

891/892

AUTOMATIC STRIP READING DENSITOMETERS



Operation Manual





Dear Customer:

Congratulations! We at X-Rite, Incorporated are proud to present you with X-Rite 891/892 Auto Strip Reading, Color Photographic Densitometer. This instrument represents the very latest in microcontrollers, integrated circuits, optics, and display technology. As a result, your X-Rite instrument 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 instrument with a 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

User Information

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 and European emission requirements.

CAUTION: Operational hazard exists if battery charger other than X-Rite SE30-77 (100-240V) is used.

VORSICHT: Betriebs- und Verletzungsgefahr besteht bei Gebrauch von anderen Adaptern als X-Rite SE30-77 (100-240 V).

ADVERTENCIA: No use otro cargador de las pilas que no sea la pieza X-Rite SE30-77 (100-240V), por el riesgo de mal funcionamiento del equipo.

ATTENTION: Ne pas utiliser d'adaptateur autre que SE30-77 (100-240V) de X-Rite au risque de mauvais fonctionnement de l'appareil.

AVVERTENZA: Non usare un altro caricabatterie che non è del pezzo X-Rite SE30-77 (100-240V), per il rischio di malfunzionamento dell'apparecchio.

The Manufacturer:
Der Hersteller:
El fabricante:
Le fabricant:
Il fabbricante:

X-Rite, Incorporated
4300 44th Street, S.E.
Grand Rapids, Michigan 49512



Declares that:
gibt bekannt:
advierte que:
avertit que:
avverte che:

Densitometer
891, 892

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no debe ser conectado a redes de telecomunicaciones públicas.
ne doit pas être relié à un réseau de télécommunication publique.
non deve essere connesso a reti di telecomunicazioni pubblici.

CE DECLARATION

Manufacturer's Name: X-Rite, Incorporated

Authorized Representative: X-Rite, Incorporated
Siemensstraße 12b • 63263 Neu-Isenburg
Germany
Phone: +49 (0) 61 02-79 57-0
Fax: +49 (0) 61 02 -79 57-57

Model Name: Densitometer
Model No.: 891, 892

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



Instructions for disposal: Please dispose of Waste Electrical and Electronic Equipment (WEEE) at designated collection points for the recycling of such equipment.

PROPRIETARY NOTICE

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

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This instrument may be covered by one or more patents. Refer to the instrument for actual patent numbers.

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All other logos, product names, and trademarks mentioned are the property of their respective holders.

LIMITED WARRANTY

X-Rite warrants this Product against defects in material and workmanship for a period of twelve (12) months from the date of shipment from X-Rite's facility, unless mandatory law provides for longer periods. During such time, X-Rite will either replace or repair at its discretion defective parts free of charge.

X-Rite's warranties herein do not cover failure of warranted goods resulting from: (i) damage after shipment, accident, abuse, misuse, neglect, alteration or any other use not in accordance with X-Rite's recommendations, accompanying documentation, published specifications, and standard industry practice; (ii) using the device in an operating environment outside the recommended specifications or failure to follow the maintenance procedures in X-Rite's accompanying documentation or published specifications; (iii) repair or service by anyone other than X-Rite or its authorized representatives; (iv) the failure of the warranted goods caused by use of any parts or consumables not manufactured, distributed, or approved by X-Rite; (v) any attachments or modifications to the warranted goods that are not manufactured, distributed or approved by X-Rite. Consumable parts and Product cleaning are also not covered by the warranty.

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Customer shall be responsible for packaging and shipping the defective product to the service center designated by X-Rite. X-Rite shall pay for the return of the product to Customer if the shipment is to a location within the region in which the X-Rite service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations. Proof of purchase in the form of a bill of sale or receipted invoice which is evidence that the unit is within the Warranty period must be presented to obtain warranty service. Do not try to dismantle the Product. Unauthorized dismantling of the equipment will void all warranty claims. Contact the X-Rite Support or the nearest X-Rite Service Center, if you believe that the unit does not work anymore or does not work correctly.

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Getting Started

This section covers unpacking, inspection, and general set up of your instrument. Product description, paper guide adjustments, and measurement techniques are also include.

Section One Contents

- Unpacking and Inspection
- Product Description
- Applying Power
- User Interface
- Adjusting the Paper Guides
- Strip Measurement Techniques

UNPACKING AND INSPECTION

After removing the instrument from the shipping carton, inspect for possible damage. If any damage occurred during shipping, immediately contact the transportation company. Do not proceed with installation until the carrier's agent has inspected the damage.

Your instrument 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, contact X-Rite to have a replacement shipped to you.

Packaging Drawing and Parts List

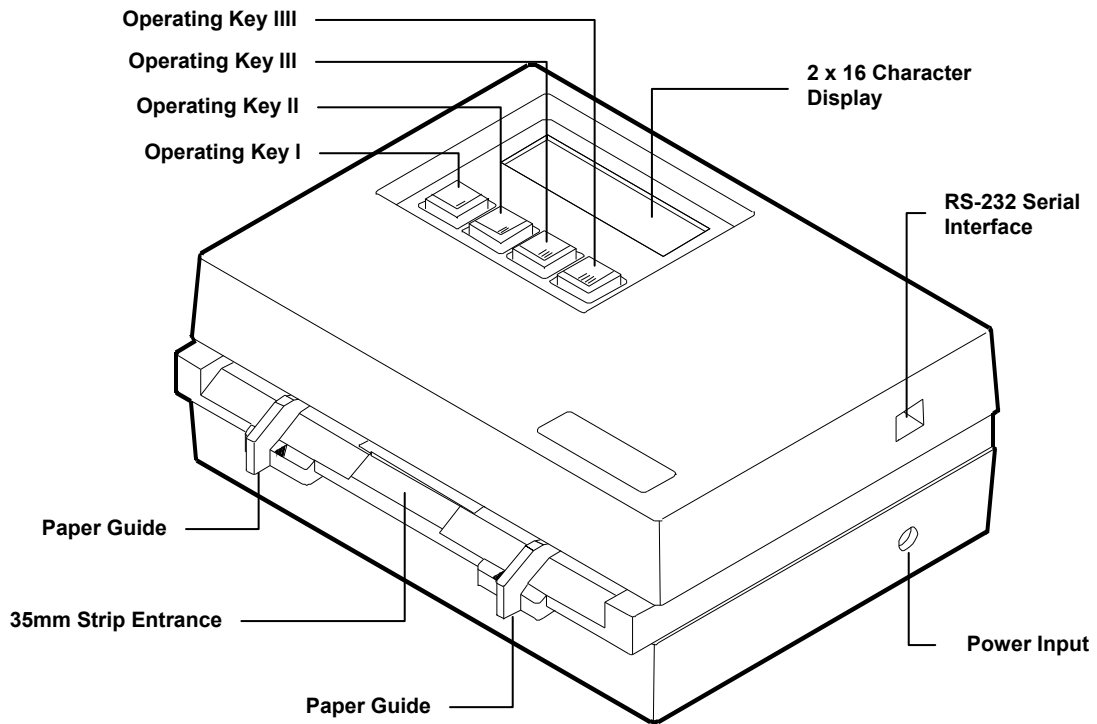
Check your packaging contents against your packing list and your original order. Detailed packaging drawing and parts list is included in this manual as *Appendix D*.

PRODUCT DESCRIPTION

The X-Rite 891/892 automated instruments measures paper, film, and printer balance control strips. Simply insert the strip into the instrument for motorized, automatic measurements. Red, green, and blue density data is sorted for fields such as HD, LD, and Stain, then simultaneously displayed and transmitted to a minilab printer for analysis. The 892 instrument has the added ability of reading internegative strips.

To accommodate the different size control strips, the instrument has adjustable paper guides on each side of the control strip entrance. Adjustment is made by simply sliding the paper guides to the settings displayed for the selected strip.

The instrument communicates through a standard RS-232 interface. If you wish to remotely control your instrument, you must use the remote control interface protocol discussed in the RS-232 Interface Manual—available from X-Rite, Incorporated.

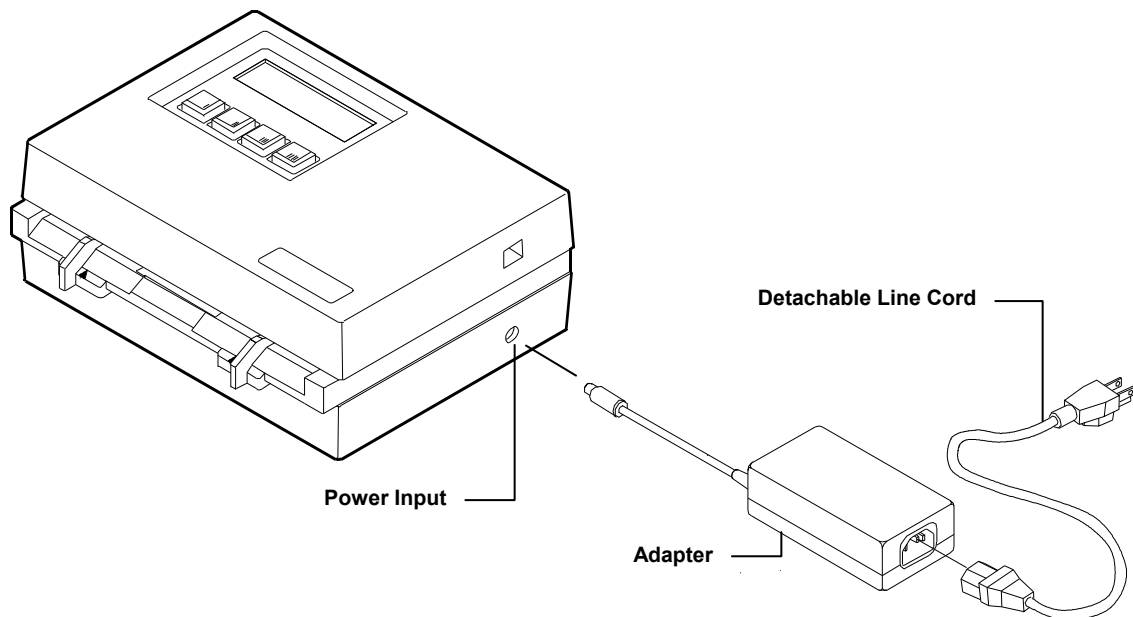


APPLYING POWER

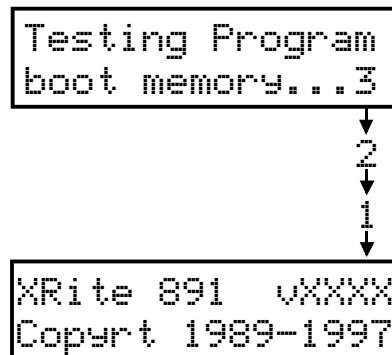
To apply power to the instrument:

1. Verify that the voltage indicated on the adapter complies with the AC line voltage in your area. If not, contact X-Rite or your authorized representative.
2. Insert the small plug from the adapter into the power-input connector on the instrument.
3. Plug the detachable line cord into the adapter.
4. Plug the line cord into an AC wall receptacle.

IMPORTANT: To extend the life of the internal memory battery, it is recommended that the instrument remain plugged into AC power. If you are using a modem, AC power must be applied in order to transmit or receive data.



At initial power-up, the instrument performs a “boot memory test.” The testing sequence is displayed on the instrument screen. If all internal tests are OK, Page 1 Channel Menu displays—see next page.



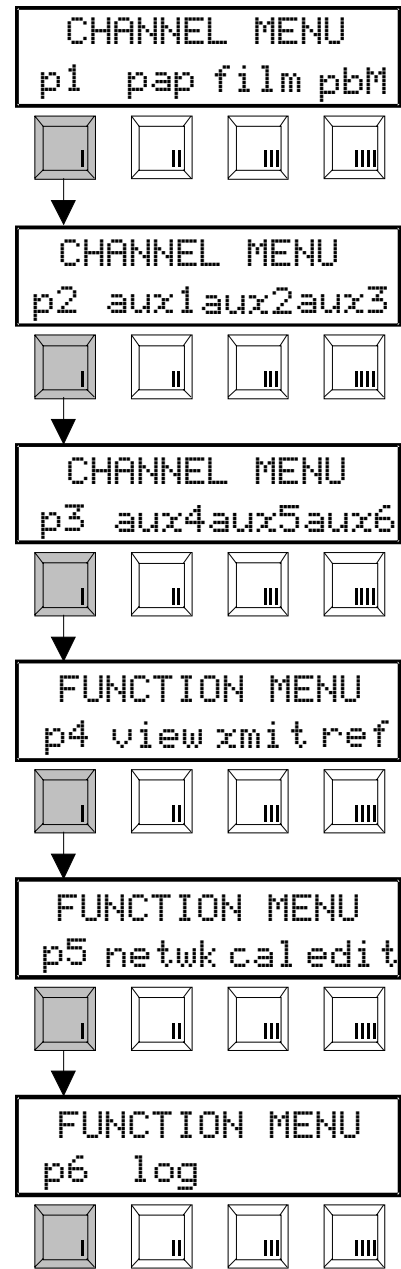
USER INTERFACE

The 891/892 instrument incorporates a six page menu system. Menu pages are displayed by continually pressing keyswitch **I** (p#) on the instrument. The first three pages are labeled “CHANNEL MENU” pages. These pages contain all the predefined control strips. The last three pages are labeled “FUNCTION MENU” pages. These pages provide access to the instrument setup options and strip measurement data.

Channel and Function Menus

- **pap** (paper) - accesses the paper measurement channel. The format selected remains selected until changed.
- **film** - access the film measurement channel. The format selected remains selected until changed.
- **pbM** (printer balance master) - accesses the main printer balance measurement channel. The format selected remains selected until changed.
- **aux1-aux3** (auxiliary 1-3) - allows measurement tracking of three additional control strip formats—paper, film, or printer balance.
- **aux4-aux6** (auxiliary 4-6) - allows measurement tracking of three additional control strip formats—paper, film, or printer balance.
- **view** - used to view data of the last 2 reference strips measured and last 16 control strips measured for each channel.
- **xmit** (transmit)- used to manually transmit data of the last 2 reference strips measured and up to 16 control strips measured for each channel—via RS-232 port.
- **ref** (reference) - used to select a reference strip, enter correction values (if needed), and measure strip.
- **netwk** (network) - provides a modem link between the instrument and QC computers.
- **cal** (calibration) - used for calibration.
- **edit** - used to access the aim value adjustment (**ava**) function, system configuration (**cnfg**) options, delete (**del**) function, and date/time (**time**) preset.
- **log** - allows configuration and data entry into the internal log buffer.

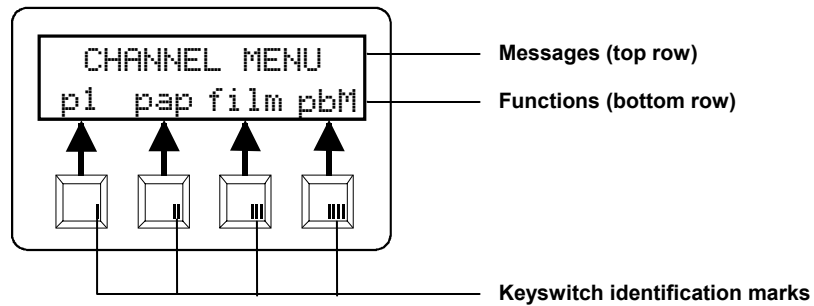
NOTE: The “NET” system configuration option must be turned On for page 6 to appear. The log buffer options are covered in the 891/892 Networking Installation/Operation Manual, P/N 891-503.



Display and Keyswitch Definition

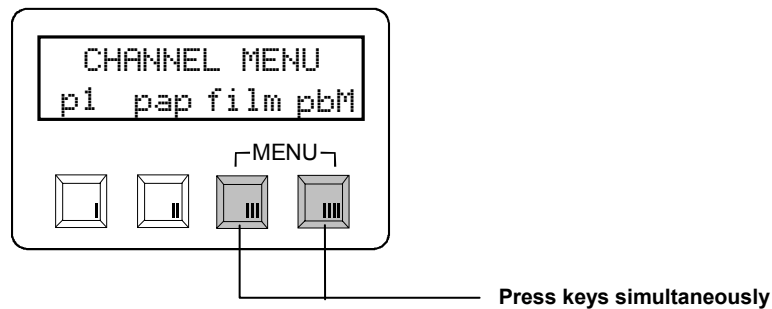
The characters in the bottom row of the display dictate which function is selected or which action takes place when a corresponding keyswitch is pressed. Normally, upper-case lettering in the top row of the display is used for messages, and lower-case lettering in the bottom row is used for menu options that are selectable.

Each keyswitch is embossed with identification marks signifying its number. The left-most key is labeled “I”, center-left key is labeled “II”, and so on. Keyswitches that are used to select a function or perform an action are tinted (grayed) throughout this manual.



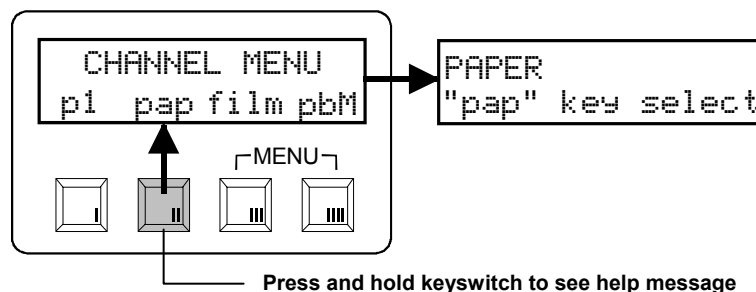
Menu Keys

Keyswitch III and IIII have the word “MENU” printed above them. Pressing these two keys simultaneously at any location in the menu structure causes the display to return to page 1 of the channel menu.



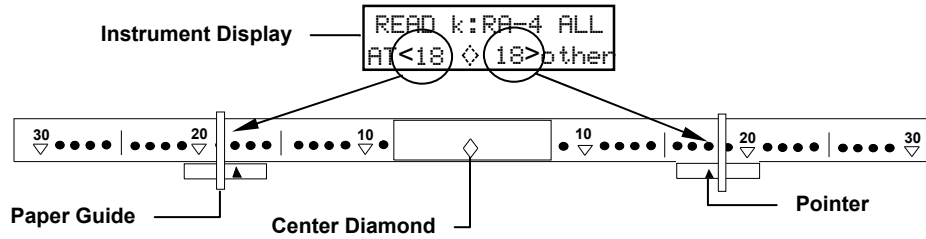
Help Messages

Built-in help messages are available for most functions. Help messages are activated by pressing and holding down a key until the message appears. To temporarily pause a message, press the key again.

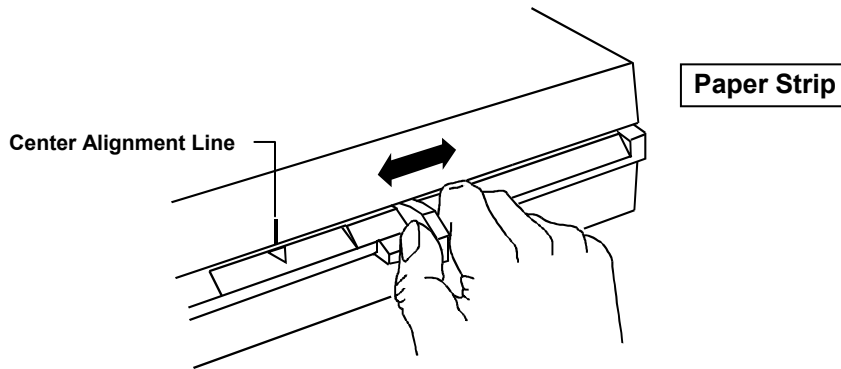


ADJUSTING THE PAPER GUIDES

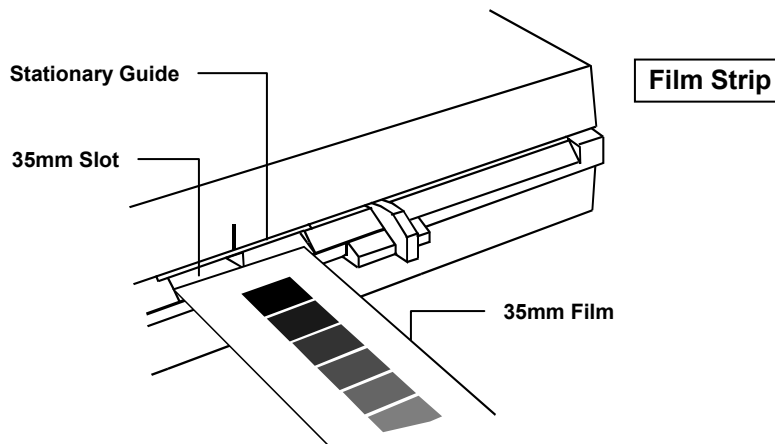
To accommodate various size paper strips, the instrument has an adjustable paper guide on each side of the strip entrance. Each paper guide has a pointer (triangle) that is aligned with a number on the guide rail. The guide setting numbers are shown on the instrument display when a paper strip is selected. The paper guide rail has setting marks that range from “9-30” to the left and right of the center diamond. Each mark (stop) is 1/10” increment—10 stops equal one inch. The instrument automatically displays the proper guides settings for the selected strip (see below).



The paper guides are moved by sliding them to the left or right.



To accommodate 35mm wide strips, the instrument has a special stationary guide located above the diamond



STRIP MEASUREMENT TECHNIQUES

All control strip types should have at least a 30.5mm (1.25") leader before the first measurable patch. However, strips with less than a 30.5mm leader can also be measured reliably if required. Refer to your Control Strip and Balance Print Format Guide for leaderless strip measurement procedure.

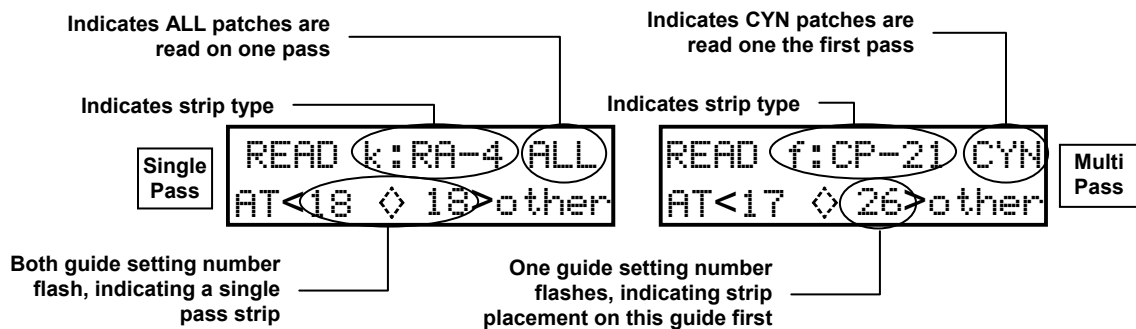
Supported strip definitions and strip insertion direction information is available in your Control Strip and Balance Print Format Guide shipped with your instrument.

Strip Information

- If a strip becomes “jammed” in your instrument during a measurement, simultaneously press keys **III** and **IIII** labeled “MENU.” This should cause the instrument to feed-out the strip. If this method does not work, slowly pull strip out from the front of the instrument.
- A strip is inserted into the instrument until it rests against the drive rollers.
- After a strip is initially inserted into the instrument, a one second delay occurs before the drive mechanism is activated to allow time for proper alignment.
- Due to the amount of variation in printer balance strips, no guide setting numbers appear in the display in the printer balance categories.
- Due to the configuration of the instrument drive mechanism, 16mm wide film control strips cannot be measured.
- The instrument does measure strips that are creased.

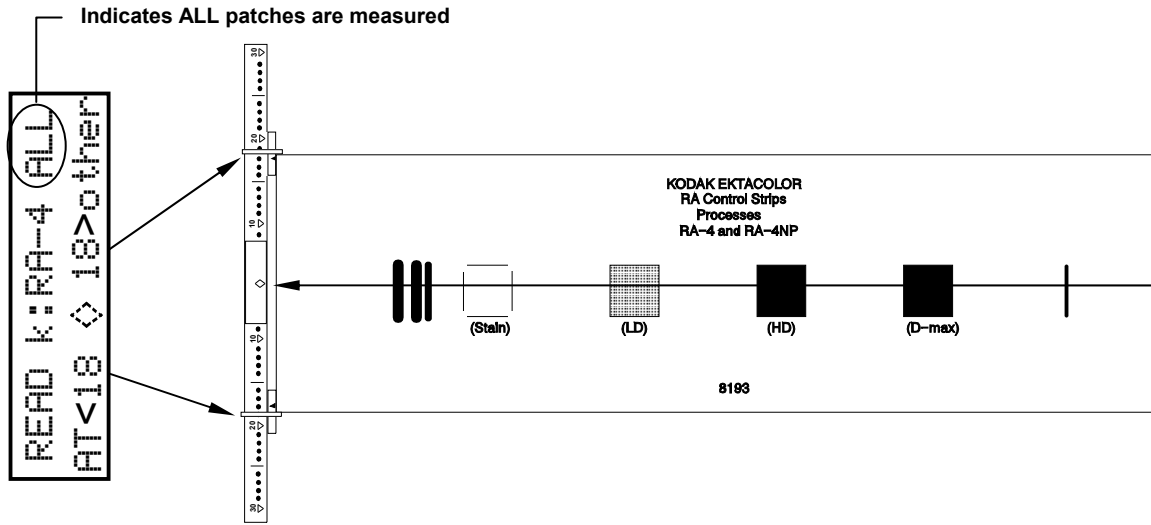
Paper Strip

When a particular paper strip is selected, one or both of the displayed paper guide setting numbers flash. If only one guide setting number is flashing, this indicates the guide that the strip rests on first when measuring. In most cases this only occurs on a strip that required multiple passes such as, Fuji CP-21. Both guide setting numbers flash on single pass strips.



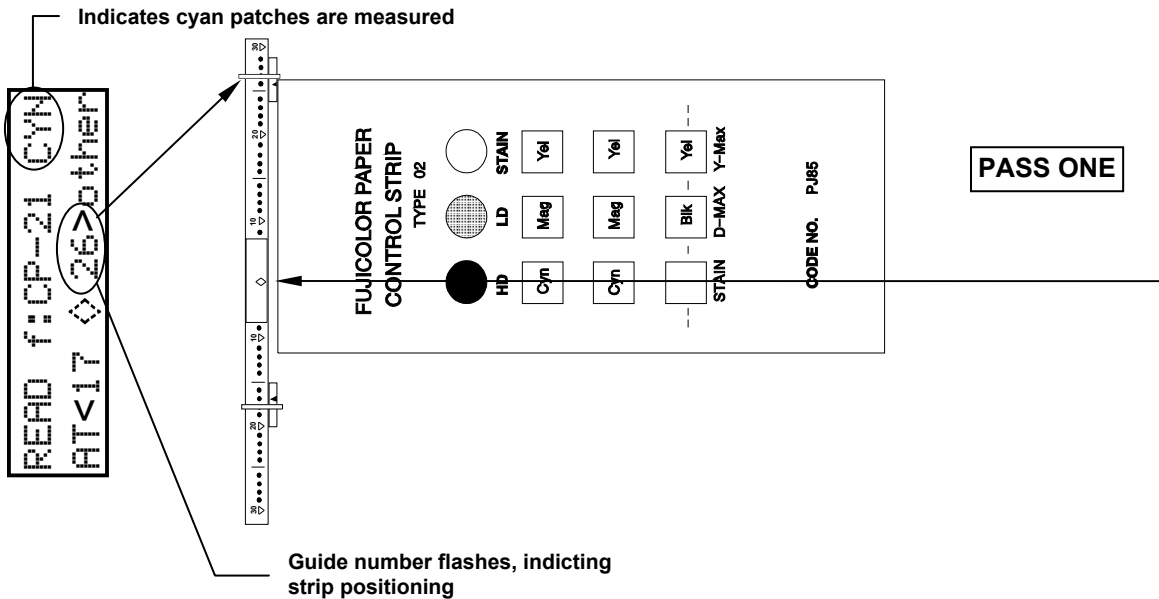
Single Pass

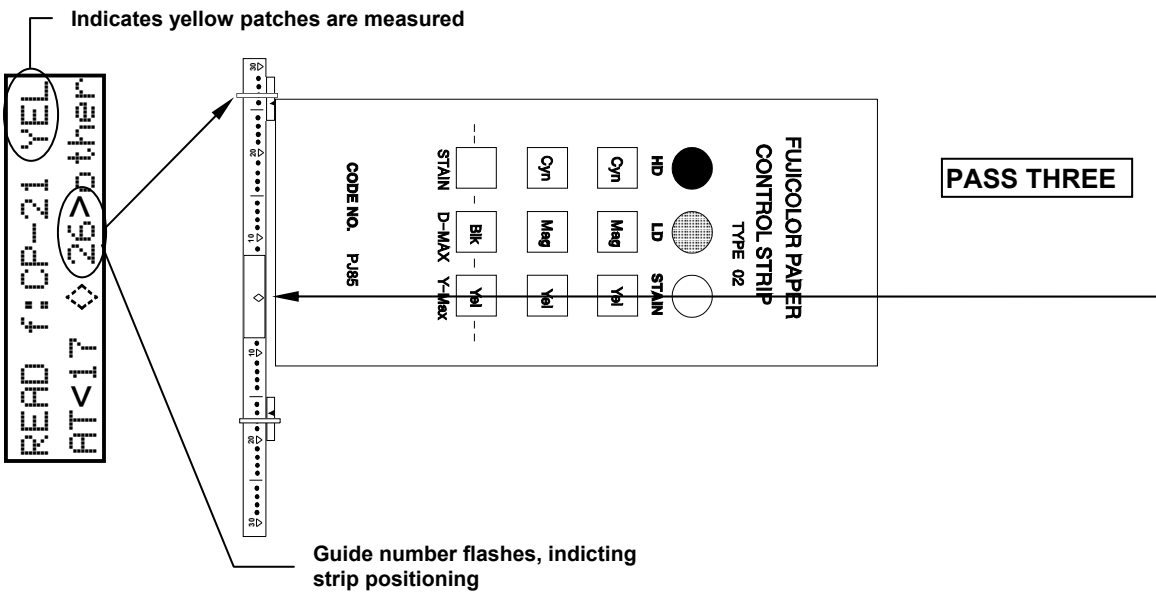
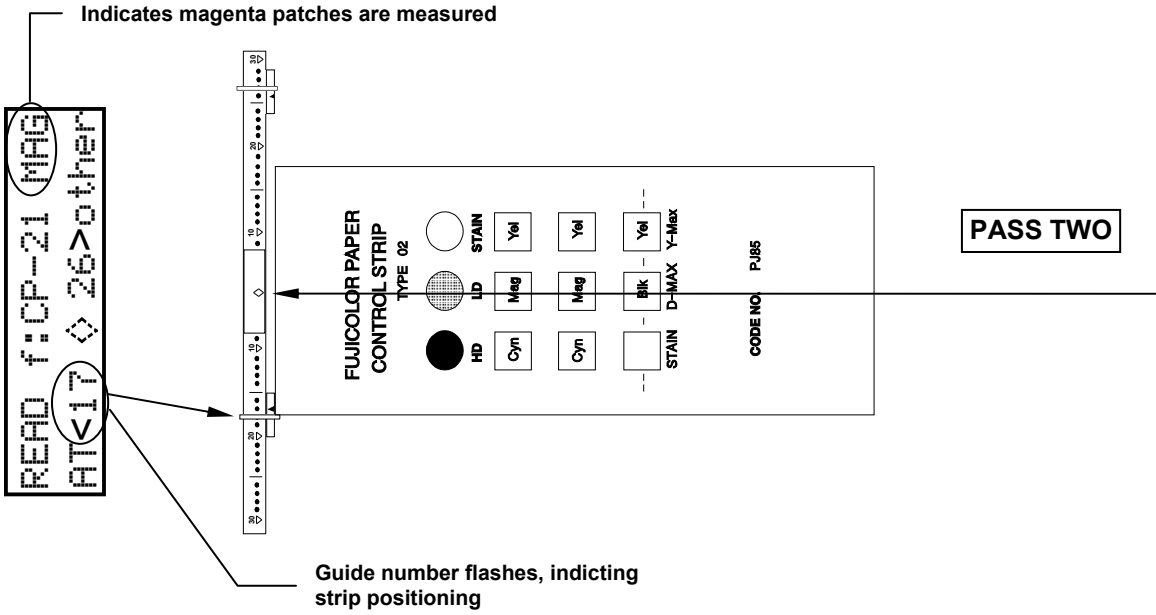
Single pass strips require the strip to be inserted into the instrument once. In this example, the strip—Kodak RA4—can be inserted in either direction. Refer to your Control Strip and Balance Print Format Guide for information on all strips supported.



Multi Pass

Typically, a multi pass strip requires three pass through the instrument to obtain measurement data. The instrument displays what color patches are measured and what guide is used to insert the strip from. In this example, the cyan—Fuji CP-21—row of patches is measured first, followed by the magenta and yellow. Refer to your Control Strip and Balance Print Format Guide for information on strip insertion direction.

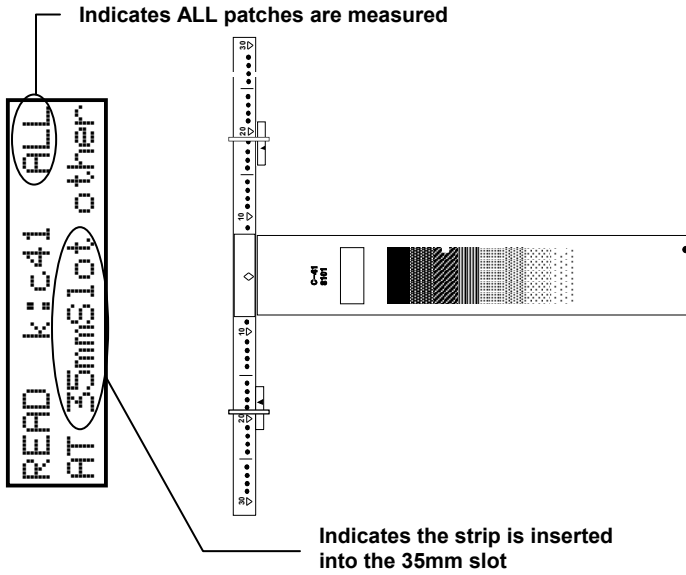




The third pass requires the strip to be rotated to take the measurement.

Film Strip

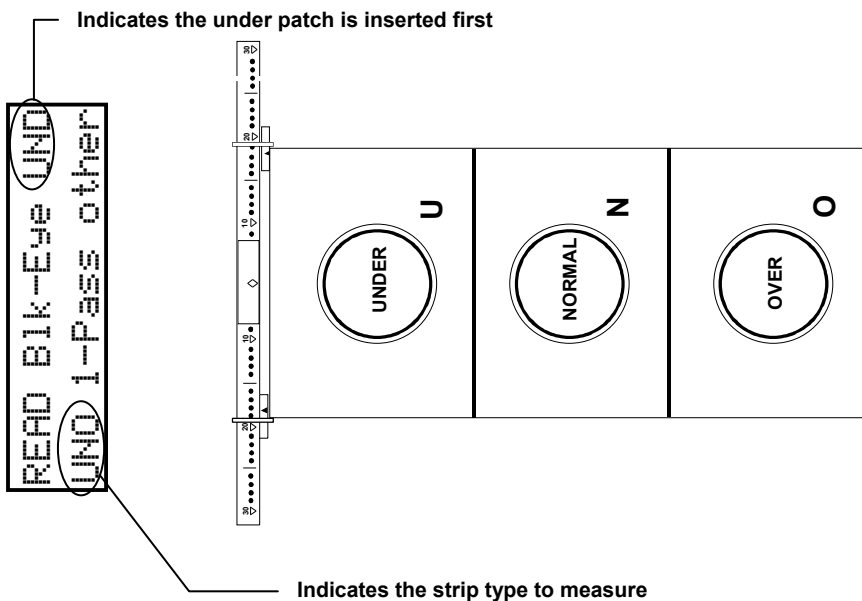
The Film category requires that the film strip be inserted into the 35mm slot located above the center diamond. In this example—Kodak C41—the strip can be inserted in either direction. Refer to your Control Strip and Balance Print Format Guide for information on all strips supported.



Printer Balance Strip

The Printer Balance category in the instrument has five basic strip formats: Wht-Eye, Blk-Eye, No-Ring, K:3510, and Small-BE. Each category has six print options to choose from. Refer to your Printer Balance and Control Guide for detailed information on all aspects of the printer balance strips. Due to the amount of variation between printer balance strips, no guide setting numbers appear in the display.

In this example—Blk-Eye, UNO 1-Pass—the Under patch is inserted first.



Instrument Calibration

This section covers the calibration procedures for your instrument.

Section Two Contents

- Calibration Information
- Auto Calibration Procedure
- Manual Calibration Procedure

CALIBRATION INFORMATION

The instrument has two types of calibration procedures available, automatic and manual. AUTO is the standard method of calibration. If you want your instrument to measure the same as another densitometer that has the same response, you would use the manual procedure. When the instrument automatically calibrates, the density values are set precisely to that of the paper measured for reflection, and to no film (air) for transmission.

The instrument has many self-checking algorithms built in to verify the accuracy of calibration. If you wish to maintain accuracy verification, we suggest that you obtain a C41 reference strip and a paper reference strip. Measure each strip and record the density values. Place the strips in an envelope and store them in a dry, cool environment. Periodically, measure them to verify accuracy. Note, reference strips tend to drift in density with time, consult the manufacturer's specifications for expected density changes.

If your Auto-Cal strip gets ruined or worn, you can order a replacement from X-Rite or your local dealer. Order Part Number 880-100.

Frequency of Calibration

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

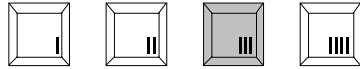
AUTO CALIBRATION PROCEDURE

NOTE: Make sure the Auto-Cal strip is free of dust, dirt, and smudgemarks. Refer to Section Eight for cleaning procedure. Handle cal strip by the edges.

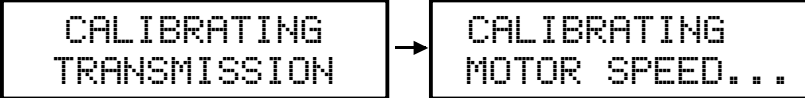
1. Press key III (cal) located on Function Menu page (p5) to initiate calibration.



FUNCTION MENU
p5 netwk cal edit



- The instrument screen momentarily displays **CALIBRATING TRANSMISSION** during automatic transmission calibration (reading air), and **CALIBRATING MOTOR SPEED**.

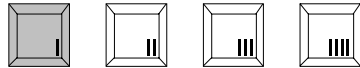


CALIBRATING TRANSMISSION → CALIBRATING MOTOR SPEED...

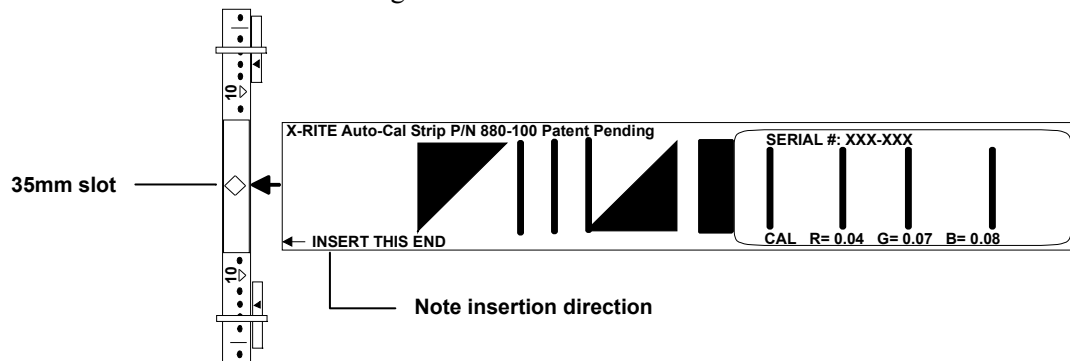
- After this is complete, the instrument screen asks you to **INSERT CAL STRIP**. Make sure the key labeled **AUTO** is upper-case lettering. If not, press key I (AUTO) to toggle to upper-case. Note, lower-case lettering denotes manual calibration (MANUAL) is activated.



INSERT CAL STRIP
AUTO manual



2. Insert the designated end of the Auto-Cal strip into the 35mm slot until it comes to rest against the drive rollers.



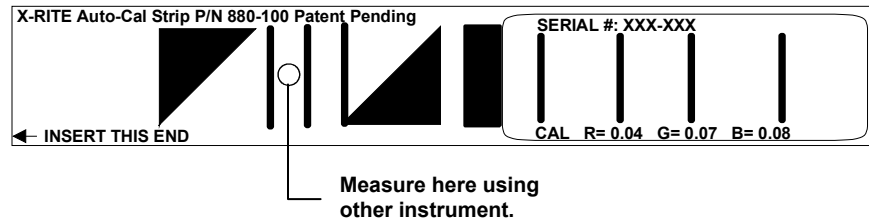
- **READING** is momentarily displayed on the screen followed by calibration density values. Auto calibration is now complete and the instrument screen returns to the Channel menu.

NOTE: If **UNRECOGNIZABLE STRIP** momentarily appears on the screen when a cal strip is measured, the strip may be dirty—refer to Section Eight for procedure. However, if cleaning the strip does not resolve the problem, enter calibration manually then re-measure the strip.

MANUAL CALIBRATION PROCEDURE

The manual calibration procedure is used to correlate the low densities of the instrument to another densitometer. Doing this allows the instrument to measure approximately the same as another densitometer that has Status A reflection response, and has been calibrated to ANSI Standards.

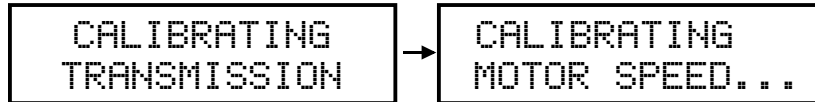
1. Using the instrument's own reference, calibrate the densitometer that you want this instrument to correlate with.
2. Using the same densitometer, measure the white area below the first black bar on the X-Rite Auto-Cal strip and record the Red, Green, and Blue values.



3. Press key III (cal) located on Function Menu page (p5) to initiate calibration.



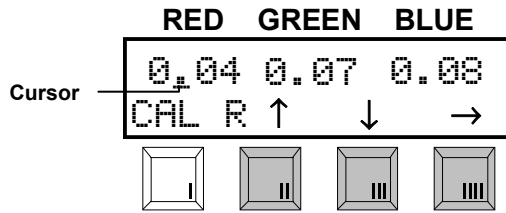
- The instrument screen momentarily displays **CALIBRATING TRANSMISSION** during automatic transmission calibration (reading air), and **CALIBRATING MOTOR SPEED**.



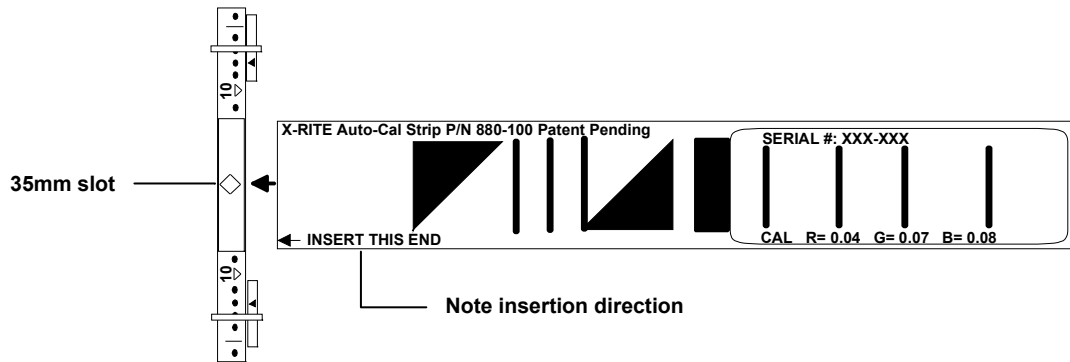
4. After this is complete, the instrument screen asks you to **INSERT CAL STRIP**. **DO NOT INSERT STRIP AT THIS TIME**. Press key IIII (manual) to advance to calibration reference values screen.



5. Enter the Red, Green, and Blue values you previously recorded into the designated fields. Press key IIII (→) to move the cursor to the desired location, and to advance to the next step after editing the values. Press key II (↑) to increase value and key III (↓) to decrease value.



6. **INSERT CAL STRIP** re-appears on the screen. Insert the designated end of the Auto-Cal strip into the 35mm slot until it comes to rest against the drive rollers.



- **READING** is momentarily displayed on the screen followed by calibration density values. Manual calibration is now complete and the instrument screen returns to the Channel menu.

Setting System Configuration

The system configuration allows you to customize your instrument to meet your requirements. The configuration should be viewed and edited as needed before any measurements are taken.

Section Three Contents

- Instrument Configuration
- Date and Time

INSTRUMENT CONFIGURATION

The configuration functions are contained in two main screen pages. Page one contains setup functions for language, instrument beeper tone, and networking. Page 2 is broken down into five menu pages, four of which are submenus—p2a, p2b, and so on. Page two menus contain serial interface control options.

Descriptions for all configuration options are listed below, followed by set up procedures.

Page 1 Configuration Options

TONE

Use to adjust the instruments beeper volume. Available settings are: OFF, SOFT, and LOUD.

NET (Networking)

Enables the instrument to automatically send and receive data via the modem at a predetermined time that is selected by the QC computer. Available settings are: OFF, OUT, IN, and I&O.

- OFF - disables the instrument from automatically sending or receiving data.
- OUT - enables unit to *call out* via modem from QC host.
- IN - enables unit to *answer* incoming call on modem from QC host.
- I&O - enables both automatic transmission and reception of data.

Page 2 Configuration Options

IO preset

This options provides several QC system selections. All the necessary RS-232 interface parameters are automatically set when a predefined I/O preset is selected. A “CUSTOM” preset is available which allows you manually set all available I/O options. Below is a chart that contains all available I/O presets and their parameter settings.

NOTE: Certain parameters are mandatory for the I/ O preset and cannot be changed. They are labeled with an “L” for locked. Other parameters are not considered mandatory and are labeled with a “U” for unlocked. Parameters labeled “#” must be set manually to ensure proper use. Finally, parameters that remain unchanged from previous settings—and can be changed—are shown as an asterisk (*).

I/O Preset	RCI	PIN5	XON	DPT	COMP	ALF	DEL	AXMT	REF	BAUD
REPORT	Off	*	*	On (L)	On (L)	On (U)	Off (L)	Off (U)	On (U)	*
SPRD-SHT	*	*	*	*	Off (L)	*	*	On (L)	*	*
k:TNetA	Off (L)	Off (L)	Off (L)	Off (L)	On (L)	On (L)	On (L)	On (L)	Off (L)	300(L)
k:TNetXT	Off (L)	CTS(L)	Off (L)	Off (L)	On (L)	On (L)	Off (L)	On (L)	Off (L)	*
k:C.A.P.	Off (L)	CTS(U)	Off (L)	Off (U)	On (U)	On (U)	Off (L)	On (L)	*	9600(L)
k:SYS25-75	Off (L)	CTS(L)	Off (L)	Off (L)	On (L)	On (L)	Off (L)	On (L)	*	*
f:TECOM	Off (L)	Off (L)	Off (U)	Off (U)	Off (U)	Off (U)	Off (U)	On (U)	Off (L)	1200(U)
c:I/O#1	On (L)	Off (L)	Off (L)	Off (U)	On (U)	On (U)	On (U)	On (L)	*	9600(L)
c:I/O#2	On (U)	Off (U)	Off (U)	Off (U)	On (U)	On (U)	On (U)	On (U)	*	9600(U)
MITSY#1	Off (U)	Off (U)	Off (U)	Off (L)	Off(L)	Off(L)	Off (U)	On (U)	*	300(L)
MITSY#2	Off (L)	Off (L)	On (U)	Off (L)	Off(L)	Off(L)	Off (L)	On (L)	Off (L)	300(U)
NORITSU	Off (L)	CTS(U)	Off (L)	Off (L)	On (L)	On (L)	Off (L)	On (L)	Off (L)	2400(U)
n:QSnet	Off (U)	Off (U)	Off (U)	Off (U)	Off (U)	Off (U)	Off (U)	On (U)	Off (U)	2400(U)
n:Micro	*	*	*	*	*	*	*	*	*	*
kn:Net	TTL (U)	Off (U)	Off (U)	Off (U)	On (U)	Off (U)	Off (U)	Off (U)	On (U)	2400(U)
a:LC2000	Off (U)	Off (U)	Off (U)	Off (U)	On (U)	On (U)	On (U)	On (U)	Off (U)	1200(U)
CUSTOM	#	#	#	#	#	#	#	#	#	#
Windense	On (U)	Off (U)	Off (U)	Off (U)	On (U)	Off (U)	Off (U)	On (U)	On (U)	9600 (U)
Kodatel	On (U)	Off (U)	Off (U)	Off (U)	On (U)	Off (U)	Off (U)	On (U)	On (U)	9600 (U)
Sienna	On (U)	Off (U)	Off (U)	On (U)	On (U)	On (U)	Off (U)	On (U)	Off (U)	4800 (U)

k: (Kodak), f: (Fuji), c: (Copal), kn: (Konica), n: (Noritsu), a: (Agfa)

NOTE: Setting the I/O preset to “n:Micro” changes the menu structure of the instrument making several menu items unavailable.

Page 2a Configuration Options

RCI (Remote Control Interface)

Controls the ability of the instrument to be operated remotely. Available settings are: OFF, ON, TTL.

- OFF - sets the instrument into a receive mode at which time the instrument receives data.
- ON - enables data to be received via RCI command.
- TTL (Time Tagged Log) - causes all data received into the serial port to be placed into the log buffer with a time stamp.

PIN5

Determines the status of the handshaking input on Pin 5 of the RS-232 I/O port. Pin 5 may be interpreted as BUSY, CTS (clear-to-send), or OFF (ignored).

XON

When set to On (XON), this enables bi-directional transmit On/Off protocol.

When set to Off (xon), the instrument ignores XON/OFF codes. Note, usage is limited to output at this point.

Page 2b Configuration Options

DPT (Decimal Point)

Controls the decimal point availability during data output. When off (dtp), no decimal is output with data. When on (DTP), decimal points are included with the output data.

COMP (Compact)

Varies the output format of the data. When when off (comp), data for each color is delimited with a carriage return—or CR LF if ALF is enabled. When on (COMP), a space and delimiter is transmitted after each set of RGB data values.

ALF (Automatic Line Feed)

Controls the line feed availability during data output. When off (alf), no line feed is output with data. When on (ALF), a line is included with the output data.

Page 2c Configuration Options

DEL (Delay)

Controls a transmitted delay between each set if RGB data output. When off (del), no delay is sent between each set of RGB data. When on (DEL), a one second delay is sent between each set of RGB data.

AXMT (Automatic Transmit)

Controls automatic transmission of data after a measurement. When off (axmt), no data is transmitted out the I/O port after a measurement. When on (AXMT), data is automatically sent out the I/O after a measurement.

REF (Reference)

Controls reference comparison of data. When off (ref), measurement data is not compared to reference data. When on (REF), measurement data is compared to reference data. REF is automatically turned on when a reference reading is taken.

Page 2d Configuration Options

BAUD (Rate)

Determines the data output rate (characters per second) of the I/O port “A.” Available settings are: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, and 57600. Does not affect modem I/O port “B” baud rate.

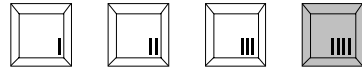
LOCK

Controls the ability to change the configuration options. When off (lock), configuration options are available for change. When on (LOCK), configuration options cannot be changed. Note, an additional step is required to change this option, refer to the following procedure for details.

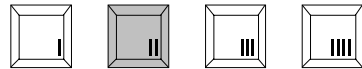
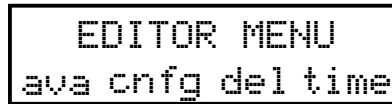
Configuration Setup Procedure

- Options that toggle on and off display in upper-case (on) or lower-case (off). For example, COMP = on and comp = off.
- You can save and exit the configuration at anytime without editing all options. This is accomplished by simultaneously pressing key I and key II when SAVE is displayed in the screen.
- Configuration can be exited at anytime without saving changes by simultaneously pressing key III and key IIII (MENU keys).

1. Press key IIII (edit) located on Function Menu page (p5) to enter the Editor Menu.

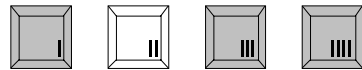


2. Press key II (cnfg) located on the Editor Menu screen to enter Page1 Configuration screen.



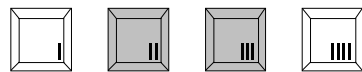
3. **Page 1 Configuration Screen**

- Press key III (TONE) to page through and select a beeper tone option (OFF, SOFT, and LOUD).
- Press key IIII (NET) to page through and select a networking option (OFF, OUT, IN, and I&O. *Note, only set if network modem is used.*)
- After editing Page 1 Configuration options, press key I (P1) to advance to Page 2 Configuration screen.

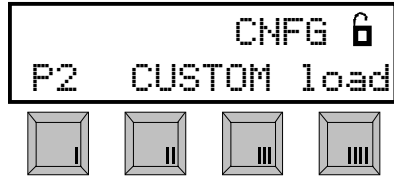


4. **Page 2 Configuration Screen**

- Press key II or key III (IOpreset) once to enter I/O preset menu.

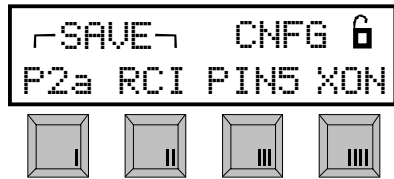


- Press key **II** or key **III** to page through and select a preset options (CUSTOM, REPORT, SPRD-SHT, k:TNetA, etc.).
- After selecting I/O preset option, press key **IIII** (P2) to load preset and advance to Page 2a Configuration screen.
- If you do not want to load a preset, press key **I** (P2) to advance to Page 2a Configuration screen.



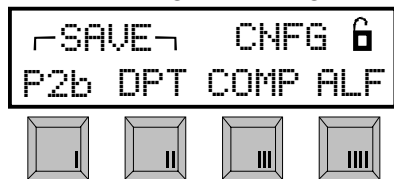
5. Page 2a Configuration Screen

- Press key **II** (RCI) to page through and select a remote control interface option (OFF, ON, TTL).
- Press key **III** (PIN5) to page through and select a handshake option (OFF, BUSY, and CTS).
- Press key **IIII** (XON) to select bi-directional transmit On/Off protocol option. Each key depression alternates between xon (off) and XON (on).
- After editing Page 2a Configuration options, press key **I** (P2a) to advance to Page 2b Configuration screen.



6. Page 2b Configuration Screen

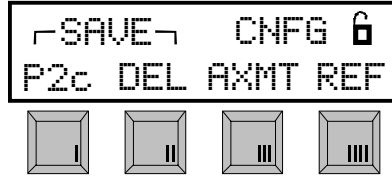
- Press key **II** (DPT) to select decimal point output option. Each key depression alternates between dtp (off) and DPT (on).
- Press key **III** (COMP) to select data output format option. Each key depression alternates between comp (off) and COMP (on).
- Press key **IIII** (ALF) to select automatic line feed option. Each key depression alternates between alf (off) and ALF (on).
- After editing Page 2b Configuration options, press key **I** (P2b) to advance to Page 2c Configuration screen.



7. Page 2c Configuration Screen

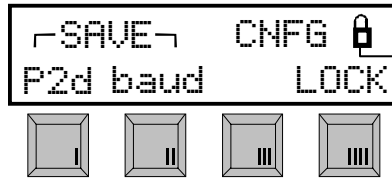
- Press key **II** (DEL) to select delay option. Each key depression alternates between del (off) and DEL (on).
- Press key **III** (AXMT) to select automatic transmission option. Each key depression alternates between axmt (off) and AXMT (on).
- Press key **IIII** (REF) to select reference comparison option. Each key depression alternates between ref (off) and REF (on).

- After editing Page 2b Configuration options, press key I (P2b) to advance to Page 2c Configuration screen.



8. Page 2d Configuration Screen

- Press key II (baud) to page through and select a baud rate option (300, 600, 1200, 2400, 4800, 9600, 19200, 38400, and 57600).
- Insert a piece of paper into the paper slot at least 1-1/4" to activate the read switch—heavy paper or film works best. Press key IIII (lock) to select lock option. Each key depression alternates between lock (off) and LOCK (on). A "LOCK" selection (padlock icon closed) prevents any option changes from occurring.
- After editing Page 2d Configuration options, simultaneously press key I (P2d) and key II (baud) to save configuration settings. Pressing key I (P2d) alone causes Page 1 Configuration screen to reappear.



Padlock icon displays "closed" when options are locked.

DATE AND TIME

The date and time function allows you to adjust the instruments internal clock. The factory default setting for the clock is Eastern Time Zone.

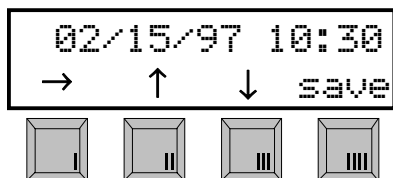
1. Press key **||||** (edit) located on Function Menu page (p5) to enter Editor Menu screen.



2. Press key **||||** (time) located on Editor Menu screen to enter Date and Time setting screen.



3. Enter your current date and time into the designated fields. Use key **|** (→) to move the cursor to desired location. Use key **||** (↑) to increase value and key **|||** (↓) to decrease value. Press key **||||** (save) to save settings and exit Editor Menu.



SECTION THREE

Establishing Reference (AIM) Values

Proper handling of preprocess reference strips prior to establishing values is essential to achieve accurate data. Refer to your strip manufacturer's documentation for proper handling procedures.

Reference strip values are used to establish "aim" points that all controls strips are compared with. Any measured control strips that deviate from predefined limits are instantaneously displayed, allowing corrective actions to be taken.

Reference values are established by measuring preprocessed reference strips, entering correction factor (if not preloaded), and performing strip crossover. Depending on your process procedures, correction factors and strip crossovers may not be required. Due to the variability of printer balance strips, correction factors and strip crossover procedures are not available.

The 891/892 densitometer can automatically enter correction factors (ACF) for a selected reference strip. This occurs if they are preloaded into the instrument using Kodatel, etc. The instrument displays the proper correction factors assigned to a strip batch code.

Aim value adjustments can also be performed on reference strips if required.

Section Four Contents

- Reference Strip Measurement
- AIM Value Adjustments

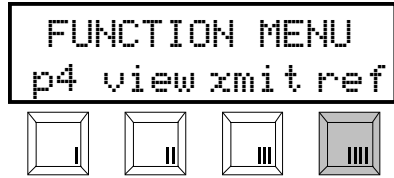
REFERENCE STRIP MEASUREMENT

Refer to your Control Strip and Balance Print Format Guide to located your reference strip for proper insertion direction.

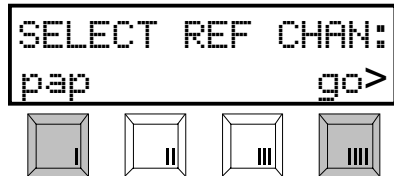
Each "film", "pap", and "pbM" channel stores one reference for its respective strip type. Each "aux" channel (1-6) stores one film, paper, or printer balance reference strip.

1. Press key **IIII** (ref) located on Function Menu page (p4) to enter Select Reference Channel screen.

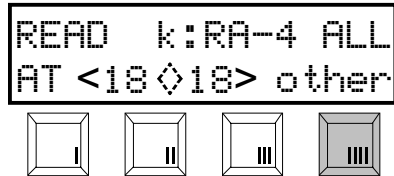
NOTE: If the calibration procedure has not been performed for two weeks, a Calibration Required message appears when key **IIII** (ref) is pressed.



2. Press key I (pap, etc.) located on Select Ref Chan screen to select reference channel. After selecting channel, press key IIII (go>) to advance to the measurement screen.

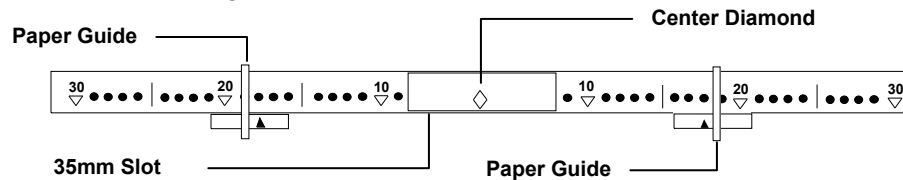


3. Press key IIII (other) to select reference format.



4. **Measure strip**

- For paper strips, adjust the paper guides according to the number displayed on the screen. If multiple pass, note what color is to be measured first. Insert strip until it comes to rest against the drive rollers.
- For film strips, note insertion direction and insert strip into the 35mm slot until it comes to rest against the drive rollers.
- For printer balance strips, not insert direction and center bull's-eye over middle diamond. Slide paper guides next to strip and insert strip until it comes to rest against the drive rollers.



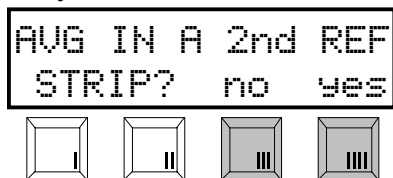
- The densitometer indicates that processing is taking place and the measured “pass” status. If a paper strip is measured that has multiple passes, the display will indicate the pass to insert.



5. After the first reference strip measurement is complete, the display screen asks if you want to average in a second reference strip.

NOTE: REFERENCE MISMATCH appears in the display if the reference strip measured does not match the format previously measured. Press key IIII (yes) to continue, or press key III (no) to exit reference function.

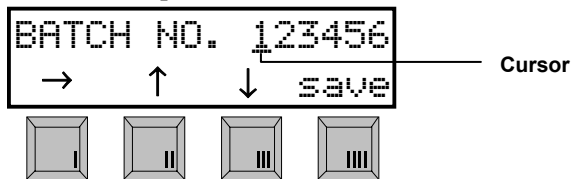
- If additional strips are required (maximum of eight), press key **||||** (yes) and repeat measurement sequence with new reference strip.
If averaging is not required, press key **|||** (no) and advance to Batch Code Entry screen.



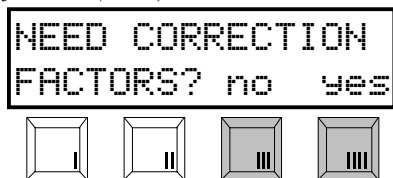
- The instrument screen momentarily displays a message asking you to enter a batch code number.



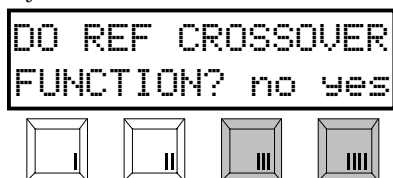
6. The batch code consists of a combination of numbers and letters at a maximum of six characters. Press key **I** (→) to move the cursor to desired location. Press key **||** (↑) to increment character; press key **|||** (↓) to decrement character. Press key **||||** (save) to save batch number to reference strip and advance to next screen.



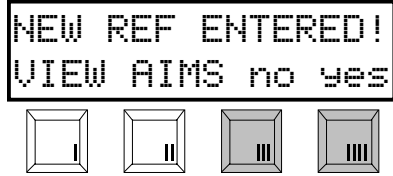
7. If correction factor adjustments are required, press key **||||** (yes) and refer to Correction Factor Entry procedure later in this section. If correction factor adjustments are not required, press key **|||** (no) to advance to next screen. *Note, the correction factor screen does not appear for printer balance references, or when automatic correction factors (ACF) are used.*



8. If reference crossover function is required, press key **||||** (yes) and refer to Reference Crossover procedure later in this section. If reference crossover is not required, press key **|||** (no) to advance to next screen. *Note, the reference crossover screen does not appear for printer balance references.*



9. The instrument display screen indicates that the new reference is entered and allows you to view the data. If you want to view the measurement data, press key **IIII** (yes) and refer to Viewing Reference Data later in this section. If you do not want to view the data, press key **III** (no) to return instrument screen to Channel menu.

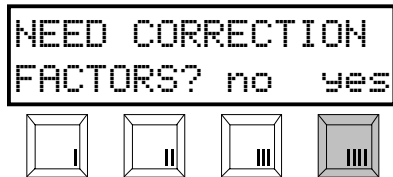


Correction Factor Procedure

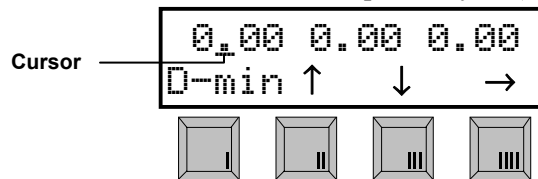
NOTE: The correction factor procedure does not apply when automatic correction factors (ACF) are used.

Typically, correction factor numbers are supplied with your new reference strips. Correction factors compensate for the variability that can occur during strip manufacturing.

1. From the Need Correction Factors screen, press key **IIII** (yes).



2. Enter correction factors for all required fields measured. Press key **I** (D-min, etc.) to page through available fields. Note, pressing key **I** an additional time after the last field displays advances the screen to the Load screen.
- Press key **IIII** (→) to move the cursor to desired location. Press key **II** (↑) to increase value; press key **III** (↓) to decrease value.



- Press key **I** (review) to return to the correction factor fields. Press **IIII** (continue) to exit correction factors and continue with the reference entry procedure.

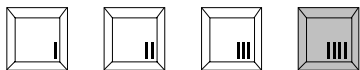


Crossover Procedure

The crossover procedure reduces the affect of change that can occur between old and new batches of reference strips.

1. From the Do Ref Crossover Function screen, press key **||||** (yes).

```
DO REF CROSSOVER
FUNCTION? no yes
```

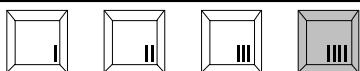


- The instrument screen momentarily display a message asking you to read three old QC strips.

```
PLEASE READ OLD
Q.C. STRIPS (3)
```

2. The instrument screen displays batch number and strip type to measure. Measure three strips from the old batch. Note, Pressing key **||||** (abort) exits the crossover function.

```
OLD-1 123456 ALL
AT <18◇18> abort
```



3. After the third old strip is measured, the instrument screen momentarily displays a message asking you to read three new QC strips.

```
PLEASE READ NEW
Q.C. STRIPS (3)
```

4. The instrument screen displays batch number and strip type to measure. Measure three strips from the new batch. Note, Pressing key **||||** (abort) exits the crossover function.

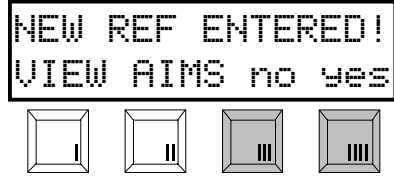
```
NEW-1 123456 ALL
AT <18◇18> abort
```



5. After the third new strip is measured, the instrument screen momentarily displays a crossover complete message.

```
CROSSOVER OLD TO
NEW REF COMPLETE
```

- The instrument display screen indicates that the new reference is entered and allows you to view the data. If you want to view the measurement data, press key **IIII** (yes) and refer to Viewing Reference Data below. If you do not want to view the data, press key **III** (no) to return instrument screen to Channel menu.



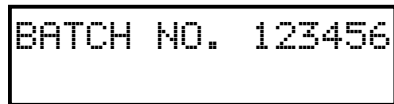
View Reference Data

Reference values displayed consist of the average values (if more than one strip is measured) with any correction factors applied.

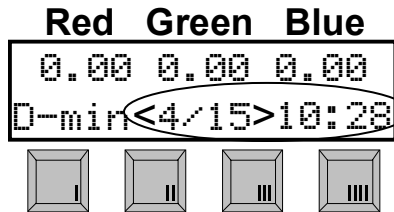
Reference data is viewed after a reference measurement, or reference data is viewed by selection from the Function Menu.

- Viewing Data after Reference Measurement**

Batch number is momentarily displayed after pressing key **IIII** (yes).



- Press key **I** (D-min) to page through RGB data fields of the strip.
- Previously measured reference strips are viewed by pressing key **II** (<) to go back in time, or pressing key **III** (>) to go forward in time. Batch number momentarily displays before each strip's RGB data.
- After viewing data press key **IIII** (time) to exit reference viewing.



Reference strip measurement date and time.

Viewing Reference Data from Function Menu

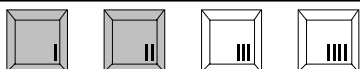
- Press key **II** (view) located on Function Menu page (p4) to enter View screen.



NOTE: VIEW LAST displays after pressing key **II** (view) if the last strip measured is a different format than the reference previously measured in that channel. This allows you to measure different strip formats and view data without affecting the channel's memory of the last 16 strips measured. Press key **IIII** (go>) to view strip data. Press key **I** (chan) to go to next view menu.

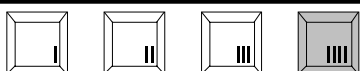
2. Press key **I** (chan) to select reference channel for viewing. After selecting channel, press key **II** (ref) to indicating reference data for viewing (ref will appear is upper-case when selected).

```
VIEW pap k:RA-4
chan ref dev go>
```



3. Press key **IIII** (go>) to view reference data.

```
VIEW pap k:RA-4
chan REF aim go>
```



NOTE: NO REF INSTALLED appears in the display if no reference is available in the selected channel.

4. Data is viewed in the same manner as discussed on the previous page.

```
Red Green Blue
0.00 0.00 0.00
D-min<4/15>10:28
```



5. After viewing data, continue to press key **I** (D-min) until the Exit screen appears, then press key **IIII** (yes) to exit.

AIM VALUE ADJUSTMENTS (AVA)

Certain conditions may require value adjustment of your reference strips. The aim value adjustments (AVA) are range limited and will not exceed the aim value adjustment tolerances (AVAT's) set in the instrument.

Simultaneously pressing key III and key IIII labeled MENU at anytime aborts the AVA function. Any adjustments that had been made prior to exiting are not saved.

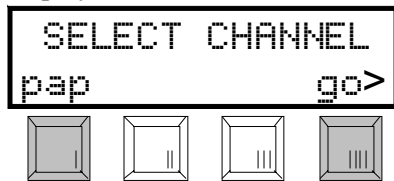
1. Press key IIII (edit) located on Function Menu page (p5) to enter Editor Menu screen.



2. Press key I (ava) located on Editor Menu screen to enter Select Channel screen.

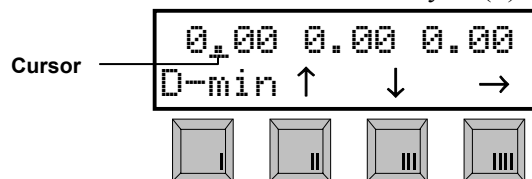


3. Press key I (chan) to select reference channel. Press key IIII (go>) to display AVA edit screen.



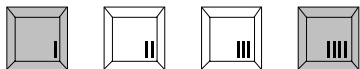
NOTE: NO REF INSTALLED appears in the display if no reference is available in the selected channel.

4. Adjust aim values for all required fields. Press key I (D-min, etc.) to page through available fields. Note, press the key I again after the last field displays to advance the screen to the Aims Adjusted screen.
 - Press key IIII (→) to move the cursor to desired location. Press key II (↑) to increase value and key III (↓) to decrease value.



- Press key **I** (review) to review the aim adjustment fields. Press **IIII** (return) to save adjustments and return to the Editor Menu.

```
AIMS ADJUSTED.  
review OR return
```

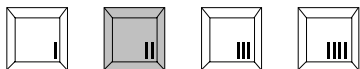


View Aim Values

Aim values displayed are the reference values with transformation rules applied. Any adjustments that result from a crossover are also included.

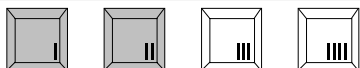
1. Press key **II** (view) located on Function Menu page (p4) to enter View screen.

```
FUNCTION MENU  
p4 view xmit ref
```



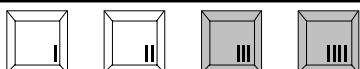
2. Press key **I** (chan) to select reference channel for viewing. After selecting channel, press key **II** (ref) to select reference (“ref” changes to upper-case when selected and “dev” changes to “aim”).

```
VIEW pap k:RA-4  
chan ref dev go>
```



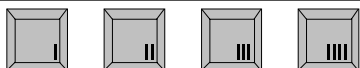
3. Press key **III** (aim) to select aim (“aim” changes to upper-case). Press key **IIII** (go>) to view aims values.

```
VIEW pap k:RA-4  
chan REF aim go>
```



4. Data is viewed in the same manner as previously discussed.

```
Red Green Blue  
0.00 0.00 0.00  
D-min<4/15>10:28
```



5. After viewing data, continue to press key **I** (D-min) until the Exit screen appears, then press key **IIII** (yes) to exit.

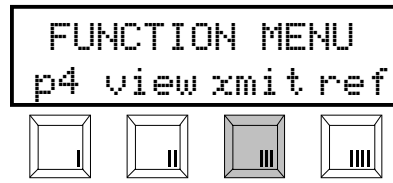
TRANSMIT REFERENCE AND AIM DATA

Strip reference and aim data is available for transmission from the I/O port “A” on the instrument. Individual channels are selected for transmission.

Transmitted *reference* values consist of the average values (if more than one strip was measured) with any correction factors applied.

Transmitted *aim* values are the reference values with transformation rules applied. Any adjustments that result from a crossover are also included.

1. Press key **III** (xmit) located on Function Menu page (p4) to enter Transmit screen.



NOTE: XMIT LAST displays after pressing key **III** (xmit) if the last strip measured is a different format than the reference previously measured in that channel. This allows you to measure different strip formats and transmit data without affecting the channels memory of the last 16 strips measured. Press key **IIII** (xmit) to transmit strip data. Press key **I** (chan) to go to next view menu.

2. Press key **I** (chan) to select reference channel for transmitting. After selecting channel, press key **II** (ref) to select reference (“ref” changes to upper-case when selected and “dev” changes to “aim”).



3. Press key **IIII** (go>) to select reference data, or press key **III** (aim) and then press key **IIII** (go>) to select aims data.



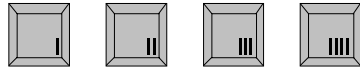
NOTE: NO REF INSTALLED appears in the display if no reference is available in the selected channel.

4. Select strip to transmit.
 - Previously measured reference strips are viewed by pressing key II (<) to go back in time, or pressing key III (>) to go forward in time. Batch number momentarily displays before each strip's data and time.
 - Press key I (xmit) to transmit selected strip data ("xmit" changes to upper-case during transmission).
 - After transmitting data press key IIII (time) to exit transmit screen.

```

pap ( k:RA-4 )
xmit <4/15>10:28
    
```

Reference strip
measurement
date and time.



SECTION FOUR

Control Strip Operation

The values obtained when measuring a control strip are the deviations from the reference values. It is important to make sure control strips and reference strips used are from the same batch number.

Always inspect control strips for damage before measuring. Care must also be taken when handling strips. Fingerprints on measurable patches can affect density values.

When measuring strips into the auxiliary channels (aux1 - aux6), the data is not immediately loaded into the database. You are given the option of loading the data into the database or not. Not loading the data allows the auxiliary channels to be used as “scratch pad” channels, where strips are measured and viewed but not saved.

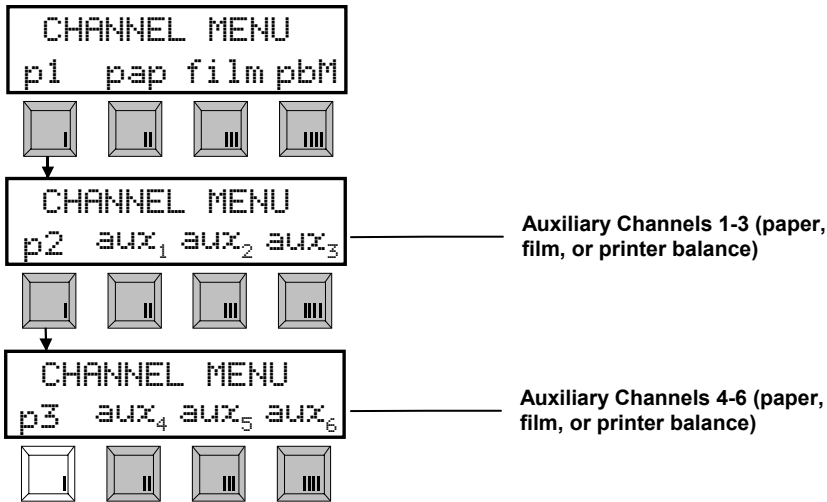
IMPORTANT! When inserting strips into the instrument, there should be at least a 30.5mm (1.25”) leader before the outside edge of the first measurable target or the first target may not be detected. For information on measuring leaderless strips (30.5mm), refer to your Control Strip and Balance Print Format Guide, Section Five.

Section Five Contents

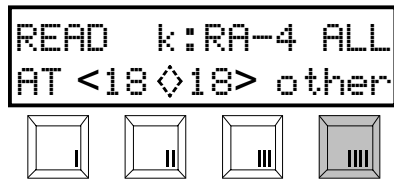
- Measuring Control Strips
- Manually Transmitting Strip Data

MEASURING CONTROL STRIPS

Refer to your Control Strip and Balance Print Format Guide to located your control strip for proper insertion direction.

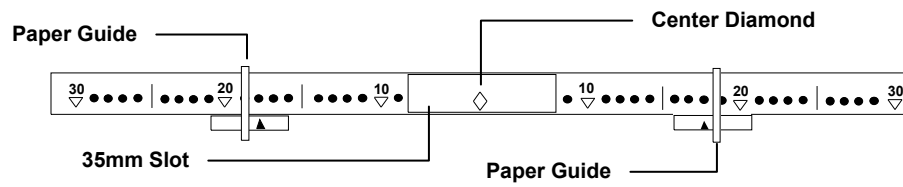


1. Select strip channel from Channel Menu page 1, 2, or 3.
2. If format displayed is not correct, press key **III** (other) to select correct strip format.



3. **Measure strip**

- For *paper strips*, adjust the paper guides according to the number displayed on the screen. If multiple pass, note what color is to be measured first. Insert strip until it comes to rest against the drive rollers.
- For *film strips*, note insertion direction and insert strip into the 35mm slot until it comes to rest against the drive rollers.
- For *printer balance strips*, note insert direction and center bull's-eye over middle diamond. Slide paper guides next to strip and insert strip until it comes to rest against the drive rollers.



- The densitometer indicates that processing is taking place and the measurement status. If a paper strip is measured that has multiple passes, the display indicates the pass to insert.



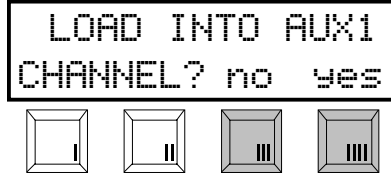
NOTE: If **INVALID READING**, **UNRECOGNIZABLE STRIP**, or **BUFFER OVERFLOW** messages display after a measurement, re-read strip. If the same message appears after re-reading strip, refer to Appendix B of this manual.

- Transmitting Data momentarily appears in the display screen (if auto transmit is enabled in Configuration Options), indicating measurement data is being transmitted out the I/O port.



- If the reference option is disabled or no reference data exists in the selected channel, the instrument screen displays the RGB measurement results.

- For Auxiliary channels, control limit pass or violation message is momentarily displayed followed by a Load into Channel question. Pressing key III (no) allows you to view the data without loading it into the database. Pressing key IIII (yes) loads the data into memory and indicates a time tag.



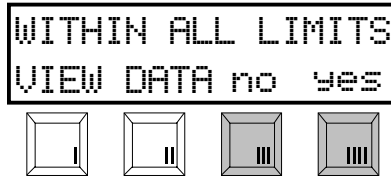
- Time tag information momentarily appears, providing a date stamp for the control strip measurement.



4. A control limit pass or violation message is displayed along with a View Data question.

NOTE: If a **LIMIT EXCEEDED** message appears after a time tag, consult the manufacturer’s processor documentation for corrective action required.

- Pressing key III (no) returns the instrument screen to the Channel Menu display. Pressing key IIII (yes) advances the instrument screen to the View screen. See below for Viewing Control Strip Data.



View Control Strip Data

Control strip data consists of the “actual” values measured by the instrument and deviation values from the aim strips.

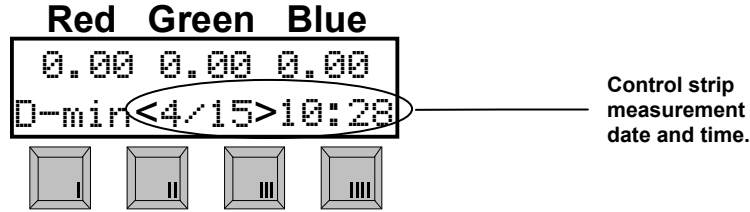
Control strip data is viewed after a strip measurement or by selection from the Function Menu.

Viewing Data after Control Strip Measurement

1. Press key IIII (go>) to view channel actual measurement data, or press key III (dev) and then press key IIII (go>) to view strip deviation data.

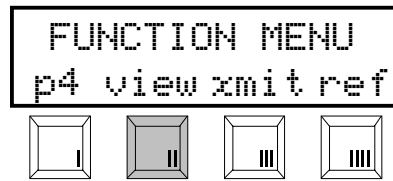


2. Press key I (D-min) to page through RGB data fields of the strip.
3. Previously measured control strips are viewed by pressing key II (<) to go back in time, or pressing key III (>) to go forward in time.
4. After viewing data, continue to press key I (D-min) until the Exit screen appears, then press key IIII (yes) to exit.



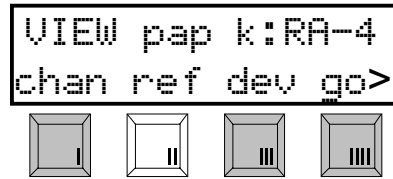
Viewing Control Strip Data from Function Menu

1. Press key II (view) located on Function Menu page (p4) to enter View screen.



NOTE: VIEW LAST displays after pressing key II (view) if the last strip measured is a different format than the reference previously measured in that channel. This allows you to measure different strip formats and view data without affecting the channels memory of the last 16 strip measured. Press key IIII (go>) to view strip data. Press key I (chan) to go to next view menu.

2. Press key I (chan) to select control strip channel for viewing. After selecting channel, follow previously discussed steps.

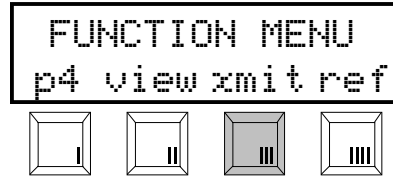


NOTE: CHANNEL IS EMPTY appears in the display if no control strip data is available in the selected channel.

MANUALLY TRANSMITTING STRIP DATA

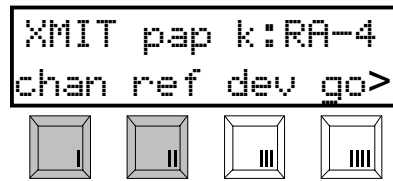
The manual transmission of stored strip data can occur whenever required. Individual strip data (actual values or deviations) or all strips that reside in one channel can be selected for transmission.

1. Press key **III** (xmit) located on Function Menu page (p4) to enter Transmit screen.



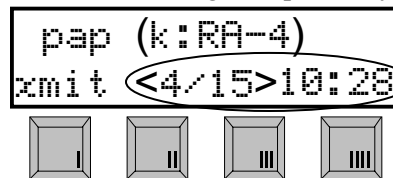
NOTE: XMIT LAST displays after pressing key **III** (xmit) if the last strip measured is a different format than the reference previously measured in that channel. This allows you to measure different strip formats and transmit data without affecting the channels memory of the last 16 strip measured. Press key **IIII** (xmit) to transmit strip data. Press key **I** (chan) to go to next view menu.

2. Press key **I** (chan) to select control strip channel for transmitting. Press key **IIII** (go>) to select actual strip data, or press key **III** (dev) and then press key **IIII** (go>) to select deviation strip data.



NOTE: CHANNEL IS EMPTY appears in the display if no control strip data is available in the selected channel.

3. Select strip to transmit.
 - Previously measured control strips are viewed by pressing key **II** (<) to go back in time, or pressing key **III** (>) to go forward in time. Note, pressing key **III** (>) once more past the last control strip displays **ALL DATA** on the instrument screen. Pressing key **I** (xmit) when this displays causes all strips in the selected channel to be transmitted.
 - Press key **I** (xmit) to transmit selected strip data ("xmit" changes to upper-case during transmission).
 - After transmitting data press key **IIII** (time) to exit transmit screen.



Control strip
measurement
date and time.

SECTION FIVE

Internegative Operation (892 Only)

In addition to the 891 instrument functionality, the 892 instrument has the capability of measuring internegative strips. The 892 also computes changes in exposure and filter pack necessary to balance the internegative using the density difference method.

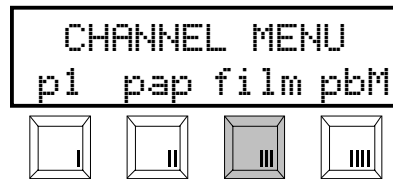
Section Six Contents

- Measuring Internegatives
- Viewing Integative Data
- Auto Exposure and Filter Pack Compensation

MEASURING INTERNEGATIVES

The 892 instrument measures “type 1” and “type 2” internegative, utilizing “6011” or “4114” film. Refer to your Control Strip and Balance Format Guide for strip preparation and positioning procedures.

1. Press key **III** (film) located on Function Menu page (p1) to enter film screen.



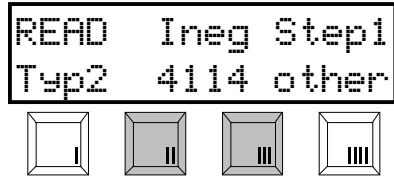
2. Press key **IIII** (other) until **Ineg Step 1** appears on the instrument screen.



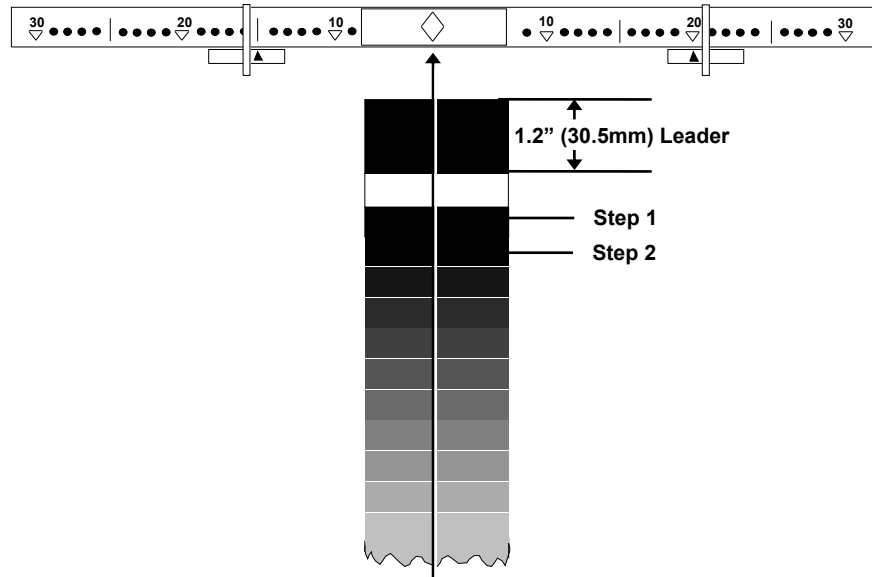
3. Select internegative type by pressing key **I** (typ2). For this example, “Typ2” is selected. Refer to Control Strip and Balance Print Format Guide.



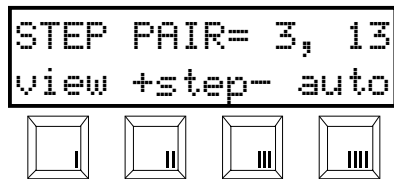
- Select internegative film by pressing key **II** or key **III** (4114). Select 6011 if your are using film similar to Kodak 6011 or interneg film 4112. Select 4114 if you are using film similar to Kodak 4114.



- Insert Type 2 strip into the 35mm slot until it comes to rest against the drive rollers.



- After strip measurement, the display screen indicates which step pair is used on subsequent calculations.
 - Pressing key **I** (view) allows viewing of density difference numbers. Refer to Viewing Density Difference later in this section.
 - Pressing key **II** (+) increments step number and key **III** (-) decrements step number. Refer to Viewing Individual Steps later in this section.
 - Pressing key **IIII** (auto) performs filter pack and exposure calculations automatically. Refer to Auto Exposure and Filter Pack Compensation later in this section.



NOTE: If the strip is severely over exposed, a warning message **STRIP TOO FAR OVEREXPOSED** appears briefly. You are then allowed to view the individual steps using [+] or [-] step keys. However, the View and Auto functions are not available. If this occurs, reduce your exposure by three or four times and try another strip.

VIEWING INTERNEGATIVE DATA

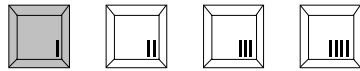
The View function allows you to view the density difference values and recommended filter pack changes. Individual internegative steps can also be viewed.

Density Difference

Density difference values are calculated by simply subtracting the density values of the higher numbered step from the densities of the lower numbered step. These values are used to look-up your filter pack changes from the table.

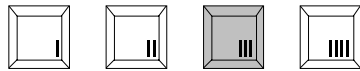
1. Press key I (view).

```
STEP PAIR= 3, 13
view +step- auto
```



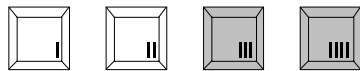
2. Press key III (Δ fp) to display the filter pack changes from the internal table. These numbers are changed (indicated by the Greek letter Δ) and should be added to the filter pack used for exposing this internegative.

```
D= 0.62 0.75 0.80
       $\Delta$ fp exit
```



3. Press key III (Δ den) to redisplay the density difference values. Press key IIII (exit) to return to the Step Pair menu to allow further viewing or calculations.

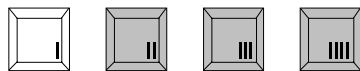
```
 $\Delta$ FP -03C +05M +02Y
       $\Delta$ den exit
```



Individual Steps

1. Press key II (+) to increment step or key III (-) to decrement step. Press key IIII (exit) to return to the Step Pair menu to allow further viewing or calculations.

```
0.20 0.47 0.83
#21 +step- exit
```



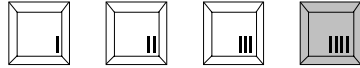
NOTE: For “Type 1” internegatives (4 x 5 format), all of the even numbered steps are computed internally using a curve fitting algorithm. Actual internegatives only contain the odd numbered steps.

AUTO EXPOSURE AND FILTER PACK COMPENSATION

The Auto function initiates the automatic exposure and filter pack compensation. Since internegatives are used as a set up tool rather than a process control tool, measurement data is not stored in channel memory. Data currently stored in channel memory is not destroyed.

1. Press key **||||** (auto) to advance to filter pack entry screen.

```
STEP PAIR= 3, 13
view +step- auto
```



- The instrument screen momentarily displays a message asking you to enter starting filter pack.

```
Enter Starting
Filter Pack...
```

2. Enter the values of the filter pack used to make this internegative. Press key **I** (→) to move the cursor to desired location. Press key **II** (↑) to increase value and key **III** (↓) to decrease value. Press key **||||** (cont) to save values and advance to next screen.

Cursor →

```
FP 00C 30M 30Y
  →  ↑  ↓  cont
```

- The instrument screen momentarily display a message asking you to enter exposure.

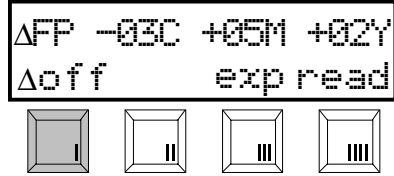
```
Enter Exposure
```

3. Enter the exposure time and aperture. Note, the “f” stop values change in 1/6 stop steps and range from f/4.0 to f/3.2. Press key **I** (→) to move the cursor to desired location. Press key **II** (↑) to increase value and key **III** (↓) to decrease value. Press key **||||** (cont) to save values and advance to next screen.

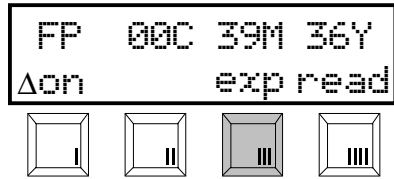
Cursor →

```
EXP 10sec f/8.0
  →  ↑  ↓  cont
```


- The display screen now indicates suggested changes for your filter pack. These numbers are changes (indicated by the Greek letter Δ) and should be added to the filter pack used for exposing this internegative. Press key I (Δ off) to turn the “change mode” off and view “absolute” filter pack values.

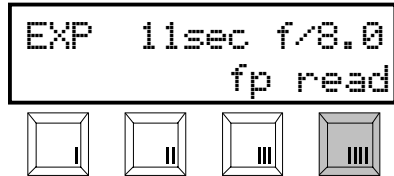


- The absolute values are the addition of your starting filter pack (entered earlier) and changed values. These values are adjusted to remove any neutral density. Therefore, one of these values (usually cyan) is always zero. These values constitute your new filter pack which should be used for subsequent exposures. Press key III (exp) to display the suggested exposure.



NOTE: Any neutral density adjustments to the filter pack affect exposure as well. To avoid reciprocity problems, exposure time is held within 1/2 stop of your starting exposure time. This sometimes causes an aperture change if the calculated exposure time adjustment is greater than 1/2 stop.

- Press key IIII (read).



- Measure another internegative. The entire procedure described is repeated, except that the exposure and filter pack values just viewed are used as the starting point.

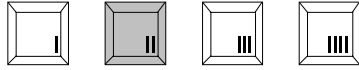
SECTION SIX

Networking

The 891 and 892 instruments are networked through an external modem using X-Rite's QCNetII protocol.

Refer to X-Rite 891/892 Networking Installation/Operation Manual for details (Part Number 891-503), or contact your X-Rite representative.

```
FUNCTION MENU
p5 netwk cal edit
```



SECTION SEVEN

Service and General Maintenance

This section covers repair information, cleaning, general maintenance, and troubleshooting tips for your instrument.

Section Eight Contents

- Repair Information
- Cleaning the Instrument
- Replacing the Read Lamp
- Troubleshooting Tips

REPAIR INFORMATION

The X-Rite 891/892 is covered by a one-year limited warranty and should be referred to the factory or an authorized service center for repairs within the warranty period. Attempts to make repairs within this time frame may void the warranty.

X-Rite provides a factory repair service to their customers. Because of the complexity of the circuitry, all repairs should be referred to the factory (call toll free: 1-888-826-3044) or an authorized service center.

X-Rite will repair any 891/892 instrument past warranty. Shipping cost to the factory or authorized service center shall be paid by the customer, and the instrument shall be submitted in the original carton, as a complete unaltered unit.

CLEANING THE INSTRUMENT

Your instrument requires very little maintenance to achieve years of reliable operation. However, to protect your investment and maintain reading accuracy, a few simple-cleaning procedures should be performed from time to time.

General Cleaning

Whenever required, the exterior of the instrument may be wiped clean with a cloth dampened in water or a mild cleaner.

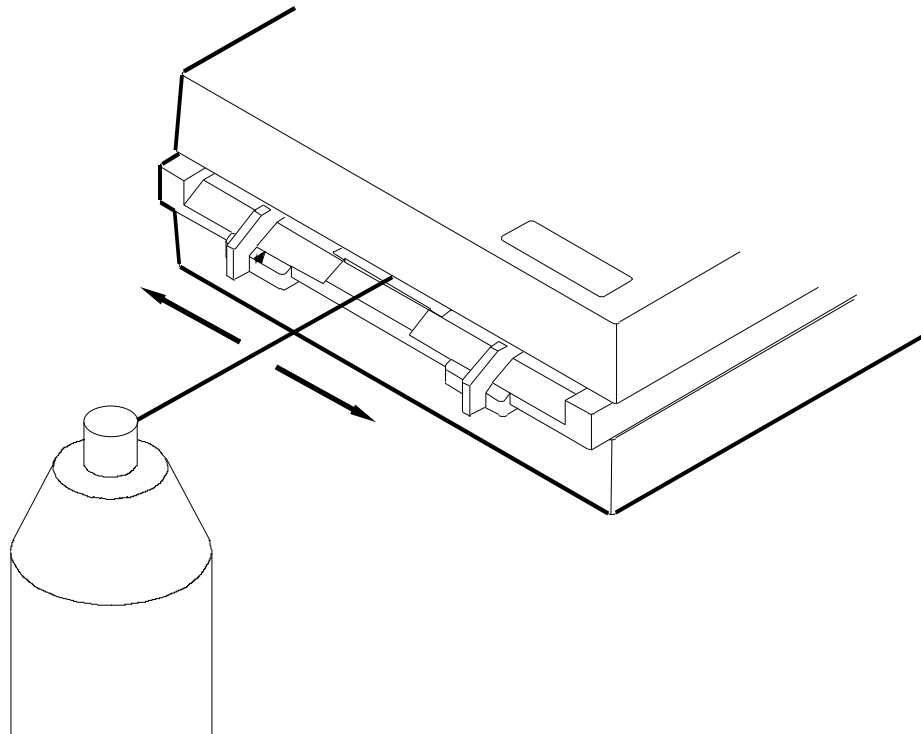
NOTE: *DO NOT* use any ketone solvents to clean the unit, this will cause damage to the cover.

Cleaning the Optics

The optics and drive wheel assembly should be cleaned once a week in normal environments, and more often in dirty or dusty environments.

1. Carefully lift instrument and insert tube from canned air into “front” strip insertion slot.
2. With back and forth motion, spray clean, dry air from one side to the other—do this several times. This should remove any accumulated dust and lint from the optics and wheel assembly.

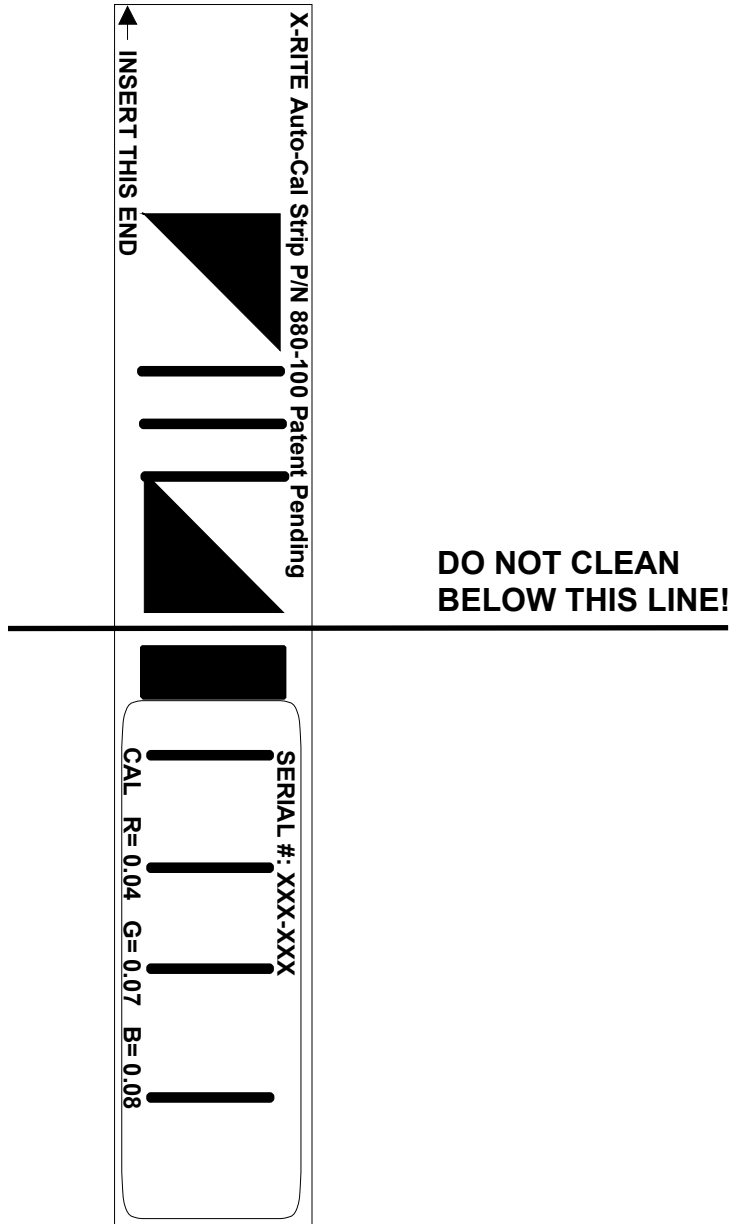
WARNING: *DO NOT* invert cans that use freon as a propellant, doing so could cause damage to the optics assembly.



Cleaning the Calibration Strip (Part Number 880-100)

The Auto-Cal strip can be cleaned with a mild soap detergent, and wiped dry with a clean, lint-free cloth. You must let the calibration strip dry completely before taking a calibration measurement.

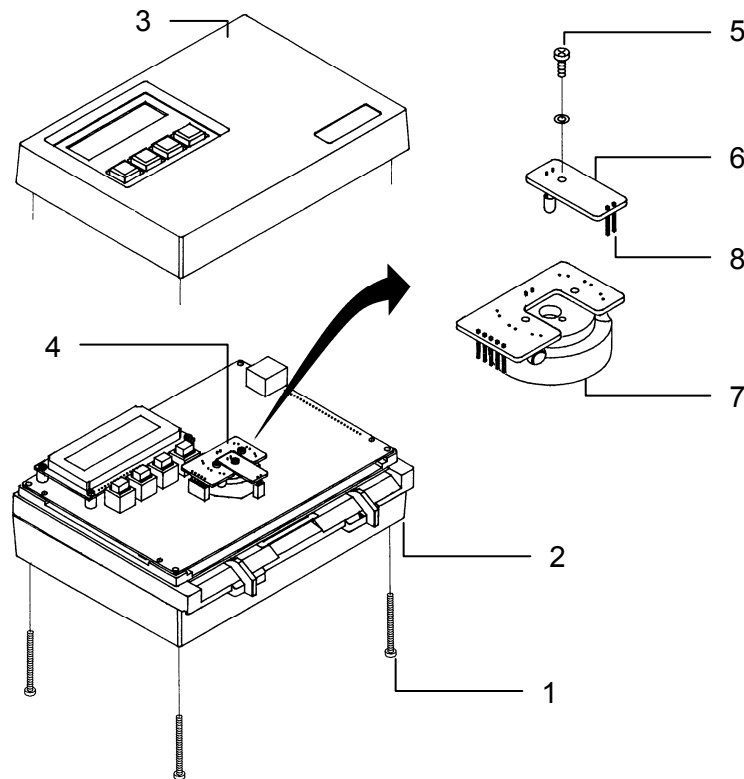
DO NOT clean below the bottom triangle. The attached label is not coated and smears when moisture is applied. **DO NOT** get fingerprints on any portion of the strip, handle by the edge.



REPLACING THE READ LAMP (PART NUMBER 880-07)

NOTICE: New lamp may appear bent, **DO NOT** attempt to straighten.

1. Remove four screws 1 securing the bottom cover 2 with a phillips-head screwdriver. Leave bottom cover 2 on unit.
2. Holding top 3 and bottom 2 covers in place, turn unit over so it rests on the bottom cover 2. Remove top cover 3.
3. Locate optics assembly 4 and remove screw and washer 5 in the middle of lamp assembly P.C.B. 6.
4. Lift out old lamp assembly 6 and discard.
5. Install new lamp assembly 6 by carefully inserting lamp 6 into housing 7 and lamp pins 8 into lamp connector. Press down gently to make sure connector pins 8 are properly seated.
6. Secure lamp screw and washer 5 in place.
7. Carefully clean any dust or plastic chips off circuit board and top cover 3 using moisture free compressed air. Place top cover back on instrument.
8. Holding top and bottom covers in place, turn unit over so that it rests on top cover 3.
9. Remove bottom cover 2. Clean circuit board and bottom cover 2 with compressed air, then place bottom cover 2 back on instrument.
10. Secure bottom cover 2 to instrument with four screws 1 using a phillips-head screwdriver.



TROUBLESHOOTING TIPS

Reflection measurement incorrect:

- Recalibrate instrument.
- Clean reflection cal strip or replace if bad.
- Replace read lamp.*
- Contact X-Rite or Authorized Service Center.

Transmission measurement incorrect:

- Recalibrate instrument
- Replace read lamp*
- Contact X-Rite or Authorized Service Center.

Transmission and Reflection measurement incorrect:

- Recalibrate instrument.
- Replace read lamp.*
- Contact X-Rite or Authorized Service Center.

Measurements drift:

- Recalibrate instrument.
- Replace read lamp.*
- Contact X-Rite or Authorized Service Center.

Unit will not calibrate:

- Clean or replace cal strip.
- Read lamp not working.
- Replace read lamp.*
- Contact X-Rite or Authorized Service Center.

Measurements unrepeatabile/incorrect:

- Re-insert strip.
- Use different strip.
- Contact X-Rite or Authorized Service Center.

* The instrument has a failure monitor that in most cases automatically indicates when the read lamp requires replacement.

SECTION EIGHT

Technical Specifications

Transmission Process Control

Film Width	35mm fixed slot or 1.4–6.0in. adjustable
Measurement Speed	1.1 to 1.4 in/sec (1.2 typical)
891 Spectral Response	Status M
892 Spectral Response	Status A and M
Density Range	0–4.0D
Density Accuracy	±.02D (0–3.00D), ±1% (3.01–3.40D) ±3% (3.41–4.00D)
Density Repeatability	±.01D (0–3.00D), ±.02D (3.01–3.40D) ±.04 (3.41–4.00D)
Control Strip Measurement Area	0.375" (length) x 0.5" (wide) minimum

Reflection (paper) Process Control and Printer Balance

Paper Width	1.4–6.0in. adjustable slot
Measurement Speed	1.3in./sec.
Control Strip Measurement Area	0.375" L x 0.5" W minimum
Printer Balance Measuring Area	0.75" diameter minimum
Spectral Response	Status A
Density Range	0–2.5D
Density Accuracy	±.02D
Density Repeatability	±.01D

General Specifications

AC Adapter	12VDC @ 0.7amp 115VAC (P/N SE30-61) 230VAC (P/N SE30-62)
Instrument Dimensions	7.2" W x 6.0" D x 2.75" H (182.8mm W x 152.4mm D x 69.8mm H)

Specifications and design subject to change without notice.

Error Messages

Below is a list of typical error messages that can appear on your instrument's display screen. If any error messages listed, or not listed should appear, make a note of it and take the appropriate steps to try to correct it. If an error message is consistently displayed, contact X-Rite or an authorized service center.

Message	Reason	Possible Cause	Solution
INVALID READING - PLEASE RE-READ! or UNRECOGNIZABLE STRIP or BUFFER OVERFLOW (during measurement)	Unit did not recognize strip.	Wrong strip selection.	Select correct format.
		Strip did not have a 30.5mm (1.2") leader before first target.	Use strip with leader or refer to the Control Strip & Balance Print Format Guide for leaderless strip insertion.
		Strip not inserted in the correct direction.	Refer to your Control Strip and Balance Print Format Guide for insertion direction.
		Unit needs calibration	Calibrate instrument, Sec. 2.
		Measurement region not aligned with center diamond, or strip not tracking properly.	Make sure measurement patches are centered with diamond and center line. Usually setting the paper guides to the numbers indicated on the display takes care of the problem. Make sure strip feed straight through unit and does not curve toward one side.
		One or more measurement patches are cloudy, have excessive gradients, or have flecks.	Process and then measure a new strip.
		NOTE: If first read causes invalid error message, try re-reading strip again. Measurement tolerances across the patch are opened slightly on second read.	
		Motor drive roller slippage due to restraint or obstruction, or contamination of rollers from reading wet strips.	Remove restraint/obstruction or dry drive rollers with air.
Lamp failure (weak or bad).	Perform transmission calibration to test lamp, Sec. 2.		
A-LIMIT EXCEEDED	Strip measured exceeds Action Limit	Computed values minus aims, are greater than the calculated Action limit.	Consult the manufacturer's process manual.

Message	Reason	Possible Cause	Solution
C-LIMIT EXCEEDED (during measurement)	Strip measured exceeds Control Limit.	Computed values minus aims, are greater than the calculated Control limit.	Consult the manufacturer's processor manual.
S-LIMIT EXCEEDED (during measurement)	Strip measured exceeds Color spread limit.	RGB values are not remaining proportional to each other.	Consult the manufacturer's processor manual.
UNRECOGNIZABLE AUTO-CAL STRIP! (during reflection cal)	Unit did not feed consistently.	Strip inserted in backwards or upside-down.	Insert strip correctly, Sec. 1.
		Cal strip is dirty.	Clean cal strip, Sec. 8.
STRIP RESTRAINED RE-INSERT STRIP! (during reflection cal)	Cal strip did not feed consistently.	Strip path is blocked by debris keeping cal strip from feeding properly.	Clean strip path, Sec. 8.
		Motor drive roller slippage due to restraint or obstruction, or contamination of rollers from reading wet strips.	Remove restraint/obstruction or dry drive rollers with air. IF problem persists, return unit for service.
WARNING MOTOR ERROR! (during reflection cal)	Unit senses motor abnormality.	Strip was pulled out from back during calibration.	DO NOT pull on strip during measurement.
		Motor brush wear. NOTE: If motor error message constantly displays, unit should be returned for proper service.	Return unit for service.
PRESET MEMORY PLEASE CALIBRATE (during power-up)	Memory data detected in unit is not valid.		Recalibrate unit, Sec. 2.
WARNING LAMP MARGINAL! (during trans cal)	Lamp output is less than 50% of its peak intensity (but still able to read).	Lamp has aged close to end of its useful life.	Order new lamp. Replace at convenient time.
WARNING REPLACE LAMP (during trans cal)	Lamp output is less than required intensity. Measurement accuracy of unit is questionable at this point.	Useful lamp life has expired.	Replace lamp immediately, Sec. 8.
MAIN MENU FAIL ok	Refer to Appendix E, Instrument Update Information.		

Term Abbreviations

ALF	Automatic Line Feed
ALL	Strip is one pass and may be read in either direction (strip measurement mode)
Avg	Average
aux 1 through aux 6	Auxiliary 1 through Auxiliary 6
ava	Aim Value Adjustments
AXMT	Automatic Transmit
baud	Varies unit of data transmission speed.
BLK	Black patch must be read first (strip measurement mode)
cal	Calibration
chan	Channel
c:I/O#1	Copal, I/O #1
c:I/O#2	Copal, I/O #2
cnfg	Configuration
COMP	Compact
CTS	Clear to Send
CYN	Cyan patch must be read first (strip measurement mode)
del	Delete
DEL	Delay (in configuration)
DEV	Deviation
DPT	Decimal Point
edit	Editing
f:TECOM	Fuji, Tecom System
HD	High Density patch must be read first (strip measurement mode)
k:C.A.P.	Kodak, Create a Print
k:SYS²₅→⁷₅	Kodak, Systems 25 through 75
k:TNetA	Kodak, Technet A
k:TNetXT	Kodak, Technet XT
LANG	Language
MIN	Minimum Density patch must be read first (strip measurement mode)
netwk	Network
NEW-1 through NEW-3	New Strip #1 through New Strip #3

APPENDIX C

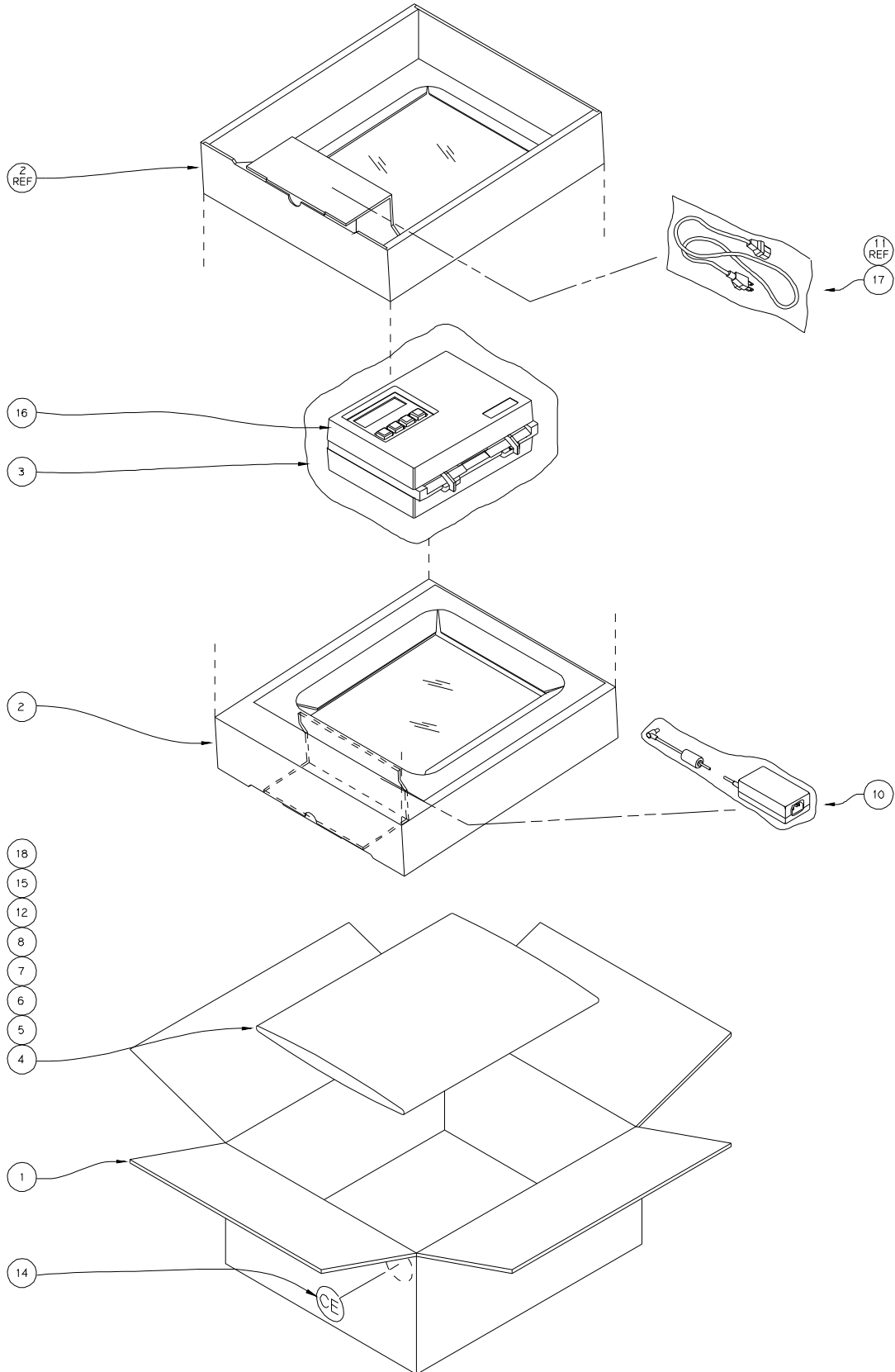
NRM	Normal patch must be read first (strip measurement mode)
NUO 1-Pass	Normal/Under/Over in 1 pass
OLD-1 through OLD-3	Old Strip #1 through Old Strip #3
pap	Paper
pbM	Printer Balance, Master Channel
PIN5	Pin5 of RS232 port can be set to Off, Busy, or CTS
p1 through p5	Page #1 through Page #5
p2a through p2d	Page #2a through Page #2d
Q.C.	Quality Control
RCI	Remote Control Interface
ref	Reference
SPRD-SHT	Spread Sheet
TTL	Time tag log
UND	Under patch must be read first (strip measurement mode)
UNO 1-Pass	Under/Normal/Over in 1 pass
UNO 3-Pass	Under/Normal/Over in 3 passes
xmit	Transmit
YEL	Yellow patch must be read first (strip measurement mode)
↑	Increase amount
↓	Decrease amount
→	Advances cursor
<	Changes display to previous measurements
>	Advances display to next measurement

Parts List and Packaging Drawings

Parts List

18	1	1	SD01-68	LINE CORD NOTICE
17	-	1	SD33-08	LINE CORD
	1	-	SD33-07	LINE CORD
16	1	1	891U-00-01	PHOTOGRAPHIC SCANNING DENSITOMETER ASSY
15	1	1	SD01-41	CERTIFICATE OF CALIBRATION
14	1	1	SD43-77	CE LABEL
13	-	-	NOT USED	
12	1	1	880-602	CONTROL STRIP & BALANCE PRINT FORMAT GUIDE
11	1	1	SD65-13	PLASTIC BAG
10	1	1	SE30-77	POWER SUPPLY, 12V - SWITCHING
9	-	-	NOT USED	
8	1	1	SD01-10	IMPORTANT NOTICE
7	1	1	SD01-04	WARRANTY REGISTRATION FORM
6	1	1	880-100	AUTO CALIBRATION STRIP ASSY
5	1	1	891-500	OPERATORS MANUAL
4	1	1	SD68-10	PACKAGING ENVELOPE
3	1	1	SD65-07	PLASTIC BAG
2	2	2	SD200-880-06	CARTON INSERT
1	1	1	SD200-880-01	CARTON
ITEM	QTY 891U	QTY 891UX	PART NUMBER	DESCRIPTION
PARTS LIST				

Packaging Drawing



Instrument Firmware Update

Your instrument's firmware can be updated from a host computer via a modem, or from a direct connection to a PC serial port. Both methods are discussed on the following pages.

MODEM UPDATE INFORMATION

Newer versions of Kodak's Kodatel 2 and Photoware's Windense quality control software programs (running on a host computer) provide an automatic instrument firmware update feature. After data is received from the host computer, the instrument firmware datecode is checked. If the firmware is found to be an older version, your instrument is automatically updated with the latest version firmware. The update data is sent at the end of the receive session.

This is an extremely powerful feature ensuring that your instrument always contains the latest strip definitions, correction factors, and so on required for accurate QC operation.

If for any reason data transmission is interrupted during the update session (modem disconnect, power failure, etc.), the instrument is forced into a Main Menu Fail mode when it is restarted. If this occurs, the instrument can be reconnected to the host computer and the update completed by following the procedure below.

This procedure also applies to instruments that are updated directly from a PC using a 3-1/2" disk and a disconnect occurs.

1. From the instrument **Main Menu Fail** display, press key **IIII** (ok). The instrument displays the **Loader** menu.
2. Press key **III** (load) and then press key **IIII** (recv) on **Select Function** menu. The modem is initialized and **Waiting for Host** displays. The host computer automatically reinitiates the update session.

NOTE: You may need to verify that the "phone number" and "prefix" settings are correct in the **mod** menu if the instrument cannot connect via modem to the host computer.

COMPUTER UPDATE PROCEDURE

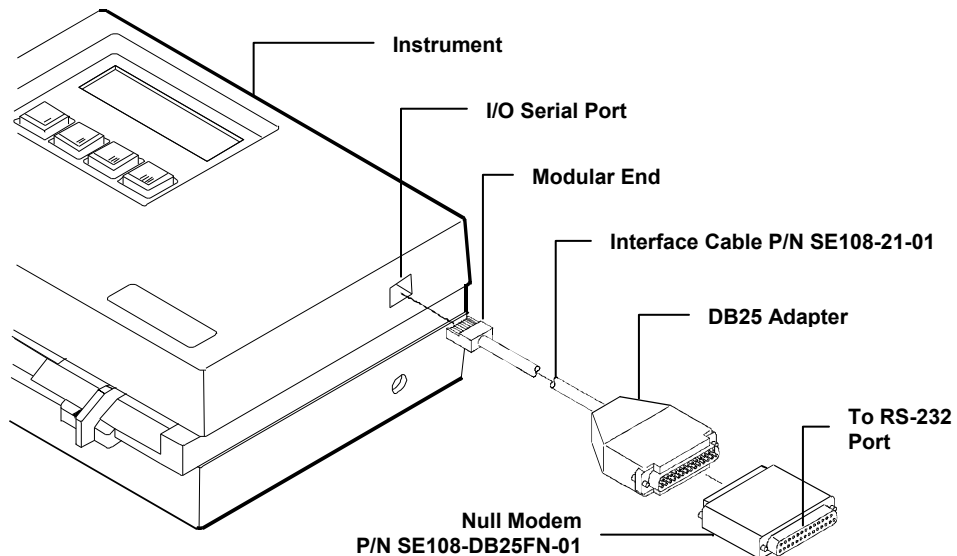
The following items are required to perform a instrument firmware update using a PC serial port.

- Computer with an available serial port
- Instrument with AC adapter
- Update firmware disk
- Interface cable (P/N SE108-21-01) and Null Modem adapter (P/N SE108-DB25FN-01)

NOTE: Computer screen savers must be disabled during the update procedure. Once the update has been started, the old firmware version is permanently erased.

Step 1 Cabling Connection Procedure

- Insert the modular end of the interface cable into the I/O port on the instrument.
- Insert the DB25 adapter end of the interface cable into one end of the null modem adapter.
- Attach the null modem adapter to an available "RS-232" I/O port on the computer.



Step 2 Setting Instrument to Receive Update

- Apply AC power to the instrument.

NOTE: Make sure the modem baud is set to "57.6K." Press **netwk** key on p5 menu. Press **cfg** key, **mod** key, and **baud** key. Edit baud if required. Refer to Section Two in the 891/892 Networking Installation and Operation Manual for additional information.

- Enter the **Network Menu** by pressing key **II** (netwk) on page 5 (p5) **Function Menu**.

- Press key **III** (snd), **Waiting for Host** is displayed.

NOTE: If "**NET is not on . . .**" message appears, you must enable networking. From p5 menu, press **edit** and then **cfg** key. Continually press **net** key until **OUT** appears, then save. Refer to Section Three for additional information.

Step 3 Firmware Update Procedure

If you are running DOS under Windows 3.x, you may need to exit Windows to run the Loader program reliably. An MS DOS window can be open using Win95 or NT.

- Insert 3-1/2" Update disk into your computer 3-1/2" drive.
- Change DOS prompt to appropriate drive (A or B).
- Type: **89X** and press **[ENTER]** key. The program now establishes communication with the instrument and begins update.
- After the firmware is updated the unit goes through a normal startup routine.
- Firmware update is now complete, remove disk and cabling.

Main Menu Fail Message

A Main Menu Fail message will appear on the instrument display if an interruption in communication occurred during the update. Possible cause for this message is a power failure, cabling disconnect, etc. When this occurs, the instrument can only be set to the **Waiting for Host** mode from the **Loader** menu. Refer to procedure that follows.

- From the **Main Menu Fail** display, press key **IIII** (ok). The instrument displays the **Loader** menu.
- Press key **III** (load) and then press key **IIII** (recv) on **Select Function** menu. **Waiting for Host** is re-displayed on the instrument.
- Continue with Step 3.

**Corporate Headquarters**

X-Rite, Incorporated
4300 44th Street SE
Grand Rapids, Michigan 49512
Phone 1 800 248 9748 or 1 616 803 2100
Fax 1 800 292 4437 or 1 616 803 2705

European Headquarters

X-Rite Europe GmbH
Althardstrasse 70
8105 Regensdorf
Switzerland
Phone (+41) 44 842 24 00
Fax (+41) 44 842 22 22

Asia Pacific Headquarters

X-Rite Asia Pacific Limited
36th Floor, No. 169 Electric Road
Hong Kong, China
Phone (852)2568-6283
Fax (852)2885 8610

Please visit www.xrite.com for a local office near you.