Sections

INTRODUCTION

INTRODUCTION

Welcome to the Alkon Spectrum Concrete Batching System. This guidebook was written for first time users and as a reference source for more experienced users. The first eight sections of this guidebook describe the Spectrum Software. Sections 9 through 11 describe the hardware of the Spectrum System.

FIRST TIME USERS

It is recommended that a first time user read the first seven sections. It is desirable to start entering information required by the system as soon as possible. For this reason, it is recommended to unpack and connect the computer, monitor, and keyboard to boot up the Spectrum Software before the installation of the system is performed. Once the computer is unpacked and plugged in, turn on the power. To start entering data into the computer, refer to Sections 1 and 3 for systems equipped to print delivery tickets. For systems without this feature, skip Section 1 and refer only to Section 3.

BOOTING UP

The software will be preloaded onto the computer. After powering the computer, it will perform various internal checks, and then begin loading the operating system. Before the actual Spectrum Software is loaded, the screen will turn blue and pause with the following message:

Mounting Another Window

Please Press the e key to Continue

At this time, press the e key. The Spectrum Software will now be loaded. After a few moments, the Main Menu will appear. This process is called "booting up" the computer.

INTRODUCTION

ABOUT THE SPECTRUM SOFTWARE

The Spectrum Software is divided into numerous screens. Access to these screens is provided from several menus. The Main Menu is the starting point for access to any screen or menu. To make a selection from the Main Menu you can use one of two methods:

1 - Use the arrow keys on the keyboard to highlight the desired selection and then press the e key.

2 - Press the first letter of the desired selection.

For example, if the user wanted to look at the Daily Inventory Screen, the letter "V" could be pressed to select View/Adjust Inventory from the Main Menu. This would access the Inventory Menu, then the letter "D" could be pressed for selection of the Daily Inventory Screen.

|is used to leave a screen, taking the system back to the Main Menu.

The Job Index, Auto Batch Setup, Order Entry, and Batching Screens have several other sub-menus to be accessed. Refer to the diagrams showing access to these screens at the end of this section.

MOVEMENT WITHIN A SCREEN

Once a screen is accessed, various functions can be performed from that screen. Every screen has different fields used for various functions of the system. (A field is an area in which you can add or change information). Most of these fields can be changed. To change a field, the cursor must first be placed on that field. The cursor is represented as a blue box that highlights the field where it is currently located. The arrow keys are used to move the cursor. Some screens have a quick cursor movement feature. This feature utilizes the g, d, {,and } keys to jump the cursor to different sections of the screen. Once a change to a field is made, e must be pressed for the system to accept the change.

INTRODUCTION

USING THE BROWSE FEATURE

The browse function is associated with all fields that have [square brackets] around them when the cursor is placed on them. Once the cursor is placed on a field that has the [square brackets] around it, m may be pressed. This will pop up a blue box (i.e. browse window), showing the allowed entries for this field. The cursor will be located on the first selection of the browse window. The w, y, {, }, g, and d keys are used to move the cursor within the browse window. The browse window is a scrolling window that will display a limited amount of data at one time. A short cut on using this browse function is available. Before pressing m to pop up the browse window, type in the first few numbers/letters of the code into the field. Then press m and the browse window will use the typed in values as a starting point versus starting at the top of the list of codes.

SECTION 1 ORDER ENTRY

1.0 INTRODUCTION

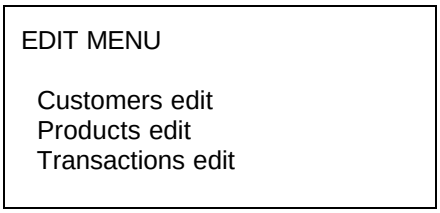
Order Entry is for Spectrum systems equipped to print delivery tickets from an On-Line customer base. **If your system is not equipped with Order Entry/Ticketing skip to Section 2.** In this section, the Order Entry software will be described in detail--from the setup of the customer data, to the printing of the delivery ticket. Before orders can be entered, batched, and printed, several sets of information must be entered into the Spectrum software. These data sets consist of formulae, customers, extra products and charges, tax rates, discount rates, credit codes, and the format of the printed ticket.

1.1 ENTERING MIXES

All mixes that can be batched should be entered in Mix Designs. Refer to Section 3 on Mix Designs for detailed information on entering mixes.

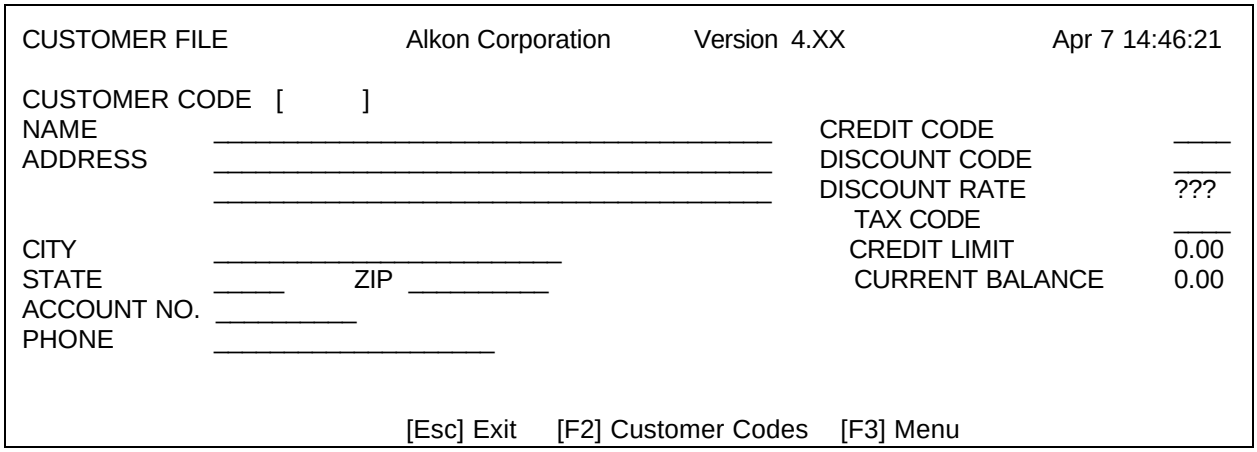
1.2 ENTERING CUSTOMERS

A customer file containing all regular customer information must be created. This information is entered in the Customer File screen and is accessed by selecting Customers/Products/ Transactions from the Main Menu. This will pop up a smaller menu as shown below:



Select Customers Edit from this menu and the Customer File screen shown on page 2 appears.

SECTION 1 ORDER ENTRY



The customer information is described as follows:

CUSTOMER CODE (browsable field)

The first item to be entered is the Customer Code. This is a ten character alphanumeric field. Since the Customer browse uses this code in the Order Entry screen, it is strongly recommended that a short name, or abbreviation that is easily recognized by the operator, be used (there is a separate field for Account # below). Notice the two brackets around this field. This represents a browse feature that allows a view and select feature of all customer codes that have been entered. The browse feature is accessed using the m key. If no customers have been entered, the m key will reveal a blank blue box.

NAME

This is a 40 character alphanumeric field that should be entered as the name to be printed on the delivery ticket.

SECTION 1 ORDER ENTRY

ADDRESS

These two lines, which are 30 character alphanumeric fields, are used for the customer's billing address. Note that the City, State, and Zip/Postal Code need not be entered on the second line as they have their own fields below:

CITY	**(15 character field)**
STATE	**(3 character field)**
ZIP/POSTAL CODE	**(10 character field)**
ACCOUNT NO.	**(10 character field)**
PHONE	**(10 character field)**

These fields should be entered as the customer's billing location. Even if this information is not to be printed on the ticket, it may be useful to enter all fields as a reference source.

CREDIT CODE (browsable field)

This field is used for the customer's credit status information such as COD, ON HOLD, or CREDIT OK. These codes are set up in the Order Entry Setup Menu found in the System Setup Menu. (It may be wise to skip to the Order Entry Setup Section of this chapter, Section 1.4 before continuing with the customer entry).

DISCOUNT CODE (browsable field)

This field is used for the discount code associated with a percentage discount that this particular customer is to receive. Refer to Section 1.4 for a more descriptive explanation of this field.

TAX CODE (browsable field)

This field is used for a tax code associated with the tax rate that this particular customer is to be charged. Refer to Section 1.4 for a more descriptive explanation of this field.

CREDIT LIMIT
CURRENT BALANCE

The customer's credit balance is kept in the Current Balance field. If a number greater than "0" is entered for the Customer Credit Limit and the Current Balance exceeds that limit, a message is given to the operator before batching a load for that customer.

SAVING CUSTOMER INFORMATION

After all the customer information is entered, it must be saved in the customer file. To save this information, pull up the Customer File Menu by pressing the nkey, select the Save option and press the ekey. After the customer is saved, the Customer File screen will be blank, ready for another customer to be entered. After all customers are entered, the | key will bring back the Main Menu.

REMOVING A CUSTOMER

To remove a customer from the customer file, pull the customer into the Customer File screen by entering the Customer Code. Once the customer information is pulled into this screen, it may be removed from the file by selecting the Remove option from the Customer File Menu. This menu is accessed by using the nkey. Select remove, then press the ekey.

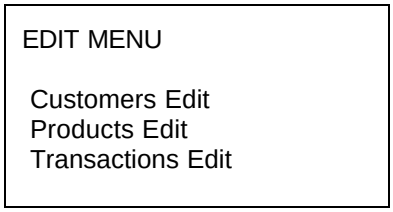
USE OF A GENERIC CUSTOMER

After all customers with accounts are entered, it is suggested to enter a generic customer, such as COD, for ticketing non-regular customers. This will allow the operator to quickly prepare an order for these customers without having to enter their name in the Customer File screen. The actual customer name may be entered in the Auto Batch Setup Screen.

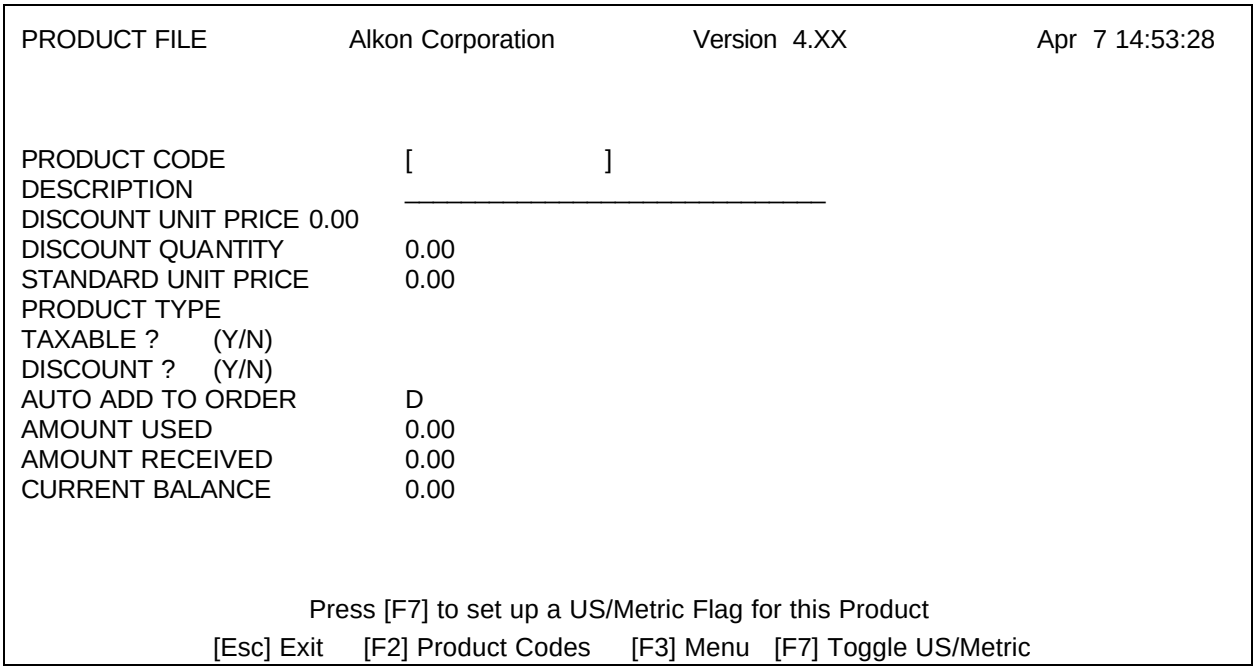
1.3 ENTERING EXTRA PRODUCTS AND CHARGES

Extra products are any non-concrete items sold and any additional charges associated with the delivery of concrete.

To enter these extra products, please select **Customers/Products/ Transactions** from the Main Menu. This will pop up the smaller menu shown below:



Select **Products Edit** from this menu and the Product File screen will appear as below:



A description of all the fields on this screen follows:

PRODUCT CODE (browsable field)

The Product Code is a 10 character alphanumeric field. This should be entered as a short description of the product that the operator will easily recognize, or your company's accounting code for this product.

DESCRIPTION

This is the description of the product to be printed on the delivery ticket. This is a 30 character alphanumeric field.

DISCOUNT UNIT PRICE

This is the discounted price per unit of the product. This price will be used if the amount of this product ordered per batch is greater than the Discount Quantity listed below:

Example: An order has 10 bags of fiber on it
Discount Quantity = 5

The Discount Unit Price will be used over the Standard Price since the quantity for this batch is greater than the Discount Quantity.

DISCOUNT QUANTITY

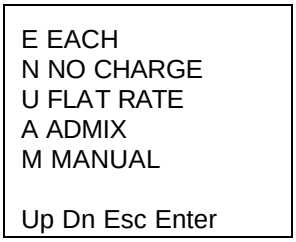
This is the amount of product ordered per batch that will cause the Discount Unit Price to be used instead of the Standard Price. If the ordered quantity is greater than or equal to this value, the Discount Unit Price will be used. **NOTE:** If this field is 0, the Discount Unit Price will be used **all the time**.

STANDARD UNIT PRICE

This is the price per unit of the product for an amount ordered that is less than the Discount Quantity described above.

PRODUCT TYPE (browsable field)

This determines how the product is priced. The choices are:



EACH is used for products that are sold independent of the load size of the concrete delivered. *Examples*: rebar, expansion joints, etc...

NO CHARGE is used for products that have no charge associated with them but are desired to be printed on the delivery ticket.
Examples could include: Front End Discharge, Conveyor, etc...

FLAT RATE is used for single charges. *Examples*: Haul Charge, Saturday Delivery, etc...

ADMIX is for any product that is charged per yard. *Examples*: Calcium Chloride, Fiber Mesh, etc...

MANUAL forces the operator to manually enter the amount ordered when entering the job order.

TAXABLE

Enter a "Y" to tax this product, an "N" will not calculate taxes on this product.

DISCOUNT? (Y/N)

If the cost of the product is to be given a percentage discount associated with the customer's discount code, enter a "Y" in this field. If no percentage discount is to be given to any customers for this product, enter an "N".

AUTO ADD TO ORDER (browsable field)

A product can be automatically added to orders using this field. The choices are:

```
D Disable Auto Add of Products
A Add Product to ALL Orders
W Add Product to Winter Orders
S Add Product to Summer Orders
L Add Product to Order based on Load Size
0 Add Product to Order based on Ordered Size

Up Dn Esc Enter
```

Disable Auto Add of Product will force the operator to enter the product when creating an order.

Add Product to ALL Orders will automatically add the product to all orders when entering them.

Add Product to Winter Orders will automatically add the product to every order entered with a load date between the Start Winter Date and Start Summer Date specified in the Enter Date and Time screen, Refer to Section 7.1.

Add Product to Summer Orders will automatically add the product to every order entered with a load date between the Start Summer Date and Start Winter Date specified in the Enter Date and Time screen, Refer to Section 7.1.

Add Product to Order based on Load Size will automatically add this product to and order if the Load size is less than the Discount Quantity.

Add Product to Order based on Ordered Size will automatically add this product to and order if the amount Ordered is less than the Discount Quantity.

AMOUNT USED
AMOUNT RECEIVED
CURRENT BALANCE

These fields are used for inventory purposes. The **Amount Used** will increment every time the product is printed on a ticket. The **Amount Received** can be updated when a shipment is received. The **Current Balance** field is the On-Hand amount of the product.

ADDING A US/METRIC FLAG TO PRODUCT
(Switchable US/Metric Only)

Pressing the r key will add a US/Metric Flag to this product. Subsequent presses of the r key will toggle the flag between systems of measure.

To remove the flag, press the band rkeys.

SAVING AN EXTRA PRODUCT

After all the information is entered, it must be saved in the product file. To save this information, pull up the Product File Menu by pressing the n key and select the Save option. After the product is saved, the Product File screen will be blank ready for another product to be entered. After all products are entered, pressing the | key will bring back the Main Menu.

REMOVING A PRODUCT

To remove a product from the product file, pull the product into the Product File screen by entering the Product Code. Once the product information is pulled into this screen, it may be removed from the file by selecting the Remove option from the Product File Menu. This menu is accessed using the nkey.

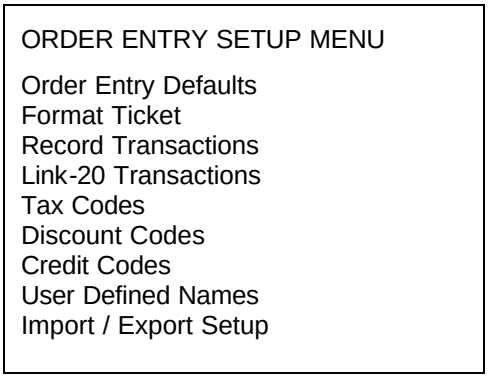
CREATING A UNIT PRICE DISCOUNT

If a dollar discount is desired, as opposed to a percentage discount, an extra product can be created with a negative unit price.

1.4 ENTERING SPECIAL CODES FOR ORDER ENTRY.4 ENTERING SPECIAL CODES FOR ORDER ENTRY

Special codes used in the Order Entry software include Tax Codes, Discount Codes, Credit Codes, and User Defined Names.

To set these codes up, select System Setup from the Main Menu. Select Order Entry Setup and the Order Entry Setup Menu will appear as shown below:



A description of the choices from this menu follows.

SECTION 1 ORDER ENTRY

ORDER ENTRY DEFAULTS

This allows setting default values for the Batch Code, COD flag, and Remote Ticket Number fields. These fields will be discussed in Section 1.7.

FORMAT TICKET

Selecting this choice will pop up the Ticket Format screen. In this screen the ticket can be set up to be printed as required. The ticket format is discussed in detail in Section 1.5.

RECORD TRANSACTIONS

When printing tickets, the information associated with each ticket is saved in a file (3:/rgb/cust/ticket.dat). Using the Record Transactions screen the format of this file may be changed to fit your needs for possible uploading of tickets for accounting. The ticket file is described in greater detail in Section 1.6.

LINK-20 TRANSACTIONS

When printing tickets using the Link-20 protocol, the information associated with each ticket is saved in a file. (Link-20 is used when tickets are electronically dispatched to the Spectrum). Using the Link-20 Transactions screen the format of this file may be changed for your needs. The ticket file is described in greater detail in Section 1.6.

If using the Link-20 protocol to transfer ticket to the Spectrum, the file format is contained in the Link-20 Transactions Screen. Access to this screen is obtained by selecting Link-20 Transactions from the Order Entry Setup menu. This screen is shown on the next page.

SECTION 1 ORDER ENTRY

LINK-20 REC. FORMAT Alkon Corporation Version 4.XX Nov 6 9:02:53

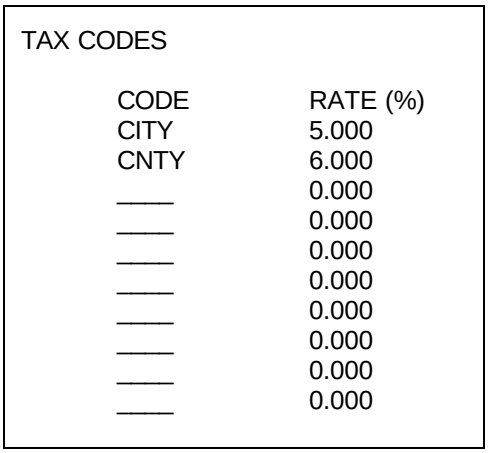
FIELD		ROW	COL	FIELD	ROW	COL	FIELD	ROW	COL
TICKET SIZE		66	80	C.O.D.	0	0	TAX CHARGE	16	71
DATE		1	10	CREDIT CODE	8	30	PREV TOTAL	18	71
TIME		1	20	TAX CODE	8	40	SUB TOTAL	14	71
CUSTOMER CODE		0	0	PROJECT CODE	8	50	DISCOUNT	15	71
ACCOUNT #		7	60	BATCH COST EXT	9	71	NEW TOTAL	17	71
CUSTOMER NAME		3	3	FORMULA	9	10	GRAND TOTA	L9	71
CUST ADDRESS 1		4	3	DESCRIPTION	9	20	PERCENT DISC	0	0
CUST ADDRESS 2		5	3	LOAD SIZE	9	3	CALCIUM	19	19
CITY		6	3	DEL ADD LINE1	0	0	MEMO1	23	1
STATE		6	18	PRICE PER UNIT	9	64	2	24	1
ZIP		6	24	ORDERED	9	50	TRUCK LEFT PLAN	0	0
NOTES		0	0	DELIVERED	9	58	TRUCK ON JOB	0	0
DELIVERY	INST1	3	45	LOADS	0	0	TRUCK LEFT JOB	0	0
	INST2	4	45	TRUCK #	1	40	TRUCK RETURN		0
0									
	INST3	5	45	DRIVER #	60	1	DEL ADD LINE 2	0	0
	INST4	20	1	DRIVER NAME	0	0	DEL ADD LINE 3	0	0
	INST5	21	1	SLUMP	60	40	CANADIAN FED TA	0	0
	INST6	22	1	BATCH REPORT	26	1	CAN FED TX S TO	0	0
P.O. #		7	45	BATCH NUMBER	1	70		0	0
S.O.		7	0	REMOTE TICKET #	0	0	USER ONE	20	50
JOB #		0	0	PLANT #	1	4	USER TWO	21	50

[F3] Format Extra Products [F5] Moisture Name [F10] Label Editor Page 1

There are two pages of this screen which are changed by pressing the { and } keys. The n key will bring up the Extra Products Record Format.

TAX CODES

This is where different tax rates are entered. Ten different tax rates can be entered as ten different tax codes. The tax code can be any 4 character alphanumeric string that uses the corresponding tax rate % in the Tax Code Table. Selecting Tax Codes will pop up the Tax Code Table:



In the example above, two tax codes have been entered. The CITY tax code corresponds to a tax percentage of 5%, where CNTY will charge all taxable items in an order at a 6% rate.

It is important to note that you are not restricted to ten tax jurisdictions, but ten percentages. Many jurisdictions carry the same tax rate.

DISCOUNT CODES

Discount Codes are where different discount rates are entered. Ten different discount rates can be entered as ten different discount codes. The discount code can be any four character alphanumeric string that uses the corresponding discount rate % in the Discount Code Table. Selecting Discount Codes will pop up the Discount Code Table:

DISCOUNT CODES

CODE	RATE (%)
A	1.00
B	2.00
C	3.00
D	4.00
J	5.00
K	6.00
L	7.00
M	8.00
N	9.00
O	10.00

Refer to Section 1.3 for a $ amount discount.

CREDIT CODES

This is where different credit codes are entered. Ten different credit codes can be entered . The credit code can be any 4 character alphanumeric string that uses the corresponding credit code description in the Credit Code Table. Selecting Credit Codes will pop up the Credit Code Table:

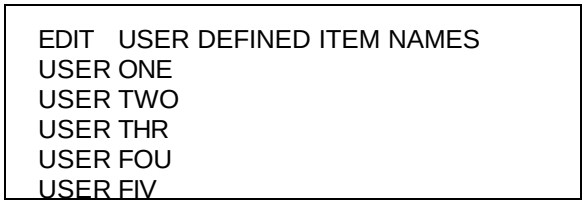
CREDIT CODES

OK	CREDIT IS GOOD
COD	CASH ON DELIVERY
HOLD	NO CREDIT
A	A
B	B
C	C
D	D
E	E
F	F
G	G

USER DEFINED NAMES

SECTION 1 ORDER ENTRY

There are five fields in the Order Entry screen that can be set up for anything the user needs that does not already exist. Each name can be up to 8 characters long. These fields are defined in the User Defined Names Table. Selecting User Defined Names pops up this table:



Some examples of these may be Temp., Chutes, Time, etc...

IMPORT / EXPORT SETUP

This is for future use.

1.5 FORMATTING THE TICKET

The Ticket Format screen is accessed from the Order Entry Setup Menu located in the System Setup Menu. By selecting Ticket Format from the Order Entry Setup Menu, the Ticket Format screen appears as shown below:

LINK-20 REC. FORMAT Alkon Corporation Version 4.XX Nov 6 9:02:53

FIELD		ROW	COL	FIELD	ROW	COL	FIELD	ROW	COL
TICKET SIZE		66	80	C.O.D.	0	0	TAX CHARGE	16	71
DATE		1	10	CREDIT CODE	8	30	PREV TOTAL	18	71
TIME		1	20	TAX CODE	8	40	SUB TOTAL	14	71
CUSTOMER CODE		0	0	PROJECT CODE	8	50	DISCOUNT	15	71
ACCOUNT #		7	60	BATCH COST EXT	9	71	NEW TOTAL	17	71
CUSTOMER NAME		3	3	FORMULA	9	10	GRAND TOTA	L9	71
CUST ADDRESS 1		4	3	DESCRIPTION	9	20	PERCENT DISC	0	0
CUST ADDRESS 2		5	3	LOAD SIZE	9	3	CALCIUM	19	19
CITY		6	3	DEL ADD LINE1	0	0	MEMO1	23	1
STATE		6	18	PRICE PER UNIT	9	64	2	24	1
ZIP		6	24	ORDERED	9	50	TRUCK LEFT PLAN	0	0
NOTES		0	0	DELIVERED	9	58	TRUCK ON JOB	0	0
DELIVERY	INST1	3	45	LOADS	0	0	TRUCK LEFT JOB	0	0
	INST2	4	45	TRUCK #	1	40	TRUCK RETURN		0
0									
	INST3	5	45	DRIVER #	60	1	DEL ADD LINE 2	0	0
	INST4	20	1	DRIVER NAME	0	0	DEL ADD LINE 3	0	0
	INST5	21	1	SLUMP	60	40	CANADIAN FED TA	0	0
	INST6	22	1	BATCH REPORT	26	1	CAN FED TX S TO	0	0
P.O. #		7	45	BATCH NUMBER	1	70		0	0
S.O.		7	0	REMOTE TICKET #	0	0	USER ONE	20	50
JOB #		0	0	PLANT #	1	4	USER TWO	21	50

[F3] Format Extra Products [F5] Moisture Name [F10] Label Editor Page 1

This screen shows the format of the printed ticket. There are two pages in this screen. Page 2 is accessed by pressing the {key. All printable fields are shown on this screen. The line and column numbers representing where to print these fields are to their right. Fields with zero for ROW will not print. Pressing the n key will pop up the Extra Products Ticket Format screen. The { and } keys will scroll through the five Extra Products Ticket Formats. Press the | key to exit.

PRODUCT TICKET FORMAT

FIELD		LINE		COL
PRODUCT CODE	1	12		10
DESCRIPTION		12		21
QUANTITY ORDERED		12		50
QUANTITY DELIVERED	12		57	
QUANTITY THIS BATCH	12		1	
TAXABLE		0		0
DISCOUNTABLE		0		0
PRICE		12		67
TOTAL PRICE		12		73

Press [PgDn] for Next-product
Press [PgUp] for Previous Product

THE LABELING EDITOR

A labeling editor has been provided to print labels or messages on every ticket. This editor is accessed by pressing the u key in the Ticket Format screen. Labels do not overwrite printable fields except in the batch report.

After changes have been made to the Ticket Format screen, the | key will bring back the Main Menu. It is suggested to do a backup of the Data Files as soon as possible after making ticket format changes.

1.6 THE TICKET FILE FORMATS

A ticket file is created or appended after printing a ticket. This file can be transferred to a DOS format and uploaded into other DOS compatible programs. The format of this file is contained in the Record Format screen. This screen is accessed by selecting Record Transactions from the Order Entry Setup Menu.

LINK-20 REC. FORMAT Alkon Corporation Version 4.XX Nov 6 9:02:53

FIELD		ROW	COL	FIELD	ROW	COL	FIELD	ROW	COL
TICKET SIZE		66	80	C.O.D.	0	0	TAX CHARGE	16	71
DATE		1	10	CREDIT CODE	8	30	PREV TOTAL	18	71
TIME		1	20	TAX CODE	8	40	SUB TOTAL	14	71
CUSTOMER CODE		0	0	PROJECT CODE	8	50	DISCOUNT	15	71
ACCOUNT #		7	60	BATCH COST EXT	9	71	NEW TOTAL	17	71
CUSTOMER NAME		3	3	FORMULA	9	10	GRAND TOTA	L9	71
CUST ADDRESS 1		4	3	DESCRIPTION	9	20	PERCENT DISC	0	0
CUST ADDRESS 2		5	3	LOAD SIZE	9	3	CALCIUM	19	19
CITY		6	3	DEL ADD LINE1	0	0	MEMO1	23	1
STATE		6	18	PRICE PER UNIT	9	64	2	24	1
ZIP		6	24	ORDERED	9	50	TRUCK LEFT PLAN	0	0
NOTES		0	0	DELIVERED	9	58	TRUCK ON JOB	0	0
DELIVERY	INST1	3	45	LOADS	0	0	TRUCK LEFT JOB	0	0
	INST2	4	45	TRUCK #	1	40	TRUCK RETURN		0
0									
	INST3	5	45	DRIVER #	60	1	DEL ADD LINE 2	0	0
	INST4	20	1	DRIVER NAME	0	0	DEL ADD LINE 3	0	0
	INST5	21	1	SLUMP	60	40	CANADIAN FED TA	0	0
	INST6	22	1	BATCH REPORT	26	1	CAN FED TX S TO	0	0
P.O. #		7	45	BATCH NUMBER	1	70		0	0
S.O.		7	0	REMOTE TICKET #	0	0	USER ONE	20	50
JOB #		0	0	PLANT #	1	4	USER TWO	21	50

[F3] Format Extra Products [F5] Moisture Name [F10] Label Editor Page 1

Note that this screen can only be accessed if a ticket file does not already exist.

SECTION 1 ORDER ENTRY

1.7 ENTERING ORDERS

The Order Entry screen can be accessed from the Main Menu or the Job Index. To enter an order from the Main Menu, select Order Entry. This will bring up the Job Orders screen as shown below:

```
JOB ORDERS          READY Alkon Corporation        Version   4.XX          Feb 25 15:42:46

CUSTOMER    CODE  [        ]              CUSTOMER
            [Home]                 DELIVERY ADDRESS
JOB NUMBER
            NOTES
                                   [PgUp]
            P.O.#                  MIX #                SLUMP
            S.O.#                  ORDERED              % FLYASH
            C.O.D.                 LD SIZE              % SLAG
            TAX CODE               LD DATE              % CALCIUM
            CREDIT CODE            LD TIME              % HOT WTR
                                   LD INTVL             BATCH CODE      NUM LOADS
                                   [PgDn]
            CODE  ORD'D  DELIV'D   DESCRIPTION                    QTY.   PRICE  EXT.


                                                                    SUB-TOTAL
                                   + TAX          - DISCOUNT        = NEW TOTAL
                                   [End]  + PREVIOUS TOTAL          = GRAND TOTAL

    New Order     [Esc]-Index     [F3]-Menu     [F4]-Mix Description     [F7]-Clear     [F8]-Copy
```

A description of all the fields in the Job Orders screen follows.

CUSTOMER CODE

The first field on the order is the Customer Code. This must be entered identically to the Customer Code entered in the Customer File screen as described in Section 1.2. If the code entered here is not found in the Customer file, the screen will give an error message.

The browse feature is applicable in this field by using the mkey, all the Customer Codes are displayed in a scrollable box. The browse feature on this field is an extremely powerful tool as it alleviates the task of memorizing the Customer Codes. Another benefit of the browse feature in this field is the search capability. This allows the operator to type in the first few characters of the Customer Code, then press the m key for the browse. The browse will find the location in the Customer File of the characters typed and begin at this starting point.

Once the cursor is positioned on the correct Customer Code in the Browse window, pressing the ekey will pull that customer into the order.

JOB NUMBER

The Job Number allows a customer to have multiple orders. For instance, if John Smith is doing several jobs around town, separate orders should be entered for each job. The first job entered for John Smith will have job number 1 assigned to it. The next job number for John Smith will be 2 and so on. If the operator presses the ekey when the cursor is on this field, the Spectrum will automatically assign the next available job number for the selected customer. To select a previously entered order, the operator can enter the job number in this field.

NOTES

This field can be used for any special notes on an order. This field, as any other field on this screen, may or may not be printed on the delivery ticket. This is determined by the ticket format as described in Section 1.5.

CUSTOMER

This is the customer's name as entered in the Customer File screen. This field can be edited here to change this order only. The next order for this customer will revert back to the Customer File's Customer Name. The ability to edit this field is useful for creating orders using a generic customer for non regular customers (i.e. Cash).

DELIVERY ADDRESS

Three lines are provided to enter the delivery address of the order.

PO NUMBER

A purchase order number may be entered here.

SO NUMBER

A sales order number may be entered here. You may prefer to use the Lot # here.

COD

Entering a "Y" in this field will print the pricing of the order on the delivery ticket. Entering an "N" or leaving this field blank will suppress the printing of the prices.

TAX CODE (browsable field)

This is the tax code entered for the customer. This field has a browse feature accessed using the mkey.

CREDIT CODE (browsable field)

This is the credit code entered for the customer.

MIX # (browsable field)

This is the Mix Name of the mix for this order as entered in Mix Designs. The browse will show the Mix Name and its description as shown below:

```
5 SK      5 SACK SAND           & GRAVEL
          Y
5 SK      5 SACK SAND & GRAVEL  (Metric)          M
6 SK      6 SACK SAND & GRAVEL                    Y
6.5 SK    6.5 SACK SAND & GRAVEL                  Y
7 SK      7 SACK SAND & GRAVEL                    Y
7 SK      7 SACK SAND & GRAVEL  (Metric)          M
8 SK      8 SACK SAND & GRAVEL  (Metric)          M
8 SK      8 SACK SAND & GRAVEL                    Y
5 SKA     5 SACK SAND & GRAVEL WITH AIR           Y
5.5 SKA   5.5 SACK SAND & GRAVEL WITH AIR         Y

Up Dn Esc Enter
```

Each mix has a "Y" or "M" on the far right side of the browse indicating whether it is a U.S. Mix or a Metric Mix. The type of order (i.e. U.S. or Metric) is determined by the mix design.

ORDERED

This is ordered amount in volume (cubic yards/meters).

LD SIZE

This is the load size to be delivered per load. The load size will change to the balance between ordered and delivered should the load size throw the delivered amount higher than the ordered amount.

LD DATE

This is the date the order is to be delivered.

LD TIME

This is the time the order is to be batched. **NOTE:** All times are entered in military time. The order will be sorted on the Job Index by this time if Time Based sorting is enabled.

LD INTVL

This is the time interval between batching trucks for this order. After the load is batched the order will re-sort on the Job Index to the next load time (Batch Time + Interval = Next Batch Time).

SLUMP

This is the desired slump for this order. Refer to Section 2.2.1 for how the slump affects a batch.

% FLYASH

If using percent substitution of flyash for cement, this is the percentage used. Refer to Section 3.1 for specifics when using this parameter.

% CALCIUM

If using Calcium, this is the percentage to use. Refer to Section 3.1 for specifics when using this parameter.

% HOT WATER

If blending hot and cold water using the Spectrum's capability, this is the percentage of the hot water to batch. Refer to Section 3.1 for specifics when using this parameter.

BATCH CODE (browsable field)

This allows for printing tickets without batching or batching without printing batch weights. The default value is set in the Order Entry Defaults as described in Section 1.4.

N Don't Batch, Don't Print Target Batch Weights
P Don't Batch, Print Target Batch Weights
B Batch, Don't Print Any Batch Weights
Y Batch And Print Batch Weights

Up Dn Esc Enter

USER DEFINED 1-5

These can be used for special fields not located elsewhere on this screen. The labels for these fields are set in the Order Entry Setup. Refer to Section 1.7.

NUM LOADS

This shows how many loads have been delivered for this order. THIS IS NOT HOW MANY LOADS TO DELIVER. For a new order, a value of zero in this field is correct.

EXTRA PRODUCTS AND PRICING

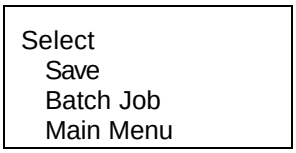
Now the top half of the order screen is filled out. The rest of the screen shows the products to be delivered and the associated charges for these products. These products are divided into six rows. The first row will show the concrete. The next five are used to enter the extra products as entered in the Product file described in Section 2.3. The first column in this matrix is the product code. This column has a browse feature using the mkey. The second and third columns are the ordered and delivered amounts of each product. The next column is the product description. The fifth column is the quantity to deliver on each load. The sixth and seventh columns are the unit price and the extension respectively.

A list of the Function Keys follows:

[F1] - Help Screen
Brings up the Help Screen.

[F2] - Browse Function on [ ] Fields
Will pull up a browse window when the cursor is on specific fields.

[F3] - Menu Select
Brings up the Order Entry Menu. This menu and a description of the selections are shown below:



Save - Save the current order and clear the screen.

Batch Job - Save the current order and then load that order into the Batch Setup Screen in preparation to batch.

Main Menu - Does not save the current order and leaves the screen going to the Main Menu. If changes have been made, appropriate messages are displayed before loosing changes.

[F4] - Edit Mix Description
This allows access to the First Description in the product portion of the screen which is reserved for the Mix Design. This was added to allow different descriptions of the same mix design for different orders. This should only be changed after the Mix # field is entered into the order.

[F5] - Toggle to and from Batching Screen
Allows direct access to the Batching Screen.

[F6] - Printer Port Selector / Reprint Last Ticket

This pulls up the Printer Port Selector screen, as shown below:

PRINTER PORT SELECTOR

	Port Number	Printer Location / Description	Port Name
	0	* Printer Port 1	**$lpt**
-	8	SERIAL PRINTER 1	**$mdm**
-	9	SERIAL PRINTER 2	**$term1**
-	10	SERIAL PRINTER 3	**$term2**

*** Bright = SELECTED** Dim = OFF

[Esc] to Save & Exit [Insert] to Select [F4] Reprint Last Ticket

From the Printer Port Selector Screen, the port the Spectrum uses to print ticket can be changed. This is useful if the Spectrum is being used to print ticket at different locations.

Also from this screen, the last ticket can be reprinted by pressing the okey. This is helpful if the printer jammed or ran out of paper while printing the ticket.

The Printer Port Selector is also accessed by pressing the a and "P" keys simultaneously.

[F7] - Clear Screen

r will clear the current order off the screen and bring up a blank Order Entry screen. This will delete any information that was not saved to the current order.

[F8] - Copy This Job

The s key will copy all the information from the current order to a new order. This is useful for jobs which repeat except for minor changes.

[F10] - Exploded Pricing Display

This field will pull up the Exploded Pricing Display screen as shown on the following page.

EXPLODED PRICING DISPLAY

	Disc = 0.00000			GST = 0.05000	PST = 0.01000		
Code	Qty	* Price =	Exten	- Disc	+ GST	+ PST	= Total
3500 PSI	1.00	37.50	37.50	0.00	1.88	0.38	39.76
				Taxable Totals	37.50	37.50	
Press [Esc] to Exit			37.50	0.00	1.88	0.38	39.76

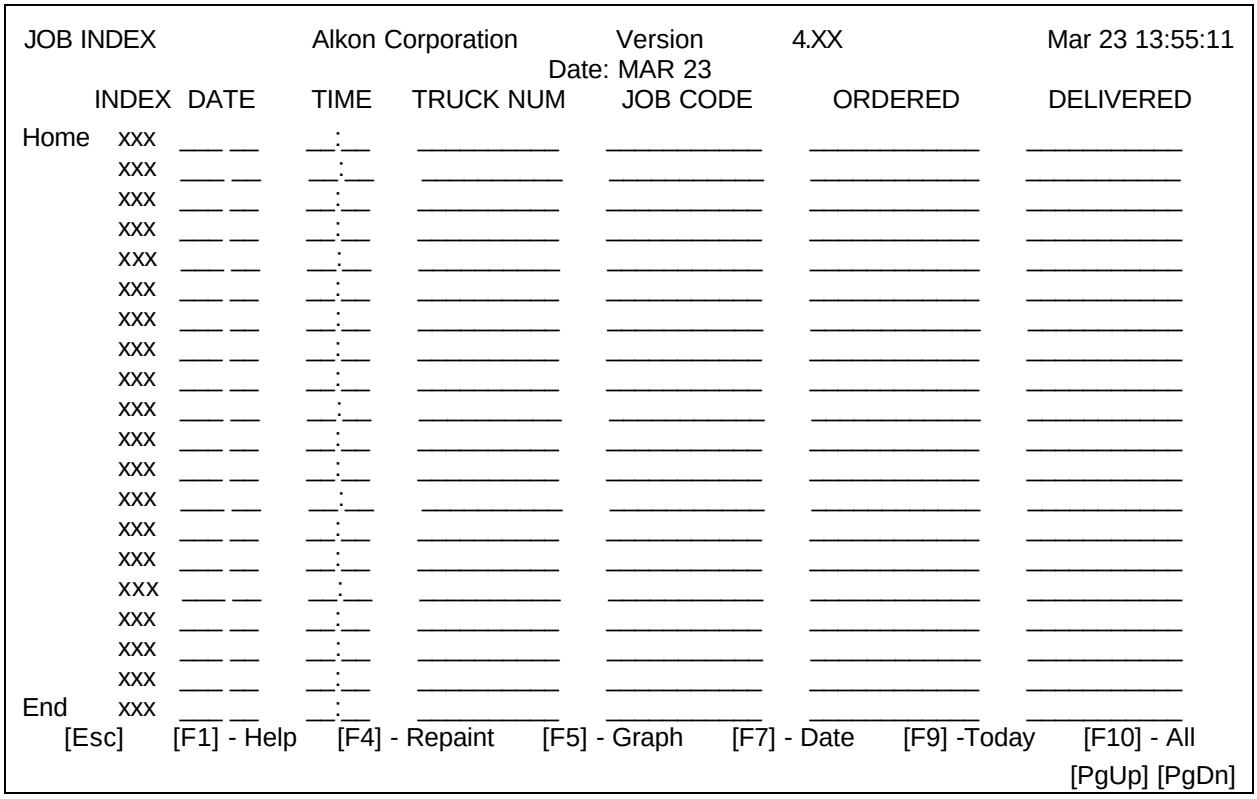
This will show all the taxes, discounts, and prices for the order. This was added for situations that require a Federal Tax Rate on top of local taxes.

Several locations on the Order Entry screen have keystroke labels next to them. By pressing the corresponding key, the cursor will jump to that location. The following list describes these fields and the key used for this quick cursor movement.

g - Move Cursor to Customer Code Field
{ - Move Cursor to Mix Code # Field
} - Move Cursor to Mix Delivered Field
d - Move Cursor to Previous Total Field

1.8 THE JOB INDEX.8 THE JOB INDEX

The Job Index screen is the interface between the Order Entry and the batching software of the Spectrum System. The Job Index is accessed by selecting Auto Batching from the Main Menu.



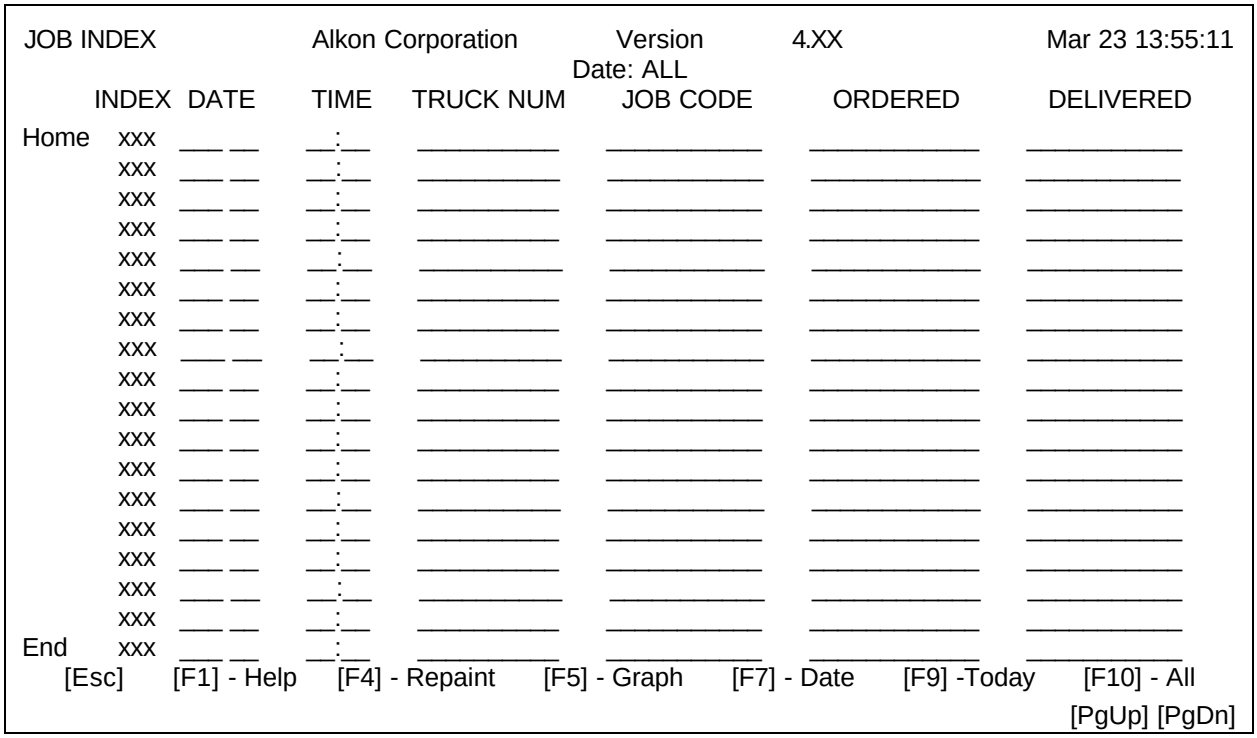
The Job Index screen lists all orders entered in the Spectrum software either chronologically by date and load time or alphabetically. The Index can hold up to 500 orders. There are 20 orders contained on each page of the Index and these pages can be accessed by using the { and }keys. The Index is designed to display all orders for a given date specified in the Date field at the top center of the screen.

The Date and Time can be changed on a Job Index Screen. The Index Display Column, labeled Truck Num in the screen print above, can also be changed. Refer to Section 7.4 for further explanation.

1.8.1 ORDERS DISPLAYED ON THE JOB INDEX

When first entering the Job Index after booting up the computer, the Date field will show the current date and display all orders entered for that day. If the date is incorrect, it may be changed in the System Setup screens. Refer to Section 7.1.

To view all the orders in the system, press the u key. Notice the Date field is now displayed as ALL.



To view only the current day's orders, press the t key. The Date field will now show the current date.

To view orders for a specific date other than today, press the r key. The cursor will now be in the Date field, type in the date of the orders to be displayed in the form: MMM DD where MMM is a 3 letter abbreviation for the month and DD is the day of the month. *For example*, if the orders for April 8th are to be displayed, the operator would type APR 8 and press the e key.

Once an order is displayed in the Job Index, several functions can be performed on that job. These functions include batching, changing the order, copying the order, and removing the order. To perform a function on a particular order, the cursor must first be placed on that order. This is accomplished by using the arrow keys to move the cursor around the index. Once the cursor is on the desired order, the function may be performed using the corresponding function key. An explanation of these functions and how to perform them follows.

1.8.2 BATCHING AN ORDER.8

Once the cursor is placed on the correct line of the index, the order can be batched by pressing the n or qkeys. This will pull up the Auto Batching screen with all the corresponding information from the order brought into this screen. This information includes the Customer Name, Mix, Load Size, and Slump. This screen is described in detail in Section 2 on Batching.

1.8.3 CHANGING AN EXISTING ORDER

A change may be needed on an existing order for numerous reasons such as updating the ordered amount. To change an existing order, the Order Entry screen needs to be accessed with the order to be changed pulled into this screen. This may be done several ways. The most common method is to select the order in the Job Index by placing the cursor on the corresponding line of the Index and pressing the skey. This will pull that order into the Order Entry screen where all necessary changes may be made and the order saved again. The same results are obtained using the Modify/Copy Selected Job option from the Job Index Menu. This menu is accessed using the n key in the Job Index screen.

The final method to pull an existing order into the Order Entry screen is to enter the Customer Code and existing Job Number in a blank screen. Once a change is made to an order, it must be saved again for that change to take effect.

NOTE: A common mistake made when changing an order is not updating the load time. If the current time is past the load time and the order is saved, the software assumes that the order is for the following year and puts it at the end of the Index. This can cause confusion if the Index is set to display only the current day's orders.

1.8.4 COPYING AN ORDER

On some jobs, more than one mix is called for at different times. This will cause several orders to be entered for this job. To alleviate the task of entering all constant information for this job, one order can be entered and then copied and modified for the remaining orders for this job. To copy an order, it must first be pulled into the Order Entry screen. This can be done by the methods described in the previous section. Once the order is in the Order Entry screen, it can be copied to another order by pressing the skey. Notice that this will increment the Job Number and all other information remains unchanged. Any changes can now be made and the order saved by selecting the nkey. Any changes you make will not effect the order you used to access this screen since they were saved under a different Job Number.

1.8.5 REMOVING AN ORDER

There are several methods for removing orders from the system. Orders may be removed by date, all at once, or one at a time.

REMOVING ORDERS BY DATE

To remove all orders for a given date, these orders only need be displayed in the Job Index. This is accomplished by using the date field as described above. After the correct date is displayed, all the orders from that date are removed using the Clear Jobs By Date selection from the Job Index Menu. The Job Index Menu is accessed by pressing the nkey.

REMOVING ALL ORDERS

To remove all orders, all the orders must be displayed in the Job Index. This is accomplished by using the u key as described above. After all the orders are displayed, they are removed using the Clear Jobs By Date selection from the Job Index Menu. The Job Index Menu is accessed by pressing the nkey.

REMOVING ONE ORDER AT A TIME

To remove a single order, that order must first be selected from the Job Index by placing the cursor on that order. The selected order can be removed by pressing the ckey. This will flash the word Delete next to the selected order. To remove that order, press the c key again. If the flashing Delete is next to an order that should not be removed, press the |key. Another method to remove a single order is to use the "Remove One Job" selection from the Job Index Menu.

An automatic removal of an order after batching can be enabled by setting the Del Tckt After Batch flag in the System Parameters screen. Refer to Section 7.4. This is usually done when another system is dispatching tickets to the Spectrum software using the Link-20 Communications Package.

FUNCTION KEYS

A description of the function keys available follows:

[Esc] - **LEAVE PRESENT WINDOW** - By pressing the |key, the current screen will be exited.

[F1] - **HELP** - Brings up the Help Screen.

[F2] - **BATCH SETUP** - Allows access to the Auto Batch Setup screen without an order being entered.

[F3] - **MENU SELECT** - Menu Select will bring up the Job Index Menu shown below:

Select
Load Job
New Job
Modify/Copy Job
Batch Setup
Clear Jobs By Date
Remove One Job
Graphic

A short description and related function key of the Job Index Menu selections follows. You can bypass the menu by selecting the listed Function Key (described on next page).

LOAD JOB - [F6]
Loads the selected job into the Auto Batch Setup screen.

NEW JOB - [Insert]
Brings up blank Order Entry screen to enter a new order.

MODIFY/COPY JOB - [F8]
Pulls selected job into Order Entry screen.

BATCH SETUP - [F2]
Brings up a blank Auto Batch Setup screen, which allows for batching without an order.

CLEAR JOBS BY DATE - NO RELATED FUNCTION KEY
Will clear all displayed orders in the Job Index.

REMOVE ONE JOB - [Delete]
Removes selected job from system.

GRAPHIC - [F5]
Allows access to the Batching screen.

[F4] - UPDATE AND REPAINT INDEX
Used to update the Job Index after changing time or date of an order. Also used frequently when a remote terminal or remote system is used to enter orders into the Spectrum software.

[F5] - TOGGLE TO AND FROM BATCHING SCREEN
Allows direct access to the Batching screen.

[F6] - LOAD SELECTED JOB
Loads selected job into Auto Batch Setup screen.

[F7] - EDIT DATE FIELD AND DISPLAY THAT DATE'S ORDERS
Allows modifying the date field of the Job Index which controls the displayed jobs.

[F8] - MODIFY/COPY SELECTED JOB
Pulls selected job into Order Entry screen to be changed or copied.

[F9] - DISPLAY TODAY'S JOBS
Changes date field of the Job Index to current date, which displays only today's orders.

[F10] - DISPLAY ALL JOBS

Changes date field of the Job Index to ALL, which displays all orders in the system.

[F11] - MOISTURE EDITOR

Shows the moisture editor below:

MOISTURE EDITOR

Bin Number & AGG Name	AUTO probe On-line	Moisture Percentage
1 GRAVEL	N	0.50
2 ROCK	N	0.75
3 ROCK		0.75
4 GRAVEL		1.20
5 SAND	Y	4.45

The Moisture Editor allows the moisture values entered for the aggregate materials to be altered. It also allows the automatic moisture probes to be turned and off-line. The first column shows the bin numbers of each aggregate. The second column is the name of the aggregate. These columns cannot be edited in the Moisture Editor. If a change is required for these, it must be made in the "Ingredient Table," refer to Section 3. The third column is the status of the automatic probes with a "Y" stating that the probe is on-line and an "N" for a probe that is turned off-line. The last column shows the current moisture entered for each material. The percentages can be changed by placing the cursor on the value to be changed, typing the desired change and pressing the ekey. After the desired changes are made, the | key saves the changes and leaves the Moisture Editor.

[F12] - END OF DAY TRUCK WASHOUT

The End Of Day Truck Washout Screen appears as shown below:

TRUCK WASHOUT
Quantity Requested = 250
See DISCHARGE PARAMETERS to change quantity

Press [F12] to start, [Esc] to abort

This screen allows water to be automatically weighed or metered for truck washout. The amount of water to be weighed or metered is set in the second page of the Discharge Parameters Screen, refer to Section 7.5. This value can be changed in this screen. After the Truck Washout Screen appears, pressing [F12] will start the water. If the | key is pressed, the water will stop running and the Truck Washout Screen will disappear. This will not affect or print a batch report.

[Insert] - NEW JOB
Enters a blank Order Entry screen for a new order.

[Delete] - DELETE SELECTED JOB
Removes selected job from the system.

[Alt]-"P" - PRINTER PORT SELECTOR / REPRINT LAST TICKET
The Printer Port Selector screen appears. Same as above.

SECTION 2 AUTO BATCHING

2.1 GENERAL INFORMATION

The Spectrum Software is designed to automate all the various types of concrete batching plants. Before being able to actually use the Spectrum for automatic batching, some data must be entered into the system. This data includes ingredients, mix designs, and configuration information that personalizes the Spectrum System with the batch plant. If the Order Entry feature is enabled, more information must be entered before delivery ticket printing is possible. This section deals with using the Spectrum's automatic batching functions.

There are two forms of batching:

- **with the Job Index** (Order Entry)
- **without the Job Index** (Non-Order Entry)

Plants which have the optional Order Entry software can batch either way. Those plants without this option are limited to the description of batching without the job index and should ignore any references to printing delivery tickets. Before a batch can be initiated, the Auto Batch Setup Screen must be accessed.

2.1.1 BATCHING WITH THE JOB INDEX

On systems with the Order Entry software, the Job Index Screen appears when selecting Auto Batching from the Main Menu. For details on this screen and how to enter an order, refer to Section 1 of this manual. To load an order into the Auto Batch Setup Screen, position the cursor on the order using the w and y arrow keys. Press the q key or pull up the Select Menu by pressing the n key and select Load Job. A blank Auto Batch Setup Screen can be accessed by pressing the m key from the Job Index Screen or by pulling up the Select Menu and choosing Batch Setup.

2.1.2 BATCHING WITHOUT THE JOB STACK

On systems without the Order Entry Software, a blank Auto Batch Setup Screen appears after selecting Auto Batching from the Main Menu. A description of this Screen and the processes performed from this screen follows.

2.2 AUTO BATCH SETUP SCREEN

The Auto Batch Setup Screen will appear before an automatic batch is started. On systems with Order Entry, some of the fields will be carried over from the original order loaded. This screen is shown below:

```
AUTO BATCH SETUP            Alkon Corporation      Version  4.XX              Mar 23
16:42:50

CUSTOMER                                                  LEFT SET BATCH NUMBER     1

FORMULA NAME  [              ]
LOAD SIZE                   RETURN AMOUNT
TRK NUM/RATE                RETURN MIX                     % HOT WATER
DRIVER ID                   SLUMP                          % SLAG
WAT IN TRK                  WAT ADJUST ±                   % FLYASH
                                                           MIXING TIME
INGREDIENTS   | AMT UNIT    TARG                           MIXER NUMBER
----------------------- + -------------------------------

                                                 QUANTITY  |    DESCRIPTION
                                                 ---------------- + --------------------------------------



                                          BATCH CODE Y HARSHNESS 1.0        AIR EFF. 1.0
                                        [Esc] Exit        [F1] Help        [F10] Equivalents Editor
```

To completely describe the Auto Batch Setup Screen, we will split it into four sections. The first section to be described is the top half of the screen and will be labeled the Batch Information Section. The second screen section described will be the Mix Design Section and is located in the lower left side of the screen. Next, the Extra Product Section, lower right side, will be discussed. The last section, the Function Section, is the last two lines of this screen.

SECTION 2 AUTO BATCHING

2.2.1 BATCH INFORMATION SECTION

This is the top half of the Auto Batch Setup Screen:

```
CUSTOMER                                          LEFT SET  BATCH NUMBER    1
MIX NAME   [            ]
LOAD SIZE                      RETURN AMOUNT
TRK NUM/RATE                   RETURN MIX              % HOT WATER
DRIVER ID                      SLUMP                   % SLAG
WAT IN TRK                     WAT ADJUST ±      % FLYASH
                                                       MIXING TIME
                                                       MIXER  NUMBER
```

A description of all the fields in this section follows:

MIX NAME

When entering a blank Auto Batch Setup Screen, the cursor is placed on this field. This field must be entered before access to any other field on this screen is allowed. This is a predefined field because it must be entered as one of the Mix Names as entered in Mix Designs. The brackets around this field indicate that it has the browse function associated with it by pressing the mkey.

CUSTOMER

On systems without the Order Entry Software, the customer's name can be typed here to print on the batch summary. To access this field, press the okey.

LOAD SIZE

The cubic amount of the batch is entered here. This is a numeric field. Fractional amounts should be entered as decimal values. No amount greater than the Maximum Load Size, defined in the Plant Configuration Screen, will be accepted.

TRK NUM/RATE

These are two separate fields. The truck number can be entered in the first field. This is a 6 character alphanumeric field. The second field is the discharge rate to be used for this truck. This is a predefined field that can only be entered as the numbers 1,2,3, or 4. These numbers correspond to the discharge rates set in the Discharge Parameters Screen, refer to Section 7.5. If the truck number entered is found in the Truck Table, it will automatically pull in the corresponding discharge rate. Refer to Section 7.7.

DRIVER ID

This can be entered as a short name or as the employee number of the driver of the truck. This field will be automatically pulled in from the Truck Table when the truck number is entered. This is a five character alphanumeric field.

WAT IN TRK

If there is wash water left in the truck, the amount entered here will be subtracted from the amount of water to batch. This value should be entered in gallons or liters but not by weight.

RETURN AMOUNT
RETURN MIX

Allows for leftover concrete. The Return Amount is a numeric field that should be entered as the cubic amount left in the truck. If a number other than zero is entered in the Return Amount, the Return Mix will automatically pull in the same mix as entered in the Mix Name field. The Return Mix may be changed to match any mix entered in Mix Designs. If the Return Mix is not changed, the system will batch a load correspond-ing to the Load Size minus the Return Amount. If the Return Mix is changed to a mix that has the same ingredients but different amounts, the system will correct the batch for these differences. If the Return Mix is changed to a mix with ingredients not contain-ed in the formula to batch, the system will give a message stating these differences and will batch a load as if the Return Mix were the same as the Mix Name. Before batching this load, the system provides the ability to continue or to make changes.

The printout will reflect the actual Load Size entered; however, the batch weights will show the actual amounts batched. The amount returned will also be on the printout.

SLUMP

This field will be automatically pulled in from the Mix Design, or in the case of Order Entry, from the order.

This slump may be changed and will affect the amount of water to batch, per unit of the Load Size, by the amounts specified in slump adjust parameters found in the System Setup Screens. Refer to Section 7 for more details.

Example: Mix is 3", changed to 4", system will add (usually) 1 gallon of water per yard extra. This also applies for metric loads using liters per meter.

WATER ADJUST ± /YD

This is a numeric field that will change the amount of water batched per unit of the load size. *For example*, a 1.0 entered in this field will add 1 gallon/liter of water per yard/meter to the load, where a -1.0 would take out 1 gallon/liter per yard/meter.

% HOT WATER

If using the Spectrum's ability to blend hot and cold water, this field is where the percentage of hot water to be batched is entered. Refer to Section 3 for more details on using this field.

% SLAG
% FLYASH

The Spectrum has the ability to substitute flyash or slag for cement. This field is where the percentages to be used must be entered. Refer to Section 3 for more details on using these parameters.

SECTION 2 AUTO BATCHING

MIXING TIME

For a central mix plant, mixing time represents the seconds required to mix the load. This numeric field is pulled in from the Mix Design Screen but may be changed here for the current load.

MIXER NUMBER

For plants that have two mixers, a mixer and a holding hopper, or a wet and dry side, the entry in this field determines which mixer the batch will be discharged into.

BATCH NUMBER

This field represents the next batch number that will be used. However, if a change to this number is required, it must be made in the Plant Configuration Screen. Refer to Section 7.3, not here.

LEFT SET

Left set is the label of the current Quick Edit set being used. To change this field, refer to Section 7.14 (Quick Edit Screen) for more information.

2.2.2 THE MIX DESIGN SECTION.2.2 THE MIX DESIGN SECTION.2.2 THE MIX DESIGN SECTION

This section is located at the lower left side of the Auto Batch Setup Screen. These ingredients and their one yard dry SSD weights appear here after a Mix Name is entered in the Batch Information Section of this screen.

INGREDIENTS	AMT	UNIT	TARG
GRAVEL	3020	LB/y	0.0
CEMENT 1	423	LB/y	0.0
CEMENT 2	0	LB/y	0.0
WATER	25.0	GL/y	0.0
HYCOL	1.00	PT/y	0.0

AEA	0.75 OZ/y	0.0

A change may be made to the mix here; however, this change will only take effect for the current load. If a permanent change to the mix is required, it must be changed in Mix Designs, refer to Section 3. A # will appear next to any ingredient that has been changed in the Auto Batch Setup Screen. This # sign will also appear on the batch weight printout.

The units beside the ingredients are optional and are set up in the ingredient table, refer to Section 3.2.

The target beside each ingredient is a very close proximally of the actual target that the current batch will use. The targets reflect moisture, water correction, slump, water trim and water in truck. They **do not**; however, reflect Air effectiveness, Harshness, Returned concrete, %Hot, or Flyash/Slag substitution. The moistures with the automatic probe are only as good as the last batches recorded value.

If you have the Switchable US/Metric option and are batching a mix in units you are not familiar with (i.e. Metric if you always batch U.S.), when editing an ingredient amount, pressing the u key will invoke a size convertor so that the weight may be entered in units you are familiar with. The computer will do the conversion for you.

2.2.3 EXTRA PRODUCT SECTION

This is the lower right side of the Auto Batch Setup Screen. Any extra products that will be printed on the delivery ticket will show up here. This section is of no use for systems without Order Entry.

QUANTITY	DESCRIPTION
5.00	HIGH EARLY
5.00	FIBER MESH
2.00	10 FT REBAR
2.00	EXPANSION JOINTS
1.00	5 GALLON BUCKET OF SEALER

The extra products cannot be edited here. They show up only to remind the operator that these items should be included in this delivery.

2.2.4 THE FUNCTION SECTION

The last two lines on the Auto Batch Setup Screen show certain values to batching parameters and the function key used to perform certain operations.

```
BATCH CODE Y          HARSHNESS 1.0          AIR EFF. 1.0
  [Esc] Exit          [F1] Help          [F10] Equivalents Editor
```

The first line shows the status of 3 parameters which are described below:

BATCH CODE

The Batch Code allows for printing tickets without batching or batching without printing batch weights. The q key moves the cursor into this field. The m browse key will show the choices for this field. The default value is set in the Order Entry Defaults as described in Section 1.4.

```
N Don't Batch, Don't Print Target Batch Weights
P Don't Batch, Print Target Batch Weights
B Batch, Don't Print Any Batch Weights
Y Batch And Print Batch Weights
Up  Dn  Esc  Enter
```

HARSHNESS
AIR EFFECTIVENESS

They are shown here because they do affect the batch's target weights for specific ingredients. Refer to Section 7.3 for details on these parameters. These fields cannot be changed on this screen. They are found in the Plant Configuration Screen.

SECTION 2 AUTO BATCHING

The second line of the Function Section shows the operations that are performed using the function keys. The keys and their uses are described below:

[F1] - HELP

[Esc] - LEAVE PRESENT WINDOW

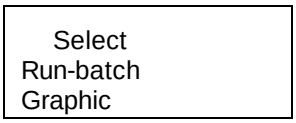
The | key exits the current screen in use.

[F2] - BROWSE FUNCTION ON [ ] FIELDS

When the cursor is placed on a field that has a browse function available, a pair of brackets will enclose the cursor. By pressing the mkey, a list of the choices available for these fields will appear. Refer to the introduction of this manual for details on using the browse feature.

[F3] - SYSTEM MENU SELECT

By pressing the nkey, the following menu will appear on the bottom of the screen:



Selecting "Run-batch" will start the batch. Selecting "Graphic" will enter the Batching Screen.

[F4] - ED IT CUSTOMER LINE

By pressing the okey, the cursor will jump to the first field in this screen, which is the Customer Name. Any changes to this field can be made and will print on the ticket and/or batch report.

[F5] - TOGGLE TO AND FROM BATCHING SCREEN

This is the same as pressing the n key, and selecting the Graphic option. By pressing the pkey, the Batching Screen will appear. This allows a quicker access to this screen. This will also work while in the Job Index Screen.

[F6] - RUN BATCH

This is the same as pressing the n key, and selecting the Run Batch option. By pressing the qkey, the batch will be started.

[F7] - TOGGLE TO EQUIVALENTS (Switchable US/Metric Only)

To invoke this, press and hold the rkey. While this key is held down, the display will change to the other systems weight equivalent for this load. *Example:* Your plant is calibrated in U.S units (i.e.: Lbs, Gal, Oz) and you are batching a Metric mix (i.e. Kgs, Liters, ML), all numbers on the screen will be in Metric (including Slump, Water in Truck, Trim, etc.). When the batch is run, the system will convert all numbers to their U.S. equivalents in order to batch on a U.S. calibrated plant. The r key will show what numbers will be used when the batch is run. **NOTE:** Once the batch has been initiated, the r key can be pressed (and released) in the graphics display to change the display back to Metric. The default display is **always** in the scale calibrated units.

A typical calculation might look like the following:

1000 Kg/M3 = 2204.6 Lb/M3; 100 Lt/M3 = 24.6 Gl/M3

[Ctrl] [F7] - Volumetric Toggle (Switchable US/Metric Only)

To invoke, hold down the b key and press the rkey, at this point the b key may be released, keeping the r key depressed. While this key is held, the display will change to the other systems volumetric equivalent for this load. *Example:* Your plant is calibrated in U.S units (i.e.: Lbs, Gal, Oz) and you are batching a Metric mix (i.e. Kgs, Liters, ML), all numbers on the screen will be in Metric (including Slump, Water in Truck, Trim, etc.). The operator, typically, will be used to the U.S. version of this mix. What does 3.81 meters mean? The band r keys will show what the operator is used to seeing, 3.81 meters = 5.00 yard(s). All numbers will now reflect what the mix would be like if it were in Cubic Yards and **not** Cubic Meters. A typical calculation might look like the following: 1000 Kg/M3 = 1685.5 Lb/Yd; 100 Lt/M3 = 20.2 Gl/Yd.

[F8] - SPECTRUM QUICK EDIT SCREEN

By pressing the skey, the Quick Edit Screen appears. Refer to Section 7.14 for details of this screen.

[F9] - CONFIGURE DEMANDS

By pressing the tkey, the Demands Setup Screen appears. For details on this screen, refer to Section 7.13.

[F9] - HOLD BATCH (Within Graphics Only)

This key only works while in the Batching Screen. Refer to Section 2.5.2.

[F10] - EQUIVALENTS EDITOR (Switchable US/Metric only)

By pressing the ukey, a size convertor box appears like below on the following page. By entering data on one side, it is dynamically converted to the other side. Pressing the n key will save the data to the appropriate fields in the Pre-Batch Screen.
NOTE: If you press the | key, you are given the option of saving or not

saving. By choosing not to save, this can be used as a *scratch pad*. The User Defined section can be accessed by pressing the pkey. There are three user defined fields that can be changed to suit your applications. Pressing the | key will save your configuration.

The Volume field actually does a double conversion. Once to the other system of measure and again from either yards to meters or vice versa.

To convert an ingredient amount, place the cursor on the ingredient you wish to change, press the u key, and the editor will be invoked with the selected ingredient name. Enter the new amount and it will be dynamically converted to the other system of measure. Pressing the n key will then save then change to the selected ingredient.

CONVERT SIZES EDITOR

	Metric		U.S.	
Load Size	2.00	M	2.62	Y
Mix Slump	127	mm	5.00	in
Trim	0.0	LT /m	0.0	GL/y
Wat In Trk	0.0	LT	0.0	GL
Rtn'd Amt	0.00	M	0.00	Y
Strength	24.13	MPa	3500	PSi
Volume	0	KG /m	0	LB /y
User Def1	5	IG	6.005	GL
User Def2	0	KG	0	LB

[Esc] Exit [F3] Save F5] User

[F11] - MOISTURE EDITOR

By pressing the f key, the Moisture Editor appears as shown below:

MOISTURE EDITOR

Bin Number & AGG Name	AUTO probe On-line	Moisture Percentage
1 GRAVEL	N	0.50
2 ROCK	N	0.75
3 ROCK		0.75
4 GRAVEL		1.20
5 SAND	Y	4.45

The Moisture Editor allows the moisture values entered for the aggregate materials to be altered. It also allows the automatic moisture probe(s) to be turned on and off-line. The first column shows the bin numbers of each aggregate.

The second column is the name of the aggregate. These columns cannot be edited in the Moisture Editor. If a change is required for these, it must be made in the Ingredient Table, refer to Section 3. The third column is the status of the automatic probe(s) with a "Y" stating that the probe is on-line and an "N" for a probe that is turned off-line. The last column shows the current moisture entered for each material. The percentages can be changed by placing the cursor on the value to be changed, typing the desired change and pressing the ekey. After the desired changes are made, the | key saves the changes and leaves the Moisture Editor.

[F12] - END OF DAY TRUCK WASHOUT

By pressing the [F12] key, the End Of Day Truck Washout Screen appears as shown below:

```
TRUCK WASHOUT
Quantity Requested = 200     New Target = 200
See DISCHARGE PARAMETERS for default target.

Press [F12] to Start Washout,   [Esc] to Abort
```

This screen allows water to be automatically weighed or metered for truck washout. The amount of water to be weighed or metered is set in the second page of the Discharge Parameters Screen, refer to Section 7.5. This value can be changed in this screen. After the Truck Washout Screen appears, pressing the [F12] key will start to run the water. If the | key is pressed, the water will stop running and the Truck Washout Screen will disappear. This will not affect or print a batch report.

g **- Move Cursor to Mix Code Name Field**

{ **- Move Cursor to First Ingredient Amount Field**

d **- Move Cursor to Last Ingredient Amount Field**

Several fields on the Auto Batch Setup Screen have keystrokes for quick cursor movement associated with them. These keystrokes allow the cursor to jump to that location.

[PgDn]

This moves the cursor into the Batch Code Field. The Batch Code allows for printing tickets without batching or batching without printing batch weights. The m browse key will show the choices for this field. The default value is set in the Order Entry Defaults as described in Section 1.4.

```
          N Don't Batch, Don't Print Target Batch
Weights
 P Don't Batch, Print Target Batch Weights
 B Batch, Don't Print Any Batch Weights
 Y Batch And Print Batch Weights
 Up   Dn   Esc   Enter
```

[Alt] "P" - PRINTER PORT SELECTOR / REPRINT LAST TICKET

This pulls up the Printer Port Selector Screen, as shown below:

```
PRINTER PORT SELECTOR

        Port
      Number   Printer Location / Description          Port Name

         0     * Printer Port 1                        $lpt
  -      8       SERIAL PRINTER  1                     $mdm
  -      9       SERIAL PRINTER  2                     $term1
  -      10      SERIAL PRINTER  3                     $term2

                  * Bright = SELECTED   Dim = OFF

[Esc] to Save & Exit      [Insert] to Select      [F4] Reprint Last Ticket
```

From the Printer Port Selector Screen, the port the Spectrum uses to print ticket can be changed. This is useful if the Spectrum is being used to print tickets at different locations.

Also from this screen, the last ticket can be reprinted by pressing the o key. This is helpful if the printer jammed or ran out of paper while printing a ticket.

2.3 STARTING A BATCH

To begin an automatic batch, enter the Auto Batch Setup Screen. Enter all the required information on this screen. Note that the only required fields that must be entered to run a batch are the Mix Name and the Load Size. After you have verified that the information on the Auto Batch Setup Screen is exactly what you want for this batch, press the n key to bring up the Auto Batch Select Menu or press the q key to immediately start the batch. If the n key was used, select Run Batch to start the load.

Once Batch Start has initiated, the computer will first verify that a quantity and a proper mix have been entered and that all ingredient names in the mix design are in valid bins, silos and bottle numbers. It will also check the scale interlock contacts to make sure the gates are closed and within the zero tolerance. Also, it will issue a pulse to all discharge gates to energize them closed. Any errors found at this point will cause an error message and require the operator to either correct the error and retry the batch, or accept the error and begin the batch. After all checks have been made, the Batching Screen will appear and the weigh-up of materials will begin.

2.4 THE BATCHING SCREEN

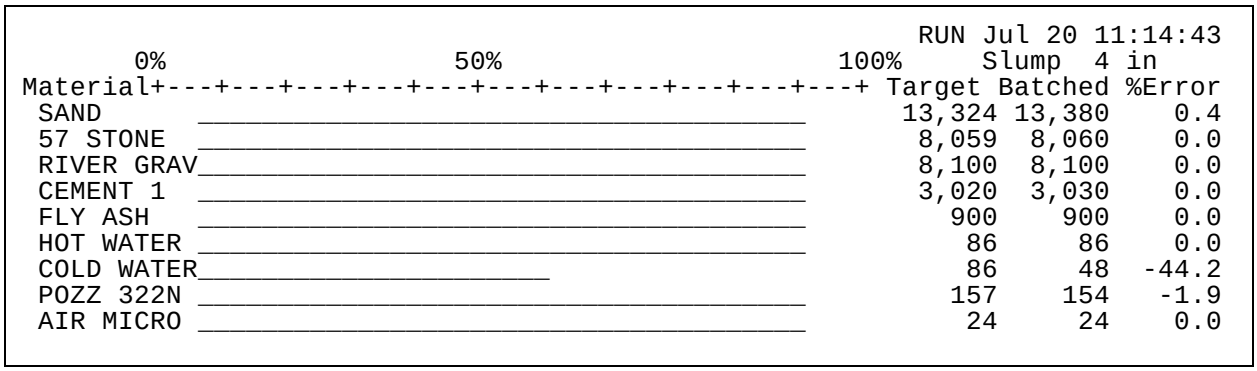
After a batch has been started, the Batching Screen will appear. The Batching Screen shows the weighing and metering of all materials and the subsequent discharge of these materials. An example of the Batching Screen is shown below:

```
                                                         RUN Jul 20 11:14:43
       0%                 50%                       100%     Slump  4 in
Material+---+---+---+---+---+---+---+---+---+---+ Target Batched %Error
 SAND      _____________________________________       13,324 13,380    0.4
 57 STONE  _____________________________________        8,059  8,060    0.0
 RIVER GRAV_____________________________________        8,100  8,100    0.0
 CEMENT 1  _____________________________________        3,020  3,030    0.0
 FLY ASH   _____________________________________          900    900    0.0
 HOT WATER _____________________________________           86     86    0.0
 COLD WATER______________________                          86     48  -44.2
 POZZ 322N _____________________________________          157    154   -1.9
 AIR MICRO _____________________________________           24     24    0.0

Scale  0%        U.S.            50%         Scale Units     100%  Scale
Name  +----+-----+-----+-----+-----+-----+-----+-----+----+-----+   Weight
*Aggregate___________________________________________              25,980
 Cement   _________________________________                         3,960
 Water    _____________                                               134



DISCHARGE STARTED                          Mix Name:1300028BS     Truck:123
[F1] SETUP NEXT LOAD, [F2]RELEASE WATER    Qty.Batched:10.00Y   Today 76.25
PRESS [F5] TO EXIT                         Batch  1 of  1       Loads    13
```

To completely describe the Batching Screen, we will divide it into three sections. The first section discussed will be the top half of the screen. This will be called the Ingredient Section. The Scale Section will be described next. This section is the lower set of bar graphs on the Batching Screen. The bottom of the screen will be the last section detailed. This is the last three lines of the Batching Screen which will be called the Batching Status Section.

SECTION 2 AUTO BATCHING

2.4.1 THE INGREDIENT SECTION OF THE BATCHING SCREEN



This part of the Batching Screen shows each ingredient in the mix design that is being batched. The slump of the current batch is shown at the top right side of the screen. The bar graph represents the percentage of these ingredients that has been weighed or metered. The first of the three columns on the right shows the target weight required for the batch. The other two columns can be configured to show a choice of the two or three selections shown below:

Batched - The amount already weighed/metered.

% Error - The percentage of the amount batched vs the target amount.

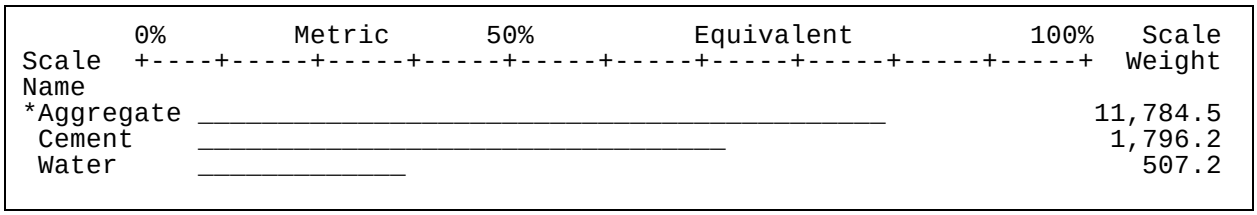
Variance - The amount batched minus the target amount.

These columns are configured by the Batching Display Option found in the System Parameters Screen, refer to Section 7.4 for details.

In the example above, all ingredients except COLD WATER have been weighed up to their respective target values. When any ingredient is in the fast feed cycle, the name of the ingredient will turn green and an asterisk (*) will appear next to it. During the Super Jog cycle, the name is in gray and during small jogs, the name is in purple. The bar graph for that material will grow from left to right to indicate a positive flow of material into the scale or bottle.

2.4.2 THE SCALE SECTION OF THE BATCHING SCREEN

This is the metric equivalent of the Batching Screen found in Section 2.4.



The Scale Section shows the name of all weigh hoppers and the current weight in each weigh hopper. The weight in each scale is represented in bar graph form as a percentage of the full scale capacity. The actual weight in the scale is shown in numerical form at the right of the bar graph. When the scale is being discharged, the Scale Name will turn green and an asterisk (*) will appear next to it. The bar graph will descend until the scale is empty. This is helpful in monitoring the flow rate of the material. Note that additional scales may be added to this display. These scales are set up in the User Scale Editor, refer to Section 7.6 for details.

2.4.3 THE BATCHING STATUS SECTION OF THE BATCHING SCREEN

```
DISCHARGE STARTED                          Mix Name:1300028BS    Truck:123
[F1] SETUP NEXT LOAD,[F2] RELEASE WATER  Qty. Batched: 10.00Y  Today  76.25
PRESS [F5] TO EXIT                         Batch    1 of  1      Loads     13
```

The Batching Status Section shows the stage that the current batch is in, the operations performed with the certain function keys, and some information about the current batch.

The left side of this section gives valuable information to the operator. The top line tells the user the current stage of the batch. The next two lines show the options available using the corresponding function keys.

The right side of this section gives information about the batch. This information includes the mix design being batched, the amount batched for this load and the number of batches the load will require. The slump of the current batch is shown at the top right side of the screen.

2.5 BATCHING FUNCTIONS

The functions available to the operator during a batch include holding the batch, aborting the batch, starting the discharge, and trimming an ingredient in the batch. Most of these functions are performed with the function keys on the keyboard.

2.5.1 HOLDING A BATCHER

Any batcher can be held during the weighing or discharging stage by the use of some special keys on the keyboard. By pressing one of these keys once, the batcher is put in a hold stage. By pressing the key again, the batcher is taken out of hold. These keys are described in the table below:

BATCHER	KEY USED TO PUT IN HOLD
AGG	h
CEM	g
WAT	{ or m
ADMIX	}

2.5.2 HOLDING THE ENTIRE BATCH DURING WEIGH-UP

Pressing the t key will terminate the weighing and liquid metering and give all the appropriate out-of-tolerance messages. Each out-of-tolerance message must be accepted by pressing the nkey. After these tolerance errors have been accepted, the following message will appear:

WEIGH COMPLETE
l DISCHARGE, n CONTINUE, o MANUAL TRIM.

Pressing the n key will resume the weigh-up.

2.5.3 ABORTING A BATCH DURING DISCHARGE

Pressing the t key will close all discharge gates and stop the conveyor belt. A message will appear as shown below:

DISCHARGED ABORTED
l SETUP NEXT LOAD, p EXIT

Press the l key to go to the Pre-Batch Screen to set up the next load.

2.5.4 TRIMMING A BATCH

If for some reason the computer has had difficulty dispensing a particular ingredient, the measurement may come up under tolerance as signaled by a red target and batched amounts in the Ingredient Section of the Batching Screen, with a negative % ERROR or positive VARIANCE. The operator has the option of instructing the computer to trim the ingredient by pressing the okey. The computer will then prompt you for the ingredient name as it appears above. The first few letters can be typed when in a hurry. (**NOTE:** If two ingredients share almost the same name (i.e. Cement I and Cement II) the full name must be typed. It will then prompt you to enter an amount. The amount should be entered as the value shown in the VARIANCE portion. If Switchable US/Metric is available, the amount entered will be converted automatically to the scale calibrated weight.

2.5.5 STARTING THE DISCHARGE FOR A SINGLE BATCH

Pressing the l key will initiate the discharge sequence which has been set up in the discharge parameters. While the discharge is in progress the computer will give the prompt:

l SET UP NEXT BATCH

This allows the operator to set up the next load during the discharge of the present load.

2.5.6 STARTING THE DISCHARGE OF A PARTIAL BATCH

Pressing the l key will initiate the discharge sequence according to the discharge parameters. When the discharge is complete for the partial batches, it will again redraw the graphics and begin the next partial or the final batch for the load. When the system is satisfied with the batch, it will automatically begin the discharge as long as no out-of-tolerance condition has occurred. If there was a tolerance error in the second batch, the operator must again okay the discharge by pressing the lkey. The computer will now give the message:

l SET UP NEXT BATCH

2.6 MAKING REPEAT BATCHES

After a batch is completed and the discharge is in progress, the computer will give the prompt:

l SET UP NEXT BATCH

If the l key is pressed, the display will return to the Job Index with the cursor on the order that has just been batched. Systems without the Order Entry option will find it a time saver to be able to make repeat batches by simply pressing the ekey. The computer will recall all of the data from the previous load except for:

LOAD SIZE
TRUCK NUMBER
DRIVER NUMBER

Enter this information and you are ready to start batching.

SECTION 2 AUTO BATCHING

2.7 SEQUENCES OF THE AUTOMATIC BATCH

This section will help the operator understand the automatic sequences of the Spectrum System. This knowledge helps diagnose problems that may occur.

2.7.1 INITIAL CHECKS

At the start of each batch, the ingredients in the mix design are checked against the ingredient table for valid ingredient names and bin or bottle numbers. The computer also checks that the weigh-batcher limit switch gates are closed, and that the printer is on-line before starting the batch. Any errors found will be displayed at the bottom of the screen. The batch will not be allowed to begin until these errors are corrected.

2.7.2 SCALE ZERO TOLERANCE

Due to build-up of materials in the weigh-batchers, scales rarely read zero prior to the start of a batch. The computer will compensate for this non-zero condition as long as it is within the zero tolerance. This is set by the ***Auto Zero*** on the Modify Scale Calibration Screen. If the scale is above the Auto Zero, a message will appear before starting the batch that will give the operator the choice of proceeding with the batch or aborting. If the batch is started, the weight in the scale will be considered as the first material to be weighed in that scale for this batch.

2.7.3 AUTOMATIC SPLITTING OF BATCHES

The computer will automatically split the batch size into two or more equally sized loads if the following conditions are met:

1. If the sum of the accumulated final target weights for any one scale exceeds the *Scale Max* as shown in the Plant Configuration table and the Quick Edit Screen, and
2. If the *Maximum Num of Loads* parameter of the plant configuration table is not exceeded.

- - OR continued on next page - -

1. The Load Size exceeds the Mixer Size and the *Split Load By Mixer Size* is set to a "1"; and
2. If the *Maximum Num of Loads* parameter of the plant configuration table is not exceeded.

Normally, the weighing procedure is identical to that of a single batch, except that jogging will occur only on the last of the partial batches for a load. Underage or overage amounts in the weighment of the partial batches are carried forward to the next partial or final batch for the load. This is configurable. The system can force all batches to jog up to target if desirable. This is accomplished by using the *Jog Every Batch* parameter in the Plant Configuration Screen. Refer to Section 7.3 for details.

2.8 WEIGHING AND METERING

Simultaneous weighing and measuring occurs for each of the ingredient types. Weighing of the aggregates begins with the first aggregate name in the mix design. Cementitious materials can weigh one of two ways. If *Sort Feed by Mix Design Entry* is "1" the computer weighs up the cementitious materials the same as the aggregates; if it is "0", it weighs cements in order of bin number with the lower being first.

Water can either be weighed, metered or metered to a holding tank, and will start its measurement when desired. Refer to Section 7.5 on Discharge Parameters. If hot water is being mixed, it will be measured out before the cold water. On weighed water plants, all of the batch water will be weighed into the scale. On metered water plants, only the initial charge of water is metered either in the holding tank or directly in the truck. For plants that meter the water directly into the truck, the system can be set up to hold the water until the operator presses the mkey. This allows a batch to start weighing before the truck is spotted under the plant.

At the same time as the water is being measured, the liquid chemicals are also being measured into the bottles, depending on how they are set up. They can also be directly metered into the truck. Whether metered directly or bottled, the admix can be configured to go in with the wash down water.

2.8.1 MAJOR INGREDIENT WEIGHING

The major ingredients consist of the aggregates, cements, and waters. Weighing for these materials is divided into four phases:

FAST FEED
SLOW FEED
SUPER JOG FEED
SMALL JOG FEED

During all four phases, a primary feed mechanism is used and will be referred to as the **slow feed** device.

An auxiliary feed device is sometimes used and referred to as the **fast feed** device. On cements, this may be two feed devices on each silo (i.e. gate and aerator) or with aggregates, the use of two bins containing the same material.

MATERIAL FLOW MONITORING

During the weighing of the ingredients, the flow of the material is monitored. After the **Time To Start Flow**, per ingredient, has timed out, the weigh-batcher is checked to ensure material flow has been established. The Spectrum takes flow readings based on **Time Between Min Flow Checks** specified in System Parameters. If a flow less than the **Minimum Flow**, per ingredient, is detected, the feed gate is closed and the material is flagged as being out of tolerance. To disable this check, make the **Minimum Flow** value zero.

CALCULATING SCALE TARGET WEIGHTS

In weighing out the materials, the computer will calculate two or three target weights, depending on the values set in the Ingredient Table for **Fast Feed Cutoff** and **Slow Feed Cutoff**. After the computer has expanded the mix design weights for the size of the batch, including all the compensations to the individual ingredients, and has adjusted for the initial scale weight, the computer obtains the final target weight.

The **Slow Feed Target** is calculated by subtracting the normal preact and the slow feed cutoff from the final target weight. The normal preact is a self-adjusting parameter. The computer closes the slow feed device at this scale reading. This represents the end of

the Slow Feed Stage of the weigh-up.

The **Fast Feed Target** is calculated by subtracting the fast feed cutoff from the slow feed target weight. When the ingredient bin is equipped to provide two stage material feeding, the main feeder or fast feed device will be turned off at this weight. This represents the end of the Fast Feed Stage of the weigh-up.

When two bins are used for the fast feeding of the materials, the lowest bin number will be considered as the slow feed bin and the higher bin number the fast feed bin.

FAST FEEDING TWO AGGREGATES FROM TWO BINS

This is common practice with sand and is accomplished by putting the same ingredient name into two bins. The computer will give you a warning message when this is done, to indicate there are duplicate material names. This message can be ignored by pressing the ekey.

The computer will use the lower bin number for the slow feed and the higher bin number for the fast feed. The higher bin parameters need not be set to work properly.

FAST FEEDING CEMENT FROM TWO SILOS

This is generally done to speed up the batching when each silo has only one feed mechanism.

In the Ingredient Table, only enter one ingredient name.

Unlike aggregates, two outputs are turned on when fast feeding a cement. These outputs may be used to feed two silos simultaneously or use one output for aeration.

FAST FEEDING CEMENT FROM ONE SILO

The computer is programmed to provide control for two feed devices on each of the three cementitious silos. These two devices are labeled Feed A and Feed B. When two separate feed devices are provided, connect the devices as shown on the electrical connection drawings. Feed A will only be energized when fast feeding. Feed B will be energized during all feed stages.

PREACTS (freefall compensation)

The *Normal Preact* (Ingredient Table) is the weight which will be in suspension after closing the gates. This value is affected by many conditions, such as gate response times, batch size and material flow characteristics. To compensate for these variables, the computer learns from its previous experience of weighing that material. After completing the Slow Feed Stage of the weigh-up, the computer subtracts the weight in the scale, recorded as soon as the feed gates were shut, from the total weight, recorded after the *Scale Settle Time* has expired. This difference is used to adjust the Normal Preact for the next batch.

Since the material freefall can be largely affected by the batch size, due to the distance the material must fall, many other parameters are provided to try and offset these variances.

The following variables are only used if *Adjust Large/Small Weight Scale Value and Cutoff Parameters* is turned on in Material Feed Control, found in the Ingredient Table.

Small Weight Scale Value - This value represents the smallest amount the Spectrum batches of this ingredient. Every time a smaller amount is used, it is stored here until finally this will be the smallest. This now tells the system the smallest weight that it can batch using a fast feed scenario.

Small Weight Cutoff - This value represents the amount of suspended weight there is after the gates were shut when the scale read the above value.

Large Weight Scale Value - This value represents the largest amount the Spectrum batches of this ingredient. Every time a larger amount is used, it is stored here until finally this will be the largest. This now tells the system the largest weight that it batches using a fast feed scenario.

Large Weight Cutoff - This value represents the amount of suspended weight there was after the gates were shut when the scale read the above value.

Together these four parameters are used to determine the new preact cutoff value. As load size increases, the suspended weight becomes less, and vice versa. With this in mind, using the above parameters the system can extrapolate data points to arrive at a fairly accurate preact cutoff for varying load sizes.

SUPER JOGS

After the fast and slow feed phases are over, the system will wait for the *Scale Settle Time*. The scale will then be read and the system will determine if the weighed amount is within tolerance. If the % error calculated is within the tolerance range, the system will consider that ingredient weigh-up complete. If the % error is above the Over Tolerance amount, the system will flag this ingredient as out-of-tolerance. If the % error is below the Under Tolerance, the system will go into the Super Jog stage of the weigh-up. The length of each Super Jog is determined by the amount left to batch, the Feed Rate per Sec and the Maximum Number of Super Jogs. Each Super Jog's length is determined by the following formula.

$$\text{Length of Super Jog} = \frac{\text{Target} - \text{Batched}}{\text{Feed Rate/Sec}} \Big/ \left[\text{Max \# of Super Jog} - \text{\# of Jogs taken}\right]$$

JOGGING

The primary feed mechanism (slow feed) is used for jogging control. The feed device will be activated for the *Jog Time* stated in the Ingredient Table to obtain the specified *Jog Weight* also in this table.

Example:

Weight to go = 52Lbs, Jog Weight = 20Lbs, Jog Time = 350
The system will open the gate for 350 mSec to try and achieve 20Lbs per Jog.

The computer will then wait for the *Jog Settle Time* in Plant Configuration before deciding to jog again. If the weight is consistently going over tolerance as it jogs, it may be necessary to decrease the *Jog Time*, found in the Ingredient Table.

The computer attempts to weigh the specified *Jog Weight* in a single jog by re-adjusting the *Jog Time* after each jog. The range for the jog time is limited by the *Max Allowable Jog Time* in System Parameters. The rate at which the jog time is changed is controlled by the *Jog Sensitivity* value which is also in System Parameters. The Jog Sensitivities range from 0 to 100; the lower the value, the smaller the increment in the jog time adjustment.

The *Maximum Number of Jogs* per ingredient limits the number of jogs. Typically, this value ranges from 10 to 30 with a value of 0 inhibiting jogging.

AUTOMATIC WEIGHING OF MAJOR INGREDIENTS SUMMARY

1. Check that the scale is within the zero tolerance.
2. Close the scale discharge gates.
3. Energize the primary and secondary feed devices.
4. Monitor for start of flow.
5. De-energize fast feed device at fast feed target.
6. De-energize slow feed device at slow feed target.
7. Wait for the scale settle time.
8. Perform Super Jogs
9. Check tolerances:
   - if within tolerance, stop
   - if under tolerance, jog
   - if over tolerance, alarm.
10. If jogging, open slow feed device for jog time.
11. Wait for the jog settle time.
12. Check tolerances and repeat, if necessary.
13. Update jog times and preacts.
14. Do next ingredient, if necessary.

2.8.2 CHEMICAL METERING PROCEDURES

Control of the chemicals is through volumetric pulse meters supplied by the chemical supplier. Each chemical must be fitted with the appropriate electrically operated control valves and a flow meter on the line to each sight bottle. (The system will work with a direct feed admix as well).

The computer will open all of the chemical valves called for in the mix design simultaneously at the beginning of the batch. Each valve closes when the computer receives a reading equal to the final target volume minus the preact. Following the measurement, the computer will adjust the preact value in the same manner as for weighed ingredients. During the metering process, the computer is also monitoring the flow to ensure placement of chemicals into the bottles for discharge.

CHEMICAL FLOW MONITORING

During the measurement of each chemical, the flow of each chemical is monitored to determine a no-flow condition. The feed solenoids are energized for the chemical to start metering and once the *Time to Start Flow* has elapsed, the computer will check to see if the flow has been established. If it has not, an alarm message sounds if *Minimum Flow* is non-zero and turns off the feed output.

Setting the *Minimum Flow* to a value of zero is **not** recommended on an admixture. Should the chemical metering device become defective and not provide contact closures, the bottle could fill to the high level probes since the computer will keep the valve open trying to establish the required target.

CHEMICAL VOLUME MEASUREMENT

Each chemical dispensing system must be equipped with a volume measure-ment meter capable of adequately measuring the chemical to the smallest unit of volume without exceeding a contact closure pulse rate of 15 per second.

During the chemical measurement process, the computer converts each pulse to the specified volume and adds this reading to the previous readings until it reaches the final target value minus the normal preact amount. The preact value in a chemical refers to meter coast.

PHYSICAL LOCATION OF FLOW METERS

Physical placement of the flow meters is crucial. It should be placed as close as possible to the valve which controls the chemical to minimize coast. On small loads, the required amount of chemical can sometimes be less than the normal preact amount. When this occurs, the computer will see that the amount requested is less than the preact and not feed at all. This could hinder small load accuracy.

CHEMICAL PREACTS

The computer will recalculate and adjust the *Normal Preact* following each batch. Typically the preacts are about three to four times the volume per pulse.

There are no jogging routines for chemicals. Therefore, the computer simply subtracts the calculated preact from the final target volume and then performs a tolerance check following the *Admix Settle Time* found in Plant Configuration.

If the preact becomes unusually high due to some batching irregularity, it may become necessary to enter the Ingredient Table and reset the preact value.

2.9 DISCHARGE

METHODS OF DISCHARGE

Almost every parameter affecting the scale discharge has been brought to one of the screen displays. This permits the tailoring of the discharge sequences to virtually any configuration. However, most discharges can be grouped into either **inching** or **choke feeding**, and in some cases a **combination** of both methods.

CHOKE FEEDING

This implies that the materials are released from the weigh- batchers with no intent to control the rate of flow. The only form of limiting the flow into the trucks is by the rate of a pre-mixer or the holding hopper to release the materials.

Normally the weigh-batcher gates are controlled by a single solenoid valve which must remain energized to open the gates. When de-energized, the batcher gates close automatically.

INCHING CONTROL

This type of discharge inches the discharge gates open or closed to maintain the specified flow rate from the weigh- batcher, so as not to plug the truck`s loading chute.

This requires two separate solenoid valves to control the discharge gates. One valve provides control to open the gate, while the other closes the gate. When the valves are de-energized, the discharge gate remains in its last position.

INGREDIENT DISCHARGE SEQUENCES

Separate from the type of discharge, is the sequence of discharge which defines the order in which the materials will be released from the weigh-batchers.

The best way of covering this subject is by example.

Example:

The plant is a low profile installation with an inclined conveyor to discharge the aggregates from the weigh-batcher into the truck. The cement batcher is sitting above the boot and the water is metered into the truck through a holding hopper for the initial charge of water.

Past operation has shown the following sequence works best for this plant:

1) Start conveyor immediately.

2) Start initial water charge of 50% into truck.

3) Start chemical discharge with the water and discharge for fifteen seconds.

4) After two seconds, open the aggregate gate.

5) After twelve seconds, start the cement discharge.

6) After 50% of aggregate and cement, release main water discharge of 30% (**NOTE:** main water charge is the difference between the initial water charge and the holdback amount).

7) When the cement scale reaches 200Lbs, turn on the vibrator for five seconds.

8) After the cement scale reaches zero tolerance setting, leave the gate open for two seconds.

9) When aggregate scale reaches the zero tolerance setting, turn on the vibrator and leave the gate open for two seconds.

10) After aggregate gate closes, purge the conveyor for seven seconds.

11) When the aggregate and cement scales reach the zero tolerance, release the water holdback of 20% or a minimum of 20 gallons.

12) Close all gates at the end of the discharge for two seconds.

With a simple statement such as this, you are armed with enough information to set the discharge sequence parameters in DISCHARGE PARAMETERS.

PARAMETER		SETTING		UNITS
Time to Start Conv		0		mSec
Time to Start Water		0		mSec
Initial Water Charge (%)		50		%
Seconds to Blow Out Admixes		15		Sec
Time to Start Agg After Conv		2000		mSec
Time to Start Cem		12000		mSec
% Agg to Start Main Wat Chg		50		%
% Cem to Start Main Wat Chg		50		%
Weight to Turn on Cem Vib	200		Lbs	
Cem Vibrator Pulse Length	2000		mSec	
Time Cement Open After 0 Tol		2000		mSec
Time Agg Gate Open After Zero		2000		mSec
Time to Purge Incl Conv		7000		mSec
Water Holdback (%)		20		%
Minimum Water Holdback		20		Gal
Time to Close Gates at End		2000		mSec

SETTINGS FOR CHOKE FEEDING

Typical settings are shown below to choke feed the materials from the weigh-batchers. These parameters are found in the Discharge Parameters Screens. These may need to be re-defined to suit your particular plant and are given only for reference.

PARAMETER	SETTING	UNITS
Agg Slow Flow Rate	100	Lbs/sec
Agg Normal Flow Rate	150	Lbs/sec
Agg Fast Flow Rate	175	Lbs/sec
Agg Very Fast Flow Rate	200	Lbs/sec
Cem Slow Flow Rate	20	Lbs/sec
Cem Normal Flow Rate	30	Lbs/sec
Cem Fast Flow Rate	40	Lbs/sec
Cem Very Fast Flow Rate	50	Lbs/sec
Agg Variation in Flow	20	%
Cem Variation in Flow	20	%
Time to Switch Open and Close	100	mSec
Agg Full Open Pulse at Strt	1500	mSec
Agg Normal Close Pulse At Strt	250	mSec
Agg Open Pulse if Flow Low	50	mSec
Agg Close Pulse if Flow High	25	mSec
Pulse Number for Agg Vib	25	
Normal Cement Open Pulse Strt	700	mSec
Cmnt Close Pulse if Flow High	50	mSec
Cmnt Open Pulse if Flow Low	30	mSec
Critical Cement Flow	0	Lbs/sec
Cmnt Full Open P if Flow Crit	3000	mSec
Cmnt Close P if Flow Critical	100	mSec
Hold Agg Gates Open	0	
Hold Cem Gates Open	0	
Agg Full Open Weight	500	Lbs
Cement Full Open Weight	100	Lbs
Agg Vib on Weight	500	Lbs
Weight to Turn on Cem Vibrator	100	

PARAMETER SETTINGS FOR INCHING CONTROL

Inching control provides some distinct advantages by allowing trucks to be classified according to their ability to be loaded on the *Truck Discharge Schedule*. From the batch setup information, the computer identifies the truck being loaded and determines from the truck discharge schedule the correct flow rates to use.

SECTION 2 AUTO BATCHING

THEORY OF INCHING CONTROL

Initially, the computer energizes the discharge gate open for the *Open Pulse at Start* time to the full open position to establish initial flow. After the *Time to Switch Open & Close* has timed out, it will energize the gate close for the *Close Pulse at Start* time to close the gate to approximately the position for a *Slow Flow Rate*. The time, determined by the *Time Between Flow Calc's*, controls how often the computer will recalculate the flow using the *Flow Smoothing Factor* which provides averaging of the flow by factoring a portion of the previous calculation with the present reading. The computer uses the calculated flow rate to determine if the flow is within the allowable *Variation in Flow* percentage. Each time the computer sees a flow value outside the boundaries of the variation in flow allowance, the computer tallies these readings by adding one count when the flow is above the limit and subtracting one count when the flow is below the limit. At the completion of the *Time to Issue (Agg, Cem, Wat) Close or Open Pulse* in Discharge Parameters, the computer will determine if there is a positive or negative count.

If a positive count is present, it will pulse the valve closed *(Agg Normal Close Pulse if Flow High or Cement Close Pulse if Flow High).* If the count is negative, it will pulse the valve open *(Agg Open Pulse if Flow Low or Cement Open Pulse if Flow Low)* to correct the flow. On the aggregates, each open pulse is counted until the value set for the *Pulse Number for Agg Vibrator* is reached, which must occur within the time period specified by the *Time to Reset Agg Vib Count* (the *Pulse Number* count is reset after this time expires). When this occurs, the vibrator is turned on for the time period specified by *Agg Vib Pulse if Flow Low* to re-establish the flow. With cements, if the flow falls below the *Critical Cement Flow*, the computer adds a one to a counter. Each time the flow reading is sensed above this value a one is subtracted from the counter. At the end of the time period set by *Time to Issue Cem Crit Pulse*, if the net result of this counter is greater than zero, the *Full Open P if Flow Critical* and the *Close P if Flow Critical* will be given to the gate to establish the flow.

TUNING INCHING CONTROL

Most of the parameters required to tune the inching control will be found in Discharge Parameters with the following exceptions:

PARAMETER	SCREEN DISPLAY
Flow Smoothing Factor X 100	System Parameters
Time Between Flow Calc's (mSec)	System Parameters

The typical values given below **should be used with caution** since they will vary with gate sizes, opening times, cylinder strokes, air pressure, etc. However, they are sufficient as a starting point.

To start, select the I/O TEST Screen in the System Setup menu. With the scales empty, observe the values opposite the *Flow* shown at the top of the screen. These should remain fairly constant fluctuating one to five digits. If they are fluctuating more than this, adjust the *Flow Smoothing Factor*. Once this has been relatively stabilized, turn on the aggregate discharge conveyor. The *Flow* value should still be stable. If it is not, look for sources of vibration such as the scale cable pulleys mounted to the side of the conveyor. With the conveyor running, the values should not much vary more than when it is not running. It is best to start with manual batches, discharging at a rate suitable for a slow truck.

Typical values for *Flow* may range as follows:

Aggregates ..... 300 to 600
Cements ..... 75 to 150

This indicates that the average *Normal Flow Rate* for aggregates is 150 Lbs/sec with a *Variation in Flow* of 20%. Similarly, the average *Slow Flow Rate* for cement is 35 Lbs/sec with a *Variation in Flow* of 20%. The danger here is trying to set the variation in flow value too small thinking you will get more consistent flow. Actually, just the opposite occurs. The computer tries to maintain this tight tolerance by constantly adjusting the position of the gates since the calculated flow is non-linear due to vibration. It is best to stay in the 20% to 50% range for the variation factors.

During manual discharge, note the relative gate open position at these flow rates and try to place chalk marks on the skirt over the conveyor as a reference for the next step.

Use a stopwatch and the manual discharge switches to determine the time required to fully open the discharge gate. Ensure that the gates open and close freely without binding. This will become the starting value for the *Agg Full Open Pulse at Start*. With the gate full open, try to determine the time to close the gate to the marks which indicates an open position suitable for a slow flow rate. This value will become the *Agg Normal Close Pulse at Start*.

The times to open or close the gates if flow high or low are generally a very short duration, and are approximated through trial and error. Values below 20 milliseconds will have no affect. It is best to start with values of approximately 20 to 50.

The *Critical Cement Flow* determines when the material has bridged and stopped flowing. A typical value for this is 0. When the computer sees that the flow has dropped below this value, it will use the *Cmnt Full Open P if Flow Crit* and the *Cmnt Close P if Flow Crit* to simulate banging the gates. Typical values for these are 3000 and 100 respectively. **NOTE: The success of getting a smooth cement discharge is dependent on proper aeration of the weigh-batcher. The aeration should be on before the discharge sequence is started.**

The *Flow Smoothing Factor* in System Parameters is used to even out the peaks and valleys in calculating the flow rates. This smoothing is accomplished by averaging a percentage of the previous calculation with the present rate. Higher factors use more of the present reading when averaging. A typical value is 80 to 90, meaning we are using more of the present reading in our calculations.

The *Time Between Flow Calcs's* determines the frequency of calculating the flow rate. It is desirable to have this calculated once a second. Therefore, typical value ranges from 900 to 1000.

Once values have been established for the slow flow rates, the normal, fast, and very fast rates can be entered by adding typically 50 Lbs and 20 Lbs for agg and cement respectively to each value. It will not be necessary to alter the timing values since the computer will adjust them to compensate for the increased flows.

When you have established values which give the acceptable smooth flow rates, be sure to:

1. Copy the screen displays to the printer by pressing and holding the band a keys and pressing the ikey. Select "b" from the menu.

2. Backup Data Files to hard and floppy disk.

Over a period of time, you may need to slightly adjust the values due to mechanical changes.

SECTION 3 MIX DESIGNS

3.0 MIX DESIGNS

To enter Mix Designs, it is first necessary to have all ingredients available entered into the Spectrum. To do this from the MAIN MENU, go to the INGREDIENT TABLE. The following display will appear:

INGREDIENT TABLE Alkon Corporation Version 4.XX Nov 7 17:33:18

		MAJOR	BIN		CHEMICAL	BOTTLE	
Aggregates use	1.	SAND	1	19.	ADX 1	1	Admixes use
BINS 1 - 8	2.	AGG 2	2	20.	ADX 2	2	BOTTLES 1 - 18
	3.	AGG 3	3	21.	ADX 3	3	
	4.	AGG 4	4	22.	ADX 4	4	
	5.	AGG 5	5	23.	ADX 5	5	
	6.	AGG 6	6	24.	ADX 6	6	
	7.	_____	__	25.	_____ __		
	8.	_____	__	26.	_____	__	
Cements use	9.	CEMENT	9	27.	_____	__	
BINS 9 - 16	10.	FLYASH	10	28.	_____	__	
	11.	CEM 3	11	29.	_____	__	
	12.	_____	__	30.	_____	__	
	13.	_____	__	31.	_____	__	
	14.	_____	__	32.	_____	__	
	15.	_____	__	33.	_____	__	
	16.	_____	__	34.	_____	__	
Waters use	17.	WATER	17	35.	_____	__	
BINS 17 & 18	18.	HOT	18	36.	_____	__	

Run daily & to date reports before deleting an ingredient

Enter choice :

Before any ingredients are entered, a few Special Ingredient names must be understood (See Section 3.1). Notice that some sample ingredients have been entered. The numbers to the left of the names do not necessarily refer to actual bin numbers, they are just there to make the table easy to read and use.

SECTION 3 MIX DESIGNS

To enter an ingredient's parameters, enter the number to the left of it. If you chose a number from 1 - 18 (a Major Ingredient which includes aggregates, cements, and waters), the screen will look similar to this:

MAJOR INGREDIENT Alkon Corporation Version 4.4XX Sep 11 16:31:43

Ingredient Name	SAND		
Bin Number	1		
Over Tolerance %	2.0	Moisture % or Sub Factor	0.00
Under Tolerance %	2.0	Moisture Probe Scale Number	4
Abs Over Tol (Lbs,Kg,etc)	60	Auto Probe On-line (Y/N)	N
Abs Under Tol (Lbs,Kg,etc)	60	Maximum Moisture	10.00
Time to Start Flow (mSec)	0	Minimum Moisture	1.00
Minimum Flow (Lbs,Kg,etc)	0	Max Moisture Change per Batch	3.00
Normal/Total Preact(Freefall)	9999	MSec to Start Reading Probe	500
Small Weight (Lbs,Kg,etc)	3000	Don't Adjust for Neg Moisture	0
Fast Feed Cutoff (Lbs,Kg,etc)	1600	Material Mixer Number	0
Slow Feed Cutoff (Lbs,Kg,etc)	40	Alternate Scale Number	0
Max Number of Jogs	12	Last Actual Feed Rate per Sec	2000
Jog Weight (Lbs,Kg,etc)	60	Absolute Preact Scale Reading	22180
Jog Time (mSec)	100	Absolute Preact (Freefall)	18780
Feed Rate per Sec(Lbs,Kg,etc)	2000	Material Feed Control	0
Maximum Number of Super Jogs	1		

[F3] Remove Ingredient [F5] Other Parameters
Press [F10] to Start Flag Editor

To set up an ingredient, a list of parameters and their descriptions are in Section 3.2.

3.1 SPECIAL INGREDIENT NAMES

The Spectrum has the flexibility of allowing materials to be identified by their common names. Certain adjustments, such as water correction, make Special Ingredient Names necessary. The Spectrum uses these names to decide which ingredients to make these adjustments to. The following describes the use of each Special Ingredient name.

SLAGXXXXXX OR **FLYXXXXXXX**

When setting up a load for substitution of regular cement (above) with a percentage of slag cement or flyash, the first three characters of the flyash ingredient must be "FLY" and the first four slag cement ingredient must be "SLAG".

COLDXXXXXX, WATERXXXXX, OR AGUAXXXXXX

This allows the Spectrum to make the proper correction to the water for these moisture values. When setting up a load, the plant operator has the option to substitute hot water for the cold water on a Percentage basis. When the Spectrum is calculating how much hot water to add, it uses the ingredient with the first letters "COLD", "WATER" or "AGUA" to determine the total water in the load.

HOTXXXXXXX

If you wish to substitute cold water with hot, the hot water ingredient must have "HOT" at the beginning of the name. This will allow blending of hot and cold water to take place on a percentage basis.

AIRXXXXXXX

When setting up a load, the plant operator has the option of adjusting the slump and air effectiveness. The Spectrum doesn't know which material to adjust for effective-ness, unless it has the first three letters "AIR". Normally, the Spectrum makes an adjustment of one gallon per yard (configurable) for every inch of change from the design slump. When computing the water adjustment, the mix is scanned to see if an ingredient with the first three letters of "AIR" is present. If so, the adjustment for slump is changed to only one-half gallon per inch change (configurable) from the design slump. The calculations for **Air Effectiveness** are in the Calculations Section of this chapter. Refer to Section 7.3.

CALCXXXXXX

If it is desirable to enter calcium chloride in the mix as a percentage, then an ingredient with the first four letters "CALC" must be used in the Spectrum. This also identifies this material as a high-volume admixture and the water needs to be reduced by the amount of calcium solution in the load. When computing the target amount of calcium, the Spectrum uses the total of all the cementitious type materials. Some examples are: Cement, Port, and Flyash. The calcium ingredient must be entered with a zero dosage amount. The percentage to be dosed is entered in the Order Entry or Batch Setup screens next to %Calc. (See also Order Entry Section 1).

3.2 MAJOR INGREDIENT PARAMETERS

SECTION 3 MIX DESIGNS

INGREDIENT NAME

Materials may be called anything you wish. It may be necessary to use a Special Ingredient Name as discussed in the previous section, or materials can be described by their common name. This name is used to identify the material on the batch printout, inventory reports, and the Batching screen. This field also has special impact on the feeding of the aggregates. If two independent bins of the same material exist with the same name, the Spectrum will feed from both bins to speed up batching. (See also Bin Number below).

BIN NUMBER

Bin Number tells the Spectrum which group this material falls into. The Bin Number is used by the Spectrum to identify which gates to open. The following describes the bin number groups used for the entire system:

1 - 8	Aggregate feed gates
9 - 16	Cement feed gates
17 - 18	Water feed bins

USE OF BIN NUMBER ZERO

Occasionally, it may be necessary to replace one of the ingredients in the feed bins with another for a particular order. To prevent the loss of inventory information, and/or various parameters, the material being replaced may be given a bin number of zero. Another blank 'slot' in the ingredient table can be assigned the bin number previously used by the material now identified by the bin number of zero. Any mix which contains an ingredient with a bin assigned as zero will give the error message "MATERIAL NOT FOUND" if tried to load.

The use of bin number 0 is best described using an example.

Example:

PROBLEM: A mix calls for pea gravel to be fed out of bin 4. Bin 4 currently has rock in it.

SOLUTION: Empty Bin 4 of rock. Change rock's bin number to 0 (zero) and change pea gravel's bin number from 0 to 4. Fill Bin 4 with pea gravel. Run the batch.

OVER/UNDER TOLERANCE %

This parameter defines the maximum over or under tolerance that the Spectrum will accept without giving an error message. Note that this parameter works in conjunction with the "Abs Over/Under Tol" value described below. During a batch, the Spectrum will use either the "Over/Under Tol %" or the "Abs Over/Under Tol", whichever is greater, to decide whether a material is out of tolerance or not.

ABS OVER/UNDER TOL (Lbs, Kg, etc.)

This parameter sets up the maximum amount of tolerance that is allowed for this material when batching smaller loads. Typically, on a one or two yard load, the one or two percent tolerance allowed on a material doesn't give a reasonable amount of tolerance. Enter the maximum allowable weight in pounds, gallons, kilograms, etc. that this material can vary from the target before being deemed out of tolerance.

TIME TO START FLOW (mSec)

During the weigh-up process, if a bin runs empty, the Spectrum can be programmed to automatically go on to the next material without waiting for the rest of this material. This parameter tells the Spectrum how long to wait before checking to see if a bin is empty or no flow. A typical value is 2000 mSec, or two seconds. If the **Minimum Flow** value (defined next) is zero, this number has no affect.

MINIMUM FLOW

This value works in conjunction with the above number. If this value is greater than zero, the Spectrum will continuously monitor the flow of material out of the feed gate into the weigh scale. If the material flow should fall below this number for the above time, the gate will close and go on to the next material. The normal setting for this parameter is zero, which disables any material flow checking. It is suggested that all cements enable this feature.

NORMAL PREACT (Freefall)

This value represents how much material resides in the air after the gates are closed, or feed shut off, and is used to prevent overweighing. The **Normal Preact** is subtracted from the target weight to determine when to shut the feed off. This parameter is self-adjusting but can be locked with the Material Feed Control parameter (See below).

SMALL WEIGHT (Lbs, Kg, etc.)

When making a small load, the **Normal Preact** value, described above may not shut the gate early enough (due to erraticness of the plant), causing material to overweigh. This normally happens in a range of 1/4 to 1/3 scale capacity, depending on the size of the feed gates. Any time a load is made, the Spectrum checks to see if the weight of THIS material in THIS batch is less than the Small Weight value. If so, the Spectrum uses "Super Jogs" (explained next) to feed the material to target.

FAST FEED CUTOFF (Lbs, Kg, etc.)

This parameter is used only if two aggregate bins share the EXACT same INGREDIENT NAME with an independent bin number. The Spectrum will automatically open both feed gates simultaneously during weigh-up to decrease the weigh-up time for that material. When getting close to the target; however, it would be better to have only one gate open for better cutoff accuracy. This parameter will shut one gate down at the **Fast Feed Cutoff** and finish-up with the other bin. This parameter should be set in the higher bin number.

SLOW FEED CUTOFF (Lbs, Kg, etc.)

This parameter is used to compensate for erratic scale behavior. It is used in conjunction with the Normal Preact parameter described previously. The Spectrum will Fast Feed any target weight if above the **Small Weight**. It does this by opening the gate full until the scale reaches the target weight, minus the sum of the Normal Preact and the Slow Feed Cutoff. The Spectrum will then wait a few seconds before deciding if jogs are necessary. This is not a self-adjusting number.

MAXIMUM NUMBER OF JOGS

This parameter saves wear and tear on a plant. If a bin runs empty, it could jog forever without this parameter. Typical numbers range from 10 to 20 meaning, the Spectrum will jog this material 10 to 20 times, if necessary. This number should be set to zero for auger and pump feeds.

JOG WEIGHT (Lbs, Kg, etc.)

This parameter is entered in scale units per jog. It represents the amount of material the Spectrum tries to obtain in one jog. If this value is too big, it will limit the accuracy of the system. However, if it is too small, it will work the plant too much and be ineffective.

The material name turns Magenta (purple) on the Bar Graph screen while jogging.

JOG TIME (mSec)

This is the estimated amount of time the system takes to try and achieve the **Jog Weight** (above). This value is self-adjusting, but can be locked to a specific number by changing the **Jog Sensitivity** value in the System Parameters screen to zero.

FEED RATE PER SEC (Lbs, Kg, etc.)

The amount of material that feeds through a gate in one second. To obtain this parameter, feed a material for five seconds and divide the scale weight by five. It is best to do three trials and take the average. This time is used by the Spectrum to calculate the Super Jog time. A Super Jog works as shown in the example listed below.

MAX NUMBER OF SUPER JOGS

Super Jogs, another word for Timed Feed, are based on the Feed Rate/Sec and will determine the time needed to obtain the target amount based on:

Target/(Feed Rate/Sec) = Sec
Sec/Number of Super Jogs = Sec/Super Jog

Example:

Target=3000Lbs **Small Weight**=3500 **Super Jogs**=2 **FR/S**=500

3000Lbs/500 Lbs/S = 6 Sec
6 Sec/2 = 3 Sec

There will nominally be two, three second Super Jogs. Should the Spectrum over or under weigh on any one of the drops, a re-calculation is made and the new gate open times are used instead.

This method of weigh-up only occurs if the required amount is under the Small Weight value. After a main feed, the system will use Super Jogs to try and achieve target **before** it tries small jogs. The material name turns gray on the Bar Graph screen during a Super Jog.

SECTION 3 MIX DESIGNS

MATERIAL FLOW CHARACTERISTICS

There are three variables to take into consideration when trying to achieve a target weight: System Jitter, Preact (mounding) and Feed Rate.

System Jitter: This can be many things which are not very predictable (i.e.: Low air pressure, Sluggish gates).

Preact (mounding): As a scale fills, mounds are created and depending on the amount required, the mounds will be large or small. Smaller mounds for smaller loads and larger mounds for larger loads. Because of this, it only stands to reason that on smaller loads, there exists a greater void (air) between the gate and the scale. Conversely, on larger loads a smaller void exists.

By determining the smallest scale weight used by your plant and the void at that weight, and the largest weight used and void at that weight, all loads in between can be extrapolated to determine a more exact preact value.

Feed Rate: When a bin is full, material flows from the gate reaching a velocity (Lbs/Sec or Kg/Sec) and remains fairly constant. As the bin is emptied, the downward force on the material decreases causing the Feed Rate to vary. If we know the flow rate, we can determine how much material we should get for a specified amount of time. Using this concept we can correct for varying feed rates by calculating the amount we are supposed to get and comparing to what we actually got. If we do this calculation once a second, we can determine better cutoff accuracy.

SMALL WEIGHT SCALE VALUE

This represents the smallest weight your plant uses and will self adjust as smaller loads are used. The Spectrum uses this value as the low setpoint when determining cutoffs that deal with the mounding portion of the target weight.

SMALL WEIGHT CUTOFF

This represents the suspended weight after the gates close when the scale is sitting at the **Small Weight Scale Value**. The Spectrum uses this value in conjunction with the above parameter to act as a starting point for the real cutoff value.

LARGE WEIGHT SCALE VALUE

The Large Weight Scale Value represents the largest weight your plant uses and will self adjust as larger loads are used. Spectrum uses this value as the high setpoint when determining cutoffs that deal with the mounding portion of the target weight.

LARGE WEIGHT CUTOFF

The Large Weight Cutoff represents the suspended weight after the gates close when the scale is sitting at the **Large Weight Scale Value**. The Spectrum uses this value in conjunction with the above parameter to act as a stating point for the real cutoff value.

MOISTURE % OR SUB FACTOR

On aggregate-type materials, this parameter allows the entry of moisture for that material. On cementitious type materials, such as flyash or slag, it is possible to substitute these materials as a percentage of the normal cement. Normally, the flyash or slag replacement is not done on a one-for-one basis, slightly higher amounts of flyash or slag are necessary. The SUB FACTOR becomes the compensation percentage.

Example:

The mix design contains this ingredient:

Ingredient	Amount
PORTLAND	500 (Lbs)

The setup of the batch includes a 20% replacement of flyash for the cement. A one yard load would first be calculated to contain:

Ingredient	Amount	
PORTLAND	400 (Lbs)	(500 * 80 % = 400)
FLYASH	100 (Lbs)	(500 * 20 % = 100)

The FLYASH ingredient is then multiplied by the **Sub Factor** to give the correct amount to substitute for the Portland cement. If the **Sub Factor** is 1.10, then the one yard weights would be:

Ingredient	Amount	
PORTLAND	400 (Lbs)	
FLYASH	100 (Lbs)	(100 * 1.10 = 110)

NOTE: The Sub Factor is a universal setting, meaning it will affect all loads. For a load by load affect, use the values in the Auto Batch Setup Screen. Refer

to Section 2.2.

MOISTURE PROBE SCALE NUMBER

This is the scale number where an automatic moisture probe is read from the Manual Station. Scale numbers are obtained from the System Setup/Modify Scale Calibration screen and are the numbers in blue. Multiple probes may be used (one per ingredient).

AUTO PROBE ON LINE

"Y" means to average the probe readings for this material when doing moisture compensation calculations. "N" means use the value in the **Moisture%/Sub Factor** parameter.

MAXIMUM MOISTURE

This value prevents the Spectrum from accepting an average moisture greater than the maximum. If exceeded, a "Moisture Out Of Tolerance" error occurs and the system uses the last valid average taken instead of the invalid value.

MINIMUM MOISTURE

This value prevents the Spectrum from accepting an average moisture less than the minimum. If moisture is less than this value, a "Moisture Out Of Tolerance" error occurs and the system uses the last valid average taken instead of the invalid value.

MAXIMUM MOISTURE CHANGE PER BATCH

This value provides a window of acceptable values the Spectrum will use when averaging. If an average goes beyond the window, the last valid average is used instead.

When the system feeds a material that is to be moisture compensated, a *gracious* target is calculated first. The target used is one that reflects worst case moisture (i.e.: **Maximum Moisture**). The probe then averages data during the feed cycle and recalculates a new target based on the real moisture average.

The **Maximum Moisture Change per Batch** can be used to lessen this jump in targeting by setting it to a fairly low value (i.e.: 2%). Now when the first target is calculated, the value used will be, the last valid average plus 2%. This will decrease the

jump in targets when the new average has been found.

mSec TO START READING PROBE

The probe averages data during the entire feed cycle of a material that is to be moisture compensated. A minimum of 2 seconds worth of valid data must be present to generate a new average. When the gate first opens, *stale* material may sit and the bottom of the bin. By putting a value in this parameter (i.e.: 500 mSec) the stale material may be disregarded. This will also allow for a good flow to be established before averaging begins.

DON'T ADJUST FOR NEGATIVE MOISTURE

"1" tells the system not to adjust the target of this material if negative moisture is read. "0" says to adjust the target, thereby subtracting material from the target.

MATERIAL MIXER NUMBER

Used only on plants that are using the Spectrum's **Select Material by Mixer Number** feature. If the aforementioned feature is enabled, this parameter selects which mixer, holding hopper, or dry lane this particular material will be discharged into.

ALTERNATE SCALE NUMBER

This represents the number for a second scale that may be used, in the case of separate cement and flyash scales. Using a separate scale allows the Spectrum to simultaneously batch this material with the normal Aggregate and Cement scales.

ABSOLUTE PREACT (Freefall)

This is the *untouched* Preact value from the last batch. (i.e.: the raw value of suspended weight from the last batch).

ABSOLUTE PREACT SCALE READING

The reading the scale was at when the **Absolute Preact**(above) was taken.

LAST ACTUAL FEED RATE PER SEC

During the fast feed cycle, material reaches a fairly consistent flow. Once this flow is established, the Spectrum finds the Feed Rate per Second and stores the value here.

MATERIAL FEED CONTROL

This is known as a bit-wise multi-purpose parameter and its value is governed by the pop-up described below [the sum of all parameters highlighted (ON)].

Parameter	Parameter Meaning
(1)	**Lock Preact Adjustment** - Does not adjust the *Normal Preact* after a feed cycle.
(2)	**Use Last Feed Rate for Super Jog After Main Feed** - Uses the *Last Actual Feed Rate/Sec* instead of *Feed Rate/Sec* for Super Jog calculations after main feed.
(4)	**Store Last Feed Rate as Feed Rate Per Sec** - Sets *Feed Rate/Sec* equal to *Last Actual Feed Rate/Sec.*
(8)	**Set Number of Super Jogs to (1) After Main Feed** - After main feed, only one Super Jog will be used to obtain target regardless of *Max Number of Super Jogs*.
(16)	**Set Number of Super Jogs to (2) After Main Feed** - After main feed, only two Super Jogs will be used to obtain target regardless of *Max Number of Super Jogs*.
(32)	**Use Scale Settle Time for Super Jog Settle Time** - After each Super Jog a settle time must occur. Either use *Jog Settle Time* (default) or *Scale Settle Time*.
(64)	**Record this Material's Batching Results to File** - Creates a file with batching results for this material. (/rgb/cust/*_results.raw where * = agg or cem)
(128)	**Adjust Large/Small Weight Scale Value and Cutoff -** Creates mounding parameters (above) to be used for large and small load size differences.
(512)	**Enable Adjustment to Preact Based on Actual FR/S** - Allows constant correction of the cutoff for varying feed rates. (Especially helpful with cements).

More parameters are kept in a pop-up window and can be entered by pressing the p key from this screen. They include the following:

INVENTORY/ON-HAND UNITS

This refers to the units that the On-Hand will display in in the Inventory screen (i.e.: TN, LB, YD, KG, etc).

Typical values for Aggregate: LB or KG
Typical values for Cement: LB or KG
Typical values for Admix: OZ or ML

INCOMING/PURCHASE UNITS

This refers to the units that this material is purchased in (i.e.: TN, LB, KG, etc).

Typical values for Aggregate: LB or KG
Typical values for Cement: LB or KG
Typical values for Admix: OZ or ML

U.S. BATCHING UNITS

This refers to the units that this material will use when batching U.S. measure. In the case of Switchable US/Metric(optional) these units will be used to convert between the two systems. These units must be the smallest possible unit for that material. (i.e.: LB **not** TN, OZ **not** BL(barrel).

METRIC BATCHING UNITS

This refers to the units that this material will use when batching in Metric. In the case of Switchable US/Metric(optional) these units will be used to convert between the two systems. These units must be the smallest possible unit for that material. [i.e.: KG **not** TE(metric Ton), CL(centiliter)].

CAL(ibrated) UNIT COST per 1000

When printing either Inventory Daily or To-Date reports, the entry in this field allows the Spectrum to calculate the raw material costs of each ingredient. Each mix design will also calculate raw material costs for that mix based on the cumulative total of all ingredients in that mix. By leaving the UNIT COST at zero, the reports will print the material cost as zero. This cost must be entered in material cost per thousand scale units.

DISPLAY ON-HAND (Y/N)

"Y" allows On-Hand to display running total
"N" will display zero (0) for On-Hand. This is handy for ingredients such as water so as to avoid very large negative amounts.

ON HAND LOW ORDER LEVEL

By changing the color of this ingredient from green to red in the Batch Setup, Bar Graph, and Inventory screens, the Spectrum can alert you that the On-Hand Inventory level has dropped below this level and is time to re-order.

BATCHING: ON-HAND CONVERSION

If a volume conversion between Batching and On-Hand units is required (i.e.: LB $\rightarrow$ YD), the conversion factor **must** be typed in. This conversion can be acquired from your supplier and is often referred to as bulk density.

PURCHASE: ON-HAND CONVERSION

If a volume conversion between Purchase and On-Hand units is required (i.e.: YD $\rightarrow$ TN), the conversion factor **must** be typed in. This conversion can be acquired from your supplier and is often referred to as bulk density.

3.3 CHEMICAL INGREDIENT PARAMETERS

This screen shows all the parameters associated with a chemical (admix) ingredient. All of the admixes have the same number of parameters. Even though the names and values are probably different, follow the same structure as shown. The following information describes each item that may differ from the previous parameters listed already in the section above on Major Ingredients.

CHEMICAL INGREDIENT Alkon Corporation Version 4.4xx Sep 11 16:36:32

Ingredient Name	REDISET
Bottle Number	3
Over Tolerance %	0.5
Under Tolerance %	0.5
Absolute Over Tolerance	6.0
Absolute Under Tolerance	6.0
Time to Start Flow (mSec)	8000
Minimum Flow	1
Preact	5
Basis/Feed/Discharge Type	0
Water Correction Factor	0
Slow Feed Cutoff	0
Max Number Of Jogs	0
Jog Time	2
Material Feed Control	0

[F3] Remove Ingredient [F5] Other Parameters
Press [F10] to Start Flag Editor

BOTTLE NUMBER

The Bottle Number tells the Spectrum which feeds, discharges, meter outputs and inputs to use to control this bottle. Refer to Section X on I/O ASSIGNMENTS for more information. (Bottle numbers range from 1 - 18).

SECTION 3 MIX DESIGNS

BASIS/FEED/DISCHARGE/TYPE

This is known as a Bit-wise multi-purpose parameter and its value is governed by the sum of all highlighted conditions.

0	=	Calculate Admix per 100 Weight of Cement
1	=	Calculate Admix per Yard or Meter
2	=	Delay Admix Feed Until Discharge Start (typically no bottle)
4	=	Start Delayed Feed or Discharge Admix with Wash Down Water
8	=	Skip Zero Check after Feed of this Admix (typical no bottle)
16	=	Discharge Admix Immediately after Batching Complete (bottles)
32	=	Discharge or Start Admix Immediately with Release of Water
64	=	Discharge or Start Admix Immediately with Discharge Okayed
512	=	Use this Material as a Cement in Water/Cement Calculation.

The Spectrum has the capability to calculate the admix dosages two ways. One method assumes the mix design contains the desired admix amount needed *per hundred weight* of cementitious materials. Please note that this method uses ALL the cementitious materials when making the calculation. See example below:

Example: Basis/Feed/Discharge Type = 0 or other even number

The mix design contains the following quantities:

Cement	420 (Lbs)
Flyash	60 (Lbs)
Air	0.94 (Oz)

The load size is 8.00 yards.

The total weight of cementitious type materials in this mix is 480 pounds. The admix target would be:

Total cementitious weight = 480(Lbs) / 100(Lbs) = 4.80

Admix target = 4.80 * 0.94(Oz) = 4.51 ounces per yard

4.51 ounces per yard
x 8.00 yards

36.00 ounces for this load

The second method assumes that the mix design contains the amount of admix desired per yard. The Spectrum simply multiplies the amount in the mix by the batch size to get the target.

Example: Basis/Feed/Discharge Type = 1 or other odd number

The mix design contains the following quantities:

Cement	420 (Lbs)
Flyash	60 (Lbs)
Air	4.25 (Ozs)

The mix design calls for 4.25 ounces of air entrainment per yard. The load size is 8 yards, so the required amount is:

4.25 ounces per yard
x 8.00 yards

34.00 ounces for this load

WATER CORRECTION FACTOR

The Water Correction Factor is the amount of water subtracted, for this material, from the total water target during a batch. Used for high volume admixes with large water contents and should be entered in ounces or milliliters. This value represents how many parts of the **Small To Large** value exist for this admix as determined by the batching units.

Enter the number below for a U.S. Plant with this admix batching in:

Ounces	→	1
Pints	→	16
Quarts	→	32
Gallons	→	128

Enter the number below for a Metric Plant with this admix batching in:

Milliliters	→	1
Centiliters	→	10
Deciliters	→	100
Liters	→	1000

More parameters are kept in a pop-up window and can be entered by pressing the p key from this screen. They include the following (with respect to those which are different from Major Ingredients):

U.S. DECIMAL PLACES

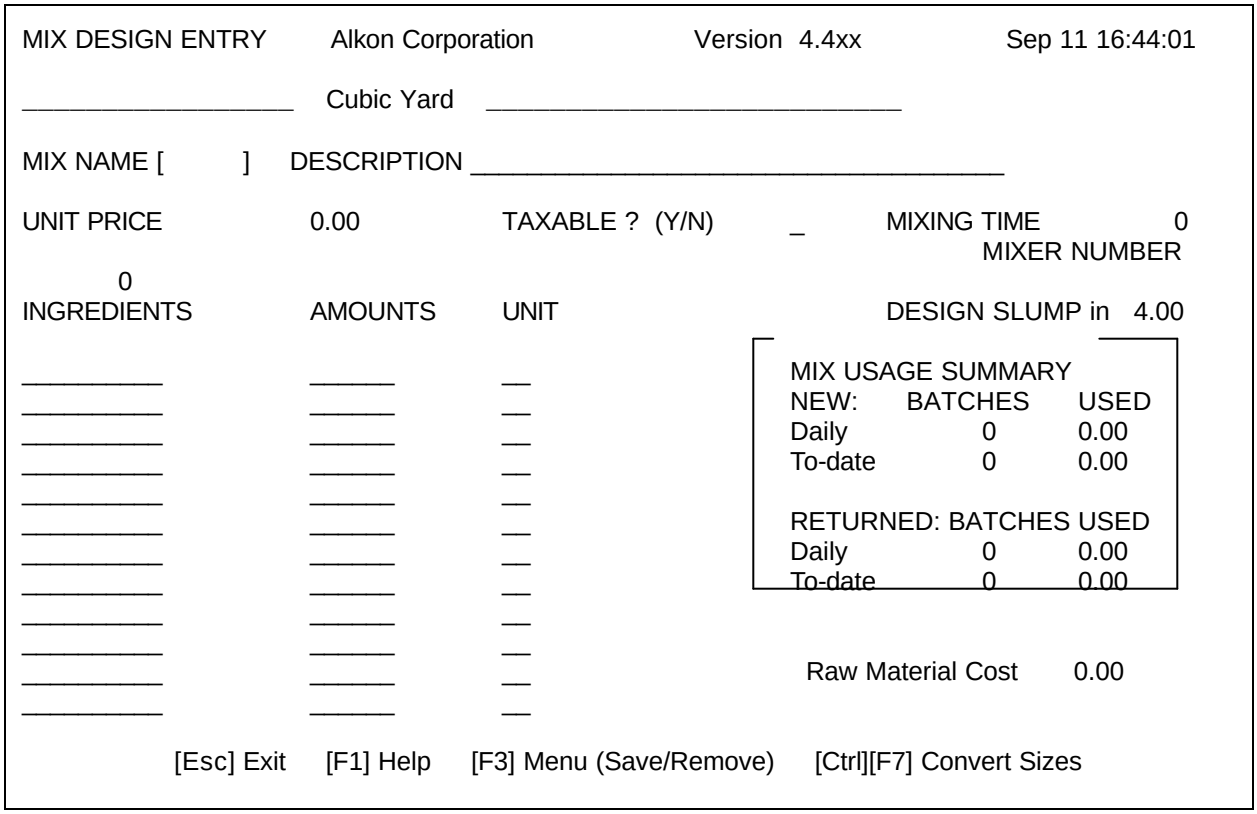
The amount of precision this admix can have when entered in a Mix Design. (i.e.: To enter 4.25 OZ in a mix, this value must be 2) Used for U.S. Calibration or for a U.S. Mix (Switchable US/Metric).

METRIC DECIMAL PLACES

The amount of precision this admix can have when entered in a Mix Design. (i.e.: To enter 2.5 ML in a mix, this value must be 1) Used for Metric Calibration or for a Metric Mix (Switchable US/Metric).

3.4 MIX DESIGN ENTRY

When selecting Mix Designs from the Main Menu will show the following screen:



MIX NAME

Can be up to 10 characters in length, with any combination of numbers and letters. When browsing Mix Designs this is the name that the browse will search against; therefore it should be a short but descriptive name that can be easily recognized.

UNIT PRICE

The selling price for one cubic unit (yard or meter) of this mix design. This price is the standard unit price, which may be printed on the ticket, but may also be adjusted in the Order Entry screen for special pricing. If the Order Entry feature is not available on your system, this field will not appear.

DESCRIPTION

A 30 character description of this mix, which can be printed on the delivery ticket and is intended to be more detailed than the Mix Name.

TAXABLE

"Y" allows this Mix to be taxed on a delivery ticket.
"N" will make this Mix tax exempt.
This field will not appear if Order Entry is not present.

MIXING TIME

Appears for central mix plants and can be entered for mixes that have different mixing times than that of the default value set in the System Setup screens.

MIXER NUMBER

Used for central mix plants with more than one mixer and *forces* this mix into a particular mixer. Mixer preference can be changed prior to charging using the skey.

DESIGN SLUMP

The slump at which this mix has been designed. Changes to this field in the Pre-Batch and/or Order Entry (optional) screens, will affect the total water batched for that load.

RAW MATERIAL COST (display only)

A direct sum of cumulative costs for all ingredients in the mix. Ingredient costs for each material are stored in the Ingredient Table and are cost per 1000 scale units.

INGREDIENTS and **AMOUNTS**

Each ingredient of a mix is entered here. The order in which the agg and cement materials are listed defines which material will weigh first. Ingredients from different classes (i.e.: Agg, Cement, Water, Admix) are weighed simul-taneously. Refer to Section 3.1 for information on Special Ingredient Names.

When entering a mix, always design the mix using one cubic unit (yard or meter), **S**aturated **S**urface **D**ry (SSD) weights. To fully use the features of the Spectrum, do not include moisture compensated weights in the mix. Sand moisture and other compensations are performed at batch time.

Sometimes it may be desirable to substitute one type of material for another without designing a different mix. To do so, enter that material in the mix with a zero AMOUNT. Prior to batching, a weight may be entered in place of the zero, and the substituted materials weight zeroed out. Doing this substitution creates a one-time change to this mix for this batch. Substitution can also take place for singular ingredients as in the case of Calcium.

ENTERING THE INGREDIENTS AND THE AMOUNTS

The next step involves the entering of ingredient names and amounts. The ingredients are broken down into two types: major and chemical. Major ingredients consist of all aggregate, cement and water materials. The chemical ingredients are reserved for all admixtures. Refer to Section 3.2 for a complete description of ingredient names.

To enter an ingredient, type in the full ingredient name exactly as it appears in the ingredient table, then press the ekey. The Spectrum will search the ingredient table and verify that the name exists. If the typed name does not match any ingredient name in the table, a "Warning: unknown material" message will appear. If this appears, press the m key to invoke the browse function and choose an ingredient from the list. There may be occasions when you don't care about this message. In those cases, just continue entering data without regards to the warning.

After choosing the ingredient name, enter the amount desired. Continue until all ingredients have been entered. The total number of materials (ingredients) in a load cannot exceed twelve (12).

Aggregates:	A total of six aggregates can be batched per load from a choice of eight bins.
Cements:	A total of three cements can be batched per load from a choice of eight bins.
Water:	A total of two waters can be batched per load from a choice of two bins.
Admixtures:	A total of eight admixtures can be batched per load from a choice of eighteen bottles.

The USAGE SUMMARY window displays the amount of this particular mix used. By pressing the ukey, the **Number of Batches** and **Amount Used** fields can be edited.

When the mix is complete, press the n key and choose "save" to keep a record of the mix on the disk.

There are many other **Quick Keys** that can be used to maneuver your way around this screen. They are as follows:

[F1] - Used to invoke a help screen to tell more about this screen.

[F2] - Invokes a browse box for Mix Designs and Ingredients.

[F3] - Invokes a menu box with Save and Remove options.
The Save option will save the current mix to the disk.
The Remove option will delete the current mix from the disk.

[F5] - Allows for deletion of individual ingredients when the cursor is on an ingredient field.

[F7] - Toggles the mix flag from U.S. to Metric and vice versa when creating a new mix. The mix begins with the flag set to the default value in System Setup/Plant Configuration/Mix Default.

[F9] - Clears the current screen for creation of new mixes.

[Ctrl] [F7] - (Used by holding the b key down and pressing the rkey)
This will convert a mix from U.S. to Metric and convert all of the weights accordingly. This is a true volumetric conversion meaning it will take one cubic yard and change it to one cubic meter and vice versa. There are two calculations that take place when this occurs. They can be explained best by the example.

3.5 EXAMPLE CALCULATIONS

The values used for **Calcium Solution Concentration, Calcium Solution Weight** and **Air Effectiveness** may be changed in the Plant Configuration Screen. To obtain these values for your application see your admix company.

Sample Calculations:

WATER BATCH WEIGHT = 216 Lbs
CALCIUM SOLUTION CONCENTRATION = 35%
DOSAGE RATE = 2%
TOTAL CEMENTITIOUS WEIGHT = 400 Lbs
CALCIUM SOLUTION WEIGHT = 10.8 Lbs/Gallon

$$\text{WEIGHT} = \frac{\text{DOSAGE X CEMENTITIOUS WT}}{\text{SOLUTION CONCENTRATION}}$$

$$= \frac{2\% \times 400 \text{ Lbs}}{35\%} = 22.85 \text{ Lbs}$$

$$\text{WT OF WATER IN SOLN} = \frac{(100 - 35\%)}{100} \times 22.85 \text{ Lbs} = 14.85 \text{ Lbs}$$

WATER REDUCTION = 216 Lbs- 14.85 Lbs= 201.15 Lbs

ON METERED WATER PLANTS

Sample Calculation:

WATER VOLUME FOR BATCH = 27 Gallons
CALCIUM SOLUTION CONCENTRATION = 35%
DOSAGE RATE = 2%
TOTAL CEMENTITIOUS WEIGHT = 400 Lbs
CALCIUM SOLUTION WEIGHT = 11.3 Lbs/Gallon

$$\text{WEIGHT} = \frac{\text{DOSAGE X CEMENTITIOUS WT}}{\text{SOLUTION CONCENTRATION}}$$

$$= \frac{2\% \text{ X } 400 \text{ Lbs}}{35\%} = 22.85 \text{ Lbs}$$

$$\text{VOLUME} = \frac{\text{DOSAGE X CEMENTITIOUS WT}}{\text{SOLUTION CONCENTRATION}} \text{ X } \frac{1}{\text{CALC SOLN WT}}$$

$$= \frac{.02 \text{ X } 400}{.35} \text{ X } \frac{1}{11.3} = 2.0 \text{ GALS}$$

$$\text{WATER IN SOLUTION} = \frac{(100 - 35\%)}{100} \text{ X WEIGHT}$$

$$= \frac{(100 - 35\%)}{100} \text{ X } 22.85 \text{ Lbs} = 14.8$$

$$\text{VOL OF WATER IN SOLN} = \frac{\text{WT OF WATER IN SOLN}}{\text{WT OF WATER PER VOL}}$$

$$= \frac{14.8}{8.345} = 1.77 \text{ Gallons}$$

ADJUSTED WATER TARGET = WAT VOL FOR BATCH - WAT IN SOLN

= 27 GALS - 1.77 GALS = 25.20 GALS

HOW CALCIUM IS CALCULATED

Example:

CALCIUM CONCENTRATION = 35%
DOSAGE RATE = 2%
BATCH SIZE = 4 YARDS
TOTAL CEMENTITIOUS WEIGHT/YARD = 400 Lbs
WEIGHT OF CALCIUM SOLUTION = 11.3 Lbs/Gal

REQUIRED WEIGHT OF SOLUTION

$$= \frac{2\% \text{ X } (4 \text{ X } 400)}{35\%} = 91.43 \text{ Lbs}$$

REQUIRED VOLUME OF SOLUTION

$$= \frac{91.43 \text{ Lbs}}{11.3 \text{ Lbs/Gal}} = 8.09 \text{ Gallons}$$

REQUIRED VOLUME IN U.S. OUNCES

= 8.47 X 128 = 1084 OUNCES

AIR ENTRAINING AGENTS

Example:

TOTAL CEMENTITIOUS WEIGHT = 1593

AIR DOSAGE = 2 OZ/100 Lbs

AIR VOLUME = .02 X 1593 = 31.86 OUNCES

EFFECTIVENESS FACTOR = .80

COMPENSATED AIR VOLUME = 31.86 X 1.25 = 39.83 OUNCES

SECTION 3 MIX DESIGNS

HOW MIX CONVERSIONS ARE DONE:

Example Calculation:

2500 LB of Stone per Cubic Yard = 866.98 KG of Stone per Cubic Meter

$$\frac{2500\frac{LB}{YD}}{2.2046\frac{LB}{KG}} = 2500*0.4535970244(\frac{LB}{YD}*\frac{KG}{LB}) = 1133.992561\frac{KG}{YD}$$

$$\frac{1133.992561\frac{KG}{YD}}{1.30798M\frac{3}{YD}} = 1133.992561*0.7645376841(\frac{KG}{YD}*\frac{YD}{M}3) = 866.9800463\frac{KG}{M}3$$

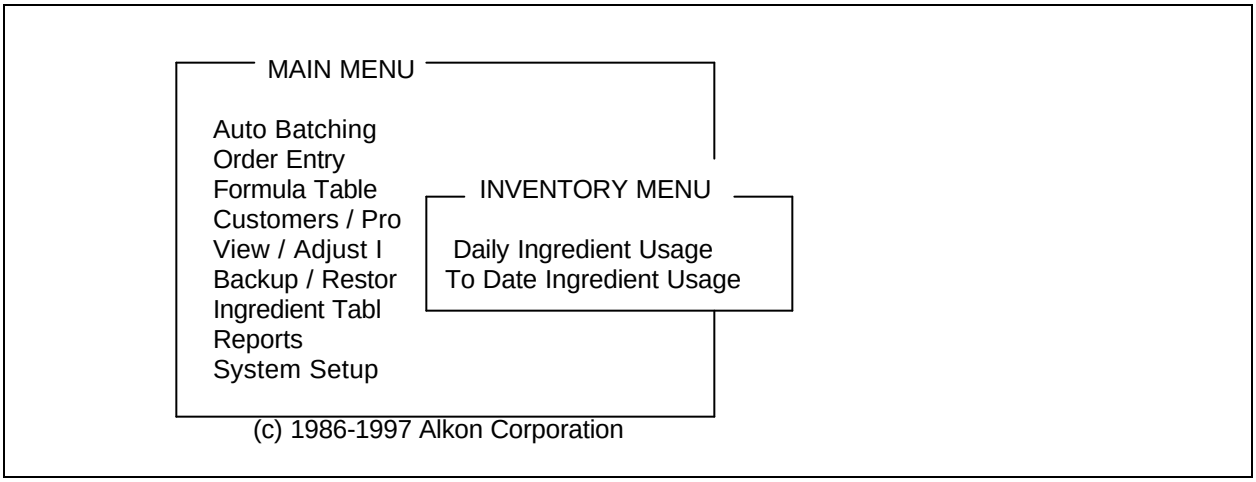
The conversion factors used above can be found on the next page.

3.6 CONVERSION FACTORS

Weight Unit	Abbrev.	Conversion (units/KG)
Ton (2000 Lb)	TN	0.0011023
Sack (94 Lb)	SK	0.023453
Pound	LB	2.2046
Ounce (advp)(weight)	WO	35.27397
Tonnes (Metric Ton)	TE	0.001
Kilogram	KG	1.0
Gram	GM	1000.0
Volume Unit	**Abbrev.**	**Conversion (units/LT)**
Cubic Yard	YD	0.00130798
Cubic Feet	FT	0.0353154
Barrels (5 Sack)(weight)	BL	0.00469038
Gallon	GL	0.264178
Imp. Gallon (Metric Gal)	IG	0.2199736
Quart	QT	1.05671
Pint	PT	2.11342
Ounce (fluid)	OZ	33.8147
Cubic Meters	M3	0.001
Liter	LT	1.0
Deciliter	DL	10.0
Centiliter	CL	100.0
Milliliter	ML	1000.0

SECTION 4
INVENTORY

4.0 VIEW / ADJUST INVENTORY



This section covers the batching inventory recorded both manually and automatically. Two choices are available from this screen. They are as follows:

DAILY INGREDIENT USAGE

This option is used for generating totals for DAILY USAGE of materials at a plant. The totals can be adjusted to reflect loads received (i.e.: incoming inventory), batched, or sold (i.e.: dump truck loads). At the end of each day they should be cleared, and the daily report printed, to start fresh the next day.

TO DATE INGREDIENT USAGE

This option is used for maintaining the total usage of materials in a plant. Typically, this is the monthly or yearly accumulation.

SECTION 4
INVENTORY

4.1 DAILY USAGE

DAILY USAGE Alkon Corporation Version 4.4xx Sep 15 9:37:58

LAST CLEARED SEP 14, 1995 13:45:49 U.S. = 50.00 Y (Y+M) = 85.32 Y
Metric = 27.00 M (M+Y) = 65.23 M

INGREDIENT	BIN	ON HAND	
57 LS	1	0.00	TN
57	4	0.00	TE
57 MRG	2	0.00	TN
8 MRG	6	0.00	TN
SAND	3	0.00	TN
57 LST	5	0.00	TN
57 LS	5	0.00	TN
PORTLAND	9	0.	LB
SLAG	10	0.	LB
CEM3	11	0.00	TN
FLYASH	12	0.00	TN
COLD	17	0.	KG
HOT	18	0.	KG

[F1]-Help [F3]-Incoming Inventory [F7]-Print & Clear [PgDn/Up]-Next Page

This screen displays the On-Hand for all major materials in the ingredient table. The admixes' On-Hand is accessed by pressing the d key. The top right shows the total yardage batched since last being cleared. The display shows: Total yardage of U.S. mixes, Total shipped of Metric mixes, Combined total in Yards and Combined total in Meters. (Switchable US/Metric only). If Switchable US/Metric is not enabled, one total will be displayed for the active system of measure (i.e.: Total Yards **or** Total Meters, not both).

SECTION 4
INVENTORY

By pressing the } key from either screen, the usage totals for the day are displayed for Major and Chemical ingredients respectively.

DAILY USAGE Alkon Corporation Version 4.4xx Sep 15 9:38:09

LAST CLEARED SEP 14, 1995 13:45:49 U.S. = 50.00 Y (Y+M) = 85.32 Y
Metric = 27.00 M (M+Y) = 65.23 M

INGREDIENT	BIN	MANUAL	REQUIRED	BATCHED	VARIANCE	% TOL
57 LS	1	0.	0.	0. LB	0.	0.0
57	4	0.	0.	0. LB	0.	0.0
57 MRG	2	0.	0.	0. LB	0.	0.0
8 MRG	6	0.	0.	0. LB	0.	0.0
SAND	3	0.	0.	0. LB	0.	0.0
57 LST	5	0.	0.	0. LB	0.	0.0
57 LS	5	0.	0.	0. LB	0.	0.0
PORTLAND	9	0.	0.	0. LB	0.	0.0
SLAG	10	0.	0.	0. LB	0.	0.0
CEM3	11	0.	0.	0. LB	0.	0.0
FLYASH	12	0.	0.	0. LB	0.	0.0
COLD	17	0.	0.	0. LB	0.	0.0
HOT	18	0.	0.	0. LB	0.	0.0

[F1]-Help [F2]-Revise Usage F7]-Print & Clear [PgDn/Up]-Next Page

All usage columns reflect what has been run out of the plant since last being cleared. The top of the table shows the date the table was last cleared. The **Manual** column shows all materials that have manually run through the plant, provided your system is configured with the **M**anual **M**aterial **M**onitor feature. **Required** shows the accumulated amount of material called for by the Spectrum during batching. **Batched** shows how much was actually put into the scale via the Spectrum. **Variance** is the difference between the **Required** and **Batched** showing how much more or less was batched. The **% Tol** shows the variance as a percentage.

To clear the daily usage of material simply press the r key and the following screen will appear:

DAILY USAGE Alkon Corporation Version 4.4xx Sep 15 9:40:40

LAST CLEARED SEP 14, 1995 13:45:49 U.S. = 50.00 Y (Y+M) = 85.32 Y
Metric = 27.00 M (M+Y) = 65.23 M

INGREDIENT	BIN	ON HAND	
57 LS	1	0.00	TN
57	4	0.00	TE
57 MRG	2	0.00	TN
8 MRG	6	0.00	TN
SAND	3	0.00	TN
57 LST	5	0.00	TN
57 LS	5	0.00	TN
PORTLAND	9	0.	LB
SLAG	10	0.	LB
CEM3	11	0.00	TN
FLYASH	12	0.00	TN
COLD	17	0.	KG
HOT	18	0.	KG

Clearing the Daily Inventory requires a report to print!

Do you wish to print the report (Y/N) ?

If you answer "N" to this question nothing will happen. If you answer "Y", a second message will appear giving you the option of either Parallel Printer or Hard Disk.

The hard disk option will store the usage to the hard disk under "/rgb/cust/daily.rpt" and clear the totals in each column, with the exception of the **On-Hand**. This is recommended for people with no printer or a specific reason to do so (i.e.: Inventory to DOS).

The parallel printer option will prompt another message asking if the printer is ready. This will allow time to back out the tickets (if used) from the tractor feed of the printer and feed plain paper for the report to print on (consult an Alkon Service Engineer for more on the Okidata 320 Printer Park feature). When this is done select "Y" to print the report and clear the totals. All totals will be cleared with exception of the "On-Hand" amounts. After the report prints another message will appear to allow the clearing of All On-Hand amounts.

SECTION 4
INVENTORY

To revise the usage of a material, press the m key and the following screen will appear:

DAILY USAGE Alkon Corporation Version 4.4xx Sep 15 9:39:22

LAST CLEARED SEP 14, 1995 13:45:49 U.S. = 50.00 Y (Y+M) = 85.32 Y
Metric = 27.00 M (M+Y) = 65.23 M

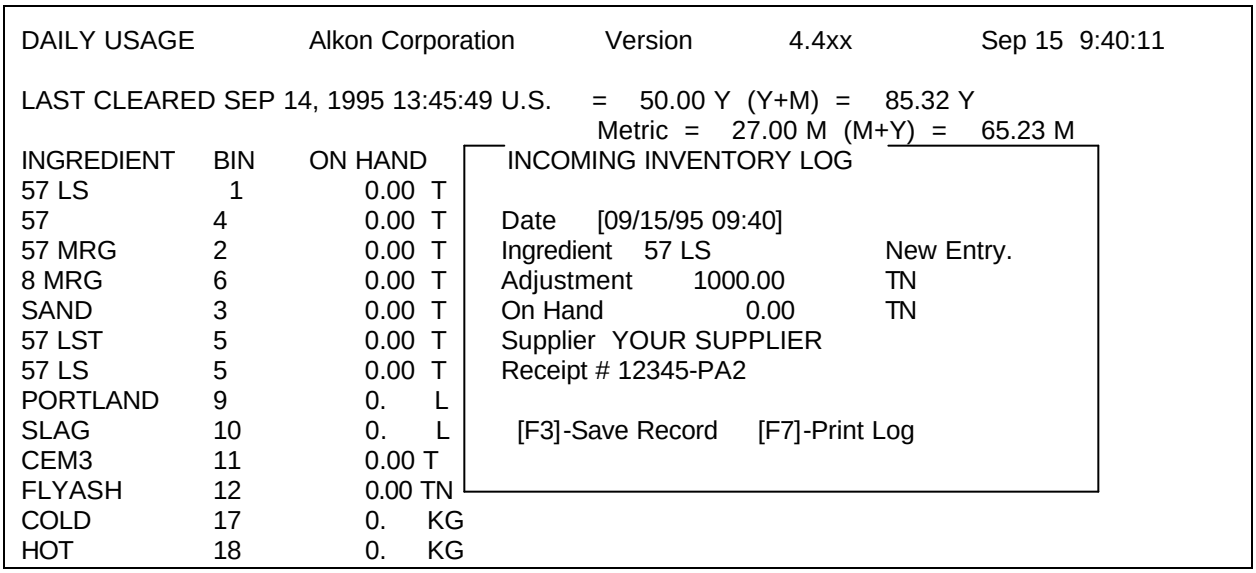
INGREDIENT	BIN	MANUAL	REQUIRED	BATCHED	VARIANCE	% TOL
57 LS ->	1	0.	0.	0.	0.	0.0
57	4	0.	0.		0. LB	0. 0.0
57 MRG	2	0.	0.		0. LB	0. 0.0
8 MRG	6	0.	0.	0. LB	0.	0.0
SAND	3	0.	0.	0. LB	0.	0.0
57 LST	5	0.	0.		0. LB	0. 0.0
57 LS	5	0.	0.	0. LB	0.	0.0
PORTLAND	9	0.	0.	0. LB	0.	0.0
SLAG	10	0.	0.	0. LB	0.	0.0
CEM3	11	0.	0.	0. LB	0.	0.0
FLYASH	12	0.	0.	0. LB	0.	0.0
COLD	17	0.	0.	0. LB	0.	0.0
HOT	18	0.	0.	0. LB	0.	0.0

INGREDIENT 57 LS INCREMENT TO REQD 0 INCREMENT TO BATD:_____

Revising usage means adding material to the **Required** or the **Batched** columns of the screen. To revise usage of a single material, first enter the name of the material exactly as it appears in the table and press the ekey or use the browse function key m. If you are changing the amount required, enter that number now in scale units, otherwise press the e key to change amount Batched.

SECTION 4
INVENTORY

To update a material's On-Hand amounts, press the n key and the following screen will appear:



Updating a material means changing the amount in the **On-Hand** column. This is done to reflect incoming deliveries and other sales of materials not carried out by the Spectrum.

With the cursor on the Date field, press the e key to move to the Ingredient field. (The date will automatically default to the current date and time). Type the name of the material or use the browse function key m to start this change. The cursor will then move to the Adjustment field where you enter the amount of received material. To decrease the On-Hand amount, use a (-) minus sign in front of the number. The next two lines are for recordation of the supplier and receipt number of the delivery ticket.

Once all data has been entered, press the n key to save this record to the disk. An Inventory Log can be printed by pressing the r key now or you will be asked if you wish to print the log at the end of the day when printing inventory reports. The inventory log is stored for one full calendar month. This means that in January, all receipts are kept. Once into February, the log is cleared of all January receipts.

Pressing the pkey, when "Zero On-Hand Amount" is displayed, will zero the On-Hand amount for that material and create a record on the hard disk. This record is not editable, nor can it be deleted. This is done to maintain a level of security.

4.2 TO DATE USAGE

The following screen appears when selecting **To-Date**:

```
TODATE USAGE        Alkon Corporation        Version        4.4xx              Sep 15  9:15:44

LAST CLEARED JUL 24, 1995 17:34:35           U.S.   =  1368.50 Y  (Y+M)   =   1368.50 Y
                                             Metric =     0.00 M (M+Y)    =   1046.27 M
INGREDIENT          BIN          ON HAND
REDISET              3             121,411.
AIR                  1             113,395.
REDISET P            2              62,817.
CALC                 5              37,659.
RETARDER             7              33,301.
DCI                  9                  0.
POZZ 20             10                  0.

[F1]-Help   [F7]-Print & Clear   [PgDn/Up]-Next Page
```

The To-Date usage is similar to the Daily usage except that it is not cleared everyday. The purpose of this table is to allow a secondary means of inventory storage. It may be cleared weekly, monthly, or as necessary. It need not be cleared at all if desired. To clear the table, press the rkey. You will be prompted whether you want the report on the hard disk or printer.

The hard disk option will store the usage to the hard disk under "/rgb/cust/todate.rpt" and clear the totals in each column, with the exception of the **On-Hand**. This is recommended for people with no printer or a specific reason to do so (i.e.: Inventory to DOS).

The parallel printer option will prompt another message asking if the printer is ready. This will allow time to back out the tickets (if used) from the tractor feed of the printer and feed plain paper for the report to print on. Select "Y" to print the report and clear the totals. All totals will be cleared with exception of the "On-Hand" amounts. After the report prints, another message will appear to allow the clearing of All On-Hand amounts.

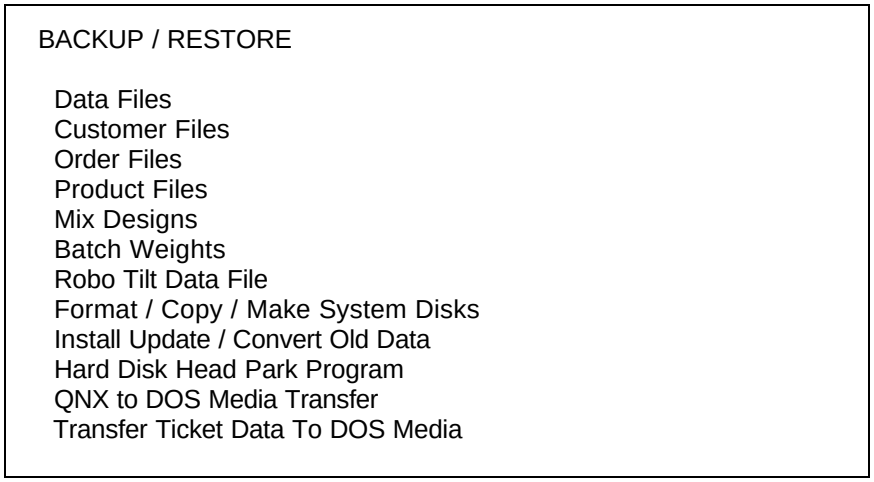
Caution must be used when entering "Y" at the "Clear All On-Hand Amounts" prompt since this will clear **all** On-Hand totals the system currently has.

Display controls are the same as the Daily usage screen.

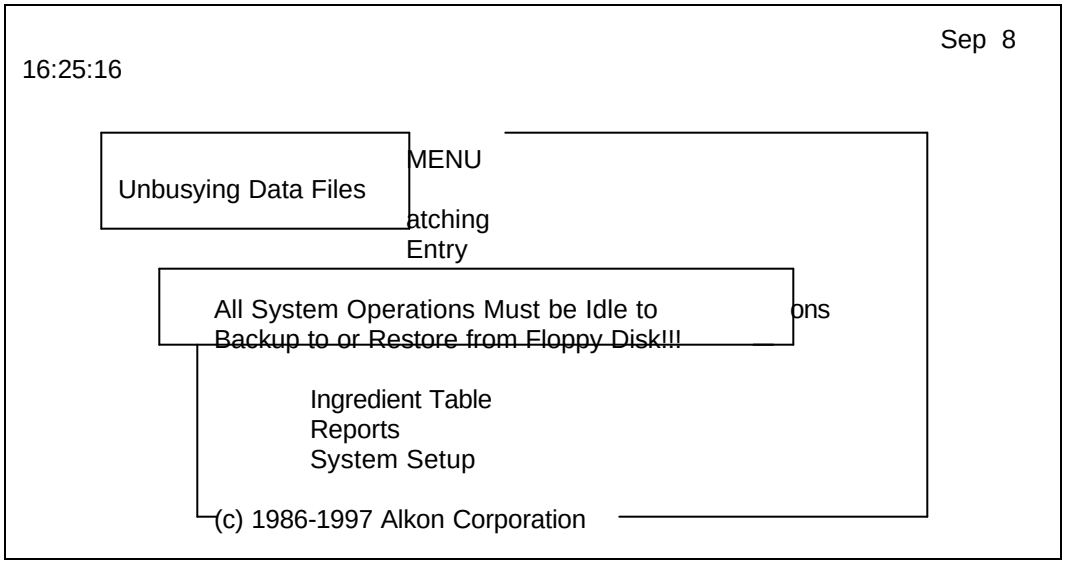
SECTION 5 BACKUP AND RESTORE

5.0 INTRODUCTION

This section deals with the file management capabilities of the Spectrum System. There are two basic functions that can be performed on files in the Spectrum software, writing files (backup), and reading files (restoring). The file management selections are found in the Backup and Restore Menu shown below:



To access this menu, select Backup/Restore from the Main Menu. Before the Backup/Restore Menu is accessed, a message will appear as shown below:



SECTION 5 BACKUP AND RESTORE

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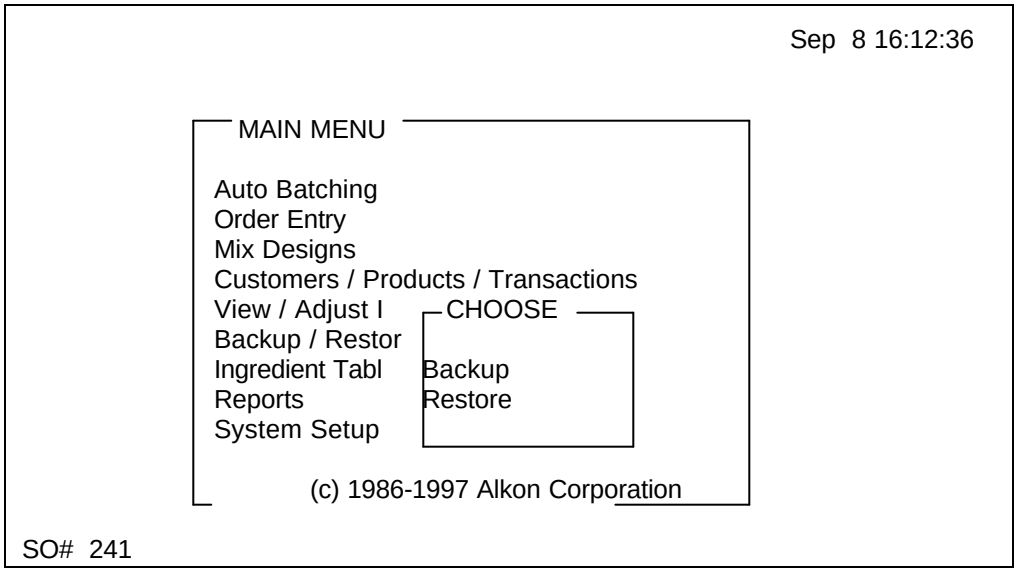
The system is preparing the files that are used in the Backup/Restore Menu's functions. You are also warned to have all systems idle before using the floppy disk. This means that there should be nothing in automatic mode (i.e.: Batching, Bin Filling, Mixer Control). After the files are ready, the Backup/Restore Menu will appear. A description of the different choices on this menu follows.

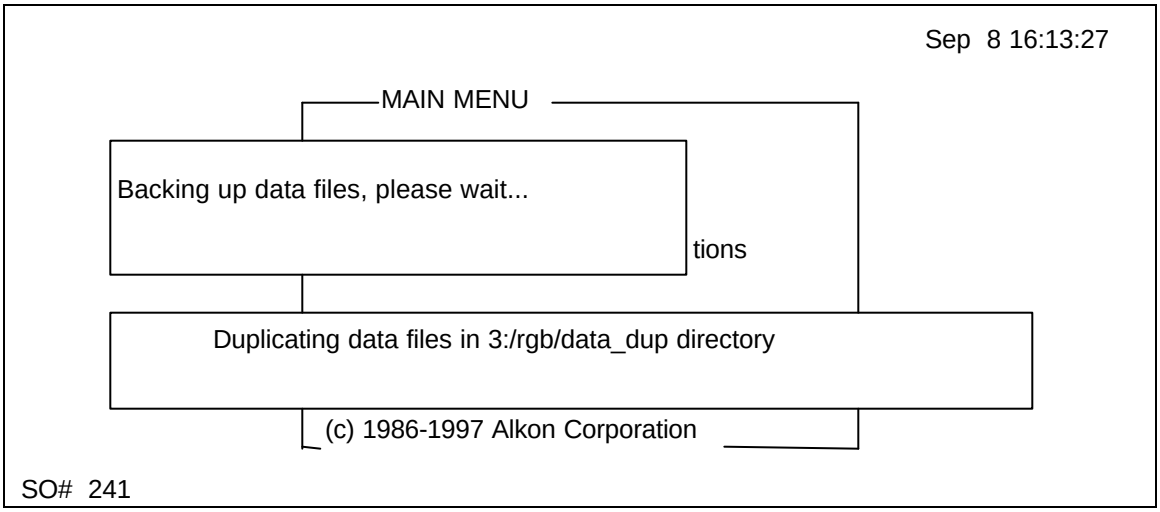
5.1 DATA FILES
CUSTOMER FILES
ORDER FILES
MIX DESIGNS
PRODUCT FILES

These options backup the files on the hard drive to a floppy diskette, and restore files from a floppy diskette to the hard drive. When any one of the options (above) is selected from the Backup/Restore Menu, the following menu will appear:

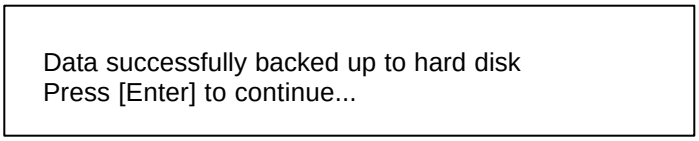


DATA FILES

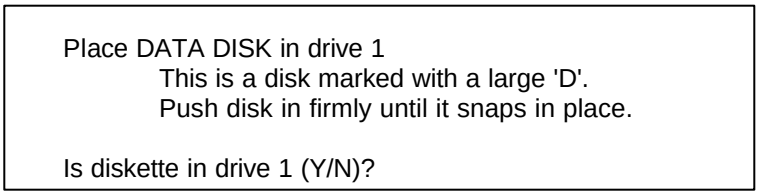
Choosing the Data Files option will store the data files onto the hard disk. The content of the data files includes all the information stored in the System Setup screens, Ingredient Table, Mix Designs, Products, Customers, and other miscellaneous data to the hard drive. While this data is being written to the hard drive, the following message will appear:



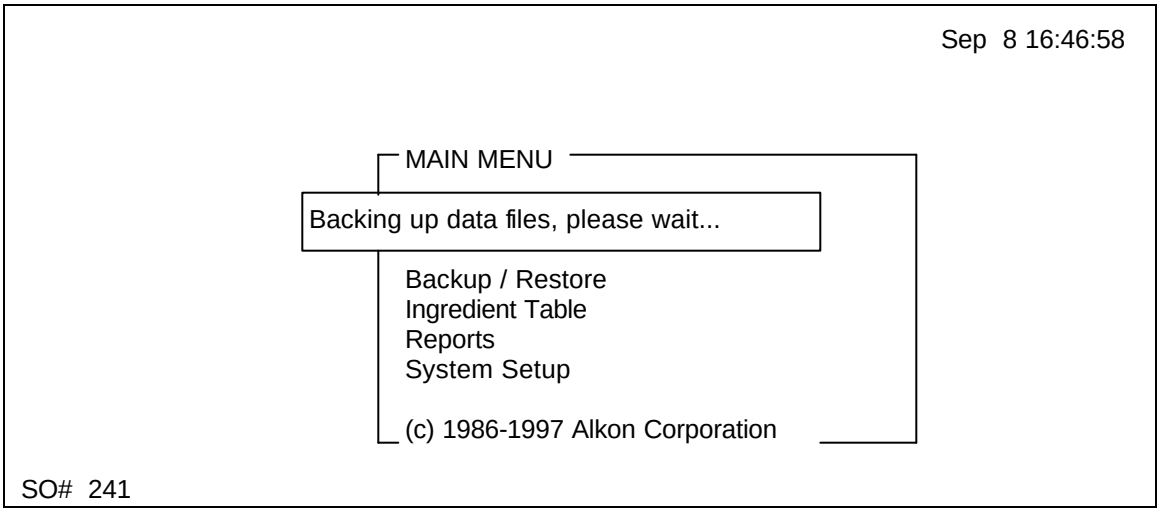
The Data is saved to the hard drive and a backup copy is also made in case the original copy gets corrupted. After the data is backed up to the hard drive, the following message will appear:



Pressing the e key will display the following message:

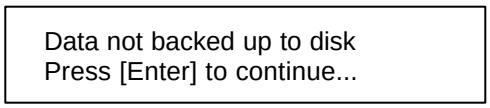


If the data needs to be stored on a floppy diskette, put the Data diskette into the computer, type "Y" and press the e key. This will write all the data described above onto the data diskette. After the data is written the following message will appear:



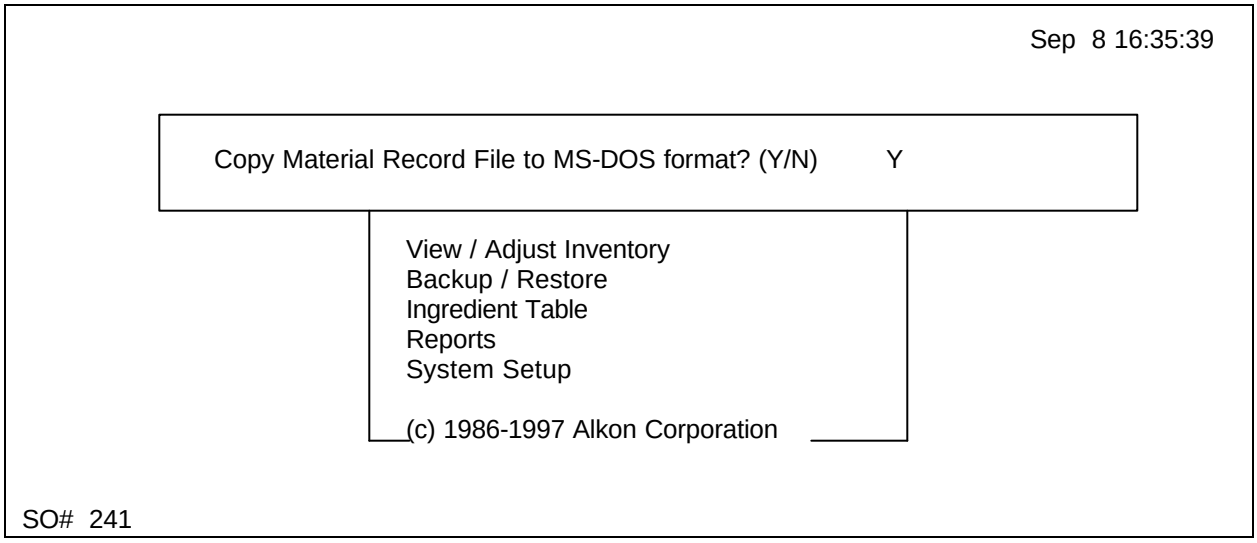
Take the diskette out of the computer and store it in a safe place. Press the e key to return to the Main Menu.

If there was a problem writing to the disk during the process described above, the following message will appear:



Press the e key to continue and call The Alkon Service Department for further instructions at 1-614-792-0677.

If you have the **Material Records to Disk** option, the following prompt will appear:



Answering "Y" to this question will prompt you to insert an MS-DOS disk into the drive. Once you have done this, answer "Y" to the next prompt and the system will start the DFS program and transfer the "/rgb/cust/mat_rec.dat" file to the DOS partition. This file contains the necessary data needed for QC Helper and/or any third party software that tracks plant efficiency. You will have the choice of transferring this file to either the Hard drive, the Floppy drive or both.

5.2 CUSTOMER FILES
ORDER FILES
MIX DESIGNS
PRODUCT FILES

Choosing any one of these options, will prompt you again for Backup or Restore. Once you have chosen which option you want, the appropriate disk is asked for and transfer will occur.

If Restore is chosen, the system will rebuild the internal indexes automatically, at which point you may resume normal operations.

5.3 BATCH WEIGHTS

If the Batch Weights to Disk option is enabled, each time the Spectrum batches a load, the batch weights are stored in a file. This file grows with each load. After the file gets to be a certain length (90% of the floppy's storage capacity) a message appears notifying the operator that the batch weights need backed up. To back the batch weights up, a Spectrum formatted disk is needed. To format a disk for this use, refer to Section 5.5.1.

With a formatted disk ready, select Batch Weights from the Backup/Restore Menu. The following will appear:

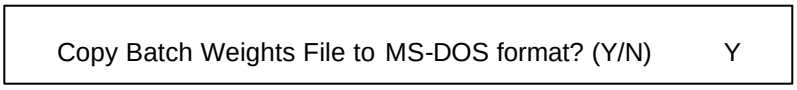
```
Place a Spectrum formatted disk in drive 1

Hit [Enter] when ready, [Esc] to quit Y
```

Put the formatted disk into the computer's floppy drive and type "Y" and press the ekey. This will copy the batch weights file onto the diskette. After it is copied, a message similar to the following will appear:

```
Batch Weights successfully copied...
First Ticket:          40 Last Ticket:    551
Write these Numbers on the Disk Label !!!
Press [Enter] to Continue...
```

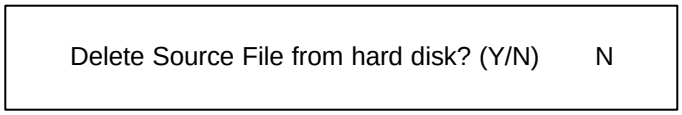
Take the diskette out of the computer and write the batch number information on the diskette for future reference.

Pressing the ekey will give you the following message:



If a DOS version of this file is required, type "Y" and press the ekey. If there is no need for a DOS version of this file, type "N" and press the ekey. **NOTE:** This will only work if the DOS FILE SYSTEM option is enabled and the proper software is loaded on the hard drive.

You are then prompted with the following message:



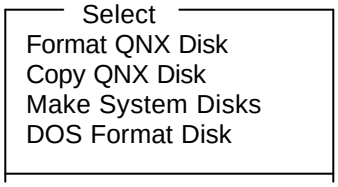
It is suggested that the file be deleted from the hard drive since a copy of it exists on the floppy. However if it is not deleted, the batch weight file will continue to grow becoming too big to fit on a floppy and eventually filling up the hard drive. This will result in the loss of the batch information on all batches since last backed up. To delete the file, type "Y" and press the ekey.

5.4 **ROBO-TILT DATA FILE** (Robo-Tilt Only)

The Robo-Tilt data file contains the learned tilting rates of the mixer. To backup this file to floppy diskette, select the Robo-Tilt Data File selection from the Backup/Restore Menu.

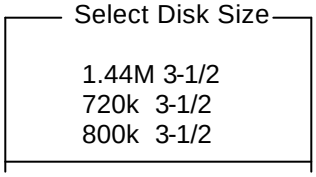
5.5 FORMAT/COPY/MAKE SYSTEM DISKS

By selecting this option from the Backup/Restore Menu, the Select Menu will appear:

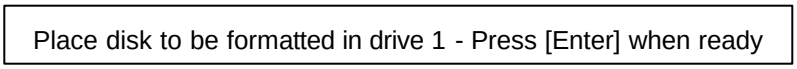


5.5.1 FORMATTING A QNX DISK

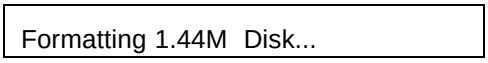
A QNX formatted disk is needed for operations such as backing up batch weights, making copies of QNX disks, and making a Data Disk. To format a QNX disk, select the first option on the Select Menu that appears by selecting the Format/Copy/ Make System Disks option in the Backup/Restore Menu. After this is selected the following message appears:



Select the proper disk size and the message below appears:



Place the disk into the computer and press the ekey. A message similar to the following will appear:



Press the band ~ keys to stop.

After a few moments, the message below will appear:

```
Disk is Formatted...
Initializing disk...
Press [Enter] to Continue...
```

Press the e key and the Main Menu will reappear. The disk in the computer is now ready to be used for a QNX operation.

5.5.2 COPYING QNX DISKS

By selecting this option from the Select Menu, an existing QNX disk may be copied to a newly formatted QNX disk. After choosing this option, the message below appears:

```
Place source disk drive 1 - Press [Enter] when ready
```

Put the disk to be copied into the computer's disk drive and press the ekey. The files will be read off this disk and the message shown below will appear:

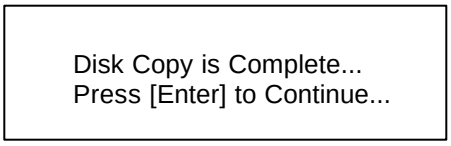
```
Reading files...
```

After all the files are read off of the source disk, a message will appear as shown below:

```
Place destination disk in drive 1 - Press [Enter] when ready
```

Take the source disk out of the computer at this point and put the newly formatted QNX disk (from above procedure) into the computer's disk drive. Pressing the e key will start writing the files onto this disk with a message stating that this is occurring. After all the

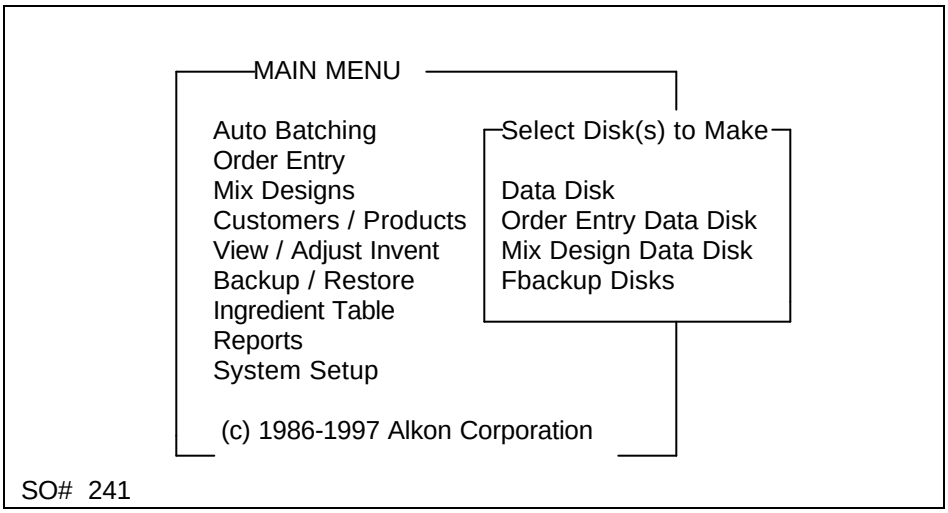
files are written to this disk, a message will appear as shown:



Press the e key and the Main Menu will reappear. Take the disk out of the computer and label it appropriately.

5.5.3 MAKING SYSTEM DISKS

By selecting this option from the Select Menu, a Data Disk and/or the Fbackup disks may be made. After selecting this option, the following menu appears:



Select the desired disk to be made. Note that Fbackup disks need not be formatted; all other diskettes require a QNX formatted disk. Follow the instructions as they appear on the screen. After the disk is successfully made, take the disk out of the computer and label it appropriately.

5.6 INSTALL UPDATE / CONVERT OLD DATA

Selecting this option will give two choices. If you choose *Install Update* you will be prompted to place the new version's Data (D) disk into the drive. This will perform an

update to your existing software.

If you choose *Convert Old Data* you will be prompted to enter either a Data disk (i.e.: Either Data(D) disk or Disk 1) or a Customers disk (i.e.: Either Data (D) disk or Disk 3) or very possibly, both. You will be prompted for the correct disk if you make a mistake in your choice. The system will then proceed to convert those older data files up to the version that it is currently running.

5.7 PARK HARD DISK HEADS

Selecting this option from the Backup/Restore Menu will physically move the heads off of the hard drive. This should be done when moving or shipping a computer. After the hard disk heads are parked, the screen will display a message stating that the power to the computer should now be turned off. It is necessary to reboot the computer to unpark the hard disk heads. **NOTE:** All computers (386 and higher) should not perform this function as they have automatic disk head parking.

5.8 QNX TO DOS TRANSFER

Selecting this option from the Backup/Restore Menu will allow an existing QNX file to be copied to a DOS file. Any file can be copied using this method. Note that the proper software must be available for this feature to work.

5.9 TRANSFER TICKET DATA TO DOS MEDIA

By selecting this option from the Backup/Restore Menu, the QNX file of the tickets (i.e.: ticket.dat) will be copied to a DOS file also named ticket.dat. The system will ask if you want to copy this file to a DOS formatted floppy disk or to the DOS partition of the hard drive.

SECTION 6
REPORTS

6.0 REPORTS

If REPORTS is selected from the MAIN MENU a list of all available reports will appear. To print a desired report, move the cursor to that report name and press the ekey. A message will appear and ask if the printer is ready. If the printer is on-line and has blank paper loaded (i.e.: not tickets), press "Y" and the e key and the appropriate report will start printing. If the printer is not ready, press N and the ekey, and the Main Menu will return. This message is there to allow the user a second chance, if necessary, to switch to plain paper from tickets in the printer.

Below is a list of descriptions of each report.

INGREDIENTS

This report details all parameters associated with each ingredient.

MIX DESIGNS

This report prints any or all of the mix designs in the Spectrum. The operator may select a range if desired.

DAILY

This report selects the current material usages and prints the today's records. It is recommended that at the close of the day's operation this report be printed. This report must be printed before clearing the daily inventory. (See Inventory, Section 4.1).

TO-DATE

This report prints the usage of all materials. Its totals are meant to supplement the DAILY report by maintaining values over a period of time. This report must be printed before clearing the to-date inventory. (See Inventory, Section 4.2).

SECTION 6
REPORTS

The DAILY and TO DATE reports will prompt the user with the following message:

Select Parallel Printer to print the report to paper or Hard Disk File to save the report to a file on the hard drive for future use.

LOG OF INCOMING INVENTORY

This report will print the entire Incoming Inventory Log and will then ask you if you wish to purge c the file. If you answer Yes, the file will be deleted, if No the file will stay; however, the next time the Daily Inventory is cleared you will be asked for a '30 day purge.' This purge keeps one calendar month's worth of tickets on the disk. The number of days is not configurable.

CUSTOMERS

This report prints a sorted customer list.

ORDERS

This reports contains all orders currently in the system. A brief report is made on each order that includes the customer name, amount ordered, and amount delivered. This report will print either in order of times or alphabetically depending on how the Job Index is sorted.

PRODUCTS

This is a sorted report of all products in the system, with current inventory levels.

SECTION 6
REPORTS

BATCH WEIGHTS

This feature allows an operator to view or print the batch weights from any batch run through the Spectrum. It can also be used to print a selected range of batch weights.

If the operator selects *View*, a batch number must be entered. If this is unknown simply press the e key or the d key and the first or last batch, respectively, will be selected. All Batch Weight records may be browsed by using the { and }keys.

If *Select Range* is chosen, simply enter the first and last batch numbers that are to be printed. If one of these numbers is invalid or not found, a warning of invalid range will appear.

If *All Records* is selected, all currently stored batch weight records will print:

NOTE: The Spectrum will search a floppy disk with batch weights stored on it by simply placing a disk in the disk drive before entering data.

SPECIAL

This report details the last 40 power up events and anytime the time and date have been changed.

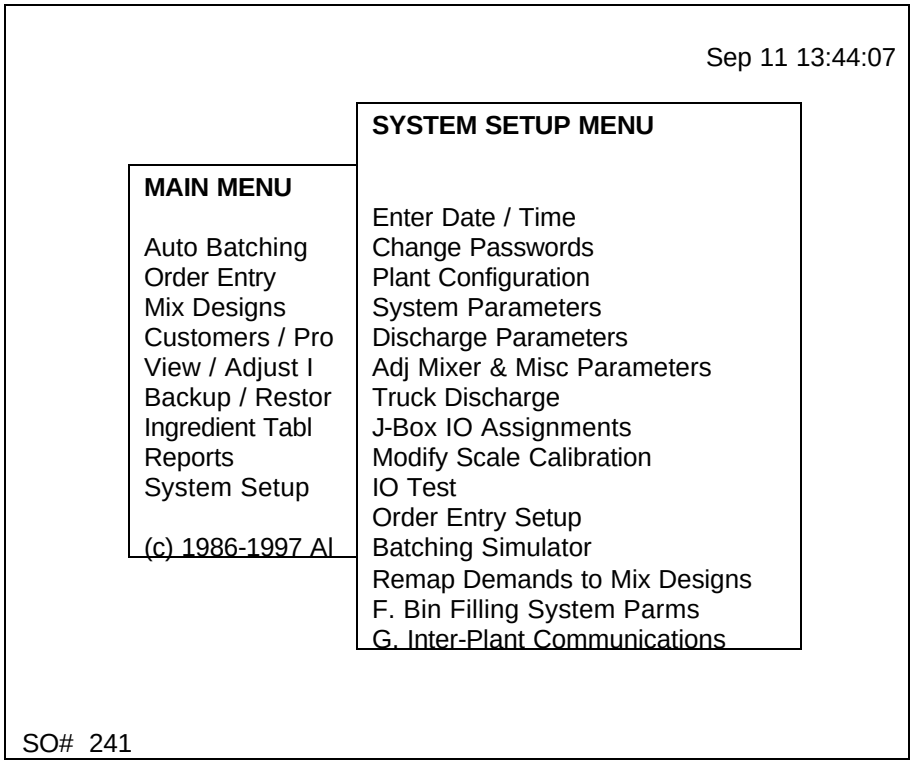
ALT-PORT SELECT

This will bring up the Printer Port selector window to allow different printers to be used in the case of more than one ticket printer. This is mainly used in the case of a remote printer. The last printed ticket can also be printed again from this window.

SECTION 7 SYSTEM SETUP

7.0 SYSTEM SETUP

This table of multiple screens contains information used by the Spectrum to process the batch, control the discharge, calibrate the scales and meters, and perform diagnostic testing. By selecting System Setup from the Main Menu, the System Setup Menu will appear as shown below:

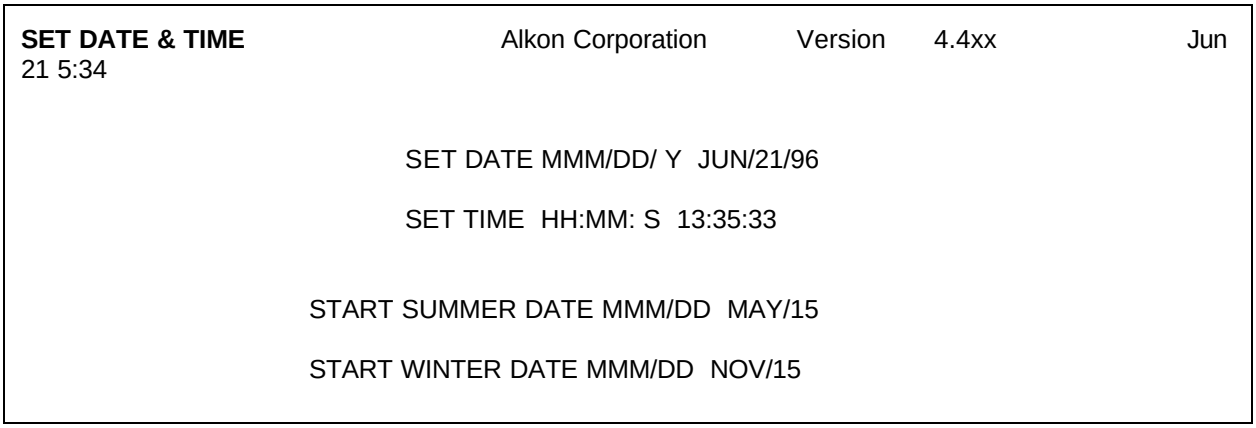


A description of all the screens accessed from this menu follows.

SECTION 7 SYSTEM SETUP

7.1 DATE AND TIME

To correct the date and time of the machine, select **Enter Date/Time** from the System Setup Menu. This menu option also sets winter and summer dates used for special extra products (Order Entry only).



ENTERING DATE AND TIME

The date is entered as MMM/DD/YY (i.e.: Aug/22/96).

The time is entered on the basis of a 24 hour clock. All six digits and both colons must be entered for the time to be read properly.

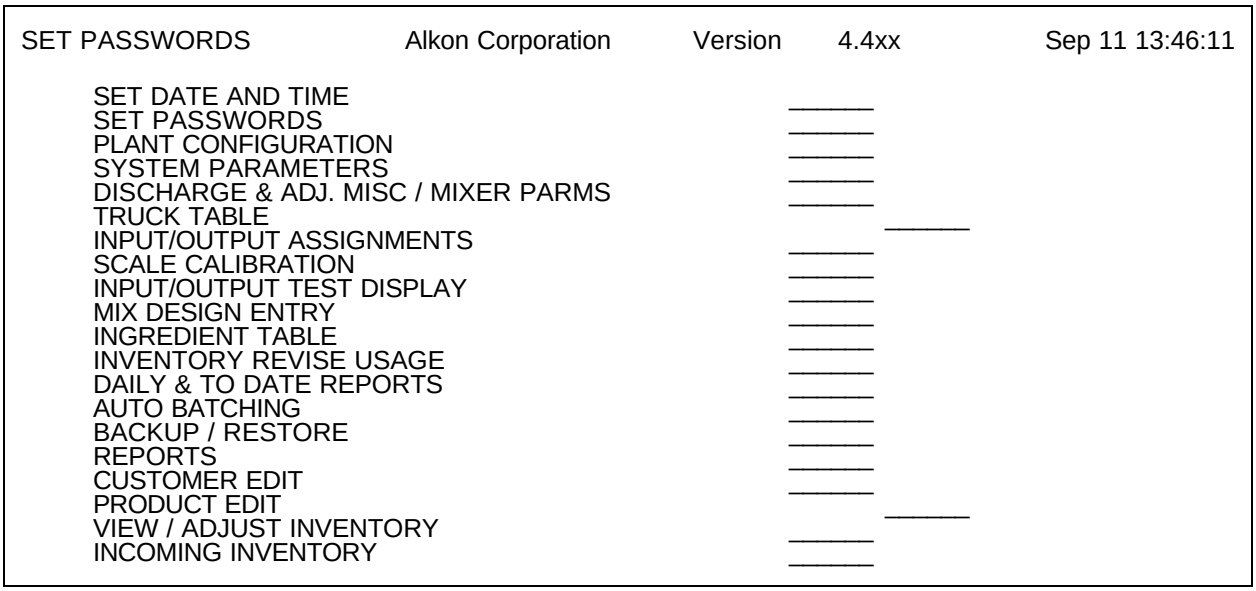
For example, a time of 3:45 pm is entered as 15:45:00. If the Spectrum has an AT compatible PC, (such as Unisys, DFI, IBM, or Compaq) the internal battery backup clock is automatically set.

CHANGING SUMMER AND WINTER START DATES

These dates are entered as MMM/DD where MMM is a three letter abbreviation. These dates are used for special extra products used in the Order Entry software. (Refer to Section 1.3).

7.2 PASSWORDS .2 PASSWORDS.2 PASSWORDS

Passwords may be set to protect certain screens from unauthorized access. Each password is an alphanumeric field of up to six characters. To set these passwords, select **Change Passwords** from the System Setup Menu. The screen appears below:



ENTERING OR CHANGING A PASSWORD

Changing a password is the same as entering a password, position the cursor on the appropriate line, type the new code and press the ekey.

PRIORITY

The highest priority should be given to the password which permits access to this screen. Less important screens may be given a different password, which allows selected operating personnel to have access to several functions.

SECURITY

When passwords are typed, the computer displays an "*" for each key pressed to hide the code from those watching.

7.3 PLANT CONFIGURATION

SECTION 7 SYSTEM SETUP

PLANT CONFIGURATION Alkon Corporation Version 4.4xx Jun 21 13:35:58

Mix Default: US=1, Metric=0 1 Initial Gate Close Wait 500
Sgl. drop batcher 0 Max Number of Batches Allowed 100 1-Cont
Disch,2-Cont Run,4-ARTP 0 Ticket Number 10807
_____ 0 Metered Water (0-No,1-Yes,2-HT) 1
Agg Scale Max 36000 Manual Batch Print Enable
0 Cem Scale Max 7000 Calibration (0=Metric /
1=U.S.) 1 Wat Scale Max 3000 Weight of
Water (x 1000) 8330 Max Load Volume (x 10) 100
Weight of Calcium (x 1000) 11275 Split Load by Mixer Size (1-Y) 0
Non-Air Mix Slump Adjust 8330 Calcium Soln Concentration (%) 33
Small To Large Volume 128 Default Slump (x 10)
40 Plant Number 2 Jog Settle Time (mSec)
1000 Agg Batching (0-Net, 1-Actual) 0
Scale Settle Time (mSec) 2000 Cem Batching (0-Net, 1-Actual) 0
Admix Settle Time (mSec) 1000 Wat Batching (0-Net, 1-Actual)
Default % Slag 0 Jog Every Batch 0=None;
1,2,4 4 Default % Fly 0 Hold if Batcher Out of
Tol 1 _____ 0 Hold if Scale
Under Zero 0
Default % Hot Water 0 Wait For End Tares 1
Default Harshness (x 10) 10 % of Total Water in First Batch
0 Default Air Effectiveness (x 10) 10 Delay Water (0-No, 1-Yes)
1

Parameters on this screen tailor software to specific plant configurations. A description of all the parameters contained on this screen follows. All parameters that are (Quick Edit Field) types cannot be changed in this screen and must be changed in the Quick Edit pop-up. The Quick Edit pop-up is discussed in further detail in Section 7.14. The message shown on the next page will appear when placing the cursor on the (Quick Edit Field) parameters.

NOTICE: Please change this value in Batch Setup using the Spectrum Quick Edit Screen...

Changes here will be overwritten...

MIX DEFAULT: US=1, Metric=0

When creating a new Mix Design, the Spectrum will default to the condition of this flag. Toggling to the other system is possible in the Mix Design Screen via rkey. (Switchable US/Metric only). (Refer to Section 3.4 for details on Mix Designs).

SGL. DROP BATCHER (bitmapped)

If a load has reason to split batch (i.e.: over scale capacity, over mixer capacity, etc.). this parameter forces the Spectrum to weigh up the total target weight, of the specified material, in the first stage of the multi-batch rather than splitting the target for all stages. Using this parameter also holds the discharge of those materials until the last batch. Typically set to 0 (zero).

Fill this parameter with the sum of all numbers to be used:

Use 1 for aggregate	Use 4 for water
Use 2 for cement	Use 8 for admixes

Call the Alkon Service Department at 1-614/792-0677 before using this parameter.

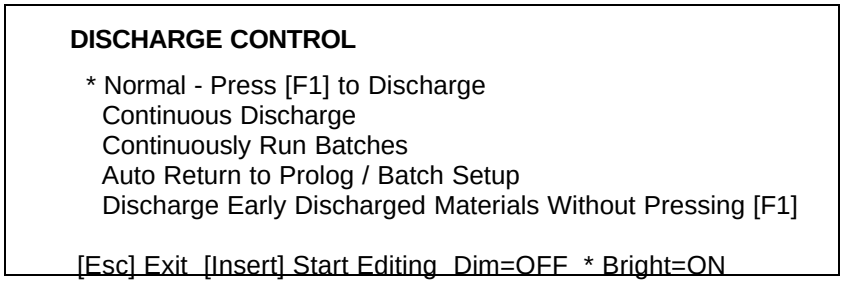
1-CONT DISCH, 2-CONT RUN, 4-AUTO**R**ETURN**T**O**P**ROLOG (Quick Edit Field)

The Discharge Control Options Editor, shown below, will appear when placing the cursor on this parameter. The Options Editor can be turned on and off by pressing the u key. Refer to Section 7.15 for instructions on using the Options Editor.

Cont Disch - forces the Spectrum to discharge the load without operator authorization. If an out-of-tolerance occurs during weigh up, the Spectrum will NOT automatically discharge the load, and the operator will have to authorize discharge.

Cont Run - forces the Spectrum to make the same load repeatedly until the operator leaves the Batch Graphic display.

ARTP - automatically forces the Spectrum to leave the Batch Graphic display when discharge starts.



AGG SCALE MAX (Quick Edit Field)
CEM SCALE MAX (Quick Edit Field)

These two parameters refer to the maximum weight each of the scales can hold in a single batch. These parameters are used in determining when to split batch a load.

WAT SCALE MAX

This parameter sets the maximum amount of water that can be batched in a single batch. For plants that weigh water, this value should be set to the scale capacity. For plants with metered water, a value greater than 0 must be entered, a typical value being **3000**.

MAXIMUM LOAD VOLUME (x 10)

This parameters tells the Spectrum to not allow a load size any larger than this number. *Example*: If Max Load Volume is 100, a load size of 10 YD or 10 M3 (depending on which way your plant is calibrated) is the highest load size allowed.

SPLIT LOAD BY MIXER SIZE (1-Y)

Entering a "1" in this parameter will use the Mixer Size parameter in the **Adjust Mixer Parameters** Screen to split the load for multi-batching. The individual maximum scale checks are still done.

CALCIUM SOLUTION CONCENTRATION (%)

If calcium is used in solution form, enter the concentration percentage here. This value is used when calculating the amount of solution to be dispensed, compensating the batch water weight by volume. This will only be used for a chemical whose name begins with CALC. (Refer to Section 3 on Special Ingredient Names).

DEFAULT SLUMP (x 10)

When creating a new Mix Design, this is the slump value with which the new mix will default. This is also the number which will be used if a Mix Design is transferred via Link-20 or Mix Design Transfer and has a slump of zero or has not been specified in the transfer. Once in the Mix Screen, you may override the default by specifying a different slump. Enter the desired slump value multiplied by 10 for this field. *For example*, use 30 for a 3.0 inch slump or 1270 for 127mm slump.

JOG SETTLE TIME (mSec)

This value represents how long the Spectrum waits between jogs. A typical value is 1000 mSec (one second).

SCALE SETTLE TIME (mSec)

This value represents how long the Spectrum waits after the feed of a material for the scale to settle. A typical value is 2000 mSec (two seconds).

ADMIX SETTLE TIME (mSec)

This value represents the time between shutting off the admix feeds and checking for tolerances. A typical value is 2000 mSec (two seconds).

DEFAULT % SLAG
DEFAULT % FLY

From these values, the specified percentage of Cement on each batch is substituted with an equal percentage of either slag or flyash. These values can also be changed in **Order Entry** or **Batch Setup**. When not required, this value should be set back to zero.

DEFAULT % HOT WATER

If hot and cold water are to be mixed by percentage, enter the percentage here. The Spectrum will dispense the percentage of hot water first, and the balance using cold water. If the percentage of hot water is altered on the **Batch Setup** Screen, the change will be remembered for future loads. This value does not appear on the **Order Entry** Screen.

DEFAULT HARSHNESS (x 10)

This value allows the ratio of sand and stone to be altered from a base of 1.0. A value of 1.0 assumes the sand and stone in the mix design is ideal. However, if more sand is needed than stone, the Spectrum will increase the sand weight by 20 Lbs per yard for each 0.1 increase of default harshness and decrease the stone weight. Subsequently, a 0.1 decrease will subtract 20 Lbs sand and add 20 Lbs stone.

The Spectrum multiplies the entered value by ten to place the decimal. *For example*, enter 10 to mean 1.0. DO NOT set this value higher than 20.

DEFAULT AIR EFFECTIVENESS (x 10)

This value allows any changes in the air entraining chemical effectiveness to be compensated for without altering the basic mix design. This is beneficial when climatic changes affect the air entraining effectiveness throughout the day. Normally a value of **10** is set, which represents 100%.

INITIAL GATE CLOSE WAIT

Before a batch, the Spectrum will pulse all discharge gates shut for the time specified. All gate checks are done after this time has elapsed. Normally this value is set to **500** mSec (1/2 second).

MAX NUMBER OF BATCHES ALLOWED

This parameter restricts the number of partial batches allowed in a load. If too many batches are required to make the load, an error message is displayed. Typical values are **1** or **2**.

TICKET NUMBER

Enter the digits at which to start the numbering of the batches. This can be reset daily, or allowed to roll over after 999,999.

METERED WATER (0=NO, 1=YES, 2-HT)

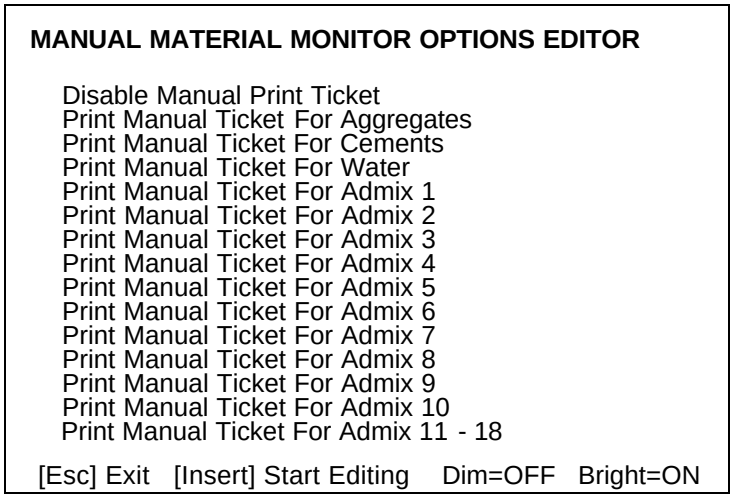
Set one of the following values for either weighed or metered water plants.

Weighed = 0 Metered = 1 Metered with Holding Tank = 2

With metered water and a holding tank (value of 2), the Spectrum will feed initial water into the holding tank at the start of a batch. After water is okayed to discharge, the holding tank will discharge until empty and then close. At this point, the wash down water will immediately feed into the holding tank but will not discharge until all scales have been emptied.

MANUAL BATCH PRINT ENABLE

This parameter governs whether or not the Spectrum will force a ticket to print after a manual operation. Items which are turned on will force the ticket before another batch may be started. The Manual Material Monitor Options Editor will appear when placing the cursor on this parameter. The Options Editor can be turned on and off by pressing the u key. (See Section 7.15).



CALIBRATION (0=Metric, 1=U.S)

Set the value based on the calibration of your plant. 0 for Kgs, Liters, etc., 1 for Lbs, Ounces, etc.

WEIGHT OF WATER (X 1000)

This parameter designates the weight of one volume of water. Typical values are:

Metric	1 Liter = 1 KG	use setting = 1000
U.S.	1 Gal = 8.345 LB	use setting = 8345
Imperial	1 Gal = 10.023 LB	use setting = 10023

WEIGHT OF CALCIUM (x 1000)

This parameter, used in calcium calculations, represents the number of pounds per gallon. This information is available from the chemical supplier. Typically, a 35% solution in U.S. units is 11.265 Lbs/Gal.

NON-AIR MIX SLUMP ADJUSTMENT

This parameter specifies the weight of water used when adjusting slump for NON-AIR mixes. If an adjustment of one gallon per inch of slump is desired, then enter the weight of one gallon. If U.S. measure, enter a value of **8345** Lbs. In the case of Metric if a change of 5 Liters per 25 mm of slump is desired, enter a **200**.

SMALL TO LARGE VOLUME

This parameter determines how many ounces are in one gallon, or milliliters in one liter.

Gallons to Ounces	=	128
Milliliters to Liters	=	1000

PLANT NUMBER

This is the plant number and it is printed on the delivery ticket. Enter a value between 1 and 65,000.

AGG BATCHING (0=NET, 1=ACTUAL)
CEM BATCHING (0=NET, 1=ACTUAL)
WAT BATCHING (0=NET, 1=ACTUAL)

These parameters compute cutoff weights. In the NET mode, each material will receive the target amount called for, regardless of any previous material.

For example, assume a mix design calls for 1000 Lbs of sand and 1000 Lbs of rock. Regardless of the actual amount of sand, the Spectrum will batch 1000 pounds of rock.

In the ACTUAL mode, each material will get the cumulative target amount called for.

For example, assume a mix design calls for 1000 Lbs of sand and 1000 Lbs of rock. If the actual sand batched was 1100 Lbs, the Spectrum will batch 900 Lbs of rock. Conversely, if 900 Lbs of sand were batched, 1100 Lbs of rock would be called for.

JOG EVERY BATCH (0=NONE; 1,2,4)

This parameter tells a particular batcher (agg, cem, or water) to always jog up to the target weight on every partial batch. Normally the Spectrum doesn't jog to target on every partial batch. Instead, any errors are made up for on the last batch. This parameter is not needed if you don't multi-batch.

The Options Editor can be turned on and off by pressing the u key. (See Section 7.15).

PARTIAL BATCH OPTIONS EDITOR

Jog Aggregate on All Partial Batches
Jog Cement on All Partial Batches
Jog Water on All Partial Batches
Jog Admix on All Partial Batches
Ignore Batching Errors in Previous Partial Batch
Adjust Targets for Batching Errors in Previous Partial Batch

[Esc] Exit [Insert] Start Editing Dim = OFF Bright = ON

HOLD IF BATCHER OUT OF TOLERANCE

If this value is set to "1" and an out-of-tolerance condition occurs during weigh up, the Spectrum will stop and allow the operator to override before continuing.

A value of "0" forces the Spectrum to continue automatically when an out-of-tolerance condition occurs. Alkon strongly recommends this value always be set to "1". If you set it to "0", you assume responsibility for any out-of-tolerance batch weights, regardless of their cause.

HOLD IF SCALE UNDER ZERO

If this value is set to "1", the Spectrum will not start an automatic batch if any weighed scale is under zero, and a message will display. The operator must override the error to continue.

1 = enable
0 = disable (default)

WAIT FOR END TARES

If this value is set to "1", the Spectrum will not finish the ticket until all scales are empty and the tares are recorded.

1 = enable (default)
0 = disable

% OF TOTAL WATER IN FIRST BATCH

Plants that multi-batch use this parameter to add extra water into the truck on the first batch. *For example*, using a value of 80 puts 80% (less holdback) of the water in the front of the truck on the first batch. The remaining 20% will be added in the subsequent batches). If the water is to be split evenly between all batches, enter "0". A typical value is 80%.

On systems with a Moisture Probe, it may be necessary to make this number higher, up to 100%, in order to get enough water in the first batch. This is due to the unknown sand moisture of the next batch. To use this parameter effectively, keep the **Maximum Moisture Change per Batch**, found in the Ingredient Table, for probe monitored materials as low as possible.

DELAY WATER (0=NO, 1=YES)

On systems with metered water, it is possible to start a batch and have the "front" water not start until the operator's signal is received. This allows the batch to get started when the truck pulls in the yard. As soon as the truck is spotted, the water can be started by pressing the mkey.

1 = enable (default)
0 = disable.

7.4 SYSTEM PARAMETERS

SYSTEM PARAMETERS	Alkon Corporation	Version 4.4xx	Sep 11 14:05:05
Color by Material on Graphics	1	Inspect On (enable=1,disable=0)	0
Max Allowable Jog Time (mSec)	1000	Default Serial Port Baud Rate	1200
Sort Feeds by Mix Design Entry	0	Air Mix Slump Adjust	8330
Time Between Min Flow Check(mS)	1000	I/O Option	5
Index Display Def. Color(1-15)	0	Index Display Control	0
Jog Sensitivity - Agg (%)	0	Inventory Control Option	0
Jog Sensitivity - Cem (%)	5	Manual Station Port (0,1,2)	2
Jog Sensitivity - Wat (%)	0	Federal Tax Rate % (x 100,000)	0
Agg/Cem Complete Pulse (mSec)	1000	Disk 1 Type (1,2,3,4)	4
Flow Smoothing Factor X 100	50	Batching Display Option	51
Time Between Flow Calc's (mSec)	100	Link-20 Port (0=Off,Ser=8+)	8
Time to Exceed Targ -Agg (mSec)	0	_____	0
Time to Exceed Targ -Cem (mSec)	0	Multidrop Number/Link-20 Cntrl	128
Time to Exceed Targ -Wat (mSec)	0	TS Delay (mSec)	0
_____ 0		Date Format in Ticket Record 0	
CRAB BUS port(0=df,1=378,2=278)	0	Del Tckt Aftr Btch (enable=1)	0
_____ 0		No Operator Edit 0	
Printer Options	778189	_____	0
Printer Port (0=$lpt,Ser=8+)	0	Truck Washdown Time (mins)	0
Demand On (enable=1,disable=0)	0	Printer Poll Time (micro secs)	600

This display contains several of the plant tuning values used during the weighing and discharge sequences.

COLOR BY MATERIAL ON GRAPHICS

By entering a "1" in this parameter, each batcher's materials' bar graphs will be set to a certain color. This was added to help make the Batching Screen more readable.

MAXIMUM ALLOWABLE JOG TIME (mSec)

The jog time for each ingredient is calculated after each jog to determine the optimum time to open the gate for the specified jog bite size. This value is the maximum time the Spectrum can calculate to be the jog time. If the jog time reaches this value, the Spectrum will stop jogging and error. It then resets the jog time to its starting value.

A typical value for this limit is 2000 milliseconds (two seconds).

SORT FEEDS BY MIX DESIGN ENTRY

A non zero value in this parameter will enable this feature allowing the cementitious materials to batch in the order that they were entered in the mix design. A value of "2" enables the **Select Materials by Mixer Number** feature (only for plants that have two Second Process Controllers, i.e.: mixers, holding hoppers, or wet and dry sides, with reserved batchers for each).

TIME BETWEEN MINIMUM FLOW CHECK (mSec)

This value determines how often the Spectrum checks for material flow during batching. A typical value is 2000 milliseconds (two seconds).

INDEX DISPLAY DEF COLOR (1-15)

This parameter sets the Job Index display's color for the first three columns. Enter the number of the desired color from the table below:

COLOR	NUMBER
BLACK	0
BLUE	1
GREEN	2
CYAN (Lt. blue)	3
RED	4
MAGENTA (purple)	5
BROWN	6
WHITE	7
GRAY	8
LT BLUE	9
LT GREEN	10
LT CYAN	11
PINK	12
LT MAGENTA	13
YELLOW	14
HI WHITE	15

JOG SENSITIVITY - AGG (%)
JOG SENSITIVITY - CEM (%)
JOG SENSITIVITY - WAT (%)

This factor controls the increments by which the jog times are adjusted. Higher values make the Spectrum more responsive to fluctuations in the jog weight, however too large a value will cause the jog size to be erratic. A typical value is 5.

AGG/CEM COMPLETE PULSE (mSec)

The length of the discharge start and end pulses is controlled by this value ranging from 0-20,000 (0-20 Sec). A typical value is 1000 mSec (1 second).

FLOW SMOOTHING FACTOR (X 100)

The Spectrum constantly averages the flow rate from the scale during the discharge cycle and achieves this by adding a percentage of the previous flow with a percentage of the current flow. This value determines the percentage of current flow used with the balance from the previous flow. Typical values range between 80 and 100.

TIME BETWEEN FLOW CALCS (mSec)

During the inching control of the discharge gates, this parameter determines how often the Spectrum recalculates the averaged flow rate. A typical value is 1000 mSec (1 second).

TIME TO EXCEED TARGET - AGG (mSec)
TIME TO EXCEED TARGET - CEM (mSec)
TIME TO EXCEED TARGET - WAT (mSec)

On some installations, particularly when load cells are installed in the steelyard cables, the response of the scale "leads" (i.e.: is ahead of) the amount of material that has actually been fed. Typically 0 (zero).

To compensate for this effect, the Spectrum can be instructed to close the feed gate some time after the scale reaches the target weight.

Call the Alkon Service Department 1-614/792-0677 before changing this parameter.

CRAB BUS PORT (0=df,1=378,2=278)

This parameter selects which parallel port the CRAB BUS will use. This parameter should only be changed when testing is needed. A warning message will appear when the cursor is placed on this parameter.

PRINTER OPTIONS

This parameter tells the Spectrum which items to print on the ticket. The **Batch Report Printer Options Editor**, as shown below, appears when placing the cursor on this parameter.

BATCH REPORT PRINTER OPTIONS

Printer Disabled
*Print Net Weights on Batch Report
Print Cumulative Weights on Batch Report
*Print Original Mix Weights (SSD) from Batch Setup
Print Only Target Weights on Batch Report
*Print Batch Summary Block
*Print % Tolerance Column
*Print Tolerance OK or NOT OK
*Print Tolerance Locked or Unlocked
*Print % Moisture Column for All Aggregates
*Print Water/Cement Ratio
*Print Actual Water in All Materials Column
*Print Water in Truck
*Print Water To Add
Exclude Water to Add in Wat/Cem Ratio Calculation
*Print Manual Trim Occurred or No Manual Trim
Print the Day, Month, and Year in DD/MM/YY format
*Print Temper Water (single mixer only)
Print Mixing Time (single mixer only)
Print Target Mixing Time

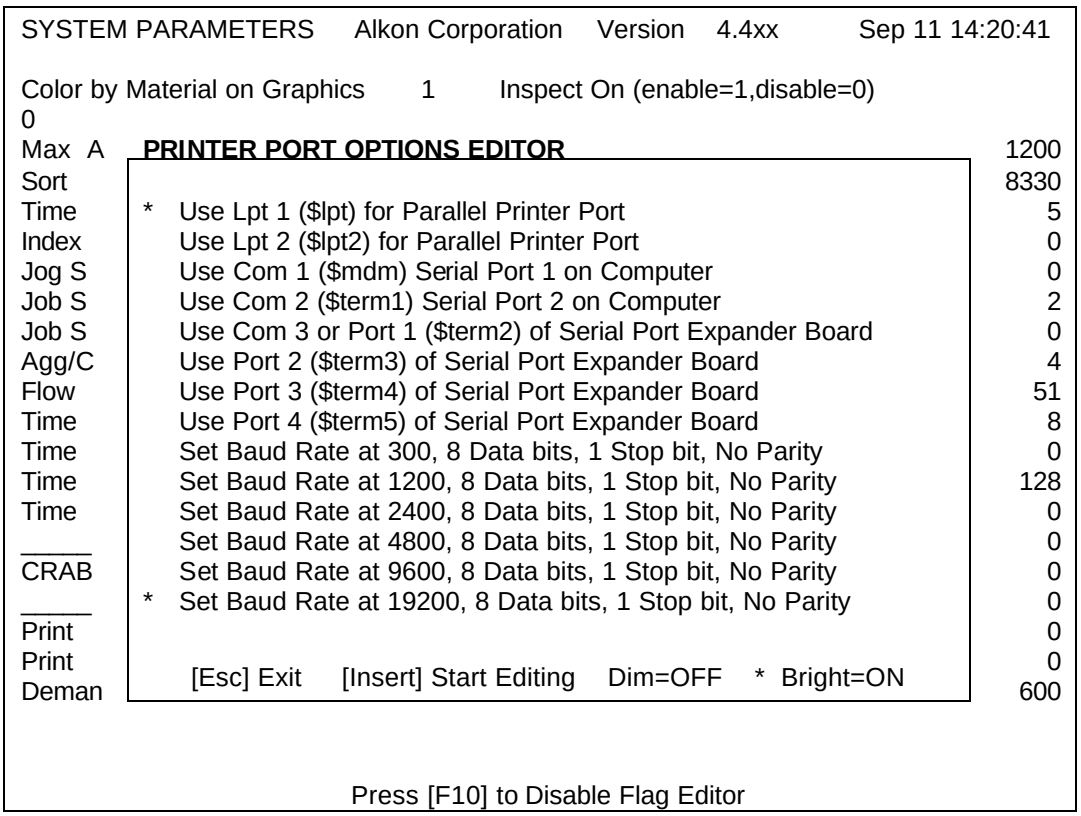
[Esc] Exit [Insert] Start Editing Dim=OFF Bright=ON

The options selected in the options editor above are shown on the batch report (ticket) shown below.

MATERIAL	REQ'D	BAT'D	MIX	TOL	AC-WT	%MST	JIM SMITH CONSTRUCTION
3/4 COMM	7052	7100	1750	0.7	6.3	0.75	DATE & TIME 2/26/97 9:17
SAND-R	5629	5600	1350	-0.5	27.7	7.15	PLANT NUMBER: 1
PORT II	2280	2280	570	0.0	0.0		BATCH NUM: 101666 DROPS:1
WATER	65	65	31.0	0.0 #	65.0		TRUCK 123 DRIVER: JOE
AEA	17	17	7.1	0.0	0.0		QUAN 5.00 MIX: 001
WRA	75	75	19	0.0	0.0		RT'D 1.00 MIX: 001
TEMPER WATER		0					SLUMP 7.0
							% HOT WATER 0
							WAT ADJUST -1.0
							AGG ST 0
							AGG ET 0
							CEM ST 0
TOL OK	TOL LOCKED		WAT TO ADD = 5.3				CEM ET 0
			WAT/CEM = 0.753T				HI ST ADX NONE
NO MANUAL TRIM			WAT IN TRK = 20.0				
SIMULATED TICKET							

PRINTER PORT (0=$lpt,Ser=8+)

The Printer Port Options Editor appears when placing the cursor on this parameter. This editor selects which port will be used for printing the delivery tickets and/or batch weights. If a serial port is selected, the setup information is also determined. In the example shown below, the ticket information will print from the Com1 serial port at a baud rate of 19,200 bps, with 8 data bits, 1 stop bit and no parity. The printer that is connected to Com1 should be set up for the same.



The Options Editor can be turned on and off by pressing the u key. (See Section 7.15).

DEMAND ON (enable=1, disable=0)

If the Spectrum has this option, scanning of the demand inputs is available. This parameter is of no consequence to most users, and should be set to zero.

INSPECT ON (enable=1, disable=0)
(Quick Edit Field)

If enabled, during the batching cycle after each material is weighed, the Spectrum will stop and wait for the user to vary the weight via the inspect potentiometer. The display will show over and under tolerance conditions. When finished, press the n key to proceed to next material. (Used mainly for certifications).

DEFAULT SERIAL PORT BAUD RATE

The BAUD rate for all serial ports not being used by the Manual Station, Link-20, or a ticket printer are set to this value.

AIR MIX SLUMP ADJUST (x 1000)

This parameter specifies the weight of water used in adjusting mixes with Air Entrainment. Typically, if an adjustment of 1/2 gallon per inch of slump is needed, enter the weight of 1/2 gallon. In U.S. measure, enter **4173**. In the case of Metric if 2.5 Liters per 25 mm of slump is desired enter **100**.

I/O OPTION

This parameter displays the type of Junction Box.

0,1,2	Used on Custom Spectrums.
3	Used for Spectrums with 36" x 30" J-Box.
4	Used for Spectrums with 24" x 24" J-Box and LCI-1 displays.
5	Used for Spectrums with an Integrated Manual Station.

INDEX DISPLAY CONTROL

On Spectrums with **Order Entry**, this parameter chooses the field that will be displayed (up to 10 characters) in the third column of the **Job Index** Screen. The following choices are available:

0 = Blank
1 = Delivery Information
2 = Memo (Link-20 Field)
3 = Notes
4 = Project Code (Link-20 Field)
5 = Mix Design Code
6 = Truck Number
7 = Sequence Number (Display Only)

All fields except the Mix Design Code can be modified on the **Job Index** Screen. Do not enter a value greater than 6.

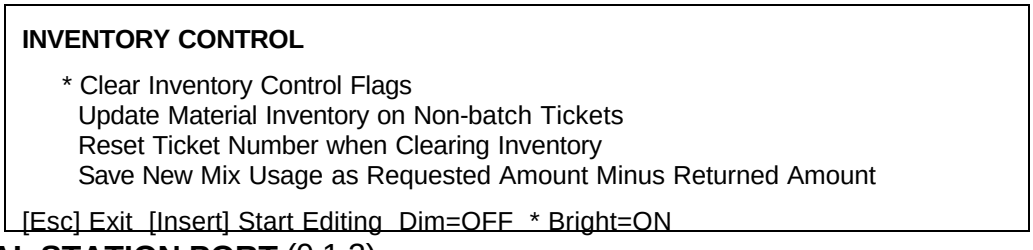
The **Index Display Control**, as shown above, appears when placing the cursor on this parameter. The Options Editor can be turned on and off by pressing u. (See Section 7.15).

INVENTORY CONTROL OPTION

A Spectrum with **Order Entry** has the capability to print tickets without actually batching a load. The Spectrum can also print theoretical target weights on the ticket. By setting this parameter to "1", the Spectrum will deduct the theoretical batch weights from the On-Hand Inventory. This is used mostly with stand alone Order Entry/Ticketing.

By adding "2", the Spectrum will automatically reset the ticket number to zero when the daily inventory is cleared.

By adding "4", the Spectrum will compensate for returned Mix Design usage.



MANUAL STATION PORT (0,1,2)

If the Spectrum has an **I/O Option** of five, this parameter shows which COM port is connected to the Manual Station.

1 = COM 1 (mdm) 2 = COM 2 (term1)

COM 2 (term1) should be used, if available.

FEDERAL TAX RATE % (x 100,000)

This parameter was added for Canadian tax calculations. The existing tax fields in **Order Entry** are to be used for Provincial taxes. The federal tax rate, entered in % x 1000, will tax the ticket sub-total regardless of products flagged as non-taxable. If the Federal tax is subject to Provincial tax, add 100,000 to the calculated Federal Tax Rate.

Example: 8% federal tax should be entered as 8,000. If the federal tax is subject to provincial tax, enter 108,000 in this field.

DISK 1 TYPE (1,2,3,4)

Use the following figures to determine the proper value to set the floppy disk drive type:

Num	Disk Size	Capacity	Typical CPU
1	5 1/4"	360K	Wyse, Zenith, IBM
2	3 1/2"	720K	Unisys
3	5 1/4"	1.2M	
4	3 1/2"	1.44M	DFI, Compaq

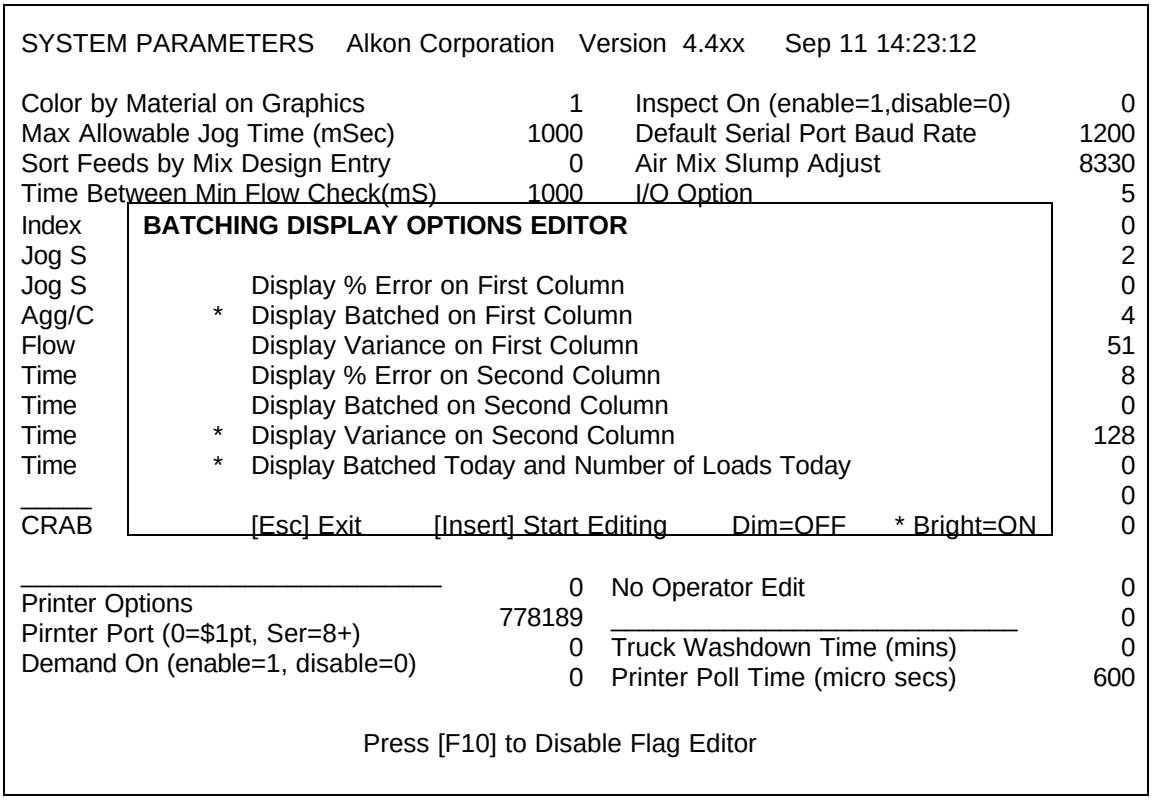
BATCHING DISPLAY OPTION

The Text-Based Batching display gives a choice of which optional items are to be displayed on the screen.

Two areas can be user defined. The first area is next to the target weights of the materials. Two of the following three fields can be displayed:

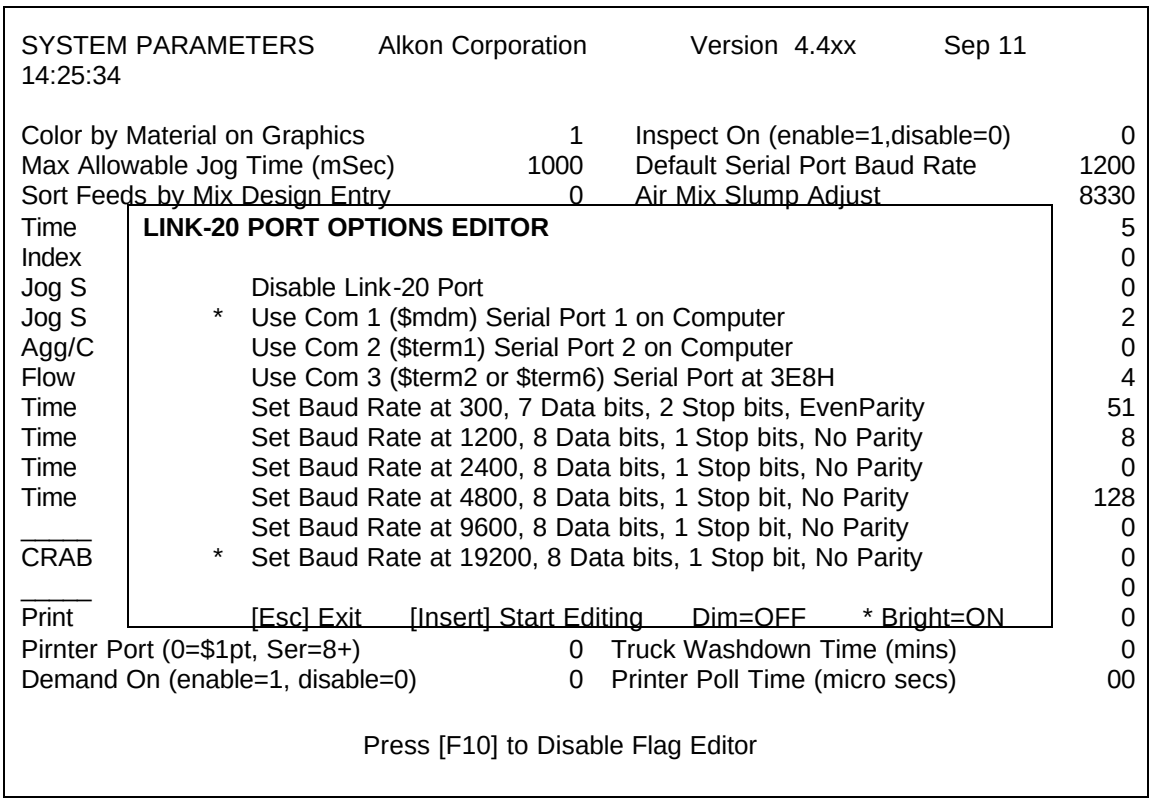
"Batched" amount
"Variance" amount
"Percent (%) Variance"

The **Batching Display Options Editor** appears when the cursor is placed on this parameter and is shown below. The Options Editor can be turned on and off by pressing the u key. Refer to Section 7.15 for details on using an Option Editor.



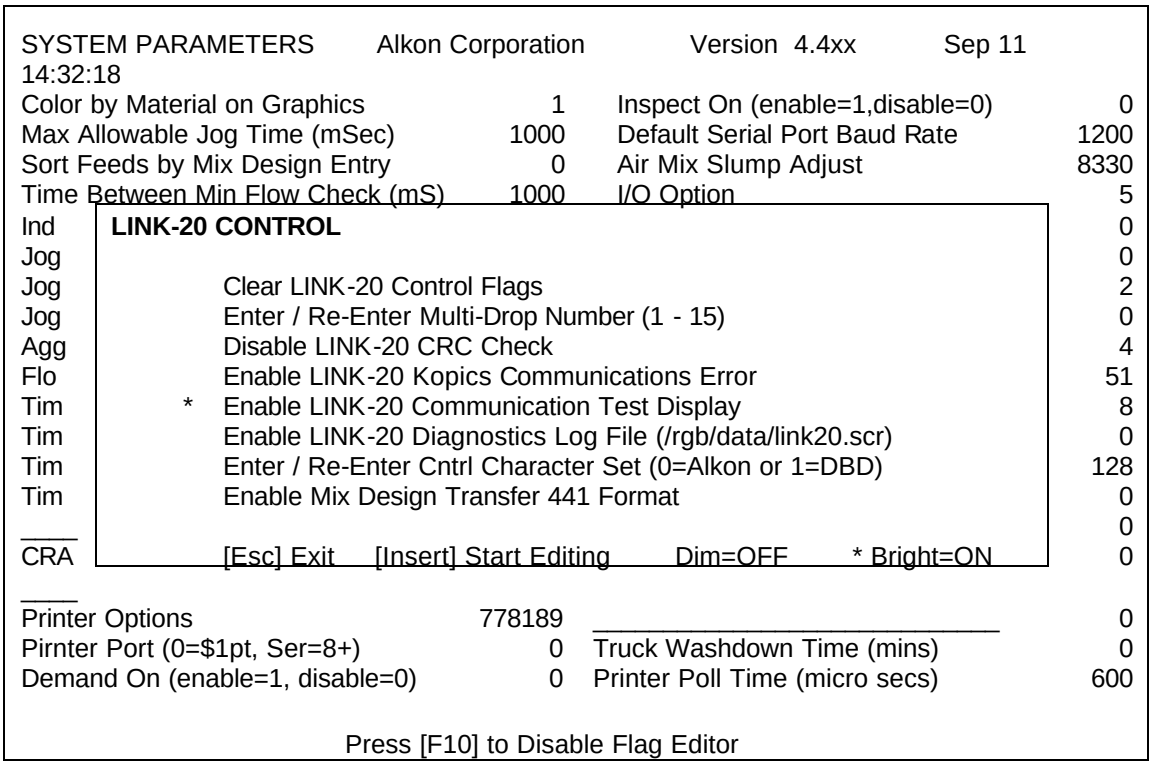
LINK-20 PORT (0=OFF,SER=8+)

If the Spectrum has Link-20, it can be programmed for different communication rates specified by this parameter.



MULTIDROP NUMBER/LINK-20 CNTRL (0=disable)

On systems using Link-20, this parameter controls how the Link will be set up and used. This parameters consists of a number (0 to 15) which represents the multidrop address of the system plus any other highlighted features. A value of 0 will allow the Link to work without any special control. The **Link-20 Control Editor** appears, as shown below, when the cursor is placed on this parameter.



CTS DELAY (mSec)

When using Link-20, this parameter forces the Spectrum to delay after raising the Request To Send line, which allows the modem carrier to be established. A typical value is 100 to 500 milliseconds.

DATE FORMAT IN TICKET RECORD

This controls whether the date is stored in DD/MM/YY or MM/DD/YY in the ticket record file (ticket.dat). A value of 0 will us the MM/DD/YY format and a value of 1 uses

DD/MM/YY.

DEL TCKT AFTER BATCH (enable=1)

When using Link-20 and central dispatch, setting this value to 1 causes the order to be deleted from the **Job Index**, after it has been batched. Normal setting of this value is zero.

NO OPERATOR EDIT (enable=1)

When using Link-20 and central dispatch, setting this value to 1 prevents the Spectrum operator from making any changes to the order. This prevents any pricing changes, and also guarantees the load shipped is the correct quantity. Normal setting of this value is zero.

TRUCK WASHDOWN TIME (mins)

This value is added to the batch time printed on the ticket and stored as TRUCK LEFT PLANT in the ticket file.

PRINTER POLL TIME (micro secs)

This sets the time interval used to poll the printer (250-2000). A number entered below 250 will default to using 1000. This parameter should be set properly for the processor and printer being used. A proper value for a DFI 386/33 computer and an Okidata 320 printer is 850, a 486/50 computer and an Okidata 320 printer is 600, and a P5/90 with a Okidata 320 printer is 700.

7.5 DISCHARGE PARAMETERS

DISCHARGE PARAMETERS Alkon Corporation Version 4.4xx Jun 21 13:37:48

Agg Slow Flow Rate	65	Pulse Number for Agg Vibrator	0
Agg Normal Flow Rate	90	Time Agg Gate Open After Zero	1000
Agg Fast Flow Rate	110	Normal Cement Open Pulse Strt	400
Agg Very Fast Flow Rate	120	Cmnt Close Pulse if Flow High	20
Cem Slow Flow Rate	60	Cmnt Open Pulse if Flow Low	75
Cem Normal Flow Rate	40	Critical Cement Flow	0
Cem Fast Flow Rate	60	Cmnt Full Open P if Flow Crit	0
Cem Very Fast Flow Rate	74	Cmnt Close P if Flow Critical	0
Agg Variation in Flow (%)	50	Weight to Turn On Cem Vibrator	100
Cem Variation in Flow (%)	30	Cem Full Open Weight	100
Time to Switch Open & Close	100	Time Cement Open After 0 Tol	1000
_____	0	Water Holdback (%)	20
Time to Start Conv	0	Minimum Water Holdback	30
Time to Start Agg After Conv	0	Time Water G Open After 0 Tol	0
Time to Start Cem	0	Seconds to Blow Out Admixes	0
Time to Start Water	0	Time to Purge Incl Conveyor	0
Agg Full Open Pulse at Strt	1600	Time to Close Gates at End	2000
Agg Normal Close Pulse at Strt	400	Initial Water Charge (%)	75
Agg Close Pulse if Flow High	100	Hold Agg Gates Open (0/1)	1
Agg Open Pulse if Flow Low	100	Hold Cem Gates Open (0/1)	1

Page 1 [Esc] TO EXIT [PgDn/PgUp] For Next / Previous Page

Pressing } will go to the next screen of parameters.

DISCHARGE PARAMETERS Alkon Corporation Version 4.4xx Jun 21 13:37:55

Agg to Strt Main Water Chg	0	Time to Start Admix 8 Disch	0
Cem to Strt Main Water Chg	0	% Agg to Start Cement	15
Agg Vib on Weight	500	Time to Start Admix 9 Disch	0
Start Water / Material Control	1	Time to Start Admix 10 Disch	0
Time to Issue Agg Close Pulse	1000	Holdback on all Multi-batches	0
Time to Issue Agg Open Pulse	2000	End of day Truck Washout	50
Time to Issue Cem Close Pulse	3000	Early discharge (bit mapped)	0
Time to Issue Cem Open Pulse	1500	Time to Start Admix 11 Disch	0
Time to Issue Cem Crit Pulse	1000	Time to Start Admix 12 Disch	0
Agg Vib Pulse if Flow Low	0	Time to Start Admix 13 Disch	0
Time to Reset Agg Vib Count	11000	Time to Start Admix 14 Disch	0
Agg Full Open Weight	800	Time to Start Admix 15 Disch	0
Incl Conv Continuous On	0	Time to Start Admix 16 Disch	0
Time to Start Admix 1 Disch	5000	Time to Start Admix 17 Disch	0
Time to Start Admix 2 Disch	5000	Time to Start Admix 18 Disch	0
Time to Start Admix 3 Disch	5000	_____	_____
Time to Start Admix 4 Disch	5000	_____	_____
Time to Start Admix 5 Disch	0	_____	_____
Time to Start Admix 6 Disch	65000	_____	_____
Time to Start Admix 7 Disch	0	_____	_____

```
Page 2          [Esc] TO EXIT    [PgDn/PgUp] For Next / Previous Page
```

AGG SLOW FLOW RATE
AGG NORMAL FLOW RATE
AGG FAST FLOW RATE
AGG VERY FAST FLOW RATE

CEM SLOW FLOW RATE
CEM NORMAL FLOW RATE
CEM FAST FLOW RATE
CEM VERY FAST FLOW RATE

Each of the above flow rates specify the weight (per second) that is allowed to flow from the scales. They relate to classifications given to each truck in the Truck Discharge Table.

Typical values are as follows:

	AGG	CEM
Slow	300	125
Normal	375	15
Fast	400	140
Very Fast	450	145

AGG VARIATION IN FLOW
CEM VARIATION IN FLOW

During inching of the aggregate and cement discharge gates, the Spectrum uses these percentages to determine if corrective action is required. It does this by pulsing the gate open or close, bringing the flow rate within this tolerance band.

The normal tendency is to set these values too low, causing the Spectrum to constantly take corrective action. Typical values range between 20 and 50.

TIME TO SWITCH OPEN AND CLOSE

During the discharge cycle, the Spectrum adjusts the gates by pulsing the open or close solenoid valve. To prevent both from coming on at the same time, the value entered here forces a delay between the open and close pulses. A typical value is 100 milliseconds.

TIME TO START CONV
TIME TO START AGG AFTER CONV
TIME TO START CEM

These timing values set the discharge sequence of ingredients. The values, entered in milliseconds, all begin when the discharge cycle is started.

TIME TO START WATER

Works the same as above parameters but should be changed in the Quick Edit Menu. Refer to Section 7.14.

AGGREGATE FULL OPEN PULSE AT STRT

By the time the discharge cycle starts, the materials in the scales may have settled and packed. By pulsing the agg gates open to full and back down (see below), the material can be induced to start flowing at a high rate, and then a more reasonable rate can be maintained with the gate partially closed. This value should be the amount of time it takes to open the agg scale door to full. Time is entered in milliseconds (i.e.: 2000 mSec = 2 Sec).

AGG NORMAL CLOSE PULSE AT STRT

After the Spectrum has fully opened the discharge gate and established flow from the batcher, it tries to close the gate to a position which gives a flow equal to the SLOW FLOW RATE.

Typical values depend upon the plant's mechanical reaction, and range from 500 to 1000 milliseconds.

AGG CLOSE PULSE IF FLOW HIGH

If, during the DISCHARGE SCALE READ TIME, the flow rate has exceeded the desired value (slow/normal/fast/very fast flow rate) by the percentage in the VARIATION IN FLOW parameter, the Spectrum will energize the close solenoid valve for the time entered here. This value should be small in order to keep the change gradual.

The minimum effective value is 20 milliseconds, and a typical value ranges between

50 and 75 milliseconds.

AGG OPEN PULSE IF FLOW LOW

If the Spectrum notices the flow rate is less than the desired value (slow/normal/fast/very fast flow rate) by the percentage in the **Variation In Flow** parameters, during the Discharge Scale Read Time, it energizes the open solenoid valve for the time specified here. This value should be kept small to make gradual changes in the position of the discharge gate opening.

The minimum effective value is 20 milliseconds, and a typical value is 50 to 75 mSec.

PULSE NUMBER FOR AGG VIBRATOR

Each time the aggregate discharge open solenoid valve is energized with no change in the flow rate, the pulse is counted. After accumulating the number of pulses set on this line, the Spectrum energizes the batcher vibrator and establishes the flow. A typical value for this parameter is 10.

TIME AGG GATE OPEN AFTER ZERO

After the aggregate batcher has been discharged to the scale zero tolerance value (set on the Scale Calibration Screen), the Spectrum closes the aggregate batcher gate following the delay specified on this line. A typical value is 3000 mSec.

NORMAL CEMENT OPEN PULSE

At the start of the cement discharge, the batcher gate must be wider than during discharge. The time period (specified by this value) will determine how far the gate is open. The cement discharge is also affected by the **Cement Close Pulse If Flow High**. A typical value is 125 milliseconds.

CMNT CLOSE PULSE IF FLOW HIGH

Once the cement gate has been opened by the **Normal Cement Open Pulse**, and the Spectrum detects the flow rate is in excess of the percentage variance, the value entered here will pulse the gate partially closed. A typical value is 50 mSec.

CEMENT OPEN PULSE IF FLOW LOW

Once the cement gate has been opened, providing the correct flow, the flow is monitored by the Spectrum. The time specified here is used to pulse the gate open if the flow rate is too low. A typical value is 50 mSec.

CRITICAL CEMENT FLOW

During the discharge of cement, the flow may stop or become less than the required flow rate. If this value is non-zero, the Spectrum interprets this as cement hung in the weigh batcher. The next two parameters are used to simulate the action of someone banging the gates to re-establish the flow. This value should normally be set to zero.

CEMENT FULL OPEN P IF FLOW CRITICAL
CEMENT CLOSE P IF FLOW CRITICAL

When the Spectrum detects that the cement flow has stopped, it will pulse the open valve for the time entered here. This should be equivalent to fully opening the gate. Immediately afterwards, the Spectrum will also pulse the cement gate closed with the **Cmt Close P If Flow Critical**. However, this pulse should be of shorter duration so that the gate doesn't completely close. Typical values are 100 for the open and 25 for the close.

WEIGHT TO TURN ON CEM VIBRATOR

This value instructs the Spectrum when to turn on the vibrator in the cement weigh batcher. Generally, this should occur in the last 200 to 300 units of weight.

CEM FULL OPEN WEIGHT

As the cement scale empties, this parameter opens the gate wide at the weight value entered here. A typical value is 250.

TIME CEMENT OPEN AFTER 0 TOL

This value controls how long the cement discharge gate remains open after the scale reaches zero. A typical value is 3000 mSec.
WATER HOLDBACK (%) (Quick Edit Field)

This value represents a percentage of the total water to hold until the washdown cycle.

MINIMUM WATER HOLDBACK (Quick Edit Field)

On smaller loads a percentage of water may be too small. This value represents the minimum amount allowed for washdown water.

TIME WATER G OPEN AFTER 0 TOL

On weighed water plants or plants with a water holding tank, this parameter controls the length of time the water discharge valve remains open after the hopper reaches zero. A typical value is 0.

TIME TO BLOW OUT ADMIXES (in seconds)

The Spectrum blows out the empty admix bottle for the length of time entered here. A typical value is 1 Second.

TIME TO PURGE INCL CONVEYOR

On low profile plants that use an inclined conveyor to discharge the aggregate, this parameter determines how long the conveyor will run, after the scale reaches zero, in order to clear the belt. During a multi-batch, the conveyor remains on between batches. A typical value is 10000 mSec.

TIME TO CLOSE GATES AT END

After discharge is complete, this parameter ensures that all gates are closed by pulsing all gate close solenoid valves for the period of time entered here. A typical value is 2000 mSec.

INITIAL WATER CHARGE (%)

This parameter specifies the amount of water that should be added prior to discharge of any other materials and should be changed in the Quick Edit Menu. Refer to Section 7.14.

HOLD AGG GATES OPEN (0/1)

HOLD CEM GATES OPEN (0/1)

To hold the discharge gates of these materials open for the duration of the discharge, enter "1" for both of these parameters. It is possible to have inching on one or both of the discharges. For inching control, enter "0" for these parameters.

% AGG TO START MAIN WATER CHG
% CEM TO START MAIN WATER CHG

Enter the percentage of the aggregate and/or cement weights to release the main water charge.

AGG VIB ON WEIGHT

During discharge, the Spectrum turns on the aggregate vibrator when the scale reaches this value. A typical value is 2000.

START WATER / MATERIAL CONTROL

If the **Initial Water Charge** and **Water Holdback** add up to less than 100 %, a third stage of water will be used. This stage is called the Main Water Charge. When three stage water is being setup, this value should be set to "1", otherwise set the value to "0". When this is set to a "1", the Main Water Charge will begin according to the % Agg To Start Main Water Chg and % Cem To Start Main Water Charge as described above.

The **Start Water / Material Control Option Editor** appears, as shown below, when the cursor is placed on this parameter.

```
START WATER / MATERIAL CONTROL

   Start Main Water by Weight of Aggregate and/or Cement
   Determine End of Initial Water Charge by Holding Tank Zero Probe
 * Do Not Wait Until Initial Water Finished to Start Agg Discharge
 * Do Not Wait Until Initial Water Finished to Start Cem Discharge
   Wait for Admixes to Empty Before Starting Washdown Water
   Wait for Conveyor to Purge Before Starting Washdown Water

 [Esc] Exit  [Insert] Start Editing  Dim=OFF  * Bright=ON
```

TIME TO ISSUE AGG CLOSE PULSE
TIME TO ISSUE AGG OPEN PULSE
TIME TO ISSUE CEM CLOSE PULSE
TIME TO ISSUE CEM OPEN PULSE

Vibration can cause erroneous scale readings during the discharge cycle, and thus affect flow rate calculations. These four values control the Spectrum's response to discharge flows outside the range allowed by the **Agg Variation** and **Cem Variation In Flow** Values.

The longer the time value specified here, the slower the response will be in issuing corrective pulses. Each time the Spectrum sees a flow value outside the allowable variation, it tallies the event within these time periods. Each time the flow rate is sensed as being high, a count of one is added to an internal counter. Each time the flow rate is low, a count of one is subtracted. If the count is positive at the end, the Spectrum will issue a corrective pulse to close the gates. If the count is negative, a pulse to open the gates will be given. Typical values are 1000 mSec.

TIME TO ISSUE CEM CRIT PULSES

During the discharge cycle, the flow of the cement may stop or fall far below the desired flow rate. This is referred to as the CRITICAL FLOW VALUE. Since vibration of the load cells affect the calculation of the flow rate, erroneous readings can occur.

To filter these bad readings, this value is provided so that corrective action is taken only when necessary. Each time the Spectrum notes a reading below the critical value, one is added to the counter. Similarly, each time the flow is above the critical value, one is subtracted. The net result determines the corrective action. This value should be lower than the **Time to Issue Cem Open Pulse** above, since critical readings also count as low readings and the **Normal Cement Open Pulse** takes precedence over the **Cmnt Full Open P If Flow Critical** pulse. Typical value is 1500 mSec.

AGG VIB PULSE IF FLOW LOW

This controls the length of time the aggregate vibrator is energized during low flows to re-establish the material flow. The time specified is in milliseconds, and a typical value is 3000.

TIME TO RESET AGG VIB COUNT

The **Pulse Number For Agg Vibrator** counts the number of pulses issued to establish flow. If the Spectrum has not issued an open pulse during this time, the counter accumulating these pulses resets.

AGG FULL OPEN WEIGHT

As the aggregate scale empties, this parameter opens the gate wide at the weight value entered here. A typical value is 2000.

INCL CONV CONTINUOUS ON

Normally, aggregate discharge conveyors use a start and stop pulse. If required, this start signal can be changed to be continuous throughout the aggregate discharge. Entering "1" will cause the **Dis Start Pls** output on the J-Box I/O assignment to be on continuously. A normal value is zero. Contact Alkon Service if you have questions about this.

TIME TO START ADMIX DISCH

After the start of discharge, each admix can be delayed by this period of time before discharge.

% AGG TO START CEMENT

This parameter allows the cement to begin discharge after percentage of aggregate has discharged, regardless of load size.

HOLDBACK ON ALL MULTI-BATCHES

Entering "1" forces the Spectrum to washdown at the end of every partial batch. Entering "0" forces a washdown at the end of the last batch. A typical value is zero.

END OF DAY TRUCK WASHOUT

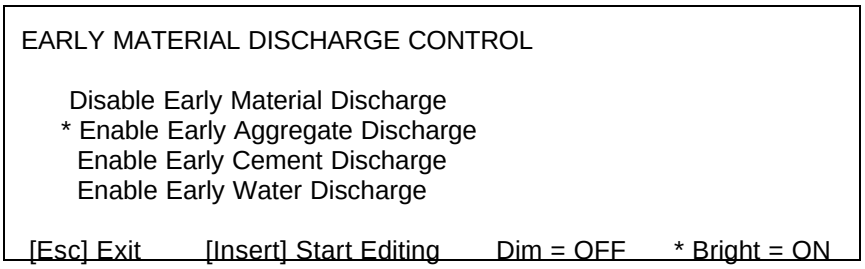
Enter the amount of water to be used to wash out trucks at the end of the day. This amount will run automatically by using `key in the Auto Batch Setup Screen.

EARLY DISCHARGE (bitmapped)

This allows any batcher to discharge before other batchers are finished weighing. A value is entered which is a sum of all batchers to be discharged early.

Admixtures discharges are set up by the Basis Feed Discharge Type parameter in the Ingredient Table. (See Section 3).

The **Early Discharge Option Editor** appears, as shown below, when the cursor is placed on this parameter.



7.6 ADJ MIXER & MISC PARAMETERS

```
MIXER PARAMETERS     Alkon Corporation   Version  4.4xx     Sep 11 14:46:29

 2nd Process (ie: Mixer) Enable   16   Select Control for Mixer 1        0
 Mixing Time (seconds) default     0   Select Control for Mixer 2        0
 Default Mixer 1 Disch Time (S)    0   Default Mixer 2 Disch Time (S)    0
 Initial Mixer 1 Disch Pulse       0   Initial Mixer 2 Disch Pulse       0
 Seconds Until Full Mixer 1 Open   0   Seconds Until Full Mixer 2 Open   0
 Mixer 1 Options (2+4+8+16+...)    0   Mixer 2 Options (2+4+8+16+...)    0
 CHARGE EARLY 1 disch delay (S)    0   CHARGE EARLY 2 disch delay (S)    0
 Mixer Size (x 10)                 0   Enable Bin Filling System         1
 Mixer Small Load Size (x 10)      0   Enable Shrink Mixer Control       0
 Sm. Load - Mixer Disch Time (S)   0   % Mixing Time in Shrink Mixer     0
 Mixer Medium Load Size (x 10)     0   ________________________________  0
 Md. Load - Mixer Disch Time (S)   0   Backup Data Type                  0
 Robo-Tilt Controller Bd Address   5   Material Record Options         261
 Enable PLC Task                   1   Mat'l Record File Size(df=300k)  0
 Robo-Tilt Mixer Return Setting    0   ________________________________  0
 Robo-Tilt Rate Modifier ( % )     0   ________________________________  0
 Robo-Tilt Table Init. Tilt Rate   0   ________________________________  0
 Erie Mixer Tilt Cushion Time      0   ________________________________  0
 Enable Batcher Start from I/O     0   ________________________________  0
 Available 2nd Process Controls    1   ________________________________  0

Page 1  [F6]User Scale Editor [F7]Robo Mixer Table [F8]Misc Printed Fields
[F4] User Dev Editor                                  [PgDn/Up] Next Page
```

Pressing } will display the next screen of parameters.

```
H.HOPPER PARAMETERS     Alkon Corporation   Version  4.4xx  Jun 21 13:44:48

  Agg Slow Flow Rate               0   Agg Full Open Pulse at Strt         0
  Agg Normal Flow Rate             0   Agg Normal Close Pulse at Strt      0
  Agg Fast Flow Rate               0   Agg Close Pulse if Flow High        0
  Agg Very Fast Flow Rate          0   Agg Open Pulse if Flow Low          0
  Cem Slow Flow Rate               0   Pulse Number for Agg Vibrator       0
  Cem Normal Flow Rate             0   Weight to Turn On Agg Vibrator      0
  Cem Fast Flow Rate               0   Agg Full Open Weight                0
  Cem Very Fast Flow Rate          0   Agg Vib Pulse if Flow Low           0
  Agg Variation in Flow (%)        0   Time Agg Gate Open After Zero       0
  Cem Variation in Flow (%)        0   Normal Cement Open Pulse Strt       0
  Water Tank (weighed=0, float=1)  0   Cement Close Pulse if Flow High     0
  Time to Start Conveyor           0   Cement Open Pulse if Flow Low       0
  Time to Start Agg After Conv     0   Weight to Turn On Cem Vibrator      0
  Time to Start Cem                0   Time Cem Gate Open After Zero       0
  Time to Start Water              0   Initial Water Charge % or float     0
  Time to Purge Incl Conveyor      0   Amount of Water to Holdback         0
  Time to Close Gates at End       0   Time Water Gate Open After Zero     0
  Time to Issue Agg & Cem Pulses   0   Aggregate Scale Number              0
  % Agg to Start Cement            0   Cement Scale Number                 0
  Select Control for Hold Hopper   0   Weighed Water Scale Number          0

    [F6] USER SCALE EDITOR  [F7] ROBO MIXER TABLE  [F8] MISC PRINTED FIELDS
     Page 2     [Esc] TO EXIT          [PgUp] PREVIOUS PAGE
```

These are parameters for plants with a mixer, holding hopper or both. There are also several parameters to deal with special options and features of the Spectrum System. A description of all the parameters on these screens follows.

2nd PROCESS (i.e.: MIXER) ENABLE (Quick Edit Field)

This parameter specifies to the Spectrum which options (i.e.: Mixer, Holding Hopper, etc.). are available to be used.

MIXING TIME (SECONDS) DEFAULT

If no mixing time is entered in the Mix Design Screen for a given mix, the mixing time will default to this value.

DEFAULT MIXER 1 DISCH TIME(S)

This is the length of time the mixer stays in the full tilt/open position before returning to the home position. This parameter is used with **Auto Right/Close After Mixing Time**

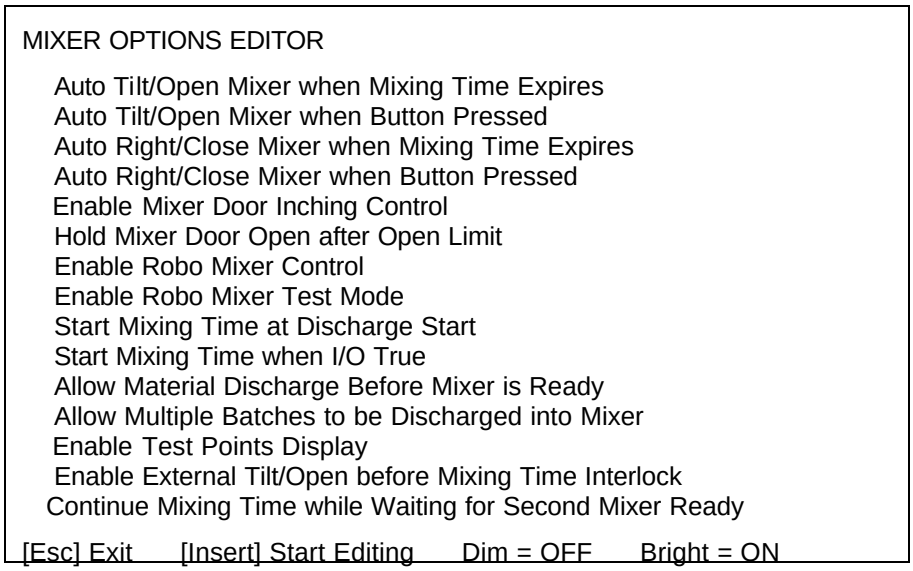
in the Mixer Options described below.

INITIAL MIXER 1 DISCH PULSE
SECONDS UNTIL FULL MIXER 1 OPEN

If Mixer Door Inching is enabled in the Mixer Options described below, the **Initial Mixer Disch Pulse** is the time the mixer will initially tilt/open. The mixer will then wait for **Seconds Until Full Mixer Open** before fully tilting/opening.

MIXER 1 OPTIONS (2+4+8+16+...)

The Mixer Options are set using the Options Editor shown below:



AUTO TILT/OPEN MIXER WHEN MIXING TIME EXPIRES

Start tilting/opening immediately after mixing time expires without manual intervention.

AUTO TILT/ OPEN MIXER WHEN BUTTON PRESSED

Start tilting/opening after TILT/OPEN button on manual station has been pressed.

AUTO RIGHT/CLOSE MIXER WHEN MIXING TIME EXPIRES

Start righting/closing immediately after mixer disch time expires without

manual intervention.

AUTO RIGHT/CLOSE MIXER WHEN BUTTON PRESSED

Start righting/closing after TILT/OPEN button on manual station has been pressed.

ENABLE MIXER DOOR INCHING CONTROL

Allows for partial door open. Mixer open signal will pulse for the **Initial Mixer Disch** Pulse duration.

HOLD MIXER DOOR OPEN AFTER OPEN LIMIT

Holds mixer door open after open limit for the duration of **Mixer Disch Time**.

ENABLE ROBO MIXER CONTROL
ENABLE ROBO MIXER TST MODE

Used for systems equipped with Robo-Tilt. Refer to Robo-Tilt Section.

START MIXING TIME AT DISCH START

Mixing time starts with discharge rather than at the end of discharge.

START MIXING TIME WHEN I/O TRUE

Used in conjunction with the I/O assignment **OK to Start Mix Time**. The mixing time will not begin until this input is received.

ALLOW MATERIAL DISCHARGE BEFORE MIXER IS READY

Starts discharge cycle before mixer is in home position. Used with Charge Early Discharge Delay described below:

NOTE: This is a "dangerous" option and should only be used when trying to achieve maximum plant production.

ALLOW MULTIPLE BATCHES TO BE DISCHARGED INTO MIXER

Allows mixer to be charged up to the Mixer Size for a multi-batch load.

ENABLE TEST POINTS DISPLAY
Test points are used for software development.

ENABLE EXTERNAL TILT/OPEN BEFORE MIXING TIME INTERLOCK
This allows the Tilt (Open) signal to be held on if it is pressed before the mixing time has expired.

CONTINUE MIXING TIME WHILE WAITING FOR SECOND MIXER READY
This was added for systems with a shrink mixer.

CHARGE EARLY 1 DISCH DELAY

If Charge Early is selected in Mixer Options, this is the time to wait after the mixer has left the tilt limit before initiating the discharge of the scales.

MIXER SIZE (x 10)

The value entered here is the cubic volume capacity of the mixer x 10.

MIXER SMALL LOAD SIZE (x 10)
SM. LOAD - MIXER DISCH TIME(S)
MIXER MEDIUM LOAD SIZE (x 10)
MD. LOAD - MIXER DISCH TIME(S)

These parameters allow for different load sizes to have different mixer discharge times from the default. Any load size equal to or smaller than the Mixer Small Load Size will use the Sm. Load - Mixer Disch Time. A load ranging between the small load size and the medium load size will use the Md. Load - Mixer Disch Time. Both sizes are entered as cubic yardage/meter x 10 and the times are entered in seconds.

ROBO-TILT CONTROLLER BD ADDRESS

On systems equipped with Alkon's automatic learned tilting of the mixer, Robo-Tilt, this parameter shows where to address the CRAB-Analog Board. (A=1,B=2,C=3,etc.).

ENABLE PLC TASK

0 Disables the PLC task
1 Enables the PLC task
2 Enables Skip Control (DO NOT USE)
4 Enables Mixer Probe Troubleshooting (DO NOT USE).

Do not change this parameter without consulting the Alkon Service Department at 1-614/792-0677.

ROBO-TILT MIXER RETURN SETTING
ROBO-TILT RATE MODIFIER (%)
ROBO-TILT TABLE INIT. TILT RATE

These parameters are used on systems with the Robo-Tilt option and control the way in which the controller works.

ERIE MIXER TILT CUSHION TIME

This is the time to energize the tilt cushion valve of an Erie Strayer Mixer after receiving a tilt limit signal.

ENABLE BATCHER START FROM I/O

This uses I/O locations to allow the start of individual batchers. These I/O locations are found on the third page of the J-Box I/O Assignments and are labeled: **OK Start Agg, OK Start Cem, OK Start Wat, OK Start Adx**. To enable these to work, add together the values as specified below and enter the sum.

1 - Aggregate
2 - Cement
4 - Water
5 - Admix

Consult the Alkon Service Department at 1-614/792-0677 before changing this value.

AVAILABLE SECOND PROCESS CONTROLS

This parameter tells the system that there is a mixer or mixers, holding hopper, or both. This parameter is set using an Options Editor. The Options Editor can be turned on and off by pressing the u key. (See Section 7.15).

```
AVAILABLE 2nd PROCESS CONTROLLERS

    * No 2nd Process Controllers Available
      Mixer 1 Available
      Mixer 2 Available
      Automatic Discharging Holding Hopper Available
      Use First Available 2nd Process Controller (Only used in enable)

[Esc] Exit      [Insert] Start Editing      Dim = OFF      * Bright = ON
```

SELECT CONTROL FOR MIXER 1

This parameter tells the system when to turn on the Select Output for the mixer. The Select Output can be used to energize diverters or other plant outputs as required. This parameter is set using an Options Editor. The Options Editor can be turned on and off by pressing the u key. Refer to Section 7.15 for instructions on using an Options Editor.

```
MIXER 1 SELECT CONTROL

 * Select Output ON when Mixer 1 is READY
   Select Output ON when Mixer 1 is Empty
   Select Output ON when Mixer 1 is Requested
   Select Output ON when Mixer 1 Selected by Quick Edit
   Suppress Select Output Switching until Next is Ready
   Leave Select Output ON

[Esc] Exit  [Insert] Start Editing  Dim=OFF  * Bright=ON
```

SELECT CONTROL FOR MIXER 2
DEFAULT MIXER 2 DISCH TIME
INITIAL MIXER 2 DISCH PULSE
SECONDS UNTIL FULL MIXER 2 OPEN
MIXER 2 OPTIONS (2+4+8+16+...)
CHARGE EARLY 2 DISCH DELAY

These parameters are identical to the mixer 1 parameters explained previously except they pertain to the 2nd mixer.

ENABLE BIN FILLING SYSTEM

If the Spectrum system also controls the material handling, this parameter will be set to a "1". Otherwise, this should be set to a value of "0".

ENABLE SHRINK MIXER CONTROL

If a shrink mixer is to be controlled as mixer 1, this parameter should be set to a value of "1"; otherwise, it should be "0".

% MIXING TIME IN SHRINK MIXER

This is the amount of the total mixing time (as a percentage) that the shrink mixer will use out of the total mixing time defined for that mix.

BACKUP DATA TYPE

Entering a value of 1 will force the Spectrum to re-make a new Data disk every time it performs a backup. This should not be used unless you consult and Alkon Service Engineer prior to setting it to 1. A value of zero will disable this feature.

MATERIAL RECORD OPTIONS

This parameter defines the format that will be used when storing each batch record to disk. These records are to be used by the QC Helper program or other 3rd party programs for use of tracking plant efficiency and accuracy. The editor for this parameter appears on the following page. (This is only needed if the **Material Records To Disk** option was purchased).

MATERIAL RECORD OPTIONS EDITOR

Disable Material Record Storage
Store All Types of Loads
* Store Automatically Batched Loads (Batch Code 'Y' or 'B')
Store Non-Batched Loads (Batch Code 'N' or 'P')
* Store Manually Batched Loads
Store Simulated Loads
Remove CR character from Record Separator (Line Feed only)
Record Items are TAB Delimited
* Record Items are COMMA Delimited
Record Items are PIPE (|) Delimited

MAT'L RECORD FILE SIZE (df=300k)

This parameter defines the size of the file (described above) that the Spectrum should allow before alerting the user that it is time to back it up.

All of the parameters on page two the Holding Hopper Parameters Screen pertain to the automatic discharge of a holding hopper. Since the discharge can be flow controlled, many of these parameters are duplicates from the Discharge Parameters Screens. Refer to Section 7.5 for explanations. An explanation of the unique parameters in this screen follows.

WATER TANK (WEIGHED=0, FLOAT=1)

If the holding hopper has a weighed water scale, enter a value of "0" in this parameter. If the holding hopper has a water tank with a float switch to signal when it is empty, enter a value of "1" in this parameter.

SELECT CONTROL FOR HOLD HOPPER

This parameter tells the system when to turn on the Select Output for the holding hopper and is set using an Options Editor. (See Section 7.15) The Select Output can be used to energize diverters or other plant outputs as required.

```
HOLDING HOPPER SELECT CONTROL

* Select Output ON when Holding Hopper is READY
  Select Output ON when Holding Hopper is Empty
  Select Output ON when Holding Hopper is Requested
  Select Output ON when Holding Hopper is Selected by Quick Edit
  Suppress Select Output Switching until Next is Ready
  Leave Select Output ON

[Esc] Exit  [Insert] Start Editing  Dim=OFF  * Bright=ON
```

AGGREGATE SCALE NUMBER
CEMENT SCALE NUMBER
WEIGHED WATER SCALE NUMBER

These parameters set which scale number, from the Modify Scale Calibration Screens, read the holding hopper's load cell.

USER SCALE EDITOR

The User Scale Editor is used to assign an additional batcher (other than AGG, CEM, or WATER) to the Batching Display. The scale editor is invoked by pressing the q key in the Adj. Mixer and Misc. Parameters Screen.

```
USER SCALE EDITOR
                                                    Active      Conv Bin+
   Description    Scale     Scale Max  Decimals    Bit Map    (256*Color)

   FLYASH           15        5000         0           2           0
   MOISTURE 1       4         10           2           4           256
   MOISTURE 2       16        10           2           4           1024
```

Description is the displayed name of the additional batcher.

Scale Number represents the location of the scale in the Modify Scale Calibration Screen.

Scale Max represents the capacity of the scale.

Decimals is the number of decimals to be displayed.

Active Bit Map is the device number which will make this scale active in the Graphics Screen.

Conv Bin+(256*Color) is the bin number of an ingredient whose Batching Units will be used to convert from U.S. to Metric and vice versa. (255 is a special case and should only be used for Temper Water).

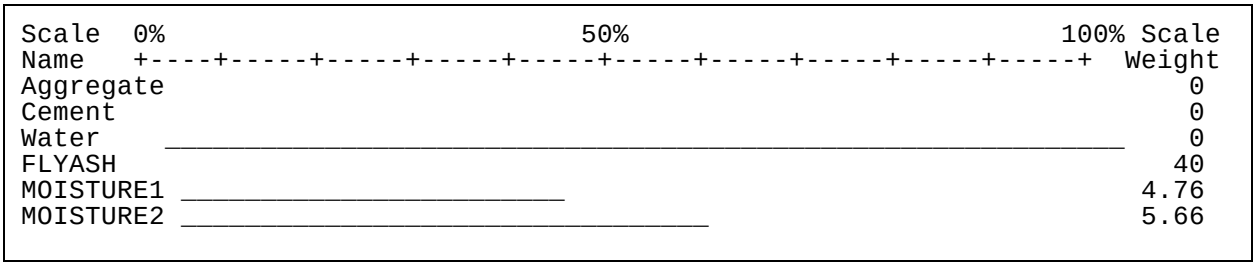
Add to this number the color code times 256 to display a colored bar. Color codes can be found in Section 7.4 in the **Index Display Def Color**.

Example: To use the units from the first cement scale, for conversion and display a bright red bar:

Cement bin = 9; Bright Red = 12
9 + (256 * 12) = 3081

After entering all necessary values, use the | key to leave the Scale Editor.

The values entered in the example above are displayed in the Batching Screen on the following page.



NOTE: Extra batchers (i.e.: Flyash in above example) will not weigh simultaneously unless they are weighed admixes. In the case of Flyash, it will not be weighed until after the cement weighs.

MISC PRINTED FIELDS

There are several names of fields that are printed on the batch weights that can be edited to print differently. The default printed names of these fields are Temper Water, Hot, and % Hot Water.

To rename these fields, press s when in the Adj. Mixer and Misc. Parameters Screen. The following will be displayed:

```
MISC PRINTED FIELDS


TEMPER WATER                        MIXER WATER
HOT              (ingredient)
% HOT WATER      (summary)
```

The name on the left is the default printed name, the name on the right is the actual printed name for that field.

On the example above, TEMPER WATER will be printed as MIXER WATER, HOT and % HOT WATER will not get printed.

ROBO-TILT TABLE EDITOR

The Robo-Tilt Table as described in the Robo-Tilt Section is edited in the Robo-tilt Table Editor as shown below:

ROBO TILT TABLE EDITOR

LOAD SIZE	INITIAL TILT TIME	SLUMP	NORMAL TILT RATE
0.0	0	0.0	0
1.0	0	1.0	0
2.0	0	2.0	0
3.0	0	3.0	0
4.0	0	4.0	0
5.0	0	5.0	0
6.0	0	6.0	0
7.0	0	7.0	0
8.0	0	8.0	0
9.0	0	9.0	0
10.0	0	10.0	0
11.0	0	11.0	0
12.0	0	12.0	0

This editor is accessed by pressing r while in the Adj. Mixer and Misc. Parameters Screen. Refer to Robo-Tilt Section.

USER DEVICES EDITOR

Use the editor (shown below) for defining the functionality of all port devices (i.e.: remote terminals, modems, etc.).

```
   USER DEVICES EDITOR

  Usr# User Description          Terminal Type    Port Desc
  Command Line 1  (Note: # char is replaced by Port Desc.)   Baud,D,S,P
  Command Line 2  (Note: @ as 1st char appends line 2 to 1.) TTY Number

 1  Main Console User              qnx              $con

    ____________________________________________________________       0
 2  Remote Terminal 1 User         qnx              $null
    ontty # comm c=/rgb/screen.t +D                          19200 8 1 0
    ____________________________________________________________     -1
 3  Remote Terminal 2 User         qnxt             $term2
    ontty $con2 qterm m=$term2                               19200 8 1 0
  ____________________________________________________________       5
 4  Remote Terminal 3 User         wyse60_693       $null
    ____________________________________________________________19200 8 1 0
    ____________________________________________________________       -1
 5  Link-20 Communications User    qnxs             $null
  Change using the Link-20 Port parameter in System Parameters1200 8 1 0
     ____________________________________________________________ -1
Default Serial Port Options:
-efunc -paged -mapcr -edit -echo +igate +oflow +iflow +edel +etab +ers

            Page 1             [F6] Re-Start Commands
```

The **Terminal Type** field represents the type of terminal that the system will be communicating with (i.e.: Wyse60, VT100).

The **Baud Rate** and **Port Desc** fields replace the **Remote Terminal Port** parameter that used to be in System Parameters Screen. The **D, S** and **P** fields stand for Data, Stop and Parity bits respectively.

A. There are browse windows for **Terminal Type** and **Port Desc** that can be accessed by pressing m.

B. This program checks for port conflicts automatically when entering the editor as well as at boot-up time. If a port conflict occurs with any setup parameters, or within the User Device Editor, the **Port Desc** for the user device that conflicts will be set to *$null*. On boot-up the system will change this to *$null* automatically or if you are in the Editor Screen, nullification occurs when leaving the screen. You can re-enter at this point and try another setup.

C. Typing the character '@' as the first character of command line two will cause command line 2 to be appended to command line one.

D. Type 'comm ?' at a QNX '$' prompt (i.e.: in the 3rd console) to get more information on the comm program.

E. One of the options of the comm program is the "i=modem_init_string." With this option the comm program initializes a modem with the characters following "i=".
Example: The command "ontty $mdm comm +hayes i=ATZ0" will cause the comm program to send the characters "ATZ0" out the $mdm port when the program initializes if it senses a Clear To Send (CTS) signal from the modem.

F. If a system has a "/config/dial.dir" file and the file contains the "hayes_setup" description, the software will import the modem initialization string from the file into the second command line of the Main Console User.

G. If the string "i=modem_init_string" is appended to a command line with "comm +hayes" (i.e.: comm +hayes i=modem_init_string), the system will replace the *modem_init_string* with the actual initialization string found on command line 2 of the Main Console User.

H. The '+B' option will cause the modem to auto detect the Baud rate of the calling modem.

I. The '+D' option allows for a direct connect (i.e.: local remote terminals).

NOTE: There is the ability to have the comm program display the commands that is uses, as it uses them (i.e.: echo on). The default for this (when it leaves Alkon's facility) is off (i.e.: echo off). If the "+hayes" or "I=" options are going to be used, then the modem_init_string must contain 'E1' (or modem equivalent) as part of the init string to turn echo on.

Pressing q from the Editor Screen will re-initialize ports and comm programs. All user information, including command lines, will be skipped on startup if the **Port Desc** for that user is *$null*.

7.7 TRUCK DISCHARGE

The Truck Table is accessed by selecting Truck Discharge from the System Setup Menu.

```
TRUCK TABLE          Alkon Corporation   Version  4.4xx     Sep 11 15:22:52


                            TRUCKS by NAME

       1.  182          15.  214          29.  2506         43.  2350
       2.  186          16.  216          30.  2508         44.  2346
       3.  188          17.  218          31.  2510         45.  2334
       4.  190          18.  550          32.  O'B          46.  1069
       5.  194          19.  222          33.  PAC          47.  2402
       6.  196          20.  552          34.  2540         48.  296
       7.  198          21.  554          35.  2344         49.  298
       8.  200          22.  270          36.  2342         50.  ______
       9.  202          23.  276          37.  2348         51.  ______
      10.  204          24.  558          38.  2338         52.  736
      11.  206          25.  220          39.  2340         53.  738
      12.  208          26.  224          40.  266          54.  572
      13.  210          27.  2502         41.  2332         55.  767
      14.  212          28.  2504         42.  2336         56.  765


         Enter choice :      (  1 to  56)

                              [PgUp] - Previous Page    [PgDn] - Next Page
```

The Truck Table consists of two columns for each truck. The first column is the index number and the second column is the truck number. The Truck Table has the capability of storing up to 100 trucks. To enter a truck into the table, type the number to the left of the next available slot and press e. In the table above, this would be a 50.
This will bring up the Truck Entry Screen as shown on the next page.

TRUCK ENTRY

```
TRUCK ENTRY          Alkon Corporation   Version  4.4xx   Feb 21 14:17:00


                                TRUCK 9   127

                               CAPACITY  12.00 Yards
                                RATE      3

                                DRIVER    DRIVER


                                                          [PgUp]  [PgDn]
```

TRUCK X

Enter the truck number in this field. The { and } keys may be used to scroll through all the truck entry slots.

CAPACITY

This represents the amount (in Yards or Meters) that this particular truck can haul as a maximum. This is used in the Pre-Batch Screen when a batch is run for a particular truck. If the load size exceeds that of this capacity, the operator is warned.

RATE

The rate field is a numeric field for the charging rate of the truck for dry batch plants. The number entered corresponds to the discharge rates in the Discharge Parameters Screen as specified below:

1	=	SLOW
2	=	NORMAL
3	=	FAST
4	=	VERY FAST

DRIVER

The driver entered should be the normal driver of the truck. The name entered here will be pulled into the Batch Setup Screen when this truck number is entered. It may be changed at batch time if a different driver is using this truck.

7.8 J-BOX I/O ASSIGNMENTS

This table is used to identify the input and output designations for various plant devices. Each device is identified by two numbers. The number preceding the device name is the device number and is used by the system for batching. Diagnostics can be done in the I/O TEST Screen with these numbers as well. The number following the device name identifies the I/O device in the J-Box.

I/O ASSIGNMENTS Alkon Corporation Version 4.4xx Sep 25 15:05:44

INPUTS			OUTPUTS			OUTPUTS	
1	BATCH ABORT	B08	17 AGG 1 FEED	A00	33	CEM DIS CLOS	C10
2	AGG L.SWITCH	C03	18 AGG 2 FEED	A01	34	CEM VIBRATOR	C09
3	CEM L.SWITCH	C11	19 AGG 3 FEED	A02	35	ADX 6 FEED	B05
4	WAT L.SWITCH	B08	20 AGG 4 FEED	A03	36	COLD FEED B	A06
5	TOL LOCK INP	___	21 AGG 5 FEED	A04	37	COLD FEED A	___
6	MIX RGT LMT	___	22 AGG 6 FEED	A05	38	HOT FEED B	A07
7	MIX TILT LMT	___	23 AGG DIS OPEN	C00	39	WAT DIS OPEN	___
8	ADX 1 ZERO	C12	24 AGG DIS CLOS	C02	40	ADX 7 FEED	___
9	ADX 2 ZERO	C12	25 AGG VIBRATOR	C01	41	ADX 1 FEED	B00
10	ADX 3 ZERO	C13	26 CEM 1 FEED B	A09	42	ADX 2 FEED	B01
11	ADX 4 ZERO	C13	27 CEM 1 FEED A	A08	43	ADX 3 FEED	B02
12	ADX 5 ZERO	C14	28 CEM 2 FEED B	A11	44	ADX 4 FEED	B03
13	ADX 6 ZERO	C15	29 CEM 2 FEED A	A10	45	ADX 5 FEED	B04
14	ADX 7 ZERO	B08	30 CEM 3 FEED B	___	46	HOT FEED A	___
15	ADX 8 ZERO	B08	31 CEM 3 FEED A	___	47	DIS START PLS	B14
16	MANUAL PRINT	A15	32 CEM DIS OPEN	C08	48	LOAD END PLS	B11

Page 1 [Esc] Exit [PgDn] Next Page

There are six pages of IO assignments with the fourth page being a user defined screen. Page four is typically used if any custom PLC code needs to exist for a special need that your plant might have.

7.9 SCALE CALIBRATION

This screen allows for calibration of the scales to the dial heads or electronic readout devices. For calibration procedures, refer to Section 10.

```
SCALE CALIBRATION        Alkon Corporation   Version 4.4xx  Sep 25 15:06:24

Scale       Serial     Raw   *   Span   *  Grad   -  Offset = Actual  Auto
Number       Word              Factor     Size                        Zero
 1 Aggregate    1        2      1.0000    20.000    -40.000       0.0    80
 2 Cement       2        2      1.0000     5.000    -10.000       0.0    20
 3 Water (SCL)  0        0      1.0000     0.000      0.000       0.0     0
 4 Moisture     3      450      1.0000     1.000     -2.000     448.0     4
 5 ADX 1        5        0      1.0000     1.000      0.000       0.0     0
 6 ADX 2        5        0      1.0000     1.000      0.000       0.0     0
 7 ADX 3        6        0      1.0000     1.000      0.000       0.0     0
 8 ADX 4        6        0      1.0000     1.000      0.000       0.0     0
 9 ADX 5        7        0      1.0000     1.000      0.000       0.0     0
10 ADX 6        8        0      1.0000     1.000      0.000       0.0     0
11 No Adx #7    0        0      1.0000     0.000      0.000       0.0     0
12 No Adx #8    0        0      1.0000     0.000      0.000       0.0     0
13 Water (MTR)  4        0      1.0000     1.000      0.000       0.0     0
14 Temper       0        0      1.0000     0.000      0.000       0.0     0
15 No Xtr Scl   0        0      1.0000     0.000      0.000       0.0     0
16 No Xtr Scl   0        0      1.0000     0.000      0.000       0.0     0
17 No Xtr Scl   0        0      1.0000     0.000      0.000       0.0     0
18 No Xtr Scl   0        0      1.0000     0.000      0.000       0.0     0
19 No Xtr Scl   0        0      1.0000     0.000      0.000       0.0     0
20 No Xtr Scl   0        0      1.0000     0.000      0.000       0.0     0
    Reset Counters ? (Y/N)                      Analog Input Range  0
```

7.10 I/O TEST .10 I/O TEST.10 I/O TEST

This is a diagnostics screen which is used to test the inputs and outputs connected to the Spectrum.

```
INPUT/OUTPUT TEST        Alkon Corporation   Version 4.4xx Sep 25 15:06:33

SCALES                      Aggregate      Cement       Water    Moisture
                   Meter            2           2           0         442
                  Weight            0           0           0         440
                    Flow            0           0           0          -6

CTRS   ADX1   ADX2   ADX3   ADX4   ADX5   ADX6   ADX7   ADX8   WATER TEMPER
Cnt       0      0      0      0      0      0      0      0       0      0
Vol       0      0      0      0      0      0      0      0       0      0

DIGITAL POINTS            1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16
                   Input
            Points  1-16  1  1  1  1  0  0  0  1  1  1  1  1  1  1  1  0
            Points 49-64  0  0  0  0  0  0  0  0  0  0  1  1  0  0  0  0

                  Output
            Points 17-32  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
            Points 33-48  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
            Points 65-80  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
            Points 81-96  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0


    Page  1        Enter output device # ___   Setting (0-off 1-on)
```

7.11 ORDER ENTRY SETUP

The Order Entry Setup Menu is used to set the ticket format, the ticket file, and special codes used in the Order Entry software. Refer to the Order Entry Section.

```
ORDER ENTRY SETUP MENU

  Order Entry Defaults

    Format Ticket
  Record Transactions
 Link-20 Transactions
      Tax Codes
   Discount Codes
   Credit Codes
 User Defined Names
Import / Export Setup
```

7.12 BATCHING SIMULATOR

The batching simulator allows for training or demonstrating the Spectrum's batching procedures. Before the simulator can be turned on, the data files must be backed up.

To turn the simulator on, select Batching Simulator from the System Setup Menu. The following will appear:

```
The simulator is currently OFF

Do you wish to turn it ON ? (Y/N)   Y
```

To enable the simulator, type a "Y" and e. When the word SIMULATOR appears in the bottom left corner of the Main Menu Screen, the Spectrum is in the simulate mode.

To turn the simulator off, select Batching Simulator from the System Setup Menu. The following will appear:

```
The simulator is currently ON

Do you wish to turn it OFF ? (Y/N)   Y
```

To disable the simulator, type a "Y" and e. When the word SIMULATOR disappears from the bottom left corner of the Main Menu Screen, the Spectrum is in the normal operating mode.

7.13 REMAP DEMANDS TO FORMULAS

This table is useful only on those systems that are using demands (mostly products plants). To access this table, select Remap Demands to Formulas from the System Setup Menu.

```
DEMAND SETUP          Alkon Corporation  Version  4.XX   Feb 21 14:21:57


                FORMULA#  MACH#              PRODUCT NAME
     DEMAND #1     1       12       _____________________________
     DEMAND #2     2       __       _____________________________
     DEMAND #3     3       __       _____________________________
     DEMAND #4     4       __       _____________________________
```

The **Formula#** is the number of the mix in the Mix Design Browse that will be batched given the corresponding demand.

The **Mach#** and **Product Name** are used to identify the plant's production. This table is useful for multiple mixes that run on
the same demand input.

F. BIN FILLING SYSTEM PARMS

These screens are for the Bin Filling software, refer to the Bin Filling Manual for details.

G. INTER-PLANT COMMUNICATIONS

Future Use.

7.14 SPECTRUM QUICK EDIT

The Quick Edit Screen allows quick changes between two sets of specific parameters and is accessed by pressing s in the Auto Batch Setup Screen. The following appears:

```
AUTO BATCH SETUP  READY Alkon Corporation  Version  4.4xx   Feb 25 13:36:3

CUSTOMER                                          RIGHT BATCH NUMBER    77
FORMULA NAME  __________
LOAD SIZE                 RETURN AMOUNT
TRK NUM/RATE              RETURN FORMULA                % HOT WATER
DRIVER ID          +-SPECTRUM QUICK EDIT-----------------------------+
WAT IN TRK         |Note: Change Edits Before Batching and/or         |
                   |      During Discharge of Previous Batch.         |
    INGREDIENTS  | |                                                  |
    -------------+-|                                       LEFT  RIGHT|
                   |2nd Process (ie: Mixer) Enable            1      1|
                   |Inspect Mode  (1-Yes, 0-No)               0      0|------
                   |Max Load Volume ( x 10 )                105    100|
                   |Agg Scale Maximum                     36000  36000|
                   |Cement Scale Maximum                   7000  10000|
                   |1-Cont Disch,2-Cont Run                   0      3|
                   |Initial Water Charge ( % )               85     75|
                   |Water Holdback ( % )                     15     25|
                   |Minimum Water Holdback                   30     30|
                   |Time To Start Water (mSec)             1000   1000|
                   |Time To Start Cement(mSec)                0      0|
                   |Time To Start Agg (mSec)                  0      0|
                   |                                                  |
                   |  [Esc] Quit  [F7] Edit Values  [F8] Toggle       |
                   |         [F1] LEFT         [F2] RIGHT             |
                   +--------------------------------------------------+
```

There are two sets of these parameters, labeled LEFT and RIGHT, that you may quickly switch to alter the Spectrum's batching control for special circumstances. To select between the "LEFT" (l) and "RIGHT" (m) set of parameters, simply pressing the desired function key. This takes the set of parameters and overwrites the values in their respective setup screens. You can alternate (toggle) between sets by pressing ss. The name of the current set being used appears in the upper right corner of the Batch Setup Screen. To edit the values or the titles of these sets of parameters, press r. When you are finished editing, press l to save these changes to the hard disk. Use | to exit the Quick Edit Screen.

A description of the parameters in the Quick Edit Screen follows on the next page.

2ND PROCESS CONTROL (i.e.: MIXER) ENABLE

Tells the Spectrum software that the plant has one mixer (value of "1"), two mixers (a value of "3"), a holding hopper (a value of "16"), or a mixer and a holding hopper (a value of "17") enabled.

INSPECT MODE (1-YES, 0-NO)

Setting this parameter to "1" forces the Spectrum to stop after weigh up of each material, and wait for the operator signal to continue. This value is typically set to zero.

MAXIMUM LOAD VOLUME (x 10)

This value, expressed in units of volume, tells the Spectrum the largest truck capacity. The x10 factor is used for decimal point placing. *For example*, if the maximum truck capacity is nine yards, enter a value of 90. The Spectrum then multiplies the value by ten to place the decimal point at 9.00. Maximum value is 200, or 20 cubic yards.

AGG SCALE MAXIMUM
CEMENT SCALE MAXIMUM

These values, expressed in units of weight, tell the Spectrum the maximum capacity for each scale.

On the basis of these values, the Spectrum will split batch. By recognizing the total weight for aggregates, cements, and water, the Spectrum determines if the scales are capable of taking the full load weight. If any one scale is too small, the load will be split into two or more batches.

1- CONT DISCH, 2- CONT RUN, 4-ARTP

Cont Disch - forces the Spectrum to discharge the load without operator authorization. If an out-of-tolerance occurs during weigh up, the Spectrum will NOT automatically discharge the load, and the operator will have to authorize discharge.

Cont Run - forces the Spectrum to make the same load repeatedly until the operator leaves the Batch Graphic display.

ARTP - automatically forces the Spectrum to leave the Batch Graphic display when discharge starts.

INITIAL WATER CHARGE (%)

Enter the amount of water, in terms of percent, to be put into the truck at the start of the batch.

If this value is less than 100% (minus holdback percentage) the Spectrum begins a three stage water discharge. The difference in these values is referred to as the main water charge.

If a three stage water discharge is desired, refer to the **%Agg to Start Main Water Chg** and the **%Cem to Start Main Water Chg** in the Discharge Parameters Section.

WATER HOLDBACK (%)

This value specifies the percentage of water to be held back, and then subsequently released, after the aggregate and cement are completely discharged. A typical value is 25.

MINIMUM WATER HOLDBACK

On small loads, 25% of the water may not be sufficient to wash down; therefore, this parameter overrides the **Water Holdback Percentage** and ensures an adequate washdown amount. A typical value is 20 to 30.

TIME TO START WATER (mSec)
TIME TO START CEMENT (mSec)
TIME TO START AGG (mSec)

These parameters refer to the time the Spectrum will wait before starting the corresponding discharge cycle.

7.15 OPTIONS EDITOR

Several parameters in the Spectrum software are edited with the use of an options editor. The prompt for the editor will pop up when the cursor is placed on these parameters. Pressing u on the following fields, will enable the graphical editor:

Printer Options, Printer Port Options, Batching Display Options, Link-20 Port Options, Index Display Control Options, Inventory Control Options, and Multidrop Number/Link-20 Cntrl Options in System Parameters.

(Cont Disch, Cont Run), Manual Batch Print Enable, and Jog Every Batch Options in Plant Configuration.

Mixer 1 & 2 Options, Available 2nd Process Control, Select Control for Mixer 1 & 2 & Holding Hopper, and Material Record Options in Adj. Mixer and Misc. Parameters.

Basis/Feed/Disch Type in the Ingredient Table for Chemical ingredients and Material Feed Control in Major and Chemicals.

An example of one of these editors is shown on the next page.

```
BATCH REPORT PRINTER OPTIONS

    Printer Disabled
   *Print Net Weights on Batch Report
    Print Cumulative Weights on Batch Report
    Print Original Mix Weights (SSD) from Batch Setup
   *Print Only Target Weights on Batch Report
   *Print Tolerance Locked or Unlocked
   *Print % Moisture Column for All Aggregates
    Print Water/Cement Ratio
   *Print Actual Water in All Materials Column
   *Print Water in Truck
    *Print Water To Add
    Exclude Water to Add in Wat/Cem Ratio Calculation
   *Print Manual Trim Occurred or No Manual Trim
   *Print Temper Water
   *Print Mixing Time

        [Esc] Exit   [Insert] Start Editing    Dim=OFF    Bright=ON
```

All available options are shown in the options editor. The selected options are brighter than the options that are not selected (or have * in the case of remote terminal). To change these options, press h. This will cause a pointer to come up on the first option. Using the arrow keys, move the pointer to the selection to be changed and press h to toggle that selection on or off. When finished editing, use | to save and exit.

SECTION 8 SOFTWARE INSTALLATION

NEW SOFTWARE INSTALL PROCEDURE
For Versions 4.37 and greater.

Spectrum Install

I. Preparatory Actions

A) You will need the following:

1) QNX (B) Boot Disk (2).

2) Data (D) disk (2).

3) Fbackup Disks 1 & 2.

4) Any other diskettes for options purchased
   a) Ditto - for Remote Diagnostics
   b) Dfs/Qtalk - for Dos File System
   c) MS-DOS - for Dos File System
   d) For Ticket Editor
      1) ZimQRT disk
      2) Ticket Editor 1 & 2.

B) Put (B) Boot disk in drive and turn the computer on.

II. The Install

A) When you see a blue screen that says "Please Enter Time and Date" or "Please put Data disk in drive", take the Boot disk out and put the NEW Data disk in the drive. Press e when you have done this.

B) Type 'N' for NEW when prompted.

C) The software will guide you through the installation in a very clear manner. You should have no troubles. This will take approximately 15 - 20 minutes.

D) If you were prompted at the end of the install to insert the MS-DOS diskettes and have installed DOS, put the Boot disk back in the drive and reboot the computer by turning it off and then back on. Follow the instructions on the screen.

SECTION 8 SOFTWARE INSTALLATION

NEW SOFTWARE INSTALL PROCEDURE
For Versions 4.37 and greater.

Spectrum Update

I. Preparatory Actions

A) You will need the following:

1) QNX (B) Boot Disk (2).

2) Data (D) disk (2).

3) Fbackup Disks 1 & 2.

B) Put (B) Boot disk in drive and turn the computer on.

II. The Update

A) When you see a blue screen that says "Please Enter Time and Date" or "Please put Data disk in drive", take the Boot disk out and put the NEW Data disk in the drive. Press e when you have done this.

B) The software will guide you through the update in a very clear manner. You should have no troubles. This will take approx. 10 - 15 minutes depending on your pc.

SECTION 8 SOFTWARE INSTALLATION

SPECTRUM SOFTWARE

INSTALLATION PROCEDURE

VERSION 4.33C THROUGH 4.364.33C THROUGH 4.36

INDEX

SECTION 8 SOFTWARE INSTALLATION

PREPARING FOR INSTALLATIONFOR INSTALLATION

The following pages describe the steps to install the Spectrum Batching System software onto the computer's hard disk.

CHECKOUT

Use the following list to verify that all necessary diskettes came with the package.

QUANTITY	3-1/2" PART #	5-1/4" PART #	DESCRIPTION
1	21375	21381	Disk 1 Data
1	21376	21382	Disk 2
1	21377	21383	Disk 3 Customers/Jobs

If this is a new system, or if the software version your machine is currently running is Version 4.14 or earlier, the following disks are required:

QUANTITY	PART NUMBER	DESCRIP TION
2	20475	QNX Boot disk

If your system has Remote Diagnostics Plus (PN-20710), meaning there is a modem on your system that an Alkon technician can call for troubleshooting, the following disk is required:

QUANTITY	PART NUMBER	DESCRIPTION
1	20709	Ditto

If your system has DOS Ticket File to Diskette (PN-20471), which is used for copying tickets to an accounting machine, Expanded Reports, or Ticket Editor, the following disk is required:

QUANTITY	PART NUMBER	DESCRIPTION
1	20440	DFS

SAVING PLANT PARAMETERSPLANT PARAMETERS

Determine what version of software the Spectrum was using before this update by looking at the "old" diskettes currently being used. Use the following table to decide which procedure to follow:

"Old" Version	Instructions
4.00 through 4.08H	Call Alkon Service Department 1-(614)-792-0677 for assistance.
4.09 through 4.14	Run a normal backup of data, customers, and orders to "old" diskettes. Then proceed to the following page.
4.15 and later	Perform an update as directed on Section 8.28.

SECTION 8 SOFTWARE INSTALLATION

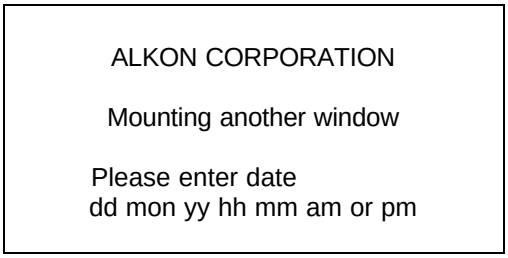
INSTALLATION

NOTE: Do not use "CAPS LOCK" during this procedure.

1. Insert one of the Boot disks into the floppy drive, and turn on the power.

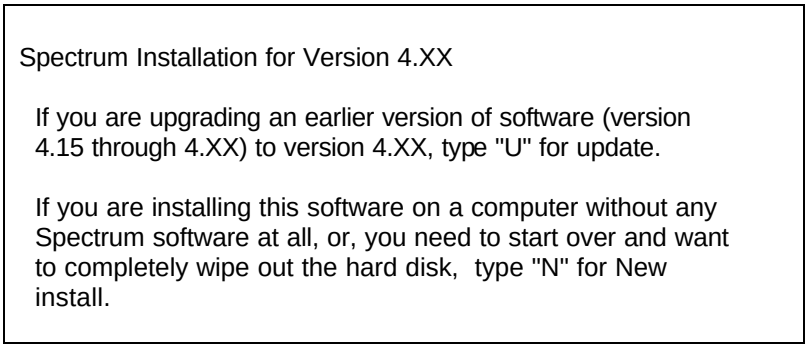
The system will first run through a series of diagnostic routines. If any error messages are displayed during the diagnostics, call the Alkon Service Department at 1-(614)-792-0677 immediately.

After the diagnostics are complete, the computer will then read the Boot diskette in the drive. After a short delay the following message will appear:



2. Remove the Boot disk from the drive and replace it with the new Data Disk, press e.

The Spectrum will then display:



Type "N" for New.

Select the monitor type used on the system. Three choices will be available:

```
Select monitor type

C -   CGA monitor (standard)
      All Wyse PC+, IBM XT, Zenith computers
      Unisys computer with Unisys or Magnavox monitor

E -   EGA monitor

V -   VGA monitor
      All IBM PS/2
      Unisys computer with ACER monitor

Selection:
```

Select the appropriate option.

It is now necessary to tell the Spectrum which type of hard drive is in the system. After a few moments, the following menu will appear:

```
      Select Hard Disk Type
      ~~~~~~~~~~~~~~~~~~~~
1     10 Megabyte [h=4 n=17 t=306]
      IBM PC-XT computers)
2     20 Megabyte [h=4 n=17 t=612]
      (Wyse PC+, Zenith computers)
3     30 Megabyte [h=4 n=17 t=2460]
      (Leading Edge)
4     [Enter] h=xx n=xx t=xxxx
5     IBM at or compatible
      (All Unisys and DFI Computers)
6     IBM PS/2 Model 30-286
7       IBM PS/2 Model 50 (esdi)
8
Enter Selection -
```

The Alkon Spectrum is supported by many types of PC-compatible processors. However, most Spectrum systems were shipped with one of three processors. Choose which configuration applies.

If your processor is not one of the above mentioned, contact the Alkon Service Department for assistance at 1-(614)-792-0677.

After a short delay, the following menu will appear:

```
Spectrum Installation Main Menu
Version 4.XX

1       Install Spectrum
        This step will first ask you to create a QNX
        partition on the hard disk.  (A suggested size
        s 30 Megabytes, 10 Megabytes is the minimum.)
        Then the system will ask for the floppy disks as
        needed and copy them onto the hard disk.
2       Convert Data Files to New Version Format
        This will modify the data of Spectrum Software
        version 4.09 and later to the format required
        by this software release.
3       General Backup
        This will backup all files from Disk 1 to the
        Hard disk.  Usually used for Ditto, DFS,
        Utilities, etc.  If you have any disks labeled
        'Ticket Editor', use this step to copy them to
        the Hard disk.

For a new install, do Step 1, then Step 3 as needed
When all disks are installed, remove any disks from
drive 1; turn power off and back on

        -Select Operation
```

If this is a new system without any mixes or customers, go to the *Change Partition*.

Otherwise, press [2] to convert the data files already on the hard disk to the proper format on the new release. When prompted, insert Data Disk, press e, and the following message will appear:

```
Converting files...
This will take a few moments...
```

After the previous screen has been displayed, the screen will go back to the Spectrum Installation Main Menu. This process has converted your old data from the hard disk to a form the new version of software can use and has been stored on floppy.

CHANGE PARTITION SIZE, BOOT PARTITION SELECTIONPARTITION SIZE, BOOT PARTITION SELECTION

On a new system, it is always necessary to do this step first, to do so, press "1".

Shortly, the following screen will display:

```
+-----------------------------------------------------------------+
|         Next Prev Change Delete Mount Boot Unboot Save Quit     |
|                                                                 |
|        OS        Start      End          Number        Boot    |
|      Name  Type  Cylinder  Cylinder    Cylinders  Blocks       |
|                                                                 |
|--> 1. qnx ( 7)     245       974         730     62050   *      |
|    2. dos ( 1)       0       244         245     20808          |
|    3. --- (--)     ---       ---         ---     -----          |
|    4. --- (--)     ---       ---         ---     -----          |
|                                                                 |
|   Use up/down arrows to select partition.                       |
|   Type the letter  c  to change/add a partition.                |
|   Type the letter  s  to save your changes.                     |
|   Type the letter  q  to quit.                                  |
|                                                                 |
|   QNX is os type 7, 8 or 9    DOS is os type 1 or 4             |
|                  Unused is os type 0                            |
|                                                                 |
|   First cylinder is X         Last cylinder is XXX              |
|   Disk is XX,XXX,XXX bytes    H=X  T=XXX  N=XX                  |
+-----------------------------------------------------------------+
```

If this screen already has information in the "OS Name" column, such as **qnx** and **dos**. If the screen is blank, proceed with the following steps.

The numbers in the Start and End Cylinder columns are for a 40 Meg (42,432,000 bytes) with h=5 n=17 t=975.

NOTE: The numbers in Start and End Cylinder Columns are for example only. They may be different to match an individual hard drive.

Setup the hard disk partitions as follows:

a. Press "c" to change the first partition type. The cursor will move to the "OS Type" column on line and will blank this column.

b. Press [7], and then e. This will select the "OS Name" **qnx** and the cursor will move to the "Start Cylinder" column.

c. Press [245], and then e. The cursor will move to the "End Cylinder" column.

NOTE: The rule of thumb recommended by Alkon is to partition the hard disk using about 30 meg for the QNX operating system and the remainder for the DOS operating system.

d. Now enter the "End Cylinder" number <xxx> (<974> for our example) and press e. The computer will fill in the "Number of Cylinders" and "Number of Blocks" columns.

e. Press <b> to make the **qnx** partition the one that will "Boot" on power up. This will make an "*" appear in the "Boot" column in row one.

f. Press <n> to go to the next partition. The pointer (-->) at the left of the screen should move down to row two.

g. Press <c> to change the second partition type. The cursor will move to the "Type" column on line two and will blank this column.

h. Press "1", and then e. This will select the "OS Name" **dos** and the cursor will move to the "Start Cylinder" column.

i. Press <0>, and then e. The cursor will move to the "End Cylinder" column.

j. Now enter <244> and press e.

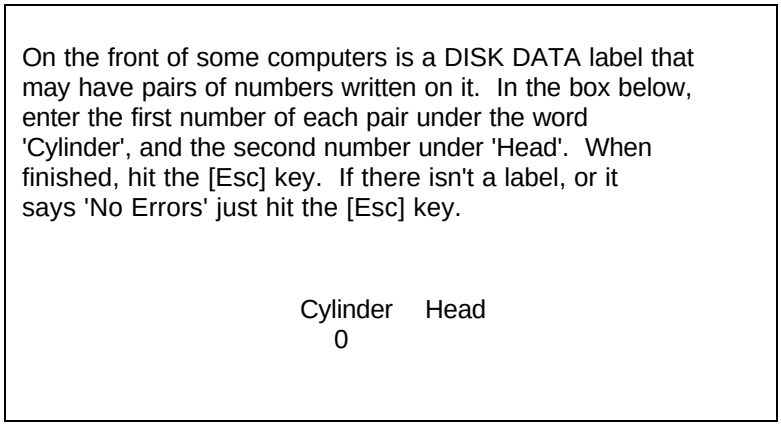
k. Press <s> to save this partition setup and then press <q> to quit or exit this screen.

NOTE: When you press "s", if a message appears asking if you want to "write the qnx boot loader to the hard disk", answer "y" for yes. Then press "q" to quit.

The following message will appear:

```
+-------------------------------------------------------------+
¦  If you created or changed a partition, DO NOT forget to    ¦
¦  remount the disk specifying the "pa=" option.  Failure to  ¦
¦  do so may overwrite other areas of the disk.               ¦
¦                                                            ¦
¦  Hard Disk Has Been Remounted.                             ¦
+-------------------------------------------------------------+
```

A window will "pop up" with the headings "Cylinder" and "Head".



This screen will then display:

Checking XXXXX blocks XX

This test will take about eight to ten minutes. The Spectrum will then ask for diskettes, as needed.

GENERAL BACKUP

GENERAL BACKUP

If you have a "Utilities", "DFS", or "Ticket Editor" disk, you need to use this backup to copy those disks to your hard disk. To do this, press "3", and you will be prompted to place a disk in Drive 1. Press e to continue. When each disk is done being copied, the "Hard Disk Setup" menu will again appear. Repeat this step for each optional disk. Do not re-copy Data Disk, Fbackup Disk 2, or Fbackup Disk 3.

The installation is now complete. Remove any disk from Drive 1 and re-boot the system. This can be done by cycling the power off for a few seconds and then back on, or by pressing and holding down b, a, and j and pressing c.
The system should now boot from hard disk.

COMPU/KEY-SPECTRUM/KEY-SPECTRUM
UPDATE SOFTWARE INSTALLATION, HARD DISK SYSTEM
VERSION 4.33C AND UP
Ref. 882C
Effective: March 25, 1992

The following describes updating the Spectrum batching system software on the computer's hard disk to the current version.

WARNING

This procedure will only work when updating from version **4.15** and up. Verify current version number, and notify the Alkon Service Department at 1-(614)-792-0677 if current version is earlier than **4.14H**.

SECTION 8 SOFTWARE INSTALLATION

CHECKOUT

Use the following list to verify that all necessary diskettes are on hand.

QTY	3-1/2" PN	5-1/4" PN	DESCRIPTION
1	21375	21381	Disk 1 Data
1	21376	21382	Disk 2
1	21377	21383	Disk 3 Customers/Jobs

INSTALLATION

1. Locate the Boot disks shipped with the original software. If your computer uses 5 1/4" instead of 3 1/2" disks; also locate the Boot Utilities disk.

   Insert the Boot disk into the floppy drive and turn on the computer.

2. Wait for the screen to turn blue, and the words "Please Enter Date". Remove the Boot disk from the floppy drive and replace it with the new Data Disk (PN 21375 or PN 21381.) Press e.

   From this point forward, the Spectrum will ask for each disk.

   When the system asks if UPDATE or NEW -- type "U" for UPDATE.

3. At some point, the paragraph below will print on the screen.

```
+-------------------------------------------------------------+
| Spectrum Installation for Version 4.XX                      |
|                                                             |
| If you are upgrading an earlier version of software (version |
| 4.15 through 4.XX) to version 4.XX, type "U" for update.    |
|                                                             |
| If you are installing this software on a computer without any |
| Spectrum software at all, or, you need to start over and want |
| to completely wipe out the hard disk,  type "N" for New     |
| install.                                                    |
+-------------------------------------------------------------+
```

For this procedure, choose "U" for update.

The Spectrum will then ask for the other disks as needed.
When complete, remove the disks and re-boot the Spectrum.
The update is now complete.

SECTION 9 THE MOISTURE PROBE

ALKON MODEL 7102 MOISTURE SYSTEM

USER'S MANUAL

Alkon Corporation
5168 Blazer Parkway
Dublin, Ohio 43017
(614) 792-0677

REVISED: November 11, 1993
July 8, 1988
September 20, 1989
October 12, 1992
November 10, 1993
August 18, 1995
October 17, 1997

Calibrate Setting	Moisture Display
_____	_____
_____	_____

SECTION 9 THE MOISTURE PROBE

OVERVIEW

The Alkon Model 7102 Moisture System uses the principle of microwave absorption to measure the moisture content of aggregate materials such as sand. Since water absorbs approximately 20 times more microwave energy than the same amount of sand, the microwave Probe is sensitive to sand moisture while ignoring the sand itself.

When the Spectrum Batching System is feeding sand, it samples the moisture reading approximately ten times per second. It then averages the readings and uses the result to calculate new sand and water target weights.

The Moisture System consists of the following components:

1) A Moisture Probe, mounted through the bin wall of the sand bin, in contact with the sand;

2) A display on the Manual Station which constantly displays the sand moisture value (whether sand is flowing or not);

3) A 6-conductor shielded cable which connects the Probe to the Manual Station;

4) Unique Alkon software which monitors the moisture and performs the moisture calculations;

5) A "precalibrator pot" assembly used during initial Probe calibration; and

6) A Probe mounting sleeve, and other miscellaneous components to complete the installation.

SECTION 9 THE MOISTURE PROBE

INSTALLATION

Installation of the Moisture Probe consists of the following steps:

I. Determine optimum location for the Probe assembly.

II. Cut hole in bin wall (or gate) and attach mounting sleeve.

III. Bolt Probe in place.

IV. Adjust Probe penetration and face angle.

V. Connect Probe to Manual Station via the moisture gauge cable.

VI. Set up Manual Station to display moisture.

VII. Calibrate moisture display to match actual sand moisture.

VIII. Enable automatic moisture compensation with the Spectrum program.

The installation steps are described in detail below. You will need the following equipment:

cutting torch
welder
small spirit level
9/16 wrench (or adjustable wrench)
scale, hot plate and pan

SECTION 9 THE MOISTURE PROBE

I. Probe Location

I. Probe Location

The Moisture Probe must be mounted through the bin wall, within the direct flow of sand, and as close as possible to the feed gate opening. If you locate the Probe in an area of stagnant material, then the moisture reading will not be representative of the moisture in the sand being batched.

For optimum Probe accuracy, drain the bin of all material to determine the flow of the material. The "worn" or "shiny" area is where the Probe needs to be mounted. For best results, mount the Probe with the contour or slope of the bin wall. (Refer to Detail 3). This along with the 30 degree face angle creates a kind of complex angle when you are finished. The Probe must always be mounted perpendicular to the gate opening.

The Probe can also be located on the side of the gate box itself. This requires at least 3½ inches of vertical clearance between the outer lip of the feed gate (full open position) and the gate mounting flange.

If gate mounting is not possible, install the Probe on the bin wall. It should be positioned as low as possible in the bin, and centered over the feed gate.

II. Sleeve Mounting. Sleeve Mounting

To mount the Probe on the gate box, you will have to cut a 3½ inch diameter hole and weld the mounting sleeve in place. This can usually be accomplished without draining sand from the bin. Use the sleeve to trace a circle around it with a scribe or soapstone and use that circle as a cutting guide.

The process is a bit more tricky for bin wall mounting. Since the Probe must be installed horizontally, and since the bin wall is on an angle, the mounting hole will be elliptical in shape.

Insert the sleeve into the hole and rotate it so the small notch faces upward. On a sloping bin wall, the sleeve should be inserted as far as possible, i.e., until the top edge of the flange touches the bin wall. For a gate mounting, the sleeve should extend 2-3 inches into the gate. Make sure that the gate, when fully opened, doesn't hit the sleeve or its flange. Tack weld it into place while holding it horizontal.

Check to make sure that the sleeve is level and extends straight into the bin. Adjust as necessary, then finish welding into place.

III. Probe Attachment. Probe Attachment

Carefully insert the Probe into the sleeve. It may be necessary to feed sand while you are doing this, to reduce the effect of sand packing around the Probe. Bolt the Probe in place using bolts, flat washers, and lockwashers.

IV. Probe Adjustment. Probe Adjustment

Position the Probe in such a way that the Probe face is at an angle of approximately 30 degrees from horizontal. The flat section of the Probe extends past the mounting sleeve. Rotate the Probe or move it in/out until positioned properly. Tighten the sleeve bolts. To be sure the Probe is in the proper position, look down into the empty bin with the gate open.

V. Cable Connection. Cable Connection

Install the Moisture Probe cable to run between the Probe and the Spectrum Manual Station. Note that the round black connector is on the Probe end, the rectangular metal connector is on the Display end. Clamp the cable in place so that it is protected from moving equipment or abrasion. Leave some slack in the cable at the Moisture Probe so that you can remove the Probe and set it on the floor or walkway. Enclose the cable in conduit if it will be subjected to physical abuse, or if required by local codes. (Maximum voltage = 15 VDC).

Plug the black connector into the mating connector attached to the Moisture Probe. (The connectors are keyed so they will only go together one way). Screw the connector ring tight. Plug the other end into the "Moisture" connector at the rear of the Manual Station. Do not tighten the two hold-down screws at this time.

> (If you have the LCI-1 style display, the cable doesn't plug into the Manual Station. Instead, plug it into the "Moisture" connector on the analog module).

VI. Manual Station Setup

VI. Manual Station Setup

Set up an unused Manual Station display section as type "S", 20.00 full scale, and grad size of .01. Refer to the "Spectrum III Manual Station Display Operator's Guide" if you are unsure of how to do this.

VII. Calibration. Calibration

The Moisture Probe and related components have been tested and adjusted at the factory to work under normal conditions. Some calibration will be necessary, though, to compensate for your unique sand characteristics.

Calibrating the Moisture Display is a matter of making the readout match the actual moisture content of the sand. This is done by adjusting the 10-turn potentiometer on the Moisture PC board (located inside the Manual Station). The potentiometer (pot) is marked "ZERO"and can be reached on the outside of the Manual Station where the cable plugs into it.

a. The ZERO pot adjusts all moisture readings up or down by the same amount. Turning the adjustment screw CLOCKWISE DECREASES the reading, counterclockwise increases it.

b. The SPAN pot requires no adjustment. It has been preset at the factory.

The moisture "Precalibrator" assembly, which plugs into the Manual Station (or Analog Module), allows you to simulate any desired moisture reading. This is an important part of the following calibration procedure, and may be useful for simulating or testing the moisture system at a later date.

Plug the Precalibrator cable into the Moisture board only. It will not work if plugged into a load cell input connector.

Calibration Procedure

1. Open the hinged lid of the Manual Station. (On LCI-1 systems, open or

remove the cover of the Analog Module). Turn on power to the display if it's not already on. Make sure the display has been "ON", and the Probe connected, for at least ten minutes before proceeding past Step 4.

2. Turn the Moisture "External Zero" adjustment clockwise four complete turns or until it "clicks". Turn the adjustment back counterclockwise exactly two full turns to center it. The readout should end up within two or three percent of the actual sand moisture. 3. Collect two (or more) samples of sand while the sand is feeding and "bake" them out. The samples should be taken directly under the gate from the sand that flows into the weigh-hopper.

4. When the test of number 3 is taken, run it automatically using the average on the Batch Report printout. **NOTE**: the Display high and low readings. The readings should not vary more than 1 to 2%.

5. If the readings differ by this amount adjust the angle of the Probe 2-3 degrees depending on the variance. Keep repeating the process until you can get consistent readings and bakeouts.

6. Unplug the Moisture Probe cable from the Manual Station, and connect the precalibrator. Adjust the precalibrator until the dial setting is at 1. Write down the display reading. Continue this for 2,3,4, etc.

7. The following bakeout procedure should be used. You should calculate moisture using the following formula.

$$\% \text{ Moisture} = \frac{\text{Wet - Dry}}{\text{Dry}} \times 100 - \text{Absorbed}$$

8. Repeat the bakeout test at least one more time to eliminate any chance of error. The two results should match within .2%. The next page is a chart to help in the calibration.

SECTION 9 THE MOISTURE PROBE

DATE:_____

MOISTURE CALIBRATION WORKSHEET

TARE (EMPTY PAN) = _____ ABSORBED WATER = _____

A	B	C	D	E	F	G	
READING #	DISPLAY	CAL	BAKEOUT	WET	DRY	WET-DRY	DRY-TARE
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

A = DISPLAY READING AT TIME OF TAKING SAMPLE ABSORBED

B = READING ON CALIBRATOR DIAL TO CREATE READING "A"

C = RESULTS OF BAKEOUT

$$C(\%) = \frac{\text{WET-DRY}}{\text{DRY-TARE}} \times 100$$

SECTION 9 THE MOISTURE PROBE

DATE:_____

MOISTURE CALIBRATION WORKSHEET

TARE (EMPTY PAN) = _____ ABSORBED WATER = _____

A	B	C	D	E	F	G	
READING #	DISPLAY	CAL	BAKEOUT	WET	DRY	WET-DRY	DRY-TARE
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

A = DISPLAY READING AT TIME OF TAKING SAMPLE ABSORBED

B = READING ON CALIBRATOR DIAL TO CREATE READING "A"

C = RESULTS OF BAKEOUT

$$C(\%) = \frac{\text{WET-DRY}}{\text{DRY-TARE}} \times 100$$

DYNAMIC CHECKS

If the Probe was installed properly, the reading will probably drop a few tenths of a percent when sand is flowing. If this change is more than 0.5%, the Probe face angle must be adjusted as described in Section IV on page 9.7. The trick is to keep the Probe face horizontal enough so that the sand compacts against it uniformly, while keeping it at enough of an angle that sand will flow across it without creating a dead zone.

If the Probe angle is OK, then use the External Zero Adjustment to raise the standing moisture reading slightly. The flowing sand reading will then be correct.

Use the External Zero Adjustment to correct the readout any time it doesn't match the measured moisture in the sand. This may be necessary if the sand composition changes greatly, or over a period of time as the Probe face wears away.

If you find it necessary to make frequent changes to the External Zero, the Probe probably requires recalibration or physical adjustment.

MOISTURE TRACKING WORKSHEET

Customer Name _____

Date _____

TIME	BATCH#	BAKEOUT	READOUT@ BATCH END	READOUT HIGH	READOUT LOW	PRINTOUT

SECTION 9 THE MOISTURE PROBE

VIII. Spectrum Setup.Spectrum Setup

To enable the Probe:

1. Boot up system. From MAIN MENU, choose "INGREDIENT TABLE".

2. Choose the ingredient that has a Moisture Probe.

3. Find parameter called "AUTO PROBE ON-LINE", and set to (Y). Set the "MOISTURE PROBE SCALE NUMBER" to the value corresponding to the proper scale number. This is typically a value of "4".

4. Set "MAXIMUM MOISTURE" to the maximum moisture expected, set "MINIMUM MOISTURE" to the minimum moisture expected. Set the "MAX MOISTURE CHANGE PER BATCH" to the maximum amount the moisture should vary between batches. Set the "MOISTURE PROBE SCALE NUMBER" to the value corresponding to the proper scale number. This is typically a value of "4".

5. Escape to "MAIN MENU", choose "SYSTEM SETUP" and choose "MODIFY SCALE CALIBRATION", for the moisture line (Scale Number 4):

    a. Set "SERIAL WORD". For weighed water systems, the serial word value is 4; otherwise 3.

    b. Set "SPAN FACTOR" to 1.000.

    c. Set "GRAD SIZE" to 1.000.

    d. Enter zero offset at a value of -2.000.

    System setup is complete. Be sure to run a "DATA BACKUP" to save these changes.

SECTION 9 THE MOISTURE PROBE

OPERATION

Initially, the target for the sand is the SSD weight (0% moisture). The Spectrum takes approximately 10 samples per second while the material is flowing over the gate. As soon as the feed gate shuts, an average of all the readings is made, and this becomes the value used to add the additional sand to the load, and make a correction to the water.

Overall, the Spectrum must have at least 20 valid readings (two seconds worth) in order to do an automatic calculation. A valid reading is defined as:

a. Readings taken after an initial delay. This delay is to allow time for the feed gate to open and for material flow to be established. The parameter is called "TIME TO START FLOW mSEC", and is located in the "INGREDIENT TABLE" in the sand bin. This value is normally 500, for .5 seconds. Decreasing this value will allow more initial samples to be used in the calculation. This may be necessary if many small loads are batched or the feed system is extremely fast. If the value is too small, the system may begin sampling moisture before the sand is flowing, resulting in inaccuracies.

b. Any reading used must be greater than the "MIN ALLOWABLE SAND MOISTURE (%)" previously discussed. Any readings which are not at least this value or greater are thrown out and are NOT counted towards the 20 valid samples needed for the average calculations.

If not enough valid samples are received, or, the average moisture calculated is greater than the "MAX ALLOWABLE SAND MOISTURE (%)", then the Spectrum will notify the operator with a "MOISTURE OUT OF TOLERANCE" message. Overriding the error causes the Spectrum to use the last valid average moisture obtained, usually from the previous batch.

If the moisture is calculated successfully, it is saved for use on the next load if needed.

SECTION 10 THE MANUAL STATION

CONFIGURING THE MANUAL STATION DISPLAY

The Spectrum Manual Station display provides an active stream of scale and counter readings to the Spectrum computer. The Manual Station is designed to interface the Spectrum computer via a Com port, but will function independently if manual batching ever becomes necessary.

The display is a seven segment LED type consisting of up to ten six-digit displays. It was designed to be totally field configurable, i.e., graduation size and decimal point location can be set up or altered by the end user. The scale and counter set up information is stored in an "EEPROM" (Electrically Erasable Programmable Read Only Memory) which retains its data without power or battery backups. The data stored in the "EEPROM" will remain there forever unless reprogrammed by the user.

The display is only operational when the "control power" toggle switch on the junction box is turned on. After power is applied, the display will remain blank for approximately 15 seconds and then display all dashes. It will remain in this condition until the operator presses the "Display Test" button, which serves as a visual check to insure all segments are working. When the "Test" button is released, scale and counter information will be displayed.

During normal operation of the display (non setup mode), pressing the "Grad" button will display the scale's or counter's total capacity. When the button is released, the graduation size is displayed for approximately 15 seconds. A daily check before batching is recommended to insure all data is correct.

There are two jumper options on the printed circuit board located behind the LED displays. The first, labeled "J1" allows the user to configure the displays if the jumper is from the middle pin to the pin labeled "UL" (unlocked). When the jumper is from the middle pin to the pin labeled "L" (locked), no change in configuration will be allowed.

The second jumper option "J2" sets the total number of displays in the Manual Station. This jumper must correspond with the actual number of displays (six or ten) in the Manual Station whether all are used or not.

To enter or change the setup information for the display, move the jumper "J1" to "UL", depress the "Manual Power" and "Set" buttons in the switch group labeled "Display". See FIGURE 1.

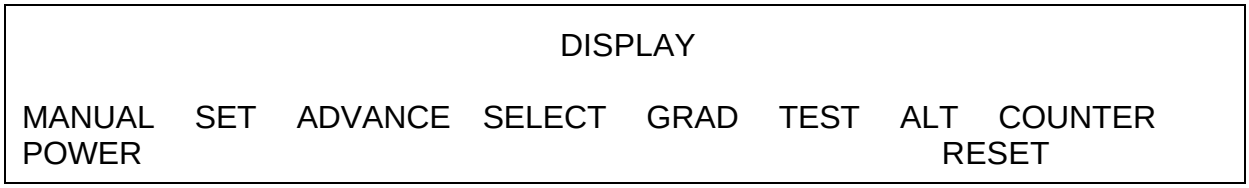


FIGURE 1

Pressing the "Set" button will cause the display to blank except for the first character in the upper left corner. If the display has never been set up before, this character will be a zero. By momentarily pressing the advance button, the digit will display an "S" for scale, by pressing the advance button again, it will display a "C" for counter. When the correct letter is shown defining whether the display is to be used for a scale or a counter, momentarily press the "Select" button to accept it. The letter will disappear and a three digit number representing the graduation size will be displayed.

To determine the graduation size, divide the scale's total capacity by 2000. This should result in a number with several digits and possibly a decimal point somewhere in the number. Disregarding the decimal point and any trailing zeros for a moment, the number remaining is the graduation size. The grad size cannot be larger than 255. If it is, the scale capacity is not a valid one for use with the Spectrum Manual Station display.

EXAMPLE: Scale Capacity = 40000
Step 1: 40000/2000 = 20
Step 2: 20
Grad Size is 20

EXAMPLE: Scale Capacity = 100000
Step 1: 100000/2000 = 50
Step 2: 50
Grad Size is 50

EXAMPLE: Scale Capacity = 7200
Step 1: 7200/2000 = 3.6
Step 2: 3.6
Grad Size is 3.6, but 36 is the number to enter as the grad size. The decimal point will be inserted later. More commonly, a grad size of 5 would be used to get even divisions and still have plenty of capacity.

EXAMPLE Scale Capacity = 300
Step 1: 300/2000 = .15

Step 2: .15
Grad Size is .15, but 15 is the number to enter as the grad size.

If the grad size that is displayed is correct, press the "Select" button to accept it. If the grad size is not correct, press the "Advance" button momentarily. The left most digit will remain on and the other two will disappear. Pressing the "Advance" button again will show a new choice for that digit. When the correct digit is displayed, press the "Select" button to accept and advance the display to the middle digit. Repeat the process of the "Advance" and "Select" buttons until all three digits are correct.

Press the "Select" button again to accept the grad size and to advance the display to the decimal point selection. If no decimal point is required, "Select" the zero. If a decimal point is required, press the "Advance" button for your choices and the "Select" button to choose it.

EXAMPLE: Scale Capacity = 300
Grad Size = .15

Press "Advance" until the display shows .00, then press "Select".

The first digit of the second display should now be on. Repeat the above process until all displays are configured.

In the event that a scale or counter is removed or is no longer to be displayed, the information for that display may be blanked by entering a 000 graduation size.

Press and release the "Set" button when all displays are configured. This will store the setup data in memory. To resume normal operation, make sure the "Set" button is released and turn the "control power" toggle switch OFF and back ON again.

NOTE: It is important to remember to press the "Select" button after the last decimal point is chosen. If this is not done and the "Set" button is released, the decimal point choices for that display will advance very rapidly. If this happens, press "Set" again, choose the correct decimal point, press "Select" and then press "Set".

SECTION 10 THE MANUAL STATION

***** IMPORTANT *****

Once you have finished setting and checking the display configuration, move the J1 jumper so that it's in the "L" position.

Next, test the setup locking by pressing the "Set" button again. This time, the displays should not blank, but continue displaying scale weights. Press and release the "Set" button.

Following these steps will prevent accidental changes to the display configuration.

The following procedure shows how to make labels for the Spectrum Manual Station.

Verify that all the necessary diskettes are available.

20438	Boot disk
20499	PANEL disk

INSTALLING THE PANEL PROGRAMTHE PANEL PROGRAM

1. From the Main Menu, hold down ba and press i. This will display a menu with a few choices.

2. The only choice to be concerned with is **Copy to Hard** (g). By selecting this option, the system will prompt you for a diskette.

3. Place the PANEL disk (PN-20499) into the drive and press e. This will copy the panel program to the hard drive for future use. Once this is done, proceed to **Using the Panel Program** for instruction on how to print labels.

USING THE PANEL PROGRAM THE PANEL PROGRAM

1. From the Main Menu, hold down ba and press i. This will display a menu with a few choices.

2. The only choice to be concerned with is **Panel** (f.) By selecting this option, the system will bring up the panel screen for user input.

CHANGING THE PUSHBUTTON NAMESTHE PUSHBUTTON NAMES

1. The screen now shows a rough layout of where the Manual Station labels are located. Choose which label needs changing, and hit the appropriate Function key. Note some locations require the "Shift" key in addition to the Function key.

   While editing the labels, the cursor keys will move the cursor to any word that needs changed. Note that you must press e to enter any change made. If you move the cursor out of an area that was changed without pressing e, the old data will remain. Press ^ to return to the screen showing the layout of the Manual Station.

2. When all the labels have the correct wording, press j and t to select the type of printer. Use the following table to select the correct printer type.

PRINTER MANUFACTURER	SELECTION
Epson, Panasonic	Epson
Okidata	Okidata
All others	NULL

3. After the printer type has been selected, insure that the printer is turned on and that the paper tear-off is just above the print head.

4. Press t to print the labels. The screen will show the number of labels waiting to be printed. You can stop the printing at any time by pressing the k.

   After printing, the labels can be re-edited and printed again if necessary.

5. When all labels are complete, press u to end the program.

6. Using a pair of scissors, cut the labels out on the lines provided by the printer. Then insert the label into the small slot on the edge of the Manual Station Overlay. The widths of the slots vary slightly, it may be necessary to trim some pieces thinner than others.

The load cell driver boards are located inside the Manual Station towards the back of the unit. Connection to the load cell is via a nine pin subminiature 'D' type connector which is accessible from the rear of the Manual Station. The pin numbers and functions are shown in Figure 1A on the previous page. There is an external zero potentiometer for each driver board located on the top of the Manual Station just below the display area.

Refer to Figure 1A and locate the zero and span dip switches. These switches are "binary weighted" with the least significant bit (LSB) to the left and the most significant bit (MSB) to the right. The LSB produces the smallest change while the MSB produces the largest. There are 8 zero switches and 10 span switches. This means 255 possible zero configurations and 1024 possible span.

Turn off or open all but the 3 right most span jumpers and all but the 3 left most zero jumpers.

Center the external zero pot.

Make sure the 3 grad zero limit jumper is installed.

Turn the medium zero pot 20 turns counterclockwise.

Ensure the scale hopper is empty and observe the reading on the LED display.

If the reading for a scale is a dash (under zero), turn on or close one or more switches to the zero section until the reading is equal to 0. If the reading is above 0, turn off or open one or more switches until it reads 0.

NOTE: At least one switch must be on (closed) in the zero section at all times.

EXAMPLE: With the initial 3 switches in the zero section turned on, the displayed weight is a dash. By turning on the fourth switch from the left, the display reads 6 graduations above 0. Turning off the first switch reduces the display by one grad. Turning off the next switch reduces the display by a total of 3 grads. Turning off the next switch takes the reading under zero, but by adding the first and second switch on again the reading is equal to 0, but occasionally flickers under zero. Adjusting the medium zero pot at this point stabilizes the display at 0.

NOTE: The medium zero potentiometer has an approximate range of 14 graduations of adjustment. HOWEVER, it should not be used until the best possible switch configuration is set.

After setting the zero, add weight to the scale that is equal to the scales total capacity.

Observe the reading on the screen. If it is not up to full scale, turn off one or more span switches. If the reading is above full scale, indicated by 'OC' over capacity on the LED display, adding span switches will reduce it. Follow the same procedure as the example in the zero section, but remember turning on span switches reduces the span, while turning off switches increases it.

The fine span adjustment has a range of 5 graduations at full scale only. Use of this adjustment should be only after the best possible switch configuration is set.

After the span is set, remove the weights, so the scale is empty and check the zero. It may be necessary to repeat the zero and span procedures again because a large adjustment in the span circuit may change your zero reading.

When the zero and span circuits have been set, any further zero adjustments, such as the external zero, will not affect the span.

With the scale empty, the three grad zero limit jumper may be removed to give approximately 7 grads of external zero adjustment. If removed, re-zero the display with the medium zero adjust or the external zero adjust. **NOTE:** Some states require the 3 grad limit for the external zero adjust.

Plug in the Pre-Cal board and record the reading at each of the ten positions. Also, record the switch settings on the zero and span switches.

NOTE: When all scales have been calibrated, replace the cover over the span switches. This will prevent others from accidentally changing the span while trying to adjust the zero reading.

Repeat the above procedure until all LCI-1's are calibrated.

NOTE: The LCI-1 boards should be checked and recalibrated, if necessary, at a maximum of six month intervals.

For Revision K LCI-1 Boards, a green LED will be located on the board as shown in Figure 1A on the previous page. The following adjustment will be required for this board.

With all the connections made and the power on, adjust the LED potentiometer clockwise until the LED goes out. Now turn the pot counter-clockwise until the LED just comes back on. The circuit that drives the LED monitors the current draw of the load cell and by making this adjustment, it is now fine-tuned to its particular cell.

This adjustment is not necessary for proper operation of the board; however, it does act as a watchdog over the load cell and cable connections. If part of the load cell should open or a sense or exciter cable line break, the LED will go out. If the LED blinks on momentarily when the control power is applied, it means that a sense line is missing or one cell of a multiple cell hookup is bad.

This concludes the calibration procedures.

LOAD CELL COLOR CODESCELL COLOR CODES

This cross reference chart allows you to replace one brand load cell with another when they have the same output (mv/v) and the same physical size.

	+EXCI-TATION	+SENSE	-EXCI-TATION	-SENSE	+OUTPUT	-OUTPUT	SHIELD
Revere	Green		Black		White	Red	Orange
Beowulf	Green		Black		White	Red	Bare
BLH	Green		Black		White	Red	Yellow
HBM	Green		Black		White	Red	Yellow
HBM (PLC SBE)	Red		Black		Green	White	Yellow
Toledo	Green		Black		White	Red	Yellow
Allegany	Green		Black		White	Red	Bare
National	Green		Black		White	Red	Yellow
Cardinal	Green		Black		White	Red	Bare
Evergreen	Green		Black		White	Red	Bare
Transducers*	Red		Black		Green	White	Orange
Interface*	Red		Black		Green	White	Bare
Electroscale*	Red		Black		Green	White	Bare
Genisco*	Red		Black		Green	White	Bare
Ormond*	Red		Black		Green	White	Bare
LeBow*	Red		Black		Green	White	Bare
Alphatron*	Red		Black		Green	White	Bare
Strainsert*	Red		Black		Green	White	Bare
Nikkei	Red		Black		Green	White	Bare
Sensor-tronics*	Red		Black		Green	White	Bare
Sensortronics (60007)	Green		Black		White	Red	Yellow
Tedea	Green	Blue	Black	Brown	Red	White	Bare
NCI	Red	Yel	Black	Blue	White	Green	Bare
Pesage Promotion	Blue		White		Red	Black	Yellow
Kubota	Red		White		Green	Blue	Yellow
Phillips	Red		Blue		Green	Gray	Bare
Transducers System	Red		Green		Yellow	Blue	Bare
Thames Side	Red		Blue		Green	Yellow	Bare
A & D Eng.	Red		White		Green	Blue	Yellow

* See **NOTES** on following page.

***NOTES:**

Color code complies with ISA S37.8-1975 "Specifications for Tests for strain gauge force transducers" also per Western Regional Strain Gauge Committee Standard.

1. Unidirectional load cells (Tension only or Compression only)
   -Positive output in the direction of rated load.

2. Bi-directional load cells (Universal; Tension and Compression)
   -Positive output in the direction of compression loading.
   Negative output in the direction of tension loading.

3. Direction of Standardization (Calibration)-In the case of bi-directional load cells, the rated output shall apply in the direction of compression loading.

To correct an instrument that displays a weight in the wrong direction, interchange the +Output and -Output connections.

EXAMPLE: If the load on the scale is increasing and the instrument display is decreasing, reverse the Output connections. Do not reverse the Excitation connections. The readout should now display increasing readings with increasing load.