORE E = EXIT

6. Press "1" for Idler.
7. The Idler Menu will appear.

F = SELECT BOOM TYPE
A=ALT-TYPE B=MOT-ERR
E = SINGLE RAIL BOOM
1.0IN -IDLER 10-TOOTH

Cherry Creek Booms
Tower / Truss Boom = 2.5 inch idler
Double Rail Boom = 2.0 inch idler
Single Rail Boom = 1.0 inch idler
*** Tic Counter on all CCS Booms = 10 or 12 tooth sprocket ***

8. Pressing "F" will change the boom type (idler diameter). Please note that the correct size for your particular Cherry Creek Systems boom is shown in the table above. *Call CCS for clarification of your system.*
9. When pressing "F", the bottom 2 lines will change to read the following:
    a. Single Rail Boom:
       1.0 in. idler 10 tooth (sprocket)
    b. Double Rail Boom:
       2.0 in. idler 10 tooth (sprocket)
    c. Tower Boom:
       2.5 in. idler 12 tooth / 1 in. axle (sprocket)
    d. Tower Boom:
       2.5 in. idler 10 tooth / 0.75 in. axle (sprocket)
10. Select the type of boom that is being used and press "E" to save and exit.
11. The next screen will state the following:

THIS CONFIGURATION
HAS A MAX BAY LENGTH
SPEED OF **90**
ANY KEY = CONTINUE

** This is for Calibration ONLY. Do not take this into account on the actual FPM **

12. Press "A" for Alternate Idler type. *This is not recommended; please contact Cherry Creek Tech Support before trying to use this feature.*
13. Press "B" to change the Motion Error timeout.

SET MOTION ERR. TIME
VALID DEL = 0.1 --> 4.0
DELAY IS 2.0 SECONDS
SAVE & EXIT PRESS E

14. The Motion Error will be set to 2.0 seconds by default. But the time can be changed to any value between 0.1 and 4.0 seconds. If the boom is experiencing "Motion Errors" without just cause, then increase the timeout. If it is necessary that the boom stops easier, decrease the timeout. Typical applications call for 2.0 to 3.0 seconds.
15. Press "E" to exit and save.

Configuration (Row Assignment)

(Main, 3, 3, 2, 2)

**** "Rows" are defined in detail on the Key Concepts page (page 4) ****

1. From Main menu press 3
2. From Setup menu press 3
3. Enter Pass Code (0000 by Default)
4. From the Site, Rows, and Bay menu press 2 (SITE)

** This screen will appear, press any key to continue **

WARNING!!! CHANGING
IDLER OR DISTANCE
WILL RESULT IN LOSS
OF CROP PROGRAM DATA

5. The Site Menu will appear.

1 =IDLER 2 =CONFIGER
3 =INITIAL 4 =BAY LENGTH
5 =LOCATE 6 =
7 = MORE E = EXIT

6. Press "2" for Configuration. This screen will appear:

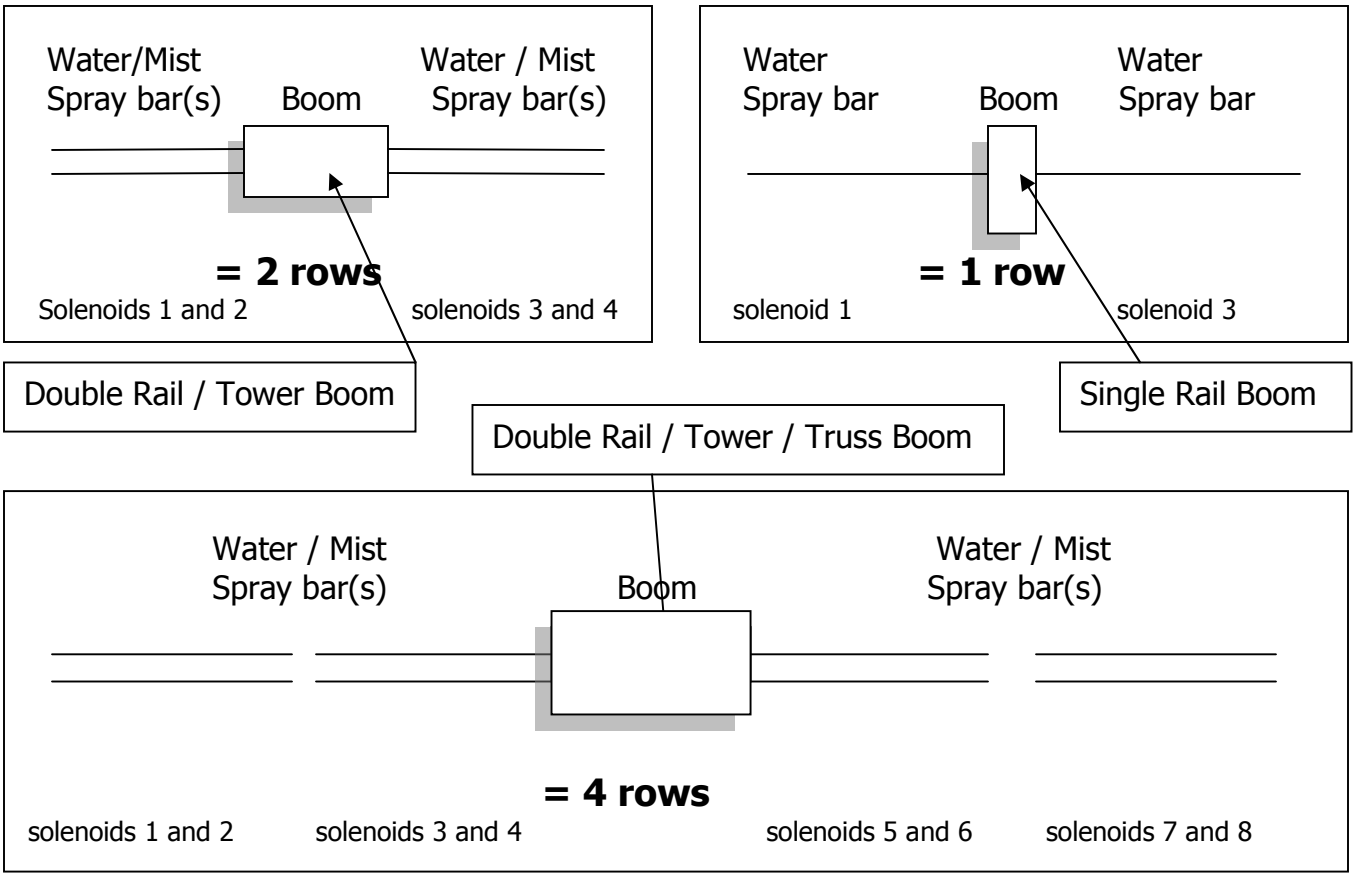
SELECT THE NUMBER OF
ROWS UNDER THE BOOM
ROWS UNDER BOOM = 4
PRESS E TO CONTINUE

7. Select the number of Rows that will be used by the boom and press the corresponding number on the keypad (in this case press "4" to utilize all 4 rows under the boom).
8. Next, assign each solenoid to a row and assign each row to a function. For example, by default all odd numbered solenoids are assigned to the "water" function and all even numbered solenoids are assigned to the "mist" function. Each one of the four rows can be assigned up to two functions each. Example screen shown below:

SOL – 1 ROW – 1 WATER
SOL – 2 ROW – 1 MIST
SOL – 3 ROW – 2 WATER
SOL – 4 ROW – 2 MIST

9. Press "F" or "B" to scroll thru and change the Row numbers, and press "C" or "D" to scroll thru and change the functions (water, mist or none). When the cursor is on the proper function, press "1" for the Water function, press "2" for the Mist function and press "3" for None.
10. Press "E" to exit and save.

*** *A row is a strip that runs the length of the bay. It has to be the same as the spray/mist bars under the boom. Each row can have a Water and/or Mist spray bar(s). Each spray bar has its own solenoid.* ***
Below are a few examples:



Initialization

(Main, 3, 3, 2, 3)

*** *Used to erase and reset your Crop and Area settings* ***

1. From Main menu press 3
2. From Setup menu press 3
3. Enter Pass Code (0000 by Default)
4. From the Site, Rows, and Bay menu press 2 (SITE)

** This screen will appear, press any key to continue **

WARNING!!! CHANGING
IDLER OR DISTANCE
WILL RESULT IN LOSS
OF CROP PROGRAM DATA

5. The Site Menu will appear.

1 =IDLER 2 =CONFIGER
3 =INITIAL 4 =BAY LENGTH
5 =LOCATE 6 =
7 = MORE E = EXIT

6. Press "3" for Initialize. This screen will appear:

CLEAR / INITIALIZE MENU
1 = INITIALIZE CROPS
2 = CLEAR SELECT AREA
F = EXIT

7. Press "1" for Initialize Crops. This will allow for the user to erase all **Crops** currently programmed into the NIC controller. After pressing "1", this screen will appear:

INITIALIZE CROPS MENU
STARTING CROP # = 01
ENDING CROP # = 16
E = INITIALIZE A = EXIT

8. Enter the Crop numbers that need to be erased, and press "E" to initialize and exit back to the Set-up screen.

CLEAR / INITIALIZE MENU
1 = INITIALIZE CROPS
2 = CLEAR SELECT AREA
F = EXIT

9. To erase all of the **Areas** stored in the NIC's memory, get back to the "Clear / Initialize" menu and press "2", Clear Select Area.

SELECTED ROW # = 1
STARTING AREA # = 001
ENDING AREA # = 060
E = INITIALIZE A = EXIT

10. Enter the Row number and the Area numbers that need to be erased, and press "E" to initialize and exit back to the Set-Up screen.

Bay Length

(Main, 3, 3, 2, 4)

1. From Main menu press 3
2. From Setup menu press 3
3. Enter Pass Code (0000 by Default)
4. From the Site, Rows, and Bay menu press 2 (SITE)

** This screen will appear, press any key to continue **

WARNING!!! CHANGING
IDLER OR DISTANCE
WILL RESULT IN LOSS
OF CROP PROGRAM DATA

5. Press "4" for "B-LENGTH" (Bay Length)

1 =IDLER 2 =CONFIGER
3 =INITAL 4 =B-LENGTH
5 =LOCATE 6 =
7 =MORE E = EXIT

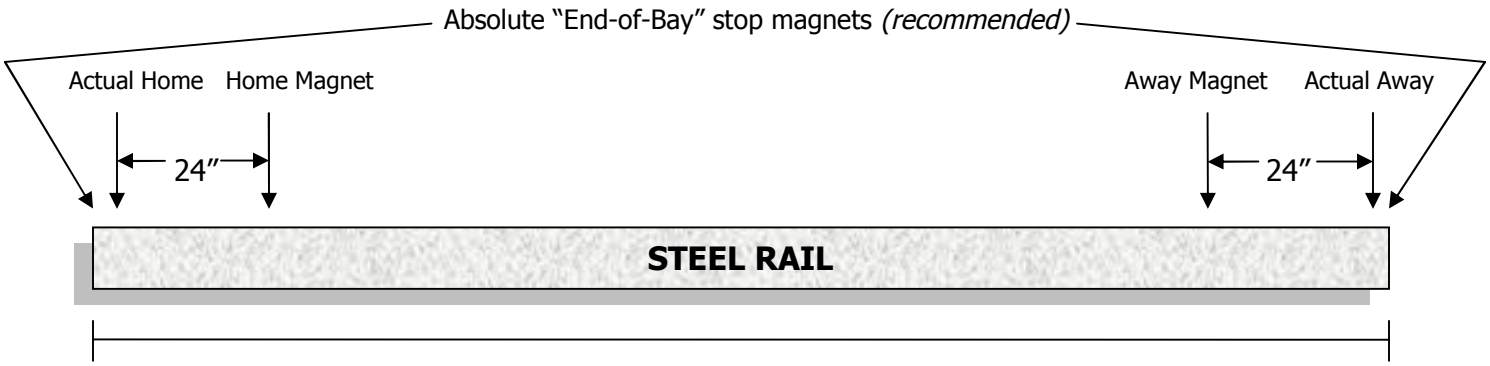
6. The "End of Bay Emergency Stop" prompt will appear. Press "E" to leave as programmed (NO, by default) or press "F" to change. Then "E" to Enter

** This function will enable SW-2 (switch input #2), which will stop the boom at a set magnet if it over shoots its target Home/Away stop points **

USE SW2 TO DETECT
ABSOLUTE END-OF-BAY
EMERGANCY STOPS? NO
E = ACCEPT F = CHANGE

7. The Home / Away / Marker magnets should be placed on the rail at this time. The Home & Away Magnets and should be placed 24" ahead of where you actually want the actual Home and Away to be. This allows the boom time to slow down to a stop. But the distance can be any number between 24" and the 5'. Any number over 5' may allow the booms calibration to get lost.

The Marker magnets should be placed at the programmed distance to assure proper calibration. **** It is recommended that a Marker magnet is placed on the rail at every (or even every other) Rail Mount Bracket in order to have the best performance and results from the Boom. If this is done, then the Marker distance should be your post spacing; typically 10 to 12 feet for US and Canadian made greenhouses. ****



8. After setting up the magnets, get back to the controller to finish the Calibration process. After the "Absolute End-of Bay" screen, the Marker Configuration screen will appear. Enter the number of Markers in the bay (as explained above). Then enter the Distance between the Markers. Then enter the Home Distance (the distance between the Home magnet and absolute Home). Then enter the Away Distance (the distance between the Away magnet and absolute Away).
   **** The distance must be consistent between the markers or Calibration will not function properly. ****

   - **Example:** if the bay is 210 feet long and there are 3 Markers (more are recommended; but this will make for an easy example) and the Home Marker is at 5 feet from absolute home and the Away Marker is 5 feet from the actual away, then the 3rd Marker should go in the middle of the bay and the Marker distance would be 100 feet (there is 100 feet between Markers).

MARKER CONFIGURATION
MARKS=03 DIST.=100.00
HM= 005.00 AW= 005.00
B =PREV F=NEXT E = EXIT

9. Next the "Locate" screen will appear. This will enable the user to move the boom between the first and second marker to initiate Calibration.

LOCATE BOOM BETWEEN
FIRST & SECOND MARKS
PRESS ANY TO ENTER
LOCATE BOOM FUNCTION

10. Press any key to move to the next screen.
11. Press "A" to change the booms direction if necessary. The boom needs to be positioned between the 1st and 2nd marker in order to initiate the calibration process. Locate the boom between the 1st and 2nd markers.

LOCATE HOME OR AWAY
MOVE AWAY AT 000 FPM
SPEED BC =INC DF =DEC
A = DIRECTION E = EXIT

12. Pressing "B" or "C" will start motor and pressing again will increase speed. Pressing "D" or "F" will slow boom down and pressing "E" will stop boom when it is in the right location (anywhere between the 1st and 2nd markers).

LOCATE LOC = 020.77 FT
MOVE AWAY AT 020 FPM
SPEED BC =INC DF =DEC
A = DIRECTION E = EXIT

13. Once the boom is between the 1st and 2nd Markers, press the "E" key. The boom is ready to start the calibration process. This screen will appear:

BAY LENGTH AT 030FPM
LOOK FOR 1ST MARK, TO
AWAY TO HOME, E = RUN
A = ENTER KEYB. F = EXIT

14. Press "E" to run the calibration. The boom will travel towards Home until it sees the 1st Marker magnet (Home), then travel toward the Away point until it sees the Away Marker magnet. The boom will also pick up Marker distances as the boom travels up and down the bay.

BAY LENGTH AT 030FPM
GO TO DISTANCE = 109.98FT
DISTANCE = 009.78 FT
PAUSE = ANY NUMBER KEY

15. After seeing the Away Marker magnet, the boom will turn around and travel back toward the Home Marker magnet and stop at the actual Home position. The boom Calibration is now complete. If the screen appears as below, then the Marker magnets or the Home / Away magnets were not seen properly and may need to be adjusted.
    ** If there are problems with Calibration, call Tech Support for help **

To review; the boom will:

- **Move towards the Home position until it locates the 1st Marker magnet (Home magnet)…**
- **Move to locate the Away magnet at the other end of your bay…**
- **Move to locate the Home magnet and stop.**

16. If the Calibration was successful, the screen will display:

ALL MARKERS FOUND
PRESS ANY KEY TO
VIEW LOCATIONS

** If this screen does not appear, the calibration was not successful **

17. Press any key to view the Marker Locations.
18. The screen will display the bay length and the number of markers that it found during Calibration.

BAY LENGTH = 109.98FT
NUMBER OF MARKERS = 10
MARKER 1 OF 10 = 04.89 FT
B =PREV F =NEXT E =EXIT

19. Press ”F” or “B” to scroll thru the Marker’s Location.
20. When the boom has been calibrated and the bay length registered, press “E” to go back to “Set-Up Menu”.

Locate Boom

(Main, 3, 3, 2, 4)

This Feature is a "short-cut" for use when the boom has gotten lost between two Markers and there is a need to manually enter the booms location. It is not to be used as a substitute for Calibration. If the boom continues to get lost, the boom needs to either be recalibrated, or diagnosed for any functional problems

1. From Main menu press 3
2. From Setup menu press 3
3. Enter Pass Code (0000 by Default)
4. From the Site, Rows, and Bay menu press 2 (SITE)

** This screen will appear, press any key to continue **

WARNING!!! CHANGING
IDLER OR DISTANCE
WILL RESULT IN LOSS
OF CROP PROGRAM DATA

5. Press "5" for "LOCATE" (Locate Boom):

1 =IDLER 2 =CONFIGER
3 =INITAL 4 =B-LENGTH
5 =LOCATE 6 =
7 =MORE E = EXIT

6. The "Locate" screen will appear. This will enable the user to move the boom to the nearest Marker or to a known Location (distance).

LOCATE BOOM BETWEEN
FIRST & SECOND MARKS
PRESS ANY TO ENTER
LOCATE BOOM FUNCTION

7. Press any key to move to the next screen.
8. Press "A" to change the booms direction if necessary.

LOCATE HOME OR AWAY
MOVE AWAY AT 000 FPM
SPEED BC =INC DF =DEC
A = DIRECTION E = EXIT

9. Pressing "B" or "C" will start motor and pressing again will increase speed. Pressing "D" or "F" will decrease the speed and pressing "E" will stop boom when it is in the necessary location.
10. Press "E" to exit and program a Location.

C URRENT LOC = 020.77 F
0 TO 9 = CHANGE
CHANGE LOCATION IF NOT
CORRECT E = SAVE&EXIT

11. Enter the correct Location and press "E" to Save and Exit.

Pass-code

(Main, 3, 3, 2, 7, 1)

1. From Main menu press 3
2. From Setup menu press 3
3. Enter Pass Code (0000 by Default)
4. From the Site, Rows, and Bay menu press 2 (SITE)

** This screen will appear, press any key to continue **

WARNING!!! CHANGING
IDLER OR DISTANCE
WILL RESULT IN LOSS
OF CROP PROGRAM DATA

5. Press "7" for "MORE"

1 =IDLER 2 =CONFIGER
3 =INITAL 4 =B-LENGTH
5 =LOCATE 6 =
7 =MORE E = EXIT

6. Press "1" for Pass-code (P-CODE)

1 =P-CODE 2 =UNITS
3 =GOTO SP 4 =DECELER.
5 =END SPD 6 =SSW SPD.
7 = E = EXIT

7. Enter any 4-digit Pass-code and press "E" to Exit & Save.

**** Write the pass-code down on the inside of the cover of this Manual ****

Units (Feet or Meters)

(Main, 3, 3, 2, 7, 2)

1. From Main menu press 3
2. From Setup menu press 3
3. Enter Pass Code (0000 by Default)
4. From the Site, Rows, and Bay menu press 2 (SITE)

** This screen will appear, press any key to continue **

WARNING!!! CHANGING
IDLER OR DISTANCE
WILL RESULT IN LOSS
OF CROP PROGRAM DATA

5. Press "7" for "MORE"

1 =IDLER 2 =CONFIGER
3 =INITAL 4 =B-LENGTH
5 =LOCATE 6 =
7 =MORE E = EXIT

6. Press "2" for "UNITS"

1 =P-CODE 2 =UNITS
3 =GOTO SP 4 =DECELER.
5 =END SPD 6 =SSW SPD.
7 = E = EXIT

7. Press the "0" key to toggle and change the Unit that the boom will use for its distance display and press "E" to Exit & Save.

Go-To Speed

(Main, 3, 3, 2, 7, 3)

**** Check Definitions for explanation of this feature ****

1. From Main menu press 3
2. From Setup menu press 3
3. Enter Pass Code (0000 by Default)
4. From the Site, Rows, and Bay menu press 2 (SITE)

** This screen will appear, press any key to continue **

WARNING!!! CHANGING
IDLER OR DISTANCE
WILL RESULT IN LOSS
OF CROP PROGRAM DATA

5. Press "7" for "MORE"

1 =IDLER 2 =CONFIGER
3 =INITAL 4 =B-LENGTH
5 =LOCATE 6 =
7 =MORE E = EXIT

6. Press "3" for "GOTO SP" (Go-To Speed)

1 =P-CODE 2 =UNITS
3 =GOTO SP 4 =DECELER.
5 =END SPD 6 =SSW SPD.
7 = E = EXIT

GOTO SPEED = 100
ENTER NEW VALUE THEN
KEY E TO SAVE & EXIT
SPEED RANGE 30–150FPM

7. By Default, the Go-To Sped will be set to 100 FPM. If this seems to fast or the boom has been programmed too low, enter a value between 30 FPM to 150FPM and press "E" to Exit & Save.

   **** It's recommended that the Go-To Speed is **NOT** set higher than 120FPM ****

Deceleration

(Main, 3, 3, 2, 7, 4)

1. From Main menu press 3
2. From Setup menu press 3
3. Enter Pass Code (0000 by Default)
4. From the Site, Rows, and Bay menu press 2 (SITE)

** This screen will appear, press any key to continue **

WARNING!!! CHANGING
IDLER OR DISTANCE
WILL RESULT IN LOSS
OF CROP PROGRAM DATA

5. Press "7" for "MORE"

1 =IDLER 2 =CONFIGER
3 =INITAL 4 =B-LENGTH
5 =LOCATE 6 =
7 =MORE E = EXIT

6. Press "4" for "DECELER." (Deceleration)

1 =P-CODE 2 =UNITS
3 =GOTO SP 4 =DECELER.
5 =END SPD 6 =SSW SPD.
7 = E = EXIT

7. Set the Deceleration by entering a value from 1 to 5, then press "E" to Exit & Save. *Check Definitions for explanation of this feature.*

SET DECELERATION
DECELERATION = 1
ENTER RATE OF 1 TO 5
E = SAVE AND EXIT

End Speed

(Main, 3, 3, 2, 7, 5)

1. From Main menu press 3
2. From Setup menu press 3
3. Enter Pass Code (0000 by Default)
4. From the Site, Rows, and Bay menu press 2 (SITE)

** This screen will appear, press any key to continue **

WARNING!!! CHANGING
IDLER OR DISTANCE
WILL RESULT IN LOSS
OF CROP PROGRAM DATA

5. Press "7" for "MORE"

1 =IDLER 2 =CONFIGER
3 =INITAL 4 =B-LENGTH
5 =LOCATE 6 =
7 =MORE E = EXIT

6. Press "5" for "END SPD" (End Speed)

1 =P-CODE 2 =UNITS
3 =GOTO SP 4 =DECELER.
5 =END SPD 6 =SSW SPD.
7 = E = EXIT

7. Set the End Speed by entering a value from 5 to 40 FPM, then press "E" to Exit & Save. *Check Definitions for explanation of this feature.*

SET END SPEED
END SPEED = 1
ENTER 5 TO 40 FPM
E = SAVE AND EXIT

Step / Stop / Water Speed

(Main, 3, 3, 2, 7, 6)

1. From Main menu press 3
2. From Setup menu press 3
3. Enter Pass Code (0000 by Default)
4. From the Site, Rows, and Bay menu press 2 (SITE)

** This screen will appear, press any key to continue **

WARNING!!! CHANGING
IDLER OR DISTANCE
WILL RESULT IN LOSS
OF CROP PROGRAM DATA

5. Press "7" for "MORE"

1 =IDLER 2 =CONFIGER
3 =INITAL 4 =B-LENGTH
5 =LOCATE 6 =
7 =MORE E = EXIT

6. Press "6" for "SSW SPD." (Step/Stop/Water Speed)

1 =P-CODE 2 =UNITS
3 =GOTO SP 4 =DECELER.
5 =END SPD 6 =SSW SPD.
7 = E = EXIT

7. Set the SSW Speed by entering a value from 10 to 20 FPM, then press "E" to Exit & Save. *Check Definitions for explanation of this feature.*

SET STEP-STOP-WATER
STEP SPEED = 20
ENTER 10 TO 20 FPM
E = SAVE AND EXIT

Acceleration

(Main, 3, 3, 0000, 3)

**** It is recommended that the Acceleration factor is increased if the Boom is having trouble when it changes direction of travel. ****

1. From Main menu press 3
2. From Setup menu press 3
3. Enter Pass Code (0000 by Default)
4. Press 3 to enter ACCEL (Acceleration)

ACCELERATION FACTOR
ACCEL FACTOR IS 05
ENTER 0 THROUGH 14
E = SAVE AND EXIT

5. Press "E" to Save and Exit.

Marker Location

(Main, 3, 3, 0000, 4)

**** It is recommended that the Acceleration factor is increased if the Boom is having trouble when it changes direction of travel. ****

1. From Main menu press 3
2. From Setup menu press 3
3. Enter Pass Code (0000 by Default)
4. Press 4 to enter MARKER LOC (Marker Location)

BAY LENGTH = 110.00FT
FOUND 10 MARKERS
MARKER 01 AT 004.96FT
B=NEXT F=PREV E=EXIT

5. Press "B" and "F" to scroll thru the Marker Locations.
6. Press "E" to Exit.

Network Enable

(Main, 3, 3, 0000, 5)

*** Contact Cherry Creek to better understand the ***Network*** feature ***

1. From Main menu press 3
2. From Setup menu press 3
3. Enter Pass Code (0000 by Default)
4. Press 5 to enter Network Menu

NETWORK ENABLED
PRESS F KEY TO STEP
THRU NETWORK/DISPLAY
PRESS E KEY TO EXIT

5. Press "F" to scroll thru the Network options.
6. There are 3 settings to choose from:
   - No Network or Display, Network Enabled, External Display On

NETWORK ADDRESS MENU
ENTER NEW ADDRESS, &
PRESS E KEY, CONTINUE
NETWORK ADDRESS= 001

7. If enabled, assign a 3-digit address to each Boom (for use with the Cherry Creek Network Accumulator). *Call CCS for details.*
8. Press "E" to Save and Exit.

Operations

Crops

(Main, 3, 1, 1, Crop #)

Quick Menu/ Keypad Number Reference

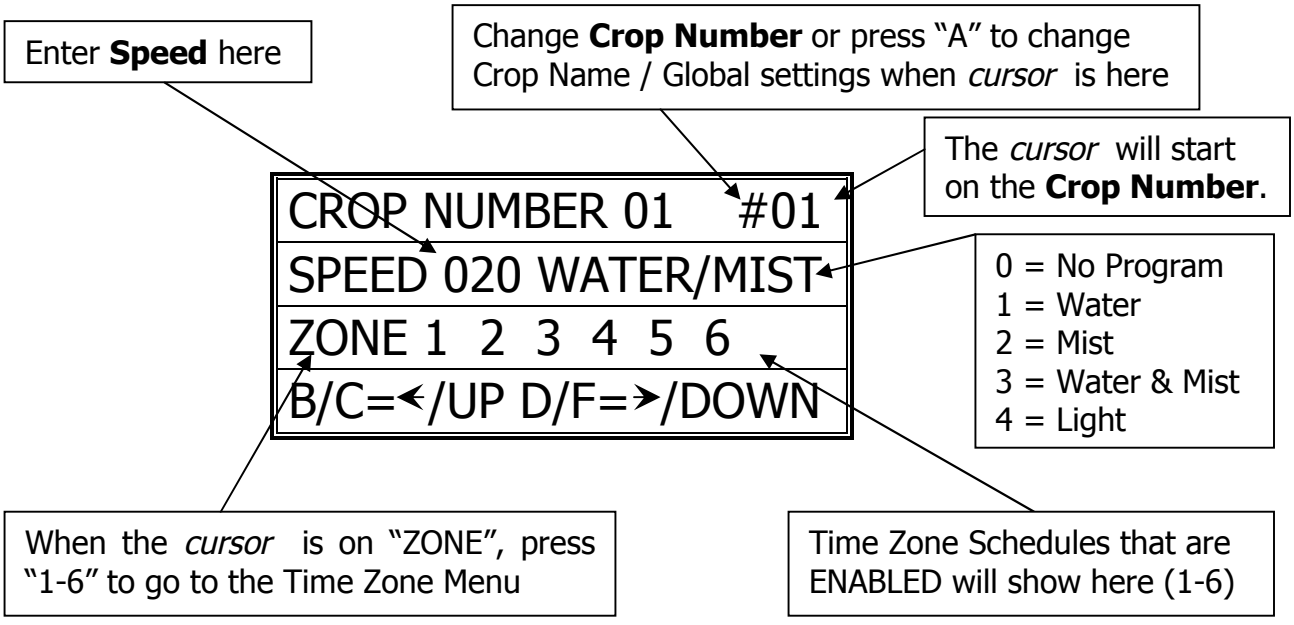
**** The Bay Length and Rows (Configuration) must be programmed before you can set up any **Crops** (see previous sections) ****

1. From the Main Menu press 3
2. From the Setup Menu press 1
3. From the Crops menu press 1
4. Enter the Crop Number (#1-16) to change any of the Crop information.

ENTER CROP NUM. 1-16
'A' KEY TO EDIT CROP
NAME/GLOBAL OR S-S-W
WHEN CURSOR ON ITEM

1. Enter the Crop Number (1-16) to be modified.
2. Use the "B/C" & the "D/F" keys to scroll through the Crop Menu.
3. To change the Crop Name, press "A" when the cursor is on the Crop Number to enter the Crop Name / Global Menu. Use the "C/D" keys to scroll, use the "B/F" keys to change the Crop Name. Press "A" to enter the "Global Solenoid Menu".

*Exploded view of the **Crop** Screen:*



4. Press "E" to Save and Exit.

Global Solenoids

(Main, 3, 1, 1, Crop #, A)

**** The normal operation of the boom is to water one Area at a time. Even if those Areas are next to each other. For example, the same Crop is under 2 rows from end to end. Instead of watering row 1 and then row 2, enabling the Global Solenoid feature will water both sides at once. ****

1. From the Main Menu press 3
2. From the Setup Menu press 1
3. From the Crops menu press 1
4. Enter the Crop Number (#1-16)
5. Press A when cursor is over the Crop Number

CHANGE CROP NAME #1
A=GLOBAL SOL. B/F=CHAR
C/D = CURSOR E = EXIT
CROP NUMBER 01

6. Press "A" to enter the Global Solenoids Menu.

CROP NUMBER 01
#01 G SOL = 1 2 3 4 5 6 7 8
ALL G SOL =
B/C/D/F = SEL E = EXIT

7. Press the 1-8 keys to toggle the solenoids on and off of Global.
8. Scrolling to All Global (ALL G SOL) and enabling solenoids 1-8 will activate those solenoids to Global for all Crop Numbers.
9. Press "E" to Exit and Save

Time Zones (Auto Programming)

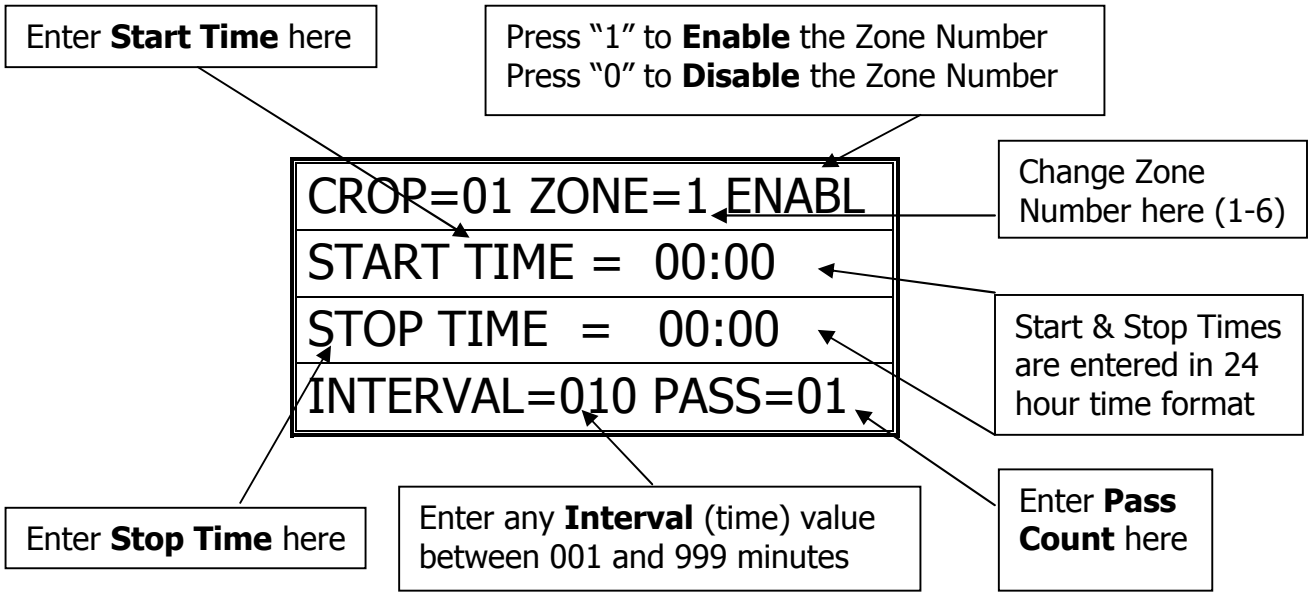
(Main, 3, 1, 2, Crop #, Curser over Zone, 1-6)

Time Zone = A time zone is a specific period of time.
Each Crop can have up to 6 different time zones.
Interval = How many minutes between passes.
Pass = 1 time over Crop.

1. From the Main Menu press 3
2. From the Setup Menu press 1
3. From the Crops Menu press 1
4. Enter the Crop Number (1-16)

5. Move curser over Zone and press 1-6 to scroll through the 6 Time Zones

*Exploded view of the **Time Zone** Screen:*



6. Cherry Creek recommends that the User press' "00" on Crop and clear out the information that appears on the screen, in Zones 1-6. This is a "bug".
7. Press "E" to Save and Exit.

Areas (Distances)

(Main, 3, 1, 3, Row #)

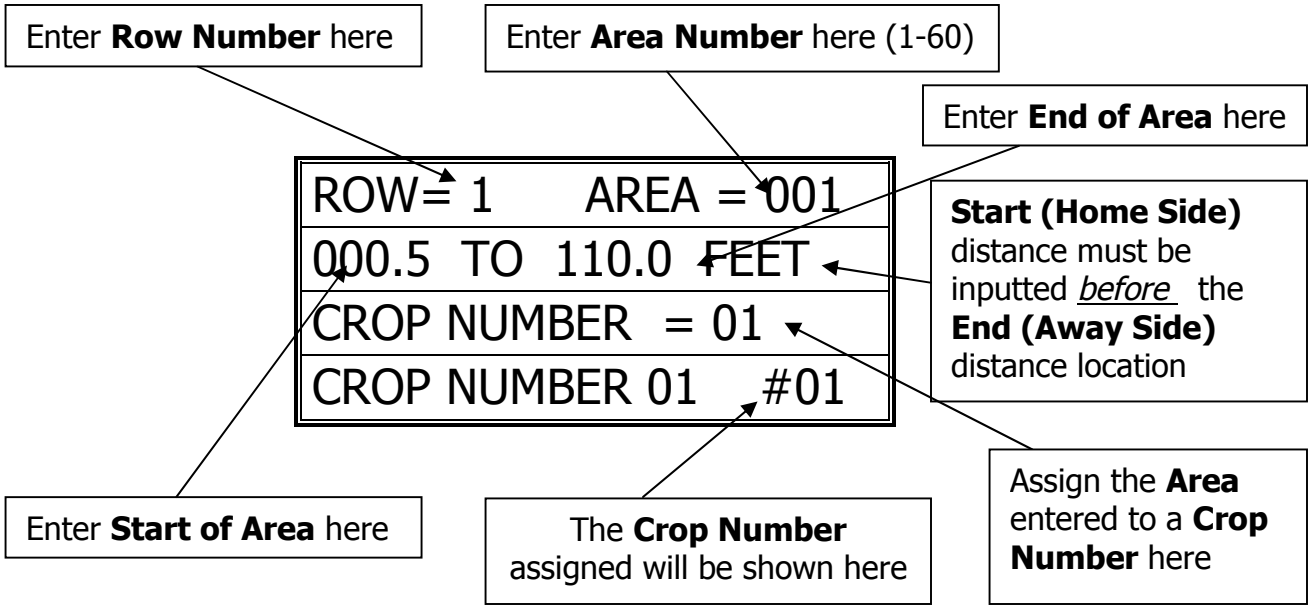
**** The Bay Length and Rows (Configuration) must be programmed before you can set up any **Areas** (see previous sections) ****

1. From the Main Menu press 3
2. From the Setup Menu press 1
3. From the Crops Menu press 1
4. Enter the Row Number (1-4)

PRESS KEY 0 THRU 9
TO SELECT A ROW
THEN SELECT AREA TO
VIEW OR CHANGE DATA

5. The Area Assignment screen will appear:

*Exploded view of the **Area Assignment** Screen:*



6. Each Row has 60 Areas that can be assigned to any of the 16 Crop Numbers. This gives the ability to program up to 240 Areas!
7. Press "E" to Save and Exit.

Manual Run

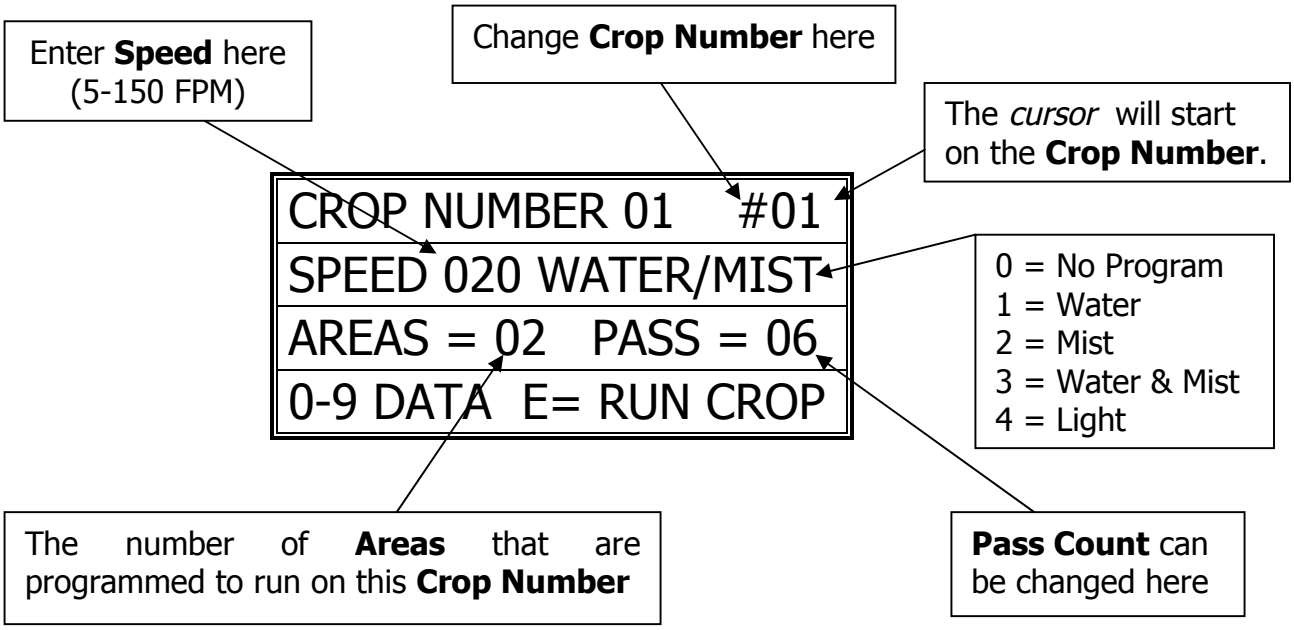
(Main, 2, Crop#)

1. From the Main Menu press 2.
2. From the Manual Menu enter crop #
3. The Manual screen will appear:

ENTER CROP NUMBER 01
A = WALK & WATER
C = CROP AREA VIEWER
E = EXIT MENU

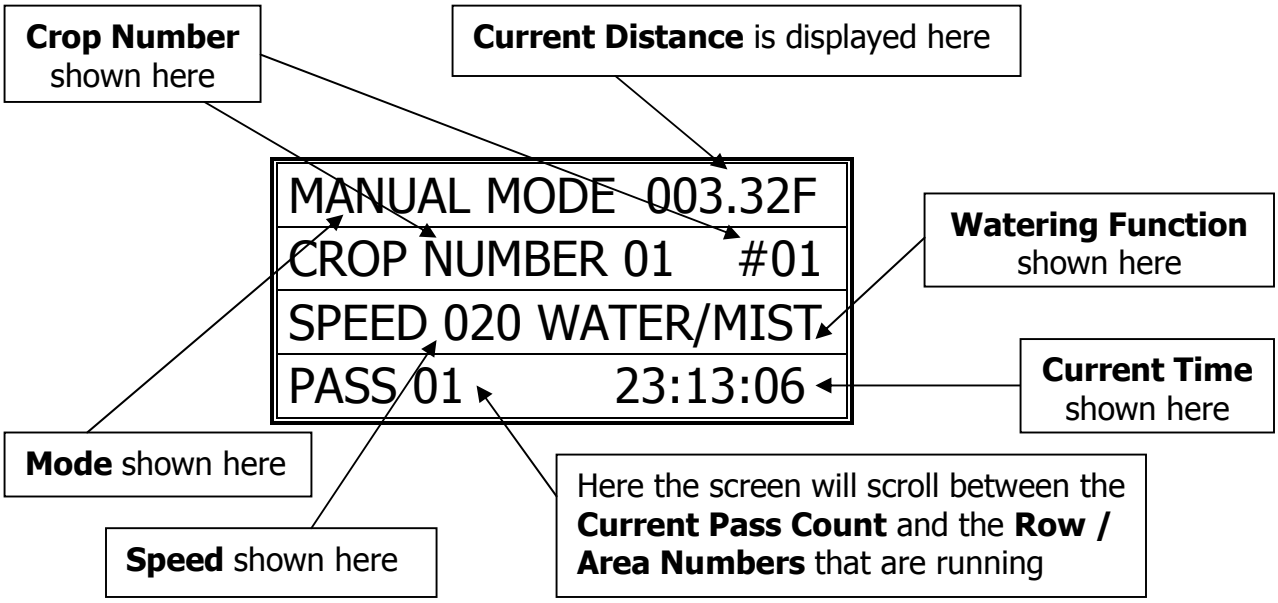
4. Enter the Crop Number to be Manually Started
5. The Manual Start screen will appear:
6. Use the "B/C" & the "D/F" keys to scroll through the Manual Start Menu. Use 0-9 keys to input the necessary data.
7. The Crop Number, Speed, Watering Function, and Pass Count can be changed before Pressing "E" to Run Crop. Changing any of these factors will *only* take effect on this Manual Run. To make permanent changes to the Crop factors, go to Crop Set-Up Menu, reprogram factors, then exit and save.

*Exploded view of the **Manual Start** Screen:*



8. Press "E" to Run Crop.
9. The "Manual Run" screen will appear:

*Exploded view of the **Manual Run** Screen:*



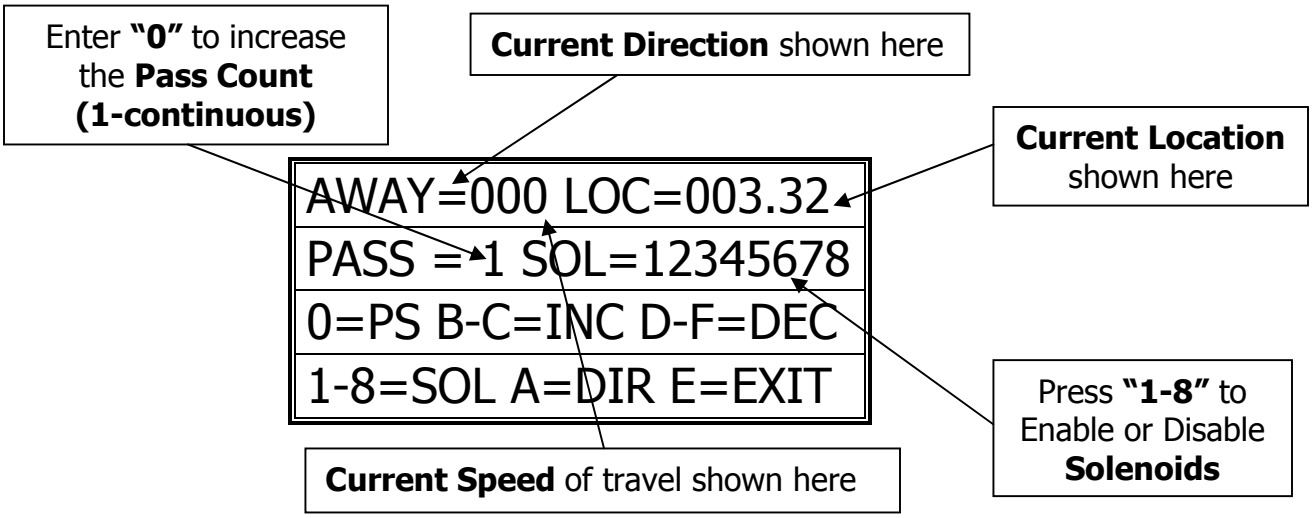
10. The Boom will Run the Manual Program, stop, and await its next command. The Boom will stop at the Start Distance.

Walk and Water

(M, 2, A)

1. From the Main menu press 2
2. Press A for Walk & Water

*Exploded view of the **Manual Start** Screen:*



3. Press "0" to increase the Pass Count (1-countinuous).
    i. Continuous Mode will run the whole length of the bay, back and forth, from Home & Away, until the user stops the boom
4. Press "A" to change Direction. Press "B/C" to increase speed and "D/F" to decrease speed and come to a stop. Press 1-8 to enable/disable solenoids.
5. Press "E" to Exit to the Main Menu.

Crop Area Viewer

(Main, 2, C)

1. From the Main Menu press 2
2. From the Manual Menu press C

ENTER CROP NUMBER
A = WALK & WATER
C = CROP AREA VIEWER
E = EXIT MENU

3. Enter the Crop Number (1-16) to View the Areas & Rows assigned:

CROP #=01 #AREAS=02
R1 A001 000.5 – 110.0F
R2 A002 005.0 – 078.8F
R4 A005 072.3 – 110.0F

4. Press "E" twice to Exit and go back to the Main screen.

Auto Run (Time Based)

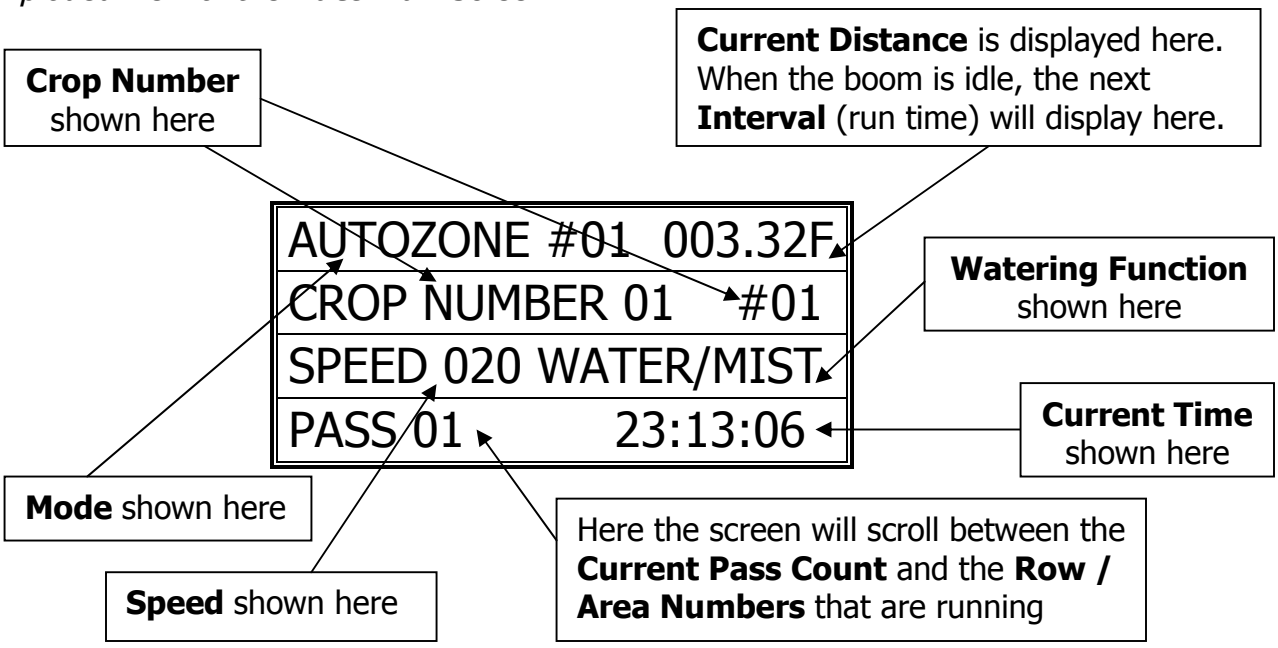
(Main, 1)

**** If not already done, set up Time Zones and Enable the Zones as needed.*
*See **"Time Zones (Auto Program)"** section ****

1. To start Auto programs go to **Main Menu & press 1**
2. Press "E" while in the Auto Mode to Exit

1=AUTO 2=MANUAL
3=SETUP CROPS & SITE
4=GLOBAL NET CROPS
NIC-EM.6 23:59:59

*Exploded view of the **Auto Run** Screen:*



Step / Stop / Water

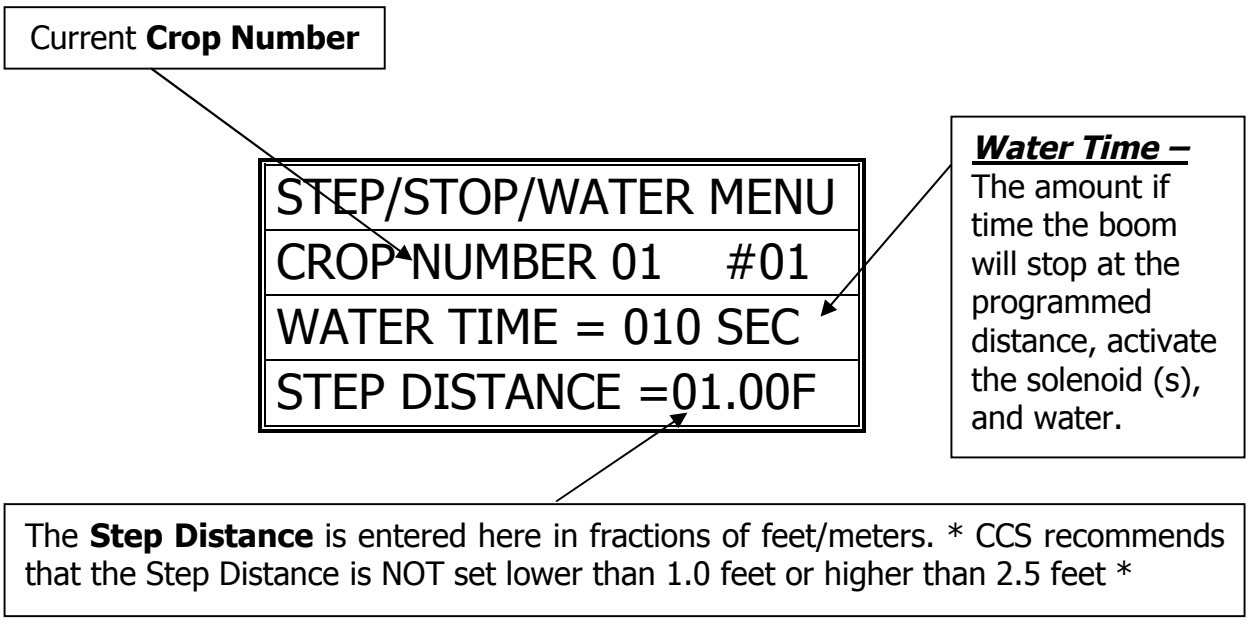
(Main, 3, 1, 1, Crop #, 00 when cursor is on Speed)

1. From the Main Menu press 3
2. From the Setup Menu press 1
3. From the Crops menu press 1
4. Enter the Crop Number (#1-16) to change any of the Crop information.

ENTER CROP NUM. 1-16
'A' KEY TO EDIT CROP
NAME/GLOBAL OR S-S-W
WHEN CURSOR ON ITEM

5. Enter the Crop Number (1-16) to be modified.
6. Use the "B/C" & the "D/F" keys to scroll through the Crop Menu.
7. To enable the Step / Stop / Water feature press "00" when the cursor is on the Speed.
8. Press "A" when the cursor is on the Step/Stop/Water to change the S/S/W settings. Use the "B/F" keys to scroll through the Menu and change info.

*Exploded view of the **Step / Stop / Water** Screen:*



9. Change the Water Time and the Step Distance the desired settings.
10. Press "E" to Exit, Save and Return to the Crop Menu.

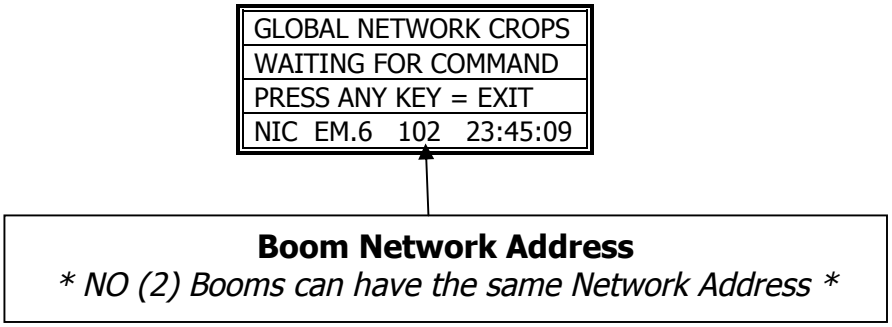
Global Networking Feature

(Main, 4)

* Contact Cherry Creek to better understand the ***Global Network*** feature *

Before this step, the Networking Feature needs to be enabled
Refer to "Network Enable" (page 29)

1. From Main menu press 4
2. This will enter the Global Network screen:



3. The NIC will then search for the Network signal and await Commands.
4. Press any key to Exit.

Troubleshooting and Support

Motion Error:

- Check Proximity (Motion) Sensor for damage and function.
- There will be a yellow light (located at the base of the sensor body) that should turn on when the sprocket teeth pass the sensor head. If there is no light fluctuation, then check that the sensor is within 3 mm. (millimeters) of the sprocket teeth as they pass.
- If the sprockets teeth are within 3mm, check the functionality of the Proximity (Motion) Sensor. *Refer to the Diagnostics part of this manual for testing sensor inputs.* If the sensor is not functional or broken, please call Cherry Creek to purchase a new sensor.

Collision Error:

- The NIC has the option of using a Collision Sensor to stop the boom if it runs into any objects that might be in the bay (carts, shelves, trash cans, people, etc.). This is an *Option* that can be purchased from CCS at any time. Call Cherry Creek for more info.
- If the boom is not equipped with the Collision Sensor option, there needs to be a jumper wire in Switch #4. To check this, open the NIC lid, pull the keypad ribbon and set the lid aside. Look at the Terminal Blocks that run down the left side of the Main Board (black "blocks" with colored wires running into them). Pull the second-from-the-top 6 pin Terminal Block from the board (labeled J2 or JT2). There will be writing on the Main Board for the switch #. Make sure the jumper wire is in place in the Block. The jumper wire should connect to Switch #4 and the Ground (GRD) that is directly above SW4.
- *If the Boom **is** equipped with the Collision Sensor Option*, then:
    - Check the Collision Sensor for damage and function.
    - *Refer to the Diagnostics part of this manual for testing sensor inputs.* If the sensor is not functional or broken, please call Cherry Creek to purchase a new sensor.

Marker Count Error:

- Check Marker Magnet Sensor for damage and function.
- Check to make sure that all the Marker magnets are in the correct placement as to the programmed distance (set when programming the Bay Length).
- Also check to make sure that the *Number* of "Markers" programmed the same as the amount of Marker magnets on the rail.
- Check the functionality of the Marker Magnet Sensor. *Refer to the Diagnostics part of this manual for testing sensor inputs.* If the sensor is not functional or broken, please call Cherry Creek to purchase a new sensor.

****** Before calling Tech Service, please try to RESET the Controller by pressing the RESET button on the board (shown in the Mother Board diagram on the "Wiring Diagrams" pages). If there is not a button, there will be two pins; jump them together with the tip of a flathead screwdriver and that will RESET the controller as well. This will sometimes solve problems and is an easy step to correcting the problem before calling Tech Service. If the NIC is "locked-up", this will typically take care of it and get the Controller functional again. Otherwise contact CCSI. ******

TECHNICAL ASSISTANCE: ***If you have any questions regarding the use of this program or any other Cherry Creek Systems Product please call us at .....***

(719) 380-8373 ext. 206

OR

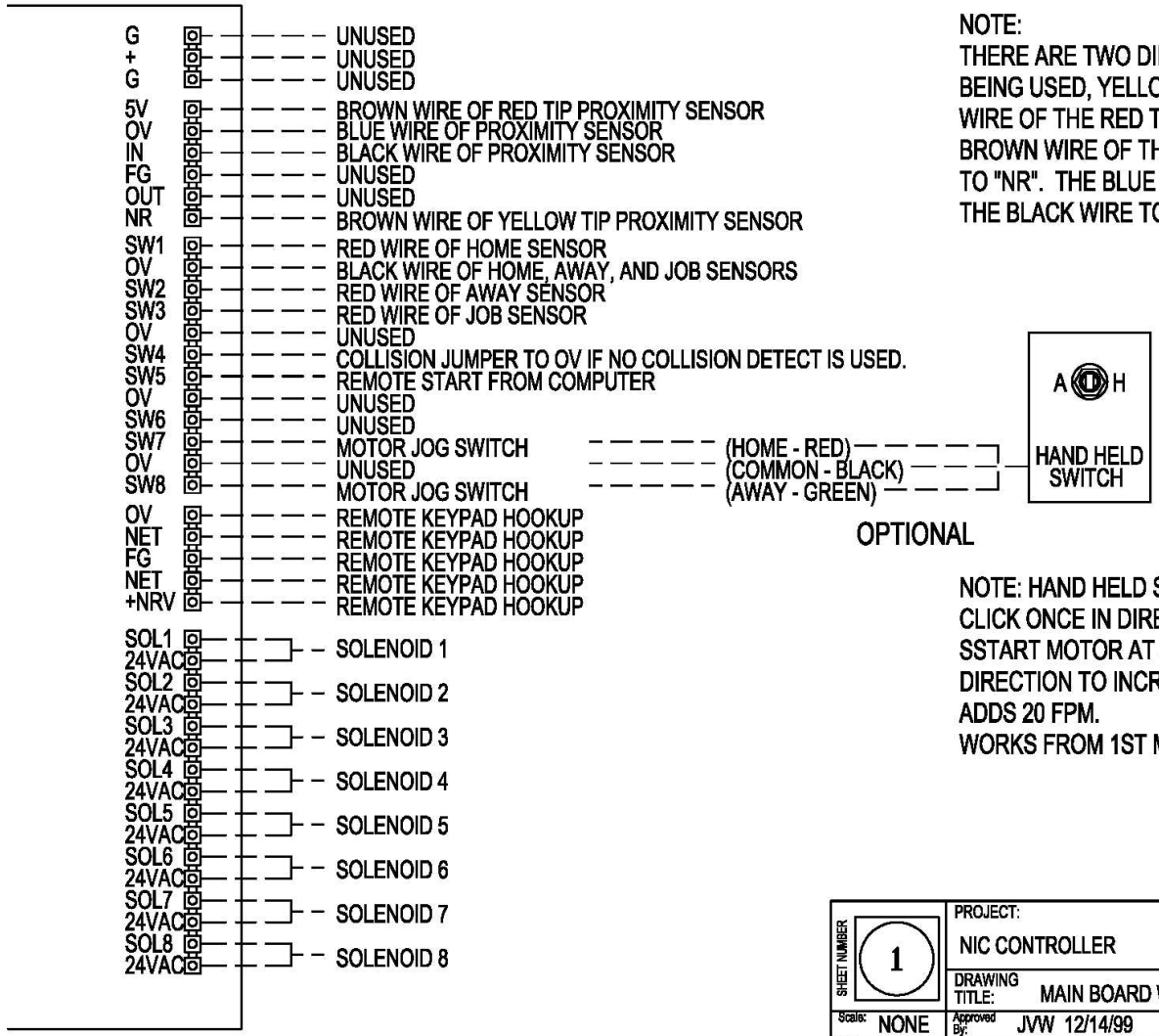
ccs@cherrycreeksystems.com

OR

info@cherrycreeksystems.com

OR

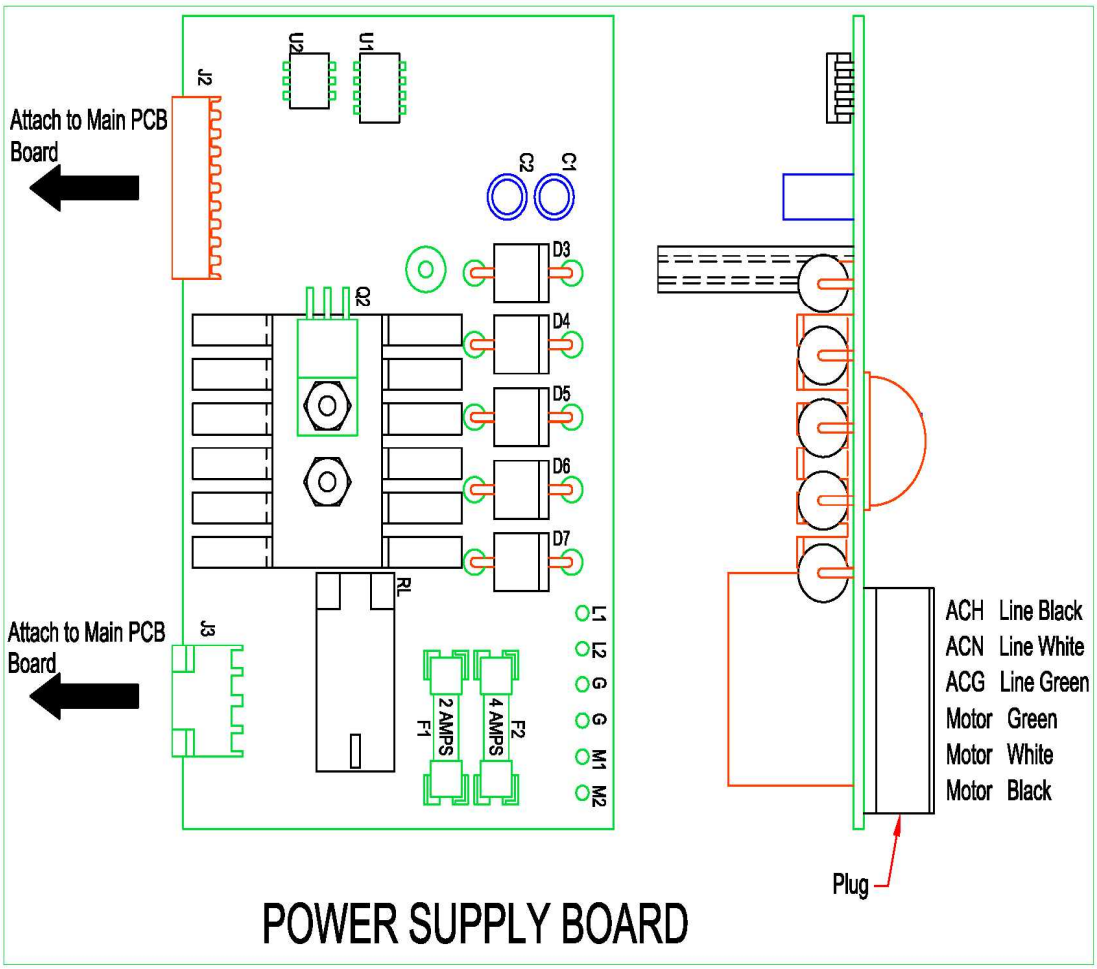
www.cherrycreeksystems.com



NOTE:
THERE ARE TWO DIFFERENT PROXIMITY SENSORS BEING USED, YELLOW TIP AND RED TIP. THE BROWN WIRE OF THE RED TIP IS CONNECTED TO "5V" AND THE BROWN WIRE OF THE YELLOW TIP IS CONNECTED TO "NR". THE BLUE WIRE IS ALWAYS TO "OV" AND THE BLACK WIRE TO "IN".

NOTE: HAND HELD SWITCH OPERATION -
CLICK ONCE IN DIRECTION (HOME OR AWAY) TO SSTART MOTOR AT SLOW SPEED. CLICK IN SAME DIRECTION TO INCREASE SPEED, EACH CLICK ADDS 20 FPM.
WORKS FROM 1ST MENU.

SHEET NUMBER: 1	PROJECT: NIC CONTROLLER	CUSTOMER: .	CHERRY CREEK SYSTEMS INC
	DRAWING TITLE: MAIN BOARD WIRING DIAGRAM		Greenhouse Equipment Specialists
Scale: NONE	Approved By: JVW 12/14/99	Drawn By: DJS	
Date: Jun 1, 98	Part Number: 315-0035	Revision Number: .	


Attach to Main PCB Board
J2
U2
U1
C2
C1
D3
D4
D5
D6
D7
Q2
RL
Attach to Main PCB Board
J3
L1
L2
G
G
M1
M2
2 AMPS
F1
4 AMPS
F2
ACH Line Black
ACN Line White
ACG Line Green
Motor Green
Motor White
Motor Black
Plug
POWER SUPPLY BOARD

Options and Upgrades

Remote Keypad and Display

An optional keypad and LCD display is available to operate the NIC from a remote location, such as the aisle.

To connect the remote keypad to the NIC:

Use shielded 22 gauge / 4-conductor wire. The NIC has a five-pin connector (on the lower, right side of the circuit board), that reads from top to bottom: **OV, NET, FG, NET, +NRV**. Likewise the remote keypad has a five-pin connector located below the LCD display that reads from left to right: **OV, NET, FG, NET, +NRV**. These connections should be made straight across with the **shield being used for the FG** connection. In other words, wires should run from *OV to OV, from NET to NET, from FG to FG* (with the shield), etc. You will find a small jumper at **J1** on the remote keypad (**J1** is the eight-pin keypad connector located directly below and behind the LCD). Remove this jumper and connect the keypad's ribbon to **J1**. The jumper should be placed on pins 4 and 5 at **J2** on the NIC (**J2** is the eight-pin keypad connector on the NIC located directly below and behind the LCD display. To toggle between the two displays (the remote display and the NIC display), select setup from the *Main Menu* and press "**6"** to enter the *Display Menu*. Press "**F**" to toggle the display and **E** to Exit to the *Main Menu*. If the jumper is not placed on J2, both displays can be viewed at the same time.

Note: **If you are having difficulty re-routing control to the remote keypad, refer to the section of this manual marked Resetting the NIC.**