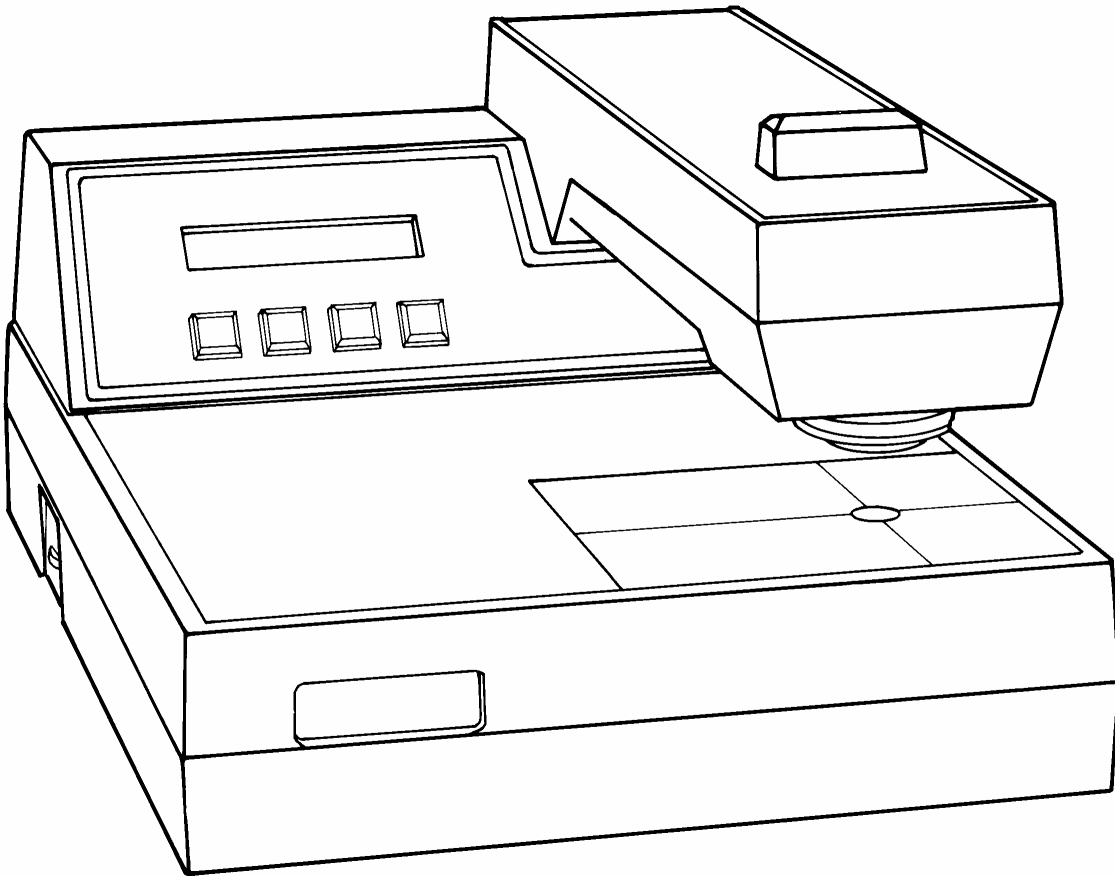


X-RITE 820 TRANSMISSION/REFLECTION COLOR  
PHOTOGRAPHIC DENSITOMETER

# Operator's Manual

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## **IMPORTANT!**

### **To prevent errors when taking measurements:**

- If film is warped... be sure to hold film flat against target window or hold film upside down.
- When centering film... be sure film area is directly over target window—beware of a parallax viewpoint.

### **Maintenance Caution:**

- Do not try to pry reading head cover upwards. Reading head cover slides backwards towards rear of unit. See *Section Five—Maintenance*.
-

**CAUTION:** For continued protection against fire, replace only with same type fuse.

**ADVERTENCIA:** Para evitar el peligro de incendio en el caso de funcionamiento defectuoso del fusible, es preciso reemplazarlo con un fusible del mismo tipo.

**AVVERTIMENTO:** Per evitare il pericolo di un incendio nel caso di funzionamento difettoso del fusibile, rimpiazzarlo solamente con un fusibile dello stesso tipo.

**VORSICHT:** Für fortgesetzten Schutz gegen Feuer, ersetzen Sie die Sicherung nur mit einer vom gleichen Typ.

**ATTENTION:** Pour une défense continue contre le feu, remplacez le fusible seulement avec tel du même type.

**CAUTION:** To prevent electrical shock, DO NOT remove cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

**ADVERTENCIA:** Para evitar un choque eléctrico, NO QUITE el recubrimiento del aparato. No hay ninguno componente reparable de usuario, dentro del aparato. Consulte un técnico calificado para servicio o arreglo.

**AVVERTIMENTO:** Per evitare una scossa elettrica, non staccare la coperta del apparecchio. C'è nessuno componenti riparabili d'utente, interno del apparecchio. Consultare un tecnico qualificato per servizio o manutenzione.

**VORSICHT:** Diese Abdeckung darf nicht entfernt werden. Sie schützt vor elektrischem Schock. Sie deckt auch keine vom Benutzer zu wartenden Teile ab. Mit notwendigen Wartungen wenden Sie sich bitte nur an autorisiertes Fachpersonal.

**ATTENTION:** Pour prévenir un choc électrique, n'enlevez pas cette couverture. Il ne contient aucune pièce réparable. La réparation ne doit être fait que du personnel compétent.

#### **FCC**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

#### **Canada**

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

**NOTE:** Shielded interface cables must be used in order to maintain compliance with the desired FCC or European emission requirements.

The Manufacturer: X-Rite, Incorporated  
Der Hersteller: 3100 44th Street, S.W.  
El fabricante: Grandville, Michigan 49418  
Le fabricant:  
Il fabbricante:

Declares that: Densitometer  
gibt bekannt: 820  
averte que:  
avertit que:  
avverte che:



is not intended to be connected to a public telecommunications network.  
an ein öffentliches Telekommunikations-Netzwerk nicht angeschlossen werden soll.  
no debe ser conectado a redes de telecomunicaciones públicas.  
ne doit pas être relié à un réseau de télécommunications publique.  
non deve essere connesso a reti di telecomunicazioni pubblici.

## **CE DECLARATION**

Manufacturer's Name: X-Rite, Incorporated  
Manufacturer's Address: 3100 44<sup>th</sup> Street, S.W.  
Grandville, Michigan 49418  
U.S.A.

Model Name: Densitometer  
Model No.: 820

Directive(s) Conformance: EMC 89/336/EEC LVD 73/23/EEC

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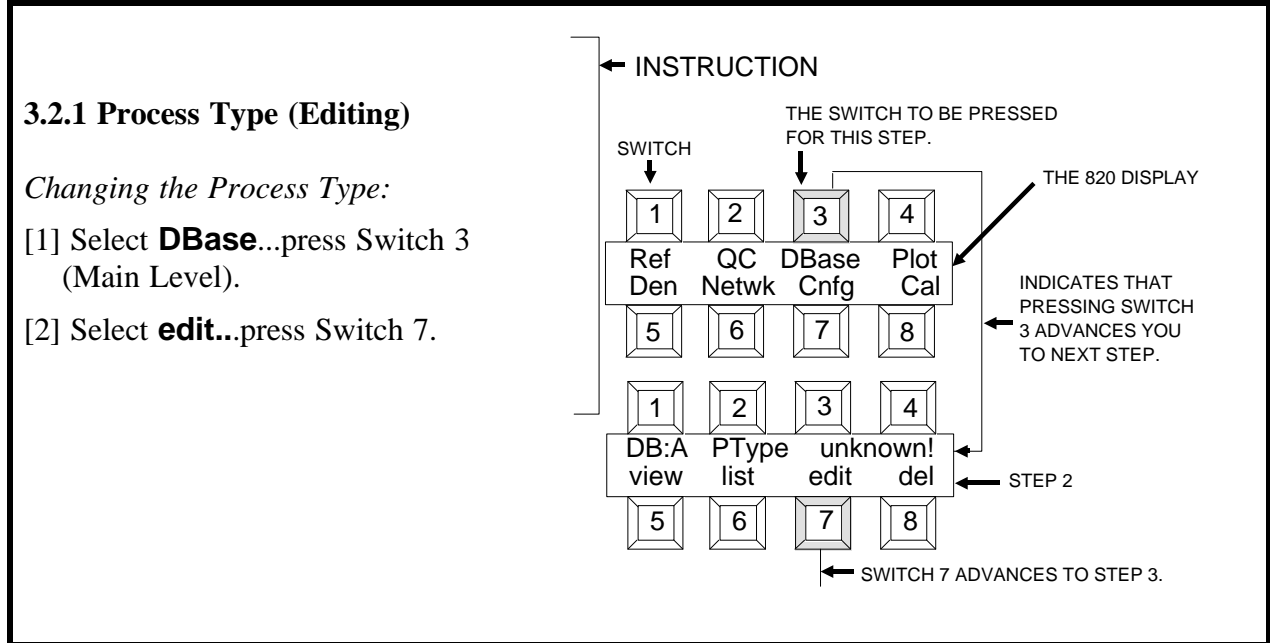
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## Preface

The purpose of this manual is to instruct the "first time" operator in how to setup and operate the X-Rite 820 densitometer. The manual breaks down the functions and operation into independent sections. Thereafter, each section is broken down to a systematic, step-by-step approach, showing how that particular function operates or is setup. Each section will always begin at the Main Menu, lead you thru the entire procedure, and then exit you back out of the procedure.

All of the procedural sections have graphics that help illustrate each step of that procedure. Most of the graphics have been specifically designed to resemble the 820 Liquid Crystal Display. That allows each instruction step to show you exactly what is being displayed, as it happens! Below is an example instruction step, with an explanation.



After you have learned the operation of your 820, you need only to refer to the 820 Reference Guide (P/N 820-601) for quick reference.



*Dear customer:*

*Congratulations! We at X-Rite, Incorporated are proud to present you with the X-Rite 820 Transmission/Reflection Densitometer. This instrument represents the very latest in microprocessors, integrated circuits, optic and display technology. As a result, your X-Rite 820 is a rugged and reliable instrument whose performance and design exhibit the qualities of a finely engineered instrument, which is not surpassed.*

*To fully appreciate and protect your investment, we suggest that you take the necessary time to read and fully understand this manual. As always, X-Rite stands behind your 820 with a full one year limited warranty and a dedicated service organization. If the need arises, please don't hesitate to call us.*

*Thank you for your trust and confidence.*

*X-Rite, Incorporated*

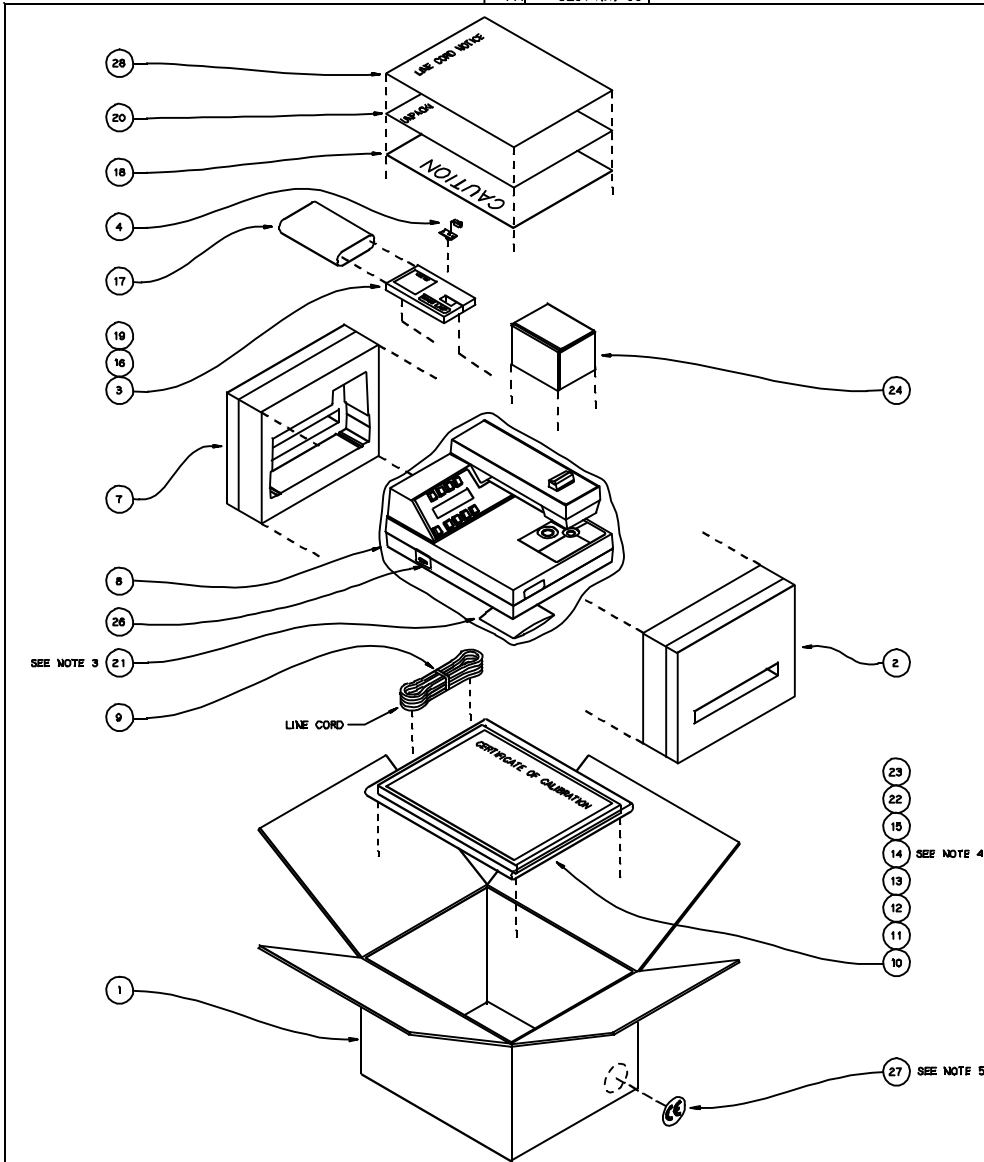
## **Packing List Check**

---

After removing the instrument from the shipping carton, inspect for possible damage. If any damage is noted contact the transportation company immediately. Do nothing more until the carrier's agent has inspected the damage.

If damage is not evident, check and make sure that all items are included (refer to the following page for the packaging illustration and parts list).

Your X-Rite 820 was packaged in a specially designed carton to assure against damage. If reshipment is necessary, the instrument should be packaged in the original carton. If the original carton is not available a new one can be obtained from X-Rite, Inc. Refer to the packaging drawing on the following page for packaging part numbers.



SEE NOTE 3

SEE NOTE 4

SEE NOTE 5

**X-Rite** Incorporated  
 GRANDVILLE, MICHIGAN, U.S.A.  
 THE PHOTOGRAPHIC COMBO DENSITOMETER ASSY  
 WITH INTERNAL MODEM PACKAGING

DATE: NONE | 07-30-85 | T.W.D.D. | page # | MPS BJB

CLASS: 820TR(X) | 820TR(X)-00 | 820TR(X)-00

RELEASED 07-30-85

A	000000-000000
B	000000-000000
C	000000-000000
D	000000-000000
E	000000-000000
F	000000-000000
G	000000-000000
H	000000-000000
I	000000-000000
J	000000-000000
K	000000-000000
L	000000-000000
M	000000-000000
N	000000-000000
O	000000-000000
P	000000-000000
R	000000-000000
S	000000-000000
T	000000-000000
U	000000-000000
V	000000-000000

ITEM	QTY	UNIT	PART NUMBER	DESCRIPTION
28	-	1	SD01-68	LINE CORD NOTICE
27	1	1	SD43-77	CE LABEL
26	-	1	820TR-00-01	TRANS/REFL DENSITOMETER ASS'Y, 230V
1	-	1	820TR-00-01	TRANS/REFL DENSITOMETER ASS'Y, 115V
25	-	-	-	NOT USED
24	1	1	820-80	MODEM CABLE ASSEMBLY
23	1	1	820-801	REFERENCE GUIDE
22	-	-	-	NOT USED
21	1	1	SD120-01	SILICA GEL DESICCANT
20	1	1	820-804	UNPACKING INSTRUCTIONS
19	1	1	SD43-820-10	LAMP INSTALLATION NOTICE
18	-	1	810-800	CAUTION NOTICE, 230V
1	-	1	810-800	CAUTION NOTICE, 115V
17	AR	AR	SM337	SHRINK FILM
16	1	1	SD43-820-00	SPARE LAMP LABEL
15	1	1	SD65-07	PLASTIC BAG
14	1	1	SD01-41	CERTIFICATE OF CALIBRATION
13	1	1	SD01-04	WARRANTY REGISTRATION CARD
12	1	1	810-800	TRANSMISSION REFERENCE ASSEMBLY
11	1	1	302-12	REFLECTION STANDARD ASSEMBLY
10	1	1	820-84	OPERATORS MANUAL
9	1	1	SD203-02	RUBBER BAND
8	1	1	SD65-11	PLASTIC BAG
7	1	1	SD200-820-03	CARTON INSERT
6	-	-	-	NOT USED
5	-	-	-	NOT USED
4	1	1	820-82-01	REFLECTION LAMP ASSEMBLY
3	1	1	SD200-820-04	CARTON INSERT
2	1	1	SD200-820-02	CARTON INSERT
1	1	1	SD200-820-01	CARTON

**PARTS LIST**

**NOTE**

1. PACKAGE AS SHOWN. RECORD MODEL NUMBER & SERIAL NUMBER ON CARTON & STAPLE CARTON SH-17.
2. PLACE ITEM 4 INTO CAVITY OF ITEM 3 & SHRINK WRAP WITH ITEM 17. PLACE ITEM 16 JUST ABOVE LAMP CAVITY.
3. PLACE ITEM 21 INSIDE OF ITEM 8 BELOW UNDERSIDE OF UNIT BETWEEN ITEM 2 & 7.
4. PROCESS ITEM 14 AS SPECIFIED BY SPECIFICATION SPP 3004. AFTER ITEM 14 HAS BEEN PROCESSED IT MUST BE PLACED IN PLASTIC BAG ON TOP OF ALL OTHER ITEMS IN PLASTIC BAG & PLACED IN CARTON.
5. PLACE ITEM 27 ON SAME SIDE OF ITEM 1 AS MODEL & SERIAL NUMBER OF INSTRUMENT. PLACE ITEM 27 ON ITEM 1 AS SHOWN.

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# 1.

# GETTING STARTED

## 1.1. What To Do First

The section lists the steps you should take to learn the operation of your X-Rite 820 densitometer.

**Note! This unit is shipped without any Process Types installed. In order to use the Reference, Quality Control, or plot functions you must enter a PType (See Section 3.2.1).**

*Step 1...*Briefly look through the entire operator's manual and get a general understanding of how the unit operates.

*Step 2...*Apply power to the unit and adjust the display angle to your line of sight (see section 1.3).

*Step 4...*Get familiar with the Main Menu (see section 1.4) and how the display dictates the function of each keyswitch (see section 1.5).

*Step 5...*Learn the basic procedure for taking density measurements (see sections 2.1 thru 2.3).

*Step 6...*Quick Zero your unit (see section 7.1).

At this point you should understand the basic operation of the 820. In order to continue with the remaining steps you must first select a Process Type for each database you wish to use (See Section 3.2.1). There are over 20 preset Processes to select from. These processes are preset to meet the manufactures specifications. Each process will guide you thru the entire measuring procedure, step by step for the specific control strip or reference strip you are using. Your 820 will also calculate and print (or plot) all the necessary data so you can keep your process under control.

*Step 7...*Setup each database (A thru T) that you wish to use with the desired PType (see Sec. 3.2.1).

*Step 8...*Measure the Reference Strip (see section 4).

*Step 9...*Measure the Control Strips at intervals according to your monitoring procedure (see section 5).

*Step 10...*Review all processed data (measured and as computed by your 820). The data can be displayed, printed, or plotted (see section 3.4).

**NOTE:** X-Rite recommends that you leave your 820 densitometer on continually (24 hours a day). This will guarantee the least amount of zero drift, and ensure the best possible measurement accuracy. Lamp life will not be adversely effected by doing so. (LAMP SAVER feature described in Sec. 1.6).

## 1.2. Basic Features

- \*Twenty Individual Databases for storing process information. Each database can be set to one of the preset processes that comes with your 820 or to a customized process you personally set up.
  
- \*Process Monitoring Library consists of approximately 25 preset processes. Each process is preset to meet the manufacturer's specification for monitoring a particular type of film. The process will automatically select the proper densitometry (Transmission/Reflection), which steps or colors to be measured, and then calculate the necessary data to inform you if the process is in or out of control.
  
- \*Process Editor gives you the ability to change the various parameters of each preset process to meet your own individual monitoring needs.
  
- \*Density Function allows you to take simple density measurements with the following features:
  - **Transmission Status A, Transmission Status M, or Reflection Status A operation.**
  - **Single (or any combination of colors) color measurement.**
  - **Simultaneous measurement and display of all four colors.**
  - **Automatic color selection.**
  
- \*I/O Port can be set up as serial or parallel to interface with a printer, plotter, or a computer device.
  
- \*Plot Function lets you output database information to a plotter (HP-GL or Casio language format). The plot function calculates all the necessary curves associated with the specific film process selected. The derived information can be from the preset processes, or according to your own set of rules (i.e., Aim Limits, Action Limits, Control Limits, and Transformation rules).
  
- \*Internal Clock/Calendar that tags each strip measured with the time and date that the measurement was taken, and then correlates that information with the measured data during a print or plot function.
  
- \*Lamp Saver is an internal program that recognizes what hours of the day you personally operate the 820. And, after establishing a pattern of operation, the 820 will automatically turn ON the read lamp one half hour before your established operating hours, and then turns it back OFF one half hour after operation has ceased.
  
- \*Help Messages that explain the operating functions and abbreviations used in the 820.

### 1.3. Applying Power and Display Angle Adjustment

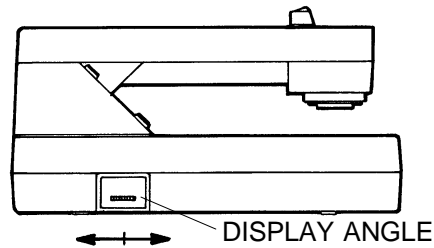
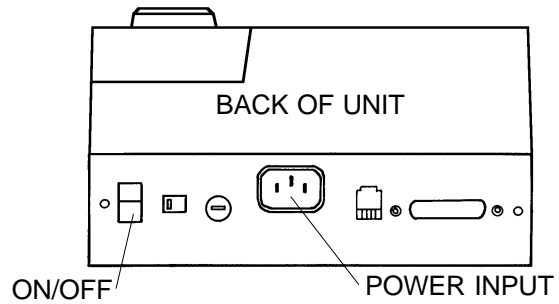
Before applying power verify that the **Voltage Select switch** (located on the back panel of the unit) is set to the proper AC line voltage for your area.

**NOTE: If the unit has been stored in an abnormal (cold) environment DO NOT apply power until the unit has sat for several hours in a normal environment (10° to 30°C / 50° to 86°F).**

**CAUTION: For safety and unit stability, do not modify line cord provided with this instrument. Connect to a grounded 3 wire receptacle.**

To apply power:

- [1] Plug female end of the line cord into Power Input located in the back panel of unit, and the other end into the wall outlet.
- [2] Adjust the Display Angle to a midway setting.
- [3] Set the Power Switch to "1" (ON).



- [4] Upon power up the unit will perform a selftest and display the present software datecode. If selftest is not passed an error message will be displayed. If this occurs refer to Appendix A.6.

```

X-Rite 820 PHOTODENS
Vxxxx SELFTEST=PASS
|
| DAY
| MONTH
| YEAR
| VERSION
    
```

- [5] After Selftest passes, the amount of hours already used on the backup battery is displayed. Battery lifetime is approximately 20,000 hours.

```

X-Rite 820 PHOTODENS
Battery Hours = xxxxx
|
| HOURS
    
```

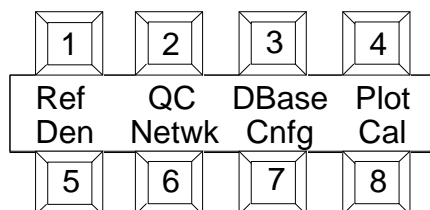
- [6] The main menu is displayed.

```

Ref QC DBase Plot
Den Cnfg Cal
    
```

## 1.4. The Main Menu

The Main Menu shows the primary functions of the 820. The main functions are Reference (**Ref**), Quality Control (**QC**), Database (**DBase**), Plot, Density (**Den**), Network (**Netwk**), Configuration (**Cnfg**), and Calibrate (**Cal**).



The following is a brief explanation of each main function. Refer to Section 1.5 on how to select each function.

- \***REFERENCE** is the function where you measure Reference Strip(s). You can use the X-Rite preset measuring sequence for the process selected or use a sequence you programmed [See Section 4].
- \***QUALITY CONTROL** is the function where you measure Control Strips. You can use the X-Rite preset measuring sequence for the process selected or use a sequence you programmed [See Section 5].
- \***DATABASE** is where the measured data and measurement sequence for each process is stored. Each Database can store up to 30 different strip readings. Database consists of four secondary functions:
  - » **VIEW**....allows you to display the measured or computed information in the selected database [See Section 3.3].
  - » **LIST**....allows you to view, print, or plot database information [See Section 3.4].
  - » **EDIT**....gives you the ability to change the various parameters of each preset process [See Section 3.2].
  - » **DELETE**....allows you to delete units from a database. A unit is one complete set of measurements of a Control Strip [See Section 3.5].
- \***PLOT** lets you output database information to a HP-GL or Casio language format. The plot function calculates all the necessary curves associated with the specific film process selected. The derived information can be from the preset processes, or according to your own set of rules (i.e., Aim Limits, Action Limits, Control Limits, and Transformation rules). [See Section 6]
- \***DENSITY** lets you take simple density measurements using Transmission Status A, Transmission Status M, or Reflection Status A. Internegatives can also be balanced using this function. [See Section 2]
- \***NETWORK** is used for quality control of multi-outlet photofinishing lab. [See Section 12]



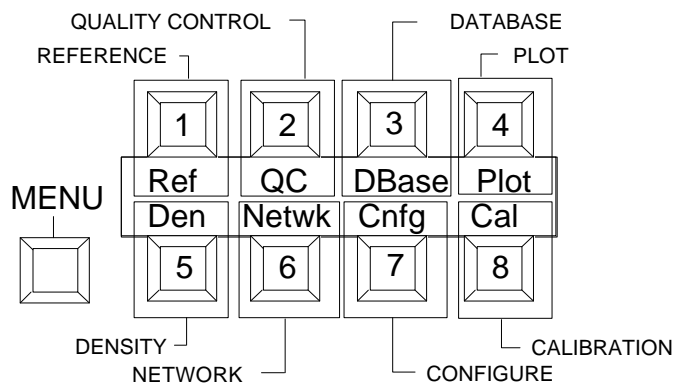
\***CONFIGURATION** allows you to turn certain operating and print options on and off [See Section 8].

\***CALIBRATE** allows you to individually calibrate Transmission Status A, Transmission Status M, Reflection Status A, and allows you to set the internal clock and calendar. The clock/calendar tags the exact time and date a measurement is taken and correlates that with the measured data during a print, plot, or when sent out the modem [See Section 7].

## 1.5. Keyswitch And Display Description

The characters in the display closest to each keyswitch (above/below) dictate which function will be selected or what action will take place when that keyswitch is pressed. When ever possible, uppercase lettering is used for menu headers, status indication, and instructions. Lowercase lettering is used for menu options that are selectable by the user. This basic relationship between the keyswitch and display is used in every mode of operation in the 820.

*For example, when the main menu is displayed:*



- Switch 1 selects Reference.
- Switch 2 selects Quality Control.
- Switch 3 selects DataBase.
- Switch 4 selects Plot.
- Switch 5 selects Density.
- Switch 6 selects Network Operation.
- Switch 7 selects Configuration.
- Switch 8 selects Calibrate.

**Note: Menu Switch will always return you to the Main menu, no matter what operating or display status you are in.**

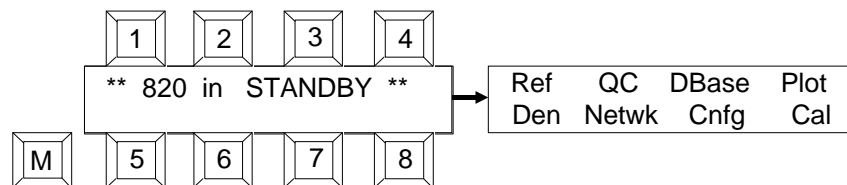
**Remember...**always check the display to see what the function of each keyswitch is.

## 1.6. Lamp Saver

Lamp Saver is an internal program that recognizes what hours of the day you personally operate the 820. And, after establishing a pattern of operation, the 820 will automatically turn ON the read lamp one half hour before your established operating hours, and then turn the lamp OFF approximately one half hour after operation has ceased. Standby is the condition where all normal internal functions halt, and the Read Lamp is turned ON or OFF based on the history of usage established over the last several days. This feature will greatly extend the life of the Read Lamp.

*Here's how it works:*

- 1) - After receiving the 820 from the factory, the first time the unit is turned on it begins monitoring your work habits. And, after eight days, the 820 assumes your personal operating hours and starts automatically turning the lamp On and Off via the Lamp Saver feature.
- 2) - During the initial eight days of monitoring, the 820 will automatically go into standby after 15 minutes of nonuse, but will not turn off the lamp. During this standby period you can wake-up the unit by pressing any key. In general the "Lamp On Times" for any given day are those times of day where the 820 has been used for taking QC or Reference measurement during the previous eight days.



- 3) - After the unit has established a work pattern and begins turning off the lamp in standby, you can still wake-up the unit by pressing any key. However if the Lamp was OFF, you should wait approximately two minutes for warm-up of the lamp. If you take measurements before the warm-up, there is a chance that the measurement will be in error.
- 4) - Anytime you wake-up the 820 during standby mode and then take a measurement, the unit will remember that time of usage and set it into the Lamp Saver memory.
- 5) - Whenever a new process type is selected for a database the 820 will erase the established usage times and reinitialize the eight day monitoring period, as in step 2.
- 6) - If desired, you can directly put the 820 into standby mode by holding the MENU switch depressed for approximately five seconds. Upon release the unit will display the standby mode.

### 1.6.1 Lamp Saver Quick-Reset

Quick Reset provides you with an easy way to reinitialize the Lamp Saver usage table. When this is done, the lamp will remain ON during Standby for the next eight days and a new work pattern has been established. The Lamp Saver is also reinitialized when a process type is changed.

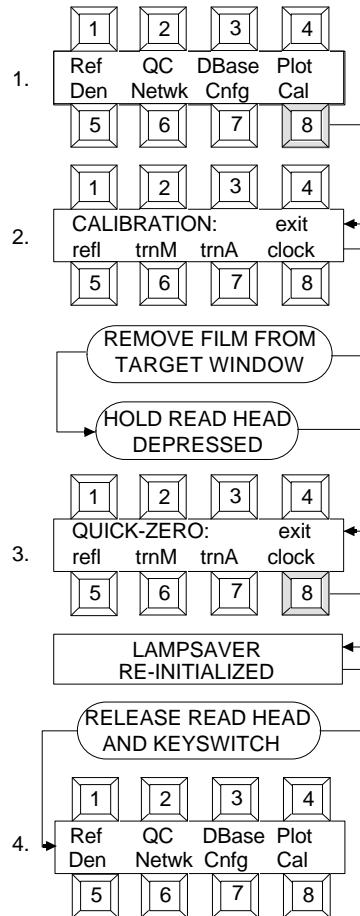
#### Quick Reset Procedure

[1] Select **Cal**...press Switch 8.

[2] Remove any film from target window.

[3] While holding the Read head depressed, press Switch 8 (Clock) then release the Read head and Switch 8.

[4] Upon release, the display will show that Lamp Saver was reset.



## 1.7. Accessing Help Messages

The Help Messages are a quick means of explaining a brief operating function and abbreviations used. Also displayed is the specific section of the 820 Operation Manual for more detailed explanations. Help Messages are obtainable in first and some second level menus, they are:

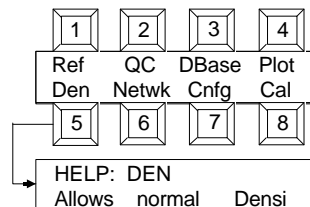
- 1) **First Level**      **Ref, QC, DBase, Plot, Den, Netwk, Cnfg, and Cal.**
- 2) **Second Level**    **Ref (Ref ID, view, and read)**  
                          **DBase (view, list, edit, and del)**  
                          **Cnfg - Page 1 (netwk, port, baud,& pin5)**  
                          **- Page 2 (aid, comp, dpt, & alf)**  
                          **- Page 3 (auto, aprnt, tone,& lock).**

Help Messages are accessible by holding down a selected switch for 3 seconds, and the Help Message will scroll across the display.

**Note: The message may be stopped at any time by pressing and holding down the switch that was selected. Once the switch is released the message will continue, and at the end of the message the display will automatically return to the Menu Level.**

### *Example of DEN Message*

[1] Press and hold down Switch 5 (main level) for 3 seconds, and then release.



*Message that is displayed.*

**HELP: Den**

**The DENSITY function allows normal density readings without using the DataBase. See sec. 2.0 of manual.**

## 2.

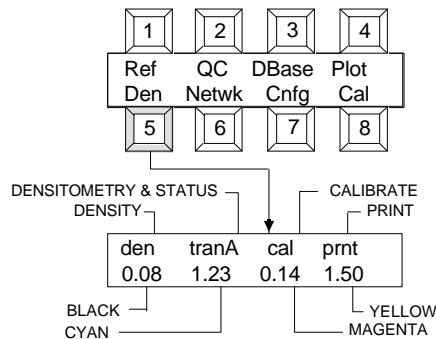
# DENSITY OPERATION

The Density function allows you take simple density measurements using the following features:

- **Transmission Status A, Transmission Status M, or Reflection Status A operation.**
- **Single (or any combination of colors) color measurement.**
- **Simultaneous measurement and display of all four colors.**
- **Automatic color selection.**
- **Automatic or manual print out.**
- **Quick Cal-Lo or Calibration.**

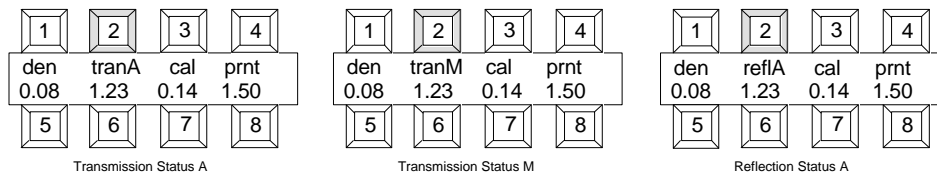
This function also allows you to balance internegatives using the density difference method.

To select Density operation press Switch 5. After pressing Switch 5, the Density menu is displayed and each key has a new function.



### 2.1. Selecting Densitometry and Status Type

Transmission Status A, Transmission Status M, and Reflection Status A are sequentially selected with each momentary depression of switch 2.

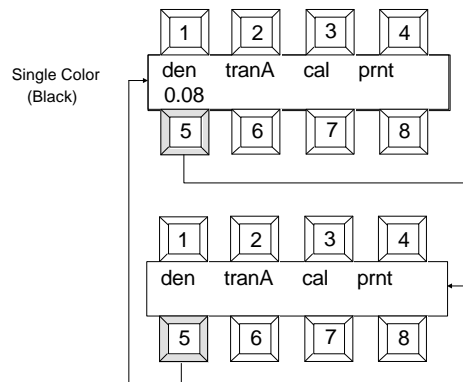


## 2.2. Selecting Color

Switch 5, 6, 7, and 8 select which color(s) is to be measured and displayed. A colored line is marked above each of these switches on the display label. The color represents the filter used during measurement. The filters correspond to the area to be measured as follows:

<b>BLACK FILTER</b>	<b>RED FILTER</b>	<b>GREEN FILTER</b>	<b>BLUE FILTER</b>
Black	Red or Cyan	Green or Magenta	Blue or Yellow

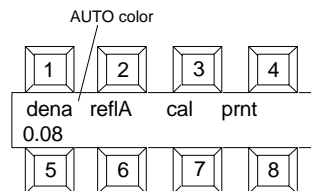
Each color can be turned on or off by pressing its key.



**Note:** In Transmission the selection of VIS will force R, G, and B to be 0.00.

Automatic Color Selection is also available in the Density function. Auto Color is turned On or Off in Configuration setup (See Section 8.3.1). Auto Color measures and updates all four colors but only displays the most dominant one. After the most dominant color is displayed you can view the density of the other colors by pressing the appropriate color key. Single or multiple color operation measures, updates, and displays only the color(s) selected.

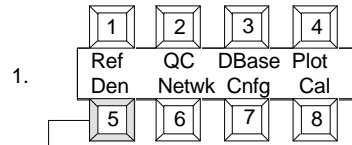
When in the Density function, Auto Color ON is displayed as:



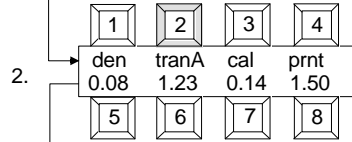
## 2.3. Taking Density Measurements

Transmission and Reflection readings are performed in the same manner:

[1] Select **Den...**...press Switch 5.



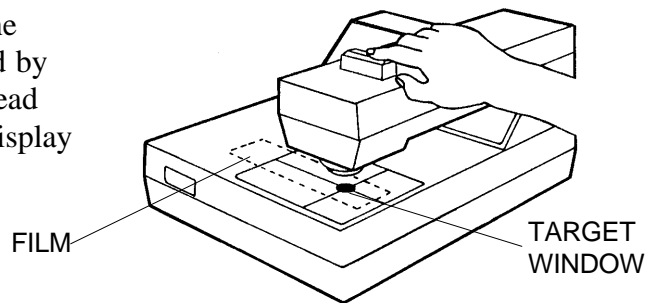
[2] Select densitometry and status type...press Switch 2.



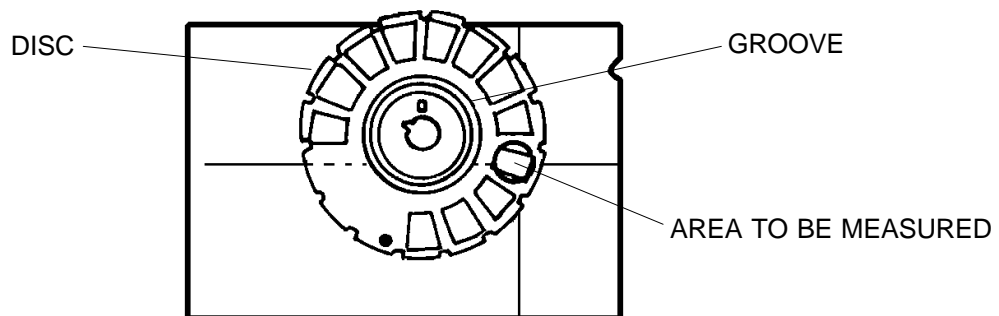
[3] Select color(s)...press Switch 5 - 8. Skip this step if Auto color is ON.



[4] Center the area to be measured over the target window then lower the read head by pressing on the read button. Hold the read button depressed until the data in the display stabilizes.



**NOTE:** A circular groove located on the light table is provided for holding disc type film. Simply position the disc into the groove and turn the disc until the desired frame is centered over the target window.



## 2.4. Density Printout

The Print function allows you to output the displayed data to a printer after a density measurement.

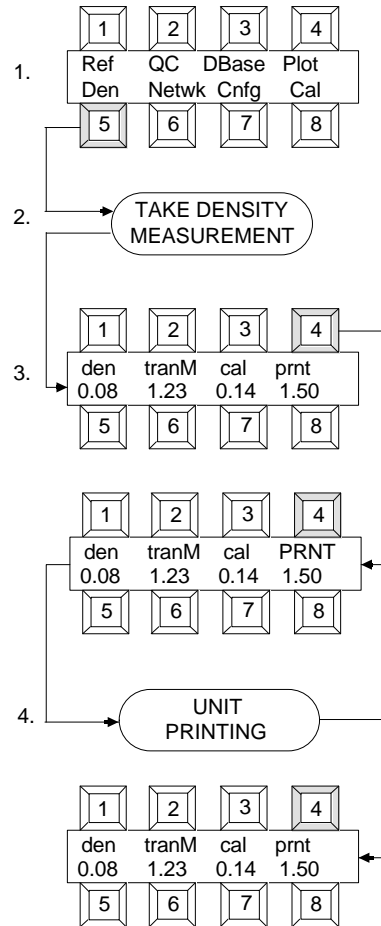
*To print out:*

[1] Select **Den**...press Switch 5.

[2] Perform a density measurement.

[3] Momentarily press **prnt** key (Switch 4).

[4] The letters "**prnt**" will change to uppercase while printing and change back to lowercase when printing is finished.



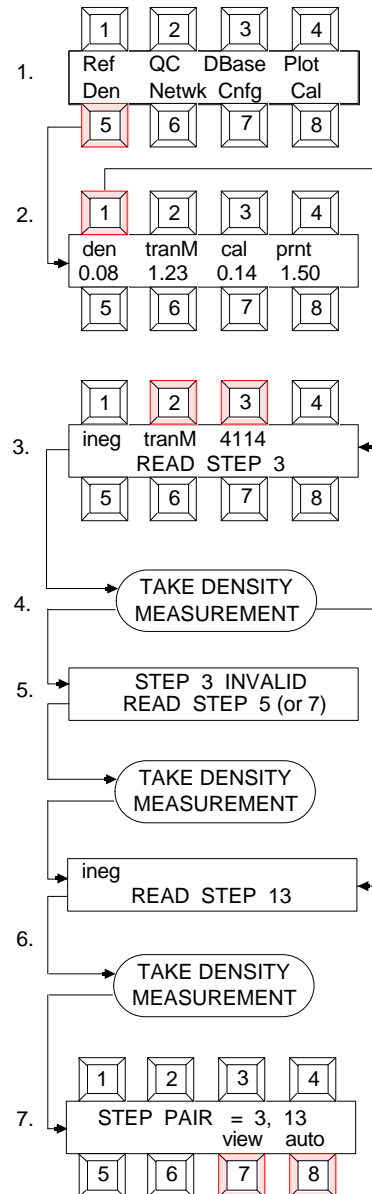
**NOTE: The print parameters are setup in "Unit Configuration" Section 8.**



## 2.5. Measuring Internegatives

The internegative function allows you to read and balance internegatives using the density difference method.

- [1] Select **Den...**press Switch 5.
- [2] Select **den...**press Switch 1. This will turn off the normal density mode and turn on the internegative mode.
- [3] Select the type of internegative. Press Switch 2 to select Status (usually transmission Status M). Press Switch 3 to select film type (4114 equivalent or 6011 equivalent).
- [4] Read the densities of Step 3 on your internegative.
- [5] If the internegative is over exposed, the 820 may prompt you to read Step 5 or Step 7.
- [6] Now read the densities of Step 13 (Step 15 or 17 if over exposed).
- [7] The display now shows which step pair will be used in the density difference calculation (depending on which steps you just read). You now have two options, view and auto. The View function allows you to view the density difference values for this step pair and the recommended filter pack changes based on those differences. The Auto function will optionally perform all the necessary computations for you and will suggest new exposure and filter pack values.



**View Mode** (continued from Step 7)

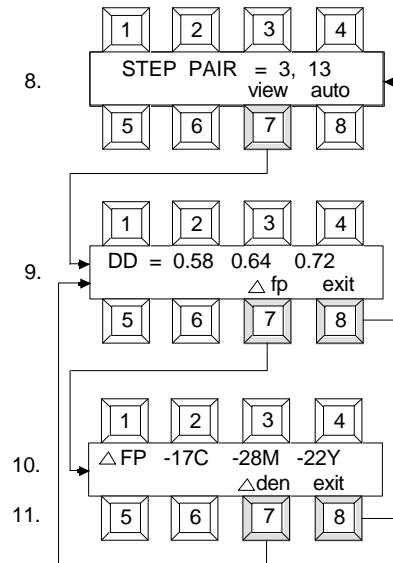
---

[8] Select **view...**press Switch 7.

[9] The display now shows density difference values. Select  $\Delta$ **fp...**press Switch 7.

[10] The display now shows the change to your filter pack necessary to balance the internegative. Note that these values must be added to your present filter pack. They signify a change to the filter pack (indicated by the Greek letter  $\Delta$ ).

[11] Select **exit...**press Switch 8 to get back to the Step Pair display.



**Auto Mode** (continued from Step 7)

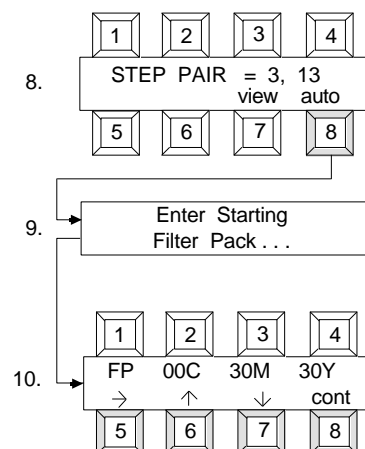
---

Auto mode must first ask some questions before it can adequately perform all its computations. You will be prompted to enter the conditions under which this internegative was exposed.

[8] Select **auto...**press Switch 8.

[9] "**Enter Starting Filter Pack...**" is briefly displayed.

[10] Enter the filter pack values which were used to expose this internegative. Press Switch 5 to advance cursor to next filter. Press Switch 6 to increase filter value or Switch 7 to decrease filter value. Select **cont...**press Switch 8 when done.



[11] "**Enter Exposure**" is briefly displayed.

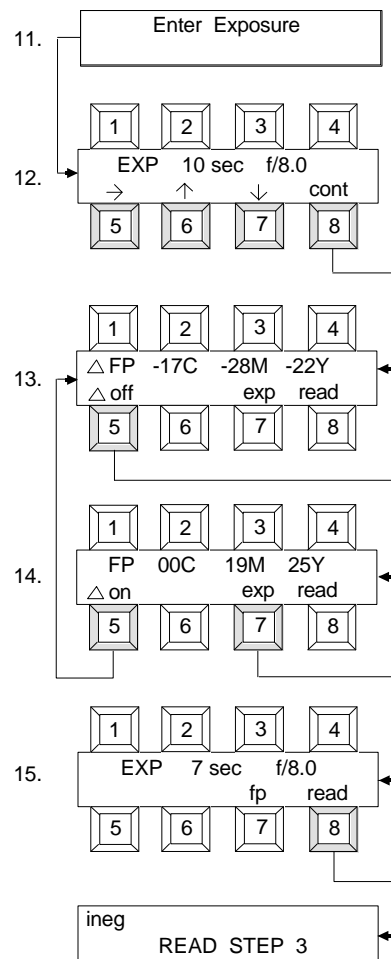
[12] Enter the exposure time and aperture which were used to expose this internegative. Press Switch 5 to advance cursor to next parameter. Press Switch 6 to increase value or Switch 7 to decrease value. Select **cont...**press Switch 8 when done.

**NOTE:** The f-stop value increments and decrements 1/6 of a stop at a time and will range from f/4.0 to f/32.0.

[13] The suggested change to your filter pack is displayed. Select **Δoff...**press Switch 5 to turn the "change" mode off. This adds the change to your present filter pack (entered earlier) and then removes any neutral density that results. Changes in neutral density are compensated for by adjusting the exposure values.

[14] Select **exp...**press Switch 7 to view the suggested exposure. Note that any neutral density removed from the filter pack will change these numbers. (In this example, 3 seconds were removed from the exposure time because 17 CC of neutral density was added to the filter pack). To avoid reciprocity problems, exposure time is always held within 1/2 stop of its original value; anything over 1/2 stop will also result in an aperture change.

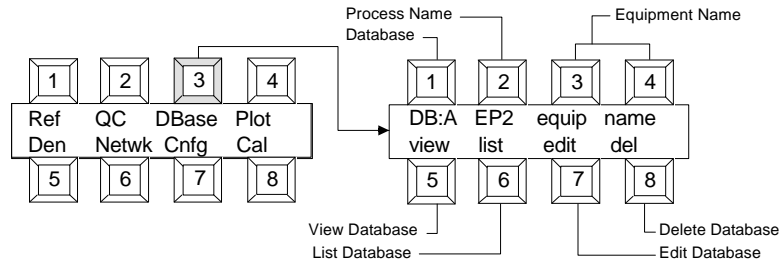
[15] Select **read...**press Switch 8 to measure another internegative. All of the suggested parameters will become the starting parameters on the next reading.



### 3.

## DATABASE FUNCTION

The 820 has twenty individual databases (A thru T) for storing process information. Each database can be set to any one of the preset processes, or to a customized process you personally setup. To select the Database function press Switch 3.



\***Database** [Switch 1] sequentially selects Databases A thru T with each depression. Each database has a preset Process and Equipment Name that can only be changed in the EDIT function.

\***Process Name** [Switch 2] is inactive. Display indicates the current process being used (See Section 3.2.2).

\***Equipment Name** [Switch 3 & 4] are inactive. Display indicates the equipment name (See Section 3.2.3).

\***View Database** [Switch 5] allows you to display the measured or computed data for the selected database (See Section 3.3).

\***List Database** [Switch 6] allows you to print, plot, or display database information (see Section 3.4).

\***Edit Database** [Switch 7] allows you to edit all parameters of the database (See Section 3.1).

\***Delete Database** [Switch 8] allows you to delete a unit (one complete measurement sequence of a Control Strip) from a database.

### 3.1. Preset Processes

Your 820 comes with several preset processes. These processes are set up to guide you thru the required measurement sequence for that particular process and calculate and plot the necessary data you need to keep that process in control. The measurement sequence, control limits, and calculated and plotted data for each process has been derived from the suggested monitoring procedures of the various manufacturer's handbooks.

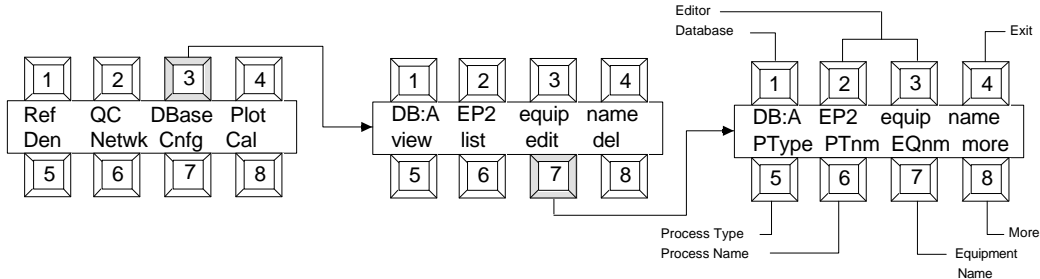
*The preset processes are:*

- **EP2 (Generic Film Process)**
- **C41 (Generic Film Process)**
- **E-6 (Generic Film Process)**
- **SSP [Single Slope Printer] (Generic Printer Process)**
- **DSP [Dual Slope Printer] (Generic Printer Process)**
- **2610 [3510/MC5 Printer] (Generic Printer Process)**
- **AP44 (Agfa-Gevaert® Film Process)**
- **AP63 (Agfa-Gevaert® Film Process)**
- **AP70 (Agfa-Gevaert® Film Process)**
- **AP92 (Agfa-Gevaert® Film Process)**
- **AP94 (Agfa-Gevaert® Film Process)**
- **C41A (Eastman Kodak® Film Process)**
- **CP21 (Fuji® Film Process)**
- **FA (formerly CP40; Fuji® Film Process)**
- **P-3 (Cibchrome-Ilford® Film Process)**
- **P-3X (Cibchrome-Ilford® Film Process)**
- **P-4 (Cibachrome-Ilford® Film Process)**
- **P-5 (Cibachrome-Ilford® Film Process)**
- **R-3 (Eastman Kodak® Film Process)**
- **RA-4 (Eastman Kodak® Film Process)**
- **KBM (Eastman Kodak® Film Process)**
- **EA-5 (Eastman Kodak® Aerial Film Process)**
- **rB&W (Generic Reflection Black & White Paper Process)**
- **tB&W (Generic Transmission Black & White Film Process)**
- **tbd 1 (User Defined)**

Refer to Section 11 for the setup parameters (i.e., process type & name, aim & control limits, transformation rules, etc.) for each process.

## 3.2. Editing a Process

Each preset process can be edited to suit your individual requirements. To select Edit function press **DBase** (Switch 3) and then press **edit** (Switch 7).



\***Database** [Switch 1] sequentially selects Databases A thru T with each depression.

\***Editor** [Switch 2 & 3] are inactive. Display used to indicate that you are in the Edit function.

\***Exit** [Switch 4] exits you out of the Edit function and back to the DBase function.

\***Process Type** [Switch 5] allows you to change the Process Type for the selected database (See Section 3.2.1). Note, the twenty databases come from the factory without any process types installed. In this case, the Process Type will be displayed as "Process type = ???".

\***Process Name** [Switch 6] allows you to change the name of the process. Note this only changes how the selected process name will be displayed and plotted/printed (See Section 3.2.2).

\***Equipment Name** [Switch 7] allows you to name the processor being used. See Section 3.2.3.

\***More** [Switch 8] allows you to access two more pages of EDIT functions (See Section 3.2.5 - 3.2.9).

### 3.2.1 Process Type (Editing)

Changing the Process Type:

[1] Select **DBase**...press Switch 3 (Main Level).

[2] Select **edit**...press Switch 7.

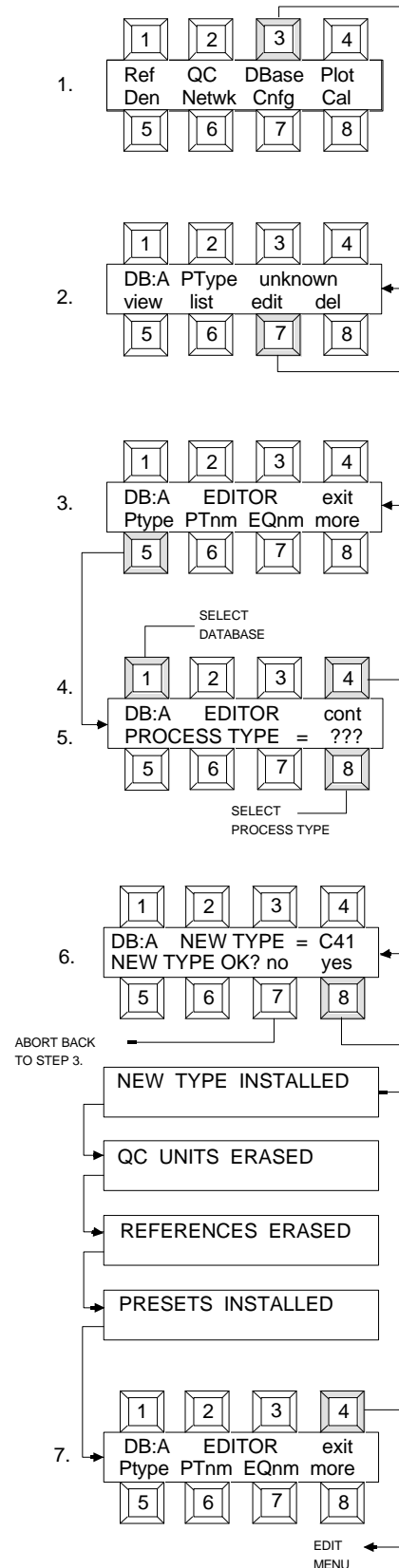
[3] Select **PType** (Process Type)...press Switch 5.

[4] Select desired Database...press Switch 1, then select a Process Type...press Switch 8.

[5] Continue to next step...press Switch 4.

[6] Accept new process...press Switch 8. If NO, press Switch 7 to abort and return back to Step 3. Display flashes New Type Installed, QC Units Erased, References Erased, and Presets Installed.

[7] Exit to Main menu...press **MENU** Switch or exit back to Editor menu ...press Switch 4.



### 3.2.2 Process Type Name (Editing)

*Changing the Process Type Name:*

[1] Select **DBase**...press Switch 3 (Main Level).

[2] Select **edit**...press Switch 7.

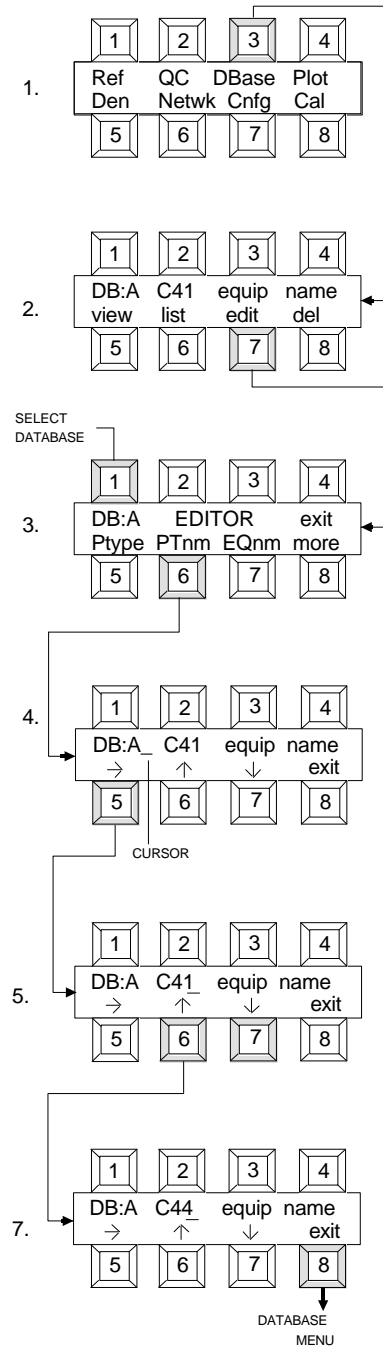
[3] Select desired Database...press Switch 1, then select **PTnm** (Process Type Name)...press Switch 6.

[4] Position cursor mark below the first character you want to modify...press Switch 5.

[5] Select new character...press Switch 6 or 7. Switch 6 & 7 sequentially increment/decrement you thru the alphabet, numbers, etc. (See Appendix A5 for character list)

[6] Repeat Step 4 & 5 for each character in Process name.

[7] After entry of new Process name exit back to Editor menu...press Switch 8.





### 3.2.3 Equipment Name (Editing)

*Changing the Equipment Name:*

[1] Select **DBase**...press Switch 3 (Main Level).

[2] Select **edit**...press Switch 7.

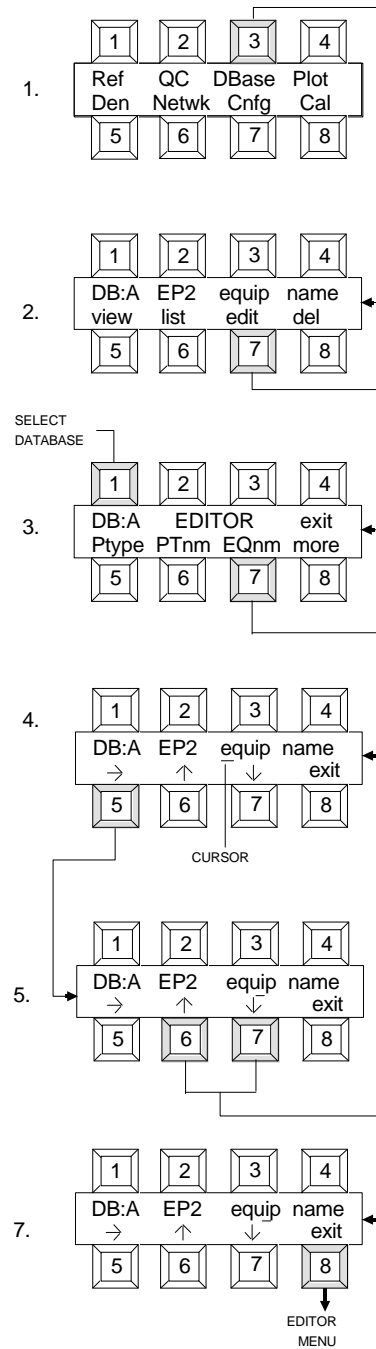
[3] Select desired Database...press Switch 1, then select **EQnm** (Equipment Name)...press Switch 7.

[4] Position cursor mark below the first character you want to modify...press Switch 5.

[5] Select new character...press Switch 6 or 7. Switch 6 & 7 sequentially increment/decrement you thru the alphabet, numbers, etc. (See Appendix A5 for character list)

[6] Repeat Step 4 & 5 for each character in Equipment name.

[7] After entry of new Equipment name exit back to Editor menu...press Switch 8.

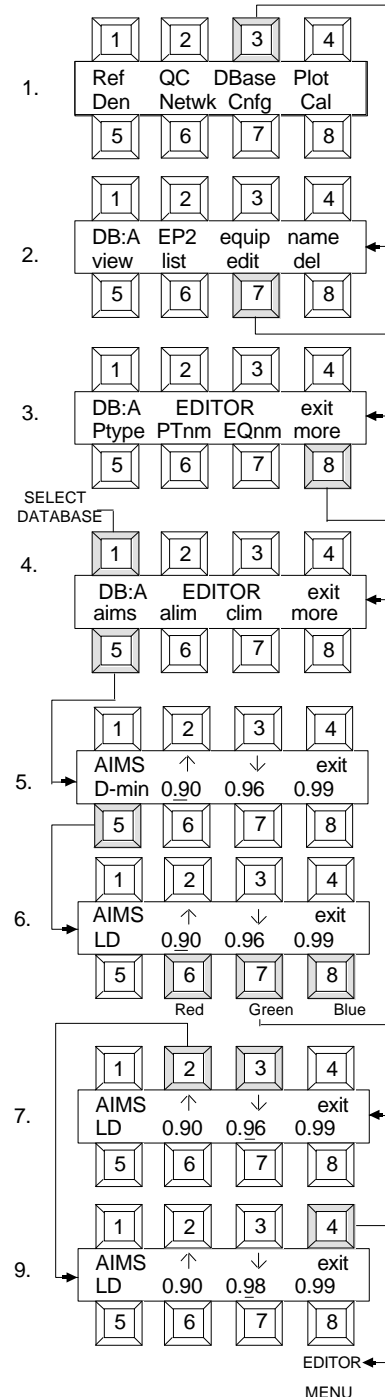


### 3.2.4 Aim Line (Editing)

**NOTE:** The AIM values are normally established by reading a Reference in the "REF" function. In general no adjustment to the AIM values should be necessary. However, to provide the flexibility to meet any biasing needs that may arise, adjustment of established AIM values is allowed in this function. *CAUTION* must be exercised when adjusting AIM values, to avoid exceeding the recommended *REFERENCE VALUE ADJUSTMENT TOLERANCES*.

Changing the Aim Line settings:

- [1] Select **DBase**...press Switch 3 (Main Level).
- [2] Select **edit**...press Switch 7.
- [3] Select **more**...press Switch 8.
- [4] Select desired Database...press Switch 1, then select **aims** (Aim Setting)...press Switch 5. Note, NO AIMS INSTALLED will be displayed if a Reference Strip has not been measured.
- [5] Select the aim setting you want to modify...press Switch 5.
- [6] Position cursor mark below the color you want to modify...press Switch 6 (Red), 7 (Green), or 8 (Blue).
- [7] Adjust setting...press Switch 2 or 3. Switch 2 increases and Switch 3 decreases value.
- [8] Repeat Step 5, 6, and 7 for each aim setting to be modified.
- [9] After last modification exit to Editor menu...press Switch 4.



### 3.2.5 Action Limit (Editing)

**NOTE:** The recommended ACTION LIMITS are preset when the PType is selected. The presets may be modified as you desire with this function. Setting an ACTION LIMIT to 0.00 causes the test for Limit to be bypassed for that particular Field and Color.

*Changing the Action Limit settings:*

[1] Select **DBase...**press Switch 3 (Main Level).

[2] Select **edit...**press Switch 7.

[3] Select **more...**press Switch 8.

[4] Select desired Database...press Switch 1, then select alim (Action Limit)...press Switch 6.

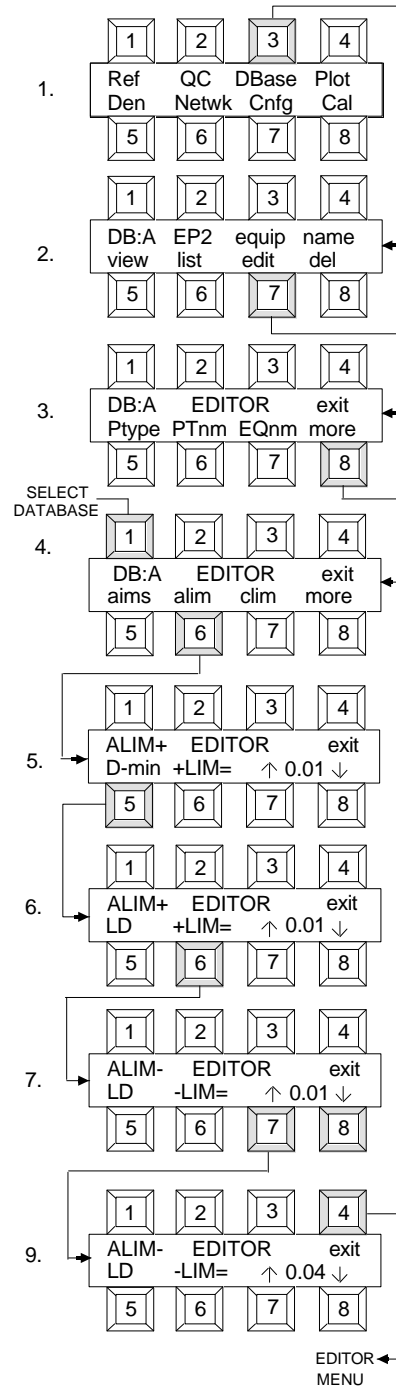
[5] Select the alim setting you want to modify...press Switch 5.

[6] Select the + or - limit...press Switch 6.

[7] Adjust setting...press Switch 7 or 8. Switch 7 increases and Switch 8 decreases value.

[8] Repeat Step 5, 6, and 7 for each alim setting to be modified.

[9] After last modification exit to Editor menu...press Switch 4.



### 3.2.6 Control Limit (Editing)

**NOTE:** The recommended CONTROL LIMITS are preset when the PType is selected. The presets may be modified as you desire with this function. Setting a CONTROL LIMIT to 0.00 causes the test for Limit to be bypassed for that particular Field and Color.

*Changing the Control Limit settings:*

[1] Select **DBase**...press Switch 3 (Main Level).

[2] Select **edit**...press Switch 7.

[3] Select **more**...press Switch 8.

[4] Select desired Database...press Switch 1, then select **clim** (Control Limit)...press Switch 7.

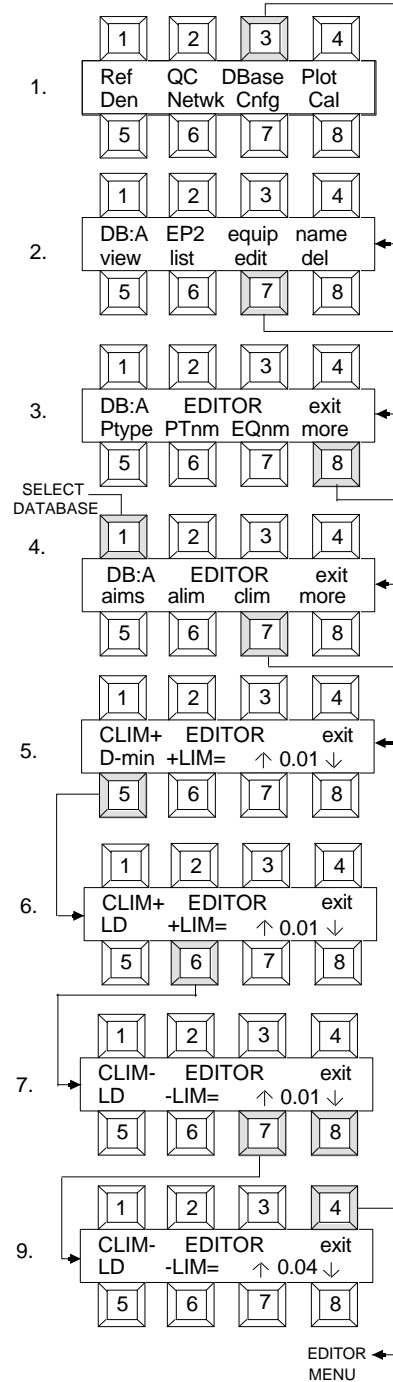
[5] Select the clim setting you want to modify...press Switch 5.

[6] Select the + or - limit...press Switch 6.

[7] Adjust setting...press Switch 7 or 8. Switch 7 increases and Switch 8 decreases value.

[8] Repeat Step 5, 6, and 7 for each clim setting to be modified.

[9] After last modification exit to Editor menu...press Switch 4.



### 3.2.7 Spread Limit (Editing)

**NOTE:** The recommended SPREAD LIMITS are preset when the PType is selected. The presets may be modified as you desire with this function. Setting a SPREAD LIMIT to 0.00 causes the test for Limit to be bypassed for that particular Field.

*Changing the Spread Limit settings:*

[1] Select **DBase**...press Switch 3 (Main Level).

[2] Select **edit**...press Switch 7.

[3] Select **more**...press Switch 8 four times to access Slim menu.

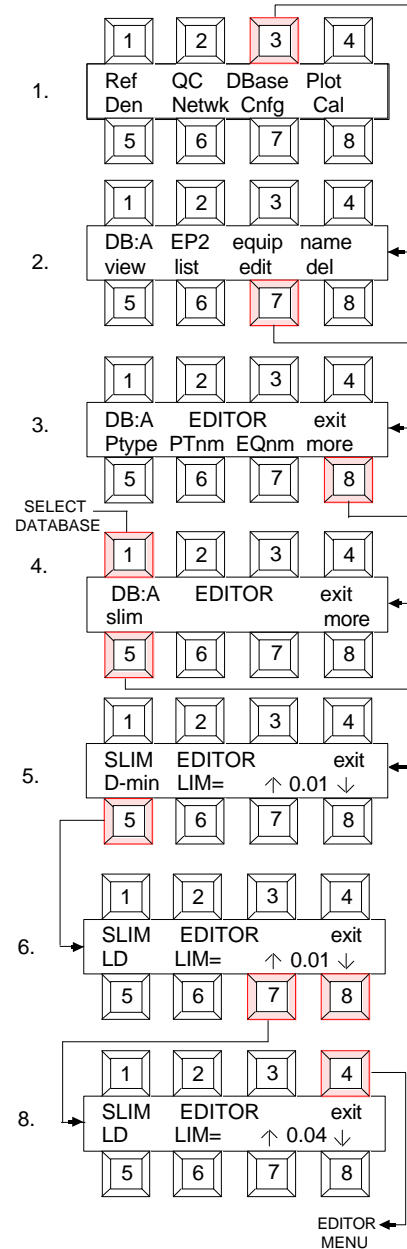
[4] Select desired Database...press Switch 1, then select **slim** (Spread Limit)...press Switch 5.

[5] Select the slim setting you want to modify...press Switch 5.

[6] Adjust setting...press Switch 7 or 8. Switch 7 increases and Switch 8 decreases value.

[7] Repeat Step 5 and 6 for each slim setting to be modified.

[8] After last modification exit to Editor menu...press Switch 4.



### 3.2.8 Transformation Rules (Editing)

The transformation rules are algebraic equations that transform the measured field data into plottable field data. Up to five fields may be plotted per "QC" sheet. Fields 1, 2, and 3 are distinct plot lines whereas lines 4 and 5 are overlapped on the plot sheet. Each field contains the measured data and transform rules (for red, green, and blue) that will produce the appropriate plot data for that field. The individual transform rules may be changed using the editor. Doing this will change the resultant plotted data and the "QC" plot accordingly.

The measured fields are numbered from one through five. For each field there are three color components: red, green, and blue. These fields are represented by R1 through R5, G1 through G5, and B1 through B5 respectively. For example, if measured field 2 is "LoDen" and measured field 3 is "HiDen" then the plotted field "HD-LD" would be represented by the transformation rules "R3-R2", "B3-B2", and "G3-G2" for red, green, and blue respectively.

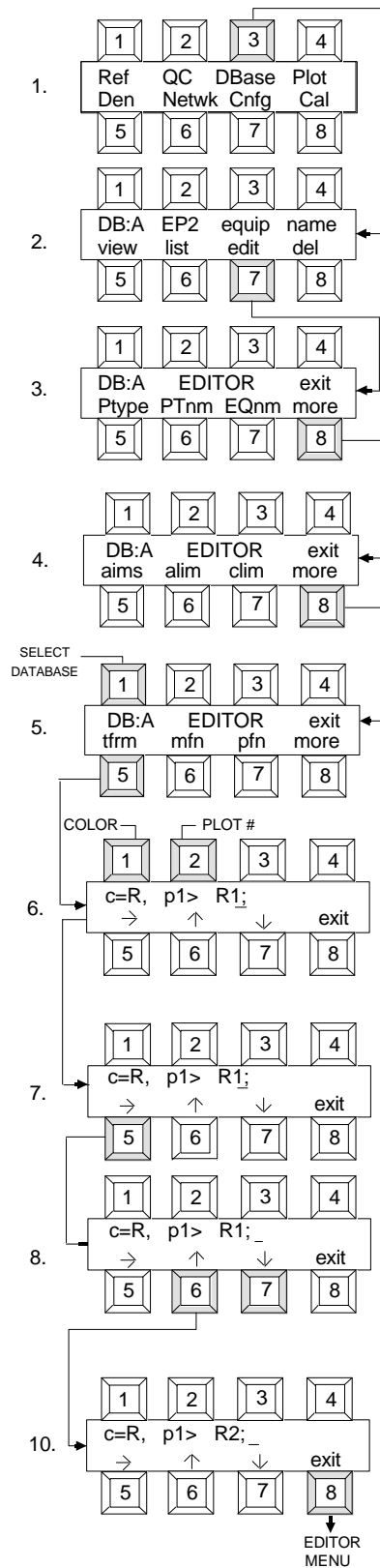
When measuring black and white strips, only a single color is used. This color (visual) is represented by V1 thru V5 (for fields 1 thru 5). Mixing visual and RGB transform rules is not recommended. Visual data for black and white strips is stored in the database in the red position, and RGB data is not stored. Any attempts to mix visual and RGB transform rules may result in undefined data.

When creating specialized transformation rules, the following limitations must be adhered to:

1. Maximum of 12 characters per transformation rule, ending with a semicolon. If the line is syntactically correct, all 12 positions may be used with the 13th position being an assumed semicolon.
2. Characters after a semicolon are ignored. The results of a semicolon in the first position is that no value is calculated for that particular plotted field and color.
3. Operators "\*", "/", "+", and "-" are valid. The priority of execution is left to right. There is no other priority (excepting parenthesis).
4. Shortened multiplication may be used in the case of field/color data. E.G. 2R3 may be substituted for 2\*R3.
5. Integers > 65535 and negative integers are invalid. Note: negative integers may be interpreted as subtractions! Decimals are also invalid.
6. Spaces are ignored.
7. Division by zero is not permitted (Result is 0). Overflows/underflows resulting from multiplication, addition, and subtraction are the user's responsibility. Two's complement form is used.
8. Integer arithmetic is used throughout. E.G. (2/3) and (4/5) will result in 0, in which cases it may be necessary to try a different format.
9. Parenthesis must match.

*Changing the Transformation Rules:*

- [1] Select **DBase**...press Switch 3 (Main Level).
- [2] Select **edit**...press Switch 7.
- [3] Select **more**...press Switch 8.
- [4] Select **more** again...press Switch 8.
- [5] Select desired Database...press Switch 1, then select tform (Transformation Rules)...press Switch 5.
- [6] Select the Color (Red,Green,Blue)...press Switch 1 and Plot number...press Switch 2, to be modified.
- [7] Position cursor mark below the character you want to modify...press Switch 5.
- [8] Select new character... press Switch 6 or 7. Switch 6 & 7 sequentially increment/decrement you thru special characters (See Appendix A5 for character list).
- [9] Repeat Step 7 & 8 for each character. Note, Repeat Step 6 to select different tfrm setting.
- [10] After modification is complete exit to Editor menu...press Switch 8.

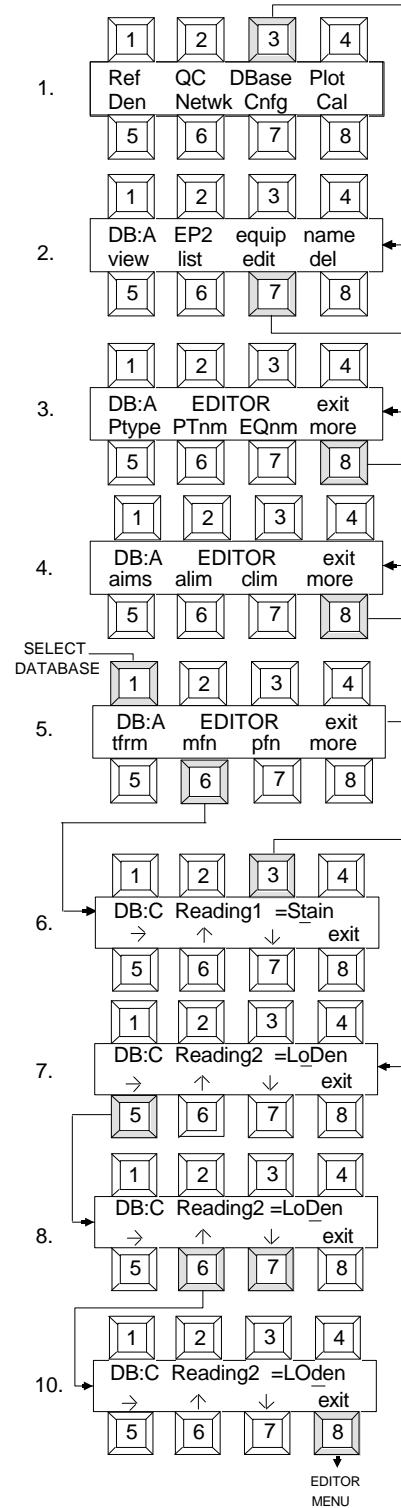


### 3.2.9 Measured Field Name (Editing)

The Measured Field Name (mfn) is the name assigned to the new data measured for that field. The mfn is used for prompting measurements in both the QC and Reference functions. The mfn's are also used to indicate which field of measured data is being viewed or printed in the DBase function. The mfn can be customized to suit your own personal needs (ex. "D-min" could be changed to "step 2").

#### Changing the Measured Field Name:

- [1] Select **DBase**...press Switch 3 (Main Level).
- [2] Select **edit**...press Switch 7.
- [3] Select **more**...press Switch 8.
- [4] Select **more** again...press Switch 8.
- [5] Select desired Database...press Switch 1, then select mfn (Measured Field Name)...press Switch 6.
- [6] Select the desired reading step you want to modify...press Switch 3.
- [7] Position cursor mark below the character you want to modify...press Switch 5.
- [8] Select new character... press Switch 6 or 7. Switch 6 & 7 sequentially increment/decrement you thru the alphabet, numbers, etc. (See Appendix A5 for character list)
- [9] Repeat Step 7 & 8 for each character. Note, repeat Step 6 to select different reading step.
- [10] After modification is complete exit to Editor menu ...press Switch 8.





### 3.2.10 Plotted Field Name (Editing)

The Plotted Field Names (pfn) are the names that are used to label each field of computed data graphed by the plot function. The pfn's are also used to indicate which field of computed data is being viewed or printed in the DBase function. The pfn can be customized to suit your personal needs (e.g., "HD-LD" could be changed to "Contr" for Contrast).

Changing the Plotted Field Name:

[1] Select **DBase**...press Switch 3 (Main Level).

[2] Select **edit**...press Switch 7.

[3] Select **more**...press Switch 8.

[4] Select **more** again...press Switch 8.

[5] Select desired Database...press Switch 1, then select **pfn** (Plotted Field Name)...press Switch 7.

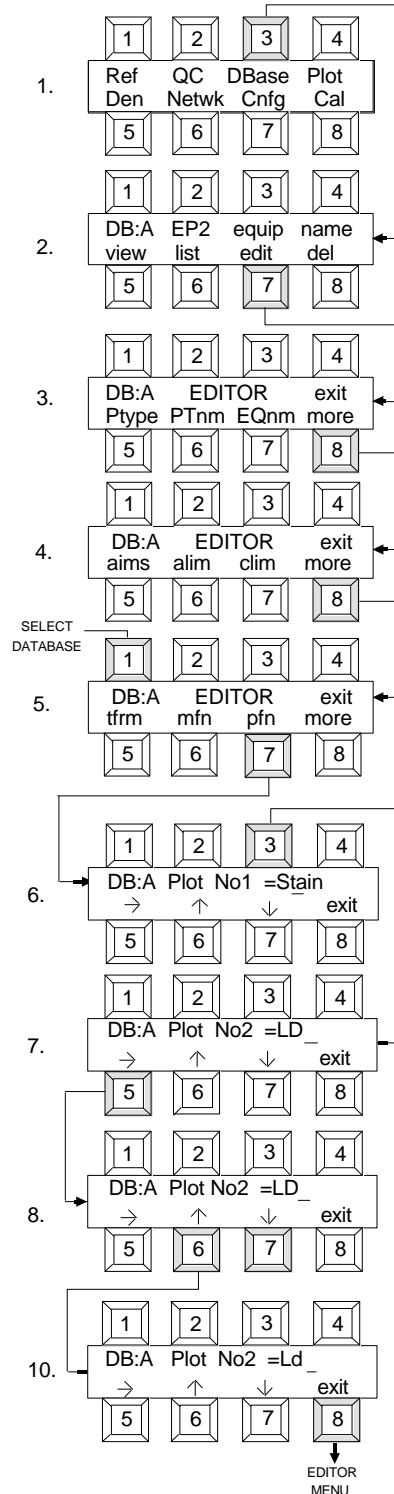
[6] Select the desired plot number you want to modify...press Switch 3.

[7] Position cursor mark below the character you want to modify...press Switch 5.

[8] Select new character... press Switch 6 or 7. Switch 6 & 7 sequentially increment/decrement you thru the alphabet, numbers, etc. (See Appendix A5 for character list)

[9] Repeat Step 7 & 8 for each character. Note, repeat Step 6 to select different plot number.

[10] After modification is complete exit to Editor menu ...press Switch 8.



### 3.2.11 Plot Scale (Editing)

Plot Scale determines the scale used for each of the plotted fields of data. The full scale value for each plotted field can be set to a value from 5 to 50 in increments of five (i.e., 5, 10, 15, 20...50).

#### Changing the Plot Scale:

[1] Select **DBase**...press Switch 3 (Main Level).

[2] Select **edit**...press Switch 7.

[3] Select **more**...press Switch 8.

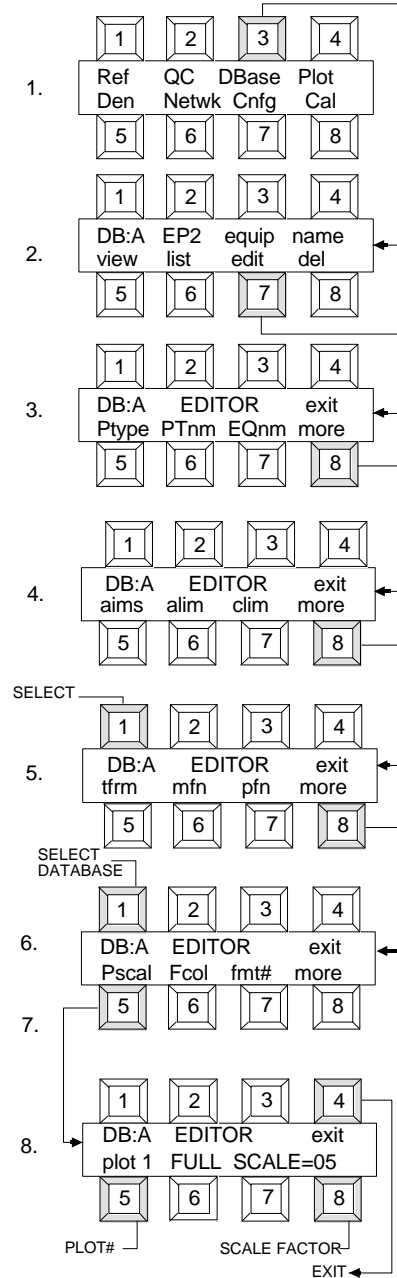
[4] Select **more** again...press Switch 8.

[5] Select **more** again...press Switch 8.

[6] Select desired Database...press Switch 1, then select **Pscal** (Plot scale)...press Switch 5.

[7] Select a plot number...press Switch 5, then select a scale for that plot number...press Switch 8.

[8] After modification is complete exit to Editor menu ...press Switch 4.



### 3.2.12 Field Color (Editing)

The Field Color selects the color(s) and color order that will be measured for a field. The field color can be set to measure all colors simultaneously or individual colors. The seven options available are:

- |          |   |
|----------|---|
| 1) NONE  | 5) I-RGB* (Individual-Red Green Blue)   |
| 2) RED   | 6) I-BGR* (Individual-Blue, Green, Red) |
| 3) GREEN | 7) S-RGB (Simultaneous-Red Green Blue)  |
| 4) BLUE  | 8) VIS (Visual data only)               |

**\*Note:** I-RGB checks to see if the correct color was measured. I-BGR does not check to see if correct color was measured.

*Changing the Field Color:*

[1] Select **DBASE...**press Switch 3 (Main Level).

[2] Select **EDIT...**press Switch 7.

[3] Select **more...**press Switch 8.

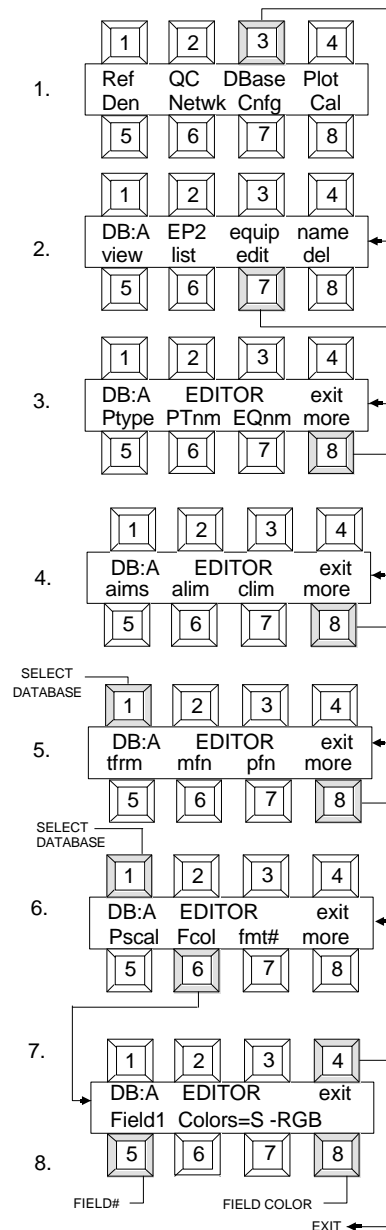
[4] Select **more** again...press Switch 8.

[5] Select **more** again...press Switch 8.

[6] Select desired Database...press Switch 1, then select **Fcolor** (Plot scale)...press Switch 6.

[7] Select the desired field...press Switch 5, then select a color for selected field...press Switch 8.

[8] After modification is complete exit to EDITOR menu ...press Switch 4.



### 3.2.13 Format Number (Editing)

Each process is assigned a unique format number used to identify that process during a remote linkup to QCNetII host. If your 820 is not part of any dial-in network, this editor can be ignored. The preset format numbers are listed at the bottom of each preset process in Section 11.

#### Entering a Format Number:

[1] Select **DBase**...press Switch 3 (Main Level).

[2] Select **edit**...press Switch 7.

[3] Select **more**...press Switch 8.

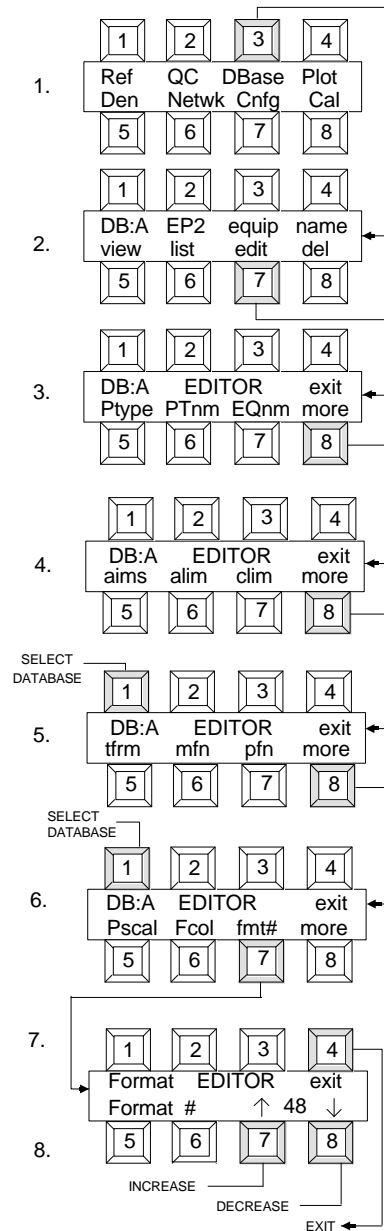
[4] Select **more** again...press Switch 8.

[5] Select **more** again...press Switch 8.

[6] Select desired Database...press Switch 1, then select **Fmt#** (Format number)...press Switch 7.

[7] Increase the format number by pressing Switch 7, decrease by pressing Switch 8.

[8] After modification is complete exit to Editor menu ...press Switch 4.



### 3.3. Viewing A Database

The measured or deviation data in the active database can be viewed in the 820 display. The measured data is the actual densities that were measured on the strip. The deviation data is measured data with the Transformation Rules applied, minus the AIM values. The deviation data is the data that is plotted.

#### 3.3.1 Measured or Deviation Data Selection

[1] Select **DBase**...press Switch 3 (Main Level).

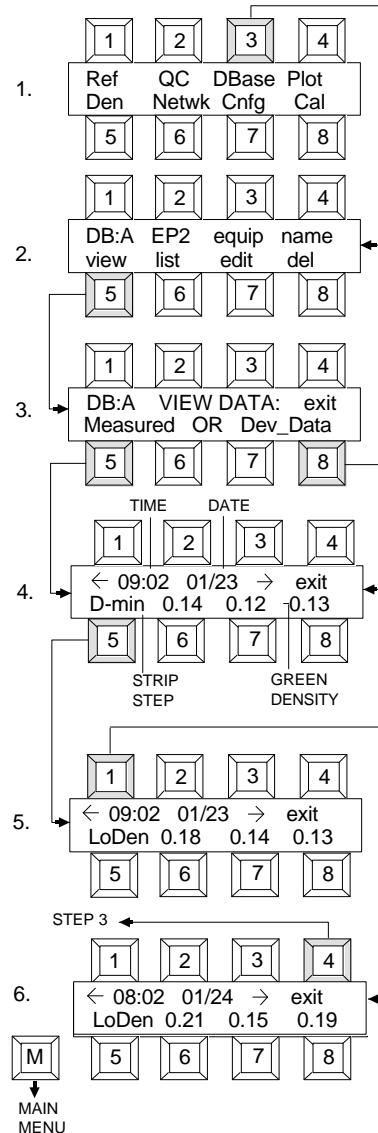
[2] Select **view**...press Switch 5.

[3] Select **measured**...press Switch 5 or select **Dev\_Data** (deviation data) ...press Switch 8.

[4] The last (i.e., most recent) data will be displayed. Press Switch 5 to view the various fields of that particular strip.

[5] To select the previous strip reading within that database (if one exists) ...press Switch 1. Pressing Switch 3 allows you to go forward in time to select the following strip reading. **NOTE:** Going forward in time beyond the newest reading will loop you to the oldest. Likewise going back in time beyond the oldest reading will loop you back to the newest.

[6] After viewing is complete exit back to Step 3...press Switch 4 or exit back to Main menu...press **MENU** Switch.



**NOTE: To maintain display consistency, the visual data from a black & white strip will appear on the display in the Red position. The Green and Blue positions will remain blank.**

### 3.4. Listing a Database

The computed data from a database can be output to a printer, plotter, or viewed in the 820 display. The printer can be any brand of printer that uses either the standard serial RS232 format or parallel (centronic type) format and ASCIItext. The plotter can be any brand of plotter that uses either the HPGL or CASIO language format (ex. Epson HI-80, Facit 4556, Gould 6120 Colorwriter, Hewlett Packard 7440A, 7475A, 7550, etc., Colorpro, & Casio FP100). The plotter language format is selected in the PLOT function (Sect.3.4.2).

#### 3.4.1 Listing To A Printer

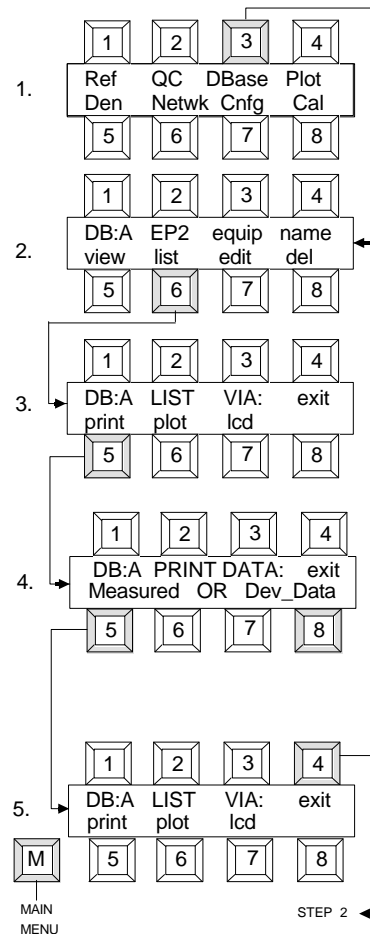
[1] Select **DBase**...press Switch 3  
(Main Level).

[2] Select **list**...press Switch 6.

[3] Select **print**...press Switch 5.

[4] Select **Measured** data  
printout...press Switch 5 or select  
**Dev\_Data** printout...press Switch 8.

[5] The data is printed and the unit automatically returns back to the list menu. Note, if the printer is not connected or some other problem exists, the unit will display "Printing....." and will remain in this condition until the **MENU** Switch is pressed.



### 3.4.2 Listing to a Plotter

[1] Select **DBase**...press Switch 3 (Main Level).

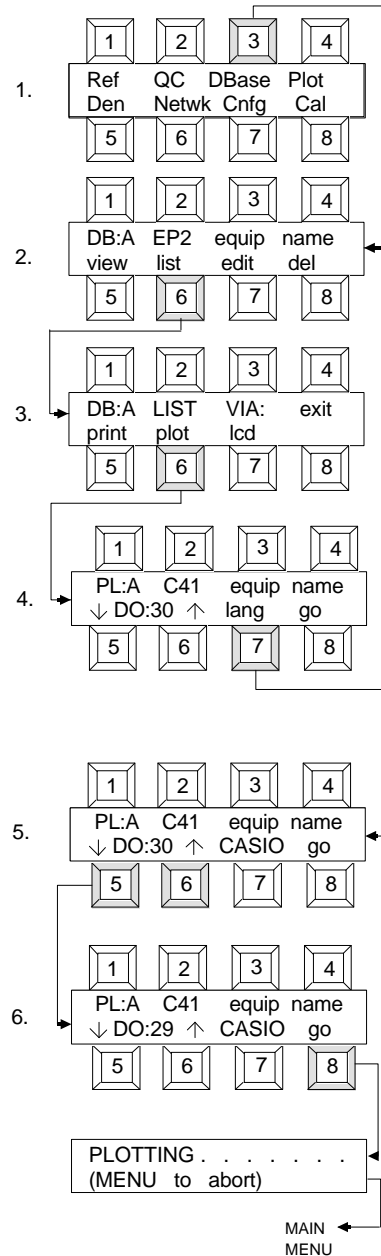
[2] Select **list**...press Switch 6.

[3] Select **plot**...press Switch 6.

[4] Select plotter language...press Switch 7. Formats are **CASIO** or **HP-GL** (Hewlett Packard Graphics Language). Once set, the Lang does not need to be reset for each plot.

[5] Select how many of the most recent QC Strip readings to plot (DO) ...press Switch 5 or 6. Switch 5 and 6 decrement/increment you thru the number of QC Strip readings. If you select DO:30, the last 30 readings will be plotted. You cannot select less than DO:02 or more than DO:30.

[6] To start plotting select GO...press Switch 8. **PLOTTING**..... will be displayed while plot data is being output. Once all data is sent to the plotter the 820 will "beep" and automatically return to Main menu. Note, if plotter is not connected or a problem exists **PLOTTER NOT READY** will be displayed, and will remain in this condition until the **MENU** key is pressed.



### 3.4.3 Listing To The Display (LCD - Liquid Crystal Display)

[1] Select **DBase**...press Switch 3 (Main Level).

[2] Select **list**...press Switch 6.

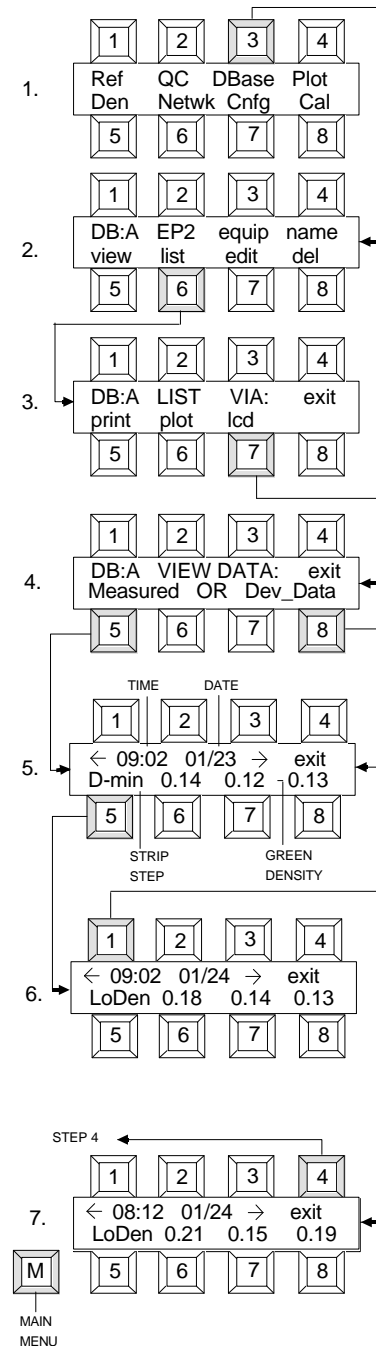
[3] Select **lcd**...press Switch 7.

[4] Select **Measured**...press Switch 5 or select **Dev\_Data**...press Switch 8.

[5] The last (i.e., most recent) data will be displayed. Press Switch 5 to view the various fields of that particular strip.

[6] To select the previous strip reading within that database (if one exists) ...press Switch 1. Pressing Switch 3 allows you to go forward in time to select the following strip reading. **NOTE:** Going forward in time beyond the newest reading will loop you back to the oldest. Likewise going back in time beyond the oldest reading will loop you back to the newest.

[7] After viewing is complete exit back to Step 4...press Switch 4 or exit to Main menu...press **MENU** Switch.



**NOTE:** To maintain display consistency, the visual data from a black & white strip will appear on the display in the Red position. The Green and Blue positions will remain blank.



### 3.5. Deleting Units in a Database

The delete function allows you to delete a unit (i.e., one QC strip reading) from a database at a time.

[1] Select **DBase**...press Switch 3 (Main Level).

[2] Select **del** (delete)...press Switch 8.

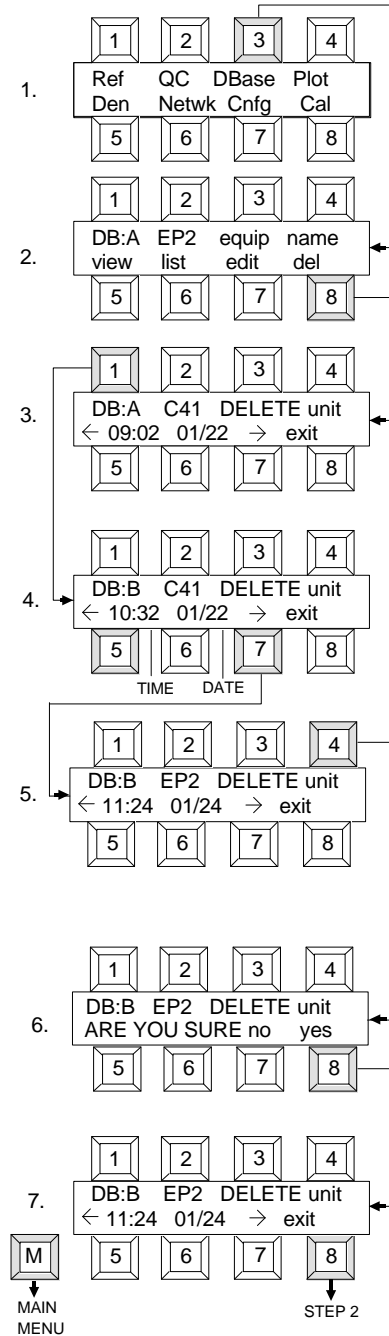
[3] Select the database you want to delete from...press Switch 1.

[4] Select the unit you want to delete (by time & date)...press Switch 5 or 7. Switch 5 & 7 decrement/increment you thru time and date.

[5] Delete selected unit...press Switch 4.

[6] If you are sure you want to delete this unit...press Switch 8. If no, press Switch 7 and you will return back to Step 4.

[7] After you have deleted the desired unit(s)...press Switch 8 to exit back to Step 2 or press **MENU** Switch to return to Main menu.



## 4.

# REF (Measuring Reference Strips)

The Reference function allows you to: enter a 6 digit Identification code for each Reference Strip, measure the reference Strip, enter correction values, view the density values of the Reference Strip, and provides optional automatic crossover procedures.

### 4.1. Entering a New Reference Strip and ID Code

This procedure should only be used when measuring a new reference strip and it requires a new ID. This procedure requires that you enter the new ID, enter correction factors (if necessary), measure the new reference, and to do a crossover procedure (if desired). The ID (Reference IDentification codes) for each database are preset to "\*\*\*\*\*" whenever a new PType is selected. The ID allows you to keep track of each reference strip by its batch No. (usually printed on the strip) and is stored within that database. The ID can be entered as a new ID, or an existing ID can be edited. Note, a Process Type must be selected for the respective database before an ID can be entered.

[1] Select **Ref** (Reference)...press Switch 1 (Main Menu).

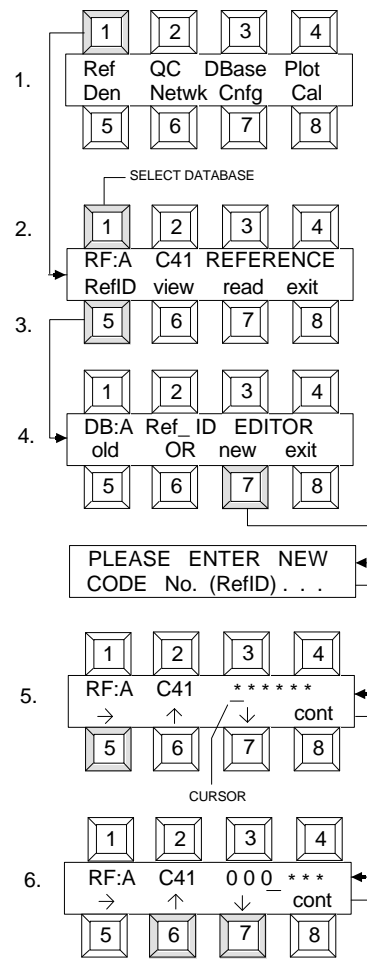
[2] Select a DataBase...press Switch 1.

[3] Select **RefID**...press Switch 5.

[4] Select **new**...press Switch 7.  
**PLEASE ENTER NEW CODE No.**  
(RefID)....is displayed.

[5] Position the cursor under the character you want to modify...press Switch 5.

[6] Select new character... press Switch 6 or 7. (See Appendix A5 for character list) Repeat Step 5 & 6 for each character.



[7] After entry is complete continue to Correction Factors...press Switch 8.

[8] If Correction Factors are required press Switch 8. If No, press Switch 7 and skip ahead to step 11.

[9] Select the field of the Reference strip you wish to enter a Correction Factor for...press Switch 5. Select Color...press switch 6, 7, or 8. Active color has cursor under decimal point.

[10] Adjust setting...press Switch 2 (increase) or Switch 3 (decrease). Repeat Step 9 and 10 for each field of the Reference step that requires a Correction Factor.

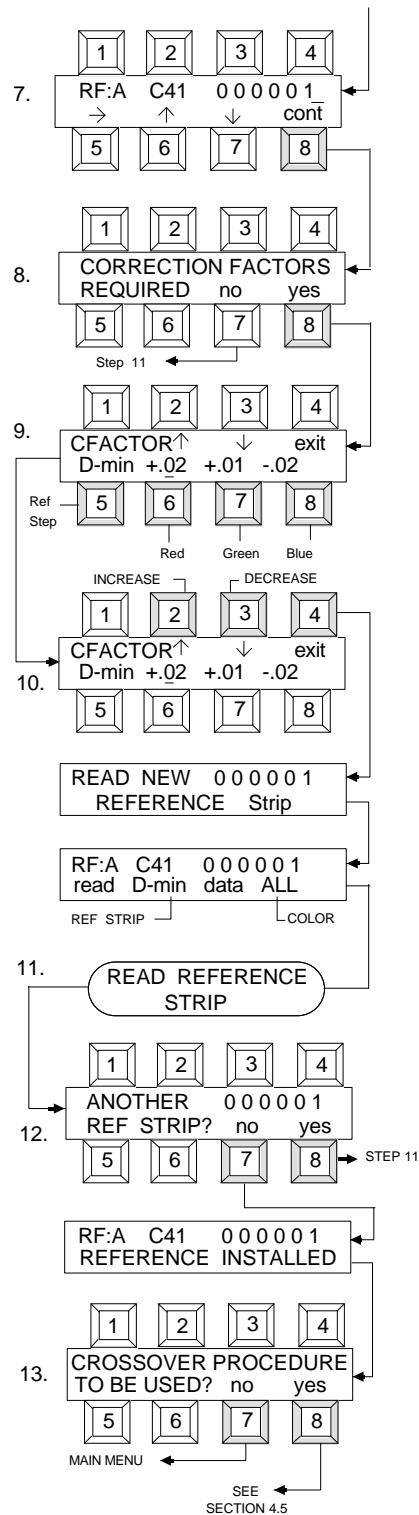
After last modification exit to measuring sequence...press Switch 4.

[11] Measure all necessary steps of reference strip as prompted by the display. The display will indicate the step and color to be measured.

[12] After last step of measurement sequence, press Switch 7 (no) if you do not want to measure (and average with) another Ref strip or press Switch 8 (YES) if you do want to measure (and average with) another strip of the same ID (i.e. batch # code). If No, advance to Step 13. If Yes, follow prompts back to step 11 and measure another reference strip. (Note: Up to 5 strips of the same number may be averaged).

[13] To do a crossover procedure...press Switch 8 or bypass and exit to main level...press Switch 7.

[14] If you select Yes, you do want to do a crossover procedure...refer to Section 4.5 for further instructions.



## 4.2. Remeasuring the Present Reference Strip

This section explains the procedure for remeasuring the present reference strip and a new ID code is not necessary. This procedure is normally used when you are not sure you measured the previous Ref. strip correctly the first time.

[1] Select **Ref** (Reference)...press Switch 1. (Main menu)

[2] Select **read**...press Switch 7.

[3] Select **no**, you do not want to enter new ID code...press Switch 7.

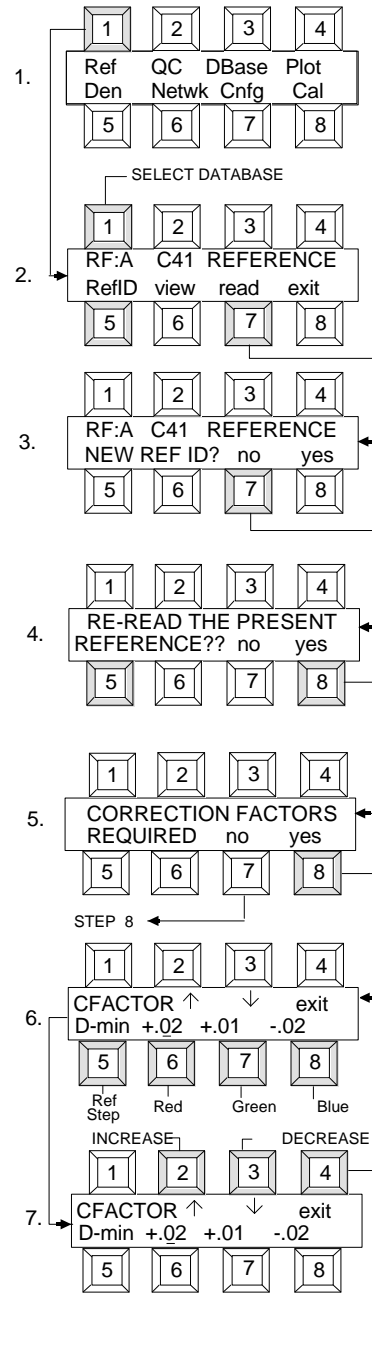
[4] Select **yes**, you do want to Re-Read the present reference strip.

[5] If Correction Factors are required press Switch 8 and advance to step 6. If No, press Switch 7 and exit to step 4.

[6] Select the field of the Reference strip you wish to enter a Correction Factor for...press Switch 5. Select Color...press switch 6, 7, or 8. Active color has cursor under decimal point.

[7] Adjust setting...press Switch 2 (increase) or 3 (decrease). Repeat Step 6 and 7 for each field of the Reference step that requires a Correction Factor.

After last modification exit to measuring sequence...press Switch 4.



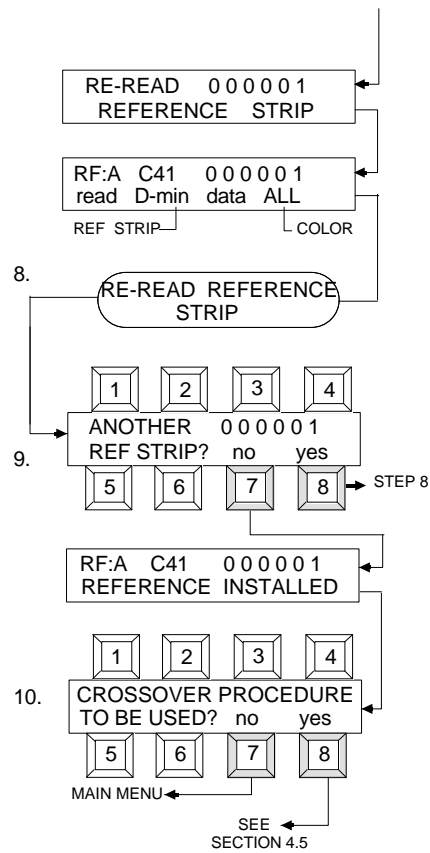
Re-Read Reference Strip is displayed.

[8] Measure all necessary steps of reference strip as prompted by the display. The display will indicate the step and color to be measured.

[9] After last step of measurement sequence, press Switch 7 (**no**) if you do not want to measure (and average with) another strip or press Switch 8 (**yes**) if you do want to measure another strip.

If No, advance to step 10. If Yes, follow prompts back to step 8 and measure another reference strip.

[10] If you select Yes, you do want to do a Crossover procedure, refer to Section 4.5 for further instructions.



### 4.3. Editing an Existing Ref ID Code

If an existing Ref ID is edited, the change will only effect how that ID code is displayed or printed. It will not effect the Reference data in any other way.

[1] Select **Ref** (Reference)...press Switch 1 (Main Menu).

[2] Select a database...press Switch 1. Select **RefID**..press Switch 5.

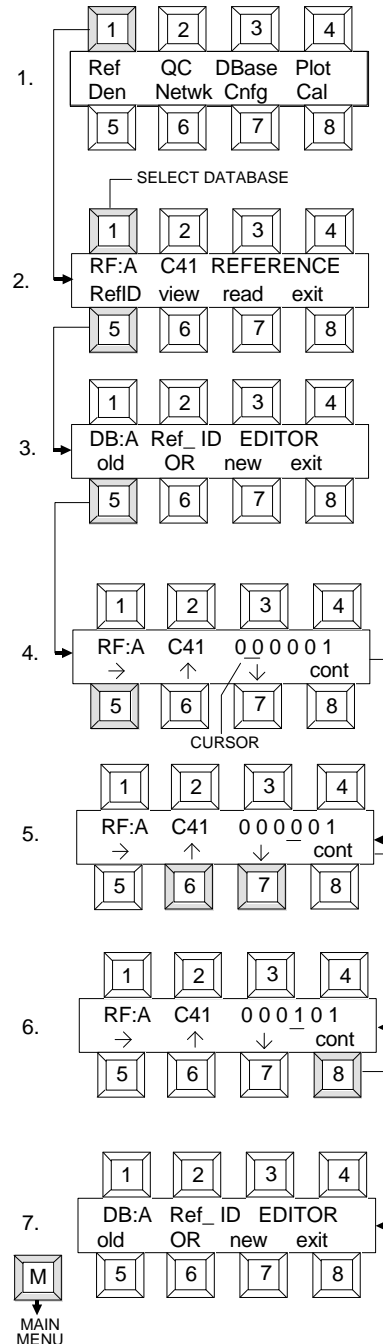
[3] Select **old**...press Switch 4.

[4] Position cursor mark below the character you want to modify...press Switch 5.

[5] Select new character ...press Switch 6 or 7. (see Ref Char Table, Appendix A5)  
Repeat Step 4 & 5 for each character to be modified.

[6] Exit to Ref edit menu...press Switch 8.

[7] Exit to Main Menu...press **MENU** Switch.





## 4.5. Using the Reference Crossover Procedure

The crossover procedure can only be accessed after measuring a new Ref. strip in a DataBASE that had an existing Reference (already installed) to "CROSSOVER" from. The procedure prompts you to measure three control strips of the old batch, measure three control strips of the new batch, and then the 820 will automatically:

- 1) Calculate an average for each set of 3.
- 2) Perform the crossover calculations (with x10 accuracy).
- 3) Adjust the new Reference values with the results ('Having the difference').
- 4) Add a 'X' to the Ref ID to indicate that it was derived via 'crossover procedure'.

**NOTE:** Before you can access the crossover procedure you must refer to Section 4.1 and follow the procedure thru Step 14.

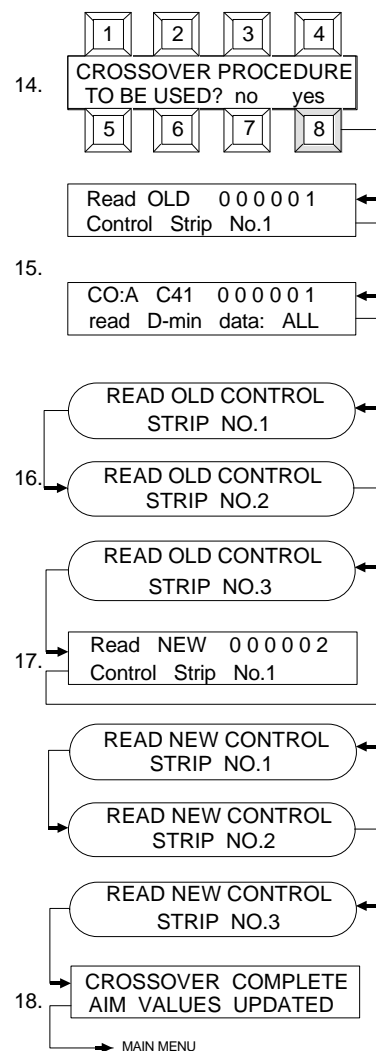
[14] Select **yes**, you do want to do a crossover procedure...press Switch 8. Display shows "**Read OLD ##### Control Strip No.1.**" Note the code number you are to measure.

[15] Measure all necessary steps of old control strip # 1 as prompted by the display. The display prompts indicate the fields and colors to measure.

[16] After last step is measured, the display will prompt you thru the last two control strips to measure of the old batch.

[17] After measuring all three strips of the old batch, the display will prompt you thru measuring three control strips of the new batch.

[18] After measuring all three strips of the new batch the unit will display that the aim values have been corrected and then the 820 automatically exits to the main menu.



**NOTE:** After a crossover procedure an "X" will be displayed at the end of the strip # to designate that a crossover procedure occurred at that strip # .



## 5.

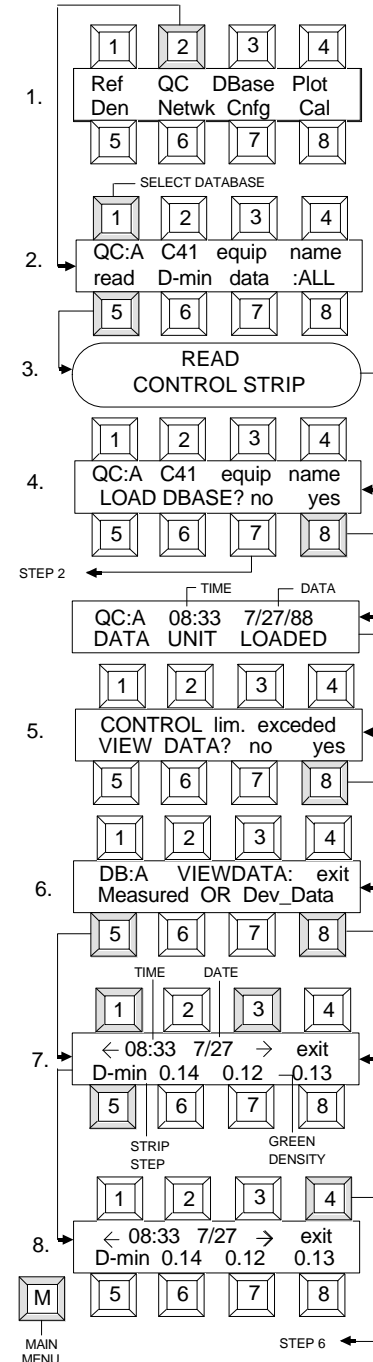
# QC (Measuring Control Strips)

The QC (Quality Control) function allows you measure Control Strips, and then the 820 automatically calculates the data into two formats:

- Measured data is the actual densities measured on the strip.
- Deviation data (Dev\_Data) is measured data with the Transformation Rules applied, minus the AIM values.

### 5.1. Control Strip Measurement Sequence

- [1] Select **QC** (Quality Control)...press Switch 2 (Main menu).
- [2] Select a DataBase (process)...press Switch 1.
- [3] Measure steps (fields) of control strip as prompted by the display. The display will indicate the steps and colors to be measured for the selected process.
- [4] After measuring all steps on the reference strip, the display asks if you want to load the database. If **yes**...press Switch 8. If **no**...ress Switch 7. NO aborts the data measured and exits you back to Step 2. Yes loads data into the database and advances you to Step 5.
- [5] The display indicates if an Action or Control Limit was exceeded and asks if you want to view the data. If **no**...press Switch 7 and exit back to Step 2. If **yes**...press Switch 8 and advance to Step 6.
- [6] Select **measured**...(press Switch 5) or select **Dev\_Data** ...(press Switch 8).
- [7] The most recent data is displayed. Press Switch 5 to view various fields of QC strip. Press Switch 1 to select previous QC strip readings. Press Switch 3 to go forward in time.
- [8] After viewing is complete exit back to Step 6...press Switch 4 or exit to Main menu...press **MENU** switch.  
**NOTE:** Going forward in time beyond the newest reading will loop you back to the oldest. Likewise going back in time beyond the oldest reading will loop you back to the newest.



## 6.

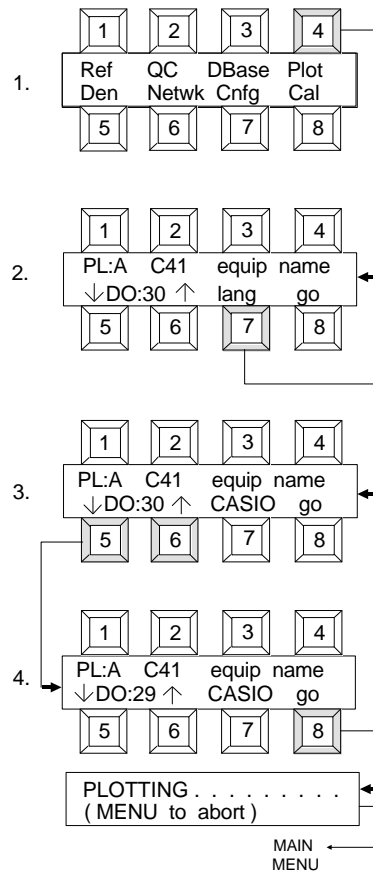
# PLOT

The computed data from a database can be output to a plotter. The PLOT function can be accessed via the Main menu or List menu (see Sect.3.4.2). The plotter can be any brand of plotter that uses either the HP-GL or CASIO language format (e.g., Facit 4556, Gould 6120 Colorwriter, Hewlett Packard 7440A, 7475A, 7550A, Casio FP-100, etc.).

**NOTE:** To compensate for plot overlap, the plot format for Control Limit and Action Limit is different for Plot 1-4 and Plot 5. During Plot 1-4 Control Limit is the long Red Line and Action Limit is the short Black line. During Plot 5 Control Limit is the short Red line and Action Limit is the long Black line.

### 6.1. DO (Selecting How Many QC Strip Readings To Plot)

- [1] Select **Plot**...press Switch 4 (Main Level).
- [2] Select plotter language...press Switch 7. Formats are **CASIO** or **HP-GL** (Hewlett Packard Graphics Language). **NOTE:** Once set, the selection will be saved until altered by operator action.
- [3] Select how many of the most recent QC Strip readings to plot (DO)...press Switch 5 or 6. Switch 5 and 6 decrement/increment you thru the QC Strip readings. If you select DO:30, the last 30 readings will be plotted. You cannot select less than DO:02 or more than DO:30.
- [4] To start plotting select **go**...press Switch 8. **PLOTTING.....** will be displayed while plot data is being outputted. Once all data is sent to the plotter the 820 will "beep" and automatically return to Main menu. **Note**, if plotter is not connected or a problem exists **PLOTTER NOT READY** will be displayed, and will remain in this condition until the **MENU** key is pressed.



## 7.

# CALIBRATION

The X-Rite 820 is designed for long and extremely stable readings. To follow good quality control practice, calibration should be checked periodically to verify measurement accuracy and proper operation of the unit.

You must calibrate Reflection, Transmission Status M, and Transmission Status A as three separate calibration procedures. The density values as specified on the transmission step wedge are the same for Transmission Status A and M.

Note: Except for Reflection, the Visual channel is not entered during calibration because the 820 automatically calculates transmission Status A and M Visual from its spectral components when taking a density reading.

### 7.1. Frequency of Calibration

Under normal operating conditions, the instrument should be calibrated once a week or when the instrument displays a message regarding calibration.

### 7.2. Quick Zero

Quick Zero provides you with an easy means of reestablishing Calibration Low. This is needed because calibration low may drift over a period of time. It is recommended that you check cal-lo first thing every morning. Quick Zero can be accessed via the "Cal" or "Den" menus. See following procedures.

**NOTE:** Transmission A/M only Quick Zero's Red, Green, and Blue to actual zero (0.00), Visual is calculated. Reflection Quick Zero's Visual, Red, Green, and Blue to the Cal-Lo values entered from Reflection Standard.

*Accessing Quick Zero via Cal Menu*

[1] Select **Cal**...press Switch 8.

[2]

**- For Transmission A/M:**

Remove film from target window.

**- For Reflection A:**

Center White Spot of reflection standard under read head.

[3] Hold read head depressed, then press the switch that represents the densitometry you want Quick Zeroed:

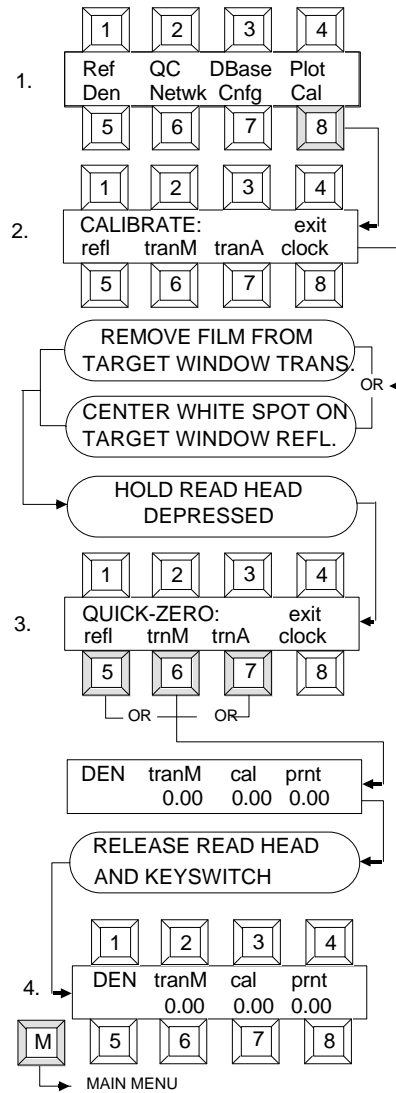
**Transmission A**...press Switch 7 (trnA).

**Transmission M**...press Switch 6 (trnM).

**Reflection A**...press Switch 5 (refl).

Release read head and switch after Cal-Lo is reestablished.

[4] Press **MENU** Switch to exit to Main menu.



Accessing Quick Zero via Den Menu

[1] Select **Den**...press Switch 5 (Main Level).

[2] Select densitometry (trnA, trnM, or reflA)...press Switch 2.

[3]

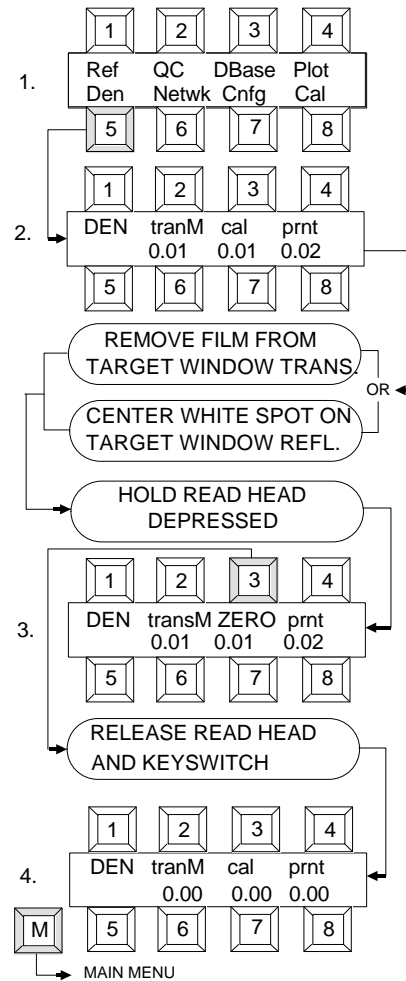
- **For trnA/trnM:**

While reading Air (no film), press Switch 3 to establish zero (Cal Lo).

- **For reflA:**

While reading White Spot on reflection standard press Switch 3 to establish Cal Lo.

[4] Exit to Main menu...press **MENU** Switch or select a different densitometry to Quick Zero...press Switch 2 and then repeat Step 3.



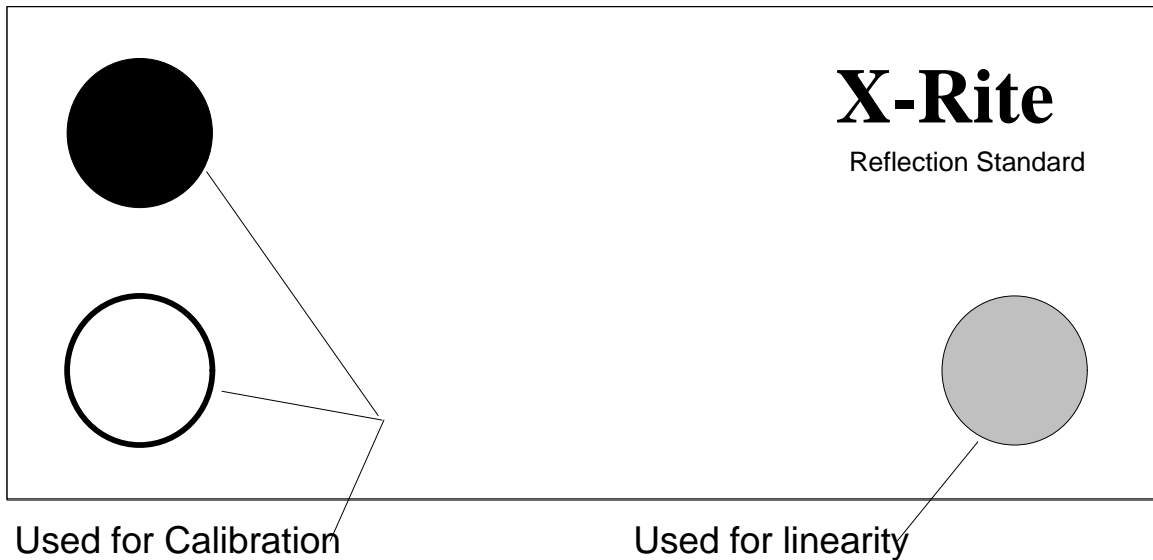
### 7.3. Reflection Calibration

The X-Rite 820 reflection calibration procedure has an automatic number setup that allows you quick access to preset numbers. In CAL LO setup step 3; with Switch 1 held down, momentarily pressing Switch 2 will automatically set the color selected to 0.09 density. Also with Switch 1 held, momentarily pressing Switch 3 will automatically set the color selected to 0.07 density. In CAL HI setup step 4; with switch 1 held down, momentarily pressing Switch 2 will automatically set the color selected to 1.81 density. Also with Switch 1 held, momentarily pressing Switch 3 will automatically set the color selected to 1.79 density.

The ceramic reflection standard has three steps ranging from approximately .10D (step 1) to 2.0D (step 3). The values listed on the ceramic reflection standard are traceable to the National Bureau of Standards (NBS).

*The ceramic reflection standard must be kept free of smudgemarks and dust.*

#### Ceramic Reflection Standard



## Reflection Calibration Procedure

[1] Select **Cal...**press Switch 8 (Main Level).

[2] Select **refl...**press Switch 5.

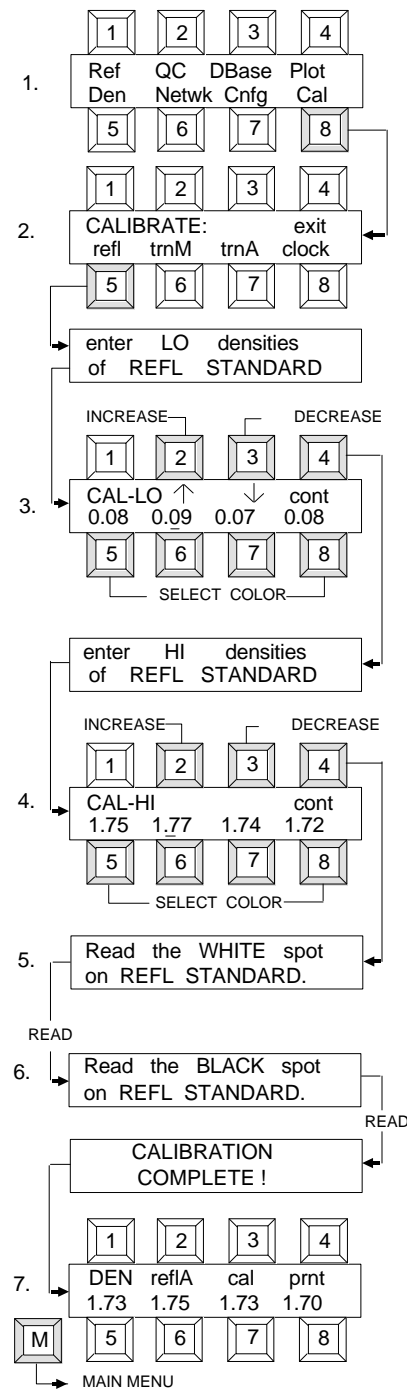
[3] Enter Lo values listed on the back of ceramic reflection standard for each color. **Note:** Values are entered by pressing Switch 2 to increase, and Switch 3 to decrease. Also color selection is accomplished by pressing Switches 5 - 8, the selected color will have a cursor below decimal point.

[4] Enter Hi values listed on the back of ceramic reflection standard for each color.

[5] Read the white spot on the reflection standard.

[6] Read the black spot on the reflection standard.

[7] Exit to Main menu...press **MENU** Switch or advance to the next calibration step by momentarily pressing Switch 2 and then switch 3.



## 7.4. Transmission (Status M and Status A) Calibration

The X-Rite 820 transmission calibration procedure has an automatic number setup that allows you quick access to preset numbers. In CAL HI setup step 3; with Switch 1 held down, momentarily pressing Switch 2 will automatically set the color selected to 3.01 density. Also with Switch 1 held down, momentarily pressing Switch 3 will automatically set the color selected to 2.99 density.

**NOTE:** When entering the values off from the Transmission step wedge, be careful not to enter the Visual densities in place of the Red, Green, and Blue values. The Visual densities listed are only for taking a linearity check after calibration.

The transmission step wedge has a four step gray scale ranging from approximately .06D (step 1) to 4.0D (step 4). The values listed on the step wedge are traceable to the National Bureau of Standards.

*The step wedge must be kept free of smudgemarks and dust.*

### Transmission Step Wedge

<b>X-Rite</b>								
P/N _____								
S/N _____								
Linearity <b>4</b>	<b>CAL HI</b>	Linearity <b>2</b>	Linearity <b>1</b>					
V _____	V _____	V _____	V _____					
R _____	R _____	R _____	R _____					
G _____	G _____	G _____	G _____					
B _____	B _____	B _____	B _____					
<table border="1" style="margin: auto;"> <tr> <td colspan="2" style="text-align: center;"><b>READ THIS SIDE UP</b></td> </tr> <tr> <td style="text-align: center;">± .02D (0 - 3.D)</td> </tr> <tr> <td style="text-align: center;">± 1% (3.1D - 3.5D)</td> </tr> <tr> <td style="text-align: center;">± 3% (3.6D - 4.0D)</td> </tr> </table>				<b>READ THIS SIDE UP</b>		± .02D (0 - 3.D)	± 1% (3.1D - 3.5D)	± 3% (3.6D - 4.0D)
<b>READ THIS SIDE UP</b>								
± .02D (0 - 3.D)								
± 1% (3.1D - 3.5D)								
± 3% (3.6D - 4.0D)								



*Transmission Calibration Procedure (Status M)*

[1] Select **Cal**...press Switch 8 (Main Level).

[2] Select **trnM**...press Switch 6.

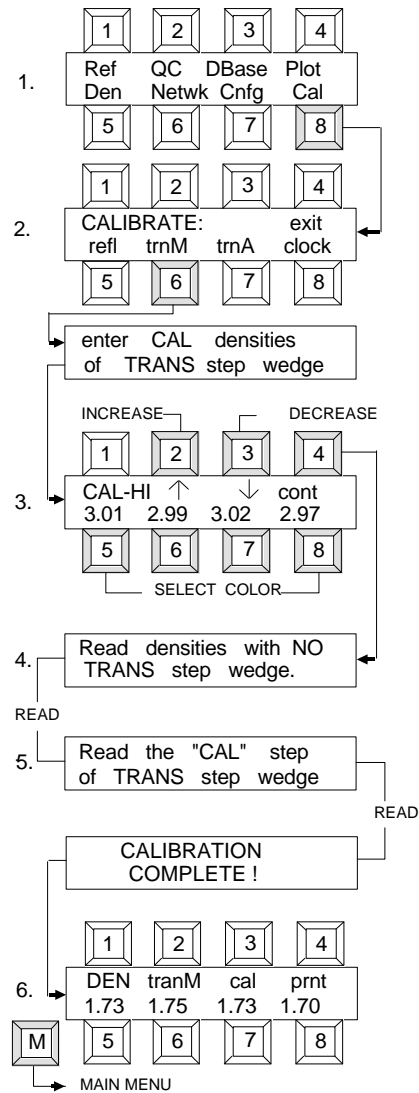
[3] Enter Hi values listed on the transmission step wedge for the red, green, and blue colors.

**NOTE:** Values are entered by pressing Switch 2 to increase, and Switch 3 to decrease. Also color selection is accomplished by pressing Switches 6 - 8, the selected color will have a cursor below the decimal point.

[4] Take reading with NO film under Read head.

[5] Read CAL step on transmission step wedge.

[6] Exit to Main menu...press **MENU** Switch or advance to the next calibration step by momentarily pressing Switch 2 and then Switch 3.



*Transmission Calibration Procedure (Status A)*

[1] Select **Cal**...press Switch 8 (Main Level).

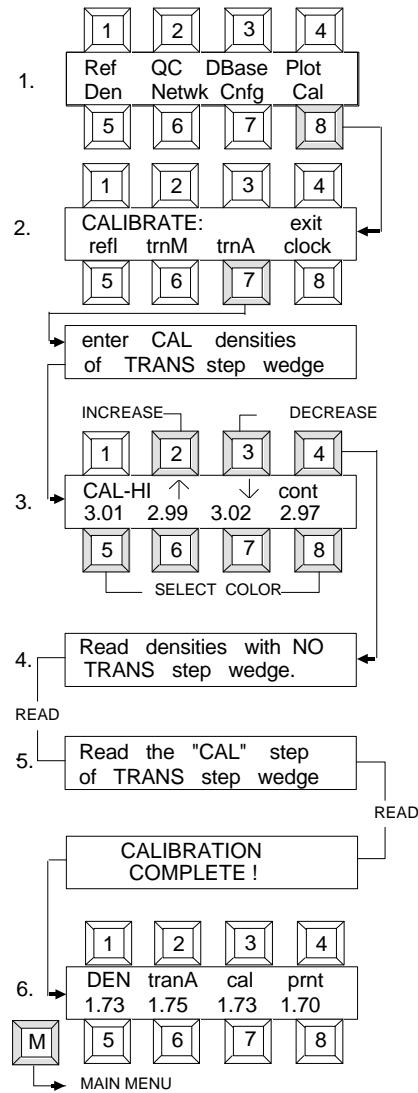
[2] Select **trnA**...press Switch 7.

[3] Enter Hi values listed on the transmission step wedge for the red, green, and blue colors. **Note:** Values are entered by pressing switch 2 to increase, and switch 3 to decrease. Also color selection is accomplished by pressing switches 6 - 8, the selected color will have a cursor below the decimal point.

[4] Take reading with NO film under Read head.

[5] Read CAL step on transmission step wedge.

[6] Exit to Main menu...press **MENU** Switch or advance to the next calibration step by momentarily pressing Switch 2 and then Switch 3.



## 7.5. Clock Set

### *Clock Set Procedure*

[1] Select **Cal**...press Switch 8 (Main Level).

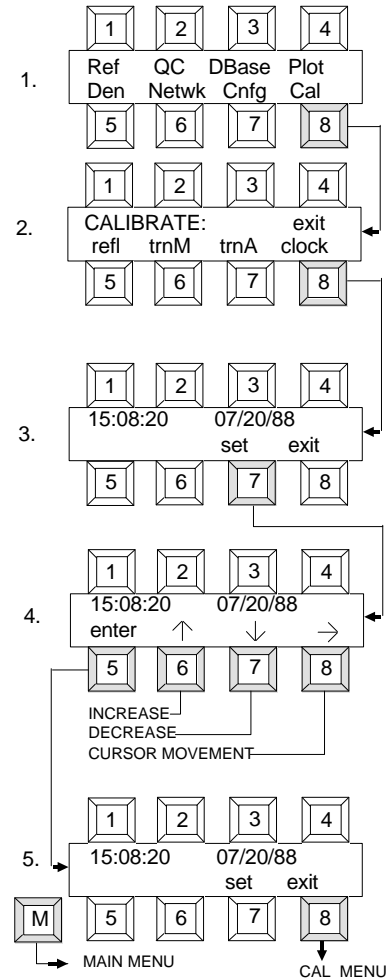
[2] Select **clock**...press Switch 8.

[3] Select **set**...press Switch 7.

#### [4] **Change Time and Date:**

Momentarily pressing Switch 8 will advance the cursor to the number that needs to be changed. Momentarily pressing Switch 6 will increase the number, and momentarily pressing Switch 7 will decrease the number. After the time and date changes are completed press Switch 5 to finalize procedure.

[5] Exit to Main menu...press **MENU** Switch or exit back to Calibration menu... press Switch 8.



**NOTE:** The clock accuracy is approximately +/- 15 seconds/month.

## 8.

# CNFG (UNIT CONFIGURATION)

The mode functions are contained in four mode pages.

- Page 1 (Netwk, Port, Baud, and Pin5)
- Page 2 (Aid, Comp, Dpt, and Alf)
- Page 3 (Auto, Aprnt, Tone, and Lock)
- Page 4 (pens, init, and end)

The following is a description of the mode functions.

### 8.1. Page 1

#### 8.1.1 Netwk (Network) On/Off

When set to On (NETWK), the networking feature is operational. When set to Off (netwk), the network feature will not operate.

#### 8.1.2 Port (Port Termination) Serial/Parallel

Allows information to be transferred in Serial or Parallel via the I/O port.

#### 8.1.3 Baud (Rate) 300/600/1200/2400/4800/9600

Determines the output rate (characters per second) of the I/O port. Available outputs are: 300, 600, 1200, 2400, 4800, and 9600.

#### 8.1.4 PIN5 (Of RS232 Port) Off/CTS/Busy

Determines the status of Pin 5 of the RS232 I/O port. Pin 5 may be set as BSY (Busy), CTS (clear to send), or as OFF.

### 8.2. Page 2

#### 8.2.1 Aid (Auto Identify) On/Off

Enables or disables an advanced lead character output that identifies the measurement as Transmission or Reflection density, as Status A or M response, and differentiates color as (Visual, Red, Green, Blue) or (Photoptic, Cyan, Magenta, Yellow). This type of output is used in the advance systems offered by many of the leading manufacturers in the photo market. Standard systems do not have this additional lead character data, and only identify color as Visual, Cyan, Magenta and Yellow.

#### STANDARD

V = Visual

R = Cyan

G = Magenta (Green)

B = Yellow (Blue)

TRANSMISSION

STATUS A

v = Visual

r = Red

g = Green

b = Blue

TRANSMISSION

STATUS M

p = photoptic

(Visual)

c = Cyan

m = Magenta

y = Yellow

#### A.I.D.

REFLECTION

STATUS A

P = photoptic

(Visual)

C = Cyan

M = Magenta

Y = Yellow

### 8.2.2 Comp (Computer) On/Off

Varies the output format of the I/O port. Upper case (COMP) makes all four colors print on the same line. Lower case (comp) makes each all four colors print on an individual line.

COMP	<p style="text-align: center;">s        s        s        sc  </p> <p>VX.XXpRX.XXpGX.XXpBX.XXpr f</p>
------	---

comp	<p style="text-align: center;">c  </p> <p>VX.XXr f</p> <p style="text-align: center;">c  </p> <p>RX.XXr f</p> <p style="text-align: center;">c  </p> <p>GX.XXr f</p> <p style="text-align: center;">c  </p> <p>BX.XXr f</p>
------	---

NOTES: X = Density Number  
 VRGB = Colors  
 s  
 p = Space  
 c  
 r = Carriage Return  
 |  
 f = Line Feed (transmission of the line feed character is determined by the ALF switch.)

### 8.2.3 Dpt (Decimal Point) On/Off

Enables or disables the decimal point from being output via the I/O port. Uppercase (DPT) enables decimal output. Lower case (dpt) disables decimal output.

DPT VX.XX
-----------

dpt VXXX
----------

NOTE: X = density number and V = color

### 8.2.4 Alf (Automatic Line Feed) On/Off

Enables or disables a line feed along with each carriage return in the output data.

## 8.3. Page 3

### 8.3.1 Auto (Automatic Color) On/Off

When activated, Auto Color measures and updates all four colors, but only displays the most dominant one. Auto color only affects the Density function, and does not affect Ref or QC functions.

### 8.3.2 Aprnt (Auto Print) On/Off

When enabled, the 820 will automatically output data to a printer after every valid measurement. **Note**, the printer configuration must be set properly (See Section 8.1.)

### 8.3.3 Tone (Audible Key Depression) Off/Soft/Loud

You can make the unit output an audible tone for each key depression. The tone can be set to soft, loud, or off.

### 8.3.4 Lock (Lock Configuration Options)

Turning lock on disables the changing of any configuration options. Turning lock off allow configuration changes. Attempts to change any option with lock on will cause the unit to beep and the option will remain unchanged. Changing the lock switch is accomplished by holding the read head depressed and momentarily pressing the lock

key. Lock status is displayed on the LCD by a padlock icon. A closed padlock means lock is enabled, an open padlock means lock is disabled.

## 8.4. Page 4

### 8.4.1 Pens 1 through 9

This function allows you to assign a color (black, red, green, or blue) to each pen (one through nine).

### 8.4.2 Init (Initial Codes) Escape Codes

This function allows you to assign printer/plotter commands that are sent to the printer/plotter before the current page is plotted. These commands are used to set the printer/plotter to the paper modes before actually attempting to plot the page. Setting the "escape sequence" codes assigns the printer commands. Only 64 separate escape codes can be entered. Refer to your printer's documentation for escape sequence codes for printer commands.

### 8.4.3 end (Ending Codes) Escape Codes

This function allows you to assign printer/plotter commands that are sent to the printer/plotter after the current page is plotted. These commands are generally used to reset the printer/plotter back to a normal printing mode (if necessary) and to eject the page. Setting the "escape sequence" codes assigns the printer commands. Only 64 separate escape codes can be entered. Refer to your printer's documentation for escape sequence codes for printer commands.

## 8.5. Setting Unit Configuration

Mode functions Netwk, Aid, Comp, Dpt, Auto, Aprnt, and Tone are turned "ON" or "OFF" by momentarily pressing the proper switch. When the function is ON (activated) uppercase letters will be displayed, and lowercase letters will be displayed when the function is OFF. Mode functions Port, Baud, and Pin5 will sequence through their various settings by momentarily pressing the proper switch.

[1] Select **Cnfg**...press Switch 7 (Main Level).

[2] Page 1 functions are displayed.

- Switch 5 sets netwk On (**NETWK**) or Off (**netwk**).
- Switch 6 sets the Port to **ser** or **par**.
- Switch 7 sets Baud rate to **300, 600, 1200, 2400, 4800, or 9600**.
- Switch 8 sets **pin5 to cts, off, or busy**.
- Press Switch 3 to advance to page 2.

[3] Page 2 functions are displayed.

- Switch 5 sets aid On (**AID**) or Off (**aid**).
- Switch 6 sets comp On (**COMP**) or Off (**comp**).
- Switch 7 sets dpt On (**DPT**) or Off (**dpt**).

- Switch 8 sets alf On (**ALF**) or Off (**alf**).
- Press switch 3 to advance to page 3.

[4] Page 3 functions are displayed.

- Switch 5 sets auto On (**AUTO**) or Off (**auto**).
- Switch 6 sets aprnt On (**APRNT**) or Off (**aprnt**).
- Switch 7 sets tone to **soft, loud,** or **off**.
- Switch 8 sets lock On (**LOCK**) or Off (**lock**).
- Press switch 3 to advance to page 4.

[5] The Page 4 functions are displayed.

- Switch 4 exits to the Main menu.
- Switch 6 displays the pens options to set the pen numbers and colors.
- Switch 7 displays the init options to define print commands to be sent before plotting the page.
- Switch 8 displays the end options to define print commands to be sent after plotting the page.

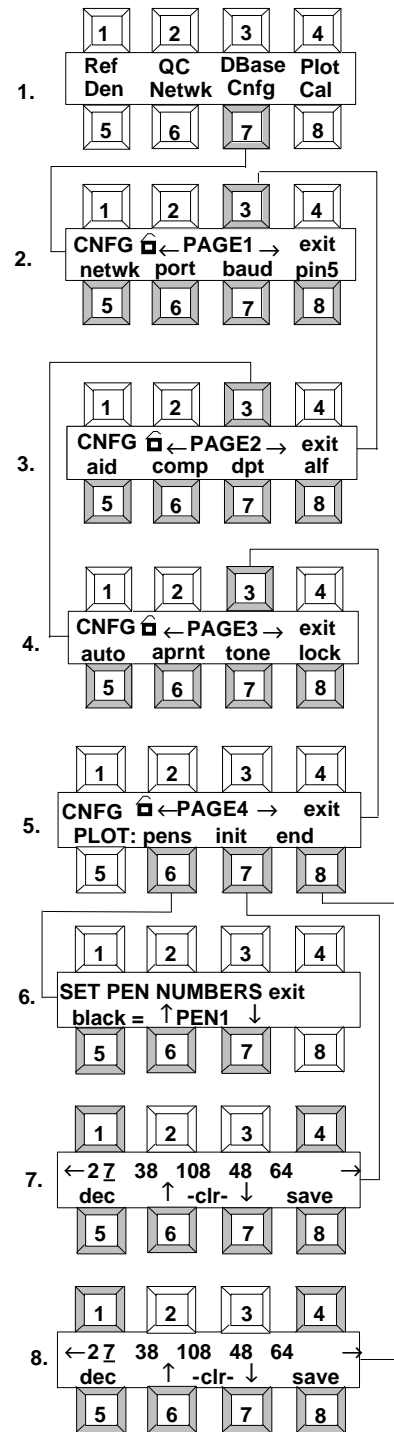
[6] The pens options are displayed.

- Switch 4 exits to the Main menu.
- Switch 5 sets the pen color to black, red, green, or blue.
- Switch 6 increases the pen number (1-9).
- Switch 7 decreases the pen number (1-9).

[7] The init options are displayed.

- Switch 1 moves the cursor (currently under 27) to the left until the first escape code is reached.
- Switch 4 moves the cursor to the right until the first blank entry after the last escape code is reached.
- Switch 5 sets the escape code mode to decimal (dec - 1 through 255) or hexadecimal (hex - 01 through FF).
- Switch 6 increases the escape code value.
- Switch 7 decreases the escape code value.
- Switch 6 and 7 pressed simultaneously will clear an escape code only if it is the last code in all of the entered sequences. If not, the code will default to 64 (a value approximately in the middle of the range of the most commonly used values).
- Switch 8 saves the settings and returns to Page 4.

[8] The end options are displayed. All of the switches have the same functions as the init options.

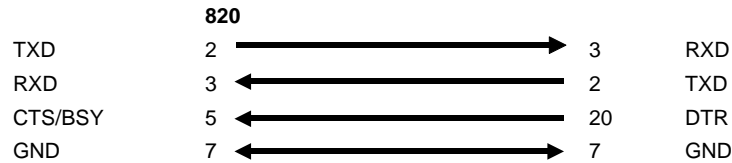


## 9.

# I/O PORT INTERFACE

### 9.1. Serial Interconnect and Definition

The 25-pin connector used for serial I/O is a DB25S type. Below is a connector diagram.

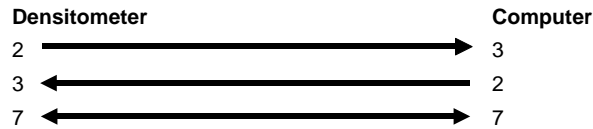


CABLE (P/N 820-75)

Pin #	Term	Term Definition
2	TXD (Transmitted Data)	Data being transmitted from the densitometer with the parameters (Baud Rate, Format) set by the densitometer
3	RXD (Received Data)	Data received by densitometer from outside source using same parameters as densitometer
5	CTS (Clear To Send)	Hardware handshake signal monitored by BSY (Busy) densitometer. One of three options is OFF (Not Monitored) selected VIA configuration menu.
7	GND (Digital Ground)	Signal ground reference used by the densitometer and the peripheral.



An alternate interconnection (in simplest form) between the densitometer and a computer is shown below. This connection does not allow for hardware handshake.



## 9.2. Serial Output Format

The baud rate and handshake type are determined by settings on the configuration menu. Serial transmission speed can be set to standard rates from 300 to 9600 baud. Proper handshake type, dictated by peripheral requirements, can be selected to follow one of three formats. The peripheral device controls the flow of information by setting the logic level on pin 5 of the densitometer's port.

If the "CTS" option is chosen, a logic level "1" on pin 5 is interpreted as "clear to send" and transmission is enabled. When pin 5 is a logic level "0" the transfer of data is inhibited.

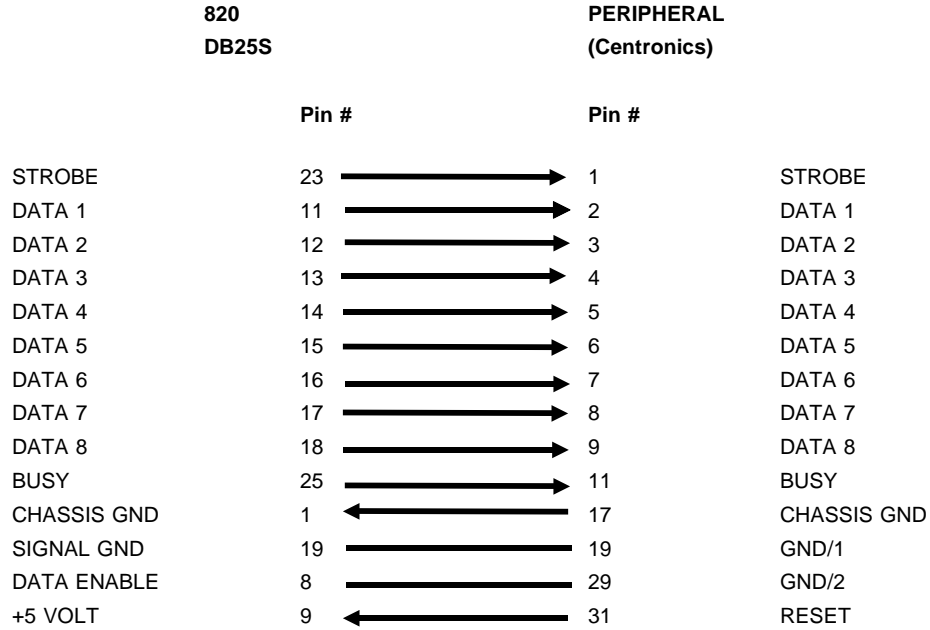
If the "BSY" option is chosen, a logic level "1" on pin 5 is interpreted as "peripheral is busy" and transmission is inhibited. When pin 5 is a logic level "0" the transfer of data is allowed.

The "OFF" option is available to allow communication to devices which offer no handshake support, the densitometer assumes that a peripheral of this type is always ready to receive information.

The word structure transmitted by the 820 begins with one start bit (space), 7 bits of ASCII, one parity bit (always zero), then one stop bit (mark). This format is commonly referred to as "seven, one & none" as it has 7 bits of data, one stop bit and no parity.

### 9.3. Parallel Interconnect and Definition

A 14 conductor cable using a DB25S connector on one end and a Centronics connector on the other end is used for parallel I/O. Below is a connection diagram.



CABLE (P/N 820-76)

<b>Term</b>	<b>Definition</b>
CHASSIS GND	Chassis ground reference
GND/1	Data signal loop return
GND/2	Used by densitometer to detect presence of peripheral and enable transmission
DATA 1-8	Signal lines used by densitometer to transmit data
STROBE	Used by peripheral for timing of data transfer
BUSY	Signal asserted by peripheral when unable to receive data
RESET	Peripheral hardware reset. Asserted when power is off to densitometer

#### **9.4. Parallel Output Format**

Enter the parallel communication mode through the configuration menu. No parameters need to be selected (eg:, baud, handshake, etc.).

## **10.**

## **MAINTENANCE**

### **10.1. General**

The X-Rite 820 Densitometer is covered by a one year limited warranty (excluding lamps) and should be referred to the factory or authorized service center for repair within this warranty period. Attempts to make repairs within this time frame may void the warranty.

Always verify instrument calibration to assure proper instrument operation. Make sure all connections are properly made.

X-Rite provides a factory repair service to their customers. Because of the complexity of the circuitry all circuitry repairs should be referred to the factory or an authorized service center.

X-Rite will repair any 820 submitted past warranty. Shipping costs to the factory or authorized service center shall be paid by the customer and the instrument shall be submitted in its special carton as a complete unaltered unit.

As a routine maintenance procedure, replace the lamp after every 2500 hours of operation. This allows approximately one year of operation per lamp (based on an 8 hour operating shift). Failure to do so may cause erroneous density readings.

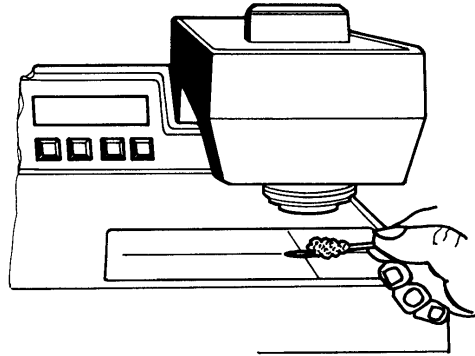
**NOTE: A General Maintenance Manual is available from X-Rite, Inc. Order P/N 820-505**

## 10.2. Optics Cleaning

**UNPLUG LINE CORD BEFORE SERVICING.**

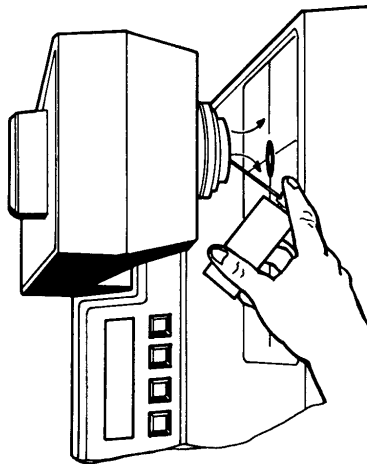
### - *TRANSMISSION OPTICS*

Clean the opal glass with a Q-tip slightly moistened with glass cleaner or alcohol.



### - *REFLECTION OPTICS*

Remove dust and lint by lightly blowing air into the nose cone opening in the reading head.



**NOTE:** When using an air can turn the unit on it's side and try to keep the air can upright, to avoid contamination.

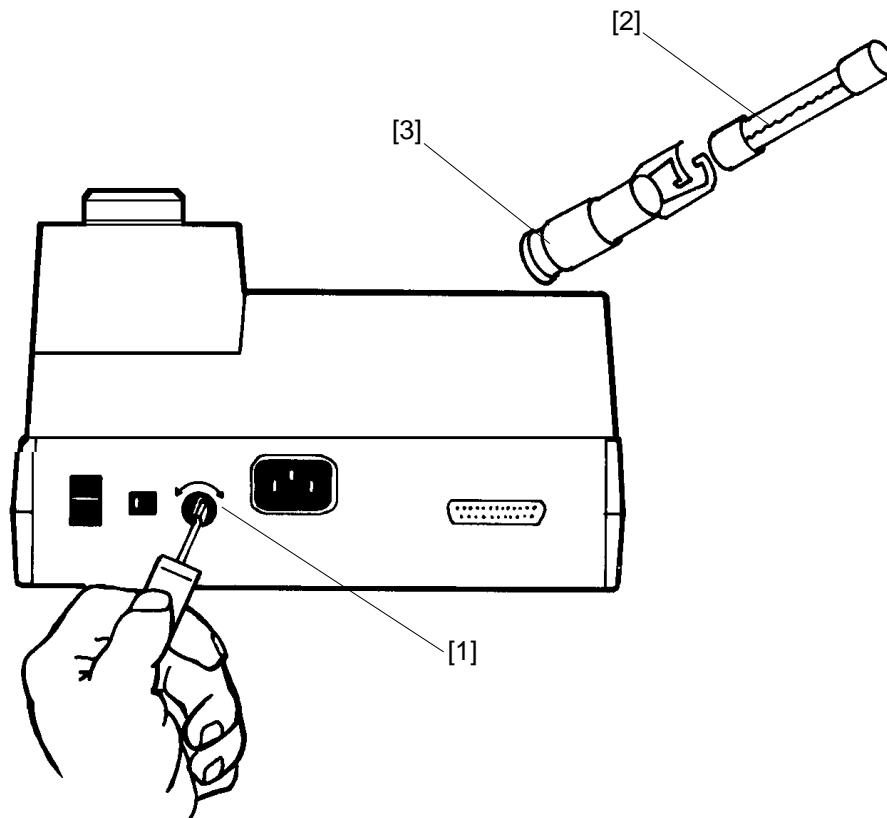
### 10.3. Fuse Replacement

**NOTE: If your instrument has a replaceable fuse on the back panel, follow the steps below.**

- 115VAC OPERATION FUSE (P/N SE24-0040)
- 230VAC OPERATION FUSE (P/N SE24-0020)

**UNPLUG LINE CORD BEFORE SERVICING.**

- 1) Insert flatblade screwdriver into slot of fuse cap [1].
- 2) Push in and turn counterclockwise one-half turn until fuse [2] and fuse cap [1] pops out.
- 3) Remove fuse [2] from fuse cap [1] and replace with same type fuse.
  - 115VAC operation (1/4" D x 1-1/4" L, 400ma Slo-blo).
  - 230VAC operation (5mm D x 20mm L, 200ma Slo-blo).
- 4) Insert fuse and fuse cap into fuseholder, push-in and turn clockwise one-half turn until fuse cap locks.

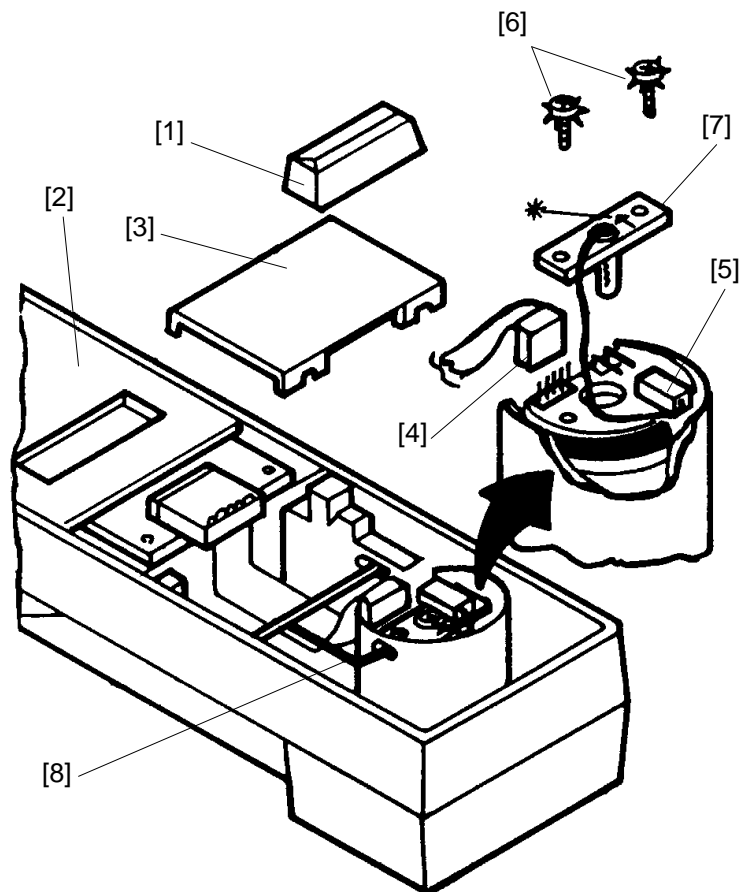


## 10.4. Reading Lamp Replacement (P/N 820-52)

**UNPLUG LINE CORD BEFORE SERVICING.**

- 1) Remove read button [1] by pulling upward.
- 2) Lift back of reading arm cover [2], then slide it backwards along side channels toward rear of unit.
- 3) Remove actuator bar [3] by lifting upwards.
- 4) Unplug connectors P19 [4] and P17 [5].
- 5) Unscrew two screws [6] then lift and remove lamp ass'y [7].
- 6) Secure new lamp assembly [7] in place with two screws [6].
- 7) Connect P19 [4] and P17 [5] as shown.
- 8) Install actuator bar [3].
- 9) Make sure springs [8] are in place.
- 10) Slide reading arm cover [2] back in place.
- 11) Press read button [1] firmly onto actuator bar [3]. The bottom nipples of the read button fit into the two holes in the actuator bar.

\*Note direction of arrow.

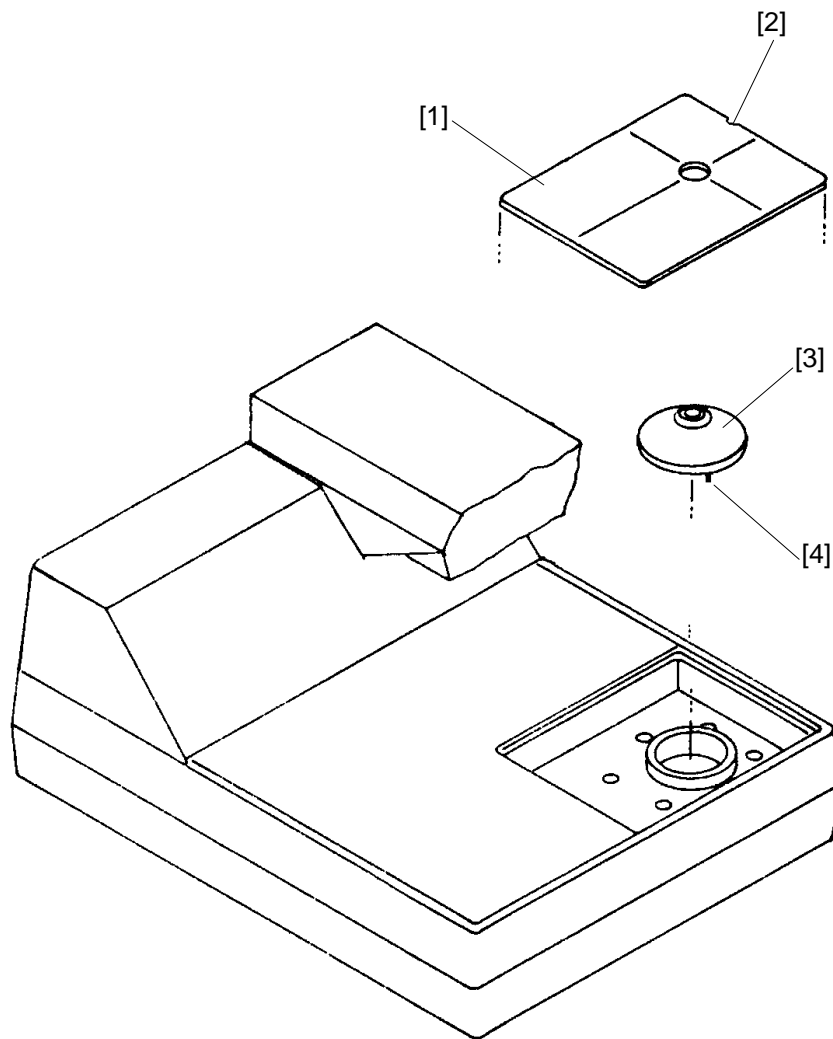


## 10.5. Transmission Optics Replacement

- Standard Optics (P/N 811M-23)
- Optional Optics (P/N 811A-23)

**UNPLUG LINE CORD BEFORE SERVICING.**

- 1) Remove light table [1] by inserting a small flatblade screwdriver into the slot [2], then pry upwards.
- 2) Remove defective transmission optics [3] by pulling upwards with both hands.
- 3) Insert new transmission optics in place with guide pin [4] facing front of unit. Be sure guide pin aligns with hole in the PCB, and that the connector pins and lamp do not get bent.
- 4) Snap light table [1] back in place.





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**11.****PRESET PROCESSES****Definition of Terms**

**DB:** . . . . . **Data Base**

**PType:** . . . . . **Process Type**

**PTnm:** . . . . . **Process Name**

**EQnm:** . . . . . **Equipment Name**

**aims:** . . . . . **Averaged Reference Reading Values**

**alim:** . . . . . **Action Limit**

**clim:** . . . . . **Control Limit**

**tform:** . . . . . **Transform Rules**

**mfn:** . . . . . **Measured Field Names**

**pfm:** . . . . . **Plot Field Names**

**c:** . . . . . **Color**

**p:** . . . . . **Plot Number**

**Field Color Definition** . . . . . **Description Of Colors And Methods  
Of Measuring (Simultaneous Or  
Individual) For Each Measured Field.**

**Plot Scales** . . . . . **Maximum positive and negative  
Range Of Plotter.**

## 11.1. Preset Process - Ptype: EP2

\*Status: Reflection

PTnm: EP2

EQnm: equip name

mfn: 1) "Stain"  
2) "LoDen"  
3) "HiDen"  
4) "Black"  
5) "\*\*\*\*\*"

pfn: 1) "Stain"  
2) " LD "  
3) "HD-LD"  
4) "Black"  
5) "B-HDc"

<u>tform:</u> Plot	1)	R1;	G1;	B1;
"	2)	R2;	G2;	B2;
"	3)	R3-R2;	G3-G2;	B3-B2;
"	4)	;	;	R4;
"	5)	R4-R3;	;	;

<u>alim:</u>	<u>Positive</u>	<u>Negative</u>
1) "Stain"	-	-
2) " LD "	.07	.07
3) "HD-LD"	.07	.07
4) "Black"	-	.07
5) "B-HDc"	-	-

<u>clim:</u>	<u>Positive</u>	<u>Negative</u>
1) "Stain"	.02	-
2) " LD "	.10	.10
3) "HD-LD"	.10	.10
4) "Black"	-	.10
5) "B-HDc"	-	-

### Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Individual Red, Green, and Blue
- 3) Individual Red, Green, and Blue
- 4) Red
- 5) None

### Plot Scales (= Full Scale)

- |            |          |
|------------|----------|
| 1) "Stain" | + /- .05 |
| 2) " LD "  | + /- .25 |
| 3) "HD-LD" | + /- .25 |
| 4) "Black" | + /- .25 |
| 5) "B-HDc" | + /- .25 |

Format Number: 02

\* Can not Be Viewed and Modified Thru DBASE EDIT

## 11.2. Preset Process - Ptype: C41

\*Status: Transmission, Status M

Ptnm: C41

EQnm: equip name

mfn: 1) "D-min"  
2) "LoDen"  
3) "HiDen"  
4) "D-maX"  
5) " Yel "

pfn: 1) "D-min"  
2) " LD "  
3) "HD-LD"  
4) "Xb-Yb" (maX blue - Yel blue)  
5) "Xr-Xg" (maX red - maX green)

<u>tform</u> : Plot	1)	R1;	G1;	B1;
"	2)	R2;	G2;	B2;
"	3)	R3-R2;	G3-G2;	B3-B2;
"	4)	;	;	B4-B5;
"	5)	R4-G4;	;	;

<u>alim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-min"		.03	.03
2) " LD "		.06	.06
3) "HD-LD"		.07	.07
4) "Xb-Yb"		.10	-
5) "Xr-Xg"		-	.20

<u>clim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-min"		.05	.05
2) " LD "		.08	.08
3) "HD-LD"		.09	.09
4) "Xb-Xg"		.12	-
5) "Xr-Xg"		-	.25

### Field Color Definition:

- 1) Simultaneous Red, Blue, and Green
- 2) Simultaneous Red, Blue, and Green
- 3) Simultaneous Red, Blue, and Green
- 4) Simultaneous Red, Blue, and Green
- 5) Blue

### Plot Scales (= Full Scale):

- 1) "D-min" + /- .10
- 2) " LD " + /- .15
- 3) "HD-LD" + /- .25
- 4) "Xb-Xb" + /- .25
- 5) "Xr-Xg" + /- .25

Format Number: 48

\* Can not be Viewed and Modified Thru DBASE EDIT

### 11.3. Preset Process - Ptype: E6

\*Status: Transmission, Status A

Ptnm: E6

EQnm: equip name

mfn: 1) "D-min"  
2) "LoDen"  
3) "HiDen"  
4) "D-maX"  
5) "\*\*\*\*\*"

pfn: 1) "D-min"  
2) "SPEED"  
3) "COLOR"  
4) "D-max"  
5) "\*\*\*\*\*"

<u>tform</u> : Plot	1)	R1;	G1;	B1;
"	2)	R2;	G2;	B2;
"	3)	R3;	G3;	B3;
"	4)	R4;	G4;	B4;
"	5)	;	;	;

<u>alim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-min"	.03	-	
2) "SPEED"	.08	.08	
3) "COLOR"	.12	.12	
4) "D-max"	-	.20	
5) "*****"	-	-	

<u>clim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-min"	.05	-	
2) "SPEED"	.10	.10	
3) "COLOR"	.15	.15	
4) "D-max"	-	.25	
5) "*****"	-	-	

Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Simultaneous Red, Green, and Blue
- 3) Simultaneous Red, Green, and Blue
- 4) Simultaneous Red, Green, and Blue
- 5) None

Plot Scales (= Full Scale):

- 1) "D-min" + /- .05
- 2) "SPEED" + /- .15
- 3) "COLOR" + /- .25
- 4) "D-max" + /- .45
- 5) "\*\*\*\*\*"

Format Number: 64

\* Can not Be Viewed and Modified Thru DBASE EDIT

## 11.4. Preset Process - Ptype: SSP

\*Status: Reflection

Ptnm: SSP

EQnm: equip name

mfn: 1) "UNDER"  
2) "NORM "  
3) "OVER "  
4) "\*\*\*\*\*"  
5) "\*\*\*\*\*"

pfn: 1) "Norm "  
2) "SLOPE"  
3) "\*\*\*\*\*"  
4) "\*\*\*\*\*"  
5) "\*\*\*\*\*"

<u>tform</u> : Plot	1)	R2;	G2;	B2;
"	2)	R3-R1;	G3-G1;	B3-B1;
"	3)	;	;	;
"	4)	;	;	;
"	5)	;	;	;

<u>alim</u> :		<u>Positive</u>	<u>Negative</u>
1)	"Norm "	-	-
2)	"SLOPE"	-	-
3)	"*****"	-	-
4)	"*****"	-	-
5)	"*****"	-	-

<u>clim</u> :		<u>Positive</u>	<u>Negative</u>
1)	"Norm "	.10	.10
2)	"SLOPE"	.10	.10
3)	"*****"	-	-
4)	"*****"	-	-
5)	"*****"	-	-

### Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Simultaneous Red, Green, and Blue
- 3) Simultaneous Red, Green, and Blue
- 4) None
- 5) None

### Plot Scales (= Full Scale):

- 1) "Norm " + /- .15
- 2) "SLOPE" + /- .15
- 3) "\*\*\*\*\*"
- 4) "\*\*\*\*\*"
- 5) "\*\*\*\*\*"

Format Number: 96

\* Can Not Be Viewed and Modified Thru DBASE EDIT

## 11.5. Preset Process - Ptype: DSP

\*Status: Reflection

Ptnm: DSP

EQnm: equip name

mfn: 1) "UNDER"  
2) "NORM "  
3) "OVER "  
4) "\*\*\*\*\*"  
5) "\*\*\*\*\*"

pfn: 1) " O-N "  
2) "NORM "  
3) " U-N "  
4) "\*\*\*\*\*"  
5) "\*\*\*\*\*"

<u>tform:</u> Plot	1)	R3-R2;	G3-G2;	B3-B2;
"	2)	R2;	G2;	B2;
"	3)	R1-R2;	G1-G2;	B1-B2;
"	4)	;	;	;
"	5)	;	;	;

<u>alim:</u>		<u>Positive</u>	<u>Negative</u>
1) " O-N "	-	-	-
2) "NORM "	-	-	-
3) " U-N "	-	-	-
4) "*****"	-	-	-
5) "*****"	-	-	-

<u>clim:</u>		<u>Positive</u>	<u>Negative</u>
1) " O-N "	.10	.10	.10
2) "NORM "	.10	.10	.10
3) " U-N "	.10	.10	.10
4) "*****"	-	-	-
5) "*****"	-	-	-

### Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Simultaneous Red, Green, and Blue
- 3) Simultaneous Red, Green, and Blue
- 4) None
- 5) None

### Plot Scales (= Full Scale):

- 1) " O-N " + /- .15
- 2) "NORM " + /- .15
- 3) " U-N " + /- .15
- 4) "\*\*\*\*\*"
- 5) "\*\*\*\*\*"

Format Number: 97

\* Can Not Be Viewed and Modified Thru DBASE EDIT



## 11.6. Preset Process - Ptype: 2610

\*Status: Reflection

Ptnm: 2610

EQnm: equip name

mfn: 1) " Uu "  
2) " Uo "  
3) " N "  
4) " Oo "  
5) " Ou "

pfn: 1) "Oo-Uo"  
2) "NORM "  
3) "Ou-Uu"  
4) "\*\*\*\*\*"  
5) "\*\*\*\*\*"

<u>tform</u> : Plot	1)	R4-R2;	G4-G2;	B4-B2;
"	2)	R3;	G3;	B3;
"	3)	R5-R1;	G5-G1;	B5-B1;
"	4)	;	;	;
"	5)	;	;	;

<u>alim</u> :		<u>Positive</u>	<u>Negative</u>
1) "Oo-Uo"	-	-	-
2) "NORM"	-	-	-
3) "Ou-Uu"	-	-	-
4) "*****"	-	-	-
5) "*****"	-	-	-

<u>clim</u> :		<u>Positive</u>	<u>Negative</u>
1) "Oo-Uo"	.10	.10	.10
2) "NORM "	.10	.10	.10
3) "Ou-Uu"	.10	.10	.10
4) "*****"	-	-	-
5) "*****"	-	-	-

### Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Simultaneous Red, Green, and Blue
- 3) Simultaneous Red, Green, and Blue
- 4) Simultaneous Red, Green, and Blue
- 5) Simultaneous Red, Green, and Blue

### Plot Scales (= Full Scale):

- 1) "Oo-Uo" + /- .20
- 2) "NORM " + /- .20
- 3) "Ou-Uu" + /- .20
- 4) "\*\*\*\*\*"
- 5) "\*\*\*\*\*"

Format Number: 100

\* Can Not Be Viewed and Modified Thru DBASE EDIT

## 11.7. Preset Process - Ptype: AP44

\*Status: Transmission, Status A

Ptnm: AP44

EQnm: equip name

mfn: 1) "D-min"  
2) " LD "  
3) " HD "  
4) "D-max"  
5) "\*\*\*\*\*"

pfn: 1) "D-min"  
2) " LD "  
3) " HD "  
4) "D-max"  
5) "\*\*\*\*\*"

<u>tform</u> : Plot	1)	R1;	G1;	B1;
"	2)	R2;	G2;	B2;
"	3)	R3;	G3;	B3;
"	4)	R4;	G4;	B4;
"	5)	;	;	;

<u>alim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-min"	.05	-	
2) " LD "	.10	.10	
3) " HD "	.15	.15	
4) "D-max"	-	.20	
5) "*****"	-	-	

<u>clim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-min"	.05	-	
2) " LD "	.10	.10	
3) " HD "	.15	.15	
4) "D-max"	-	.20	
5) "*****"	-	-	

Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Simultaneous Red, Green, and Blue
- 3) Simultaneous Red, Green, and Blue
- 4) Simultaneous Red, Green, and Blue
- 5) None

Plot Scales (= Full Scale):

- 1) "D-min" + /- .10
- 2) " LD " + /- .20
- 3) " HD " + /- .30
- 4) "D-max" + /- .40
- 5) "\*\*\*\*\*"

Format Number: 65

\* Can Not Be Viewed and Modified Thru DBASE EDIT

## 11.8. Preset Process - Ptype: AP63

\*Status: Reflection

Ptnm: AP63

EQnm: equip name

mfn: 1) "D-min"  
2) " LD "  
3) " HD "  
4) "D-max"  
5) "\*\*\*\*\*"

pfn: 1) "D-min"  
2) " LD "  
3) " HD "  
4) "D-max"  
5) "\*\*\*\*\*"

<u>tform</u> : Plot	1)	R1;	G1;	B1;
"	2)	R2;	G2;	B2;
"	3)	R3;	G3;	B3;
"	4)	R4;	G4;	B4;
"	5)	;	;	;

<u>alim</u> :		Positive	Negative
1) "D-min"	.03	-	
2) " LD "	.12	.12	
3) " HD "	.20	.20	
4) "D-max"	-	.12	
5) "*****"	-	-	

<u>clim</u> :		Positive	Negative
1) "D-min"	.03	-	
2) " LD "	.12	.12	
3) " HD "	.20	.20	
4) "D-max"	-	.12	
5) "*****"	-	-	

Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Simultaneous Red, Green, and Blue
- 3) Simultaneous Red, Green, and Blue
- 4) Simultaneous Red, Green, and Blue
- 5) None

Plot Scales (= Full Scale):

- 1) "D-min" + /- .05
- 2) " LD " + /- .20
- 3) " HD " + /- .30
- 4) "D-max" + /- .20
- 5) "\*\*\*\*\*"

Format Number: 16

\* Can Not Be Viewed and Modified Thru DBASE EDIT

## 11.9. Preset Process - Ptype: AP70

\*Status: Transmission, Status M

Ptnm: AP70

EQnm: equip name

mfn: 1) "D-min"  
2) " LD "  
3) " HD "  
4) "D-max"  
5) "\*\*\*\*\*"

pfn: 1) "D-min"  
2) "LD-Dm"  
3) "HD-LD"  
4) "Xb-Hb"  
5) "Xr-Xg"

<u>tform</u> : Plot	1)	R1;	G1;	B1;
"	2)	R2-R1;	G2-G1;	B2-B1;
"	3)	R3-R2;	G3-G2;	B3-B2;
"	4)	;	;	B4-B3;
"	5)	R4-G4;	;	;

<u>alim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-min"		.06	.06
2) "LD-Dm"		.08	.08
3) "HD-LD"		.09	.09
4) "Xb-Hb"		.15	-
5) "Xr-Xg"		-	.25

<u>clim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-min"		.06	.06
2) "LD-Dm"		.08	.08
3) "HD-LD"		.09	.09
4) "Xb-Hb"		.15	-
5) "Xr-Xg"		-	.25

### Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Simultaneous Red, Green, and Blue
- 3) Simultaneous Red, Green, and Blue
- 4) Simultaneous Red, Green, and Blue
- 5) None

### Plot Scales (= Full Scale):

- 1) "D-min" + /- .10
- 2) " LD " + /- .15
- 3) "HD-LD" + /- .20
- 4) "Xb-Yb" + /- .30
- 5) "\*\*\*\*\*"

Format Number: 54

\* Can Not be viewed and Modified Thru DBASE EDIT

## 11.10. Preset Process - Ptype: AP92

\*Status: Reflection

Ptnm: AP92

EQnm: equip name

mfn: 1) "D-min"  
2) " LD "  
3) " HD "  
4) "\*\*\*\*\*"  
5) "\*\*\*\*\*"

pfn: 1) "D-min"  
2) " LD "  
3) " HD "  
4) "\*\*\*\*\*"  
5) "\*\*\*\*\*"

<u>tform</u> : Plot	1)	R1;	G1;	B1;
"	2)	R2;	G2;	B2;
"	3)	R3;	G3;	B3;
"	4)	;	;	;
"	5)	;	;	;

<u>alim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-min"	.03	.03	
2) " LD "	.10	.10	
3) " HD "	.15	.15	
4) "*****"	-	-	
5) "*****"	-	-	

<u>clim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-min"	.03	.03	
2) " LD "	.10	.10	
3) " HD "	.15	.15	
4) "*****"	-	-	
5) "*****"	-	-	

Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Simultaneous Red, Green, and Blue
- 3) Simultaneous Red, Green, and Blue
- 4) None
- 5) None

Plot Scales (= Full Scale):

- 1) "D-min" + /- .05
- 2) " LD " + /- .20
- 3) " HD " + /- .30
- 4) "\*\*\*\*\*"
- 5) "\*\*\*\*\*"

Format Number: 07

\* Can Not Be Viewed and Modified Thru DBASE EDIT

## 11.11. Preset Process - Ptype: AP-94

\*Status: Reflection

Ptnm: AP94

EQnm: equip name

mfn: 1) "D-min"  
2) " LD "  
3) " HD "  
4) "D-max"  
5) "\*\*\*\*\*"

pfn: 1) "D-min"  
2) " LD "  
3) "HD-LD"  
4) "D-max"  
5) "\*\*\*\*\*"

<u>tform</u> : Plot	1)	R1;	G1;	B1;
"	2)	R2;	G2;	B2;
"	3)	R3-R2;	G3-G2;	B3-B2;
"	4)	R4;	G4;	B4;
"	5)	;	;	;

<u>alim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-min"	-	-	-
2) " LD "	-	-	-
3) "HD-LD"	-	-	-
4) "D-max"	-	-	-
5) "*****"	-	-	-

<u>clim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-min"	.02	-	-
2) " LD "	.10	.10	.10
3) "HD-LD"	.10	.10	.10
4) "D-max"	-	.15	.15
5) "*****"	-	-	-

Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Simultaneous Red, Green, and Blue
- 3) Simultaneous Red, Green, and Blue
- 4) Simultaneous Red, Green, and Blue
- 5) None

Plot Scales (= Full Scale):

- 1) "D-min" + /- .05
- 2) " LD " + /- .20
- 3) "HD-LD" + /- .30
- 4) "D-max" + /- .25
- 5) "\*\*\*\*\*" + /- .25

Format Number: 01

\* Can Not Be Viewed and Modified Thru DBASE EDIT

## 11.12. Preset Process - Ptype: C41A

\*Status: Transmission, Status M

Ptnm: C41A

EQnm: equip name

mfn: 1) "D-min"  
2) "LoDen"  
3) "HiDen"  
4) "D-maX"  
5) " Yel "

pfn: 1) "D-min"  
2) " LD "  
3) "HD-LD"  
4) "Xb-Yb"  
5) "\*\*\*\*\*"

<u>tform</u> : Plot	1)	R1;	G1;	B1;
"	2)	R2;	G2;	B2;
"	3)	R3-R2;	G3-G2;	B3-B2;
"	4)	;	;	B4-B5;
"	5)	;	;	;

<u>alim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-min"	.03	.03	
2) " LD "	.06	.06	
3) "HD-LD"	.07	.07	
4) "Xb-Yb"	.10	-	
5) "*****"	-	-	

<u>clim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-min"	.05	.05	
2) " LD "	.08	.08	
3) "HD-LD"	.09	.09	
4) "Xb-Yb"	.12	-	
5) "*****"	-	-	

### Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Simultaneous Red, Green, and Blue
- 3) Simultaneous Red, Green, and Blue
- 4) Simultaneous Red, Green, and Blue
- 5) Blue

### Plot Scales (= Full Scale):

- 1) "D-min" + /- .10
- 2) " LD " + /- .15
- 3) "HD-LD" + /- .25
- 4) "Xb-Yb" + /- .25
- 5) "\*\*\*\*\*"

Format Number: 48

\* Can Not Be Viewed and Modified Thru DBASE EDIT

### 11.13. Preset Process - Ptype: CP21

\*Status: Reflection

Ptnm: CP21

EQnm: equip name

mfn: 1) "STAIN"  
2) "LoDen"  
3) "HiDen"  
4) "BLACK"  
5) "Y-MAX"

pfn: 1) "STAIN"  
2) " LD "  
3) "HD-LD"  
4) "B-HDc"  
5) "Yr-Sr"

<u>tform</u> :	Plot	1)	R1;	G1;	B1;
	"	2)	R2;	G2;	B2;
	"	3)	R3-R2;	G3-G2;	B3-B2;
	"	4)	R4-R3;	;	;
	"	5)	;	;	R5-R1;

<u>alim</u> :		<u>Positive</u>	<u>Negative</u>
	1) "STAIN"	-	-
	2) " LD "	-	-
	3) "HD-LD"	-	-
	4) "B-HDc"	-	-
	5) "Yr-Sr"	-	-

<u>clim</u> :		<u>Positive</u>	<u>Negative</u>
	1) "STAIN"	.03	-
	2) " LD "	.10	.10
	3) "HD-LD"	.10	.10
	4) "B-HDc"	-	.12
	5) "Yr-Sr"	.02	-

Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Individual Red, Green, and Blue
- 3) Individual Red, Green, and Blue
- 4) Simultaneous Red, Green, and Blue
- 5) Red

Plot Scales (= Full Scale):

- 1) "STAIN" + /- .05
- 2) " LD " + /- .15
- 3) "HD-LD" + /- .15
- 4) "B-HDc" + /- .15
- 5) "Yr-Sr" + /- .15

Format Number: 05

\* Can Not Be Viewed and Modified Thru DBASE EDIT



## 11.14. Preset Process - Ptype: FA

\*Status: Reflection

Ptnm: FA

EQnm: equip name

mfn: 1) "Stain"  
2) " LD "  
3) " HD "  
4) "D-max"  
5) "Y-MAX"

pfn: 1) "D-min"  
2) " LD "  
3) "HD-LD"  
4) "D-max"  
5) "Yr-Sr"

<u>tform</u> :	Plot	1)	R1;	G1;	B1;
	"	2)	R2;	G2;	B2;
	"	3)	R3-R2;	G3-G2;	B3-B2;
	"	4)	R4;	G4;	B4;
	"	5)	;	;	R5-R1;

<u>alim</u> :		<u>Positive</u>	<u>Negative</u>
	1) "D-min"	-	-
	2) " LD "	-	-
	3) "HD-LD"	-	-
	4) "D-max"	-	-
	5) "Yr-Sr"	-	-

<u>clim</u> :		<u>Positive</u>	<u>Negative</u>
	1) "D-min"	.02	-
	2) " LD "	.10	.10
	3) "HD-LD"	.10	.10
	4) "D-max"	-	.10
	5) "Yr-Sr"	.05	-

Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Simultaneous Red, Green, and Blue
- 3) Simultaneous Red, Green, and Blue
- 4) Simultaneous Red, Green, and Blue
- 5) Red

Plot Scales (= Full Scale):

- 1) "D-min" + /- .05
- 2) " LD " + /- .25
- 3) "HD-LD" + /- .25
- 4) "D-max" + /- .25
- 5) "Yr-Sr" + /- .25

Format Number: 06

\* Can Not Be Viewed and Modified Thru DBASE EDIT

## 11.15. Preset Process - Ptype: P-3

\*Status: Reflection

Ptnm: P-3

EQnm: equip name

mfn: 1) "WHITE"  
2) " LD "  
3) " HD "  
4) "BLACK"  
5) "\*\*\*\*\*"

pfn: 1) "D-max"  
2) "HD-LD"  
3) "SPEED"  
4) "STAIN"  
5) "\*\*\*\*\*"

<u>tform</u> : Plot	1)	R4;	G4;	B4;
"	2)	R3-R2;	G3-G2	B3-B2
"	3)	R2;	G2;	B2;
"	4)	R1;	G1;	B1;
"	5)	;	;	;

<u>alim</u> :	<u>Positive</u>	<u>Negative</u>
1) "D-max"	-	-
2) "HD-LD"	-	-
3) "SPEED"	-	-
4) "STAIN"	-	-
5) "*****"	-	-

<u>clim</u> :	<u>Positive</u>	<u>Negative</u>
1) "D-max"	.15	.15
2) "HD-LD"	.10	.10
3) "SPEED"	.10	.10
4) "STAIN"	.04	-
5) "*****"	-	-

### Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Simultaneous Red, Green, and Blue
- 3) Simultaneous Red, Green, and Blue
- 4) Simultaneous Red, Green, and Blue
- 5) None

### Plot Scales (= Full Scale):

- 1) "D-max" + /- .20
- 2) "HD-LD" + /- .20
- 3) "SPEED" + /- .15
- 4) "STAIN" + /- .10
- 5) "\*\*\*\*\*"

Format Number: 08

\* Can Not Be Viewed and Modified Thru DBASE EDIT

## 11.16. Preset Process - Ptype: P-3X

\*Status: Reflection

Ptnm: P-3X

EQnm: equip name

mfn: 1) "D-min"  
2) " LD "  
3) " HD "  
4) "D-max"  
5) "BLUE"

pfn: 1) "D-min"  
2) " LD "  
3) "HD-LD"  
4) "D-max"  
5) "By-LD"

<u>tform</u> : Plot	1)	R1;	G1;	B1;
"	2)	R2;	G2;	B2;
"	3)	R3-R2;	G3-G2;	B3-B2;
"	4)	R4;	G4;	B4;
"	5)	;	;	B5-B1;

<u>alim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-max"	-	-	-
2) " LD "	-	-	-
3) "HD-LD"	-	-	-
4) "D-max"	-	-	-
5) "By-LD"	-	-	-

<u>clim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-max"	.05	.05	.05
2) " LD "	.10	.10	.10
3) "HD-LD"	.10	.10	.10
4) "D-max"	.15	.15	.15
5) "By-LD"	.10	.10	.10

### Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Simultaneous Red, Green, and Blue
- 3) Simultaneous Red, Green, and Blue
- 4) Simultaneous Red, Green, and Blue
- 5) Blue

### Plot Scales (= Full Scale):

- 1) "D-max" + /- .05
- 2) " LD " + /- .25
- 3) "HD-LD" + /- .25
- 4) "D-max" + /- .25
- 5) "By-LD" + /- .25

Format Number: 12

\* Can Not Be Viewed and Modified Thru DBASE EDIT

## 11.17. Preset Process - Ptype: P-4

\*Status: Reflection

Ptnm: P-4

EQnm: equip name

mfn: 1) "Stain"  
2) " LD "  
3) " HD "  
4) "D-max"  
5) "\*\*\*\*\*"

pfn: 1) "Stain"  
2) " LD "  
3) "HD-LD"  
4) "D-max"  
5) "\*\*\*\*\*"

<u>tform:</u> Plot	1)	R1;	G1;	B1;
"	2)	R2;	G2;	B2;
"	3)	R3-R2;	G3-G2;	B3-B2;
"	4)	R4;	G4;	B4;
"	5)	;	;	;

<u>alim:</u>		<u>Positive</u>	<u>Negative</u>
1) "Stain"	-	-	-
2) " LD "	-	-	-
3) "HD-LD"	-	-	-
4) "D-max"	-	-	-
5) "*****"	-	-	-

<u>clim:</u>		<u>Positive</u>	<u>Negative</u>
1) "Stain"	.05	-	-
2) " LD "	.10	.10	.10
3) "HD-LD"	.10	.10	.10
4) "D-max"	.15	.15	.15
5) "*****"	-	-	-

Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Simultaneous Red, Green, and Blue
- 3) Simultaneous Red, Green, and Blue
- 4) Simultaneous Red, Green, and Blue
- 5) None

Plot Scales (= Full Scale):

- 1) "Stain" + /- .10
- 2) " LD " + /- .20
- 3) "HD-LD" + /- .20
- 4) "D-max" + /- .25
- 5) "\*\*\*\*\*"

Format Number: 14

\* Can Not Be Viewed and Modified Thru DBASE EDIT

## 11.18. Preset Process - Ptype: P-5

\*Status: Transmission, Status A

Ptnm: P-5

EQnm: equip name

mfn: 1) "STEP1"  
2) "STEP2"  
3) "STEP3"  
4) "STEP4"  
5) "\*\*\*\*\*"

pfn: 1) "D-min"  
2) " LD "  
3) "HD-LD"  
4) "D-max"  
5) "\*\*\*\*\*"

<u>tform</u> : Plot	1)	R1;	G1;	B1;
"	2)	R2;	G2;	B2;
"	3)	R3-R2;	G3-G2;	B3-B2;
"	4)	R4	G4	B4;
"	5)	;	;	;

<u>alim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-min"	-	-	-
2) " LD "	-	-	-
3) "HD-LD"	-	-	-
4) "D-max"	-	-	-
5) "*****"	-	-	-

<u>clim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-min"	-	-	-
2) " LD "	-	-	-
3) "HD-LD"	-	-	-
4) "D-max"	-	-	-
5) "*****"	-	-	-

### Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Simultaneous Red, Green, and Blue
- 3) Simultaneous Red, Green, and Blue
- 4) Simultaneous Red, Green, and Blue
- 5) None

### Plot Scales (= Full Scale):

- 1) "D-min" + /- .10
- 2) " LD " + /- .25
- 3) "HD-LD" + /- .25
- 4) "D-max" + /- .25
- 5) "\*\*\*\*\*"

Format Number: 66

\* Can Not Be Viewed and Modified Thru DBASE EDIT

## 11.19. Preset Process - Ptype: R3

\*Status: Reflection

Ptnm: R-3

EQnm: equip name

mfn: 1) "D-min"  
2) "LoDen"  
3) "HiDen"  
4) "D-max"  
5) "\*\*\*\*\*"

pfn: 1) "D-min"  
2) " LD "  
3) "HD-LD"  
4) "D-max"  
5) "\*\*\*\*\*"

<u>tform</u> : Plot	1)	R1;	G1;	B1;
"	2)	R2;	G2;	B2;
"	3)	R3-R2;	G3-G2;	B3-B2;
"	4)	R4;	G4;	B4;
"	5)	;	;	;

<u>alim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-min"	-	-	-
2) " LD "	.08	.08	.08
3) "HD-LD"	.08	.08	.08
4) "D-max"	-	.08	.08
5) "*****"	-	-	-

<u>clim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-min"	.03	-	-
2) " LD "	.12	.12	.12
3) "HD-LD"	.12	.12	.12
4) "D-max"	-	.12	.12
5) "*****"	-	-	-

Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Simultaneous Red, Green, and Blue
- 3) Simultaneous Red, Green, and Blue
- 4) Simultaneous Red, Green, and Blue
- 5) None

Plot Scales (= Full Scale):

- 1) "D-min" + /- .05
- 2) " LD " + /- .15
- 3) "HD-LD" + /- .20
- 4) "D-max" + /- .20
- 5) "\*\*\*\*\*"

Format Number: 04

\* Can Not Be Viewed and Modified Thru DBASE EDIT

## 11.20. Preset Process - Ptype: RA-4

\*Status: Reflection

Ptnm: RA-4

EQnm: equip name

mfn: 1) "STAIN"  
2) "LoDen"  
3) "HiDen"  
4) "BLACK"  
5) "\*\*\*\*\*"

pfn: 1) "STAIN"  
2) " LD "  
3) "HD-LD"  
4) "BLACK"  
5) "\*\*\*\*\*"

<u>tform</u> : Plot	1)	R1;	G1;	B1;
"	2)	R2;	G2;	B2;
"	3)	R3-R2;	G3-G2;	B3-B2;
"	4)	R4;	G4;	B4;
"	5)	;	;	;

<u>alim</u> :		<u>Positive</u>	<u>Negative</u>
1) "STAIN"		-	-
2) " LD "		.08	.08
3) "HD-LD"		.08	.08
4) "BLACK"		-	.08
5) "*****"		-	-

<u>clim</u> :		<u>Positive</u>	<u>Negative</u>
1) "STAIN"		.03	-
2) " LD "		.12	.12
3) "HD-LD"		.12	.12
4) "BLACK"		-	.12
5) "*****"		-	-

### Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Simultaneous Red, Green, and Blue
- 3) Simultaneous Red, Green, and Blue
- 4) Simultaneous Red, Green, and Blue
- 5) None

### Plot Scales (= Full Scale):

- 1) "STAIN" + /- .05
- 2) " HD " + /- .20
- 3) "HD-LD" + /- .20
- 4) "BLACK" + /- .20
- 5) "\*\*\*\*\*"

Format Number: 03

\* Can Not Be Viewed and Modified Thru DBASE EDIT

## 11.21. Preset Process - Ptype: KBM

\*Status: Transmission, Status M

Ptnm: KBM

EQnm: equip name

mfn: 1) "D-MAX"  
 2) "\*\*\*\*\*"  
 3) "\*\*\*\*\*"  
 4) "\*\*\*\*\*"  
 5) "\*\*\*\*\*"

pfn: 1) "D-max"  
 2) "Xr-Xg"  
 3) "\*\*\*\*\*"  
 4) "\*\*\*\*\*"  
 5) "\*\*\*\*\*"

<u>tform</u> : Plot	1)	R1;	G1;	B1;
"	2)	R1-G1;	;	;
"	3)	;	;	;
"	4)	;	;	;
"	5)	;	;	;

<u>alim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-max"	-	-	-
2) "Xr-Xg"	-	-	.20
3) "*****"	-	-	-
4) "*****"	-	-	-
5) "*****"	-	-	-

<u>clim</u> :		<u>Positive</u>	<u>Negative</u>
1) "D-max"	-	-	-
2) "Xr-Xg"	-	-	.25
3) "*****"	-	-	-
4) "*****"	-	-	-
5) "*****"	-	-	-

Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) None
- 3) None
- 4) None
- 5) None

Plot Scales (= Full Scale):

- 1) "D-max" + /- .25
- 2) "Xr-Xg" + /- .25
- 3) "\*\*\*\*\*"
- 4) "\*\*\*\*\*"
- 5) "\*\*\*\*\*"

Format Number: 50

\* Can Not Be Viewed and Modified Thru DBASE EDIT



## 11.22. Preset Process - Ptype: EA-5

\*Status: Transmission, Status A

Ptnm: EA-5

EQnm: equip name

mfn: 1) " LD "  
 2) " HD "  
 3) "D-max"  
 4) "\*\*\*\*\*"  
 5) "\*\*\*\*\*"

pfn: 1) " LD "  
 2) " HD "  
 3) "D-max"  
 4) "\*\*\*\*\*"  
 5) "\*\*\*\*\*"

<u>tform</u> : Plot	1)	R1;	G1;	B1;
"	2)	R2;	G2;	B2;
"	3)	R3;	G3;	B3;
"	4)	;	;	;
"	5)	;	;	;

<u>alim</u> :		<u>Positive</u>	<u>Negative</u>
1) " LD "	-	-	-
2) " HD "	-	-	-
3) "D-max"	-	.20	-
4) "*****"	-	-	-
5) "*****"	-	-	-

<u>clim</u> :		<u>Positive</u>	<u>Negative</u>
1) " LD "	.10	.10	-
2) " HD "	-	-	-
3) "D-max"	-	.25	-
4) "*****"	-	-	-
5) "*****"	-	-	-

Field Color Definition:

- 1) Simultaneous Red, Green, and Blue
- 2) Simultaneous Red, Green, and Blue
- 3) Simultaneous Red, Green, and Blue
- 4) None
- 5) None

Plot Scales (= Full Scale):

- 1) " LD " + /- .20
- 2) " HD " + /- .20
- 3) "D-max" + /- .30
- 4) "\*\*\*\*\*"
- 5) "\*\*\*\*\*"

Format Number: 69

\* Can Not Be Viewed and Modified Thru DBASE EDIT

### 11.23. Preset Process - Ptype: rB&W

\*Status: Reflection, Status M

Ptnm: rB&W

EQnm: equip name

mfn: 1) "Stain"  
2) "LoDen"  
3) "HiDen"  
4) "D-max"  
5) "\*\*\*\*\*"

pfn: 1) "Stain"  
2) " LD "  
3) "HD-LD"  
4) "D-max"  
5) "\*\*\*\*\*"

<u>tform</u> : Plot	1)	V1;	:	:
"	2)	V2;	:	:
"	3)	V3-V2;	:	:
"	4)	V4;	:	:
"	5)	;	:	:

<u>alim</u> :		<u>Positive</u>	<u>Negative</u>
1) "Stain"		0	0
2) " LD "		.08	.08
3) "HD-LD"		.08	.08
4) "D-max"		0	.08
5) "*****"		-	-

<u>clim</u> :		<u>Positive</u>	<u>Negative</u>
1) "Stain"		.03	-
2) " LD "		.12	.12
3) "HD-LD"		.12	.12
4) "D-max"		-	.12
5) "*****"		-	-

Field Color Definition:

- 1) Visual
- 2) Visual
- 3) Visual
- 4) Visual
- 5) None

Plot Scales (= Full Scale):

- 1) "Stain" + /- .05
- 2) " LD " + /- .20
- 3) "HD-LD" + /- .20
- 4) "D-max" + /- .20
- 5) "\*\*\*\*\*"

Format Number: 45

\* Can Not Be Viewed and Modified Thru DBASE EDIT

## 11.24. Preset Process - Ptype: tB&W

\*Status: Transmission, Status M

Ptnm: tB&W

EQnm: equip name

mfn: 1) "Stain"  
2) "LoDen"  
3) "HiDen"  
4) "D-max"  
5) "\*\*\*\*\*"

pfn: 1) "Stain"  
2) " LD "  
3) "HD-LD"  
4) "D-max"  
5) "\*\*\*\*\*"

<u>tform</u> : Plot	1)	V1;	:	:
"	2)	V2;	:	:
"	3)	V3-V2;	:	:
"	4)	V4;	:	:
"	5)	;	:	:

<u>alim</u> :		<u>Positive</u>	<u>Negative</u>
1) "Stain"		0	0
2) " LD "		.08	.08
3) "HD-LD"		.08	.08
4) "D-max"		0	.08
5) "*****"		-	-

<u>clim</u> :		<u>Positive</u>	<u>Negative</u>
1) "Stain"		.03	-
2) " LD "		.12	.12
3) "HD-LD"		.12	.12
4) "D-max"		-	.12
5) "*****"		-	-

Field Color Definition:

1) Visual  
2) Visual  
3) Visual  
4) Visual  
5) None

Plot Scales (= Full Scale):

1) "Stain" + /- .05  
2) " LD " + /- .20  
3) "HD-LD" + /- .20  
4) "D-max" + /- .20  
5) "\*\*\*\*\*"

Format Number: 93

\* Can Not Be Viewed and Modified Thru DBASE EDIT

The X-Rite 820TR Network provides the link between X-Rite 820TR densitometers and QC computers...providing a new dimension to Quality Control, especially for multi-outlet photofinishing labs. X-Rite has worked in conjunction with leading photographic QC computer manufactures to define networking protocol.

With a Hayes compatible modem, the 820TR will communicate with a remote QC computer system where comprehensive tracking and diagnostic evaluation occurs. If desired, the QCNetII protocol can allow remedial instructions or data to be transmitted back to the densitometer where it's printed out in text form on the display or available printer.

## 12.1 Installation

The 820TR has the networking software designed into the unit. You must purchase a Hayes compatible modem to interface the 820TR to the telephone line. The 820TR is shipped with an interface cable that will interconnect the 820TR to the Hayes compatible modem.

*Step 1* - Connect the telephone jack end of the interface cable into the connector marked MODEM, located on the back of the 820TR.

*Step 2* - Connect the other end of the interface cable (RS232 DB-25 type) into the modem.

*Step 3* - Connect your telephone line into the modem.

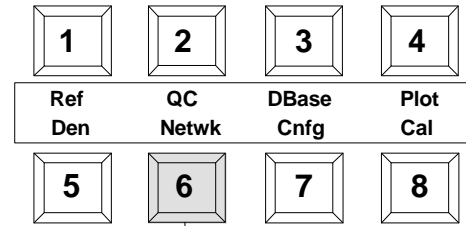
*Step 4* - Setup your modem as described by the manufacturer. Note, the BAUD rate of the modem must be set to the same rate as the 820TR (refer to the network baud rate described on page 107).

*Step 5* - Setup the 820TR Modem definition, refer to Section 12.2.

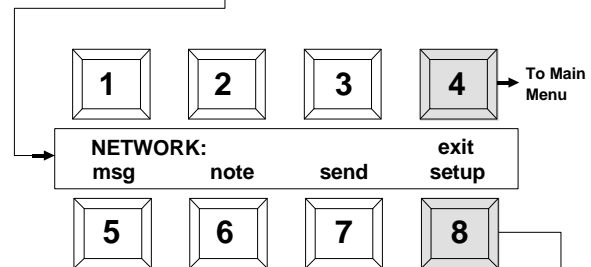
## 12.2 Setting Up Your Network

All of the networking options are set using a single menu, which can be accessed by the following procedure:

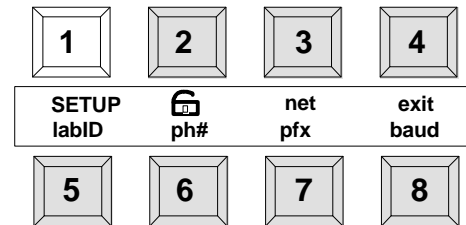
*Step 1* - Select **Netwk** . . . press Switch 6  
(Main Menu).



*Step 2* - Select **Setup** . . . press Switch 8.



*Step 3* - Select desired option to change.



## Setting Phone Number

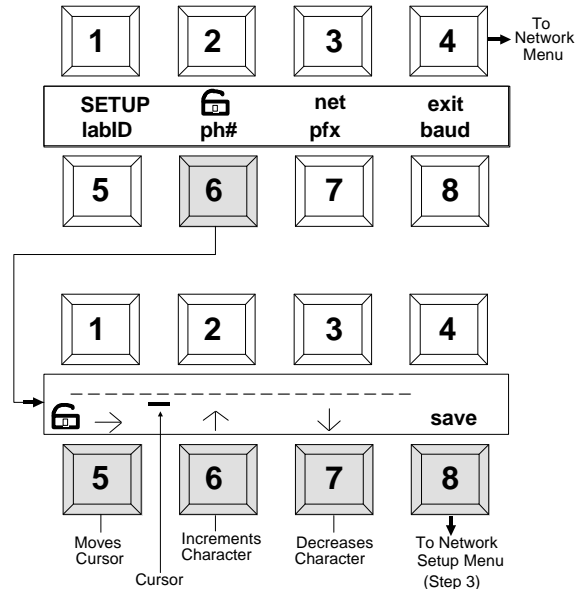
The phone number is the number that the 820TR will dial when it is time to send data to the QC computer. The telephone number can be up to 20 digits long. The parameters are the normal requirements used when dialing a telephone number.

Continued from step 3 of section 12.2.

Step 4 - Select **ph#** . . . press Switch 6 to activate phone number editor.

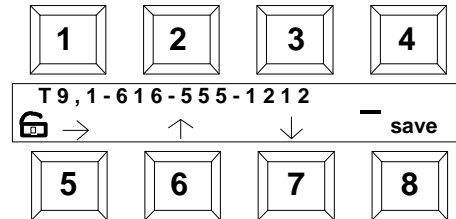
- [↑] increments through character list marked by the cursor.
- [↓] decrements through character list marked by the cursor.
- [→] moves the cursor to the next position.
- Press [**save**] to store phone number and return to network setup menu.

Available characters are:  
**P T W 0 - 9 , # \* - ( ) (space)**



Example:

Using the 820TR to touch-tone dial "1 (616) 555-1212" with a "nine" required to get an outside line.



### Dialing Command Descriptions

Command	Description
<b>P</b> <Pulse>	Dials with pulse.
<b>T</b> <Tone>	Dials with touch tone.
<b>W</b> <Wait>	Causes the modem to wait up to 5 seconds for a second dial tone.
, <Pause>	Causes the modem to wait for two seconds to allow a second dial tone to occur.
<b>0-9 * #</b>	Used as dial digits.
<b>- ( ) (Space)</b>	Are used for clarity, but are ignored.

## Setting Prefix Number

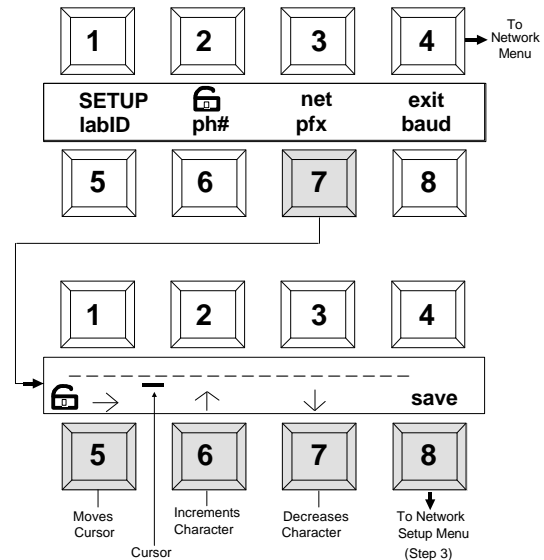
The prefix number is used to set the parameters of the modem (e.g., speaker volume, call monitoring control, etc.). The prefix number can be up to 20 digits long.

Continued from step 3 of section 12.2.

Step 4 - Select **pfx** (prefix) . . . press Switch 6 to activate the prefix editor.

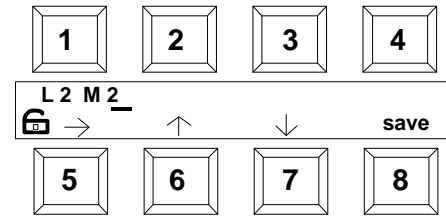
- [↑] increments through character list marked by the cursor.
- [↓] decrements through character list marked by the cursor.
- [→] moves the cursor to the next position.
- Press [**save**] to store prefix program and return to network setup menu.

Available characters for the prefix number:  
**B L M S W X 0 - 9 = (space)**



### Example:

Setting the modem to medium speaker volume (L2) and monitoring complete call (M2).



> For modem settings, refer to the modem manufacturers manual. If no changes are required, prefix program can be bypassed.

### Prefix Command Description

Command	Description
<b>B</b> (Bell)	B1 = BELL 103 & 212A (USA) and B0 = CCITT (European)
<b>L</b> (Modem Speaker Volume)	L1 = Low speaker volume, L2 = Medium speaker volume, and L3 = High speaker volume.
<b>M</b> (Monitoring Speaker)	M0 = Speaker off all the time. M1 = Listen to speaker for dial tone, busy, etc., and turns off as soon as the carrier signal is recognized. M2 = Speaker on for complete call.



## Prefix Command Description - continued

### Command

### Description

#### S (Register Value)

The "S" command is used to change the value of a register. The "=" command puts new values into the selected register. Ex. S6=0 (range is 0 , causing a 2 sec. dial tone wait).

REG	RANGE	UNITS	DEFAULT	DESCRIPTION
S0	0..255	rings	0	rings to answer
S6	0..127	sec.	2	dial tone wait
S7	1..255	sec.	30	carrier wait
S8	0..255	sec.	2	comma pause
S9	1..255	.1sec.	6	carrier delay
S10	1..255	.1sec.	7	hang-up delay
S11	50..255	.001s.	70	touch-tone duration
S12	20..255	.02s.	50	esc code time

#### W (Wait)

Causes the modem to wait up to 5 seconds between commands.

#### X (Selects Result Code Set)

**X0** = the basic result code set. The modem blind dials, waiting S6 seconds before dialing a number. The result code for both 300bps and 1200bps connection is 'CONNECT.'

**X1** = the external result code set. The modem blind dials, waiting S6 second before dialing a number. The result code for a 300bps connection is 'CONNECT', while 1200bps result code is 'CONNECT 1200.'

**X2** = a extended result code set just like X1, except that the modem looks for a dial tone before dialing.

**X3** = the extended result code set just like X1, except that the modem looks for a busy signal after dialing.

**X4** = both X2 and X3 functions.

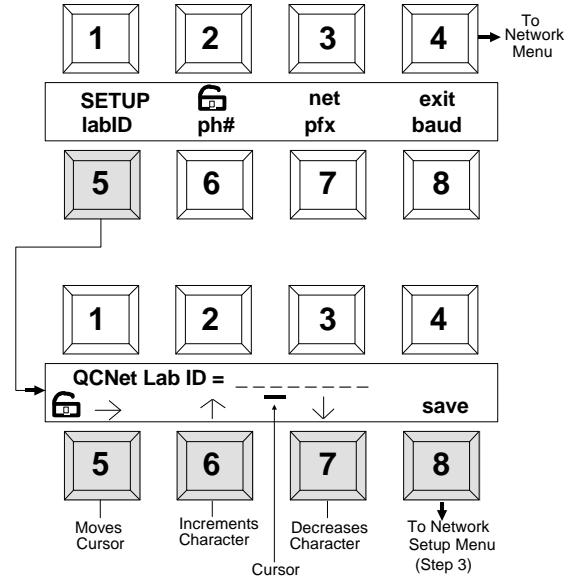
## Setting Identification Number

The Lab ID number is used to identify your particular lab when transferring data. The Lab ID can be up to 8 characters long.

**Continued from step 3 of section 12.2.**

*Step 4* - Select **labID** . . . press Switch 5 to activate Lab ID editor.

- [↑] increments through character list marked by the cursor.
- [↓] decrements through character list marked by the cursor.
- [→] moves the cursor to the next position.
- Press **[save]** to store Lab ID and return to network menu.



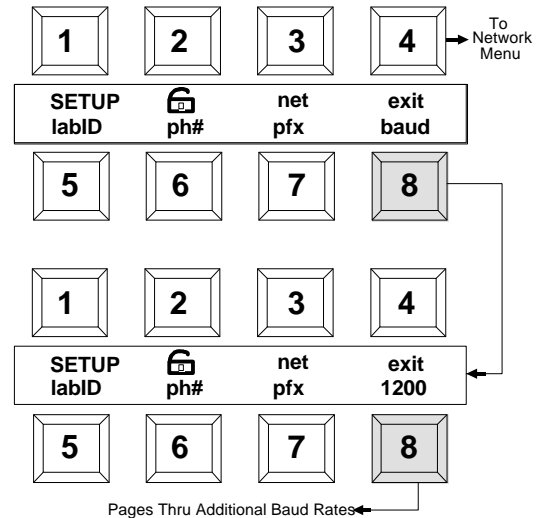
## Setting the Network Baud Rate

The network baud rate determines the output rate (characters per second) of the modem port. The available outputs for the 820TR are 300, 1200, 2400, and Auto. The auto setting determines the highest output rate supported by the modem, and sets up the 820TR to match it.

**Continued from step 3 of Section 12.2.**

*Step 4* - Select **baud** . . . press Switch 8, the current baud rate will be displayed.

*Step 5* - Each additional depression of Switch 8 will page thru the available baud rates.



## Setting the Automatic Network Enable Switch

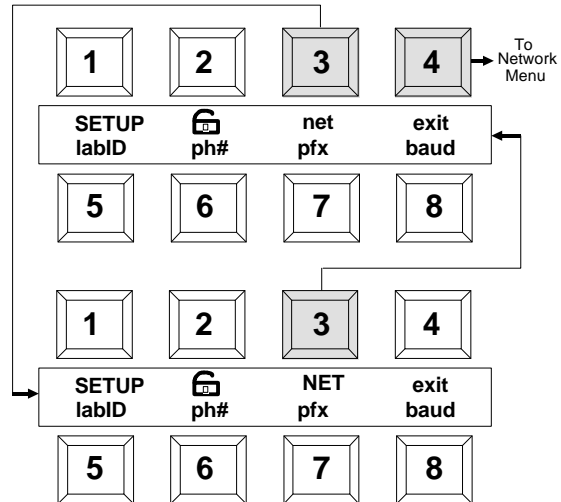
The automatic network enable switch allows the 820TR to automatically send QC data at a time predetermined by the QC computer, during a previous network session. NET = automatic transmission enabled, and net = automatic transmission disabled.

Continued from step 3 of Section 12.2.

Step 4 - Each depression of Switch 3 will alternate between **NET** (On) and **net** (Off).



> Automatic transmission of QC data occurs only when the 820TR is in standby.



## Locking the Configuration Options

All of the configuration options can be locked to prevent inadvertent changes. The lock status is displayed by a padlock icon on the liquid crystal display (lcd) under switch 2. A closed padlock indicates locked options and the options can not be changed by the user. An open padlock indicates unlocked options and all options can be changed.

Continued from step 3 of Section 12.2.

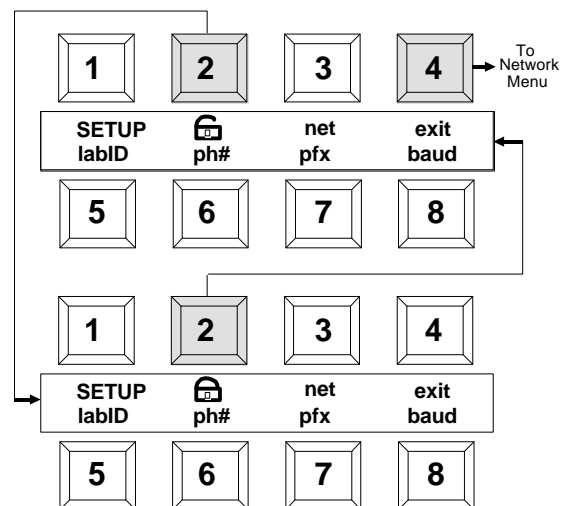
Step 4 - Hold read head depressed.

Step 5 - Each depression of Switch 2 will alternate between unlocked padlock and locked padlock.

Step 6 - Release read head.



> The lock is separate from the main CNFG lock, so it is possible to have the main CNFG options locked and the network setup options unlocked at the same time.



## 12.3 Using the Network

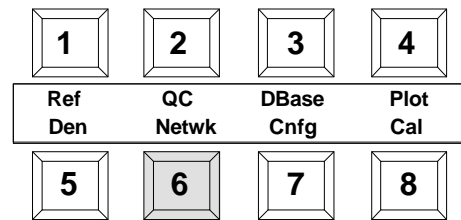
The Network has three basic operating functions: send, message (msg), and note. The function are described in the following sections.

### Sending Data

Allows you to manually send data, preselected by the host QC computer.

The procedure for manually sending data is as follows:

Step 1 - At Main Menu level, select **Netwk** . . . press Switch 6.



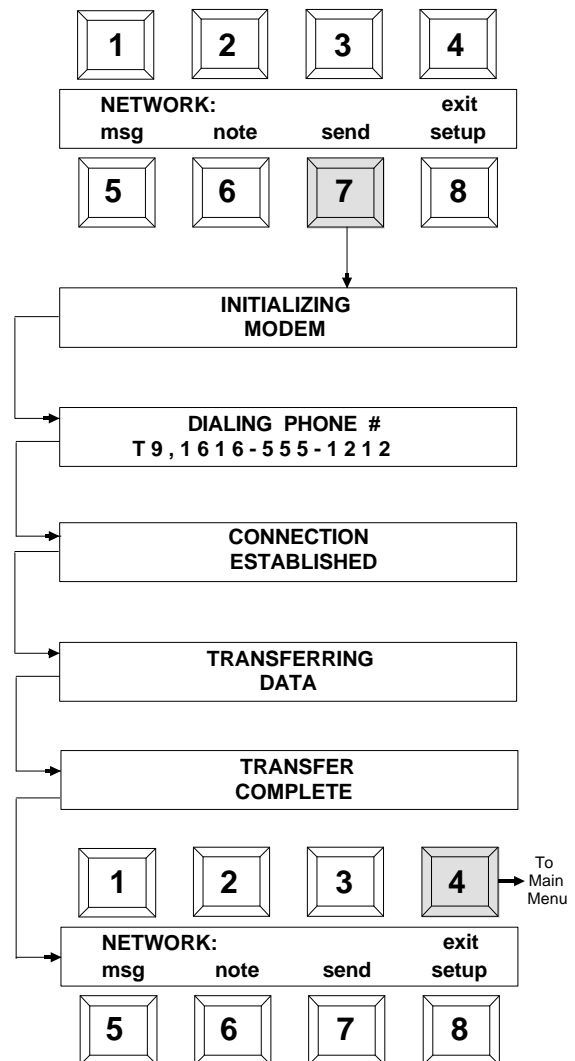
Step 2 - Select **send** . . . press Switch 7 to send data.

- The unit dials the number and transfers the data.
- After data is transmitted, press the key labeled "**exit**" to exit out of network program.



> "STARTING NETWORK SESSION" will display when data is automatically transmitted by the 820TR.

> If any error message is displayed during data transmission, refer to Section 4, for possible cause.

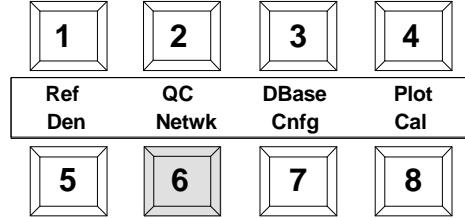


## Receiving Data

Once the 820TR has established a link to the QC computer, it can receive messages (via the modem) of up to 320 characters. These messages can be displayed or printed.

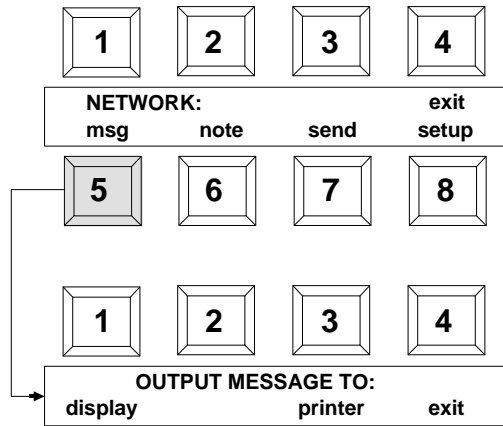
The procedure for displaying and printing messages is as follows:

Step 1 - At Main Menu level, select **Netwk** . . . press Switch 6.



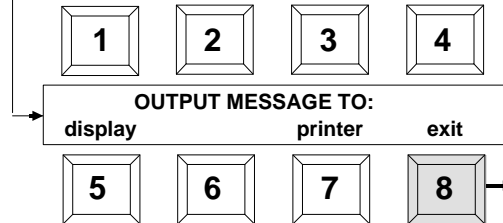
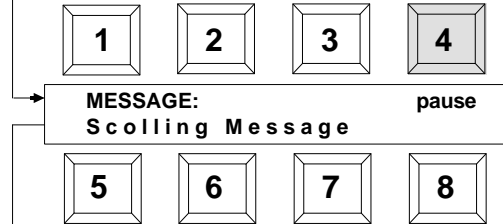
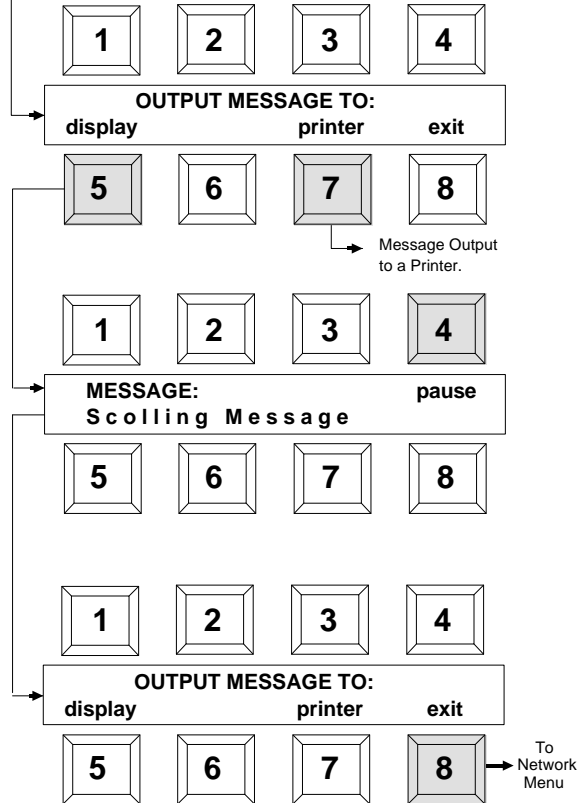
Step 2 - Select **msg** . . . press Switch 5 to receive data.

- Select **display** . . . press Switch 5 to view message.
- Message will scroll across bottom row of the display. The message may be stopped at any time by holding down the **pause** . . . Switch 4.
- Display automatically returns back to message menu after message is complete.



Step 3 - Message may be printed by pressing selecting **print** (Switch 7). The word "printer" becomes uppercase when printing takes place.

- Select **exit** . . . press Switch 8 to return to network menu.

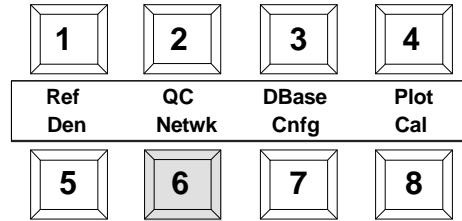


## Receiving Notes

With the 820TR QC computer link established, a note (up to 32 characters) can be received and displayed.

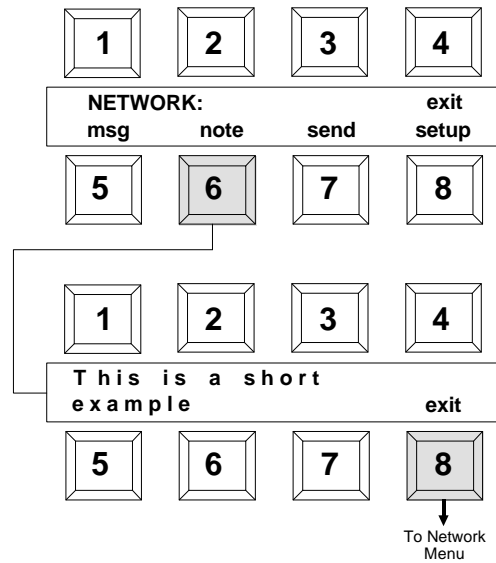
The procedure for displaying the note is as follows:

Step 1 - At Main Menu level, select **Netwk** . . . press Switch 6.



Step 2 - Select **note** . . . press Switch 6 to receive message.

- Up to a 32 character message will display if information is available.
- Select **exit** . . . press Switch 8 to return to network menu.



## 12.4 Network Error Messages

<u>Message</u>	<u>Cause</u>
<b>CHECK MODEM HARDWARE</b>	A bad connection or no connection exists on modem cabling.
<b>NETWORK ERROR #12</b>	Prefix number was entered incorrectly, recheck number.
<b>NETWORK ERROR #13</b>	Phone number was entered incorrectly, recheck number.
<b>NETWORK ERROR #14</b>	Connection not established between modem and QC computer.

**A.****APPENDIX****A.1 Proprietary Notice**

The information contained in this manual is derived from patent and proprietary data from X-Rite, Incorporated. This manual has been prepared expressly for the purpose of assisting operation and maintenance personnel in their use and general maintenance of the X-Rite 820.

Publication of this information does not imply any rights to reproduce or use it for purposes other than installing, operating, or maintaining the equipment described herein.

This instrument is covered by the following U.S. and Foreign patents:

U.S. Patent # 4,080,075, # 4,591,978, and other patents pending.

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## **A.2 Limited Warranty**

X-Rite, Incorporated warrants each instrument manufactured by them to be free of defects in material and workmanship for a period of 12 months. THERE ARE NO WARRANTIES OF MERCHANTABILITY OR FITNESS. THIS WARRANTY OBLIGATION IS LIMITED TO SERVICING THE UNIT RETURNED TO THE FACTORY FOR THAT PURPOSE AND EXCLUDES ALL LAMPS. The instrument shall be returned with transportation charges prepaid. If the fault has been caused by misuse or abnormal operating conditions, repairs will be billed at a nominal cost. In this case, an estimate will be submitted before work is started, if requested.

A Warranty Registration Card is enclosed with each instrument. The purchaser should fill in the card completely and return it to X-Rite, Incorporated postmarked no later than ten (10) days from the date of receipt. This card registers your system with us for warranty coverage. Once your unit is registered, we are able to maintain a file to help expedite service in case it is needed. Always include serial number and place of purchase in any correspondence concerning your instrument. The serial number is located at the rear of the instrument.

X-Rite, Incorporated offers a repair program for instruments out of warranty. For more information, contact X-Rite Technical Services Department.

This agreement shall be interpreted in accordance with the laws of the State of Michigan and jurisdiction and venue shall lie with the courts of Michigan as selected by X-Rite, Incorporated.

## A.3 Specifications

### Reflection Specification

**Response:**

Status A

**Measuring Range:**

0 - 2.5D

**Accuracy:**

± .02D

**Repeatability:**

± .01D

**Zero Stability Per 8 Hours:**

± .02D

**Scale Factor Stability:**

+ 1% per year

**Warm-Up Time:**

2 minutes

**Measuring Area:**

4mm

### Transmission Specification

**Response:**

Status A & M

**Measuring Range:**

0 - 4.0D

**Accuracy:**

± .02D (0 - 3.0D)

± 1% (3.01D - 3.5D)

± 3% (3.51D - 4.0D)

**Repeatability:**

± .01D

**Zero Stability Per 8 Hours:**

± .02D

**Scale Factor Stability:**

± 1% per year

**Warm-Up Time:**

2 minutes

**Measuring Area:**

4mm

### Operating Specification

**Line Voltage:**

90 - 120V AC

180 - 240V AC

**Operating**

**Temperature**

**Range:**

10°- 30°C

50°- 86°F

**Power**

**Requirement:**

50VA Max.

**Weight:**

Actual: 11.00 lbs./5kg.

Shipping: 13.25 lbs./6Kg.

**Dimensions:**

Height: 5.88 inches

Width: 8.63 inches

Length: 11.13 inches

**Line Frequency:**

50 - 60HZ

**Relative Humidity:**

≤ 76%

### Miscellaneous Specification

**Safety:**

UL 31010-1

IEC1010-1 (1990) First Edition

with Amdts. No.1 (1992), No.2 (1995)

**Industry Canada**

ICES-003 Issue 2, Revision 1

**International EMC:**

EN50081-1:1992 Class B Generic Emission Standard

EN50082-1:1992 Generic Immunity Standard

**FCC:**

Part 15, Class A, Digital Device

Specifications and appearance design subject to change for reasons of product improvement, reliability, and/or manufacturability without notice.

## A.4 Term Abbreviations:

*aid	Auto-Identify Not Enabled
*AID	Auto-Identify Enabled
aims	Target values for Control Strip plot data
*alf	Automatic Line Feed DisabledWW
*ALF	Automatic Line Feed Enabled
*alim	Action Limit
*auto	Automatic Color Select Not Enabled
*AUTO	Automatic Color Select Enabled
*BAUD	Variable Unit of Data Transmission Speed
*BUSY	Logic 1 Active
c	Color
cal.	Calibrate
"CAL"	Transmission High Density Calibration Step
CAL-LO	Calibrate Low Density (White Spot)
CAL-HI	Calibrate High Density (Black Spot)
CASIO	Casio FP-100 Plotter Language
clim:	Control Limit
CNFG	Configuration
*comp	Computer Interface Not Enabled
*COMP	Computer Interface Enabled
cont	Continue
*CTS	Clear To Send (Logic 0 Active)
DB:n	Data Base function, Database:n
DBase	Data Base
DD	Density Difference
del	Delete
Den	Density
DO:	Number Of Samples To Be Plotted
*dpt	Decimal Point Not Enabled
*DPT	Decimal Point Enabled
edit	Edit

\* Shown as they appear on CNFG pages.

## A.4 Term Abbreviations . . . continued

EQnm:	Equipment Name
equip name	Equipment Name
exit	Exit
exp	Exposure
fp	Filter Pack
$\Delta$ fp	Filter Pack Change
GO	Start Plotter
HP	Hewlett Packard Graphics Language (HP-GL)
ineg	Internegative
LANG	Plotter Language
lcd	Readings Displayed On Liquid Crystal Display
-lim.	Negative Plotter Scale Limit
+ lim.	Positive Plotter Scale Limit
list	Command To Go Into Communications Mode
*lock	Locking of Configuration Options Disabled
*LOCK	Locking of Configuration Options Enabled
mfn:	Measured Field Name
Modem	Modem Communication Output
NO	Reading Without Reference
OFF	Communications Port Not Enabled
p	Plot
*PAR.	Port = Parallal Port
pfn:	Plot Field Names
*pin5	Pin 5 of RS232 Port Can Be Set To OFF, BUSY, Or CTS
PL:n	Plot Function, Database:n
plot.	Command To Use Plotter
PLot.	Plotter
*port	Communication Port
print.	Command To Print
prnt	Print
Ptnm:	Plot Field Name

\* Shown as they appear on CNFG pages.

## A.4 Term Abbreviations . . . continued

Ptype:	Process Type
QC:n	Quality Control Function, Database:n
READ	Command To Take Instrument Reading
Ref.	Reference
REFL	Reflection
RefIA	Reflection Status A
RefID	Reference IDentification
RF:n	Reference Function, DataBASE:n
*SER	Serial Port
set.	Set Displayed Time
TIME	Time Mode
tform:	Transformation Rule
*tone	Key Closure Tone Disabled
*TONE	Key Closure Tone Enabled
TRANS	Transmission
tranA	Transmission Status A
tranM	Transmission Status M
view	Command To Display Reading Results
VIS.	Visual Data

\* Shown as they appear on CNFG pages.

## A.5 Display Character Table

These are the characters that can be sequentially selected when using the edit function.

1) space	25) 8	49) P	73) h
2) !	26) 9	50) Q	74) i
3) "	27) :	51) R	75) j
4) #	28) ;	52) S	76) k
5) \$	29) <	53) T	77) l
6) %	30) =	54) U	78) m
7) &	31) >	55) V	79) n
8) '	32) ?	56) W	80) o
9) (	33) @	57) X	81) p
10) )	34) A	58) Y	82) q
11) *	35) B	59) Z	83) r
12) +	36) C	60) [	84) s
13) ,	37) D	61) ¥	85) t
14) -	38) E	62) ]	86) u
15) .	39) F	63) ^	87) v
16) /	40) G	64) _	88) w
17) 0	41) H	65) \	89) x
18) 1	42) I	66) a	90) y
19) 2	43) J	67) b	91) z
20) 3	44) K	68) c	92) {
21) 4	45) L	69) d	93)
22) 5	46) M	70) e	94) }
23) 6	47) N	71) f	95) →
24) 7	48) O	72) g	96) ←

**Note:** If you press the "UP" and "DOWN" arrow keys together a blank space will be selected.

## A.6 Error Messages

When power is applied to the 820 densitometer, it conducts a self diagnostics test on various components in the 820. If a failure does occur, the operator is informed via an Error Message in the display window. Below lists the six Error Messages that could occur.

- |    |          |      |        |      |
|----|----------|------|--------|------|
| 1] | ERROR# 1 | 8031 | Memory |      |
|    | SELFTEST |      | =      | FAIL |
- Indicates that there is a defect in the 8031 IC's on Main PCB.
- |    |          |     |        |      |
|----|----------|-----|--------|------|
| 2] | ERROR# 2 | ROM | Memory |      |
|    | SELFTEST |     | =      | FAIL |
- Indicates a problem with the program memory on the main PCB. Proper Operation of the unit may be possible or or may be questionable if this error occurs.
- |    |           |        |      |      |
|----|-----------|--------|------|------|
| 3] | ERROR # 3 | Target | Lamp |      |
|    | SELFTEST  |        | =    | FAIL |
- Indicates that the Target Lamp is defective.
- |    |           |      |        |      |
|----|-----------|------|--------|------|
| 4] | ERROR # 4 | Temp | Sensor |      |
|    | SELFTEST  |      | =      | FAIL |
- Indicates that the Temperature Sensor is out of range.
- |    |           |         |     |      |
|----|-----------|---------|-----|------|
| 5] | ERROR # 5 | Latched | Key |      |
|    | SELFTEST  |         | =   | FAIL |
- Indicates a keyswitch is stuck down or shorted, or its associated circuit (Display PCB) is bad.
- |    |           |         |     |      |
|----|-----------|---------|-----|------|
| 6] | ERROR # 6 | Density | Lmp |      |
|    | SELFTEST  |         | =   | FAIL |
- This message indicates Lamp or Side Sensor is defective.
- |    |                      |    |     |  |
|----|----------------------|----|-----|--|
| 7] | SOFTWARE WAS CHANGED |    |     |  |
|    | RESET MEMORY?        | no | yes |  |
- Indicates that the software in the unit was changed since the last time it was powered. It is usually advisable to reset memory after a software change. However, all QC data will be destroyed. If you wish to keep your QC data, answer "no" to this question and then look through all your CNFG options, making sure that none of them has changed, or any options added or removed.



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