

TV-COLOR ANALYZER II



MINOLTA

ATTENTION OWNERS OF MODELS OTHER THAN TV-2130

This manual describes the features and operations of the standard model in Minolta's TV-Color Analyzer series, the TV-2130. When using this manual with other models in the series, the following changes should be noted where appropriate:

1. For models with low luminance range (TV-2150, 2160, 2250):

The luminance measuring range (specified as 3 - 999cd/m² or 1 - 290 ft-L in the text) should read: 0.6 - 200cd/m² (0.2 - 58 ft-L).

2. For models using red-beam standard (TV-2230, 2240, 2250):

Color-balance values (specified as **R/G** and **B/G** in the manual) should be read **G/R** and **B/R**, respectively, throughout the text. In addition, **R-beam intensity** should be substituted for **G-beam intensity**.

3. For models using 4x4 memory (TV-2140, 2160, 2240):

The number of COLOR memory channels totals 16 (instead of four as specified in the manual), there being four COLOR channels for each CRT channel. Therefore, make sure that correct CRT channel is selected before inputting data to or recalling data from a COLOR channel.

4. For models using Yu'v' color space (TV-2120):

All CIE coordinates **x** and **y** should be read **u'** and **v'**, respectively, throughout the text.

MINOLTA TV-COLOR ANALYZER SERIES

Model	Luminance range	Color memory	Beam standard	Color space
TV-2120	3 - 999cd/m ² (1 - 290 ft-L)	4 channels	green	Yu'v'
TV-2130	3 - 999cd/m ² (1 - 290 ft-L)	4 channels	green	Yxy
TV-2140	3 - 999cd/m ² (1 - 290 ft-L)	16 channels	green	Yxy
TV-2150	0.6 - 200cd/m ² (0.2 - 58 ft-L)	4 channels	green	Yxy
TV-2160	0.6 - 200cd/m ² (0.2 - 58 ft-L)	16 channels	green	Yxy
TV-2230	3 - 999cd/m ² (1 - 290 ft-L)	4 channels	red	Yxy
TV-2240	3 - 999cd/m ² (1 - 290 ft-L)	16 channels	red	Yxy
TV-2250	0.6 - 200cd/m ² (0.2 - 58 ft-L)	4 channels	red	Yxy

INTRODUCTION

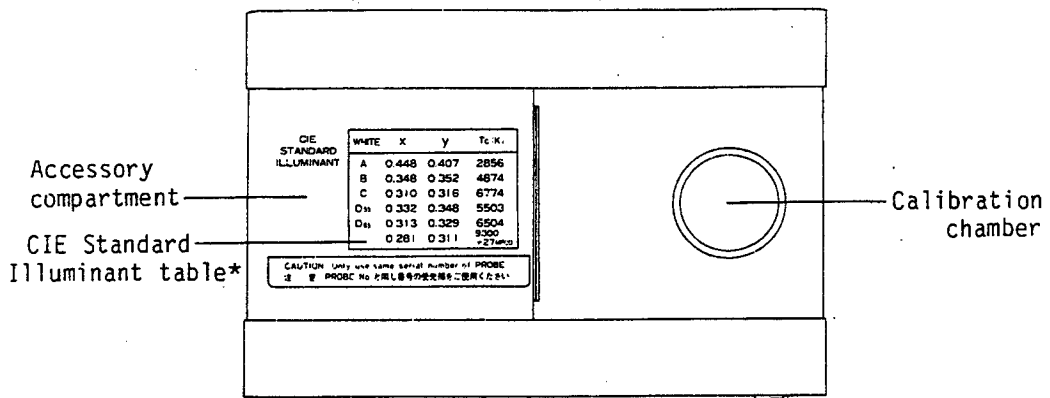
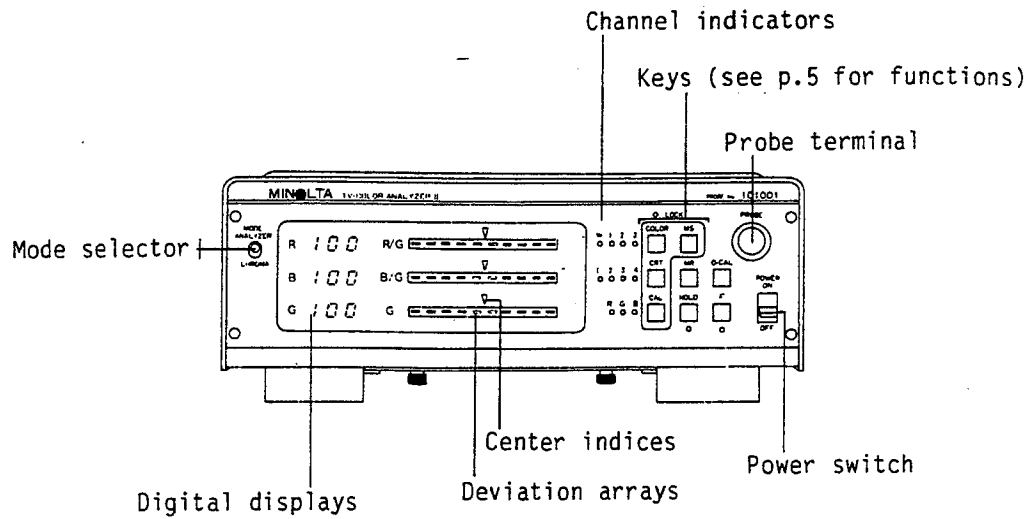
Combining state-of-the-art electronics technology with Minolta's many years of experience in light metering and colorimetry, the TV-Color Analyzer II enables objective white-balance measurement and adjustment of monitors in TV production lines and broadcast studios. A chroma mode provides color readings in Yxy units for quick memory input of any desired white standard or reference color, eliminating the need to use troublesome white masters and comparators. Analyzer mode allows users to measure and independently adjust the red, blue, and green beam intensities of any CRT, thus simplifying white balance adjustments.

Measured values are processed by a microcomputer and displayed on both digital and analog displays. The digital display shows precise values for chromaticity and luminance as well as primary-beam intensities, and the analog display can be used to check color difference and gamma tracking. A built-in memory holds as many as four white standards or reference colors, and also permits storing the phosphor characteristics of up to four CRTs for use in analyzer mode. In addition, a switch can be set to display luminance readings in either foot-lamberts or nits, and a data output terminal permits interfacing with a data processor or computer.

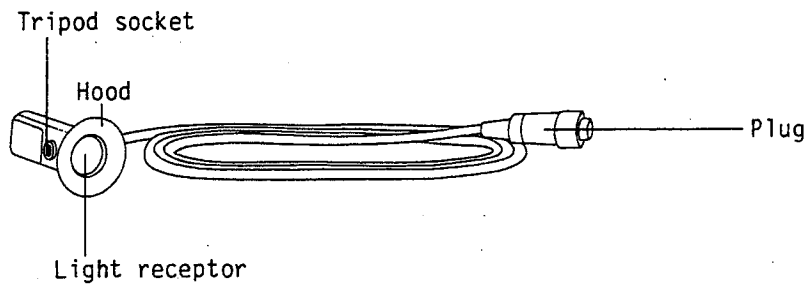
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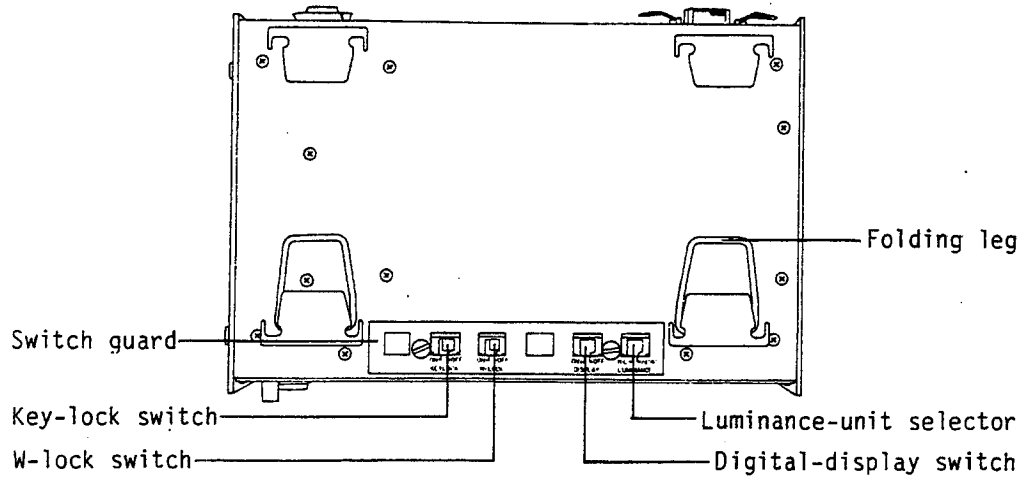
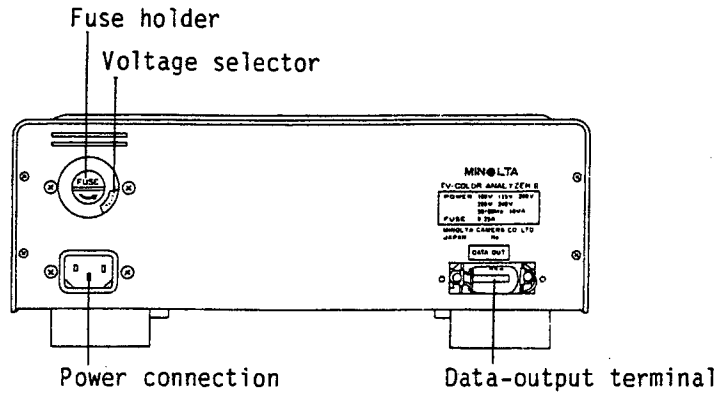
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NAMES OF PARTS

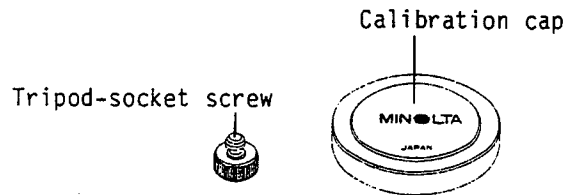


Probe:





Accessories:



FUNCTIONS OF KEYS AND SWITCHES

Front panel

MODE:	Selects measurement mode: Analyzer: Measures primary-color intensities (R, G, B) Chroma: Measures chromaticity (x, y) and luminance (Y)
COLOR:	Selects channels for memorizing or recalling white standard/reference color in the following sequence: W→1→2→3 * Pressing COLOR key while holding down MS key stores displayed data in channel indicated.
CRT:	Selects phosphor-characteristic channels in the following sequence: 1→2→3→4
CAL:	Selects R, G, or B for phosphor calibration * Pressing CAL key while holding down MS key stores data for selected primary beam in indicated CRT channel.
MS:	Inputs values of white standard/reference color into selected COLOR memory channel; or R, G, and B values of a particular CRT into selected CRT memory channel
MR:	Recalls values stored in selected memory channel according to mode setting
HOLD:	Holds displayed values until pressed again, even if probe is removed from screen
O-CAL:	Performs automatic zero calibration
F:	Starts data output (indicated by LED), stops output when pressed again

Bottom

LUMINANCE:	Selects luminance unit (cd/m ² or ft-L) for use in chroma mode
DISP:	Turns off digital display
KEY LOCK:	Locks keys enclosed by tan line on front panel (COLOR, MS, CRT, CAL) to prevent accidental memory loss
W-LOCK:	Locks channel W to prevent accidental loss of data stored in that channel

DISPLAY FUNCTIONS

Chroma mode

Digital display

1. Taking measurements

The chromaticity coordinates (x,y) and luminance (Y, in cd/m² or ft-L) of the color currently being measured are displayed digitally.

2. Recalling data

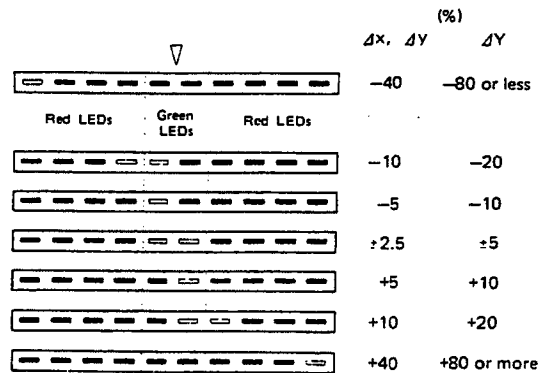
When MR key is pressed, the chromaticity coordinates and luminance value of the white standard/reference color stored in selected COLOR memory channel are displayed.

Deviation display

Deviation of the currently measured x and y values from those of the selected white standard or reference color are displayed by the top and middle LED arrays. Deviation of the currently measured luminance value from the reference luminance value is displayed in the bottom LED array. Each array expresses deviation in percentage terms (see diagram below).

How to read deviation array

white dashes = glowing LEDs



Analyzer mode

Digital display

1. Taking measurement

The primary-beam intensities (R, G, B) of the monitor currently being measured are displayed as a percentage of the selected white standard or reference color. For example, if R = 100, B = 110, and G = 90, then the R output of the monitor being measured is the same as that stored in the selected COLOR channel, while B output is 10% greater and G output is 10% less than the corresponding B and G values stored in that channel.

2. Recalling data

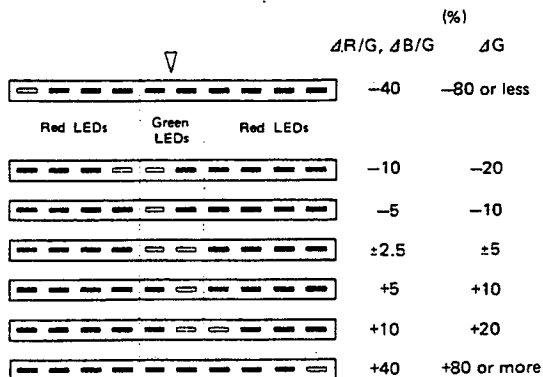
Data recalled from COLOR memory channel 1, 2, or 3 is expressed as a percentage of corresponding values stored in channel W. When channel W is selected, all three digital displays read "100".

Deviation display

Deviations of the currently measured color-balance values (R/G, B/G) from the color-balance values of the selected white standard or reference color are displayed by the top and middle LED arrays. The bottom LED array shows deviation of the currently measured G beam intensity from the memorized G beam intensity. Each array expresses deviation in percentage terms (see diagram below).

How to read deviation array

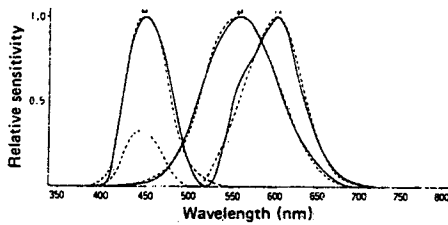
white dashes = glowing LEDs



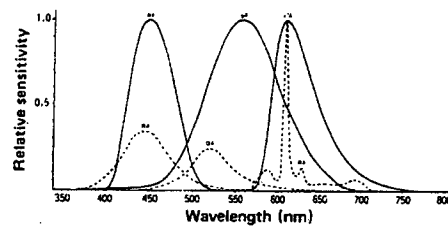
EXPLANATION OF COLOR MEASUREMENT SYSTEM

To make color measurements, the TV-Color Analyzer II uses four photoreceptors: one each filtered to detect blue and green light, and two filtered to detect red. Different red detectors need to be used for calculations in analyzer and chroma mode, since a narrower spectral sensitivity range is required of the red photoreceptor in analyzer mode. This narrower sensitivity range reduces spectral overlap between receptors, and allows the monitor's three primary beam intensities to be displayed and adjusted independently of one another. Data from all four receptors is stored when memory input is made, but only readings from the three receptors appropriate for the mode selected are used when data is recalled from memory.

Spectral Sensitivity of Photoreceptors in Chroma Mode
(Dotted line shows CIE tristimulus values.)



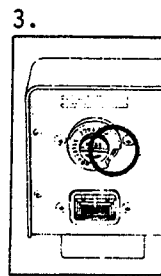
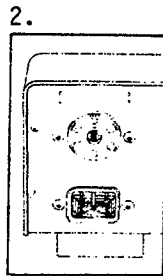
Spectral Sensitivity of Photoreceptors in Analyzer Mode
(Dotted line shows spectral distribution of sample TV monitor.)



SELECTING VOLTAGE AND INSERTING FUSE

To avoid damaging the internal circuitry, the correct voltage must be set on the rear panel before connecting unit to power source.

1. Unscrew fuse holder.
2. Pull out voltage selector.
3. Reinsert voltage selector so desired voltage is visible in window.
4. Insert fuse and fuse holder into socket and tighten.



ZERO CALIBRATION

Zero calibration should be performed each time the power is turned on.

1. Connect probe to main unit's probe terminal, turn power switch on.
2. An automatic check is conducted as soon as power is turned on. If check is satisfactory, top digital display reads "CAP". (See p. 8 for error indications.)
3. Place calibration cap over probe or set probe in calibration chamber located on top of unit.
4. Press 0-CAL key. "CAL" appears in the top display during operation, and all displays blink when calibration is complete.

NOTES

- If probe is not connected when power is turned on, test information for service use appears on display.
- If outside light reaches probe during zero calibration, "CAL" remains lit. Readjust probe to ensure sufficient darkness and repeat calibration procedure.
- When display blinks following calibration, digits other than zero may be shown.

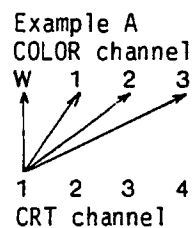
CAUTION: Be sure probe's serial number matches that printed above probe terminal. Use of other probes may result in inaccurate measurement.

SELECTING COLOR AND CRT MEMORY CHANNELS

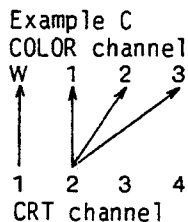
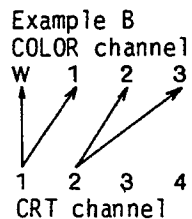
When inputting white standards or reference colors into the COLOR memory, channel W should be used before channels 1, 2, or 3. Once data is stored in channel W, the remaining channels can be selected for use in any order.

When inputting phosphor characteristics in the CRT memory, any available channel may be selected, regardless of which COLOR channel(s) are used to store corresponding white standard(s). However, since using analyzer mode to adjust white balance requires that a white standard and set of phosphor characteristics be used together (see page 13 for more information), channels should be selected so that these data pairs are not confused when recalled from the memory. The following details ways in which white standards and phosphor characteristics can be stored in the memory, according to the number of CRT types to be used:

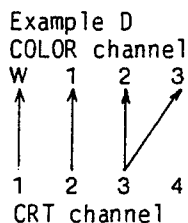
If only one type of CRT is used, its phosphor characteristics can be input to any CRT channel and up to four white standards can be input to the COLOR memory for use with all CRTs. (Example A)



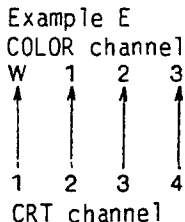
If two types of CRTs are used, the two sets of phosphor characteristics can be stored in any two CRT channels, and the COLOR memory channels are divided between them. Up to two white standards can be stored for each type of CRT (Example B), or three white standards can be stored for one type and only one standard stored for the other. (Example C)



If three types of CRTs are used, one white standard each can be input for two of the CRT types, and up to two white standards can be input for the third CRT. (Example D)



If four types of CRTs are used, only one white standard can be input for each type. (Example E)



NOTE: For adjusting white balance in chroma mode, it is not necessary to input or recall monitor's phosphor characteristics.

MEMORIZING WHITE STANDARDS AND REFERENCE COLORS

The four COLOR memory channels are used to store white standards and reference colors. Regardless of the mode used for memory input, data can be recalled in terms of primary beam intensities (analyzer mode) or color coordinate and luminance values (in chroma mode).

Operation

1. Set MODE selector to CHROMA position.
 - Either mode may be used, but chroma mode is more convenient since chromaticity coordinates and luminance value are displayed for reference.
2. Press the probe firmly against the monitor screen.
3. Select desired COLOR memory channel by pressing COLOR key until LED lights beneath appropriate channel number.
4. Generate white standard or reference color on monitor's screen (CIE Standard Illuminant table printed on top of unit can be used for reference).
5. Once desired values are shown on digital display, press COLOR key while holding down MS key to memorize. LED beneath selected channel blinks and the two center LEDs (green) on each deviation array light to confirm that data has been properly stored.

NOTES

- Care should be taken to see that stray light does not effect the probe's receptor.
- Inputting precise data is easier if HOLD key is pressed when desired values are displayed.
- In analyzer mode, each digital display reads "100" after memory input.
- Primary colors or combinations of two primary colors stored in COLOR memory channels cannot be used in analyzer mode.

MEASURING ABSOLUTE COLOR OR COLOR DIFFERENCE

1. Set MODE selector to CHROMA position.
2. Press COLOR key to select channel in which desired reference color is stored. (for measuring color difference)
3. Press probe firmly against monitor.
4. Use digital display to read chromaticity coordinates (x, y) and luminance value (Y). Deviation arrays show deviation of currently measured values from those stored in selected COLOR memory channel. (See DISPLAY FUNCTIONS, p. 6, for further information.)

NOTE: Luminance values may vary slightly due to the optical characteristics of the monitor's screen or improper placement of the probe. Use of a Minolta Luminance Meter is recommended if greater accuracy is desired.

MEMORIZING PHOSPHOR CHARACTERISTICS

After generating a white standard and storing it in the COLOR memory, the phosphor characteristics of the monitor should be input to the CRT memory (for further explanation, see page 13). To do this, the red, green, and blue phosphors of the monitor are measured separately and stored in one CRT channel.

Operation

1. Press probe firmly against monitor screen used for memorizing white standard.
2. Select desired CRT channel by pressing CRT key until LED lights beneath appropriate channel number.
3. To measure red phosphor characteristics, press the CAL key until LED lights beneath channel R.
4. Generate pure red on monitor's screen. After readings on display have stabilized, memorize values by pressing CAL key while holding down MS key.
 - . LED beneath channel R blinks to confirm that red phosphor characteristics have been properly memorized.
5. Repeat procedures 3 and 4 two more times, using CAL key to select channels G and B, and consecutively input green and blue phosphor characteristics into memory.
 - . When all primaries are input to memory, LEDs beneath R, G, and B blink briefly to indicate that the phosphor characteristics are properly stored in the selected CRT channel.

NOTES

- . All three phosphor characteristics must be input to memory for accurate measurement in analyzer mode.
- . Display fluctuates erratically if correct procedure has not been followed.

ADJUSTING WHITE BALANCE

It is recommended that analyzer mode be used for white balancing since the red, blue, and green beam intensities can be displayed and adjusted independently of each other. White balancing may also be done in chroma mode, but it is not as convenient, since both the chromaticity coordinates (x, y) are effected when adjusting any of the monitor's primary outputs.

When using analyzer mode, however, users must keep in mind the following: A stored white standard can only be used to adjust CRTs of the same type as that from which the standard was taken. For this reason, the phosphor characteristics of any monitor used when memorizing a white standard to the memory must be stored in a CRT channel and recalled when the standard is to be used. If the appropriate phosphor characteristics are not recalled, or if they do not match those of the monitor to be adjusted, the color generated may appear different even though the unit indicates white balance has been achieved.

Operation

1. Set MODE selector to ANALYZER position.
2. Press CRT key to select channel in which desired phosphor characteristics are stored.
3. Press COLOR key to select channel in which appropriate white standard is stored.
4. Press probe firmly against monitor.
5. Adjust monitor's primary beam outputs until all digital displays read "100", or until the two center LEDs (green) light on each deviation array.

NOTES

- If monitor has no G-beam control, first adjust monitor's luminance level until G output on digital display reads "100", then adjust R and B output levels accordingly.

Setting different-type CRTs to same white standard

If two different types of CRTs need to be adjusted to the same white standard, perform the following procedure: Generate the white standard on one model, then adjust the other CRT to match it either by visual means or by matching chromaticity and luminance values in chroma mode (Note: primary-beam intensities will be different even though chromaticity is the same since CRTs' phosphor characteristics do not match). Input the white standards and phosphor characteristics from each CRT to the memory. When white balancing, recall the data appropriate for the type of monitor to be adjusted.

ERROR INDICATIONS

Before zero calibration

E 0 1	Memory loss due to depletion of back-up battery: Approximately five seconds after indication appears, unit is automatically set at COLOR-W, CRT-1 and CAL-R, display will read "CAP" and normal operation can begin, starting with zero calibration and white-standard memory input. To maintain input memory values, keep power on for sufficient time to recharge battery.
E 0 2	Data-memory error: All operation stops. Turn power switch off, wait a few seconds, then turn on again. If error indication is still displayed, contact service station.
E 0 3	Too much light reaching receptor when power turned on. Shut power off and darken receptor before turning unit on again. or Analog-digital converter error: All operation stops. Contact service station.

During measurement

- - -	Light level too high for accurate measurement (under CIE Illuminant C conditions, more than 999cd/m ² or 290 ft-L)
E 0 0	Light receptor of probe not completely dark during zero calibration, or drift of zero level. Zero calibration should be completed again.

NOTE: All displays blink when light level is too low for accurate measurement (under CIE Illuminant C conditions, less than 3cd/m² or 1 ft-L)

DATA OUTPUT

The Minolta TV-Color Analyzer II is equipped for RS-232C serial output, as follows:

Transmission rate:

4800 BPS (adjustable from 300 to 9600 BPS by service station)

Transmission format:

Start Bit	Data characters	Parity bit	Stop bit
1	8	1	2

Usable connector:

Amphenol, 57-30140 or equivalent

Connection code:

Pin No.	Signal	I/O	Function
1	GND	-	-
2	TXD	Output	Data transmission
3	RXD	Input	Data receiving
4	RTS	Output	Request to send
5	CTS	Input	Clear to send
6	DSR	Input	Data set ready
7	GND	-	-
8	DTR	Output	Data terminal ready
9-14	GND	-	-

Transmission rate selection:

Change jumper on circuit board as follows:

- f ↔ g 300 BPS
- ↔ h 600
- ↔ i 1200
- ↔ j 2400
- ↔ k 4800
- ↔ l 9600

Jumper set at 4800 BPS at time of shipment; instructions for changing position available from service station upon request

Output sequence:

As soon as "F" key is pressed, indicator LED comes on and data is output according to ASCII code as follows:

1. "ANALYZER" or "CHROMA-XY" carriage return
2. "COLOR-W", "COLOR-1", "COLOR-2", or "COLOR-3" carriage return
3. "CRT-1", "CRT-2", "CRT-3" or "CRT-4" carriage return
4. "CANDELA" or "FT-L" carriage return

Provided "HOLD" key is not pressed, data output will continue as follows until "F" key is pressed again:

R data "XXX" B data "XXX" G data "XXX" carriage return
or
x data "XXX" y data "XXX" Y data "XXX" carriage return

(Values with decimal point are outputted in four spaces.)

TECHNICAL DETAILS

- Type:** Color-TV white-balance analyzer and chromaticity meter with digital/analog display
- Luminance measuring range:** 3 - 999cd/m² (1 - 290 ft-L) displayed at 0.1cd/m² (0.03 ft-L) intervals (under CIE Illuminant C conditions)
- Measurement modes:** Analyzer: Primary-color intensities based on matrix (R, G, B)
Chroma: Chromaticity coordinates (x, y), Luminance (Y)
- Chromaticity error:** ± 0.005 or less (under illuminant C conditions at 999cd/m²)
- Repeatability error:** Less than ± 0.1 (± 1 digit) over full range for measurements of luminance; less than 0.002 (at Illuminant C, 999cd/m²) for measurements of chromaticity
- Operating temperature range:** 0°C to 40°C
- Display:** Digital: R, B, G, or x, y, Y in three figures
Analog: Three 10-LED deviation arrays giving $\Delta R/G$, $\Delta B/G$, ΔG or Δx , Δy , ΔY
- Luminance unit:** In cd/m² or ft-L (selectable by switch on bottom panel)
- Measurement/display cycle:** Approx. 2/sec. (measuring time: 400-600msec.)
- Memory:** "COLOR": Four white-standard/reference-color channels
"CRT": Four phosphor characteristic channels
- Memory life:** 1500 hours (approx. 2 months), provided unit used at least 7 hours per week
- Data output:** RS-232C standard; transmission rate: 4800 BPS (adjustable from 300 to 9600 BPS by service station)
- Power sources:** AC 100, 115, 200, 220, 240v (selectable on rear panel), 50-60Hz, 10VA
- Dimensions (W x H x D):** 300 x 120 x 200mm (11-13/16 x 4-3/4 x 7-7/8 in.)
- Weight:** Approx. 4kg (8.8 lbs.) including probe
- Accessories:** Probe, calibration cap, power cord, tripod-socket screw

Specifications subject to change without notice

CARE AND STORAGE

- If the unit becomes dirty, wipe it with a dry cloth or a silicone-treated cloth. Benzene, thinner, and other chemicals should not be allowed to touch the unit's surface.
- For proper functioning of the electronic components, the main unit should not be used outside the recommended operation temperature range (0°C to 40°C).
- The main unit and probe should not be subjected to vibration or shock.
- Do not disassemble the main unit or probe.

Minolta Camera Co., Ltd.

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Minolta Austria Gesellschaft m.b.H.

Minolta Camera Benelux B.V.

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10, Teban Gardens Crescent, Singapore 2260

Through The Years & Around The World: A CED Sponsored Learning Fair Providing Age-Specific & Culturally Competent Care at St. Joseph's



Enhancing Jobs & Advancing Education

At St. Joseph's we care for patients of all ages (from neonates to geriatrics) and many different cultures. With this comes the need for all direct care providers to be knowledgeable and skillful (or as JCAHO would say...competent) about differences in the care of patients of varying ages & cultures. How do we assess a 3 year-old differently from a 12 year-old? How do we insert a peripheral IV in an 85 year-old compared to a 35 year-old? How best to teach a 10-year old about their asthma medication? How to communicate effectively with a patient or colleague from another country?

Directions: Review each station with content related to your job at St. Joseph's. Note that you might not provide care to all ages of patients. Complete the educational activity (fishbowl question, post-test, etc.) then have the educator at the station sign the checklist. Have fun learning about the great ways we care for patients at St. Joseph's.

TOPIC	DATE COMPLETED	INSTRUCTOR SIGNATURE
GROWTH & DEVELOPMENT		
Erickson's Developmental Tasks; Developmental Stages		
AGE-SPECIFIC COMMUNITY RESOURCES FOR DISCHARGE PREPARATION & TEACHING		
Culturally Competent & Age-specific Patient Education, Identifying Community Resources, Identification & Reporting of Abuse: elder, child, domestic violence		
INFANT, TODDLER, PRE-SCHOOL, SCHOOL-AGE YOUTH, ADOLESCENT		
Assessing Age-specific Clinical Data, Performing Age-specific Treatments, Age-appropriate Communication/interactive Skills, Involvement of Family &/or Significant Other In Plan of Care		
ADULT		
Assessing Age-specific Clinical Data, Performing Age-specific Treatments, Age-appropriate Communication/interactive Skills, Involvement of Family &/or Significant Other In Plan of Care		
GERIATRIC		
Assessing Age-specific Clinical Data, Performing Age-specific Treatments, Age-appropriate Communication/interactive Skills, Involvement of Family &/or Significant Other In Plan of Care, Aging Sensitivity, Spirituality of Aging		
PHARMACY SERVICES		
Drug Therapy in the Elderly; Pediatric Medication Administration		
CULTURALLY COMPETENT CARE		
Definitions of Culturally Competent Care, Dimensions of Culture, Behavioral Health Cultural Competence PI Team, Working With An Interpreter, Pastoral Care Resources		

Once you have completed all stations, share 1 example of how you have recently provided age-specific & culturally competent care on the easels by the stage & participate in the free raffle!

Learner Signature: _____ **Job Title** _____ **Date:** _____

PLEASE GIVE THIS RECORD TO YOUR SUPERVISOR. **Department** _____