Operator's Manual

MikroScan 7600PRO Thermal Imager

MIKRON INFRARED, INC.
16 THORNTON ROAD
OAKLAND, NJ 07436, USA
Tel: 1-201-405-0900
Fax: 1-201-405-0090
URL: http:\\www.mikroninfrared.com

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Section 1

General Information

Congratulations on your selection of Mikron's MikroScan 7600PRO for your thermal imaging applications. You have chosen a fine, precision instrument that will provide years of reliable service if you adhere to the precautions, recommendations, and procedures for operation, maintenance, and care as outlined in this manual. Therefore, it is recommended that you read this manual in its entirety prior to operating your MikroScan 7600PRO camera.

1.1 How To Use This Manual

This manual contains information designed to familiarize you with the features and functions of the MikroScan 7600PRO and to provide step by step instructions on the instrument's operation. Information about infrared temperature measurement theory and thermal imaging is also included together with a guide to care, maintenance and troubleshooting.

1.2 Conventions

1) Headings of main sections appear in ***italicized, bold*** type.
2) Headings of sub-sections appear in **bold** type.
3) Menu or display options appear as [BOXED TEXT].
4) BUTTON designations are indicated in capital letters.
5) Warnings, Cautions, Notes, and Tips are designated in the side bar.

The following notations appear before instructions intended to avoid injury to personnel or damage to equipment.

Warning This may cause injury to personnel or damage to user's equipment.

Caution This may cause damage to the product.

In general:

Notes contain information that is important.

Tips contain information that is helpful.

1.3 Operator Training

To best understand and utilize the measurements and images derived from the operation of this instrument, the operator should understand the basics of heat transfer and infrared radiation theory. Notes on these basics can be found in Section 8 of this manual. Education and training in these subjects should be provided by qualified personnel.

1.4 Precautions

The following precautions should be followed when handling and operating your MikroScan 7600PRO thermal imaging camera.

1.4.1 Power

Follow the connection procedures described in Section 3.2 of this manual.

1) Do not use an AC Adapter or batteries other than those provided or specified by Mikron Infrared, Inc.
2) Do not use a source for line power that is not in accordance with specifications.
3) Do not allow line voltage to exceed the specified noise or fluctuations limits.

1.4.2 Battery Pack

Follow the connection procedures described in Section 3.2 of this manual.

1) Do not disassemble the battery pack or batteries.

   If you disassemble the battery pack, the internal circuit will break and the safety systems for charging and discharging will not operate properly which may cause overheating, fire, or explosion. Also, if the battery pack is disassembled, it may generate irritating gas or cause the negative electrode to overheat and catch fire.

2) Do not short-circuit the battery pack or battery.
3) Do not expose the battery pack or battery to flame or water.

   If the battery pack or battery is exposed to flame it may catch fire or explode. If it is exposed to water, the internal circuit will break and the safety systems for charging and discharging will not operate properly which may cause overheating, fire, or explosion. Also exposure to water may cause the shielded portion of the battery to corrode and leak.

4) Do not solder the terminal of the battery pack.

   The heat may melt the case or break the internal circuit and the safety systems for charging and discharging will not operate properly which may cause overheating, fire, or explosion. Also if the battery is heated at 100°C or more, the plastic material of the gasket and separator may break and cause leakage, overheating, fire, or explosion.

5) Do not operate the camera in an enclosed case.

   Flammable gas generated by the battery may catch fire from sparks generated from a motor or switch, etc.

6) Do not install the battery terminals (+) and (-) in reverse.

7) Do not charge, overcharge, or charge in reverse with higher current than the rating.

   This may cause the battery to generate gas, catch fire or explode.

8) Do not use the battery in equipment that has not been provided or specified by Mikron Infrared, Inc., as being compatible for use with the battery.

9) Do not use a charger other than the charger provided or specified by Mikron Infrared, Inc., as being compatible for use with the battery.

1.4.3 Cable, adapter, cord

Follow the connection procedure for the instrument, AC Adapter and power connector as described in Section 3.2 of this manual.

1) Do not wet or immerse the adapter in water.

2) Do not use a damaged AC Adapter or extension cord.

3) Do not disconnect the battery or AC Adapter from the instrument with the power switched to on.

1.4.4 Neck Strap

Follow the neck strap attachment procedure as described in Section 3.3 of this manual.

1) Do not use the strap around your neck when the instrument is in transit between locations.

2) Be especially aware of protruding objects on which the strap can become hooked.

1.4.5 Environmental Conditions for Use and Storage

1) Do not exceed the storage temperature limits of -20°C to 70°C.

2) Do not exceed the operating temperature limits of -15°C to 50°C.

3) Do not exceed the humidity limit of 30% to 90% Relative Humidity (non-condensing).

4) Do not use or store the instrument in the presence of poison, flammable gas or materials, explosives, corrosive atmospheres or steam.

5) Do not use or store the instrument where it will be subjected to shock and vibration extremes.

6) Do not use or store the instrument for extended periods in direct, intense sunlight or in a location subject to extreme increases in temperature (e.g. in a car).

7) Do not use or store the instrument in extremely dusty environments.

8) Do not use or store the instrument in the presence of strong electromagnetic fields, if possible.

9) Do not use or store the instrument under wet conditions such as rain or snow unless the hatch, terminal cover and battery have been secured.

1.5 Warranty

Mikron Infrared, Inc., will repair or replace any parts or material found defective which are due to flaws in design or manufacture when reported in writing within one year from the date of sale (unless another term is agreed to in writing by Mikron as part of the sale). Once a return authorization is approved and assigned, instruments to be repaired under this warranty are to be returned to Mikron, shipping charges prepaid by the user who assumes all risk and cost of shipping to and from the plant.

In the event that Mikron, in its sole judgment and discretion, determines, for purpose of repair, that an on-site inspection is required, this warranty does not cover transportation of factory-trained service personnel to and from the installation site or expenses while there.

This warranty is void if the instrument is disassembled, tampered with, altered or otherwise damaged, without prior written consent from Mikron, or if considered by Mikron to be abused or used in abnormal conditions.

This warranty shall constitute the exclusive remedy available to the user and shall be considered a condition of sale and use.

The manufacturer, Mikron Infrared, Inc., shall not be liable for any loss, or damage, including loss of profit or consequential damages resulting from, or attributed to, the use of its product or resulting from a defect in design or manufacture of the product.

The user shall determine the particular use to which the product shall be applied and the seller excludes and disclaims any warranty that the product is fit for such use.

1.6 Regulatory Information

This section contains information that shows how the Infrared camera complies with regulations in certain regions. Any modifications to the Infrared camera not expressly approved by the manufacturer could void the authority to operate the Infrared camera in these regions.

USA

This Infrared camera generates, uses, and can radiate radio frequency energy and may interfere with radio and television reception. The Infrared camera complies with the limits for a Class B digital device used exclusively as industrial or commercial test equipment., pursuant to Part 15 Subpart B Sec. 15.103 c. of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference. However, there is no guarantee that interference will not occur in a particular installation.

General conditions of operation.

(a) Persons operating intentional or unintentional radiators shall not be deemed to have any vested or recognizable right to continued use of any given frequency by virtue of prior registration or certification of equipment, or, for power line carrier systems, on the basis of prior notification of use pursuant to Sec. 90.63(g) of this chapter.

Caution

The package should be allowed to stabilize at room temperature before removing the instrument to prevent the formation of condensation.

(b) Operation of an intentional, unintentional, or incidental radiator is subject to the conditions that no harmful interference is caused and that interference must be accepted that may be caused by the operation of an authorized radio station, by another intentional or unintentional radiator, by industrial, scientific and medical (ISM) equipment, or by an incidental radiator.

(c) The operator of a radio frequency device shall be required to cease operating the device upon notification by a Commission representative that the device is causing harmful interference. Operation shall not resume until the condition causing the harmful interference has been corrected.

1.7 Unpacking and Inspection

The MikroScan 7600PRO thermal imaging camera is shipped in a rugged and padded carrying case along with two battery packs, a battery charger, AC Adapter, memory card, hand grip, lens cap and operating manual. A wide variety of optional accessories are also available including battery belts and auxiliary lenses.

When unpacking and inspecting your camera, you need to do the following:

1) **Check container contents against the shipping list.**
2) **Carefully unpack and inspect all components for visible damage.**
3) **Save all packing materials, including the carrier's identification codes, until you have inspected all components and find that there is no obvious or hidden damage.**

Before shipment, the camera was assembled, calibrated, and tested at the Mikron Factory. If you note any damage or suspect damage, immediately contact the carrier and Mikron.

1.8 Procedure for Factory Repair and Return

Do not disassemble any Mikron instrument unless authorized by the factory. Unauthorized disassembly will void your warranty. If the instrument malfunctions, notify your local Mikron representative (or call 1-201-405-0900, or fax Mikron Service Department at 1-201-405-0090). If necessary, they will authorize the return of your instrument.

Pack the instrument in its original packing, or a carton with sufficient padding to prevent further damage. Please include a note describing the problem (be specific) or describe the services requested. Be sure to provide an approved purchase order number even if the instrument is under warranty, the name and telephone number of the person to contact should questions arise, and ship to the address below.

Within the United States, ship via United Parcel Service (UPS) to:

Mikron Infrared, Inc.
16 THORNTON ROAD
OAKLAND, NEW JERSEY 07436
U.S.A.

Shipping from outside the United States:
Please use a shipper such as UPS, FedEx or other established company. Do not ship by mail. If shipping by UPS, or FedEx, please check the waybill box which states “Shipping and Duty to be charged to Shipper.” Also state UPS or FedEx to clear customs. Shipping documents must state in English “Goods originated in the USA being returned temporarily for repairs.” If shipped by a company other than UPS or FedEx, address shipment to Mikron Infrared, Inc. c/o Shenkers Custom Brokers. Failure to comply with these instructions will result in U.S. Customs and Import duties being added to the repair cost.

Section 2

Introduction

Mikron ikron has once again raised the bar on thermal imaging with the introduction of the MikroScan 7600 PRO. This high resolution and high performance, hand-held IR camera offers capabilities that far exceed any IR camera on the market today. The MikroScan 7600PRO is an extremely lightweight, fully-radiometric camera with built-in visual imaging capabilities. With its newly developed high-performance UFPA detector and built-in visual camera, linking thermal and visual images and creating thermal/visual image composites for easy data storage, analysis and post processing has never been more efficient.

The MikroScan 7600 PRO is ergonomically designed for comfortable one-handed point-and-shoot operation using simple joystick operation, an intuitive menu system, five direct access buttons, viewfinder and highquality flip out LCD display. It includes on-board digital voice recording and has the ability to simultaneously record high-definition 14-bit thermal images with digital visual images.

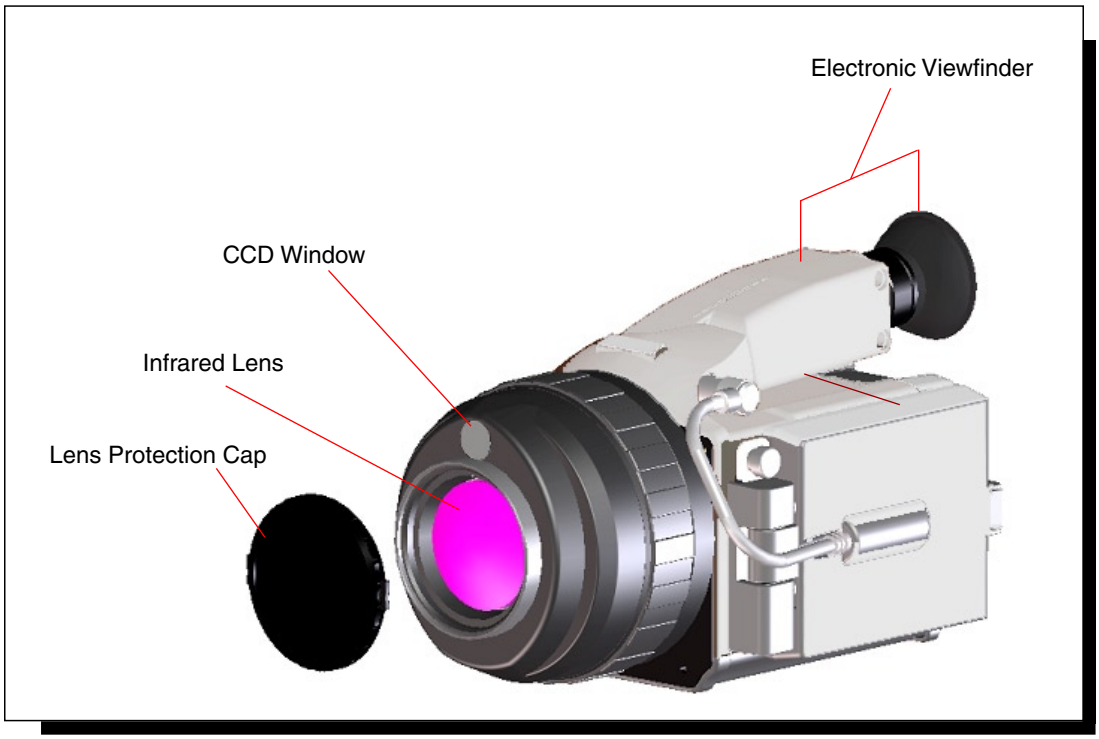
It is battery operated, comes standard with extensive onboard image processing software, and has the ability to store images and data to a standard compact flash memory card. Images can also be viewed in real-time via the video output or through a built-in IEEE 1394 (Firewire®) interface. Completely self-contained in a dust proof and splash proof case, the MikroScan 7600 PRO not only meets IP54 specifications, but it also offers a shock rating of 30G (IEC60068-2-27) and a vibration rating of 3G (IEC60068-2-6), making it the perfect imager for the even the most extreme of environments.

2.1 System Overview

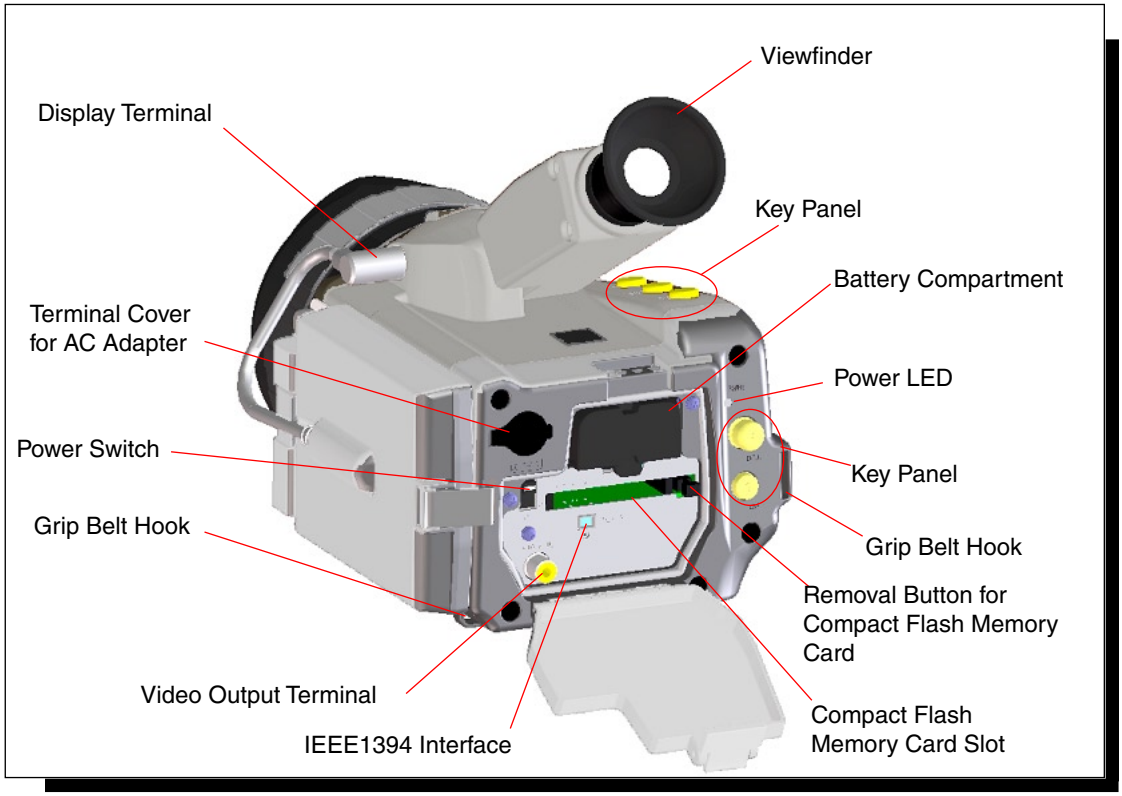
The MikroScan 7600PRO is a non-contact, high sensitivity infrared radiometer. It measures the infrared radiation emitted by the target surface and converts this radiation into a two-dimensional image related to the temperature distribution at the target surface. Through the use of standard on-board diagnostic software, the image can be used to provide a picture of temperature variations over the area included in the field of view, in either temperature related colors or in black and white. Point temperatures can also be derived from the image.

2.2 Construction

Camera Features (Front)

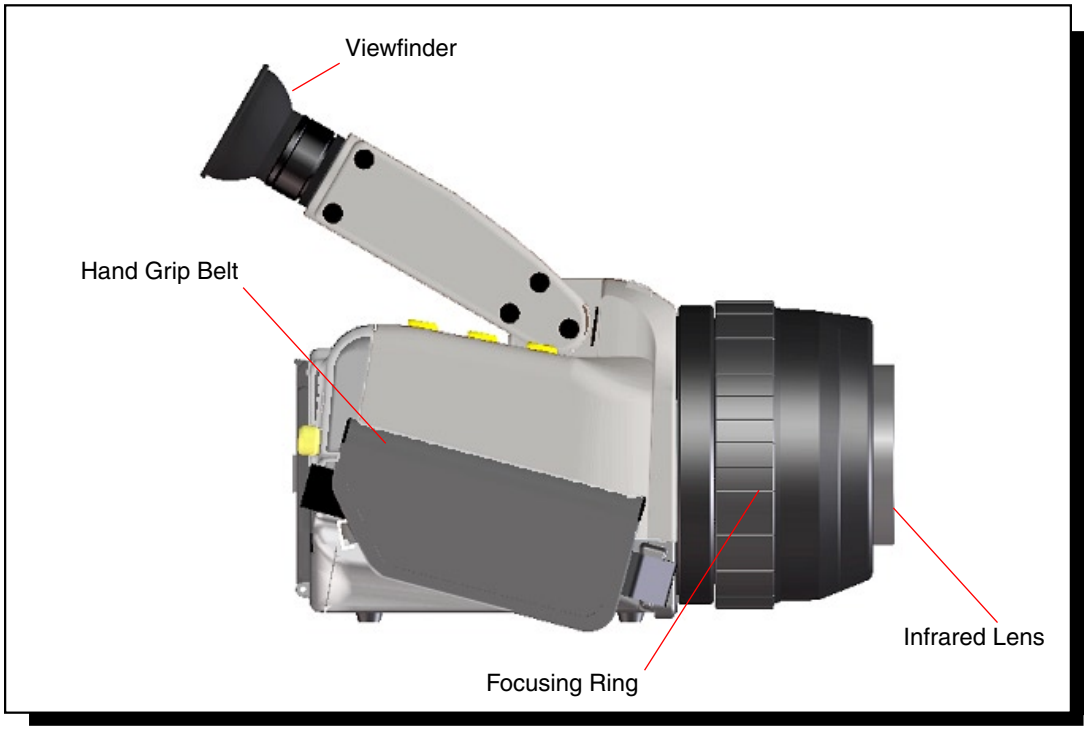


Camera Features (Back)

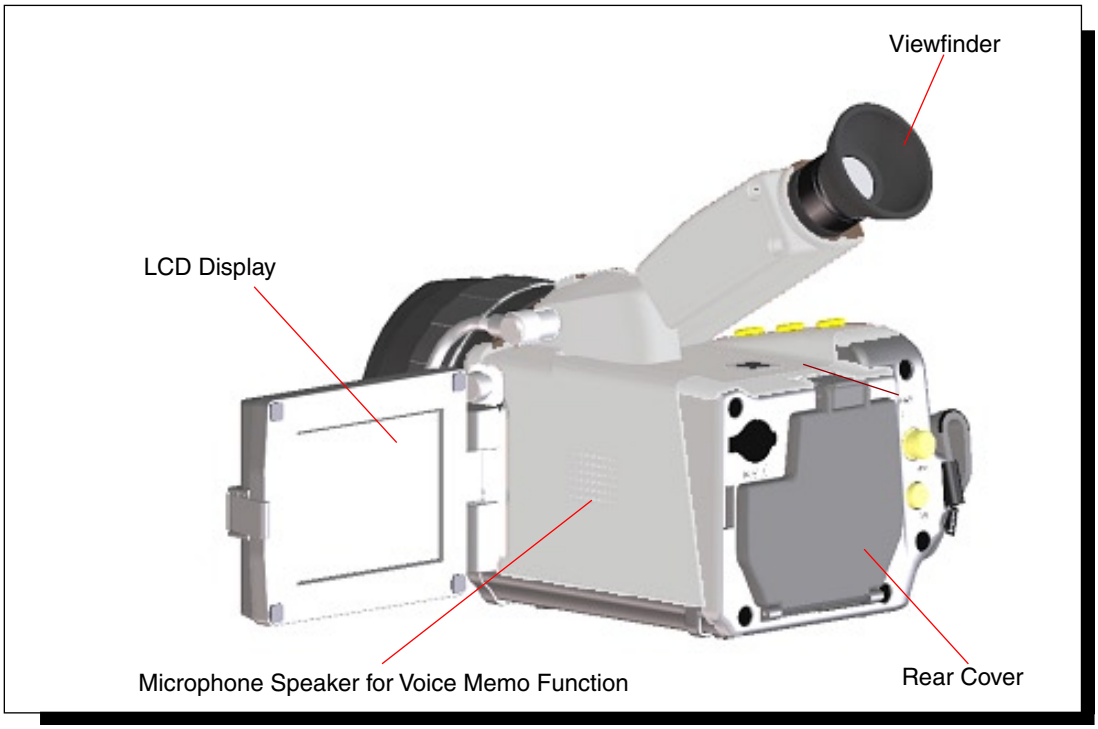


2.2 Construction

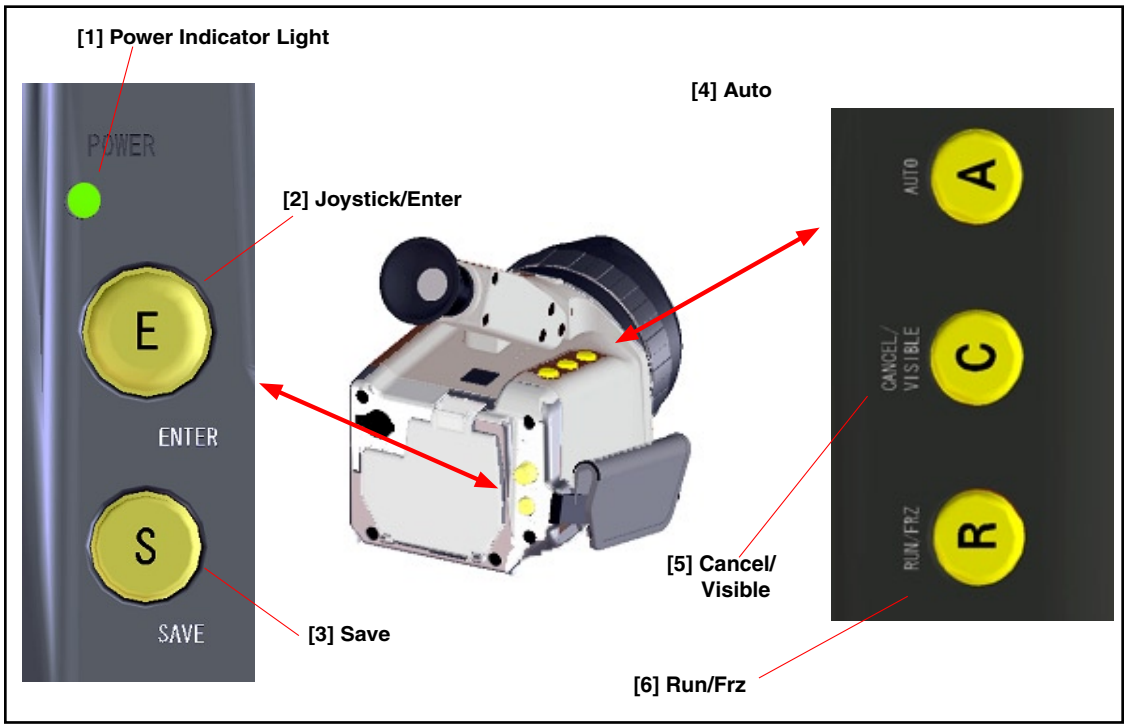
Camera Features (Side)



Camera Features (Side)



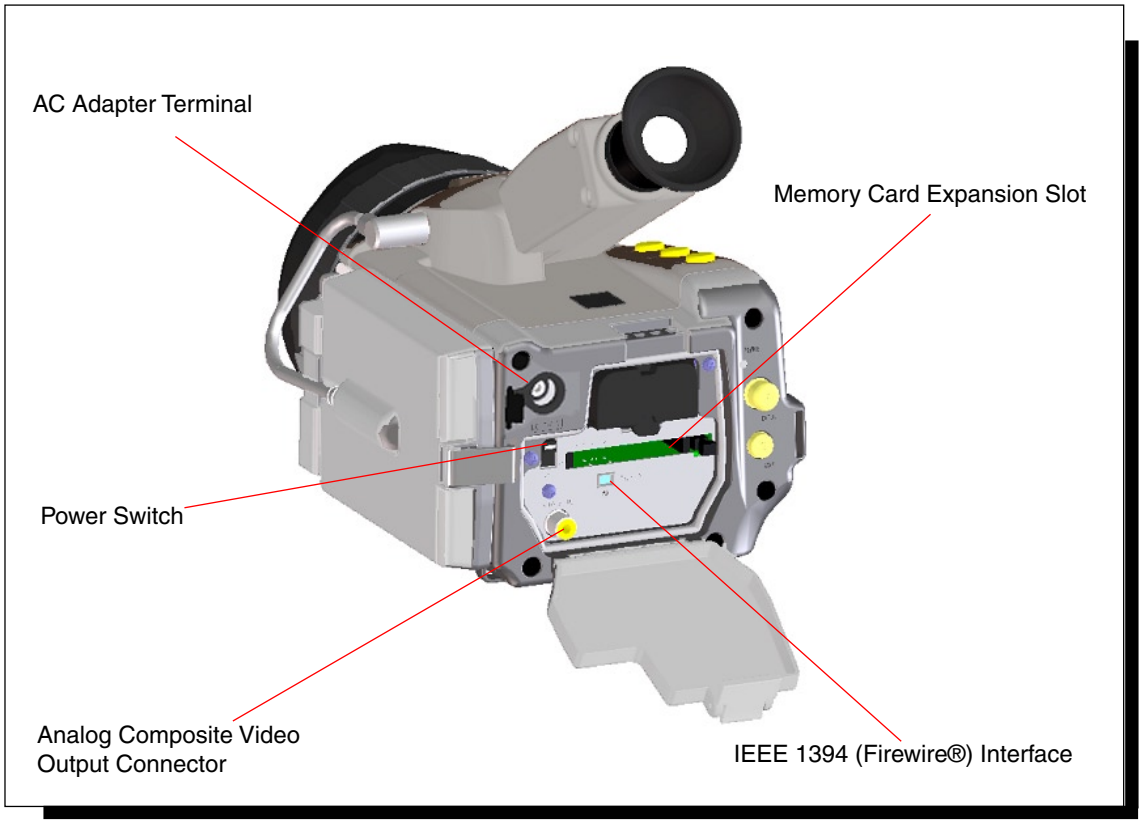
2.3 Key Panel Functions



Number	Description	Function
1	POWER	Green light indicates that the camera is switched on.
2	(E) JOYSTICK/ENTER	Used to set certain menu functions. Also used as a toggle key to move the cursor along the horizontal plane of the display and/or the vertical plane of the display, which allows navigation through menus and selection of certain options.
3	(S) SAVE	Saves the current image data in either the "run" or "freeze" modes.
4	(A) AUTO	Automatically optimizes the focus, sensitivity, and temperature level for the current display.
5	(C) CANCEL/VISIBLE	Used to cancel out of certain menu functions. Also used to display the visible light image.
6	(R) RUN/FRZ	Places the instrument in the image and data acquisition mode. Also used to "freeze" the displayed image and data and certain menu functions.

2.4 Camera Interfaces

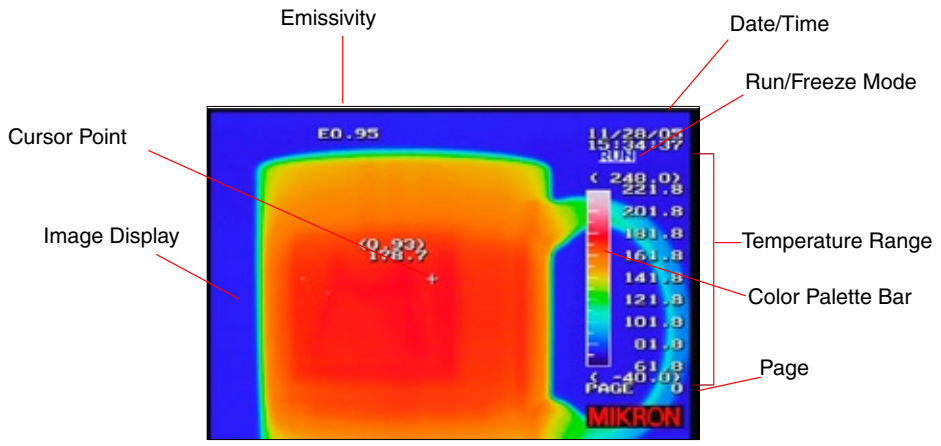
Display/Video Output/AC Adapter Terminals



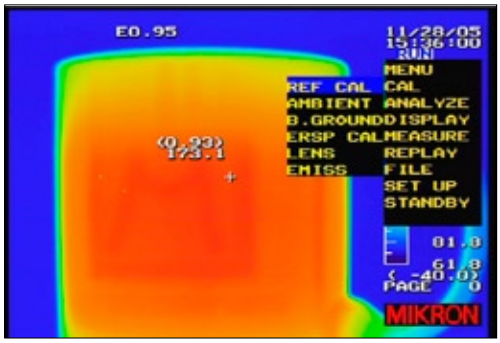
Feature	Function
AC Adapter	AC to DC power conversion is available through the DC Power Entry Connector. Input voltage is 6V DC with a current draw of up to 3.5 amps.
Power Switch	The power switch on the MikroScan 7600PRO switches the camera between two settings: ON and OFF.
IEEE 1394 (Firewire) Interface	The IEEE 1394 (Firewire) interface allows remote camera control, image capture, and process analysis using software running on a Windows-based PC.
Memory Card Expansion Slot	Insert Compact Flash Memory Card for storage and retrieval of images.
Analog Composite Video Output Connector	The Composite Video Output interface allows transmission of analog video signals over a cable to a monitor. This allows video information to be carried as a single signal in either NTSC or PAL format.

2.5 On Board Image Processing Software

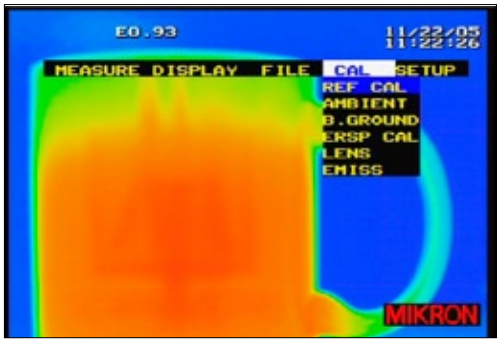
MikroScan 7600PRO Display Screens



Main Display--Run Mode



Main Display with Classic Type Menu

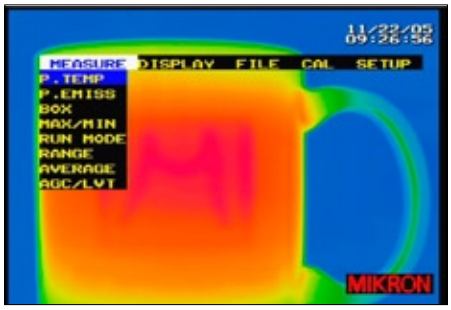


Main Display with Standard Type Menu

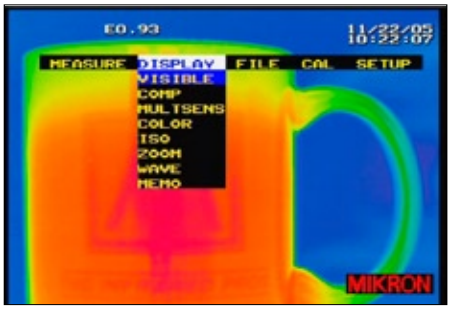
On Board Image Processing Software —Standard Type Menu

MikroScan 7600PRO Display Screens—Standard Type Menu

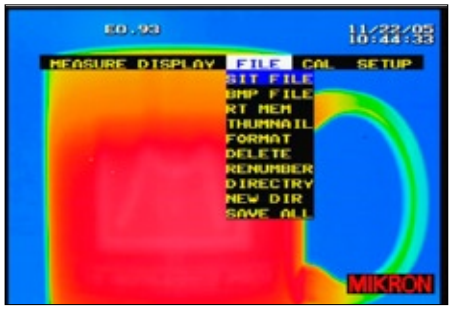
Main Display with Measure Sub-Menu



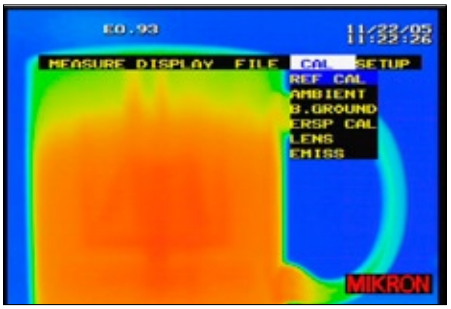
Main Display with Display Sub-Menu



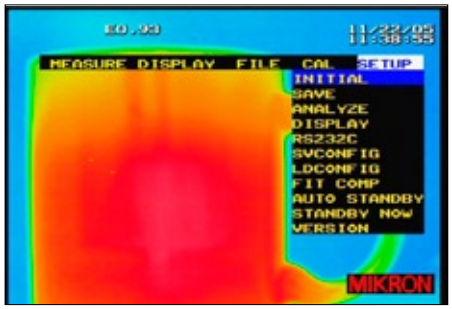
Main Display with File Sub-Menu



Main Display with Cal Sub-Menu



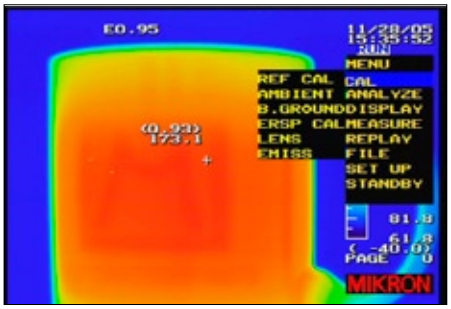
Main Display with Setup Sub-Menu



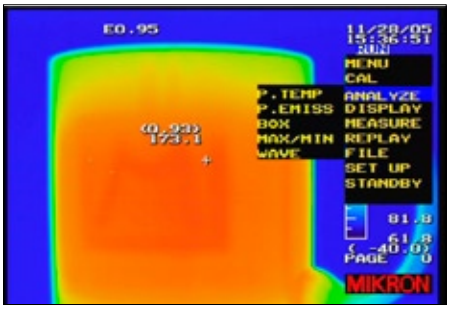
On Board Image Processing Software —Classic Type Menu

MikroScan 7600PRO Display Screens—Classic Type Menu

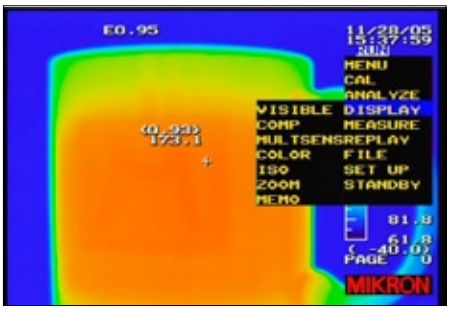
Main Display with Cal Sub-Menu



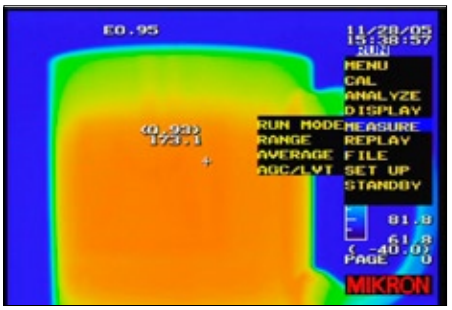
Main Display with Analyze Sub-Menu



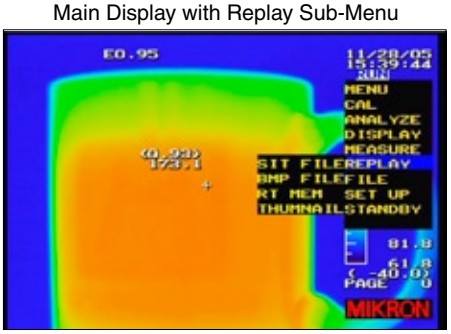
Main Display with Display Sub-Menu



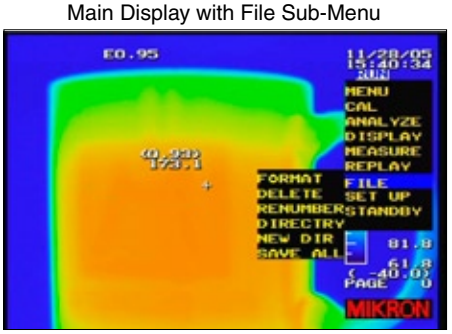
Main Display with Measure Sub-Menu



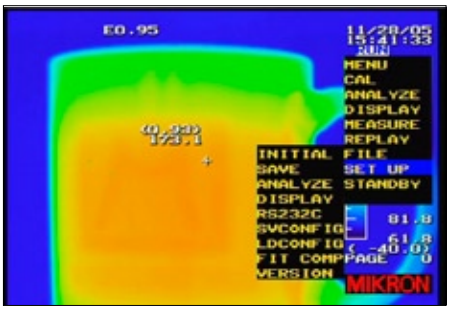
Main Display with Replay Sub-Menu



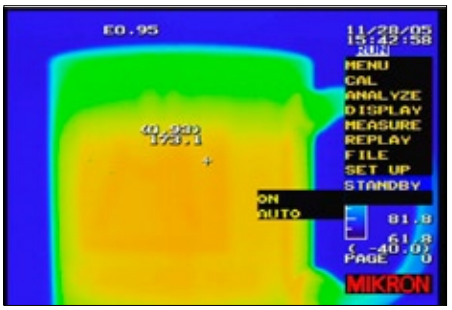
Main Display with File Sub-Menu



Main Display with Setup Sub-Menu



Main Display with Standby Sub-Menu



2.6 Camera Functions

Button Control Features

Feature		Function
1)	**[RUN/FREEZE]**	Displays the image and image data in "real-time". Also used to "freeze" the displayed image and data.
2)	**[AUTO]**	The MikroScan 7600PRO includes an auto processing feature, which automatically focuses the camera and optimizes the temperature level and sensitivity ranges for the target being monitored.
3)	**[FOCUS]**	Provides electronic focusing functionality.
4)	**[LEVEL]**	Allows you to set the optimum temperature level.
5)	**[SENSITIVITY]**	Allows you to set the level of sensitivity.
6)	**[SPAN]**	Allows you to set the upper limit temperature value of the temperature scale.
7)	**[SAVE]**	Allows you to save the thermal image, visual image, voice memo, and annotations.
8)	**[SWITCH DISPLAYED IMAGE]**	Allows you to switch between the thermal image and visible light image.
9)	**[EMISSIVITY]**	The measuring temperature can be corrected by applying the emissivity of the measured object in the emissivity setting. Emissivity for the correction can be selected within the range of 0.10 to 1.00 with 0.01 steps. See Section 6.1 for more information on Emissivity Settings.
10)	**[BLACK AND WHITE VIEW]**	Allows you to switch between a color display and a monochrome display.
11)	**[MENU]**	Allows you to select menu items

Main Menu Functions

Feature		Function
1)	**[MEASURE MENU]**	Allows you to establish certain settings for various measurement conditions.
a)	[POINT TEMP]	The MikroScan 7600PRO allows you to establish up to ten points and view the temperature data of these points at selected locations anywhere within the field of view.

b)	[POINT EMISS]	In addition to viewing point temperature data, the MikroScan 7600PRO also allows you to establish individual emissivity values for one or more points and to obtain information on how the temperatures of the various points are affected by differences in emissivity settings.
c)	[BOX]	Used to determine the Max, Min, and Avg. temperatures within a specified area of a thermal image. When creating a box on a thermal image, the max, min, and avg. temperatures within the area of the specified box are displayed.
d)	[MAX/MIN TEMP]	By combining use of this function and the function of defining a box, the temperatures within the specified area can be tracked with the cursor.
	[OFF]	Turns off the display of the maximum or minimum temperature.
	[MAX]	Displays the maximum temperature and tracks it with the cursor.
	[MIN]	Displays the minimum temperature and tracks it with the cursor.
	[MAX HOLD]	Displays the maximum temperature and holds its value and the cursor position.
	[MIN HOLD]	Displays the minimum temperature and holds its value and the cursor position.
e)	[RUN MODE]	Used to detect when the temperature on the thermal image goes out of the specified temperature range. Also used for periodically saving certain phenomenon to a memory card and can also automatically and periodically record thermal images. See Section 5.5 for more information on the Event functions.
	[SAVE]	Allows certain phenomenon to be periodically saved to a memory card.
	(OFF]	Automatic saving is NOT performed.
	(PC CARD]	Automatic saving is periodically performed (note: the time interval is set in the INTERVAL setting).
	(RTM]	Automatic saving is periodically performed (note: the time interval is set in the INTERVAL setting).
	[FREEZE]	Allows measurements to be frozen when an event condition occurs.

(OFF]	The instrument will continue to operate in run mode even when an event condition is triggered.
(ON]	The instrument will enter freeze mode as soon as an event condition is triggered..
[ALARM MSG]	Displays a warning message when an event condition occurs.
(OFF]	No alarm message will appear when the event condition is triggered.
(ON]	An alarm message of [OVER] or [UNDER] will appear on the display when the event condition is triggered.
[ALARM SOUND]	Sounds an audible warning when an event condition occurs.
(OFF]	There will be no audible sound when the event condition is triggered.
(ON]	An audible beep will be heard when the event condition is triggered.
[INTERVAL]	Specifies the time interval to be used for automatically saving the thermal image to the memory card..
(5 TO ~3600 SECONDS	The time interval can be specified by one-second steps beginning at five seconds.
[EVENT]	Occurs as the result of a condition based on the specified threshold temperature within the thermal image.
[THRESHOLD VALUE]	This value is the specified temperature for generating an event condition, and can be specified within the specified temperature range.
[UNDER]	As the temperature decreases below the threshold value, the event occurs. (This determines an event condition based on the maximum or minimum temperature on a thermal image, unless the threshold value is specified otherwise. When a BOX setup is set, it judges using the maximum or minimum temperature of the box within the limits).

[OVER]	As the temperature rises above the threshold value, the event occurs. (This determines an event condition based on the maximum or minimum temperature on a thermal image, unless the threshold value is specified otherwise. When a BOX setup is set as from A to E, it judges using the maximum or minimum temperature of the box within the limits).
[DELAY]	Specifies the time from the occurrence of an event condition to the freezing of measurements, or the number of frames automatically saved to the memory card or the internal memory.
(0 TO ~60 SECONDS	The time from the occurrence of an event condition to enter the freeze mode. (Note: if SAVE is set to OFF, the measurements will not be saved to the memory card or the internal memory.
(0 TO ~100 FRAMES	Specifies the number of frames to automatically record to the memory card before the instrument enters freeze mode (Note: the total number of frames saved will be dependent upon the amount of available space on the memory card)
(0 TO ~1664 FRAMES	Specifies the number of frames to automatically record to instruments internal memory (RTM) before the instrument enters freeze mode.
[BOX]	Allows box range areas on a thermal image to be defined to determine event conditions.
[BOX]	Allows you to specify a box range area on the thermal image to determine the event conditions.
[WHOLE]	When WHOLE is specified, event conditions are determined on the entire thermal image.
[SAVE VISIBLE]	Allows you to automatically link the visible light data with the thermal data when saving an event to the memory card.
[OFF]	The instrument will only record the thermal image and image data when an event condition is triggered.
[IR LINK]	The instrument will record to the memory card, the visible light image along with the thermal image and image data as a single .sit file when an event condition is triggered.

f)	[RANGE]	The MikroScan 7600PRO provides a total of two temperature ranges. These two ranges provide an overall temperature span of -40°C to 500°C (-40°F to 932°F).
	[1]	Range 1: -40°C to 120°C (-40°F to 248°F).
	[2]	Range 2: 0°C to 500°C (32°F to 932°F).
g)	[AVERAGE]	The S/N Improvement function aids in reducing the noise included in the image signals by means of averaging the image. See Section 4.9 for more information on this function.
h)	[GAIN CONTROL]	The Gain Control Feature is used for performing automatic temperature or automatic sensitivity tracing. See Section 4.10 for more information on the Gain Control feature.
	[OFF]	Disables the Gain Control Feature.
	[LVT]	When LVT is active, the cross cursor traces a point temperature signal and always controls for the temperature signal level to be at the center level of the color bar. When the cross cursor is not used, the temperature signal at the center (X=160, Y=120) of the thermal image is traced. While level trace is active the LVT is displayed in the upper-right corner of the screen.
	[AGC]	When AGC is active, it traces the temperature signal of the entire thermal image and always controls the display sensitivity and temperature level to be at their optimal values. By combining use of this mode and the LEVEL/SENS gain mode of the range mode, the temperature signal can be traced beyond the range. When the auto gain control is active, AGC is displayed in the upper-right corner of the screen.
2)	**[DISPLAY MENU]**	Allows you to establish certain display options.
a)	[VISIBLE IMAGE]	Allows you to display a visible image.
b)	[COMPOSITE IMAGE DISPLAY]	Creates a thermal/visual composite image.

c)	[MULTISENSE]	Adjusts the color palette to allow you to focus on the details surrounding the center temperature of the display or on the higher and lower temperature regions on the display..
	[OFF]	No adjustments are made to the color palette.
	[MIDDLE]	Adjusts the color palette to allow you to focus on the details surrounding the center temperature on the display.
	[HIGH/LOW]	Adjusts the color palette to allow you to focus on the details surrounding the higher and lower temperature regions on the display.
d)	[COLOR]	Sets the color scale to be used for the image display. The choices include, color display, reverse color display, mono-chrome display, and reverse monochrome display. Depending on the application, one scale might be more suitable than another for obtaining optimum results.
	[COLOR POSI]	Reverse color settings (Shine, Fine, Rainbow, Brightness, Hot Iron, Medical).
	(256, 128, 64, 32, 16)	Used to select the desired number of colors.
	[COLOR NEGA]	Reverse color settings (Shine, Fine, Rainbow, Brightness, Hot Iron, Medical).
	(256, 128, 64, 32, 16)	Used to select the desired number of colors.
	[MONO POSI]	Monochrome settings.
	(256, 128, 64, 32, 16)	Used to select the desired number of colors.
	[MONO NEGA]	Reverse monochrome settings.
	(256, 128, 64, 32, 16)	Used to select the desired number of colors.
e)	[ISOTHERMAL]	Isothermal bands can be set in the color display. A maximum of four (4) isother-mal bands can be set. Isothermal bands can be set within the temperature range of the color bar but not in full scale of the Temperature Ranges 1 or 2. The Isother-mal display is a very useful tool for notic-ing abnormal temperature areas on the measuring object.
	[BAND A]	Isothermal Band.
	[BAND B]	Isothermal Band.

		[BAND C]	Isothermal Band.
		[BAND D]	Isothermal Band.
	f)	[ZOOM]	Sets the digital zoom (x2 and x4).
	g)	[WAVE]	Displays the temperature distribution of the cross cursor as a line profile..
	h)	[MEMO]	Allows an operator to designate an annotation on the display consisting of an alpha-numeric combination and/or several symbols..
3)	**[FILE MENU]**		Allows you to establish certain settings for data storage and retrieval.
	a)	[SIT FILE]	Replays a .SIT file.
	b)	[BMP FILE]	Replays a .BMP file.
	c)	[RT MEM]	Replays a .frames stored in the camera's internal memory.
	d)	[THUMBNAIL)	Displays multiple images of .SIT files on a single display.
	e)	[FORMAT]	Allows you to delete all image files and subdirectories from the CF card.
	f)	[DELETE]	Deletes files contained in the root directory or subdirectories stored on the CF card.
	g)	[RENUMBER]	Renumber the files contained within the various directories stored on the CF card. The file numbers range from 0001 to 9999. More than 9999 triggers an error message of FULL. After a file is deleted, the deleted file number is absent. Therefore renumber the files in order from 0001.
	h)	[DIRECTORY]	Switches between the root directory or subdirectories stored on the CF card.
	i)	[NEW DIR]	Creates a subdirectory under the root directory of the CF card.
	j)	[SAVE ALL]	Allows you to save data previously stored in the camera's internal memory to the CF card.
5)	**[CAL MENU]**		Performs settings about adjustment processing.
	a)	[REF CAL]	Adjusts the detected temperature corresponding to the measurement environment.

	b)	[AMBIENT]	The Ambient Compensation feature is used for compensating the influence of the ambient up to the measurement object.
		[SETUP MODE]	Used to select the desired ambient compensation mode.
		[PARAM]	The Parameter mode is used for inputting the atmospheric temperature, the humidity, and the distance up to the measuring object, getting the compensation value from them, and then compensating the measuring data.
		[VALUE]	The Value mode is used for inputting the atmospheric temperature and the compensation value, and the compensating the measuring data with them.
	c)	[BACKGROUND]	The Background Compensation feature is used to compensate for reflectivity/ background errors.
	c)	[ERSP CAL]	Adjusts the detected temperature corresponding to the measurement environment.
	d)	[LENS]	The MikroScan 7600PRO is shipped with a standard lens offering a 27° (H) x 20.3° (V) field of view. It also supports additional lenses, which are available at the time of purchase. When a lens is changed, the instrument must be matched to the new lens characteristics. Refer to your lens documentation for more information on working with the optional lenses.
	e)	[EMISS]	Allows you to choose the correct emissivity from a table of emissivity values.
4)		**[SETUP MENU]**	Allows you to establish certain user environment settings.
	a)	[INITIAL MENU)	Performs initial settings for the camera..
		[TEMP UNIT]	Defines the desired temperature unit.
		[°C]	Used to display temperature in degrees Celsius.
		[°F]	Used to display temperature in degrees Fahrenheit.

[FILE NAME]	Used to specify the first four digits of the file name as it is saved to the internal memory card.
[AUTO MODE]	The AUTO MODE is used in conjunction with the auto formatting feature of the MikroScan 7600PRO. This feature automatically focuses the instrument and optimizes the temperature and sensitivity ranges for the target being monitored. See Section 4.9 for more information on the Auto Formatting functions.
[FULL]	Automatically sets the optimum values for the focus position, sensitivity, and temperature level. Full AUTO for LEVEL/SENS/FOCUS (default value)
[FOCUS]	Automatically sets the optimum values for the focus position utilizing the Focus AUTO mode.
[LEVEL/ SENSITIVITY OR LEVEL/SPAN]	Automatically sets the optimum values for the temperature level and sensitivity OR the temperature level and span.
[LANGUAGE]	The various functions of the MikroScan 7600PRO can be displayed in a number of different languages including English, Japanese, German, French, Spanish, and Portuguese.
[IEEE 1394]	Sets support option for IEEE 1394 connectivity.
[ON]	IEEE1394 supported (default).
[OFF]	IEEE 1394 not supported.
[DATE FORMAT]	Used to set the desired date format display form.
[YY/MM/DD]	Date is displayed by year, month, day (default).
[MM/DD/YY]	Date is displayed by month, day, year.
[DD/MM/YY]	Date is displayed by day, month, year.
[SET DATE]	Used to set the date stamp which will be displayed as yy/mm/dd, mm/dd/yy, or dd/mm/yy as selected from the date format menu.
[SET TIME]	Used to set the time stamp.
[HH/MM/SS]	Time is displayed by hours, minutes, seconds.

	[DISPLAY TIME]	Allows options for displaying date and/or time.
	[TIME & DATE]	Displays both date and time (default).
	[DATE]	Displays only the date.
	[TIME]	Displays only the time.
	[OFF]	Neither the time nor date are displayed.
	[OPERATION]	Allows you to choose between the standard menu structure and the classic menu structure..
	[STANDARD]	Provides navigational structure located at top of display. (default).
	[CLASSIC]	Provides navigational structure along right side of display.
b)	[SAVE MENU)	Performs save settings for the camera.
	[VOICE MEMO]	Allows you to choose whether or not to enable the voice annotation feature of the MikroScan 7600PRO. .
	[ON]	This option enables the voice annotation feature of the MikroScan 7600PRO..
	[OFF]	This option disables the voice annotation feature of the MikroScan 7600PRO (default).
	[SAVE FORMAT]	Allows you to choose to save images in either a .BMP or a .SIT format.
	[SIT]	Images are saved in full 14-bit digital format and include all data associated with the image file.
	[BMP]	Images are saved as bitmap images and do not include data which may be essential for future review and analysis. .
	[SAVE VISIBLE]	Allows you to save visible light images with their associated infrared image.
	[ON]	Allows images to be saved and linked to their associated infrared images
	[OFF]	Visible light images can be viewed but not saved.
c)	[ANALYZE)	Performs analysis settings for the camera..
	[POINT MODE]	The MikroScan 7600PRO allows you to view the temperature data of one or more points at selected locations anywhere within the field of view. It also allows you to obtain information on how the temperatures of the various points are affected by differences in emissivity settings.

	[TEMP]	Displays the temperature of the points under the color bar. Does not, however, allow emissivity settings to be changed or displayed.
	[TEMP & EMISS]	Displays the temperature and emissivity of each point near the point cursor. Also allows emissivity of each point to be set individually.·
	[ΔTEMP]	Displays the specified point temperature under the color bar. Also displays the temperature difference ΔT between point A and point B. However, this mode does not allow the emissivity to be corrected on an individual basis.
	[ΔTEMP & EMISS]	Displays the specified point temperature under the color bar and displays the emissivity setting of the point near the point cursor. Also displays the temperature difference ΔT between point A and point B. However, the emissivity is displayed only when the emissivity of the point is different from the emissivity of the whole screen.
	[BOX TEMP]	Used to determine the Max, Min, and Avg. temperatures within a specified area of a thermal image. When creating a box on a thermal image, the max, min, and avg. temperatures within the area of the specified box are displayed.
	[ON]	The maximum, minimum, and average temperature of the area defined by the box is not displayed.
	[OFF]	The maximum, minimum, and average temperature of the area defined by the box is displayed.
d)	[DISPLAY MENU)	Performs screen display settings for the camera.
	[NUC MODE]	Corrects uneven characteristics of the Infrared detector elements (UFPA). Note: the main unit internally has a reference blackbody source, which has an even temperature surface. NUC operation corrects the unevenness of characteristics for all elements of UFPA by the reference blackbody source. Also an internal accurate thermometer monitors the temperature of the reference blackbody source and calibrates the unit during the NUC Operation.

[MANUAL]	NUC only works when changing to the RUN mode. (default)
[AUTO]	In AUTO, interval time is displayed. Interval time is set from 1 minute to 24 hours.
[SET L/S]	Allows you to make adjustments based on the level & sensitivity OR the level & span.
[LEVEL/ SENSITIVITY]	Sets the intervals of the temperature color bar scale. (default)
[LEVEL/SPAN	Sets the upper limit temperature value of the color bar. Note: When the mode is set to Level & Span, changes cannot be made to the sensitivity settings..
[FILTERING]	Allows an additional level of image smoothing to a thermal image while the instrument is in Freeze mode.
[ON]	Displays the corrected image by spatial filter on FREEZE (default)
[OFF]	The spatial filter correction is not performed.
[ALL CLEAR]	Allows you to focus solely on the image by hiding all display elements other than the logo.
[ON]	All display elements are visible such as color bar, temperature scale, date, time, etc. (default).
[OFF]	All display elements are hidden other than the logo.
[STATUS BAR]	Allows you to focus solely on a greater portion of the image by hiding all status bar elements on the display.
[ON]	All status bar elements are visible such as battery level, emissivity value, date, time, etc. (default)
[OFF]	All status bar elements are hidden.
[COLOR BAR]	Allows you to choose whether or not to display the color bar.
[ON]	This option enables the display of the color bar (default).
[OFF]	This option disables the display of the color bar.

	[BATTERY]	Allows you to choose whether or not to display the battery power indication symbol.
	[ON]	This option enables the display of the battery power indication symbol (default).
	[OFF]	This option disables the display of the battery power indication symbol.
	[TV SYSTEM]	This option is used to select the desired composite video output mode.
	[NTSC]	Used to select the 60-Hz American Standard (NTSC) video output option.
	[PAL]	Used to select the 50-Hz European Standard (PAL) video output option.
	[TV SCAN]	This option is used to select the desired TV Scan format
	[NON-INTERLACE]	Used to select the non-interlace option.
	[INTERLACE]	Used to select the interlace option.
	[LCD BRIGHT]	Sets the brightness level of the LCD display.
e)	[RS232C)	Performs RS-232C communications settings for the camera.
	[RS-232C BAUD RATE]	Utilized in conjunction with the RS-232C interface.
	[RS-232C FORMAT]	Used to select the 50-Hz European Standard (PAL) video output option.
f)	[SVCONFIG]	Saves environmental settings.
g)	[LDCONFIG]	Loads Saved environmental settings.
h)	[FIT COMPOSITE IMAGE]	Adjust the position of the thermal to the visible image when a composite image is displayed.
i)	[AUTO STANDBY]	Allows you to set the camera to automatically enter standby mode based on a pre-established time interval.
j)	[STANDBY NOW]	Allows you place the camera in standby mode.
k)	[VERSION)	Displays information pertaining to the camera's firmware version.

2.7 Standard Camera Accessories

AC Adapter

Battery Charger

(2) Battery Packs

Neck Strap

Lens Protection Cap

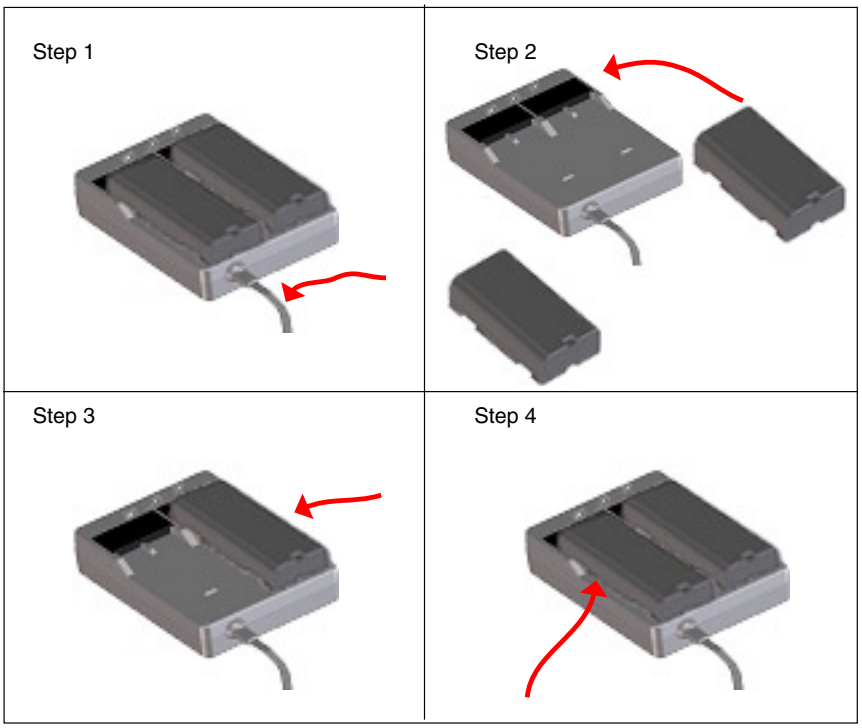
Getting Started

3.1 Charging the Batteries

Your MikroScan 7600PRO was supplied with two Lithium Ion (Li-ion) Batteries. When fully charged, each battery should provide approximately 110 minutes of continuous operating use. Because these batteries have been shipped from the Mikron Factory with a minimal charge, they will need to be fully charged before use.

NOTE:

- Store battery packs in a cool, dark location when not in use.
- Recharge the battery pack every 6 months when in storage. Also recharge before and after every use.



1) **Plug the battery charger power cord into a standard wall outlet.**
2) **Position one battery pack on the battery charger by aligning the brackets and terminal ports on the battery pack to those on the charger.**
3) **Press down on the battery pack while sliding it forward into position.**
4) **Repeat steps 2 and 3 for the second battery pack.**

Charging time is approximately 100 minutes per battery.

NOTE:

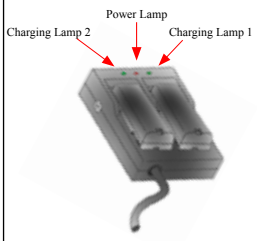
If the charger has been connected to the power supply before placing the battery packs into position, the charging pattern will not be position dependent. That is, the first battery to be inserted will begin charging regardless of the position it holds. Once that battery is fully charged, the second battery will begin charging.

NOTE:

If the battery temperature is lower than -10°C ±3°C or higher than 60°C ±3°C, the charger goes into a standby mode and the charging lamps will continue to flash green for 120 minutes. After 120 minutes, the charging lights turn off.

3.1 Charging the Batteries (continued)

The battery charger has one red "Power On" lamp and two green "Charging" lamps. The charging indicator lights indicate the charger assembly status as listed below:



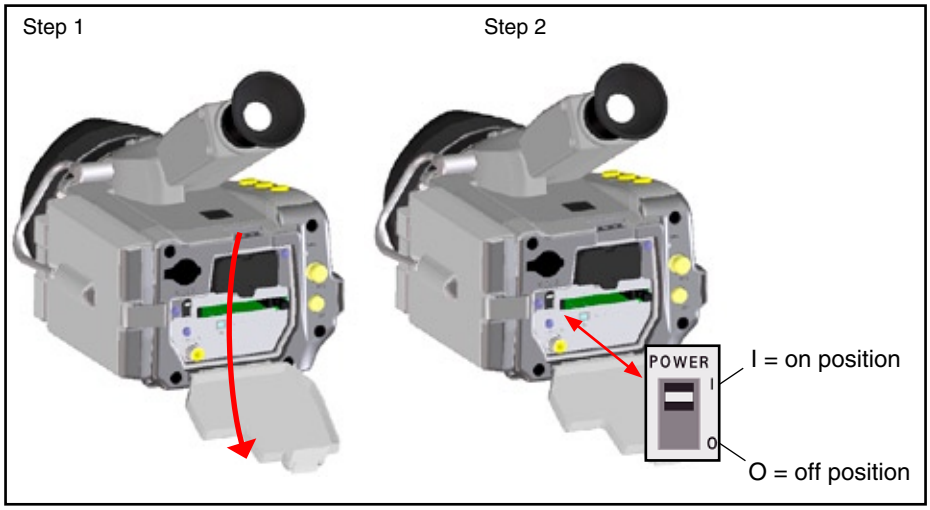
Color	Status	Notes
Green, Flashing	Charging	Flashes green 'on' and 'off' at 1 Hz while in the charging mode.
Green	Full Charge	Indicator light will remain green once the battery pack has been fully charged.
Black	Error	Charging lights will turn off if an error has been detected.

3.2 Connecting the Power Supply

Although there are several optional power supply accessories available for your MikroScan 7600PRO, the standard power supply options supplied with your camera include the AC Adapter and two battery packs. This section will cover the steps necessary for using these standard power supply options.

3.2.1 Before You Begin

Before applying any power source to your MikroScan 7600PRO, it is important that the power switch on the camera be in the off position.

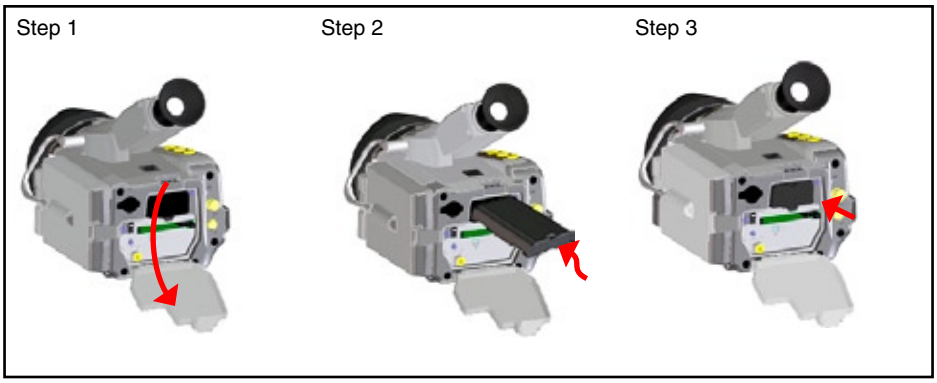


1) **Open the hatch cover on the back of the camera.**

2) **Verify that power switch is in the off position as indicated in the figure above.**

3.2.2 Attaching the Battery Pack

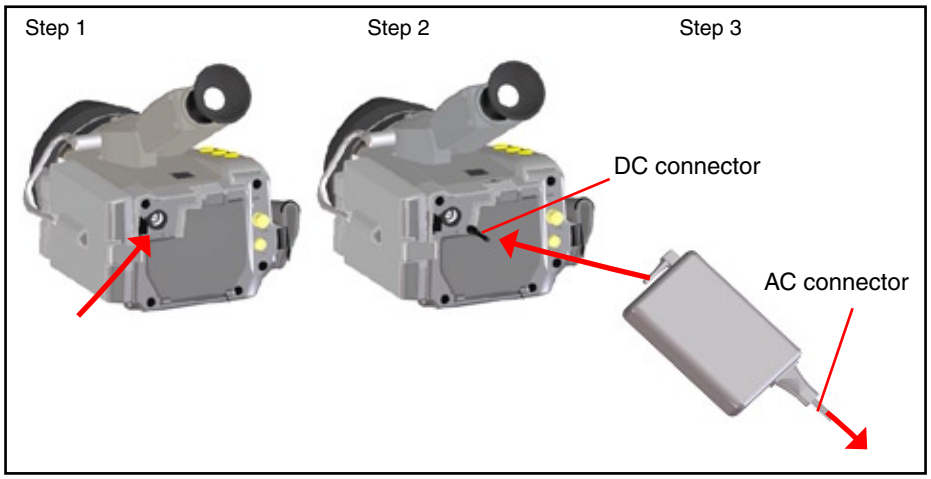
Before attaching the battery pack to your MikroScan 7600PRO, it is important that the power switch on the camera be in the off position.



1) **Open the terminal cover.**
2) **Position the fully-charged battery pack over the latch on the terminal side of the camera as indicated by the arrow in Step 2 above.**
3) **Push the battery pack forward until it snaps into position as indicated in Step 3 above.**

3.2.3 Connecting the AC Adapter

Before connecting the AC Adapter to your MikroScan 7600PRO, it is important that the power switch on the camera be in the off position.



1) **Open the terminal cover on the camera.**
2) **Connect the DC connector of the AC Adapter to the DC input connector on the camera.**
3) **Plug the AC power cord into a standard wall outlet.**

NOTE:

The AC Adapter only provides power to the camera; it does not charge the battery.

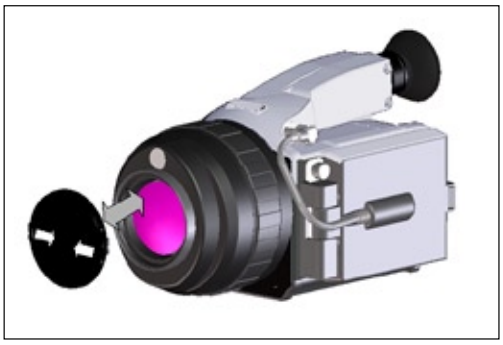
When the AC Adapter and battery are connected at the same time, the camera receives its power from the AC Adapter, not the battery.

3.3 Handling the Lens Protection Cap

Your MikroScan 7600PRO was shipped with a lens protection cap which was designed specifically for the MikroScan 7600PRO. The lens protection cap not only offers protection to the camera lens, but it can also be used for performing a reference calibration of the camera (See Section 6.5.2 for more information regarding on calibrating the instrument).

Caution

When camera operation has been completed, always attach the lens protection cap to protect the lens from damage.



3.3.1 Removing the Lens Cap

1) **Squeeze the clips on both side of the lens cap.**
2) **Pull the lens protection cap off of the camera lens.**

3.3.2 Attaching the Lens Cap

1) **Position the lens protection cap over the camera lens with the clips aligned horizontally to the camera.**
2) **Squeeze the clips on both sides of the lens cap and place over the camera lens.**
3) **Release the clips and verify that the lens protection cap is secure.**

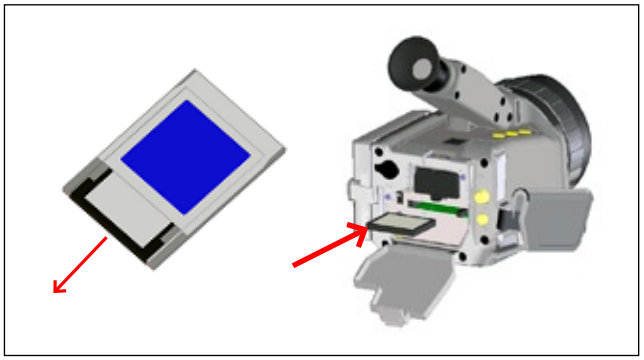
NOTE:

See Section 5.4 for information on Using the Memory Card Management Options.

3.4 Handling the Memory Card

Your MikroScan 7600PRO was shipped with a Compact Flash Memory Card which is used for storing images and image data. A Compact Flash Adapter was also supplied to provide transfer of images through a PCMCIA card slot in your laptop computer or through a Card Reader attached to your personal computer. This section provides information on installing the memory card into the MikroScan 7600PRO.

Before inserting or removing the memory card, it is important that the power switch on the camera be in the off position.



3.4.1 Inserting the Memory Card

1) **Remove the memory card from the Compact Flash Adapter.**
2) **Turn the memory card so that the connecting pins are vertically aligned with the Memory Card Expansion Slot on the Camera.**
3) **Insert the memory card until you hear a click.**

3.4.2 Removing the Memory Card

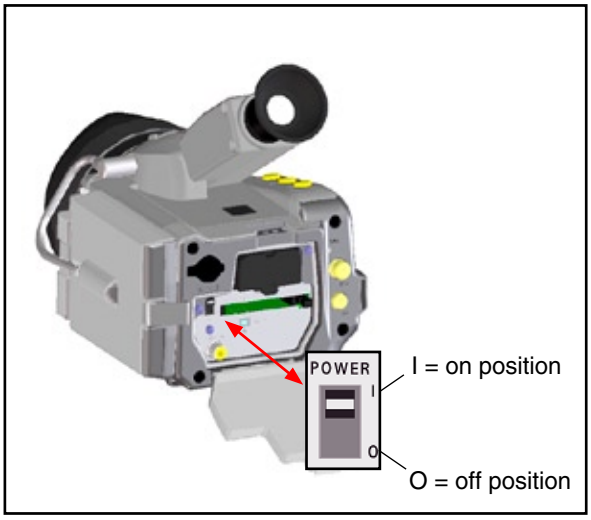
1) **Push the release button located at the bottom of the Memory Card Expansion Slot to release the memory card.**
2) **Pull the memory card from the camera.**
3) **Insert the memory card into the Compact Flash Adapter.**

3.5 Viewing Your First Image

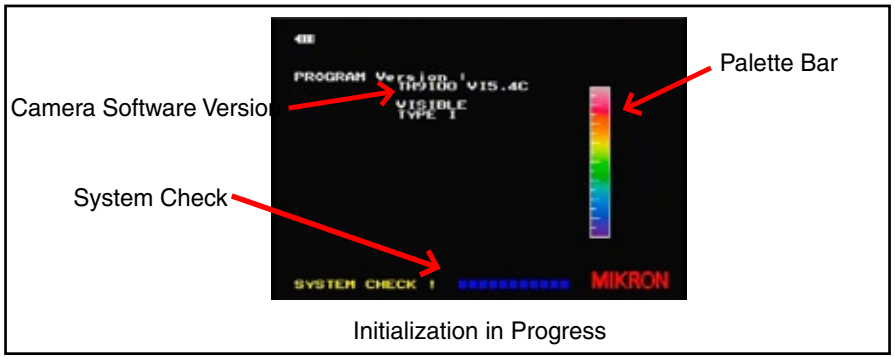
1) **Connect the power supply as described in Section 3.2 of this manual.**
2) **Open the interface hatch cover on the back of the camera.**
3) **Insert the memory card or attach the appropriate cable to the com serial port connector for video and data capture.**
4) **Move the power switch to the on position.**
5) **Remove the lens cover.**

NOTE:

When the camera is powered on, the display is automatically placed in run mode.



Once the power switch has been turned on, the camera will enter an initialization mode. During initialization, a display will appear showing the software version, the color palette bar, and the progress of the system check in the form of a blue dotted line.



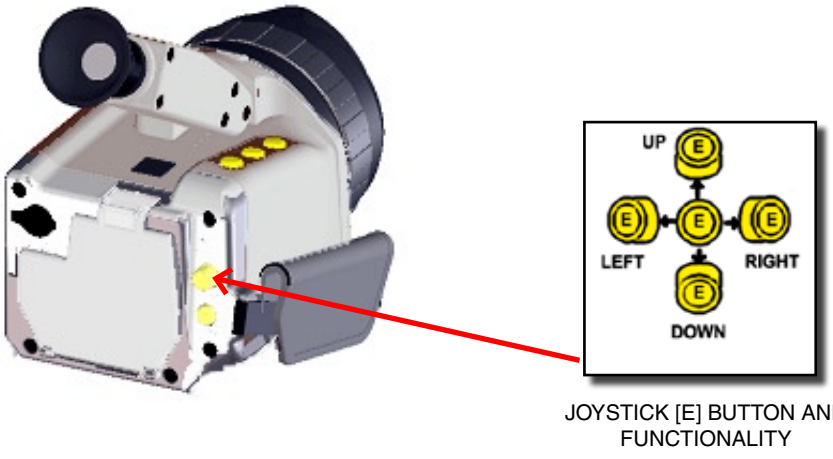
Initialization in Progress

Once the initialization process has been completed, the camera enters the run mode and the display changes to show additional information on the various camera settings as well as the scene towards which the camera is pointed.

3.6 Accessing the MikroScan 7600PRO Expanded Menu Functions

Your MikroScan 7600PRO provides two types of menu structures which allow you to navigate through the various camera options. The first is the Standard Type menu option, which provides the navigational structure located at the top of the display. The second is the Classic Type menu option which provides the navigational structure along the right side of the display.

To access the menu functions of the 7600PRO, you will be working with the JOYSTICK and the JOYSTICK [E] BUTTON:

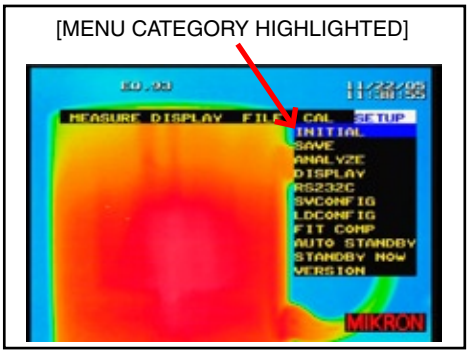


JOYSTICK [E] BUTTON AND FUNCTIONALITY

3.6.1 Using the Standard Type Navigational Structure

1) **Press the** JOYSTICK [E] **button gain access to the 7600PRO standard type menu.**

2) **Toggle the** JOYSTICK **to the left or right as needed until the desired menu category appears with its pull-down menu.**



NOTE:

The particular menu structure that will be displayed is dependent upon the type of operation selected in the Initial Setup menu. See section 3.9.1.10 for more information on setting the type of menu structure.

3) **Toggle the JOYSTICK up or down as needed to highlight the desired main-menu choice.**

[MAIN MENU CHOICE HIGHLIGHTED]

4) **Press the JOYSTICK [E] button to select the menu option.**

OR

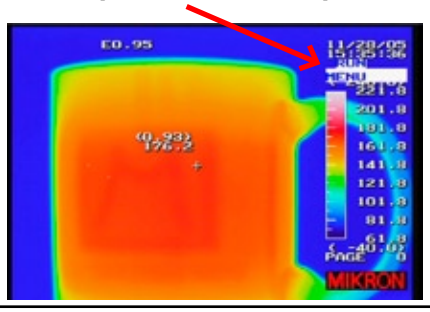
Press the CANCEL/VISIBLE button to cancel out of the menu mode and to return to the main display.

3.6.2 Using the Classic Type Navigational Structure

1) **Press the JOYSTICK [E] button to lock the display and gain access to the 7600PRO classic type menu.**

2) **Toggle the JOYSTICK button to the left or right until the [MENU] option becomes highlighted at the top right hand corner of the display.**

[MENU HIGHLIGHTED]



NOTE:

The particular menu structure that will be displayed is dependent upon the type of operation selected in the Initial Setup menu. See section 3.9.1.10 for more information on setting the type of menu structure.

3) Toggle the JOYSTICK button down to expose the drop-down list of menu functions.

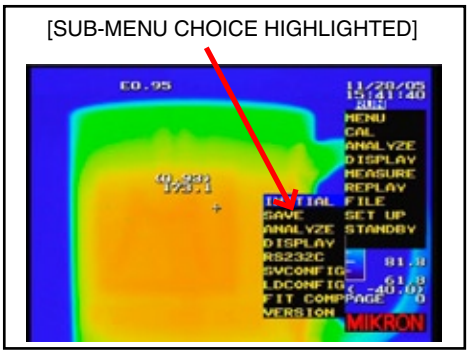
[MENU LIST EXPOSED]

4) Toggle the JOYSTICK button up or down as needed to highlight the desired main menu choices.

[MAIN MENU CHOICE HIGHLIGHTED]

5) Toggle the JOYSTICK button to the left to highlight the sub-menu choices.

[SUB-MENU CHOICE HIGHLIGHTED]



Caution

Do not use excessive force when opening, closing, or tilting the LCD Display.

Make sure the LCD display is securely latched when the MikroScan 7600PRO. is not in use.

NOTE:

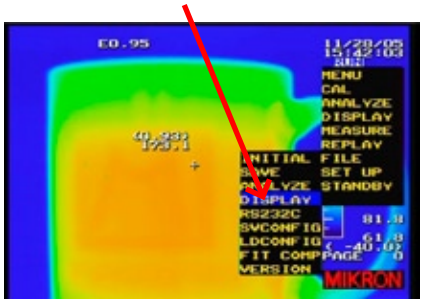
The device automatically switches between the LCD mode and the viewfinder mode by simply opening and closing the LCD display.

NOTE:

See Section 7.1 of this manual for information on working with External LCD Displays.

6) **Toggle the** JOYSTICK **button up or down as needed to highlight the desired sub-menu choice.**

[SUB-MENU CHOICE HIGHLIGHTED]



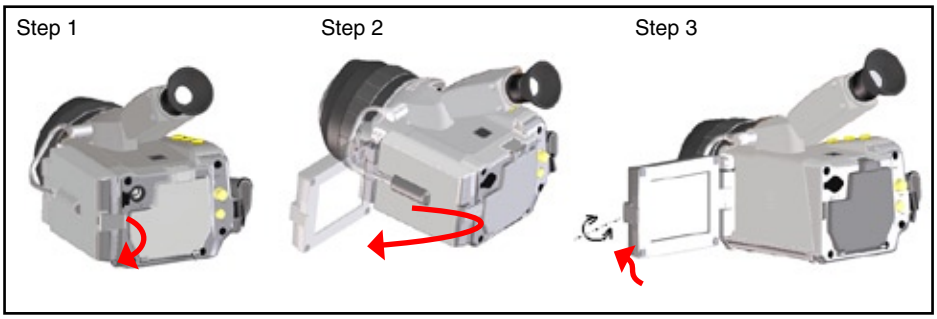
7) **Press the** JOYSTICK [E] **button to select the menu option.**

OR

Press the CANCEL/VISIBLE **button to cancel out of the menu mode and to return to the main display.**

3.7 Working with the LCD Display

The MikroScan 7600PRO allows you to view images through the viewfinder or on the flip-out LCD display. The camera is supplied with an autoswitch function which will allow you to automatically switch between the LCD mode and the viewfinder mode simply by opening and closing the LCD display.



1) **Unlatch the LCD Display hook in the direction of the arrow as shown in Step 1 above.**

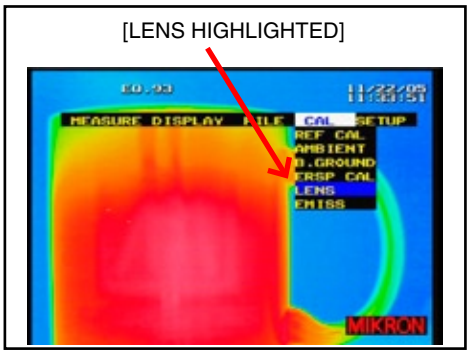
2) **Open the LCD Display in the direction of the arrow as shown in Step 2 above.**

3) **Tilt the LCD display as needed to adjust for proper viewing as shown by the arrows in Step 3 above.**

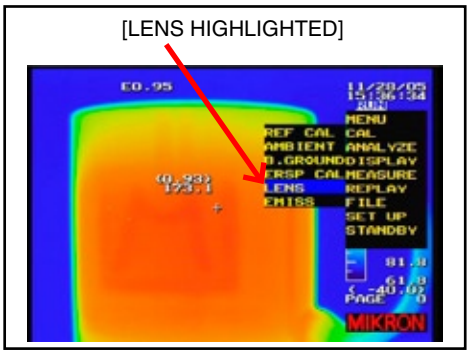
3.8 Selecting a Lens Option

The MikroScan 7600PRO supports a lens with a 30.1°(H) x 22.7°(V) FOV, which is provided as a standard feature. It also supports additional lenses, which are available at the time of purchase. When a lens is changed, the instrument must be matched to the new lens characteristics. The lens option is changed as follows:

1) **Verify the camera is operating in** [RUN] **mode.**
2) **Go to [MENU] → [CAL] → [LENS].**

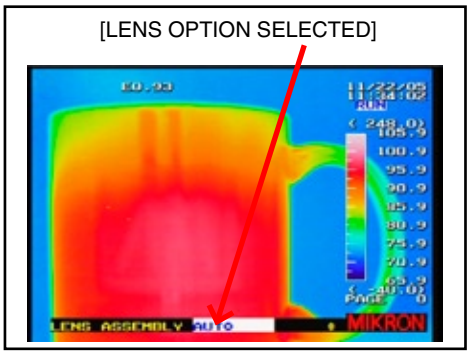


Standard View Menu



Classic View Menu

3) **Press the** JOYSTICK [E] **button to select the LENS option.**



A bar will appear at the bottom of the screen showing the current lens option:

4) **Toggle the** JOYSTICK **up or down if needed until the desired option has been selected.**

> NOTE:
> Refer to your lens documentation for selecting the appropriate lens option.

The options are:

- AUTO (Default)
- OPTION A *
- OPTION B *
- OPTION C *
- OPTION D *
- OPTION E *
- OPTION F *
- OPTION G *

*refer to your lens documentation for selecting the appropriate setting

5) **Press the** JOYSTICK [E] **button to save the setting and to return to the main display**

OR

Press the CANCEL/VISIBLE **button to cancel out of the menu mode and to return to the main display.**

3.9 Customizing your MikroScan 7600PRO

The MikroScan 7600PRO provides environment setup options, which allow you to setup, change, save and recall different camera configurations based on your selections.

3.9.1 Establishing the Initial Setup Values

3.9.1.1 Selecting the Temperature Unit

The temperature scale is displayed on the right-hand side of the display screen next to the color palette bar. The scale shows how the temperature levels and their associated colors are distributed throughout the image displayed. The high end of the temperature range is shown at the top of the scale and the low end of the temperature range is shown at the bottom of the scale.

The temperature range can be displayed in degrees Celsius or degrees Fahrenheit.

The temperature unit can be selected as follows:

1) Go to [MENU] → [SET UP] → [INITIAL].

[INITIAL HIGHLIGHTED]

Standard View Menu

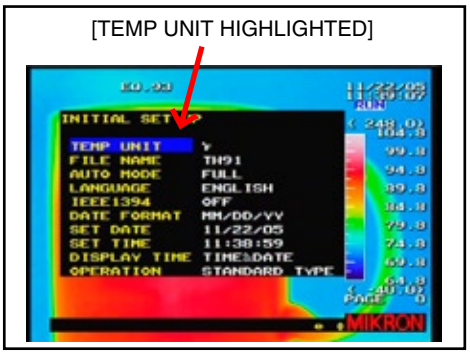
[INITIAL HIGHLIGHTED]

Classic View Menu

2) Press the JOYSTICK [E] **button to gain access to the INITIAL SET UP Menu**.

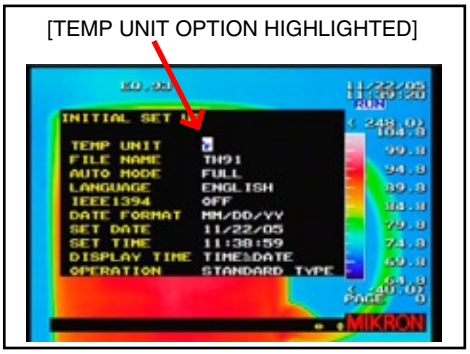
3) Toggle the JOYSTICK **up or down if needed to highlight [TEMP UNIT].**

[TEMP UNIT HIGHLIGHTED]



4) Toggle the JOYSTICK **to the right to highlight the TEMP UNIT option.**

[TEMP UNIT OPTION HIGHLIGHTED]



NOTE:

See Section 5 of this manual for more information on Working with Images and Image Files.

5) Toggle the JOYSTICK **up or down as needed to select the desired temp unit option.**

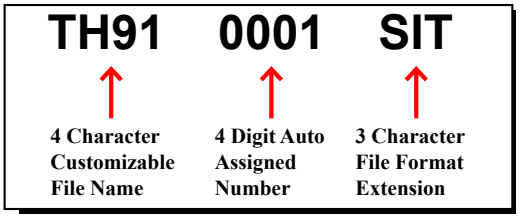
The temp unit options are:

- °C (Default)
- °F

6) Press the JOYSTICK [E] **button to save the setting and to return to the main display.**

3.9.1.2 Customizing the Memory Card File Name

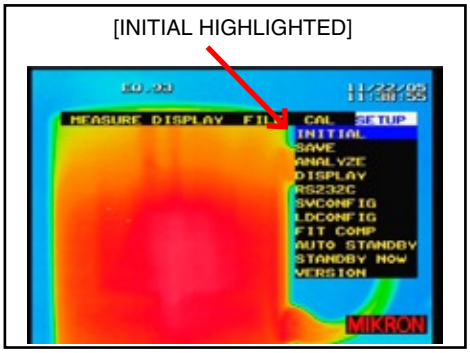
The MikroScan 7600PRO stores images and image data to the memory card using a pre-defined naming convention. As such, each eleven character file name is made up of the following components.



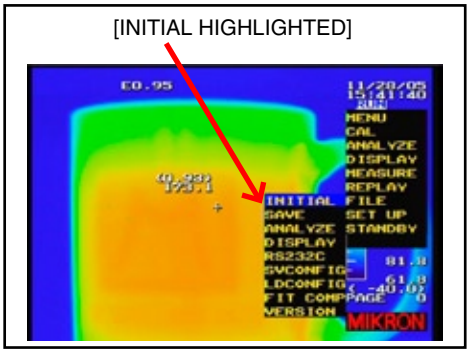
The first four characters designate the file name. This file name can be customized according to your particular needs.

To establish a new four-character file name prefix:

1) Go to [MENU] → [SET UP] → [INITIAL].



Standard View Menu

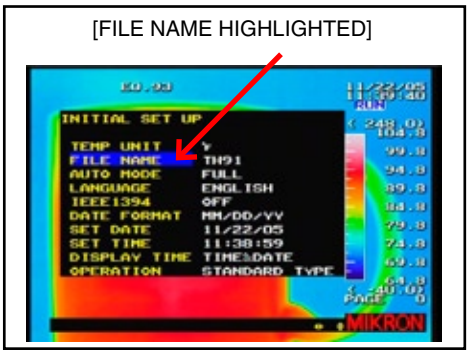


Classic View Menu

2) Press the JOYSTICK [E] **button to gain access to the INITIAL SET UP Menu.**

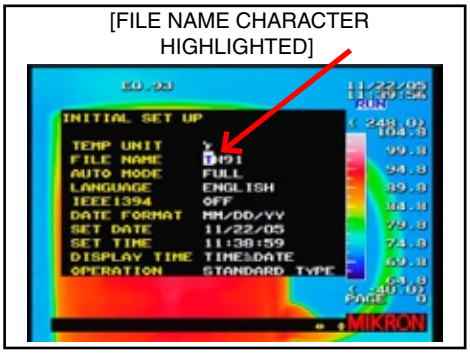
3) Toggle the JOYSTICK up or down if needed to highlight [FILE NAME].

[FILE NAME HIGHLIGHTED]



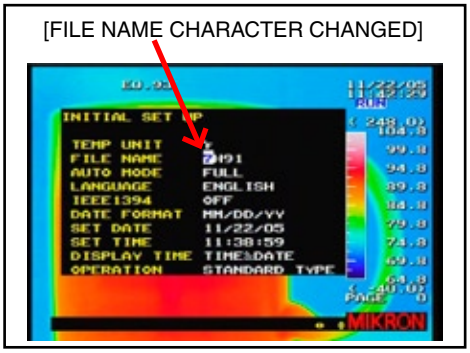
4) Toggle the JOYSTICK to the right to highlight the first character of the file name.

[FILE NAME CHARACTER HIGHLIGHTED]



5) Toggle the JOYSTICK up or down as needed to scroll through the characters to select a letter in the A-Z range or a number in the 0-9 range.

[FILE NAME CHARACTER CHANGED]



6) Toggle the JOYSTICK **to the right to highlight the next character of the file name.**

[FILE NAME CHARACTER HIGHLIGHTED]

7) Repeat steps 5 and 6 until you have selected and/or changed all the desired file name values.

[FILE NAME CHARACTERS CHANGED]

8) Press the JOYSTICK [E] **button to save the setting and to return to the main display.**

NOTE:

See Section 4.10 of this manual for more information on Using the Auto Processing Functions.

3.9.1.3 Setting the Auto Mode Function

The MikroScan 7600PRO includes an auto processing feature which automatically focuses the instrument and optimizes the temperature level and sensitivity OR temperature level and span for the target being monitored.

The three available AUTO settings are as follows

Feature	Function
FULL AUTO	Automatically sets the optimum values for the focus position, sensitivity or span, and temperature level
AUTO FOCUS	Automatically sets the optimum values for the focus position
LEVEL & SENS (LEVEL & SPAN)	Automatically sets the optimum values for the temperature level and sensitivity OR the temperature level and span.

Note: Whether the Auto Mode function affects the Level & Span OR the Level & Sensitivity is determined by the L/S option that is selected in display setup menu. See Section 3.9.4.2 for more information on selecting the desired L/S option.

To set the auto mode function:

1) Go to [MENU] → [SET UP] → [INITIAL].

[INITIAL HIGHLIGHTED]

Standard View Menu

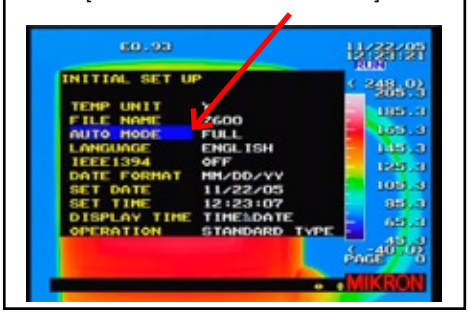
[INITIAL HIGHLIGHTED]

Classic View Menu

2) Press the JOYSTICK [E] **button to gain access to the INITIAL SET UP Menu.**

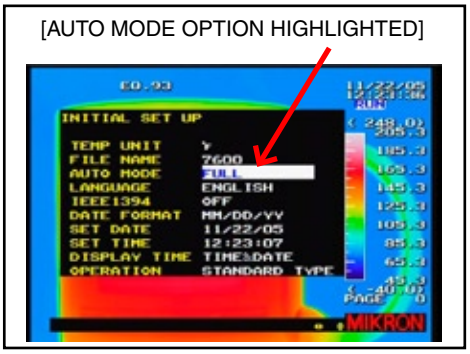
3) **Toggle the** JOYSTICK **up or down if needed to highlight [AUTO MODE].**

[AUTO MODE HIGHLIGHTED]



4) **Toggle the** JOYSTICK **to the right to highlight the auto mode option.**

[AUTO MODE OPTION HIGHLIGHTED]



5) **Toggle the** JOYSTICK **up or down as needed to select the desired auto mode option.**

The auto mode options are:

- FULL (DEFAULT)
- FOCUS
- LEVEL & SENSE or (LEVEL & SPAN)

6) **Press the** JOYSTICK [E] **button to lock the setting and to return to the main display.**

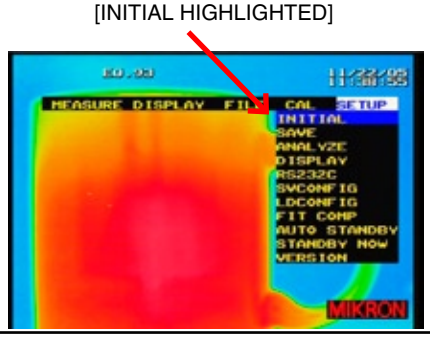
3.9.1.4 Setting the Language

The various functions of the MikroScan 7600PRO can be displayed in a number of different languages including English, Japanese, Portuguese, Spanish, French, German, Traditional Chinese, Chinese, Korean, Russian, and Italian.

To set the language:

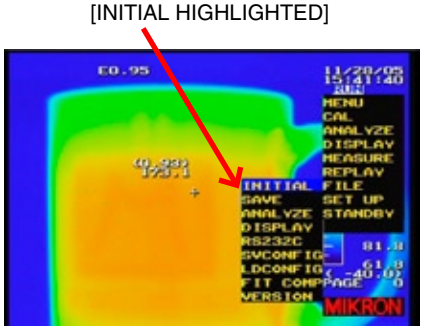
1) Go to [MENU] → [SET UP] → [INITIAL].

[INITIAL HIGHLIGHTED]



Standard View Menu

[INITIAL HIGHLIGHTED]



Classic View Menu

2) Press the JOYSTICK [E] **button to gain access to the INITIAL SET UP Menu.**

3) Toggle the JOYSTICK **up or down if needed to highlight [LANGUAGE].**

[LANGUAGE HIGHLIGHTED]

4) Toggle the JOYSTICK to the right to highlight the LANGUAGE option.

[LANGUAGE OPTION HIGHLIGHTED]

5) Toggle the JOYSTICK up or down as needed to select the desired LANGUAGE option.

The language options are:

- ENGLISH (Default)
- JAPANESE
- PORTUGUESE
- SPANISH
- FRENCH
- GERMAN
- TRADITIONAL CHINESE
- CHINESE
- KOREAN
- RUSSIAN
- ITALIAN

6) Press the JOYSTICK [E] button to save the setting and to return to the main display.

3.9.1.5 Activating the IEEE 1394 Functionality

The IEEE 1394 (Firewire®) feature of the MikroScan 7600PRO provides remote camera control functionality and real-time data acquisition and analysis through the IEEE 1394 interface.

See Working with Communication Interfaces found in Section 7.3 of this manual for more information on setting up the IEEE 1394 (Firewire®) feature of this camera.

3.9.1.6 Setting the Date Format

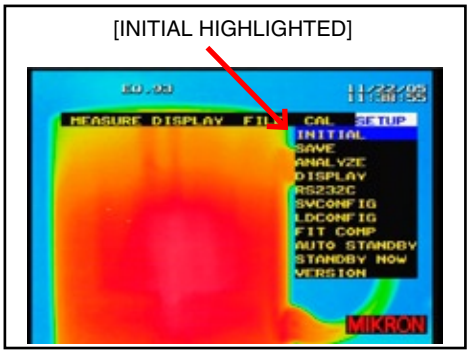
The date and time function of the MikroScan 7600PRO sets the internal clock for the camera. The date and time is saved as part of the image file and can be viewed on the display.

NOTE:

See Working with Communication Interfaces found in Section 7.3 of this manual for more information on setting up the IEEE 1394 (Firewire®) feature of this camera.

To set the date format:

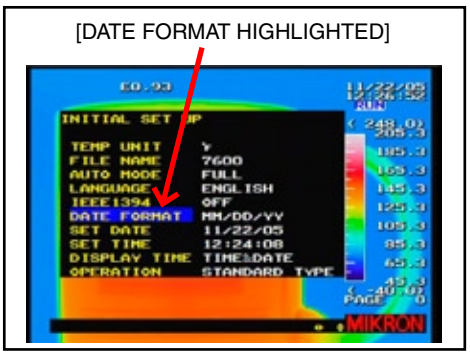
1) **Go to [MENU] → [SET UP] → [INITIAL].**



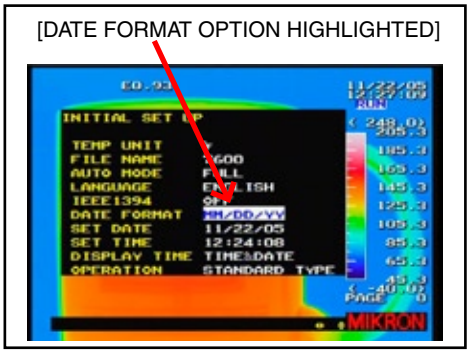
Standard View Menu Classic View Menu

2) **Press the** JOYSTICK [E] **button to gain access to the INITIAL SET UP Menu.**

3) **Toggle the** JOYSTICK **up or down as needed to highlight [DATE FORMAT].**



4) **Toggle the** JOYSTICK **to the right to highlight the DATE FORMAT option.**



5) Toggle the JOYSTICK **up or down as needed to change the DATE FORMAT option.**

The date format options are:

- YY/MM/DD: (year, month, day) [Default]
- MM/DD/YY: (month, day, year)
- DD/MM/YY: (day, month, year)

6) Press the JOYSTICK [E] **button to save the setting and to return to the main display.**

3.9.1.7 Setting the Date

1) Go to [MENU] → [SET UP] → [INITIAL].

[INITIAL HIGHLIGHTED]

Standard View Menu

[INITIAL HIGHLIGHTED]

Classic View Menu

2) Press the JOYSTICK [E] **button to gain access to the INITIAL SET UP Menu.**

3) Toggle the JOYSTICK **up or down as needed to highlight [SET DATE].**

[SET DATE HIGHLIGHTED]

4) Toggle the JOYSTICK to the right to highlight the first set of variables.

[DATE VARIABLE SELECTED]

5) Toggle the JOYSTICK up or down as needed to increase or decrease the numeric value of the selected variable.

The variable options are dependent upon the date format setting **(See Section 3.9.1.6 of this manual).**

The variable options appear in the following order:

- YY/MM/DD: (year, month, day) [Default]
- MM/DD/YY: (month, day, year)
- DD/MM/YY: (day, month, year)

6) Toggle the JOYSTICK to the right to highlight the next set of variables.

7) Repeat steps 5 and 6 above to set the remaining variables.

8) Press the JOYSTICK [E] button to save the setting and to return to the main display.

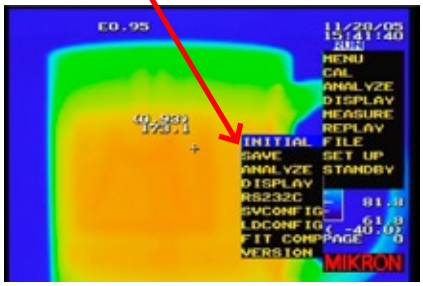
3.9.1.8 Setting the Time

1) Go to [MENU] → [SET UP] → [INITIAL].

[INITIAL HIGHLIGHTED]

Standard View Menu

[INITIAL HIGHLIGHTED]



Classic View Menu

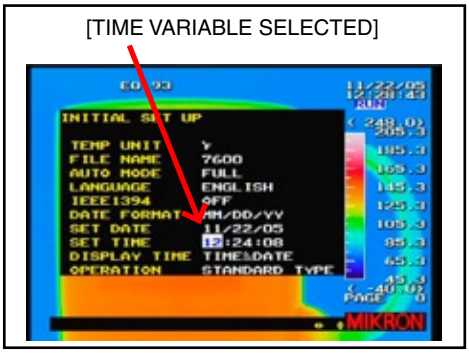
2) Press the JOYSTICK [E] **button to gain access to the INITIAL SET UP Menu.**

3) Toggle the JOYSTICK **up or down as needed to highlight [SET TIME].**

[SET TIME HIGHLIGHTED]

4) Toggle the JOYSTICK **to the right to highlight the first set of variables.**

[TIME VARIABLE SELECTED]



5) Toggle the JOYSTICK **up or down as needed to increase or decrease the numeric value of the selected variable.**

The variable options appear in the following order:

- HH/MM/SS: (hour, minute, second)

6) Toggle the JOYSTICK **to the right to highlight the next set of variables.**

[TIME VARIABLE SELECTED]

7) **Repeat steps 5 and 6 above to set the remaining variables.**

8) **Press the** JOYSTICK [E] **button to save the setting and to return to the main display.**

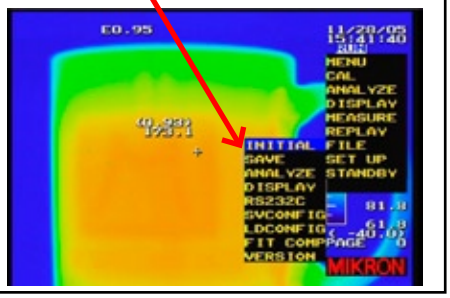
3.9.1.9 Displaying the Date and Time

1) **Go to [MENU] → [SET UP] → [INITIAL].**

[INITIAL HIGHLIGHTED]

Standard View Menu

[INITIAL HIGHLIGHTED]



Classic View Menu

2) **Press the** JOYSTICK [E] **button to gain access to the INITIAL SET UP Menu**.

3) **Toggle the** JOYSTICK **up or down as needed to highlight [DISPLAY TIME].**

[DISPLAY TIME HIGHLIGHTED]

4) Toggle the JOYSTICK to the right to highlight the DISPLAY TIME option.

[DISPLAY TIME OPTION HIGHLIGHTED]

5) Toggle the JOYSTICK up or down as needed to select the desired DISPLAY TIME option.

The display time options are:

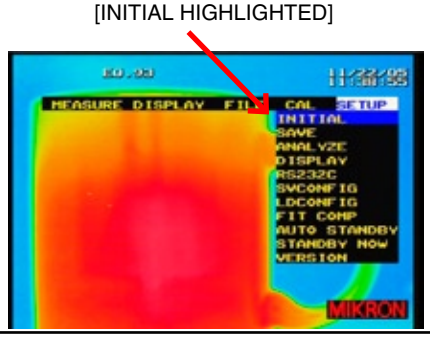
- TIME & DATE (Default)
- DATE
- TIME
- OFF

6) Press the JOYSTICK [E] button to save the setting and to return to the main display.

3.9.1.10 Selecting a Navigational Structure

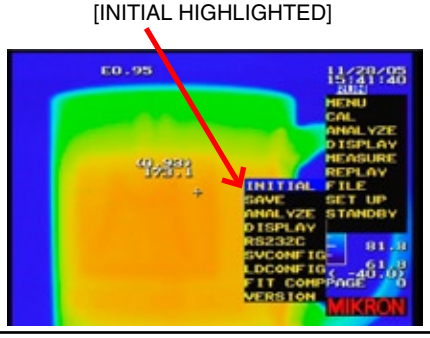
1) Go to [MENU] → [SET UP] → [INITIAL].

[INITIAL HIGHLIGHTED]



Standard View Menu

[INITIAL HIGHLIGHTED]



Classic View Menu

2) Press the JOYSTICK [E] button to gain access to the INITIAL SET UP Menu.

NOTE:

See Section 3.6 of this manual for more information on Accessing the MikroScan 7600PRO Expanded menu functions.

3) Toggle the JOYSTICK **up or down as needed to highlight [OPERATION].**

[OPERATION HIGHLIGHTED]

4) Toggle the JOYSTICK **to the right to highlight the OPERATION option.**

[OPERATION OPTION HIGHLIGHTED]

5) Toggle the JOYSTICK **up or down as needed to select the desired OPERATION option.**

The operation options are:

- STANDARD TYPE (Default)
- CLASSIC TYPE

6) Press the JOYSTICK [E] **button to save the setting and to return to the main display.**

3.9.2 Establishing the Save Setup Values

3.9.2.1 Selecting a Voice Memo Recording Option

The MikroScan 7600PRO allows voice annotations to be added to image files that are saved in the .SIT format. These voice files can be replayed on the MikroScan 7600PRO or transferred along with all other image data to an external computer.

To select a voice memo recording option:

1) Go to [MENU] → [SETUP] → [SAVE].

[SAVE HIGHLIGHTED]

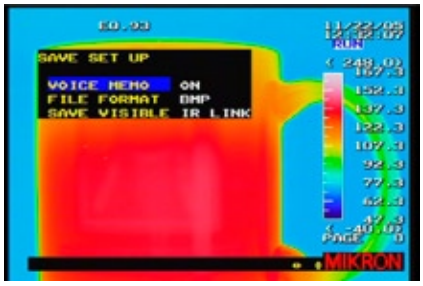
Standard View Menu

[SAVE HIGHLIGHTED]

Classic View Menu

2) Press the JOYSTICK [E] **button to gain access to the SAVE SET UP Menu**

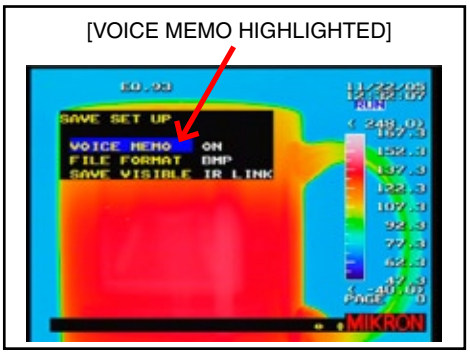
[SAVE SETUP MENU]



> **NOTE:**
>
> See Section 5.1.3 of this manual for more information on Adding a Voice Memo to a New Image..

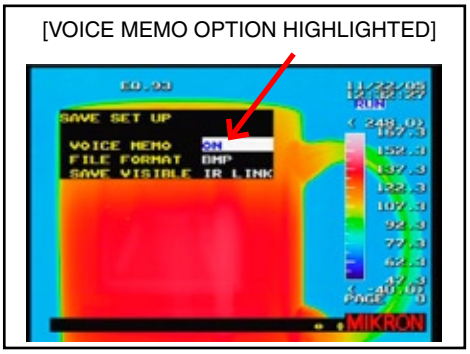
3) Toggle the JOYSTICK **up or down, if needed, to highlight VOICE MEMO from the list of menu choices.**

[VOICE MEMO HIGHLIGHTED]



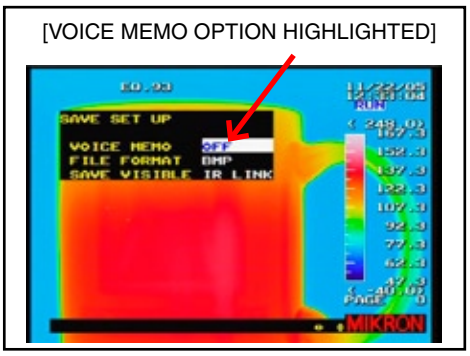
4) Toggle the JOYSTICK **to the right to highlight the voice memo options.**

[VOICE MEMO OPTION HIGHLIGHTED]



5) Toggle the JOYSTICK **up or down as needed to select the desired voice memo option.**

[VOICE MEMO OPTION HIGHLIGHTED]



The voice memo options are:

- OFF (DEFAULT)
- ON

6) Press the JOYSTICK [E] **button to lock the setting and to return to the main display.**

NOTE:

See Section 5.1 through 5.3 for more information on saving images.

3.9.2.2 Selecting the Image Save Format

The MikroScan 7600PRO allows images to be stored to the memory card in the MikroScan 7600PRO file format utilizing the .SIT file extension or as a bitmap file with the .BMP file extension.

When the image is saved with the .SIT extension, it is saved in a full 14-bit digital format and includes all the data associated with the file. If the voice memo function is activated, the voice memo will be embedded in the .SIT image file. Furthermore, if the visible save option is activated, the .SIT image will be saved along with its visible image counterpart as a single .SIT image file.

When an image is saved with the .BMP file extension, it is only saved as an image file and does not include data which may be essential for future review and analysis. However, if the visible save option is activated, the visible image is saved as a .JPG visible light image file and is automatically linked to the .BMP thermal image file.

To select the image save format:

1) Go to [MENU] → [SETUP] → [SAVE].

[SAVE HIGHLIGHTED]

Standard View Menu

[SAVE HIGHLIGHTED]

Classic View Menu

2) Press the JOYSTICK [E] **button to gain access to the SAVE SET UP Menu.**

3) Toggle the JOYSTICK **up or down to highlight FILE FORMAT from the list of menu choices.**

[FILE FORMAT HIGHLIGHTED]

4) **Toggle the** JOYSTICK **to the right to highlight the file format options.**

[FILE FORMAT OPTION HIGHLIGHTED]

5) **Toggle the** JOYSTICK **up or down as needed to select the file format option.**

[FILE FORMAT OPTION HIGHLIGHTED]

The file format options are:

- SIT (DEFAULT)
- BMP

6) **Press the** JOYSTICK [E] **button to lock the setting and to return to the main display.**

3.9.2.3 Selecting the Visible Save Option

The MikroScan 7600PRO allows visible images to be viewed and saved with their thermal image counterparts. These visible light images can be reviewed through the MikroScan 7600PRO or transferred along with all other image data to an external computer. The camera also provides thermal/visual composite image functionality, which allows you to view and save composite images

NOTE:

See Section 5 of this manual for more information on Images and Image Files.

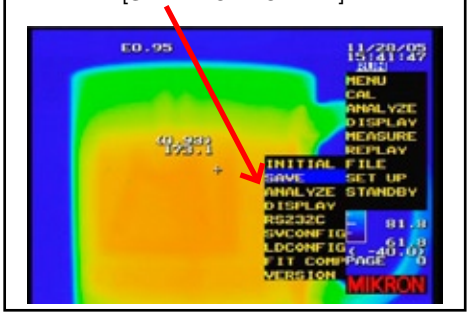
To select the visible save option:

1) Go to [MENU] → [SETUP] → [SAVE].

[SAVE HIGHLIGHTED]

Standard View Menu

[SAVE HIGHLIGHTED]



Classic View Menu

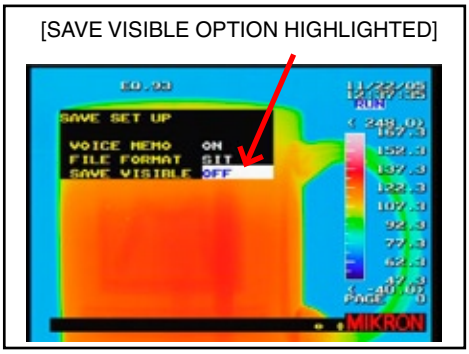
2) Press the JOYSTICK [E] **button to gain access to the SAVE SET UP Menu**.

3) Toggle the JOYSTICK **up or down to highlight SAVE VISIBLE from the list of menu choices.**

[SAVE VISIBLE HIGHLIGHTED]

4) Toggle the JOYSTICK **to the right to highlight the save visible options.**

[SAVE VISIBLE OPTION HIGHLIGHTED]



NOTE:

The IR LINK option will link the visible image with the thermal image and record the two images as a single file.

The CMP LINK option will link the composite image to the thermal image and record the two images as a single file..

5) Toggle the JOYSTICK up or down as needed to select the desired visible save option.

[SAVE VISIBLE OPTION HIGHLIGHTED]

The visible save options are:

- IR LINK (DEFAULT)
- CMP LINK
- OFF

6) Press the JOYSTICK [E] button to lock the setting and to return to the main display.

3.9.3 Establishing the Analyze Setup Values

3.9.3.1 Setting the Multipoint Display Mode

NOTE:

See section 6.4 of this manual for more information on Working with the Multi-Point Temperature Display Options.

The MikroScan 7600PRO allows you to view the temperature data of one or more points at selected locations anywhere within the field of view. It also allows you to establish individual emissivity values for one or more points and to obtain information on how the temperatures of the various points are affected by differences in emissivity settings. The Multi-Point Temperature Display Options can be used in either the RUN or FREEZE modes.

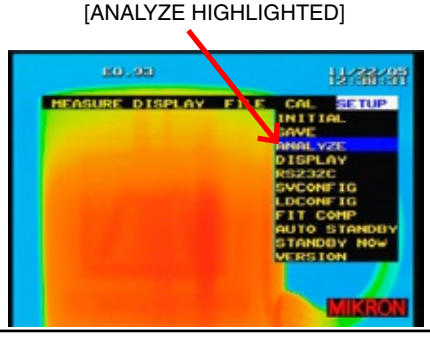
The Multi-Point Temperature Display offers four mode choices:

Mode	Details
[TEMP] (DEFAULT)	Displays the temperature of the points under the color bar. Does not, however, allow emissivity settings to be changed or displayed.
[TEMP & EMISS]	Displays the temperature and emissivity of each point near the point cursor. Also allows emissivity of each point to be set individually.
[ΔTEMP]	Displays the specified point temperature under the color bar. Also displays the temperature difference ΔT between point A and point B. However, this mode does not allow the emissivity to be corrected on an individual basis.
[ΔTEMP & EMISS]	Displays the specified point temperature under the color bar and displays the emissivity setting of the point near the point cursor. Also displays the temperature difference ΔT between point A and point B. However, the emissivity is displayed only when the emissivity of the point is different from the emissivity of the whole screen.

To set the multipoint display mode:

1) Go to [MENU] → [SETUP] → [ANALYZE].

[ANALYZE HIGHLIGHTED]



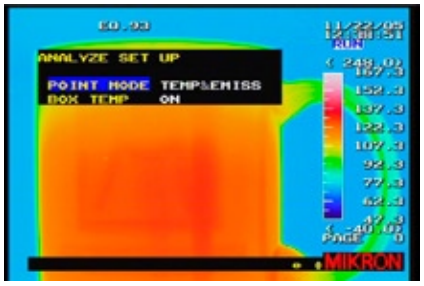
Standard View Menu

[ANALYZE HIGHLIGHTED]

Classic View Menu

2) Press the JOYSTICK [E] **button to gain access to the ANALYZE SET UP Menu.**

[ANALYZE SET UP MENU]



3) **Toggle the JOYSTICK up or down, if needed, to highlight POINT MODE from the list of menu choices.**

[POINT MODE HIGHLIGHTED]

4) **Toggle the JOYSTICK to the right to highlight the point mode options.**

[POINT MODE OPTION HIGHLIGHTED]

5) **Toggle the JOYSTICK up or down as needed to select the desired point mode option.**

[POINT MODE OPTION HIGHLIGHTED]

The point mode options are:

- TEMP (DEFAULT)
- TEMP & EMISS
- ΔTEMP
- ΔTEMP & EMISS

NOTE

[TEMP]

Displays the temperature of the points under the color bar. Does not, however, allow emissivity settings to be changed or displayed.

[TEMP & EMISS]

Displays the temperature and emissivity of each point near the point cursor. Also allows emissivity of each point to be set individually.

[ΔTEMP]

Displays the specified point temperature under the color bar. Also displays the temperature difference ΔT between point A and point B. However, this mode does not allow the emissivity to be corrected on an individual basis.

[ΔTEMP & EMISS]

Displays the specified point temperature under the color bar and displays the emissivity setting of the point near the point cursor. Also displays the temperature difference ΔT between point A and point B. However, the emissivity is displayed only when the emissivity of the point is different from the emissivity of the whole screen.

6) **Press the** JOYSTICK [E] **button to lock the setting and to return to the main display.**

3.9.3.2 Activating/Deactivating the Box Temperature Option

The MikroScan 7600PRO allows you to define up to five box-shaped regions of interest within the field of view. These boxes can be displayed with the maximum, minimum, and average temperature within the defined box region of interest.

The Box Temperature option offers two mode choices:

Mode	Details
[ON] (DEFAULT)	Displays the box and the box label along with the minimum, maximum, and average temperature of the area defined by the box.
[OFF]	Displays the box and box label.

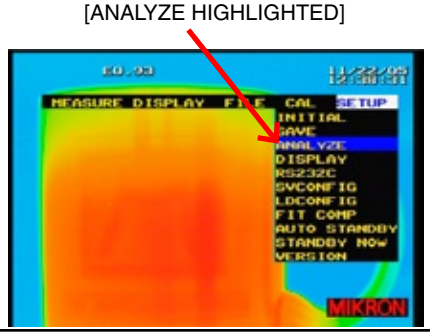
To activate/deactivate the box temperature option:

1) **Go to [MENU] → [SETUP] → [ANALYZE].**

NOTE:

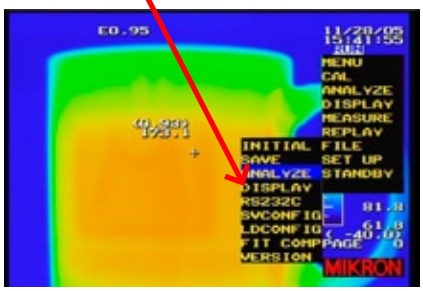
See section 6.6 of this manual for more information on Working with Boxes.

[ANALYZE HIGHLIGHTED]



Standard View Menu

[ANALYZE HIGHLIGHTED]



Classic View Menu

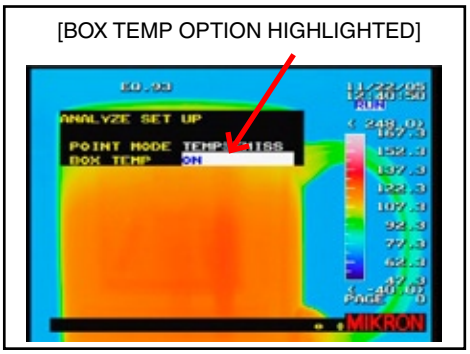
2) **Press the** JOYSTICK [E] **button to gain access to the ANALYZE SET UP Menu.**

3) **Toggle the** JOYSTICK **up or down, if needed, to highlight BOX TEMP from the list of menu choices.**

[BOX TEMP HIGHLIGHTED]

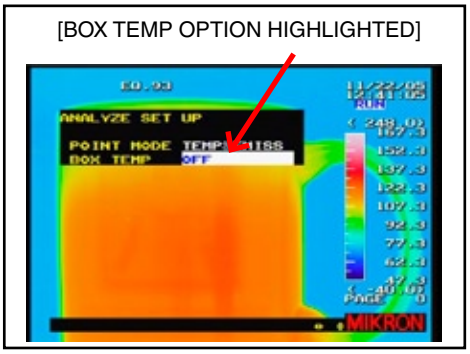
4) Toggle the JOYSTICK to the right to highlight the box temp options.

[BOX TEMP OPTION HIGHLIGHTED]



5) Toggle the JOYSTICK up or down as needed to select the desired box temp option.

[BOX TEMP OPTION HIGHLIGHTED]



The box temp options are:

- ON (DEFAULT)
- OFF

6) Press the JOYSTICK [E] button to lock the setting and to return to the main display.

3.9.4 Establishing the Display Setup Values

3.9.4.1 Setting the NUC (Non Uniformity Correction) Mode

The Non Uniformity Correction (NUC) function corrects uneven characteristics of the UFPA (Infrared detector elements). The focal plane array is made up of 76800 infrared sensitive cells called pixels. When scenes containing bright objects or areas are focused on the array, some pixels may be partially or completely saturated, rendering them noisy or unresponsive.

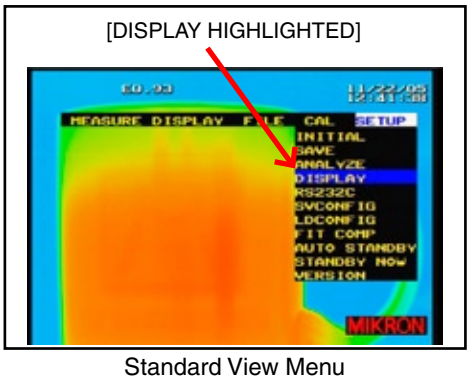
The main unit internally has a reference blackbody source, which has an even temperature surface. The NUC operation corrects the unevenness of characteristics for all elements of the UFPA by a reference blackbody source while an internal accurate thermometer monitors the temperature of the reference blackbody source and calibrates the unit during the NUC operation. This operation is referred to in thermal imaging as "NUCing" the array.

The NUC option offers two mode choices:

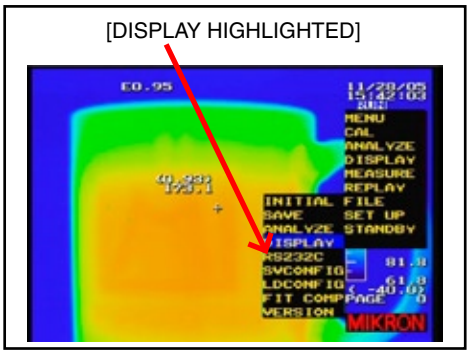
Mode	Details
[MANUAL] (DEFAULT)	The non uniformity correction (detector stabilization) will be performed when the camera switches from FREEZE mode to RUN mode.
[AUTO]	The non uniformity correction (detector stabilization) will be performed at prees-tablished time intervals while the camera is operating in the RUN mode.

To set the NUC Mode:

1) Go to [MENU] → [SETUP] → [DISPLAY].



Standard View Menu



Classic View Menu

2) Press the JOYSTICK [E] **button to gain access to the DISPLAY SET UP Menu.**

[DISPLAY SETUP MENU]

3) Toggle the JOYSTICK **up or down, if needed, to highlight NUC MODE from the list of menu choices.**

[NUC MODE HIGHLIGHTED]

4) Toggle the JOYSTICK **to the right to highlight the NUC mode options.**

[NUC MODE OPTION HIGHLIGHTED]

5) Toggle the JOYSTICK up or down as needed to select the NUC mode option.

[NUC MODE OPTION HIGHLIGHTED]

The NUC mode options are:

- MANUAL (DEFAULT)
- AUTO

Setting the Manual NUC mode option

1) Follow steps 1-5 for Setting the NUC (Non Uniformity Correction) Mode in Section 3.9.4.1 of this manual.

2) Select MANUAL from the list of mode options

[MANUAL NUC MODE OPTION HIGHLIGHTED]

3) Press the JOYSTICK [E] button to lock the setting and to return to the main display.

When the manual NUC mode operation has been selected, the instrument will perform a non uniformity correction (detector stabilization) whenever the display changes to the Run mode.

Setting the Auto NUC mode option

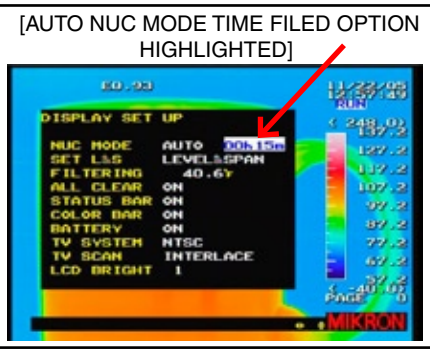
1) **Follow steps 1-5 for Setting the NUC (Non Uniformity Correction) Mode in Section 3.9.4.1 of this manual.**

2) **Select AUTO from the list of mode options.**

[AUTO NUC MODE OPTION HIGHLIGHTED]

3) **Toggle the** JOYSTICK **to the right to highlight the time field.**

[AUTO NUC MODE TIME FILED OPTION HIGHLIGHTED]



4) **Toggle the** JOYSTICK **up or down as needed to increase or decrease the desired time interval (ranging from 1 minute to 24 hours).**

5) **Press the** JOYSTICK [E] **button to lock the setting and to return to the main display.**

When the Auto NUC mode operation has been selected, the instrument will perform a non uniformity correction (detector stabilization) according to the time interval set in Step 4 above.

NOTE:

See Sections 4.7 through 4.9 of this manual for more information on working with the Temperature Level, Span, and Sensitivity..

3.9.4.2 Setting the L&S (Level & Sensitivity OR Level & Span) Mode

The 7600PRO provides two options for making adjustments to the temperature scale of a thermal image.

The first option is to make adjustments to the level of sensitivity. The level of sensitivity determines the instrument's ability to resolve adjacent areas of different temperatures within the overall scene. Since only a small portion of the whole temperature range is used for viewing, it is often necessary to increase or decrease the intervals of the temperature scale by adjusting the Sensitivity Level.

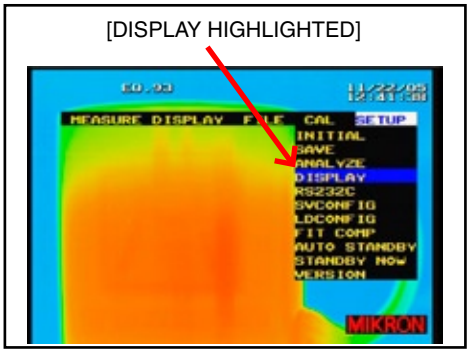
The second option is to adjust the temperature span which sets the upper limit temperature value on the color bar. Ideally, the span should embrace most of the temperatures of interest and be equally displaced about some median temperature in the target area.

The L&S option offers two mode choices:

Mode	Details
[LEVEL & SENSITIVITY] (DEFAULT)	Sets the intervals of the temperature color bar scale..
[LEVEL & SPAN]	Sets the upper limit temperature value of the color bar. Note: When the mode is set to Level & Span, changes cannot be made to the sensitivity settings.

To set the L&S Mode:

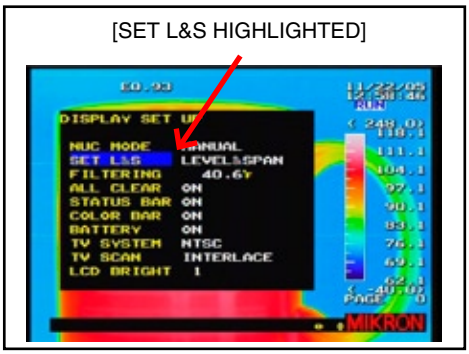
1) Go to [MENU] → [SETUP] → [DISPLAY].



Standard View Menu | Classic View Menu

2) Press the JOYSTICK [E] **button to gain access to the DISPLAY SET UP Menu.**

3) Toggle the JOYSTICK **up or down, if needed, to highlight SET L&S from the list of menu choices.**



4) Toggle the JOYSTICK to the right to highlight the L&S options.

[L&S OPTION HIGHLIGHTED]

5) Toggle the JOYSTICK up or down as needed to select the desired L&S option.

[L&S OPTION HIGHLIGHTED]

The Set L&S options are:

- LEVEL & SENSE (DEFAULT)
- LEVEL & SPAN

6) Press the JOYSTICK [E] button to lock the setting and to return to the main display.

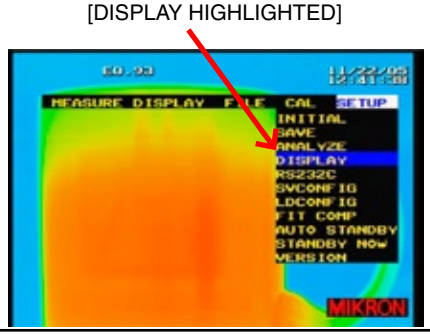
3.9.4.3 Setting the Threshold for Spatial Filtering

The Spatial Filtering feature of the MikroScan 7600PRO allows an additional level of image smoothing to a thermal image while the instrument is in Freeze mode.

To set the Threshold for Spatial Filtering:

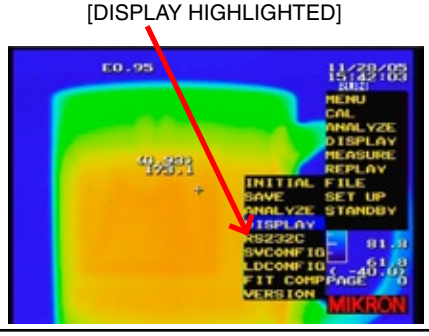
1) Go to [MENU] → [SETUP] → [DISPLAY].

[DISPLAY HIGHLIGHTED]



Standard View Menu

[DISPLAY HIGHLIGHTED]

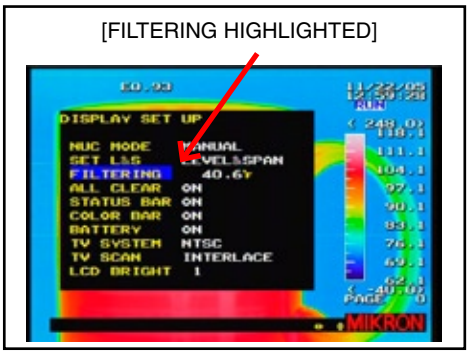


Classic View Menu

2) Press the JOYSTICK [E] **button to gain access to the DISPLAY SET UP Menu**.

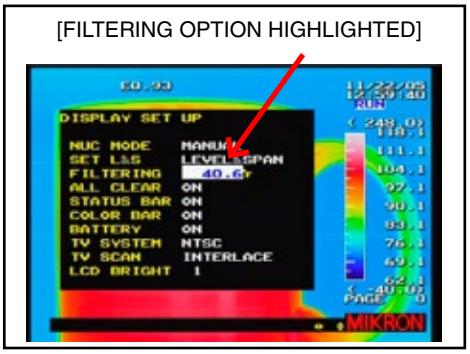
3) Toggle the JOYSTICK **up or down to highlight FILTERING from the list of menu choices.**

[FILTERING HIGHLIGHTED]



4) Toggle the JOYSTICK **to the right to highlight the filtering options.**

[FILTERING OPTION HIGHLIGHTED]



5) Toggle the JOYSTICK **up or down as needed to select the desired threshold for spatial filtering.**

[FILTERING OPTION HIGHLIGHTED]

The filtering options are:

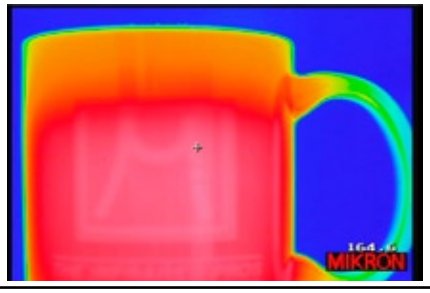
- OFF
- Select a threshold from 0.1°C to 5.0°C (32.2°F to 41°F) with the step of 0.1°C (.1°F)

6) Press the JOYSTICK [E] **button to lock the setting and to return to the main display.**

3.9.4.4 Clearing/Showing Display Elements

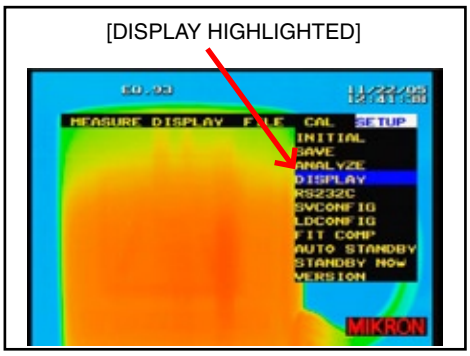
The All Clear feature of the MikroScan 7600PRO allows you to focus solely on the image by hiding all display elements other than the logo.

[ALL CLEAR FUNCTION ACTIVATED]



To activate/deactivate the All Clear function:

1) **Go to [MENU] → [SETUP] → [DISPLAY].**



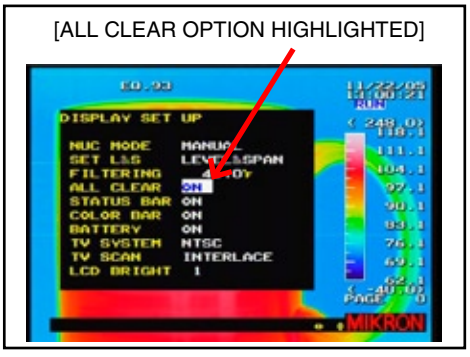
Standard View Menu

Classic View Menu

2) **Press the** JOYSTICK [E] **button to gain access to the DISPLAY SET UP Menu**.

3) **Toggle the** JOYSTICK **up or down to highlight ALL CLEAR from the list of menu choices.**

4) **Toggle the** JOYSTICK **to the right to highlight the All Clear options.**



5) Toggle the JOYSTICK up or down as needed to select the desired All Clear option.

[ALL CLEAR OPTION HIGHLIGHTED]

The All Clear options are:

- ON [DEFAULT] -- all elements are displayed
- OFF -- all elements are hidden other than the logo

Activating the All Clear Option (clearing the display)

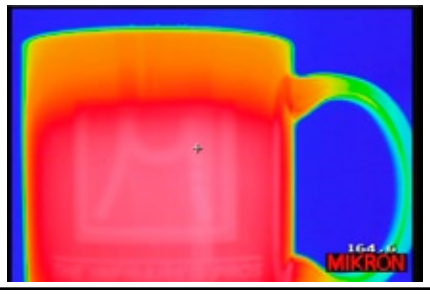
1) Follow steps 1-5 for Clearing/Showing Display Elements in Section 3.9.4.4 of this manual.

2) Select OFF from the list of mode options.

[ALL CLEAR OFF OPTION SELECTED]

3) Press the JOYSTICK to lock the setting and to return to the main display.

[ALL CLEAR FUNCTION ACTIVATED]



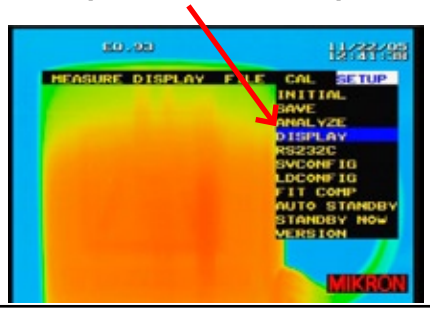
NOTE

Although the All Clear OFF option will clear the elements from the display, these elements are only hidden and can be accessed in the same manner as when they are actively displayed.

Deactivating the All Clear Option

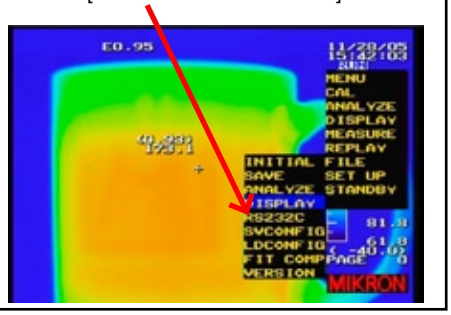
1) Go to [MENU] → [SETUP] → [DISPLAY].

[DISPLAY HIGHLIGHTED]



Standard View Menu

[DISPLAY HIGHLIGHTED]



Classic View Menu

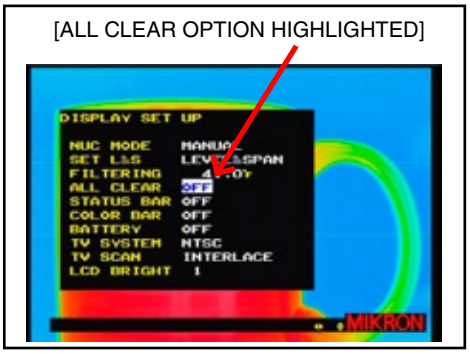
2) Press the JOYSTICK [E] **button to gain access to the DISPLAY SET UP Menu**.

3) Toggle the JOYSTICK **up or down to highlight ALL CLEAR from the list of menu choices.**

[ALL CLEAR HIGHLIGHTED]

4) Toggle the JOYSTICK **to the right to highlight the All Clear options.**

[ALL CLEAR OPTION HIGHLIGHTED]



5) **Toggle the JOYSTICK up or down as needed to select the All Clear ON option.**

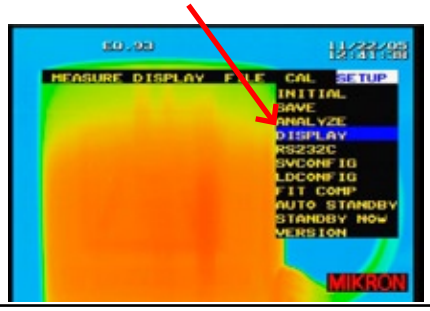
[ALL CLEAR ON OPTION SELECTED]

6) **Press the JOYSTICK [E] button to lock the setting and to return to the main display.**

3.9.4.5 Clearing/Showing the Status Bar

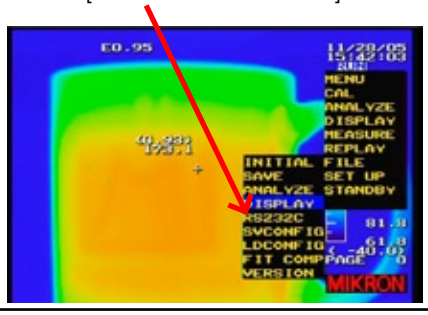
1) **Go to [MENU] → [SETUP] → [DISPLAY].**

[DISPLAY HIGHLIGHTED]



Standard View Menu

[DISPLAY HIGHLIGHTED]

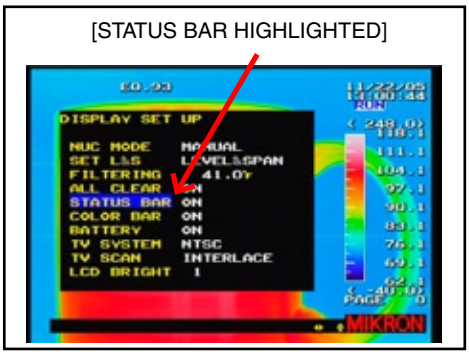


Classic View Menu

2) **Press the JOYSTICK [E] button to gain access to the DISPLAY SET UP Menu.**

3) **Toggle the JOYSTICK up or down to highlight STATUS BAR from the list of menu choices.**

[STATUS BAR HIGHLIGHTED]

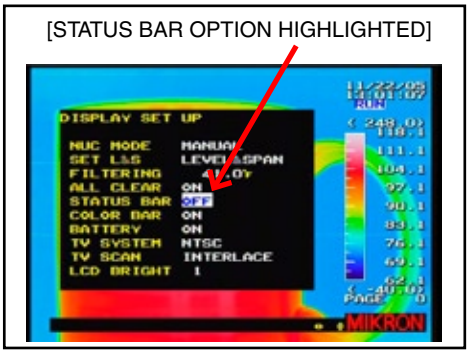


4) Toggle the JOYSTICK **to the right to highlight the status bar display setup option.**

[STATUS BAR OPTION HIGHLIGHTED]

5) Toggle the JOYSTICK **up or down as needed to select the desired option.**

[STATUS BAR OPTION HIGHLIGHTED]



The status bar display options are:

- ON (DEFAULT)
- OFF

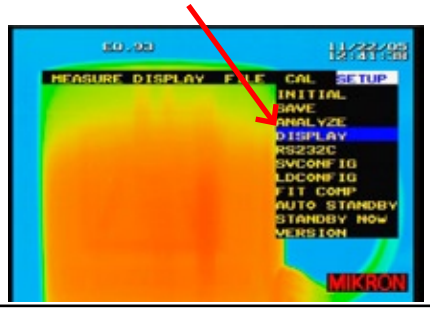
6) Press the JOYSTICK [E] **button to lock the setting and to return to the main display.**

Although the Status Bar OFF option will clear the status bar elements from the display, these elements are only hidden and can be accessed in the same manner as when they are actively displayed.

3.9.4.6 Clearing/Showing the Color Bar

1) Go to [MENU] → [SETUP] → [DISPLAY].

[DISPLAY HIGHLIGHTED]



Standard View Menu

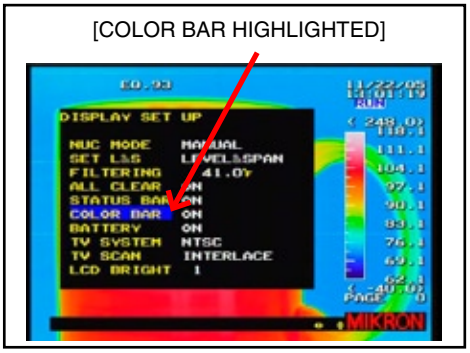
[DISPLAY HIGHLIGHTED]

Classic View Menu

2) Press the JOYSTICK [E] **button to gain access to the DISPLAY SET UP Menu.**

3) Toggle the JOYSTICK **up or down to highlight COLOR BAR from the list of menu choices.**

[COLOR BAR HIGHLIGHTED]



4) Toggle the JOYSTICK **to the right to highlight the color bar display setup option.**

[COLOR BAR OPTION HIGHLIGHTED]

5) Toggle the JOYSTICK up or down as needed to select the desired option.

The color bar display options are:

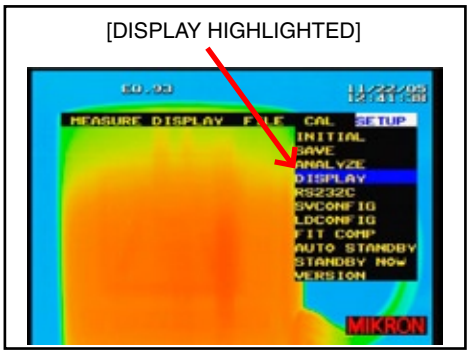
- ON (DEFAULT)
- OFF

6) Press the JOYSTICK [E] button to lock the setting and to return to the main display.

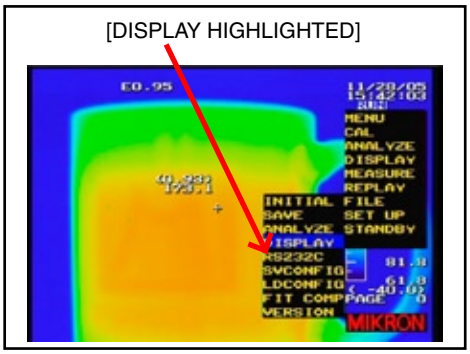
Although the Color Bar OFF option will clear the color bar and temperature range scale from the display, these elements are only hidden and can be accessed in the same manner as when they are actively displayed.

3.9.4.7 Clearing/Showing the Battery Status Indicator

1) Go to [MENU] → [SETUP] → [DISPLAY].



Standard View Menu



Classic View Menu

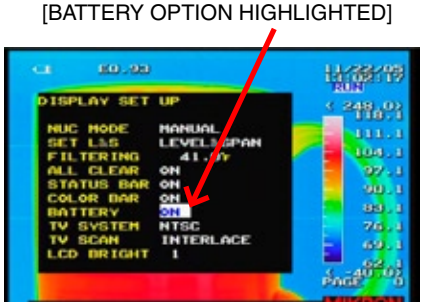
2) Press the JOYSTICK [E] button to gain access to the DISPLAY SET UP Menu.

3) Toggle the JOYSTICK up or down to highlight BATTERY from the list of menu choices.

[BATTERY HIGHLIGHTED]

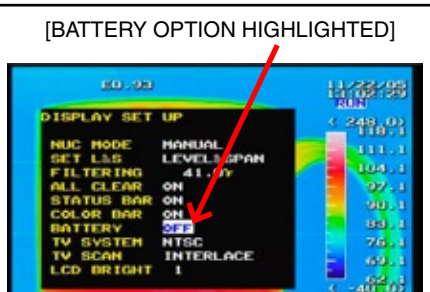
4) Toggle the JOYSTICK to the right to highlight the battery indicator display option.

[BATTERY OPTION HIGHLIGHTED]



5) Toggle the JOYSTICK up or down as needed to select the desired option.

[BATTERY OPTION HIGHLIGHTED]



The battery indicator display options are:

- ON (DEFAULT)
- OFF

6) Press the JOYSTICK [E] button to lock the setting and to return to the main display.

NOTE:

See Working with External Video Displays found in Section 7.2 of this manual for more information on setting up the Video Output Mode feature for this camera.

NOTE:

See Working with External Video Displays found in Section 7.2 of this manual for more information on setting up the TV Scanning Mode feature for this camera.

3.9.4.8 Setting the TV System (Video Output Mode)

The MikroScan 7600PRO provides a NTSC/PAL composite video port which is used for providing an interface for external video displays.

Mode	Details
[NTSC] (DEFAULT)	Used to select the 60-Hz American Standard (NTSC) video output option.
[PAL]	Used to select the 50-Hz European Standard (PAL) video output option. (Note: When the instrument has been set to the PAL video output mode, the LCD or visual image display, save, and replay are not available).

3.9.4.9 Setting the TV Scanning Mode

When images or image frames are displayed on a monitor, they are displayed as rows of pixels with each row being "painted" on the screen from left to right. Once the first row of pixels has been scanned the process continues until the entire 'scene' has been scanned and displayed. Because the 7600PRO offers a resolution of 640 x 480, this means that each image or image frame would include 480 individual rows of pixels.

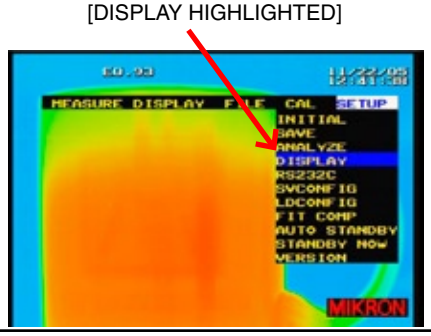
The 7600PRO offers two scanning modes. The first is the default non-interlace mode. With the non-interlace mode of scanning, the whole frame is painted at one time with each line being scanned in succession (i.e. 1,2,3,4,5, etc.) from top to bottom.

The second mode is the interlace mode. With the interlace mode of scanning, each frame is split in two with the first pass scanning all the odd number rows, and the second pass scanning all the even number rows. Basically, this results in the display being refreshed from top to bottom twice as frequently as in the non-interlaced case

3.9.4.10 Adjusting the LCD Brightness Level

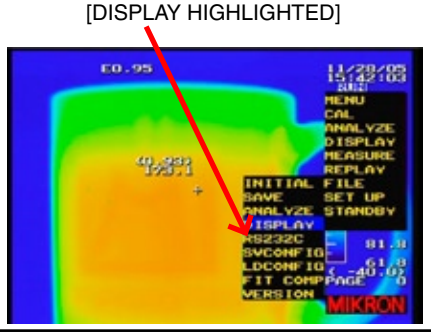
1) Go to [MENU] → [SET UP] → [DISPLAY].

[DISPLAY HIGHLIGHTED]



Standard View Menu

[DISPLAY HIGHLIGHTED]

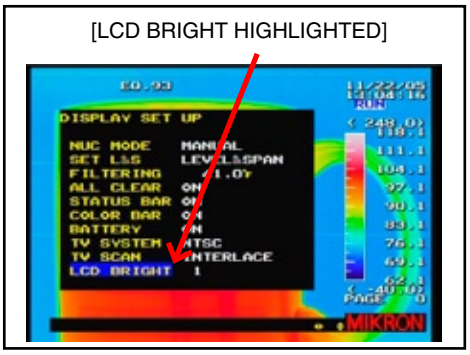


Classic View Menu

2) **Press the** JOYSTICK [E] **button to gain access to the DISPLAY SET UP Menu.**

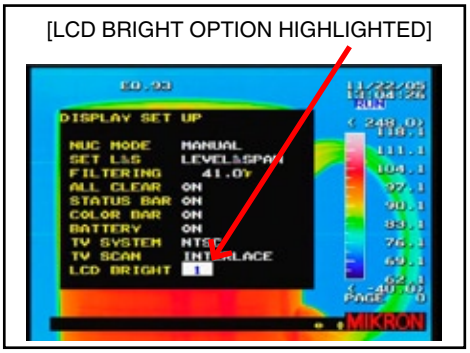
3) **Toggle the** JOYSTICK **up or down as needed to highlight [LCD BRIGHT].**

[LCD BRIGHT HIGHLIGHTED]



4) **Toggle the** JOYSTICK **to the right to highlight the LCD Bright option.**

[LCD BRIGHT OPTION HIGHLIGHTED]



5) **Toggle the** JOYSTICK **up or down as needed to change the LCD Bright option.**

The LCD Bright options are:

- 0: (dark)
- 1: (middle) [DEFAULT]
- 2: (bright)

6) **Press the** JOYSTICK [E] **button to lock the setting and to return to the main display.**

NOTE

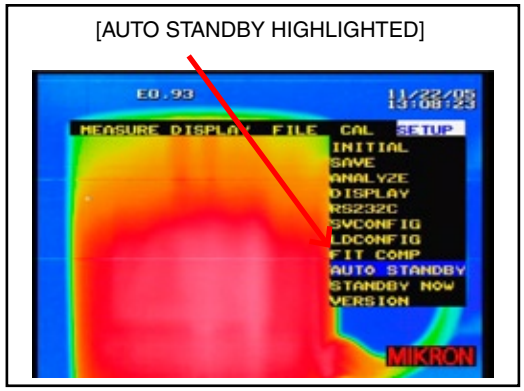
All camera settings are saved when the instrument is in standby mode.

3.9.5 Establishing the Auto Standby Parameters

In addition to a manual standby mode as described in Section 4.2.1 of this manual, the MikroScan 7600PRO also provides an automatic standby feature which is used to conserve battery power and to eliminate detector stabilization time when making intermittent measurements.

3.9.5.1 Activating the Auto Standby Feature

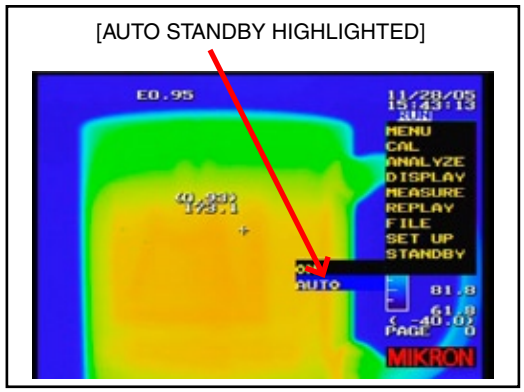
1) **If using the Standard Type Menu, go to [MENU] → [SETUP] → [AUTO STANDBY].**



Standard View Menu

OR

If using the Classic Type Menu, go to [MENU] → [STANDBY] → [AUTO].



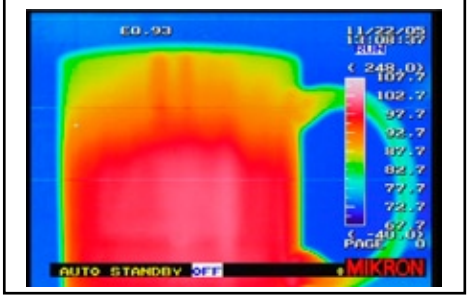
Classic View Menu

Caution

- The Auto Standby feature does not shut the camera down. It only places the camera in standby mode.
- Do not leave the camera in Standby mode for an extended period of time as it will eventually deplete the battery charge.
- Be sure to turn the power button off when the measurements have been completed.

2) Press the JOYSTICK [E] **button to gain access to the AUTO STANDBY Mode.**

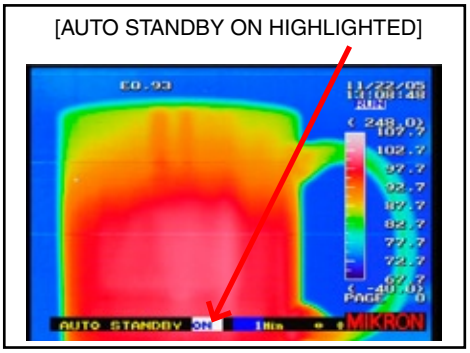
[AUTO STANDBY MODE SCREEN]



A bar will appear at the bottom of the screen showing the current auto standby setting.

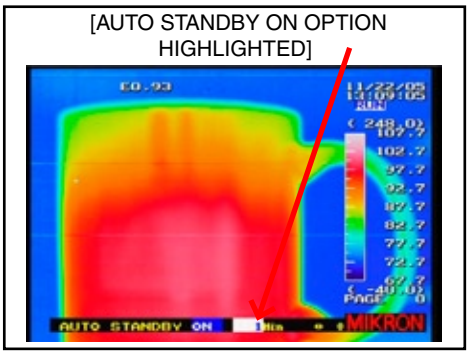
3) Toggle the JOYSTICK **up or down as needed to select AUTO STANDBY [ON].**

[AUTO STANDBY ON HIGHLIGHTED]



4) Toggle the JOYSTICK **to the right to highlight the AUTO STANDBY set time option.**

[AUTO STANDBY ON OPTION HIGHLIGHTED]



NOTE:

When activated, the screen will darken and the camera will enter standby mode when there has been no activity for the selected time period as set in Step 5.

Press any key to cancel the standby mode and to return to the normal operation.

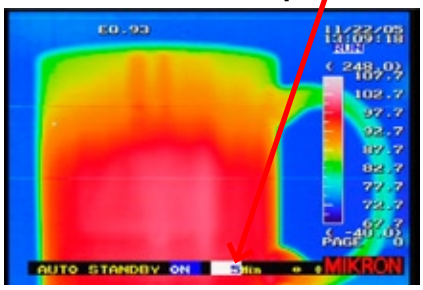
The instrument will then go through the system check and normal operation will resume after approximately 20 seconds.

Caution

- The Auto Standby feature does not shut the camera down. It only places the camera in standby mode.
- Do not leave the camera in Standby mode for an extended period of time as it will eventually deplete the battery charge.
- Be sure to turn the power button off when the measurements have been completed.

5) Toggle the JOYSTICK up or down as needed to increase or decrease the amount of time to wait before the camera enters standby mode.

[AUTO STANDBY ON OPTION HIGHLIGHTED]



When activated, the screen will darken and the camera will enter standby mode when there has been no activity for the selected time period as set in Step 5.

6) Press the JOYSTICK [E] button to save the setting and to return to the main display.

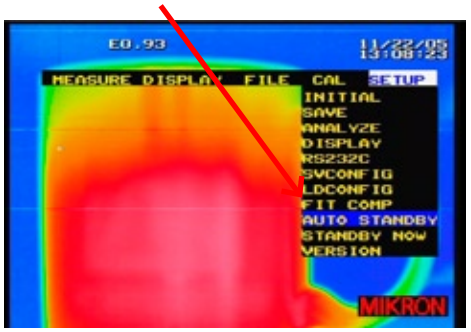
OR

Press the CANCEL/VISIBLE [C] button to cancel out of the auto standby mode and to return to the main display.

3.9.5.2 Deactivating the Auto Standby Feature

1) If using the Standard Type Menu, go to [MENU] → [SETUP] → [AUTO STANDBY].

[AUTO STANDBY HIGHLIGHTED]



Standard View Menu

OR

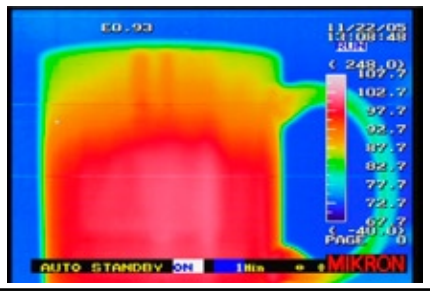
If using the Classic Type Menu, go to [MENU] → [STANDBY] → [AUTO].

[AUTO STANDBY HIGHLIGHTED]

Classic View Menu

2) Press the JOYSTICK [E] **button to gain access to the AUTO STANDBY Mode.**

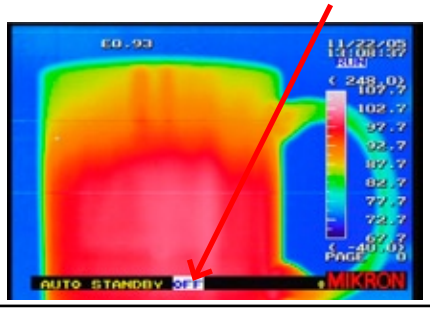
[AUTO STANDBY MODE SCREEN]



A bar will appear at the bottom of the screen showing the current auto standby setting.

3) Toggle the JOYSTICK **up or down as needed to select AUTO STANDBY [OFF].**

[AUTO STANDBY OFF HIGHLIGHTED]



4) **Press the** JOYSTICK [E] **button to save the setting and to return to the main display.**

OR

Press the CANCEL/VISIBLE [C] **button to cancel out of the auto standby mode and to return to the main display.**

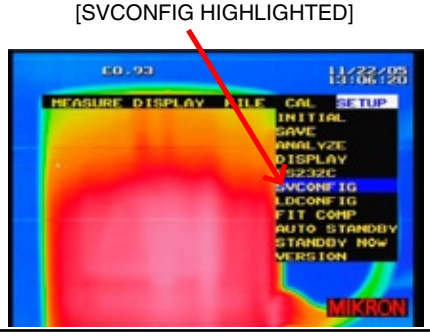
3.10 Working with Configuration Files

The MikroScan 7600PRO provides a number of setup options and allows you to establish, save, and recall up to 10 customized camera configurations based selections you made in the Initial Setup menu, the Save Setup menu, the Analyze setup menu, and the Display Setup menu.

3.10.1 Saving a configuration file

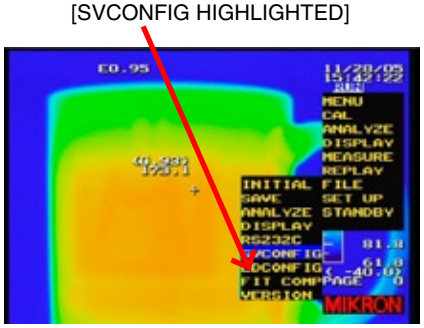
1) **Go to [MENU] → [SETUP] → [SVCONFIG].**

[SVCONFIG HIGHLIGHTED]



Standard View Menu

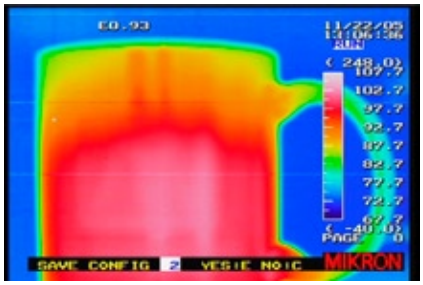
[SVCONFIG HIGHLIGHTED]



Classic View Menu

2) **Press the** JOYSTICK [E] **button to gain access to the SAVE CONFIGURATION Mode.**

[SAVE CONFIGURATION SCREEN]



NOTE:

If the configuration file number has already been assigned to another configuration, a message bar will appear at the bottom of the display asking if you want to over write the previous configuration file.

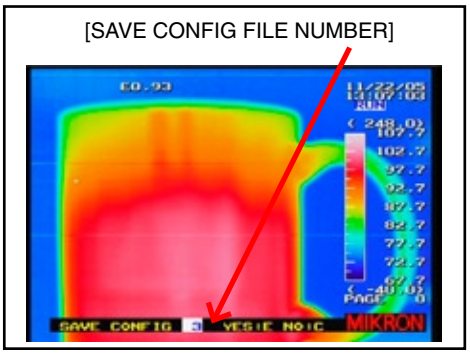
You can either press the JOYSTICK [E] button to over write the existing file,

OR

You can press the CANCEL/VISIBLE [C] button to cancel the request and select another configuration file number.

3) Toggle the JOYSTICK **up or down to select a configuration file number from 1 to 10.**

[SAVE CONFIG FILE NUMBER]



If the configuration file number has already been assigned to another configuration, a message bar will appear at the bottom of the display asking if you want to over write the previous configuration file.

You can either press the JOYSTICK [E] button to over write the existing file,

OR

You can press the CANCEL/VISIBLE [C] button to cancel the request and select another configuration file number.

4) Press the JOYSTICK [E] **button to save the setting and to return to the main display.**

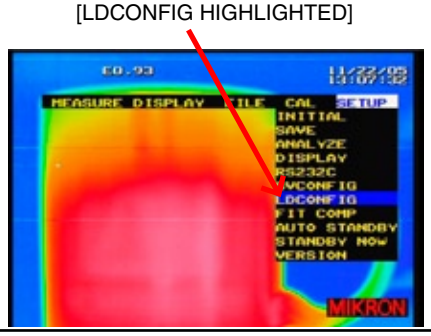
OR

Press the CANCEL/VISIBLE [C] **button to cancel out of the auto standby mode and to return to the main display.**

3.10.2 Loading a saved configuration file

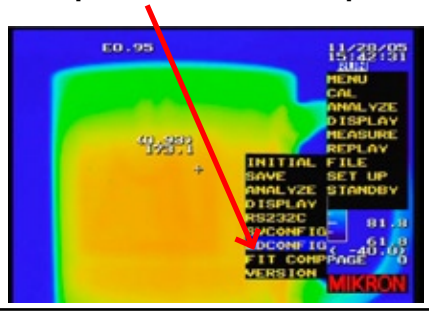
1) Go to [MENU] → [SETUP] → [LDCONFIG].

[LDCONFIG HIGHLIGHTED]



Standard View Menu

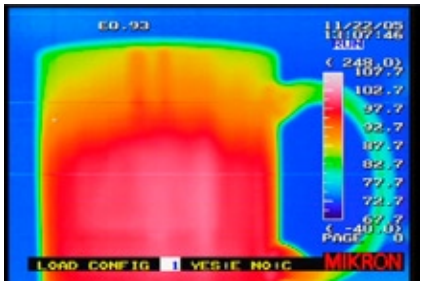
[LDCONFIG HIGHLIGHTED]



Classic View Menu

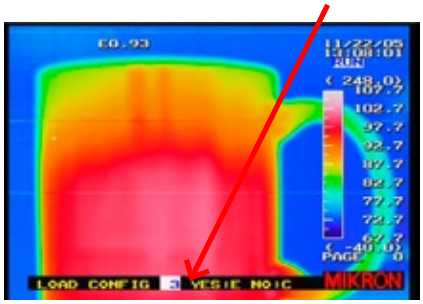
2) Press the JOYSTICK [E] **button to gain access to the LOAD CONFIGURATION Mode.**

[LOAD CONFIGURATION SCREEN]



3) Toggle the JOYSTICK **up or down to select a configuration file number from 1 to 10.**

[LOAD CONFIG FILE NUMBER]



4) Press the JOYSTICK [E] **button to save the setting and to return to the main display.**

OR

Press the CANCEL/VISIBLE [C] **button to cancel out of the auto standby mode and to return to the main display.**

3.11 Information on the MikroScan 7600PRO Firmware Version

To access information on the MikroScan 7600PRO Firmware Version:

1) Go to [MENU] → [SETUP] → [VERSION].

[VERSION HIGHLIGHTED]

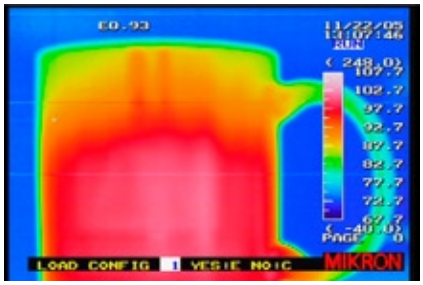
Standard View Menu

[VERSION HIGHLIGHTED]

Classic View Menu

2) Press the JOYSTICK [E] **button to gain access to the VERSION Display Screen**.

[VERSION DISPLAY SCREEN]



3) Press the JOYSTICK [E] **button to return to the main display.**

3.12 Finishing

1) **Press the power switch to turn the camera off.**
2) **Close the LCD display.**
3) **Attach the lens cover.**
4) **Disconnect the power supply.**
5) **Close the interface hatch cover on the back of the camera.**

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Basic Operation

4.1 Toggling between the Run and Freeze Modes

The MikroScan 7600PRO on board processing software allows you to view images at a rate of 60 frames per second in the run mode. Because the run mode operates in real-time, the time clock, image, and image data are continuously updated. The software also allows you to freeze an image (freeze mode) which stops the time clock and allows more time for viewing and analyzing data associated with a single image frame.

NOTE

Most display and menu options function while the camera is in either the Run or Freeze mode. However, there are certain options that only function when the camera is in the Run mode, while others only function when the camera is in the Freeze mode.

Freeze Mode Only Options include:
- Memory Card
- Voice Memo

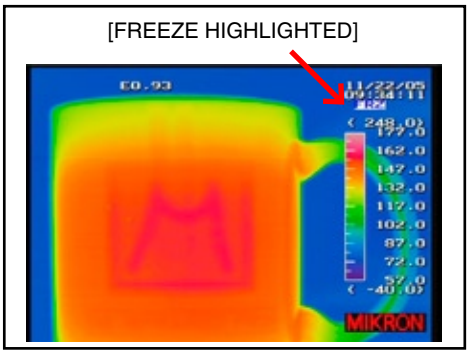
Run Mode Only Options include:
- Ambient Comp.
- Background Comp.
- Calibration
- Emissivity
- Focus
- Gain Control
- Lens Assembly
- Range

4.1.1 Switching to Freeze Mode

RUN/FRZ R

1) **Press the** R **[RUN/FRZ] key button to place the camera into Freeze Mode.**

2) **Verify** [FRZ] **is highlighted at the upper right hand corner of the display and that the time clock has stopped.**

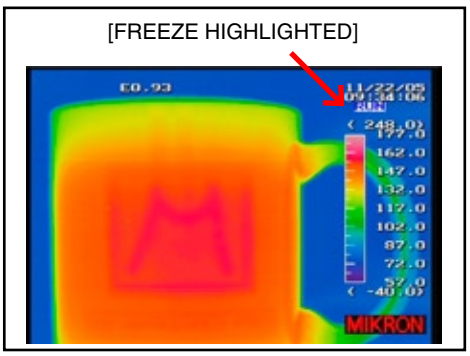


4.1.2 Returning to Run Mode

RUN/FRZ R

1) **Press the** R **[RUN/FRZ] key button to place the camera into Run Mode.**

2) **Verify** [RUN] **is highlighted at the upper right hand corner of the display and that the time clock has restarted.**



NOTE:

When activated, the screen will darken and the camera will enter standby mode.

Press any key to cancel the standby mode and to return to the normal operation.

The instrument will then go through the system check and normal operation will resume after approximately 20 seconds.

NOTE

All camera settings are saved when the instrument is in standby mode.

Caution

- The Standby feature does not shut the camera down. It only places the camera in standby mode.
- Do not leave the camera in Standby mode for an extended period of time as it will eventually deplete the battery charge.
- Be sure to turn the power button off when the measurements have been completed.

4.2 Using the Power Standby Mode

The instrument can be placed in Power Standby mode to conserve battery power and to eliminate detector stabilization time when making intermittent measurements.

4.2.1 Working with the Power Standby ON Function

1) **If using the Standard Type Menu, go to [MENU] → [SETUP] → [STANDBY NOW].**

[AUTO STANDBY HIGHLIGHTED]

Standard View Menu

OR

If using the Classic Type Menu, go to [MENU] → [STANDBY] → [ON].

[AUTO STANDBY HIGHLIGHTED]

Classic View Menu

2) **Press the** JOYSTICK [E] **button to place the camera in Standby Mode**.

The screen will darken and the Power On LED will flash approximately every 2 seconds. If the battery power is depleted while in Standby mode, the Power LED will flash rapidly.

3) **Press any key to cancel the standby mode and to return to normal operation.**

The instrument will go through the system check and normal operation will resume after approximately 20 seconds.

4.2.2 Working with the Power Standby Auto Function

1) **Refer to Section 3.9.5 of this manual for information on establishing the Auto Standby Parameters and working with the Auto Standby Function.**

4.3 Selecting the Temperature Range and Mode

Two temperature ranges are provided as a standard camera feature. These two ranges provide an overall temperature span of -40°C to 500°C (-40°F to 932°F).

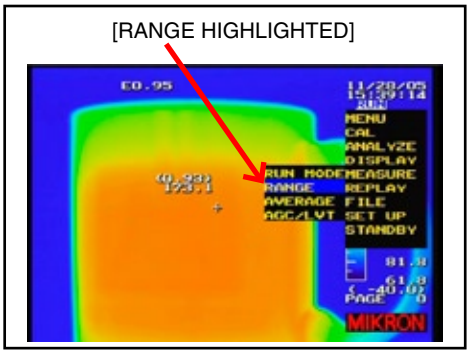
Each range offers a FIXED range mode setting and a L/S LINK (Level/Sens linking mode) setting. In the FIXED mode, the LEVEL and SENSITIVITY can be adjusted to their minimum and maximum levels without affecting the displayed range.

In the L/S LINK mode, adjustments made beyond the LEVEL will switch the camera from one range to the other.

4.3.1 Selecting the Temperature Range (Option 1)

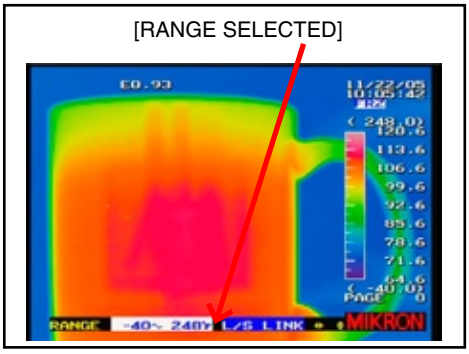
1) **Verify the camera is operating in** [RUN] **mode.**
2) **Go to [MENU] → [MEASURE] → [RANGE].**

Standard View Menu



Classic View Menu

3) **Press the** JOYSTICK [E] **button to select the temperature RANGE function.**



A bar will appear at the bottom of the screen showing the current temperature range option:

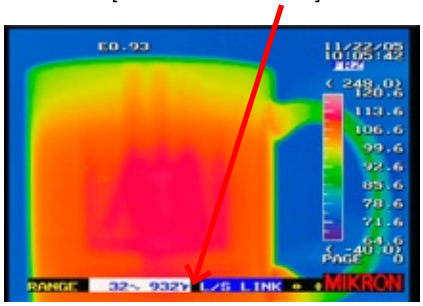
NOTE

The Maximum Temperature Level for Range 1 is 120°C (248°F), while the Minimum Temperature Level for Range 1 is -40°C (-40°F).

The Maximum Temperature Level for Range 2 is 500°C (932°F), while the Minimum Temperature Level for Range 2 is 0° (32°F).

4) Toggle the JOYSTICK up or down if needed until the desired temperature RANGE has been selected.

[RANGE SELECTED]

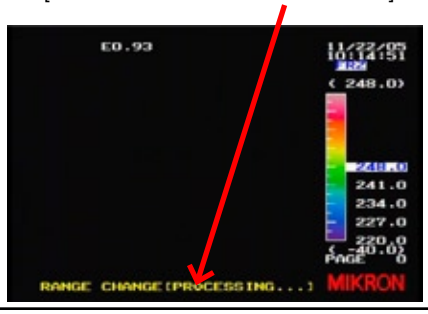


The two standard temperature ranges are:

- RANGE 1 -40°C TO 120°C (-40°F TO 248°F)
- RANGE 2 0°C TO 500°C (32°F TO 932°F)

5) Press the JOYSTICK [E] button to save the setting and to return to the main display.

[RANGE PROCESSING MESSAGE]



A message will appear at the bottom of the display indicating that the temperature range request is processing.

OR

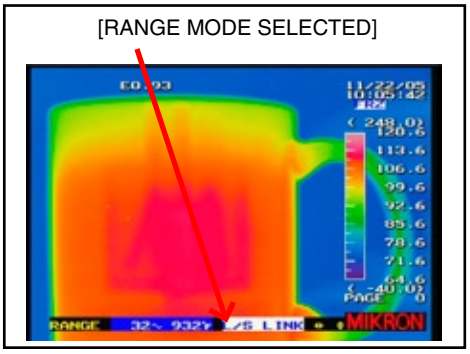
Press the CANCEL/VISIBLE [C] button to cancel out of the menu mode and to return to the main display.

4.3.2 Selecting the Temperature Range Mode Setting

1) **Follow steps 1-3 for Selecting the Temperature Range (See Section 4.3.1 of this manual).**

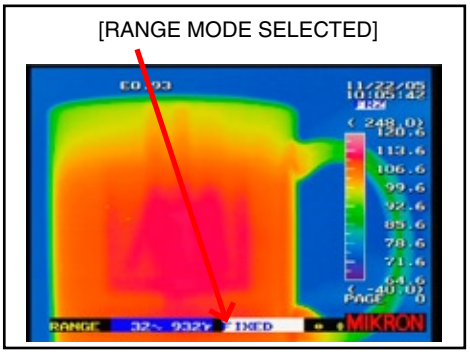
2) **Toggle the** JOYSTICK **to the right to highlight the temperature RANGE mode.**

[RANGE MODE SELECTED]



3) **Toggle the** JOYSTICK **up or down if needed until the desired temperature RANGE mode has been selected.**

[RANGE MODE SELECTED]



The two temperature range modes are

- FIXED
- L/S LINK (LEVEL/SENS LINKING MODE)

4) **Press the** JOYSTICK [E] **button to save the setting and to return to the main display.**

4.4 Switching Between Ranges

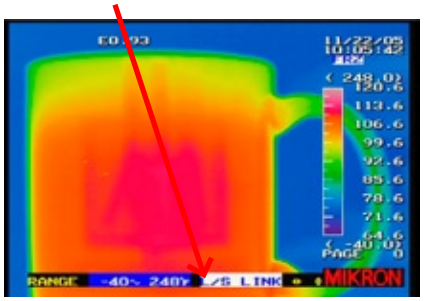
When the L/S LINK mode is selected while in RANGE 1 and the temperature level exceeds the upper limit of RANGE 1, the instrument will automatically jump to RANGE 2. When the L/S LINK mode is selected while in RANGE 2 and the temperature level exceeds the lower limit of RANGE 2, the instrument will automatically jump to RANGE 1.

4.4.1 Using the Manual Range Formatting Option with L/S Link

1) Follow steps 1-4 for Selecting the Temperature Range Mode Setting (See Section 4.3.2 of this manual).

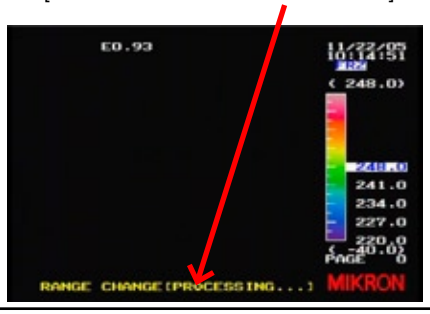
In step 3 of Selecting the Temperature Range Mode Setting, be sure to select [L/S LINK].

[L/S LINK RANGE MODE SELECTED]



2) While in RANGE 1, Toggle the JOYSTICK up until the temperature level exceeds the upper limit of RANGE 1.

[RANGE PROCESSING MESSAGE]



> **NOTE**
>
> The Maximum Temperature Level for Range 1 is 120°C (248°F), while the Minimum Temperature Level for Range 1 is -40°C (-40°F).
>
> The Maximum Temperature Level for Range 2 is 500°C (932°F), while the Minimum Temperature Level for Range 2 is 0° (32°F).

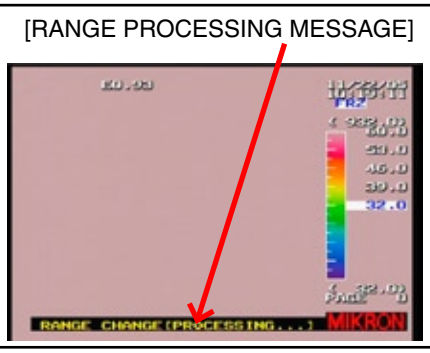
The screen will freeze momentarily while the instrument is processing the range change. Once the processing has been completed the temperature range scale will reflect the fact that the camera is now operating in RANGE 2.

[RANGE 2]

RANGE 2 0°C TO 500°C (32°F TO 932°F)

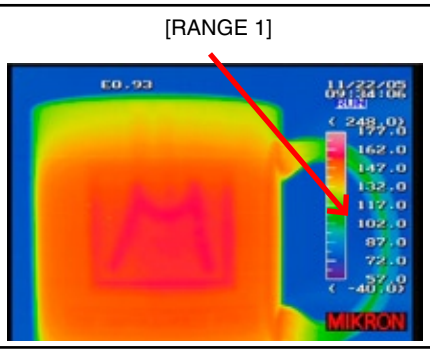
3) While in RANGE 2, Toggle the JOYSTICK down until the temperature level exceeds the lower limit of RANGE 2.

[RANGE PROCESSING MESSAGE]



The screen will freeze momentarily while the instrument is processing the range change. Once the processing has been completed the temperature range scale will reflect the fact that the camera is now operating in RANGE 1.

[RANGE 1]



RANGE 1 -40°C TO 120°C (-40°F TO 248°F)

NOTE

The Maximum Temperature Level for Range 1 is 120°C (248°F), while the Minimum Temperature Level for Range 1 is -40°C (-40°F).

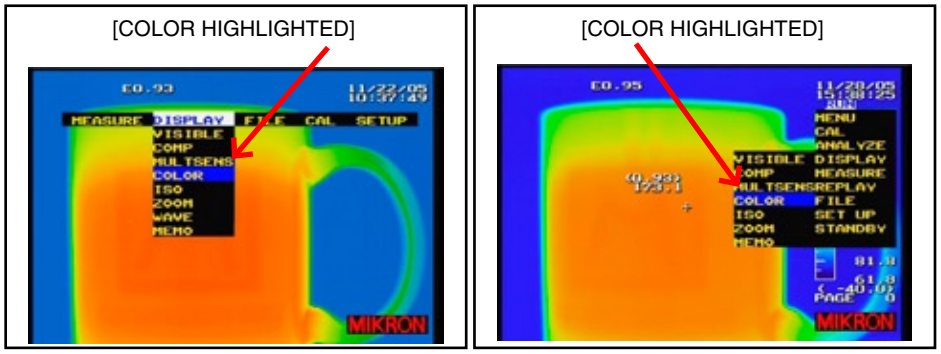
The Maximum Temperature Level for Range 2 is 500°C (932°F), while the Minimum Temperature Level for Range 2 is 0° (32°F).

4.5 Working with the Color Palette Options

The MikroScan 7600PRO offers a large number of palette options which allow the target to be displayed as a colorized or monochrome thermal image. Choice of a particular palette will depend on the scene being monitored, operator comfort and other considerations such as ease of focusing.

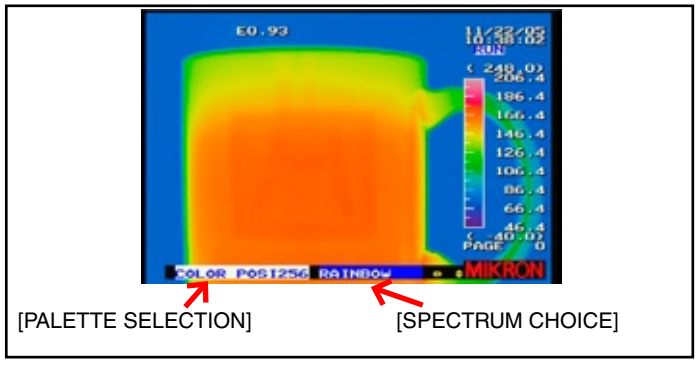
4.5.1 Choosing a Color Palette

1) **Go to [MENU] → [DISPLAY] → [COLOR].**



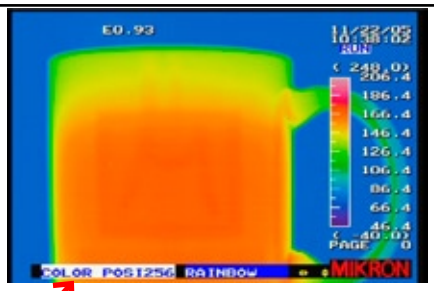
Standard View Menu Classic View Menu

2) **Press the** JOYSTICK [E] **button to gain access to the COLOR SET UP Mode.**



A bar will appear at the bottom of the screen showing the display's current color palette selection and spectrum choice.

3) Toggle the JOYSTICK up or down to scroll through the highlighted palette selection labels to select the desired palette.

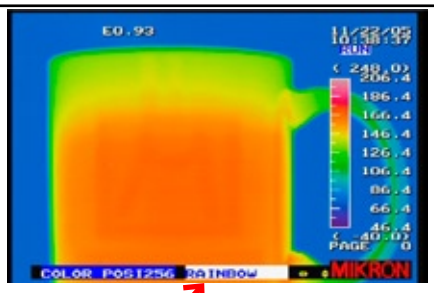


[HIGHLIGHTED PALETTE SELECTION LABEL]

Palette selection options for the color display, monochrome display, and reverse color selections are as follows:

- COLOR POSI (256 DEFAULT)
- COLOR POSI (128, 64, 32, 16)
- COLOR NEG (256, 128, 64, 32, 16)
- MONO POSI (246, 128, 64, 32, 16)
- MONO NEG (246, 128, 64, 32, 16)

4) Toggle the JOYSTICK to the right to highlight the color spectrum choice label to select the desired spectrum.



[HIGHLIGHTED SPECTRUM CHOICE LABEL]

5) Toggle the JOYSTICK up or down as needed to select the color spectrum.

The spectrum choices are:

- SHINE (DEFAULT)
- FINE
- RAINBOW
- BRIGHTNESS
- HOT IRON
- MEDICAL

6) Press the JOYSTICK [E] button to lock the setting and to return to the main display.

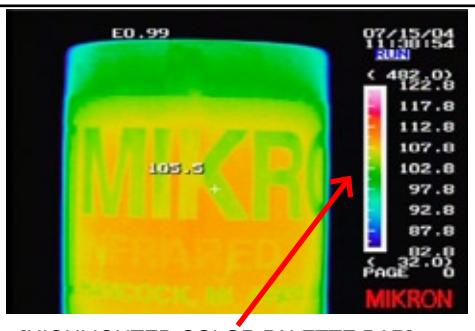
4.5.2 Switching between the Color and Monochrome Display

The instrument has the capability of switching back and forth between a color display and a monochrome display.

4.5.2.1 Using the Standard Type Menu

1) **Press and hold the** JOYSTICK [E] **button to gain access to the MikroScan 7600PRO quick menu functions.**

2) **Press the** JOYSTICK [E] **button again until the color bar becomes highlighted on the display.**



[HIGHLIGHTED COLOR PALETTE BAR]

3) **Toggle the** JOYSTICK **up or down as needed to toggle between the color display and the monochrome display**

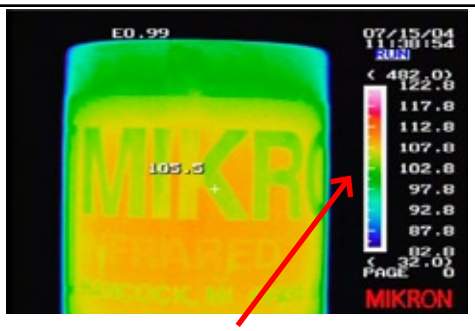
[HIGHLIGHTED COLOR PALETTE BAR]

4) **Press the** JOYSTICK [E] **button to lock the setting and to return to the main display.**

4.5.2.2 Using the Classic Type Menu

1) **Press the** JOYSTICK [E] **button to activate the display functions.**

2) **Toggle the** JOYSTICK **left or right as needed to highlight the palette bar.**



[HIGHLIGHTED COLOR PALETTE BAR]

3) **Toggle the** JOYSTICK **up or down as needed to toggle between the color display and the monochrome display**

[HIGHLIGHTED COLOR PALETTE BAR]

4) **Press the** JOYSTICK [E] **button to lock the setting and to return to the main display.**

4.6 Adjusting the Focus

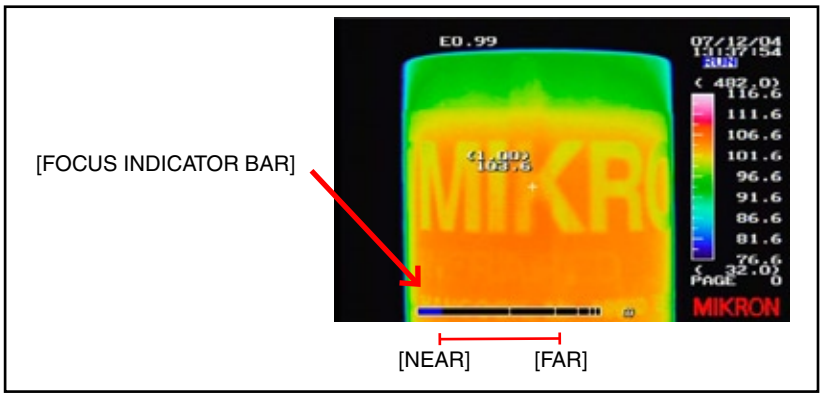
Precise focusing is important in order to provide the best visual resolution of the area being measured and to exclude extraneous surfaces or objects. The minimum focus range is 50 cm, while the maximum focus range is infinity.

4.6.1 Using the Focus Indicator Bar with the Standard Type Menu

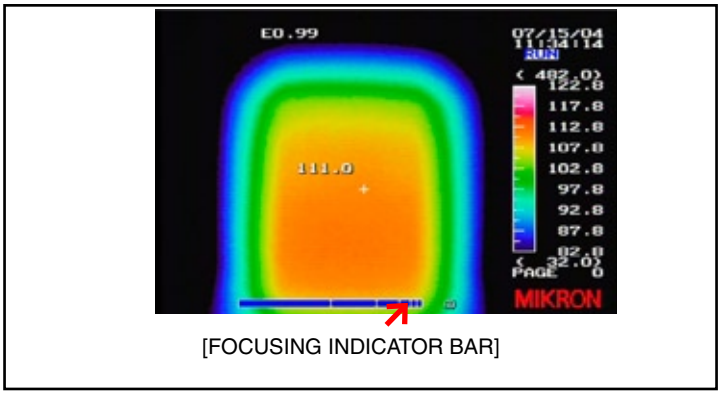
1) **Verify the display is in** [RUN] **mode and that no other parameter is highlighted.**

2) **Press and hold the** JOYSTICK [E] **button to gain access to the MikroScan 7600PRO quick menu functions.**

3) **Press the** JOYSTICK [E] **button again until the focus indicator bar appears becomes highlighted on the display.**



4) **Toggle the** JOYSTICK **upward to increase the focal distance.**



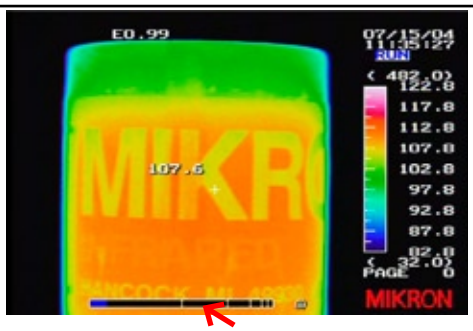
Toggling the joystick upward will move the blue focus indicator bar toward the far focus range of infinity.

OR

TIP

It may be helpful to switch to a monochrome display before focusing. See Section 4.6.2 for more information on Switching between a Color an Monochrome Display.

Toggle the JOYSTICK **downward to decrease the focal distance.**



Toggling the joystick upward will move the blue focus indicator bar toward the near focus range of 50 cm.

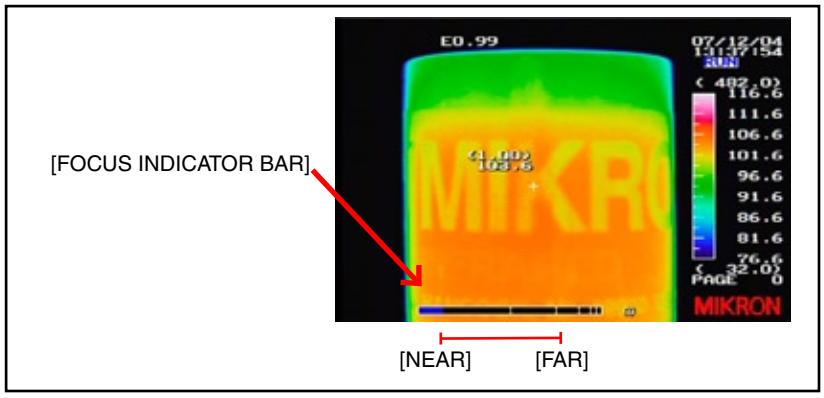
5) **Press the** JOYSTICK [E] **button to lock the setting and to return to the main display.**

4.6.2 Using the Focus Indicator Bar with the Classic Type Menu

1) **Verify the display is in** [RUN] **mode and that no other parameter is highlighted.**

2) **Press the** JOYSTICK [E] **button to activate the display functions.**

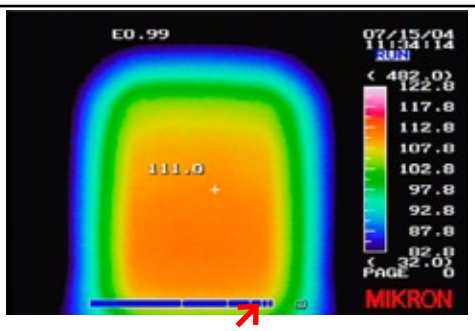
3) **Toggle the** JOYSTICK **left or right as needed to display the focus indicator bar.**



TIP

It may be helpful to switch to a monochrome display before focusing. See Section 4.6.2 for more information on Switching between a Color an Monochrome Display.

4) Toggle the JOYSTICK **upward to increase the focal distance.**

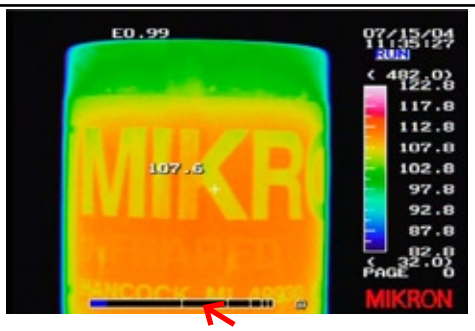


[FOCUSING INDICATOR BAR]

Toggling the joystick upward will move the blue focus indicator bar toward the far focus range of infinity.

OR

Toggle the JOYSTICK **downward to decrease the focal distance.**



[FOCUSING INDICATOR BAR]

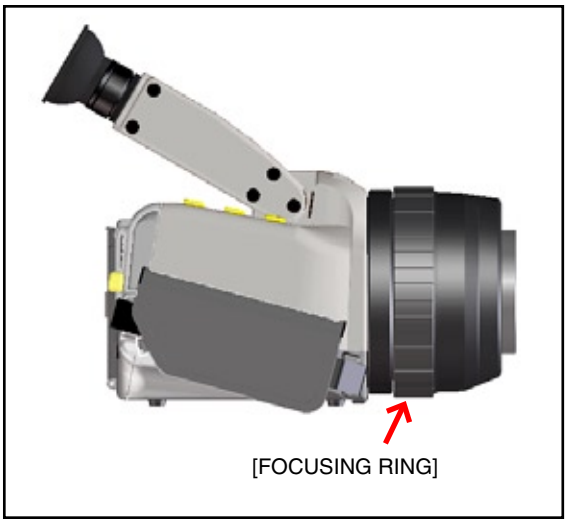
Toggling the joystick upward will move the blue focus indicator bar toward the near focus range of 50 cm.

5) Press the JOYSTICK [E] **button to lock the setting and to return to the main display.**

4.6.3 Manual Focusing

1) **Verify the display is in** [RUN] **mode and that no other parameter is highlighted.**

2) **Turn the focusing ring on the camera clockwise or counter-clockwise as needed until the image appears in focus.**



Turning the focusing ring clockwise will move the focal point toward the far focus range of infinity. Turning the focusing ring counter-clockwise will bring the focal point to the near focus range of 50 cm.

TIP

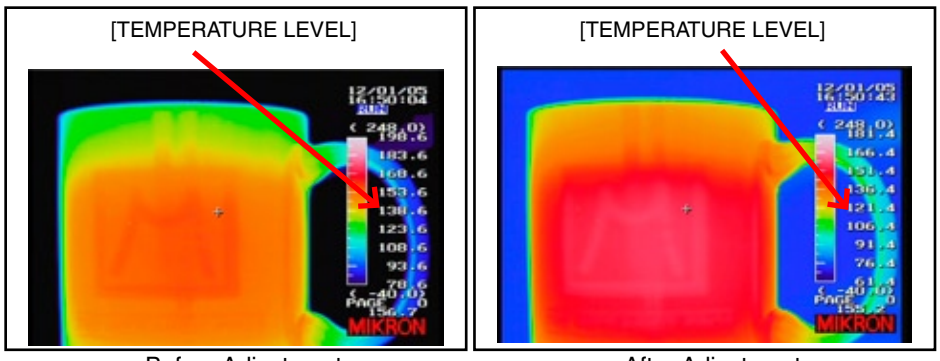
It may be helpful to switch to a monochrome display before focusing. See Section 4.6.2 for more information on Switching between a Color an Monochrome Display.

4.7 Adjusting the Temperature Level

The center temperature of the scale is called the Temperature Level. The temperature level setting determines the span of temperature displayed on the screen within the overall temperature range. Ideally, the span should embrace most of the temperatures of interest and be equally displaced about some median temperature in the target area.

To adjust the temperature level:

Toggle the JOYSTICK **up or down as needed to change the temperature level**



Before Adjustment After Adjustment

NOTE:

If the temperature of the target area exceeds the upper or lower limit of the selected range, the range setting will need to be adjusted accordingly (See Sections 4.3 and 4.4 of this manual for more information on temperature ranges).

NOTE:

If the temperature of the target area exceeds the upper or lower limit of the selected range, the range setting will need to be adjusted accordingly (See Sections 4.3 and 4.4 of this manual for more information on temperature ranges).

4.8 Adjusting the Temperature Span

The temperature span setting sets the upper limit temperature value of the color bar.

To adjust the span:

1) **Follow steps 1-5 for Setting the L&S (See Section 3.9.4.2 of this manual).**

   In step 5 of Setting the L&S, be sure to select [LEVEL & SPAN].

[LEVEL & SPAN SELECTED]

2) **Toggle the JOYSTICK to the right to increase the upper limit temperature value.**

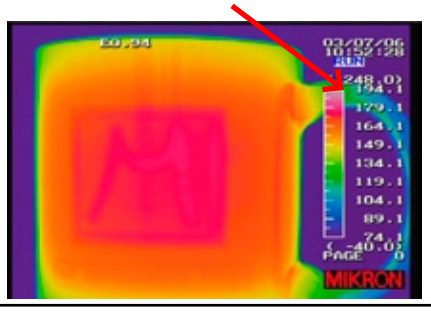
OR

Toggle the JOYSTICK to the left to decrease the upper limit temperature value.

[TEMPERATURE SPAN]

Before Adjustment

[TEMPERATURE SPAN]



After Adjustment

4.9 Adjusting the Sensitivity

While the temperature level setting determines the span of temperature displayed on the screen within the overall temperature range, the level of sensitivity determines the instrument's ability to resolve adjacent areas of different temperature within the overall scene.

Since only a small portion of the whole temperature range is used for viewing, it is often necessary to increase or decrease the intervals of the temperature scale by adjusting the sensitivity level.

To adjust the sensitivity:

1) **Follow steps 1-5 for Setting the L&S (See Section 3.9.4.2 of this manual).**

   In step 5 of Setting the L&S, be sure to select [LEVEL & SENSITIVITY].

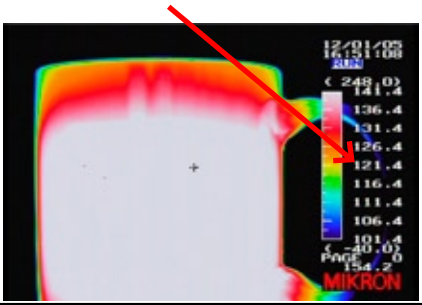
[LEVEL & SENSITIVITY SELECTED]

2) **Toggle the** JOYSTICK **to the right to increase the intervals of the temperature scale.**

OR

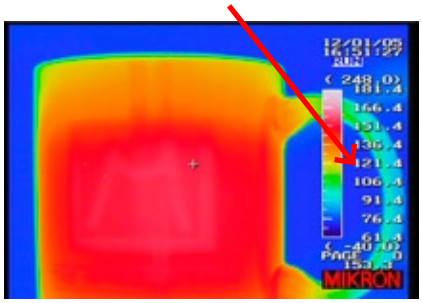
Toggle the JOYSTICK **to the left to decrease the intervals of the temperature scale.**

[SENSITIVITY]



Before Adjustment

[SENSITIVITY]



After Adjustment

4.10 Using the Auto Processing Functions

The MikroScan 7600PRO includes an auto processing feature which automatically focuses the instrument and optimizes the temperature and sensitivity ranges for the target being monitored.

The three available AUTO settings are as follows

Feature	Function
FULL AUTO	Automatically sets the optimum values for the focus position, sensitivity or span, and temperature level
AUTO FOCUS	Automatically sets the optimum values for the focus position
LEVEL & SENS (LEVEL & SPAN)	Automatically sets the optimum values for the temperature level and sensitivity OR the temperature level and span.

4.10.1 Performing the Full Auto Function

1) **Follow steps 1-6 for Setting the Auto Mode Function (See Section 3.9.1.3 of this manual).**

2) **Verify the** AUTO MODE **option in the** [INITIAL SETUP] **menu is set to** [FULL].

[AUTO MODE FULL OPTION HIGHLIGHTED]

3) **Verify the camera is operating in** [RUN] **mode (See Section 4.1 of this manual for more information on Toggling between the Run and Freeze Modes).**

4) **Press the** AUTO **button**

The screen will freeze momentarily while the instrument is auto processing. Once auto processing has been completed, the display will once again appear in [RUN] mode.

NOTE

When there is little difference between the measuring object and its surroundings, AUTO Processing may not function completely. Refer to Sections 4.6 through 4.9 for more information on adjusting the focus, temperature level and sensitivity.

4.10.2 Performing the Auto Focus Function

1) **Follow steps 1-6 for Setting the Auto Mode Function (See Section 3.9.1.3 of this manual).**

2) **Verify the** AUTO MODE **option in the** [INITIAL SETUP] **menu is set to** [FOCUS].

[AUTO MODE FOCUS OPTION HIGHLIGHTED]

3) **Verify the camera is operating in** [RUN] **mode (See Section 4.1 of this manual for more information on Toggling between the Run and Freeze Modes).**

AUTO

4) **Press the** AUTO **button**

The screen will freeze momentarily while the instrument is auto processing. Once auto processing has been completed, the display will once again appear in [RUN] mode.

4.10.3 Performing the Auto Level & Sens/Level & Span Function

1) **Follow steps 1-6 for Setting the Auto Mode Function (See Section 3.9.1.3 of this manual).**

2) **Verify the** AUTO MODE **option in the** [INITIAL SETUP] **menu is set to** [LEVEL & SENSE OR LEVEL & SPAN].

[AUTO MODE LEVEL & SENSITIVITY OPTION HIGHLIGHTED]

Note: Whether the Auto Mode function affects the Level & Span OR the Level & Sensitivity is determined by the L/S option that is selected in display setup menu. See Section 3.9.4.2 of this manual for more information on selecting the desired L/S option.

NOTE

The Auto Focus adjustment is performed around the existing cursor positions. If there is no cursor present, the adjustment will be performed around the center of the display screen.

NOTE

The AUTO Level & Sensitivity function can be performed in both RUN and FREEZE modes.

3) Press the AUTO **button**

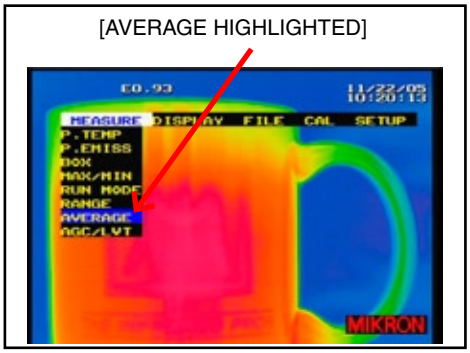
The screen will freeze momentarily while the instrument is auto processing. Once auto processing has been completed, the display will once again appear in [RUN] mode.

4.11 Working with the Averaging Function (S/N Improvement)

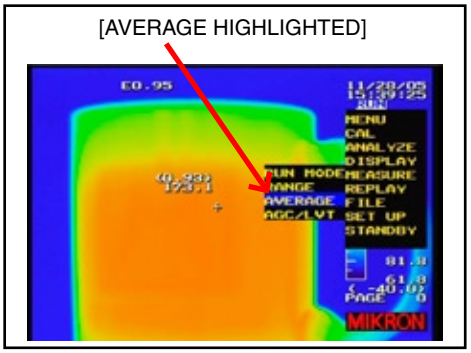
The MikroScan 7600PRO provides an S/N Improvement function that reduces the noise included in the image signals by means of averaging the image. This function also improves the minimum detectable size of the image. This function allow you to set the S/N improvement to Off, ∑2, ∑8, ∑16, ∑32 or ∑64.

To set the image averaging function:

1) Go to [MENU] → [MEASURE] → [AVERAGE].

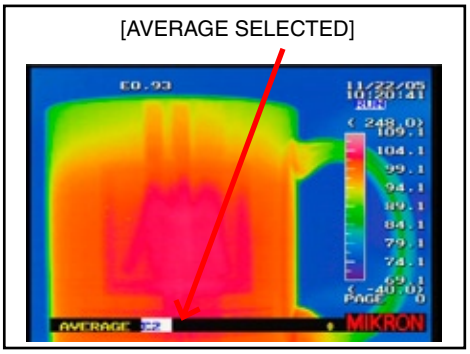


Standard View Menu



Classic View Menu

2) Press the JOYSTICK [E] **button to select the AVERAGE option.**

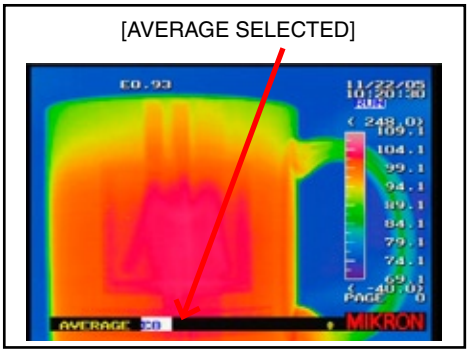


A bar will appear at the bottom of the screen allowing you to select the desired image averaging option.

The image averaging options are:

- OFF
- ∑2
- ∑8
- ∑16
- ∑32 (only available at FREEZE & INTERVAL SAVING)
- ∑64 (only available at FREEZE & INTERVAL SAVING)

3) Toggle the JOYSTICK **up or down as needed to select the desired imaging averaging option.**



4) Press the JOYSTICK [E] **button to select the desired setting and to return to the main display.**

OR

Press the CANCEL/VISIBLE [C] **button to cancel out of the menu mode and to return to the main display.**

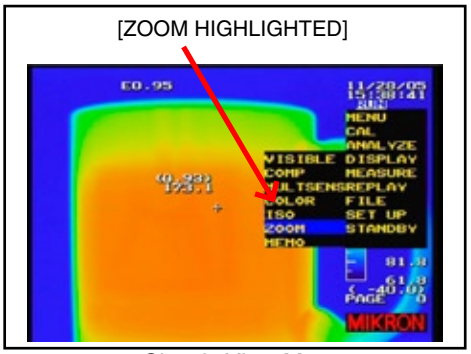
4.12 Working with the Image Zoom Function

The MikroScan 7600PRO provides an Image Zoom function that provides a digital zoom of x2 or x4 on the thermal image which magnifies the thermal image relative to its center.

To set the image zoom:

1) Go to [MENU] → [DISPLAY] → [ZOOM].

Standard View Menu



Classic View Menu

2) Press the JOYSTICK [E] **button to select the ZOOM option.**

A bar will appear at the bottom of the screen allowing you to select the desired image zoom option.

The digital image zoom options are:

- x2
- x4

3) Toggle the JOYSTICK **up or down as needed to scroll through the image zoom options.**

4) Press the JOYSTICK [E] **button to select the desired setting and to return to the main display.**

OR

Press the CANCEL/VISIBLE [C] **button to cancel out of the menu mode and to return to the main display.**

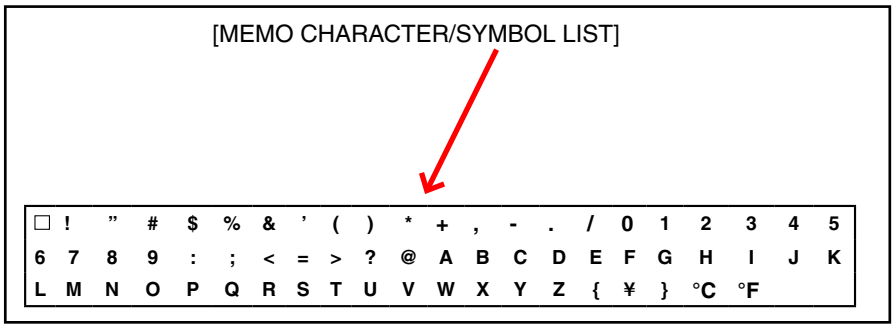
4.13 Using the Memo Function

The MikroScan 7600PRO allows an operator to designate a point on the display or on the whole display with an alpha-numeric combination and/or several symbols.

There are two methods of creating a memo.

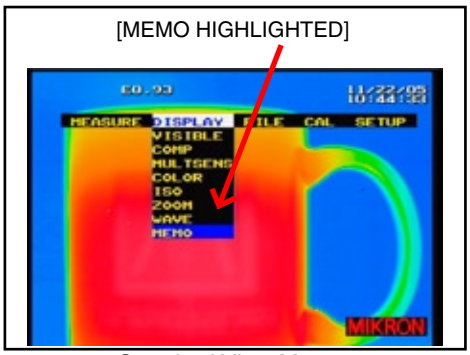
Character Input	Utilizes the MikroScan 7600PRO character/symbol list.
File Selection	Utilizes an ASCII file previously stored to a MikroScan 7600PRO formatted memory card.

In the character-input mode, characters are entered one by one after being selected from a character/symbol list on the display. In the file selection mode, an ASCII coded memo is stored onto the memory card and then accessed by utilizing the memo function of the camera.

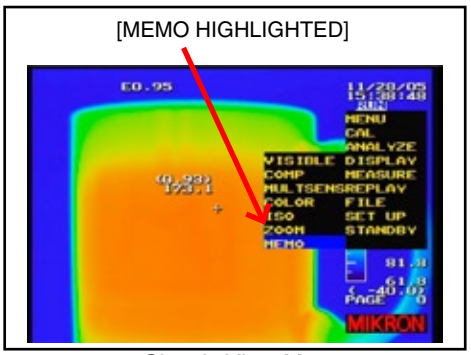


4.13.1 Creating a Memo using the Character Input Method

1) Go to [MENU] → [DISPLAY] → [MEMO].



Standard View Menu

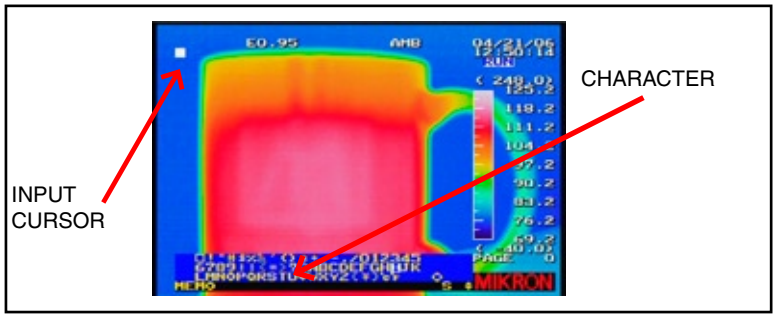


Classic View Menu

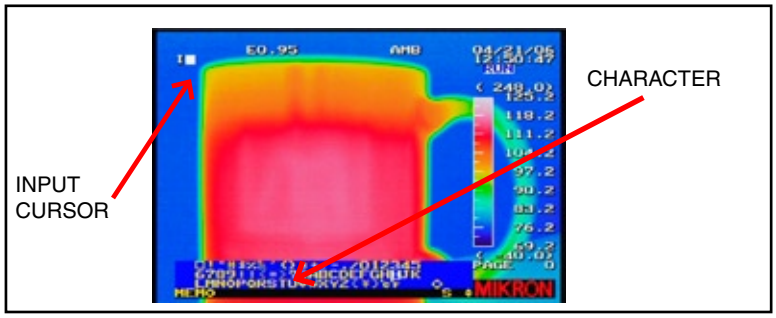
2) Press the JOYSTICK [E] button to select the MEMO option.

Upon completion of step 2, a box will appear on the display containing the [MEMO] character/symbol list.

3) Toggle the JOYSTICK button up or down as needed to choose the first character of the memo.



4) Press the SAVE button to select the character and enter it on the display.



To enter a space between characters, use the box symbol found at the beginning of the character/symbol list.

Once a single character has been entered, the input cursor moves to the next position.

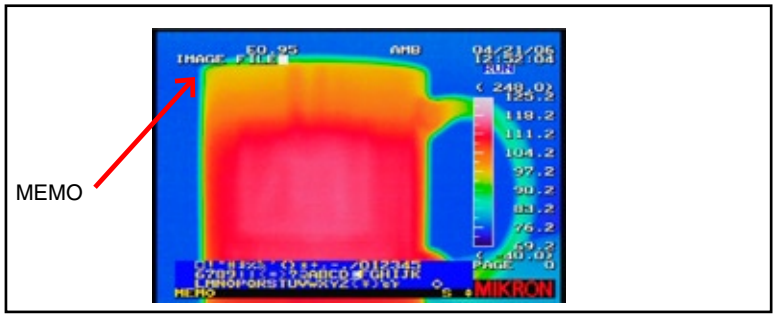
NOTE

While creating a memo, when the multi-point display is in the TEMP & EMISS MODE, the temperatures are not updated on the display.

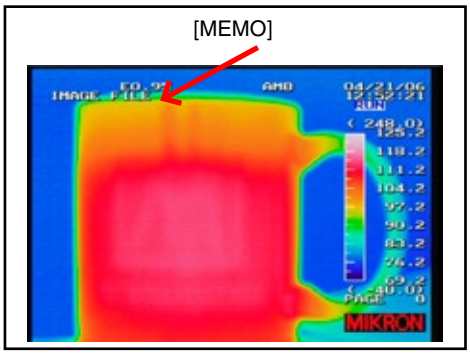
NOTE

To enter a space between characters, use the box symbol found at the beginning of the character/symbol list

5) Repeat steps 3 and 4 above until all characters have been entered.



6) Press the JOYSTICK [E] **button to select the desired setting and to return to the main display.**



The text and location of the memo will remain on the display until it is deleted or the camera is turned off.

OR

a) Press the CANCEL/VISIBLE [C] **button to cancel out of the function and to return to the main display.**

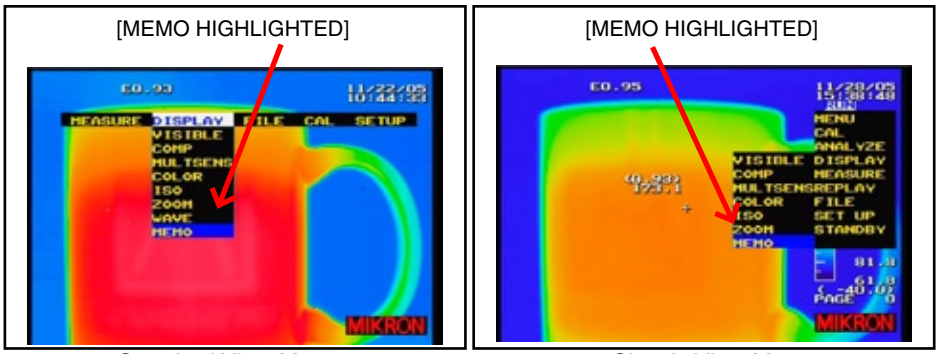
b) Press the JOYSTICK [E] **button to acknowledge that you want to clear the memo and return to the main display**

NOTE

If the camera is turned off and then powered up again, the text and location of the memo do not appear on the display and are not recorded when a new image is saved. However, if a new image is saved after recalling a stored image (containing a memo), the new image along with all subsequent images will contain the same memo.

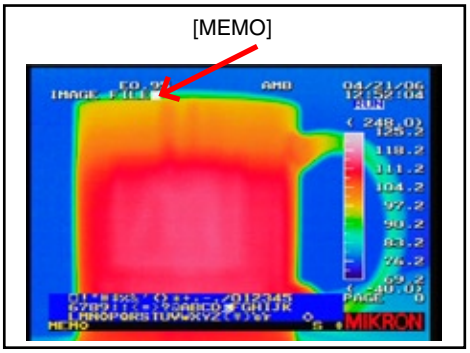
4.13.2 Adding Multiple Memos Using the Character Input Method

1) Go to [MENU] → [DISPLAY] → [MEMO].



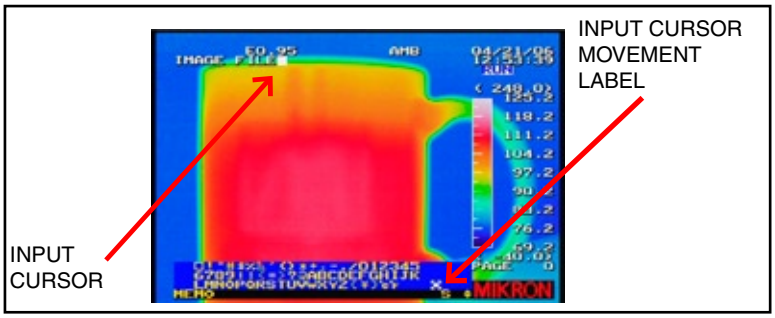
Standard View Menu | Classic View Menu

2) Press the JOYSTICK [E] **button to select the MEMO option.**



Upon completion of step 2, a box will appear on the display containing the [MEMO] character/symbol list.

3) Toggle the JOYSTICK **button up or down as needed to choose the Input Cursor Movement Label** [◊].



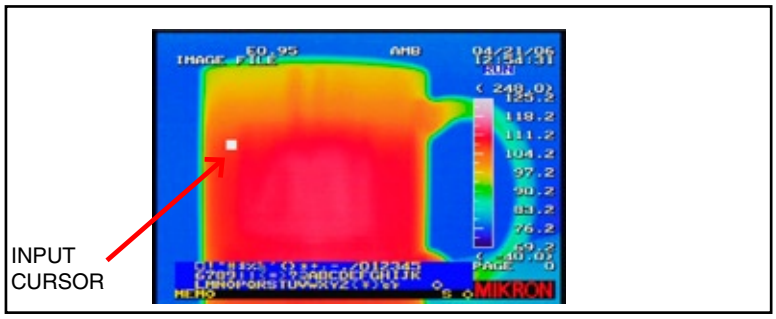
SAVE

4) Press the SAVE button to enter the cursor movement mode.

The highlighted box displayed on the screen can now be moved to any part of the display by toggling the joystick [e] up, down, left or right. This highlighted box is referred to as the INPUT CURSOR.

5) Toggle the JOYSTICK button up or down as needed to move the INPUT CURSOR along the vertical plane to the desired location point on the image display.

6) Toggle the JOYSTICK button left or right as needed to move the INPUT CURSOR along the horizontal plane to the desired location point on the image display.



SAVE

7) Press the SAVE button to enter the cursor input mode.

8) Toggle the JOYSTICK button up or down as needed to choose the first character of the memo.

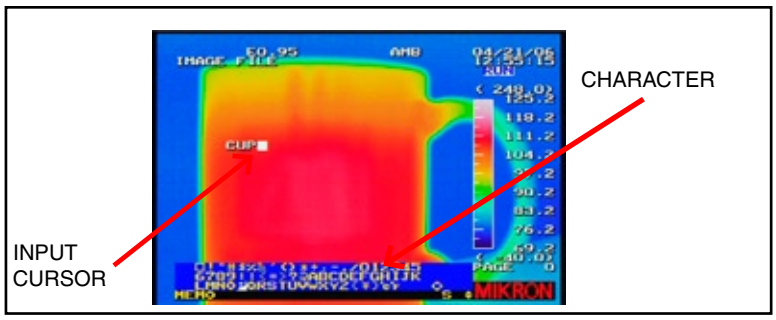
SAVE

9) Press the SAVE button to select the character and enter it on the display.

To enter a space between characters, use the box ■ symbol found at the beginning of the character/symbol list.

Once a single character has been entered, the input cursor moves to the next position.

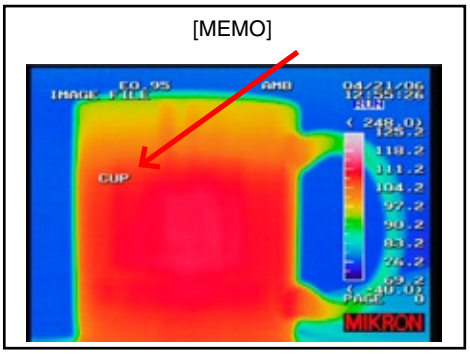
10) Repeat steps 8 and 9 above until all characters have been entered.



NOTE

If the camera is turned off and then powered up again, the text and location of the memo do not appear on the display and are not recorded when a new image is saved. However, if a new image is saved after recalling a stored image (containing a memo), the new image along with all subsequent images will contain the same memo.

11) Press the JOYSTICK [E] **button to save the memos and to return to the main display.**



The text and location of the memo will remain on the display until it is deleted or the camera is turned off.

OR

a) Press the CANCEL/VISIBLE [C] **button to cancel out of the function and to return to the main display.**

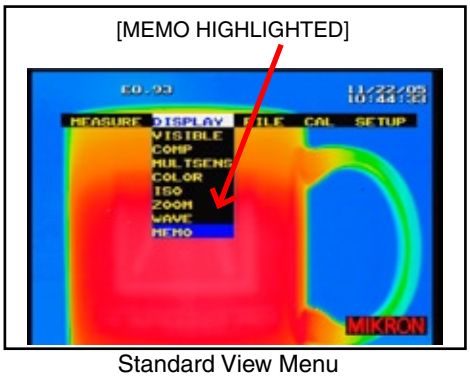
b) Press the JOYSTICK [E] **button to acknowledge that you want to clear all memos and return to the main display**

4.13.3 Applying a Memo Designation using the File Selection Method

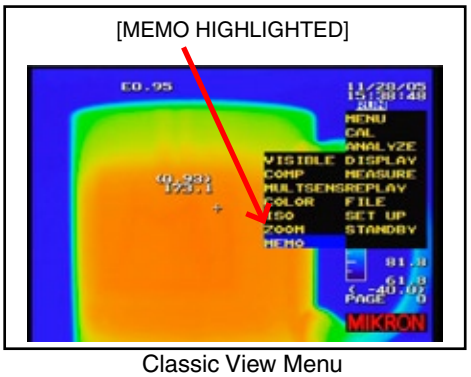
1) Insert a MikroScan 7600PRO formatted memory card containing one or more previously stored ASCII memo files.

The memo files are text files that are created on an external computer using an ASCII compliant program such as NotePad or WordPad. These files are then saved to a memory card with a .csv or .txt file extension.

2) Go to [MENU] → [DISPLAY] → [MEMO].



Standard View Menu



Classic View Menu

NOTES

Regarding the ASCII Memo File Structure:

- The memo file is a text file in ASCII code.
- The filenames can be up to 8 alpha-numeric characters.
- The extension of a file name should be .scv or .txt.
- One line ending in CR/LF code is treated as a memo. The number of the characters in one line can be up to 638 characters, not including the CR/LF code.
- One file can store up to 1000 memos. However, the maximum file size is 128 KB.
- Memos can only be created utilizing the same characters as found in the MikroScan 7600PRO memo character/symbol list (refer to the MikroScan 7600PRO character/symbol list found at the beginning of Section 4.14).
- The °C or °F symbols cannot be used in the ASCII memo files.

3) Press the JOYSTICK [E] **button to select the MEMO option.**

[LIST OF STORED MEMOS]

Upon completion of step 3, a box will appear on the display containing the list of stored memo files.

4) Toggle the JOYSTICK **button as needed to scroll through the list of stored memo files to select the desired memo file.**

Although the first 20 characters of each memo are displayed in list form, all memo characters will be displayed on the thermal image once a specific file has been selected.

5) Press the JOYSTICK [E] **button to attach the file to the image.**

The text of the memo will appear in a fixed position at the top of the display screen. The text and location of the memo will remain in the camera's memory until it is deleted. (See Section 4.13.5.1 for information on deleting individual characters in a memo and See Section 4.13.5.2 for deleting an entire memo from the display.)

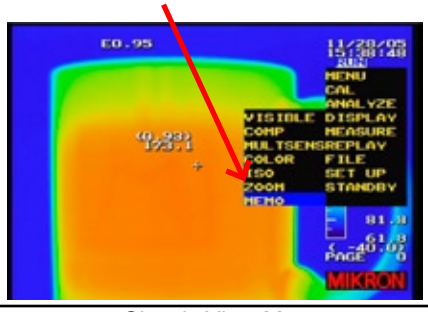
4.13.4 Changing a Memo

1) Go to [MENU] → [DISPLAY] → [MEMO].

[MEMO HIGHLIGHTED]

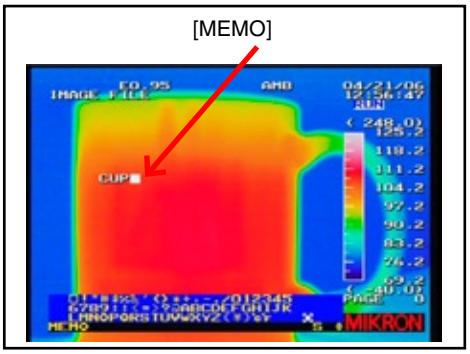
Standard View Menu

[MEMO HIGHLIGHTED]



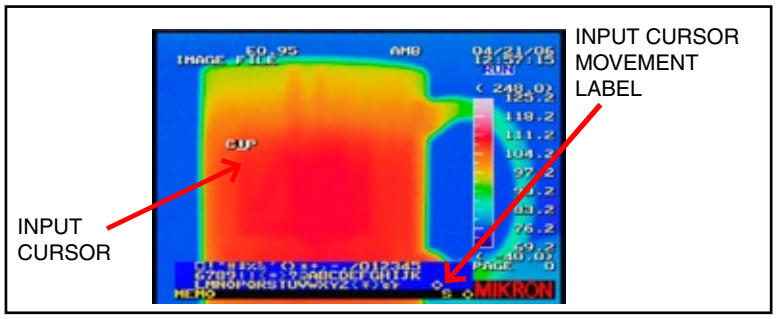
Classic View Menu

2) Press the JOYSTICK [E] **button to select the MEMO option.**



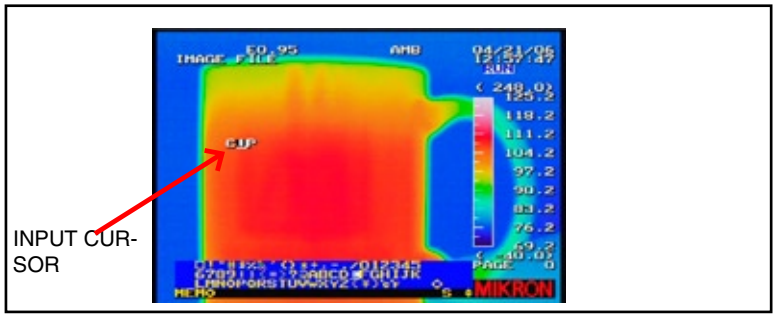
Upon completion of step 2, a box will appear on the display containing the [MEMO] character/symbol list.

3) Toggle the JOYSTICK **button up or down as needed to choose the Input Cursor Movement Label [◊].**



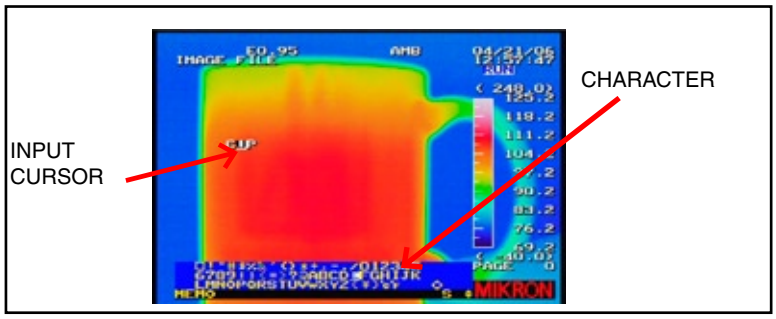
4) Press the SAVE **button to enter the cursor movement mode.**

5) Toggle the JOYSTICK **button left or right as needed to move the cursor over the character that needs to be changed or deleted.**



6) Press the SAVE **button to go back to the box of symbols/characters.**

7) Toggle the JOYSTICK button up or down as needed to select a new character.

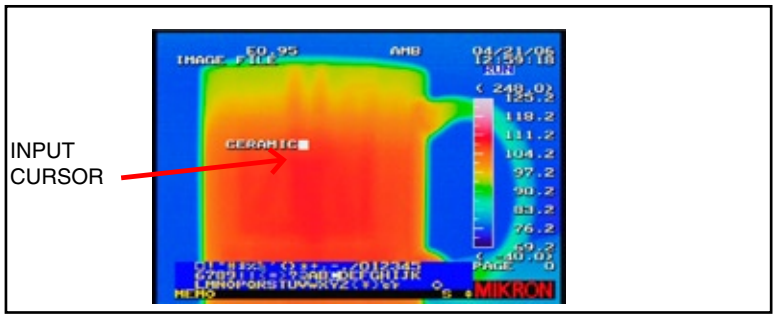


You can use the box ■ symbol found at the beginning of the character/symbol list to delete a character and have it replaced with a space. Or, you can select another symbol or character from the list to use as a replacement.

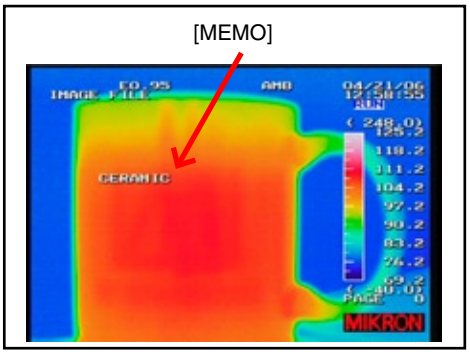
8) Press the SAVE button to select the character and enter it on the display.

Once the replacement character has been entered, the input cursor moves to the next position.

9) Repeat steps 7 and 8 above until all characters have been changed or deleted.



10) Press the JOYSTICK [E] **button to save the memo and to return to the main display.**



The text and location of the memo will remain on the display until it is deleted or the camera is turned off.

OR

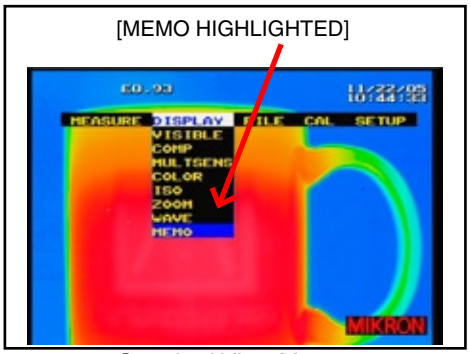
a) Press the CANCEL/VISIBLE [C] **button to cancel out of the function and to return to the main display.**

b) Press the JOYSTICK [E] **button to acknowledge that you want to clear the memo and return to the main display.**

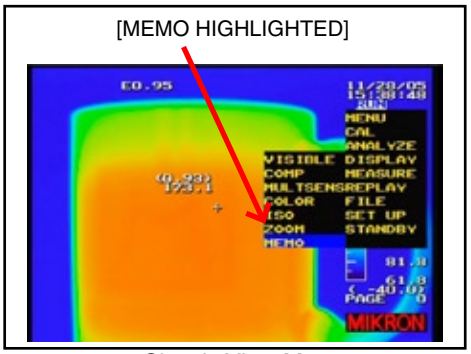
4.13.5 Deleting an Memo Designation

4.13.5.1 Deleting a Single Character

1) Go to [MENU] → [DISPLAY] → [MEMO].

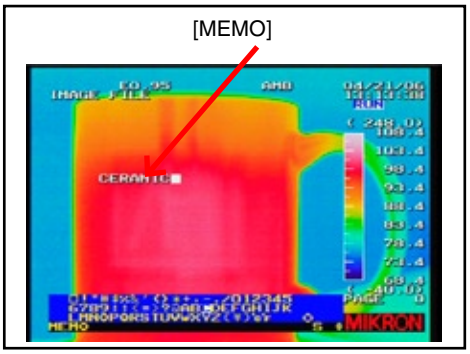


Standard View Menu



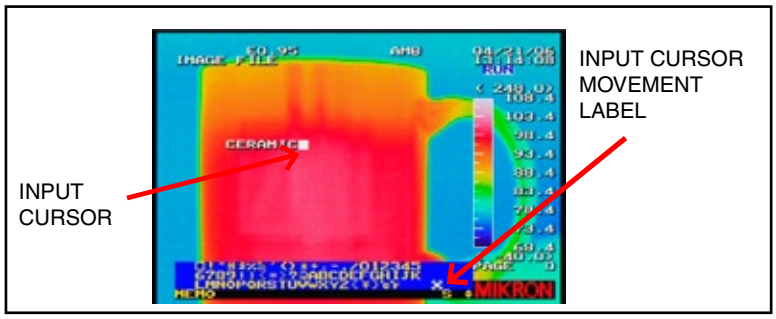
Classic View Menu

2) Press the JOYSTICK [E] button to select the MEMO option.



Upon completion of step 2, a box will appear on the display containing the [MEMO] character/symbol list.

3) Toggle the JOYSTICK button up or down as needed to choose the Input Cursor Movement Label [◊].

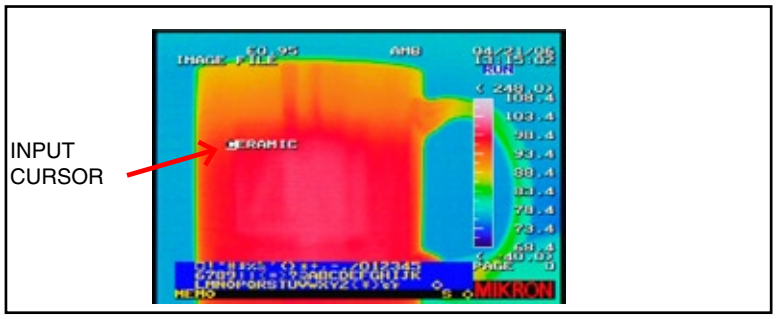


4) Press the SAVE button to enter the cursor movement mode.

The highlighted box displayed on the screen can now be moved to any part of the display by toggling the JOYSTICK [E] up, down, left or right. This highlighted box is referred to as the INPUT CURSOR.

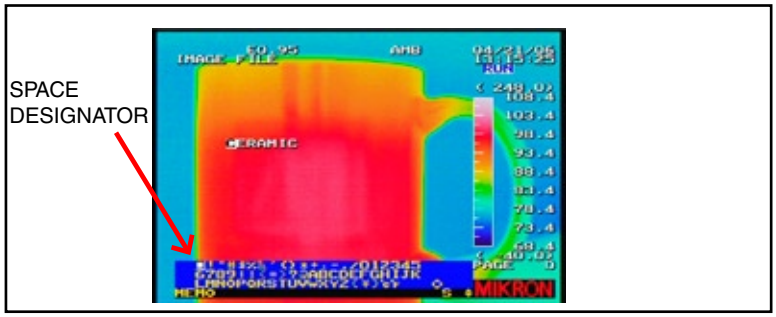
5) Toggle the JOYSTICK button left or right as needed to move the INPUT CURSOR along the horizontal plane to position the box over the character that needs to be deleted.

6) **Toggle the JOYSTICK button up or down as needed to move the INPUT CURSOR along the vertical plane to position the box over the character that needs to be deleted.**



7) **Press the SAVE button to enter the cursor input mode.**

8) **Toggle the JOYSTICK button up or down as needed to scroll through the list of characters/symbols to select the space [ ] designator.**

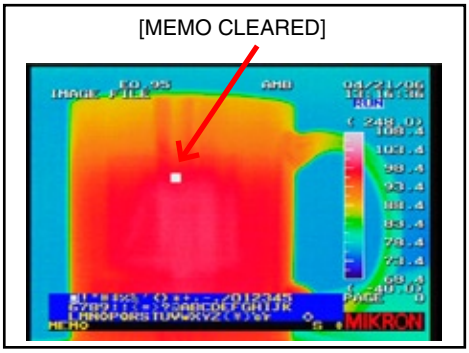


9) **Press the SAVE button to replace the character with a space.**

Once a single character has been entered, the memo input cursor moves forward to the next position.

10) **Repeat steps 4-9 above for deletion of additional characters.**

11) **Press the JOYSTICK [E] button to save the remaining characters and to return to the main display.**



OR

a) Press the CANCEL/VISIBLE [C] **button to cancel out of the function and to return to the main display.**

b) Press the JOYSTICK [E] **button to acknowledge that you want to clear all memos and return to the main display.**

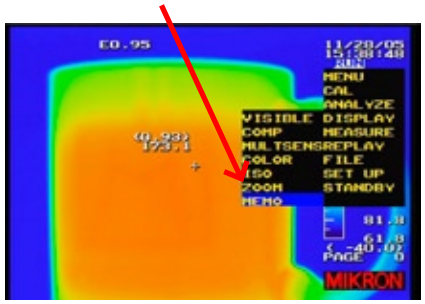
4.13.5.2 Deleting all Characters at Once

1) Go to [MENU] → [DISPLAY] → [MEMO].

[MEMO HIGHLIGHTED]

Standard View Menu

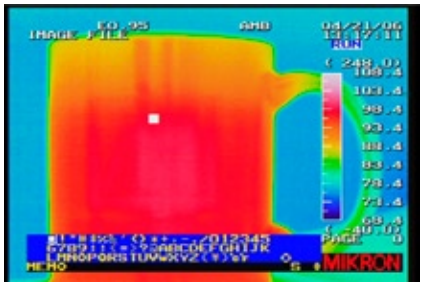
[MEMO HIGHLIGHTED]



Classic View Menu

2) Press the JOYSTICK [E] **button to select the MEMO option.**

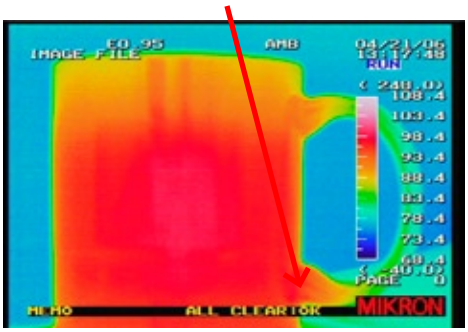
[MEMOS]



Upon completion of step 2, a box will appear on the display containing the [MEMO] character/symbol list.

3) Press the CANCEL/VISIBLE [C] **button.**

[CLEAR MEMO MESSAGE]



A message will appear at the bottom of the screen confirming the deletion request.

4) Press the JOYSTICK [E] **button to clear all memos and to return to the main display.**

Images and Image Files

5.1 Working with the Save Function

Your MikroScan 7600PRO was shipped with a Compact Flash Card which is capable of storing images and image data obtained from the 7600PRO. A Compact Flash Adapter was also supplied to provide transfer of images through a PCMCIA card slot in your laptop computer or through a Card Reader attached to your personal computer.

This section provides information on using the memory card with the MikroScan 7600PRO.

5.1.1 Saving Image Data as .SIT Files

Live and frozen images can be saved to the memory card utilizing the .SIT file extension by pressing the SAVE button. When an image is being saved to the memory card, an image file is created which contains the image and all data associated with the image.

A file name is automatically assigned to the image showing the four-character file prefix, the image number, and the .SIT file type extension. When an image has been saved, the directory name and file name appear at the bottom of the display.

To save an image as a .SIT file in either [RUN] or [FRZ] mode:

1) **Verify that a Mikron approved Compact Flash Memory Card has been inserted into the camera (See Section 3.4 of this manual for information on Inserting and Removing the Memory Card).**

2) **Follow steps 1-6 in Section 3.9.2.2 of this manual for information on Selecting an Image Save Format.**

3) **In step 5, select** [.SIT].

[.SIT OPTION SELECTED]

4) **Aim the camera at a specific target of interest.**

5) **Make any desired adjustments to the temperature range setting or temperature level and sensitivity. (See Sections 4.4 through 4.10 of this manual for more information on these settings).**

NOTE

Images are stored with a four-digit file name followed by the file extension. The file names are numbered from 0001 to 9999. If the number exceeds 9999 an error message will appear indicating that there is no more room available on the memory card.

NOTE

If the camera is in the [RUN] Mode while this operation is performed, the camera will automatically enter the [FRZ] mode for approximately five seconds. Once the image has been saved, the camera reverts back to the [RUN] Mode.

A brief message indicating the full file name and page number will appear at the bottom of the display while the image is being saved.

NOTES

1. **When the measuring distance is more than 1 meter, the visible camera has the ability to display the full screen area of the infrared image.**
2. **When the measuring distance is less than 1 meter, the visible camera can not display a part of the infrared image because of the difference in the optical axis.**
3. **The viewing field is obstructed by the installation of the optional telephoto lens or wide angle lens, therefore the visible image can not be displayed the same as the infrared image.**
4. **Because the focus distance is fixed, it can not focus a measuring object within 50cm. Therefore, when the optional close-focus lens is installed, the visible image will not be displayed correctly.**
5. **The infrared image and visible image can not be displayed simultaneously. There is approximately a one-second time difference between the saving of a thermal image and the saving of a visible image.**
6. **The visible image can not be displayed if the ambient temperature becomes more than 45°C during continuous operation.**

Additional changes to the temperature level and sensitivity values can be made at a later time using the MikroScan 7600PRO software.

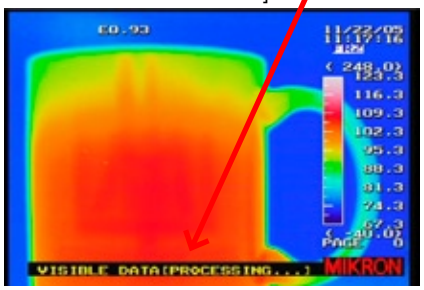
6) **Focus the camera. (See Section 4.6 for more information for Adjusting the Focus of the camera).**

SAVE (S)

7) **Press the** SAVE **button.**

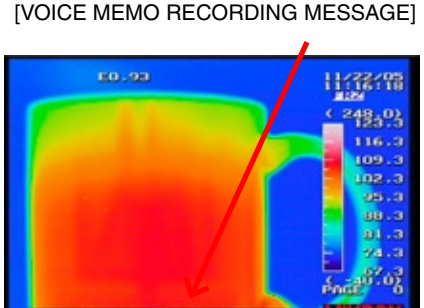
If the Save Visible option has been activated (see Section 3.9.2.3 for more information on selecting the Save Visible option), the screen will momentarily flash a visible light image and then a message will appear at the bottom of the display indicating that the camera is processing the visible data.

[VISIBLE DATA PROCESSING MESSAGE]



If the Voice Memo Recording option has been activated (see Section 3.9.2.1 for more information on Selecting the Voice Memo Recording Option), a message will appear at the bottom of the display indicating that the JOYSTICK [E] button needs to be pressed to begin the recording function (See Section 5.1.3 for more information on working with Voice Memos).

[VOICE MEMO RECORDING MESSAGE]



To save the image without a voice annotation memo:

CANCEL/VISIBLE (C)

Press the CANCEL/VISIBLE [C] **button.**

To save the image with a voice annotation memo:

Follow the steps outlined in Section 5.1.3 entitled Adding a Voice Memo to a New Image.

NOTES

1. **When the measuring distance is more than 1 meter, the visible camera has the ability to display the full screen area of the infrared image.**
2. **When the measuring distance is less than 1 meter, the visible camera can not display a part of the infrared image because of the difference in the optical axis.**
3. **The viewing field is obstructed by the installation of the optional telephoto lens or wide angle lens, therefore the visible image can not be displayed the same as the infrared image.**
4. **Because the focus distance is fixed, it can not focus a measuring object within 50cm. Therefore, when the optional close-focus lens is installed, the visible image will not be displayed correctly.**
5. **The infrared image and visible image can not be displayed simultaneously. There is approximately a one-second time difference between the saving of a thermal image and the saving of a visible image.**
6. **The visible image can not be displayed if the ambient temperature becomes more than 45°C during continuous operation.**

5.1.2 Saving Image Data as .BMP Files

Live and frozen images can be saved to the memory card as bitmap files (.BMP). A file name is automatically assigned to each image showing the four-character file prefix, the image number, and the .BMP file type extension.

To save an image as a bitmap file in either [RUN] or [FRZ] mode:

1) **Verify that a Mikron approved Compact Flash Memory Card has been inserted into the camera (See Section 3.4 of this manual for information on Inserting and Removing the Memory Card).**

2) **Follow steps 1-6 in Section 3.9.2.2 of this manual for information on Selecting an Image Save Format.**

3) **In step 5, select** [.BMP].

[.BMP OPTION SELECTED]

4) **Aim the camera at a specific target of interest.**

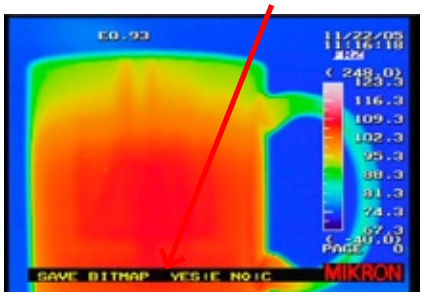
5) **Make any desired adjustments to the temperature range setting or temperature level and sensitivity. (See Sections 4.4 through 4.10 of this manual for more information on these settings).**

6) **Focus the camera. (See Section 4.6 for more information for Adjusting the Focus of the camera).**

SAVE (S)

7) **Press the** SAVE **button.**

[SAVE BITMAP MESSAGE]

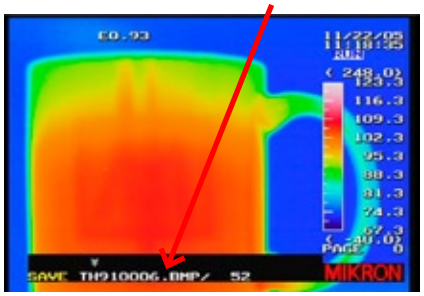


Once the SAVE button has been pressed, a **SAVE BITMAP** message will appear at the bottom of the screen offering you the choice of saving the image as a **.BMP** file or canceling out of the save bitmap function.

8a) Press the JOYSTICK [E] **button to select OK:enter**

A file name is automatically assigned to the page showing the four-character file prefix, the image number, and the **.BMP** file type extension. A brief message indicating the full file name and page number will appear at the bottom of the display.

[BITMAP FILE INFORMATION]



OR

8b) Press the CANCEL/VISIBLE [C] **button to select NO:cancel**

Once the CANCEL/VISIBLE [C] button has been selected, the camera will cancel out of the save bitmap function and return to the main display.

5.1.3 Adding a Voice Memo to a New Image

The MikroScan 7600PRO allows voice memos to be added to image files that are saved in the .SIT format. Voice memos can be added to both live and frozen .SIT images as they are saved to the memory card.

When an image is being saved to the memory card, an image file is created which contains the image, the voice memo, and all other data associated with the image. These voice files can be replayed on the MikroScan 7600PRO or transferred along with all other image data to an external computer.

To add a voice memo to a new image:

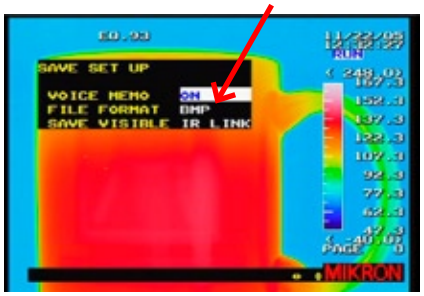
1) **Verify that a Mikron approved Compact Flash Memory Card has been inserted into the camera (See Section 3.4 of this manual for information on Inserting and Removing the Memory Card).**

2) **Verify that the .SIT Format has been selected in the Save Setup Menu (Refer to Section 3.9.2.2 of this manual for information on Selecting the Image Save Format.)**

[.SIT OPTION SELECTED]

3) **Verify that ON has been selected as the** VOICE MEMO **option in the Save Setup Menu (Refer to Section 3.9.2.1 of this manual for information on Selecting the Voice Memo Recording Option.)**

[VOICE MEMO ON SELECTED]

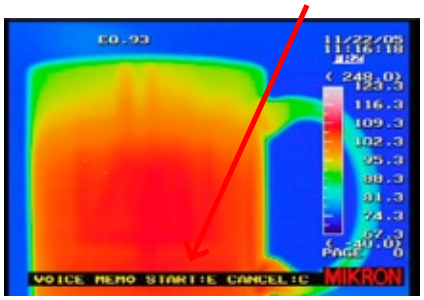


4) **Open the LCD Display to expose the speaker microphone on the side of the camera.**

SAVE (S)

5) **Press the** SAVE **button.**

[VOICE MEMO RECORDING MESSAGE]

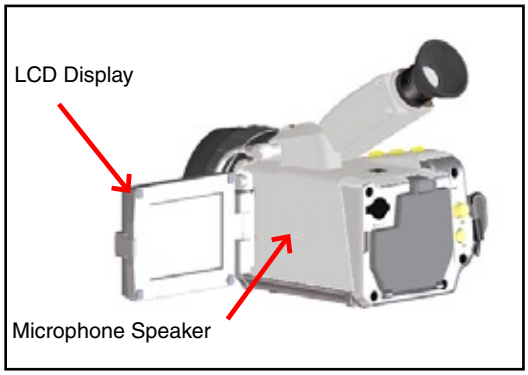


A message will appear at the bottom of the display indicating that the JOYSTICK [E] button needs to be pressed to begin the recording function.

6) Press the JOYSTICK [E] **button to begin the recording process.**

A single beep will indicate the start of the recording process along with a message at the bottom of the display indicating the recording function is in progress.

7) Speak slowly and clearly into the microphone.



After approximately 10 seconds, two short beeps will sound indicating the recording function has ended.

To cancel the voice annotation prematurely:

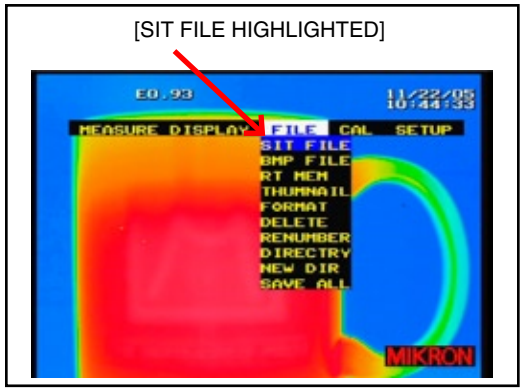
Press the CANCEL/VISIBLE [C] **button.**

5.2 Reviewing Saved Images using the MikroScan 7600PRO

5.2.1 Reviewing .SIT Images Using the Replay File Feature

1) **Follow steps 1-6 of Section 5.4.2 (entitled Selecting Directories) to select the desired directory.**

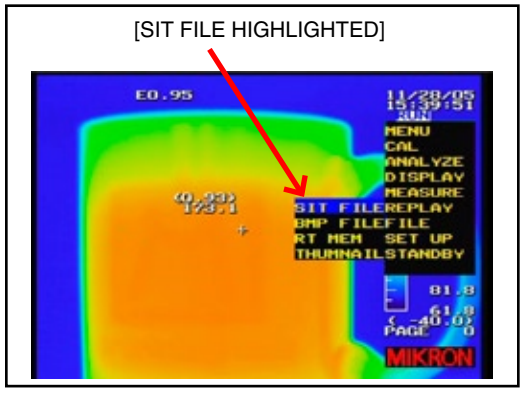
2) **If using the Standard Type Menu, go to [MENU] → [FILE] → [SIT FILE].**



Standard View Menu

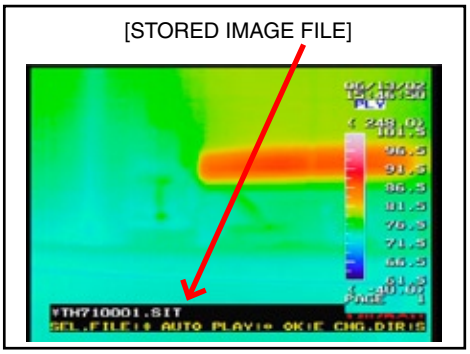
OR

If using the Classic Type Menu, go to [MENU] → [REPLAY] → [SIT FILE].



Classic View Menu

3) **Press the** JOYSTICK [E] **button to gain access to the pages of individually stored images.**



A message bar will appear at the bottom of the screen, allowing you to view the image file and to scroll through the remaining images that have been stored to the instrument's internal memory card.

4) **Toggle the** JOYSTICK **up or down as needed to scroll through the pages of stored images.**

OR

Toggle the JOYSTICK **to the left or right to activate the auto page feature.**

The auto play feature can be paused at any time by toggling the JOYSTICK up or down.

5) **Press the** JOYSTICK [E] **button to select the image and place it on the main display.**

Once a saved .SIT image has been placed on the display, you can review any associated voice and/or visible image data by pressing the CANCEL/VISIBLE [C] button as needed.

6) **Press the** CANCEL/VISIBLE [C] **button to replay any voice memo that may have been saved with the image.**

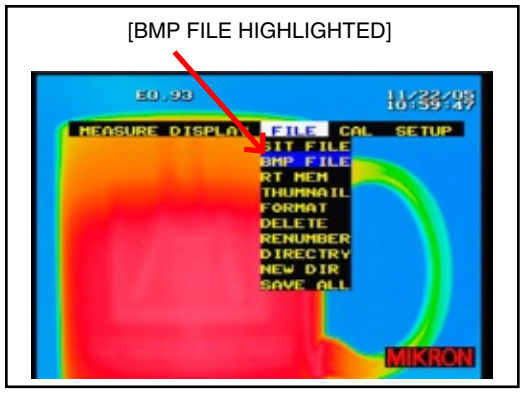
7) **Press the** CANCEL/VISIBLE [C] **button again to review any visible light image or composite image that had been saved with the thermal image.**

8) **Press the** R [RUN/FRZ] **button to return the camera to Run Mode.**

5.2.2 Reviewing .BMP Images Using the Replay File Feature

1) **Follow steps 1-6 of Section 5.4.2 (entitled Selecting Directories) to select the desired directory.**

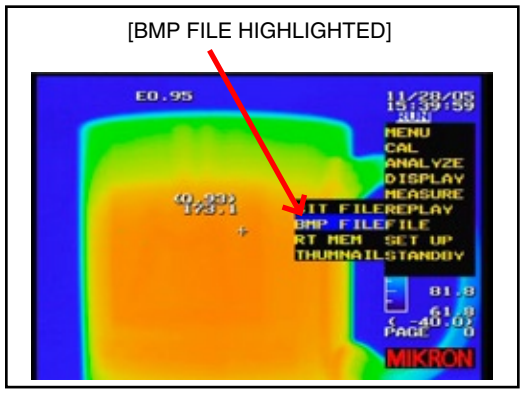
2) **If using the Standard Type Menu, go to [MENU] → [FILE] → [BMP FILE].**



Standard View Menu

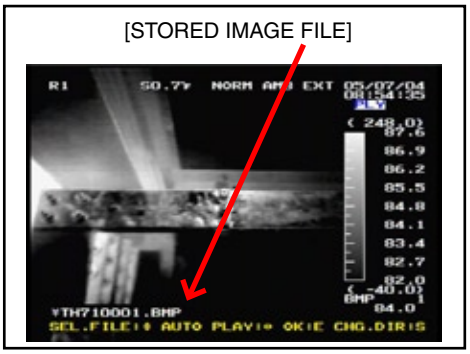
OR

If using the Classic Type Menu, go to [MENU] → [REPLAY] → [BMP FILE].



Classic View Menu

3) Press the JOYSTICK [E] **button to gain access to the pages of individually stored images.**



A message bar will appear at the bottom of the screen, allowing you to view the image file and to scroll through the remaining images that have been stored to the instrument's internal memory card.

4) Toggle the JOYSTICK **up or down as needed to scroll through the pages of stored images.**

OR

Toggle the JOYSTICK **to the left or right to activate the auto page feature.**

The auto play feature can be paused at any time by toggling the JOYSTICK up or down.

5) Press the JOYSTICK [E] **button select the image and return to the main display.**

Once a saved .BMP image has been placed on the display, you can review the associated visible image by pressing the CANCEL/VISIBLE [C] button.

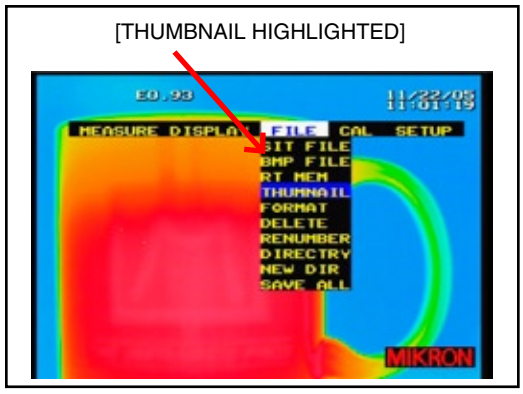
6) Press the CANCEL/VISIBLE [C] **button to review any visible light image or composite image that had been saved with the .bmp image.**

7) Press the R [RUN/FRZ] **button to return the camera to Run Mode.**

5.2.3 Reviewing Images Using the Thumbnail Feature.

1) **Follow steps 1-6 of Section 5.4.2 (entitled Selecting Directories) to select the desired directory.**

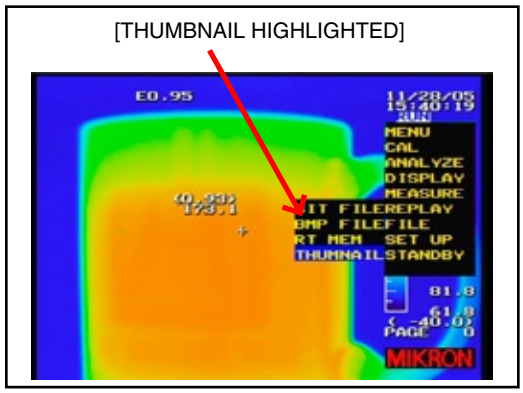
2) **If using the Standard Type Menu, go to [MENU] → [FILE] → [THUMBNAIL].**



Standard View Menu

OR

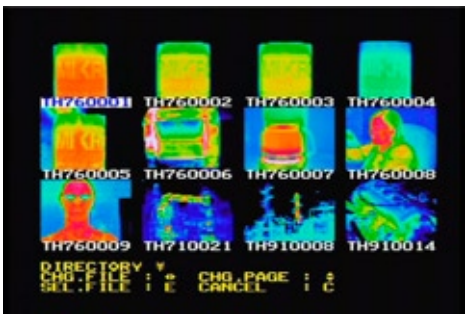
If using the Classic Type Menu, go to [MENU] → [REPLAY] → [THUMBNAIL].



Classic View Menu

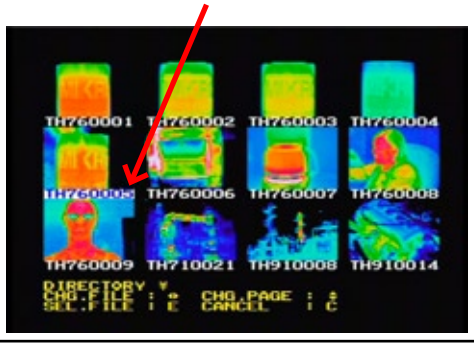
3) Press the JOYSTICK [E] **button to freeze the display and gain access to the THUMBNAIL Display.**

[THUMBNAIL DISPLAY]



4) Toggle the JOYSTICK **to the left or right as needed to scroll through the individual thumbnails on the page.**

[THUMBNAIL HIGHLIGHTED]



5) Toggle the JOYSTICK **up or down as needed to scroll through the thumbnail pages.**

[NEW THUMBNAIL HIGHLIGHTED]

6) **Press the** JOYSTICK [E] **button to select the desired thumbnail.**

OR

Press the CANCEL/VISIBLE [C] **button to cancel out of the THUMBNAIL mode and to return to the main display.**

7) **Press the** R [RUN/FRZ] **button to return the camera to Run Mode**

5.3 Working with Images Stored to Real-Time Memory

In addition to saving images to a compact flash card, your MikroScan 7600PRO also has the capability of recording real-time image sequences to its internal memory. These image sequences can then be played back and reviewed using your MikroScan 7600PRO. Individual image frames captured through the real-time memory option can also be selected and saved to the compact flash memory card.

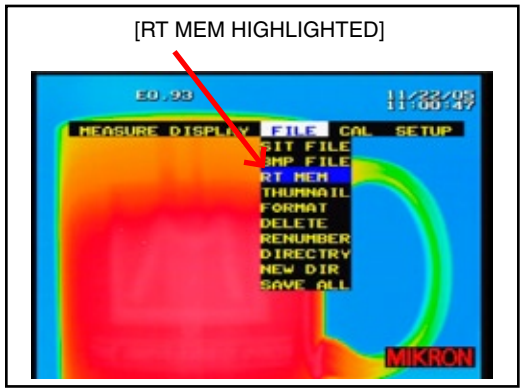
The real-time memory option works in conjunction with the camera's run mode feature, with sequences being captured based on a triggering event. For more information on the run mode feature and real-time memory, see section 6.11 of this manual, entitled Working with the Event Functions.

NOTE

The real-time memory option works in conjunction with the camera's run mode feature, with sequences being captured based on a triggering event. For more information on the run mode feature and real-time memory, see section 6.11 of this manual, entitled Working with the Event Functions.

5.3.1 Reviewing Images Stored to Real-Time Memory

1) **If using the Standard Type Menu, go to [MENU] → [FILE] → [RT MEM].**



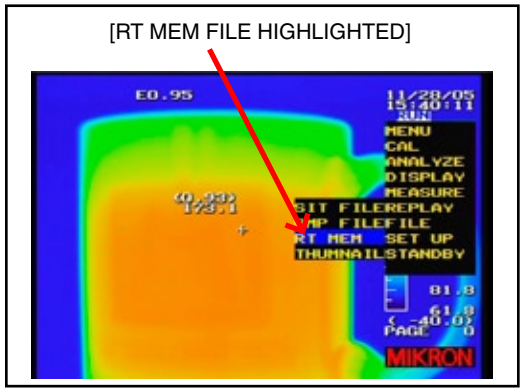
Standard View Menu

OR

NOTE

The real-time memory replay feature is not available if no image data has been saved to the camera's internal memory. For more information on saving image data to real-time memory, see section 6.11 of this manual, entitled Working with the Event Functions.

If using the Classic Type Menu, go to [MENU] → [REPLAY] → [RT MEM].



Classic View Menu

2) Press the JOYSTICK [E] **button to gain access to the images stored in real-time memory.**

A PLY notation will appear in the upper right corner of the screen, while the camera is operating in real-time memory replay mode.

3) Toggle the JOYSTICK **up or down as needed to scroll through the individual frames of the real-time memory file.**

OR

Toggle the JOYSTICK **to the left or right to activate the auto play feature.**

The auto play feature can be paused at any time by toggling the JOYSTICK up or down.

4) Press the JOYSTICK [E] **button select an individual frame and place it on the main display.**

Once a frame has been placed on the display, you can make any desired adjustments to the temperature level and sensitivity (or span). You can also work with certain menu functions such as adding temperature points, boxes, annotations, etc.

5) Press the R [RUN/FRZ] **button to return the camera to Run Mode.**

5.3.2 Saving RTM Images to the Compact Flash Memory Card

Images captured through the real-time memory function can be saved to the memory card as either .SIT files or as .BMP files. A file name is automatically assigned to each image showing the four-character file prefix, the image number, and the selected file type extension.

5.3.2.1 Saving Individual Image Frames as .SIT Files

When an image frame is saved, a file name is automatically assigned to the image showing the four-character file prefix, the image number, and the .SIT file type extension. When an image has been saved, the directory name and file name appear at the bottom of the display.

1) **Verify that a Mikron approved Compact Flash Memory Card has been inserted into the camera (See Section 3.4 of this manual for information on Inserting and Removing the Memory Card).**

2) **Follow steps 1-6 in Section 3.9.2.2 of this manual for information on Selecting an Image Save Format.**

3) **In step 5, select** [.SIT].

[.SIT OPTION SELECTED]

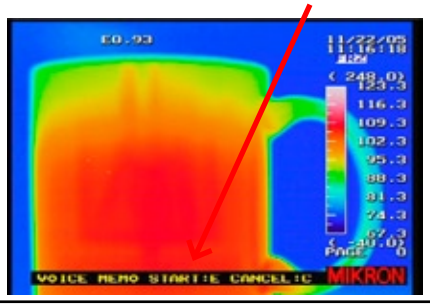
4) **Follow steps 1-5 in Section 5.3.1 of this manual to review and select the desired image frame that had been stored in real-time memory.**

SAVE (S)

5) **Press the** SAVE **button.**

If the Voice Memo Recording option has been activated (see Section 3.9.2.1 for more information on Selecting the Voice Memo Recording Option), a message will appear at the bottom of the display indicating that the JOYSTICK [E] button needs to be pressed to begin the recording function (See Section 5.1.3 for more information on working with Voice Memos).

[VOICE MEMO RECORDING MESSAGE]



To save the image without a voice annotation memo:

Press the CANCEL/VISIBLE [C] **button.**

5.3.2.2 Saving Individual Image Frames as .BMP Files

When an image frame is saved, a file name is automatically assigned to the image showing the four-character file prefix, the image number, and the .BMP file type extension. When an image has been saved, the directory name and file name appear at the bottom of the display.

1) **Verify that a Mikron approved Compact Flash Memory Card has been inserted into the camera (See Section 3.4 of this manual for information on Inserting and Removing the Memory Card).**

2) **Follow steps 1-6 in Section 3.9.2.2 of this manual for information on Selecting an Image Save Format.**

3) **In step 5, select** [.BMP]**.**

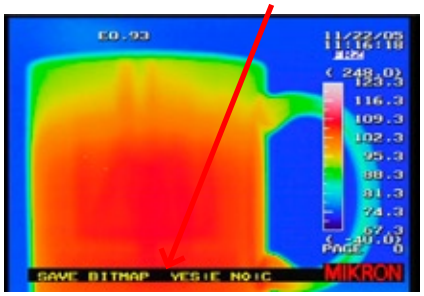
[.BMP OPTION SELECTED]

4) **Follow steps 1-5 in Section 5.3.1 of this manual to review and select the desired image frame that had been stored in real-time memory.**

SAVE (S)

5) **Press the** SAVE **button.**

[SAVE BITMAP MESSAGE]

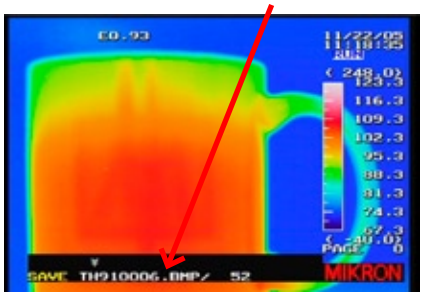


Once the SAVE button has been pressed, a **SAVE BITMAP** message will appear at the bottom of the screen offering you the choice of saving the image as a **.BMP** file or canceling out of the save bitmap function.

6a) Press the JOYSTICK [E] **button to select OK:enter**

A file name is automatically assigned to the page showing the four-character file prefix, the image number, and the **.BMP** file type extension. A brief message indicating the full file name and page number will appear at the bottom of the display.

[BITMAP FILE INFORMATION]



OR

6b) Press the CANCEL/VISIBLE [C] **button to select NO:cancel**

Once the CANCEL/VISIBLE [C] button has been selected, the camera will cancel out of the save bitmap function and return to the main display.

5.3.2.3 Using the RTM Save All Feature

The 7600PRO provides a real-time memory save all feature, which allows you to select all frames or certain image sets to be stored to the compact flash memory card. The amount of data that can be saved to the card will be dependent on the amount of space available on the memory card

To use the RTM save all feature:

1) **Verify that a Mikron approved Compact Flash Memory Card has been inserted into the camera (See Section 3.4 of this manual for information on Inserting and Removing the Memory Card).**
2) **Follow steps 1-6 in Section 3.9.2.2 of this manual for information on Selecting an Image Save Format.**
3) **In step 5, select the desired image save format.**

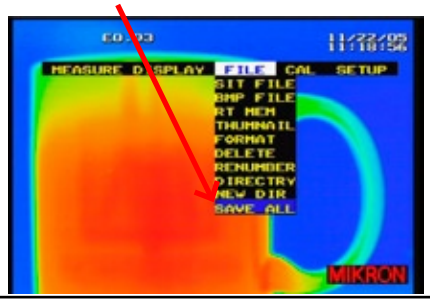
NOTE

The real-time memory save all feature allows you to choose between saving individual image sets or saving all image frames that have been stored to the memory card.

Once image frames have been saved to the memory card, they are removed from the camera's internal memory.

4) Go to [MENU] → [FILE] → [SAVE ALL].

[SAVE ALL HIGHLIGHTED]



Standard View Menu

[SAVE ALL HIGHLIGHTED]

Classic View Menu

5) Press the JOYSTICK [E] **button to freeze the display and gain access to the SAVE ALL option**.

[SAVE ALL BEGIN SELECTED]

A bar will appear at the bottom of the screen showing the total number of image frames captured to real-time memory. Note: although the internal memory will hold up to 1664 image frames, the number of frames that can be saved to the compact flash card will be dependent upon the amount of space available on the card.

6) Toggle the JOYSTICK **up or down if needed to select the desired frame as a start point for saving image data to the compact flash card.**

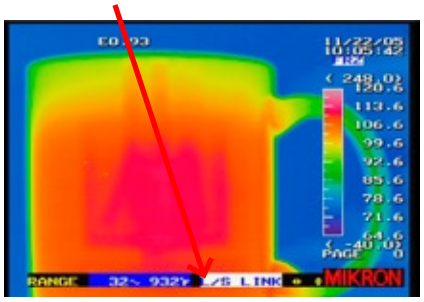
NOTE

The real-time memory save all feature allows you to choose between saving individual image sets or saving all image frames that have been stored to the memory card.

Once image frames have been saved to the memory card, they are removed from the camera's internal memory.

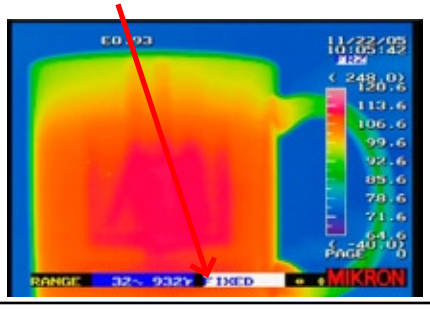
7) Toggle the JOYSTICK to the right to highlight the last frame number of the sequence.

[SAVE ALL END POINT HIGHLIGHTED]



8) Toggle the JOYSTICK up or down if needed to select the desired frame as an end point for saving image data to the compact flash card.

[SAVE ALL END POINT SELECTED]



You can choose to save individual image sets rather than saving all frames that have been stored in the internal memory. That is, you can perform this function multiple times using different start points and end points.

For example, if you choose to save only image frames 1-10, then the remaining images 11-[end] will remain in real time memory. You can then repeat the above steps to save additional image groups as desired.

Note: once a range of frames have been saved to the memory card, they are removed from the camera's internal memory.

Also note that you can not cancel out of this function once you have begun saving the image frames.

9) Press the JOYSTICK [E] button to save the image frames to the memory card.

You can not cancel out of this function once it has begun saving the image frames.

NOTE

Multi-point temperature settings, boxes, memos, etc., that have been previously set will be saved to the memory card along with the image frame.

If you receive an error message, such as the card is full, press the CANCEL/VISIBLE [C] button to cancel out of the error. You will then have the opportunity to install a new memory card and save the remaining image frames to the new memory card.

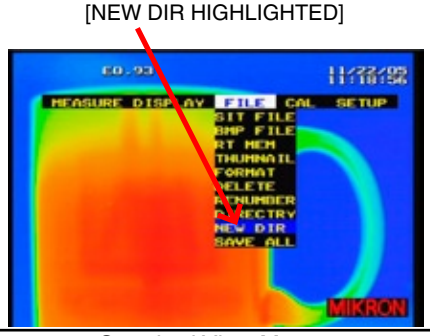
5.4 Using the Memory Card Management Options

The MikroScan 7600PRO provides a number of memory card management options, which allow you to make directories as well as renumber and delete image files.

5.4.1 Making Directories

1) **Go to [MENU] → [FILE] → [NEW DIR].**

[NEW DIR HIGHLIGHTED]



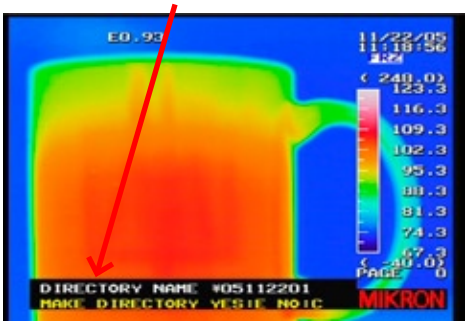
Standard View Menu

[NEW DIR HIGHLIGHTED]

Classic View Menu

2) **Press the** JOYSTICK [E] **button to freeze the display and gain access to the NEW DIR Menu**.

[NEW DIRECTORY SCREEN]



A message bar will appear at the bottom of the screen, with an auto-generated directory name. It will allow you to accept this new directory or cancel out of the function.

NOTES

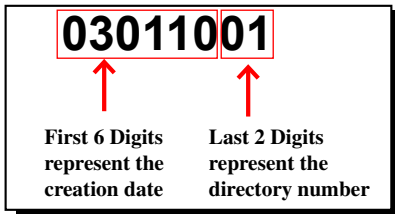
When directories are created on the camera, they are created with an auto-generated eight-digit directory name.

Although the 7600PRO firmware allows you to create directories it does not allow you to delete directories or change the name of a directory using the camera.

However, directories can be created, changed, or deleted using a personal computer.

3) Press the JOYSTICK [E] **button to save the new directory.**

The directory will be saved with an auto-generated eight-digit directory name. As such, each directory name is made up of the following components.



The first six digits designate the date the directory was created. In the above example 030110 would represent 2003/1/10. The last two digits represent the directory number. Directories are numbered sequentially from 01 to 99 on the date they are created. When a directory is created on a different date, the numbering sequence for the new date begins with 01.

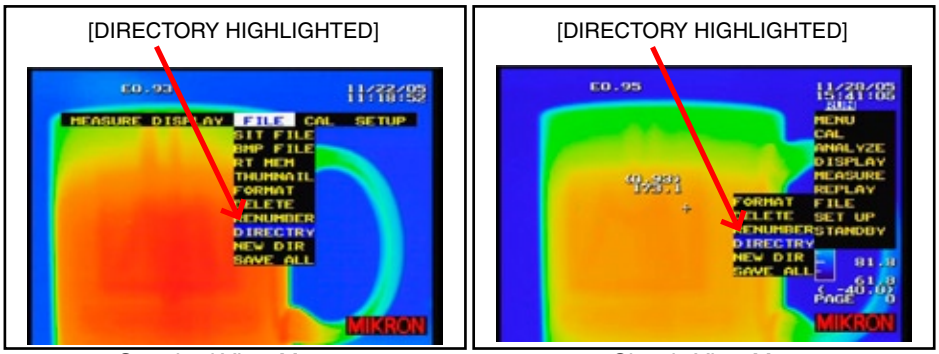
OR

Press the CANCEL/VISIBLE [C] **button to cancel out of the function and to return to the main display.**

4) Press the R [RUN/FRZ] **button to return the camera to Run Mode**

5.4.2 Selecting Directories

1) Go to [MENU] → [FILE] → [DIRECTORY].



Standard View Menu Classic View Menu

NOTES

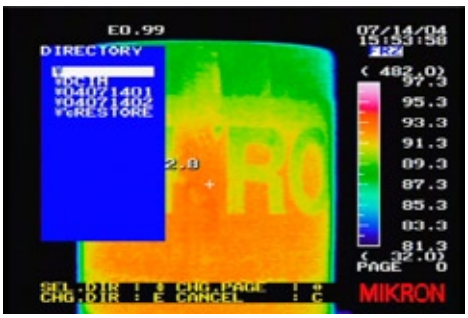
When directories are created on the camera, they are created with an auto-generated eight-digit directory name.

Although the 7600PRO firmware allows you to create directories it does not allow you to delete directories or change the name of a directory using the camera.

However, directories can be created, changed, or deleted using a personal computer.

2) Press the JOYSTICK [E] **button to freeze the display and gain access to the DIRECTORY Menu.**

[LIST OF DIRECTORIES]



A directory screen will appear, with options that allow you to scroll through directory names, select a directory or cancel out of the function.

3) Toggle the JOYSTICK **up or down as needed to scroll through the list of directories.**

[NEW DIRECTORY HIGHLIGHTED]

4) Toggle the JOYSTICK **to the left or right as needed to advance forward and backward through directory lists.**

5) Press the JOYSTICK [E] **button to select the desired directory.**

OR

Press the CANCEL/VISIBLE [C] **button to cancel out of the SELECT DIRECTORY mode and to return to the main display.**

6) Press the R [RUN/FRZ] **button to return the camera to Run Mode**

5.4.3 Deleting Files

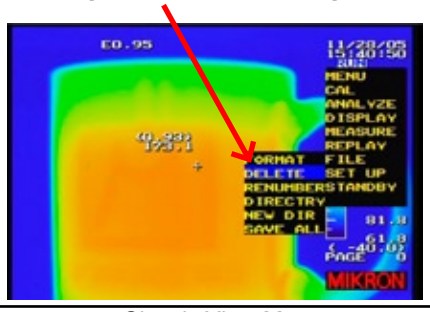
1) **Follow steps 1-6 of Section 5.4.2 (entitled Selecting Directories) to select the desired directory.**

2) **Go to [MENU] → [FILE] → [DELETE].**

[DELETE HIGHLIGHTED]

Standard View Menu

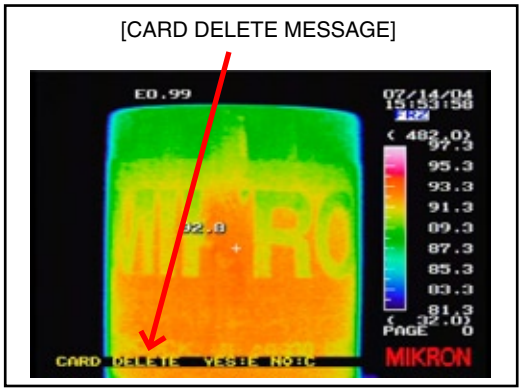
[DELETE HIGHLIGHTED]



Classic View Menu

3) **Press the** JOYSTICK [E] **button to freeze the display and gain access to the DELETE option**.

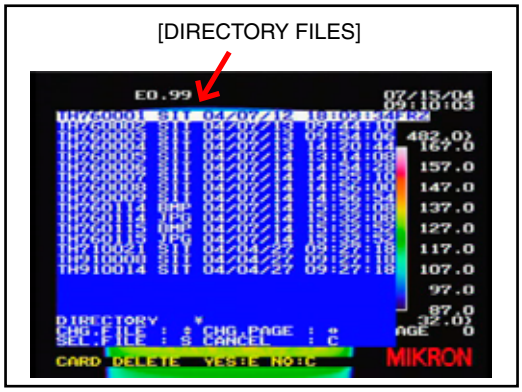
[CARD DELETE MESSAGE]



A message bar will appear at the bottom of the display asking you to confirm your choice or to cancel out of the function.

4) **Press the** JOYSTICK [E] **button to select the** [YES] **option access the list of files in the selected directory**.

[DIRECTORY FILES]



> **NOTE**
>
> The delete feature will only function with the MikroScan 7600PRO native .SIT files or .BMP files. All other files can only be deleted through the reformatting process or by using an external PC. **(See Section 5.4.5 of this manual for information on Formatting the Internal Memory Card).**

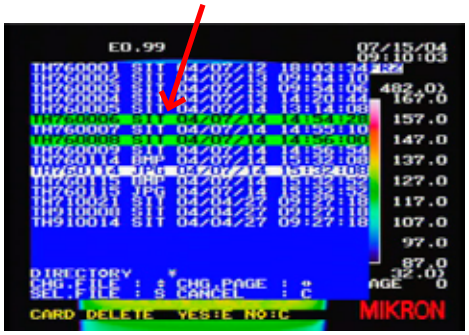
A list will appear on the screen showing the files in the selected directory.

5) Toggle the JOYSTICK **up or down as to scroll through the list of files on a directory page.**

6) Toggle the JOYSTICK **to the left or right as needed to scroll forward and backward through the directory pages.**

7) Press the SAVE **button to select a file for deletion.**

[FILES SELECTED FOR DELETION]



Each selected file will be highlighted in green. Multiple files can be marked for deletion by pressing the save button, then scrolling to another file and pressing the save button again.

You can also unmark a file for deletion by scrolling back to the marked file name and pressing the save button again.

8) Press the JOYSTICK [E] **button to select the** [OK] **option which will begin deleting the selected files in the directory.**

The deleted files will be removed from the list and the numbering sequence of the other files in the directory will not change (See Section 5.4.4 for more information on Renumbering Files).

9a) Repeat steps 5 through 8 above to delete additional files

OR

9b) Press the CANCEL/VISIBLE [C] **button to cancel out of the DELETE FILE mode and to return to the main display.**

10) Press the R [RUN/FRZ] **button to return the camera to Run Mode**

NOTE

Each selected image file will be marked in green. Multiple files can be marked for deletion by pressing the save button, then scrolling to another file and pressing the save button again.

You can also unmark a file for deletion by scrolling back to the marked file name and pressing the save button again.

NOTE

The delete feature will only function on files that are currently displayed on the screen.

NOTE

Files are numbered in sequential order from 0001 to 9999 for each directory. Once a file number of 9999 has been generated, any additional file that needs to be saved beyond that number, will generate an error message.

When you delete individual files, the space held by the deleted file will remain open and will create a gap in the numbering sequence. The renumbering feature allows you to close this gap and continue to generate additional file numbers through number 9999.

NOTE

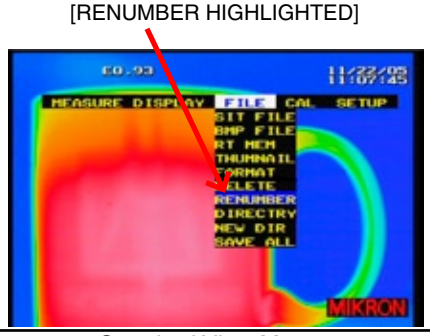
The renumbering feature can only be executed on files with an .SIT, .BMP, or .JPG extension and have a file name containing an alphabetical or numerical character in the first 4 digits and only a numerical value in the last four digits of the file name. (e.g. TH910123. SIT or TH910456. BMP.

5.4.4 Renumbering Files

1) **Follow steps 1-6 of Section 5.4.2 (entitled Selecting Directories) to select the desired directory.**

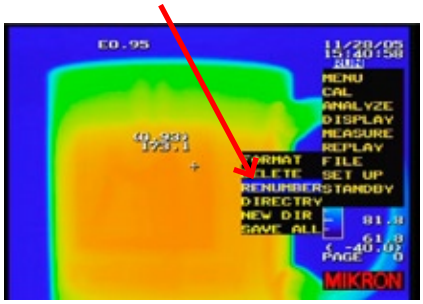
2) **Go to [MENU] → [FILE] → [RENUMBER].**

[RENUMBER HIGHLIGHTED]



Standard View Menu

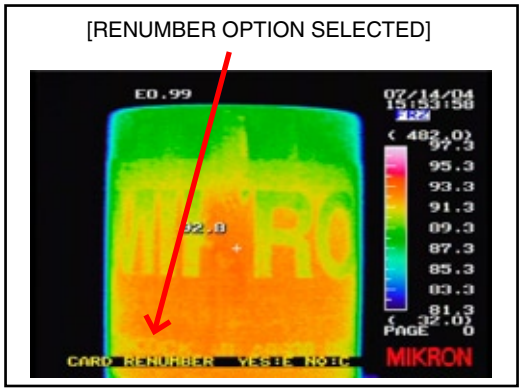
[RENUMBER HIGHLIGHTED]



Classic View Menu

3) **Press the** JOYSTICK [E] **button to freeze the display and gain access to the RENUMBER option**.

[RENUMBER OPTION SELECTED]



A message bar will appear at the bottom of the screen, asking you to confirm your choice.

4) **Press the** JOYSTICK [E] **button to select the** [YES] **option which will begin renumbering the files in the selected directory.**

A [NOW RENUMBERING] message will appear on the bar at the bottom of the screen while the files in the directory are being renumbered.

OR

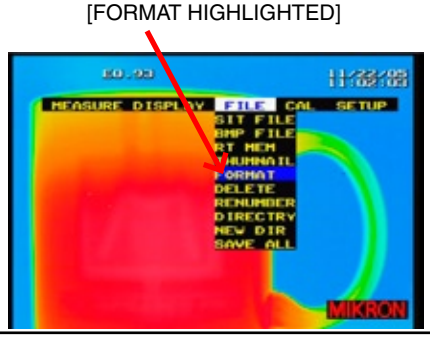
Press the CANCEL/VISIBLE [C] **button to cancel out of the RENUMBER FILE mode and to return to the main display.**

5) **Press the** R [RUN/FRZ] **button to return the camera to Run Mode**

5.4.5 Formatting the Memory Card

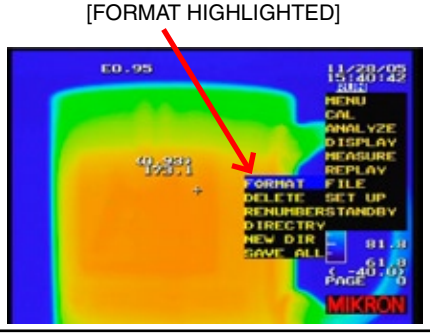
1) Go to [MENU] → [FILE] → [FORMAT].

[FORMAT HIGHLIGHTED]



Standard View Menu

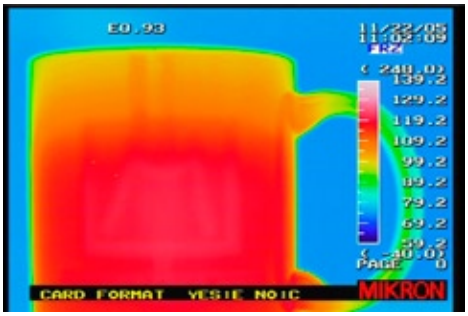
[FORMAT HIGHLIGHTED]



Classic View Menu

2) Press the JOYSTICK [E] **button to freeze the display and gain access to the FORMAT option**.

[FORMATTING DISPLAY]



A message bar will appear at the bottom of the screen, asking you to confirm your choice.

3) Press the JOYSTICK [E] **button to select** [YES] **option which will begin reformatting the internal memory card.**

A [CARD FORMATTING] message will appear on the bar at the bottom of the screen while the internal memory card is being reformatted.

OR

Press the CANCEL/VISIBLE [C] **button to cancel out of the FORMAT mode and to return to the main display.**

> **NOTE**
>
> The formatting option is useful when needing to delete all existing files on a memory card (including files created on devices other than the MikroScan 7600PRO).

5.4.6 Working with Memory Card Error Messages

There are five error messages associated with memory card use. These error messages appear on a bar located at the bottom of the screen. Refer to the table below for the particular error messages which could appear, the possible cause of the error, and the steps to follow for corrective action.

Message	Possible Cause	Corrective Action*
NOT READY	The memory card is missing or not inserted properly.	Verify that the memory card has been inserted properly. (See Section 3.4.1 for information on Inserting the Memory Card).
DATA MISS-MATCH	The data is not compatible with the 7600PRO file structure.	Reformat the memory card using the method described in Section 5.4.5 - Formatting the Memory Card.
FULL	There is no more space on the memory card.	Make more space available by deleting unwanted files or insert a new memory card (See 5.4.3 for information on deleting files.
I/O ERROR	The memory card is not formatted	Format the card using the method described in 5.4.5 - Formatting the Memory Card.
FILE NOT FOUND	The specified file does not exist	Verify that the correct memory card has been inserted in the camera.

Correcting Memory Card Errors

1) **Verify the cause of the error by referring to the above list of error messages and possible causes.**

2) **Press the** CANCEL/VISIBLE [C] **button to exit the command and return to the main display.**

3) **Perform the appropriate corrective action for the error.**

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Data Analysis

6.1 Adjusting for Ambient Compensation

The MikroScan 7600PRO includes an ambient compensation feature which compensates for the influence of the ambient up to the measurement object. When a target is of low emissivity it will have a high reflectivity. If the target is at a great distance and the target is close to ambient temperature the infrared energy of the surrounding objects and the intervening atmosphere will be reflected by the target into the sensor and measures as emitted radiation.

The two AMBIENT COMPENSATION modes are as follows:

Mode	Function
PARAM.	Input the atmospheric temperature, the humidity, and the distance up to the measuring object, get the compensation value from them, and compensate the measuring data.
VALUE	Input the atmospheric temperature and the compensation value, and compensate the measuring data with them.

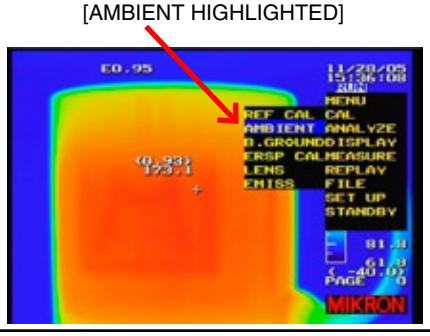
6.1.1 Accessing the Ambient Compensation Mode Settings

1) **Verify the camera is operating in [RUN] mode.**
2) **Go to [MENU] → [CAL] → [AMBIENT].**

[AMBIENT HIGHLIGHTED]

Standard View Menu

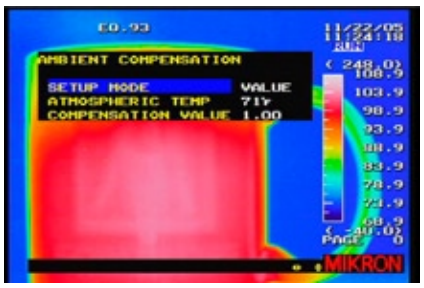
[AMBIENT HIGHLIGHTED]



Classic View Menu

3) **Press the** JOYSTICK [E] **button to gain access to the AMBIENT COMPENSATION Display.**

[AMBIENT COMPENSATION DISPLAY]



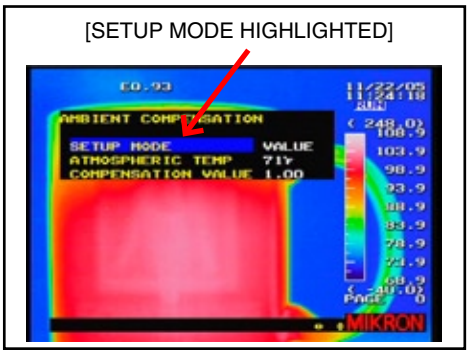
NOTE

When the ambient compensation mode has been activated, the letters AMB appear on the display's status bar. This designates that the ambient compensation mode has been turned on and that emissivity has been adjusted by the ambient compensation value.

Refer to **Deactivating the Ambient Compensation Mode found in Section 6.1.4 of this manual** for information on turning off the ambient compensation mode.

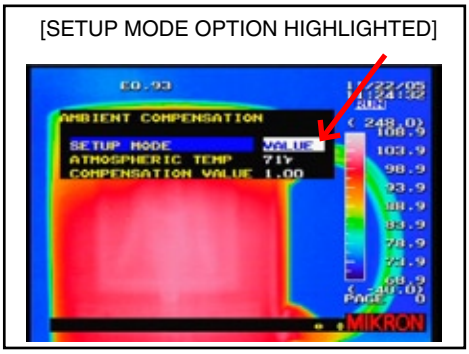
4) **Toggle the JOYSTICK up or down, if needed, to highlight [SETUP MODE] from the list of menu choices.**

[SETUP MODE HIGHLIGHTED]



5) **Toggle the JOYSTICK to the right to highlight the SETUP MODE options.**

[SETUP MODE OPTION HIGHLIGHTED]

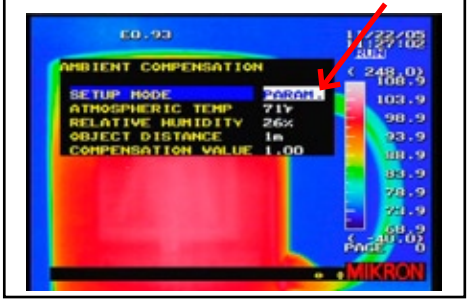


6.1.2 Setting Ambient Compensation Using the Parameter Mode

1) **Follow steps 1-5 for Accessing the Ambient Compensation Mode Settings (See Section 6.1.1 of this manual).**

2) **Toggle the JOYSTICK up or down, if needed, to highlight [PARAM] from the list of menu choices.**

[PARAM. MODE OPTION HIGHLIGHTED]



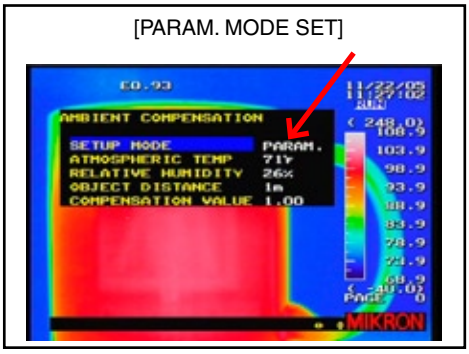
NOTE

When the ambient compensation mode has been activated, the letters AMB appear on the display's status bar. This designates that the ambient compensation mode has been turned on and that emissivity has been adjusted by the ambient compensation value.

Refer to **Deactivating the Ambient Compensation Mode found in Section 6.1.4 of this manual** for information on turning off the ambient compensation mode.

3) Toggle the JOYSTICK to the left to set the PARAM mode and return to the list of displayed options.

[PARAM. MODE SET]



OR

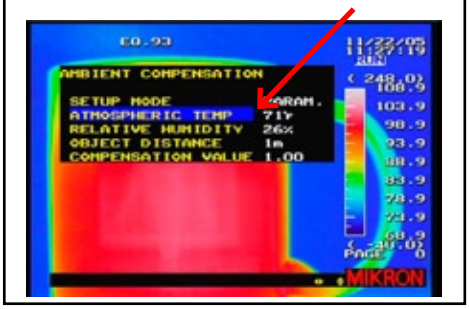
Press the JOYSTICK [E] button to save the setting and to return to the main display.

6.1.2.1 Setting the Atmospheric Temperature Value

1) Follow steps 1-3 for Setting Ambient Compensation Using the Parameter Mode (See Section 6.1.2 of this manual).

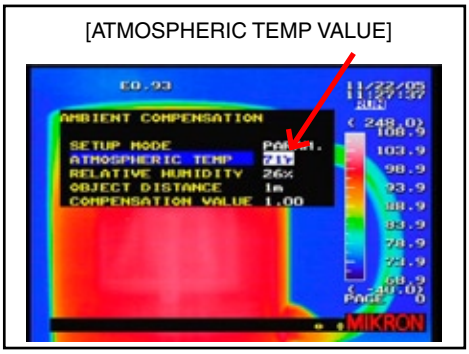
2) Toggle the JOYSTICK up or down, if needed, to highlight [ATMOSPHERIC TEMP] from the list of menu choices.

[ATMOSPHERIC TEMP SET]



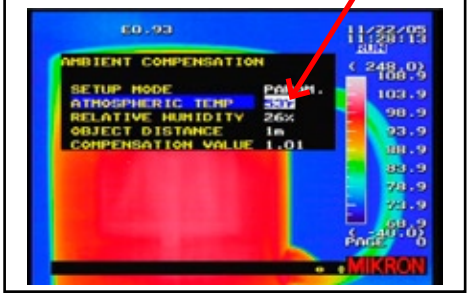
3) Toggle the JOYSTICK to the right to highlight the ATMOSPHERIC TEMP. value.

[ATMOSPHERIC TEMP VALUE]



4) Toggle the JOYSTICK **up or down, as needed to increase or decrease the ATMOSPHERIC TEMP. value.**

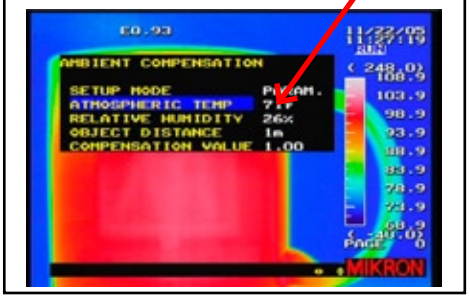
[ATMOSPHERIC TEMP VALUE CHANGED]



The compensation value will automatically reflect the adjustments made to this parameter.

5) Toggle the JOYSTICK **to the left to set the ATMOSPHERIC TEMP value and return to the list of displayed options.**

[ATMOSPHERIC TEMP VALUE SET]



OR

Press the JOYSTICK [E] **button to save the setting and to return to the main display.**

NOTE

When the ambient compensation mode has been activated, the letters AMB appear on the display's status bar. This designates that the ambient compensation mode has been turned on and that emissivity has been adjusted by the ambient compensation value.

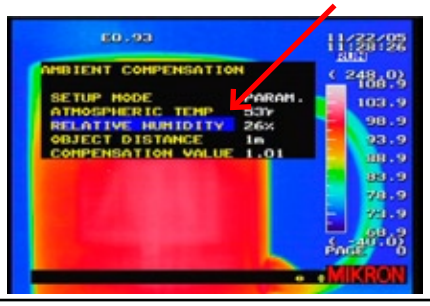
Refer to **Deactivating the Ambient Compensation Mode found in Section 6.1.4 of this manual** for information on turning off the ambient compensation mode.

6.1.2.2 Setting the Relative Humidity Value

1) **Follow steps 1-3 for Setting Ambient Compensation Using the Parameter Mode (See Section 6.1.2 of this manual).**

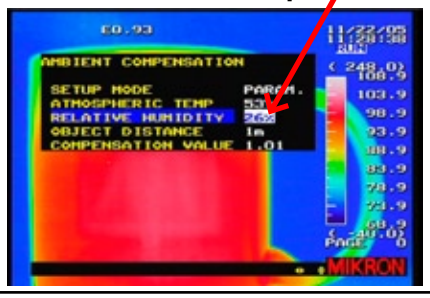
2) **Toggle the** JOYSTICK **up or down, if needed, to highlight [RELATIVE HUMIDITY] from the list of menu choices.**

[RELATIVE HUMIDITY HIGHLIGHTED]



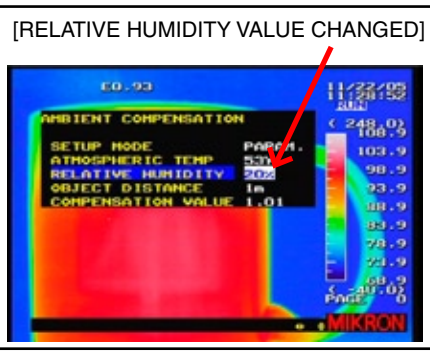
3) **Toggle the** JOYSTICK **to the right to highlight the RELATIVE HUMIDITY value.**

[RELATIVE HUMIDITY VALUE HIGHLIGHTED]



4) **Toggle the** JOYSTICK **up or down, as needed to increase or decrease the RELATIVE HUMIDITY value.**

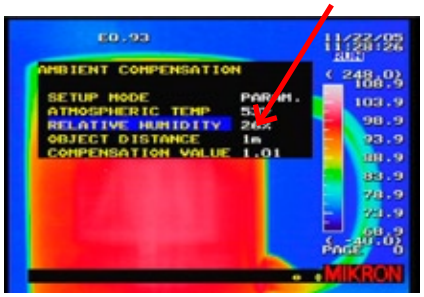
[RELATIVE HUMIDITY VALUE CHANGED]



The compensation value will automatically reflect the adjustments made to this parameter.

5) Toggle the JOYSTICK to the left to set the RELATIVE HUMIDITY value and return to the list of displayed options.

[RELATIVE HUMIDITY VALUE SET]



OR

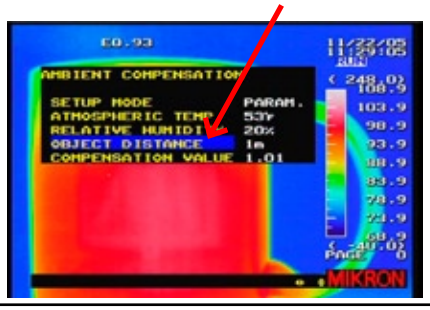
Press the JOYSTICK [E] button to save the setting and to return to the main display.

6.1.2.3 Setting the Object Distance

1) Follow steps 1-3 for Setting Ambient Compensation Using the Parameter Mode (See Section 6.1.2 of this manual).

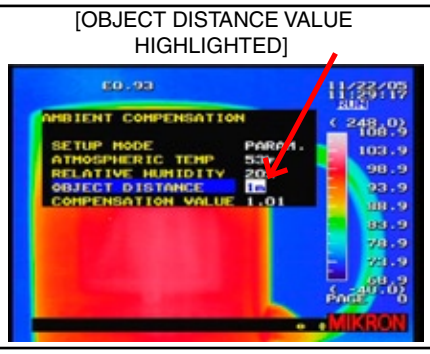
2) Toggle the JOYSTICK up or down, if needed, to highlight [OBJECT DISTANCE] from the list of menu choices.

[OBJECT DISTANCE HIGHLIGHTED]



3) Toggle the JOYSTICK to the right to highlight the OBJECT DISTANCE value.

[OBJECT DISTANCE VALUE HIGHLIGHTED]



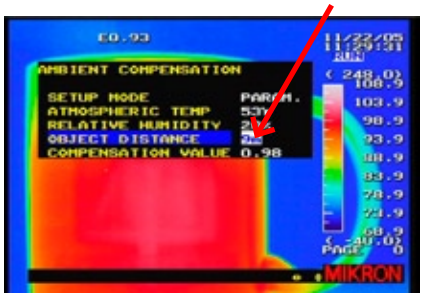
NOTE

When the ambient compensation mode has been activated, the letters AMB appear on the display's status bar. This designates that the ambient compensation mode has been turned on and that emissivity has been adjusted by the ambient compensation value.

Refer to **Deactivating the Ambient Compensation Mode found in Section 6.1.4 of this manual** for information on turning off the ambient compensation mode.

4) Toggle the JOYSTICK up or down, as needed to increase or decrease the OBJECT DISTANCE value.

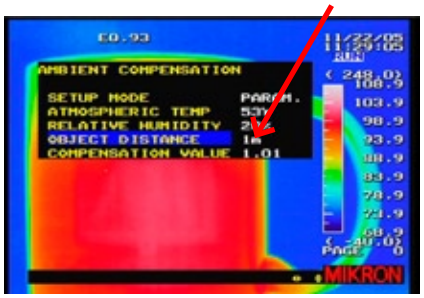
[OBJECT DISTANCE VALUE CHANGED]



The compensation value will automatically reflect the adjustments made to this parameter.

5) Toggle the JOYSTICK to the left to set the OBJECT DISTANCE value and return to the list of displayed options.

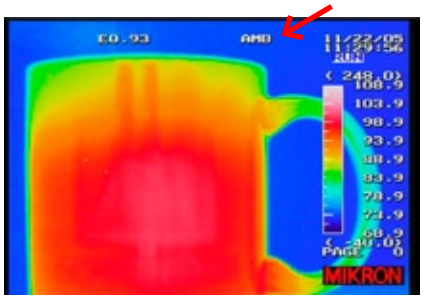
[OBJECT DISTANCE VALUE SET]



OR

Press the JOYSTICK [E] button to save the setting and to return to the main display.

[AMBIENT MODE ACTIVATED]



6.1.3 Setting Ambient Compensation Using the Value Mode

1) **Follow steps 1-5 for Accessing the Ambient Compensation Mode Settings (See Section 6.1.1 of this manual).**

2) **Toggle the JOYSTICK up or down, if needed, to highlight [VALUE] from the list of menu choices.**

[VALUE MODE OPTION HIGHLIGHTED]

3) **Toggle the JOYSTICK to the left to set the VALUE mode and return to the list of displayed options.**

[VALUE MODE SET]

OR

Press the JOYSTICK [E] button to save the setting and to return to the main display.

6.1.3.1 Setting the Atmospheric Temperature Value

1) **Follow steps 1-3 for Setting Ambient Compensation Using the Value Mode (See Section 6.1.3 of this manual).**

2) **Toggle the** JOYSTICK **up or down, if needed, to highlight [ATMOSPHERIC TEMP] from the list of menu choices.**

[ATMOSPHERIC TEMP HIGHLIGHTED]

3) **Toggle the** JOYSTICK **to the right to highlight the ATMOSPHERIC TEMP. value.**

[ATMOSPHERIC TEMP VALUE HIGHLIGHTED]

4) **Toggle the** JOYSTICK **up or down, as needed to increase or decrease the ATMOSPHERIC TEMP. value.**

[ATMOSPHERIC TEMP VALUE]

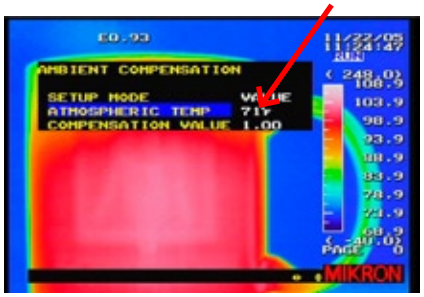
NOTE

When the ambient compensation mode has been activated, the letters AMB appear on the display's status bar. This designates that the ambient compensation mode has been turned on and that emissivity has been adjusted by the ambient compensation value.

Refer to **Deactivating the Ambient Compensation Mode found in Section 6.1.4 of this manual** for information on turning off the ambient compensation mode.

5) Toggle the JOYSTICK to the left to set the ATMOSPHERIC TEMP value and return to the list of displayed options.

[ATMOSPHERIC TEMP VALUE SET]



OR

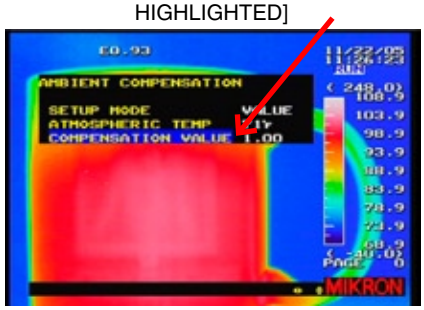
Press the JOYSTICK [E] button to save the setting and to return to the main display.

6.1.3.2 Setting the Compensation Value

1) Follow steps 1-3 for Setting Ambient Compensation Using the Value Mode (See Section 6.1.3 of this manual).

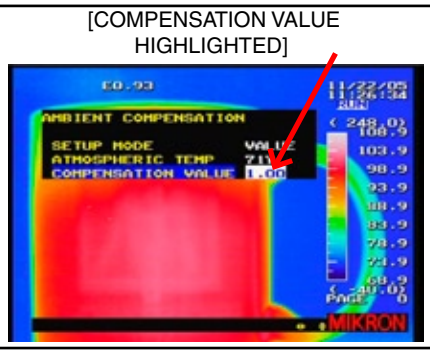
2) Toggle the JOYSTICK up or down, if needed, to highlight [COMPENSATION VALUE] from the list of menu choices.

[COMPENSATION VALUE HIGHLIGHTED]



3) Toggle the JOYSTICK to the right to highlight the COMPENSATION VALUE.

[COMPENSATION VALUE HIGHLIGHTED]



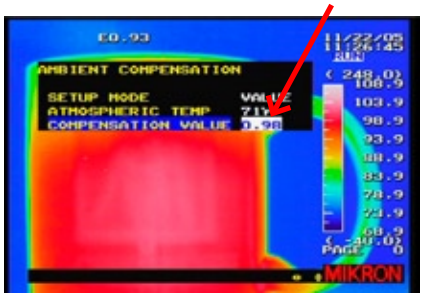
NOTE

When the ambient compensation mode has been activated, the letters AMB appear on the display's status bar. This designates that the ambient compensation mode has been turned on and that emissivity has been adjusted by the ambient compensation value.

Refer to **Deactivating the Ambient Compensation Mode found in Section 6.1.4 of this manual** for information on turning off the ambient compensation mode.

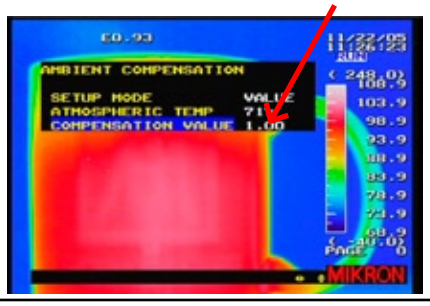
4) Toggle the JOYSTICK up or down, as needed to increase or decrease the COMPENSATION VALUE.

[COMPENSATION VALUE]



5) Toggle the JOYSTICK to the left to set the COMPENSATION VALUE and return to the list of displayed options.

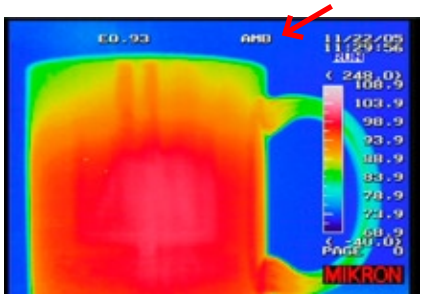
[COMPENSATION VALUE SET]



OR

Press the JOYSTICK [E] button to save the setting and to return to the main display.

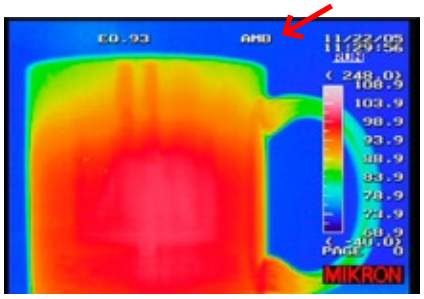
[AMBIENT MODE ACTIVATED]



6.1.4 Deactivating the Ambient Compensation Mode

1) Verify the camera is operating in [RUN] mode.

[AMBIENT MODE ACTIVATED]

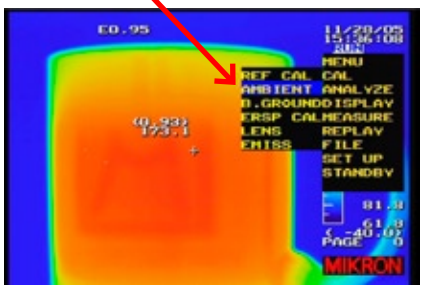


2) Go to [MENU] → [CAL] → [AMBIENT].

[AMBIENT HIGHLIGHTED]

Standard View Menu

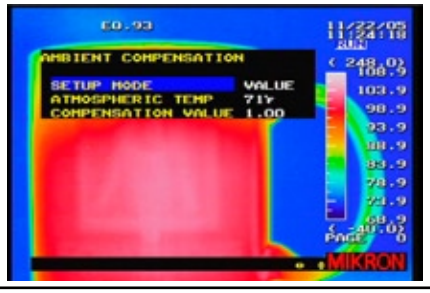
[AMBIENT HIGHLIGHTED]



Classic View Menu

3) Press the JOYSTICK [E] **button to gain access to the AMBIENT COMPENSATION Display.**

[AMBIENT COMPENSATION DISPLAY]



4) Press the CANCEL/VISIBLE [C] **button to cancel out of the AMBIENT COMPENSATION mode.**

NOTES

1. The default value of the temperature is based on the cursor point if the cursor point is displayed. If there is no cursor, the temperature is based on the center point of the screen.
2. The temperature is displayed using an emissivity value of 1.00 even if the screen emissivity or multi-point emissivity is specified differently.
3. If performing a calibration, the compensation value of the background compensation is canceled.
4. The background compensation is only effective when the emissivity is less than 1.00.
5. To ensure accurate results, the background function should only be performed by individuals who understand the basics of heat transfer and infrared radiation theory.

6.2 Adjusting for Background Compensation

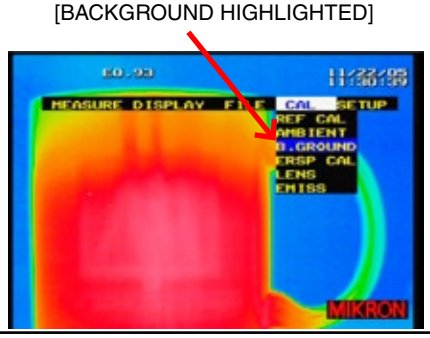
When the emissivity of measured object is low, reflectivity will be high. If background objects are radiating larger amounts of infrared radiation, due to either higher temperature than the target or higher emissivity, the infrared energy from the background will add to the indicated temperature reported by the MikroScan 7600PRO thus causing an error. The MikroScan 7600PRO incorporates a sophisticated algorithm to remove these types of reflectivity/background errors.

To adjust the Background Compensation temperature value:

1) Verify the camera is operating in [RUN] mode.

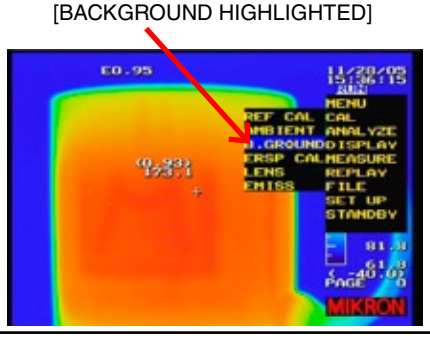
2) Go to [MENU] → [CAL] → [BACKGROUND].

[BACKGROUND HIGHLIGHTED]



Standard View Menu

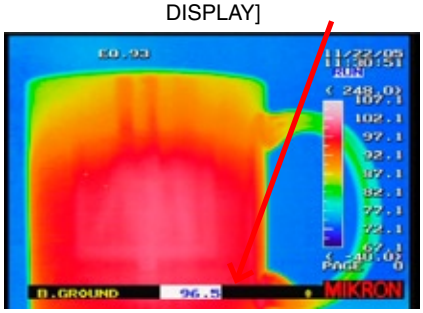
[BACKGROUND HIGHLIGHTED]



Classic View Menu

3) Press the JOYSTICK [E] **button to access the BACKGROUND COMPENSATION Display.**

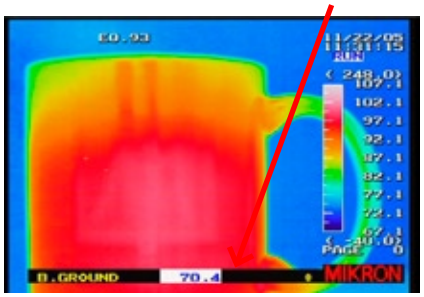
[BACKGROUND COMPENSATION DISPLAY]



A bar will appear at the bottom of the screen allowing you to adjust the background compensation temperature value.

4) Toggle the JOYSTICK **up or down as needed to select the desired BACKGROUND COMPENSATION temperature value.**

[TEMP VALUE SELECTED]



Make sure to use a temperature value that falls within the current measuring temperature range.

5) Press the JOYSTICK [E] **button to save the setting and to return to the main display.**

OR

Press the CANCEL/VISIBLE [C] **button to cancel out of the BACKGROUND COMPENSATION mode.**

6.3 Working with the Gain Control Function

The MikroScan 7600PRO includes a gain control feature which is used for performing automatic temperature or automatic sensitivity tracing.

The two GAIN CONTROL modes are as follows:

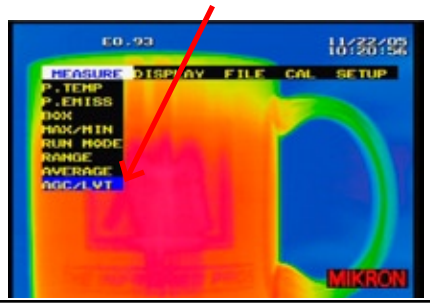
Mode	Function
LEVEL TRACE	The cross cursor traces a point temperature signal, and always controls for the temperature signal level to become the center level of the color bar. When the cross cursor is not used, the temperature signal of the center (X=160, Y=120) of the thermal image is traced.
AUTO GAIN	It traces the temperature signal of the entire thermal image, and always controls the display sensitivity and temperature level to be at their optimal values. By combining use of this mode and the Level/Sens linking mode of the range mode, the temperature signal can be traced beyond the range.

6.3.1 Selecting a Gain Control Option

1) **Verify the camera is operating in [RUN] mode.**

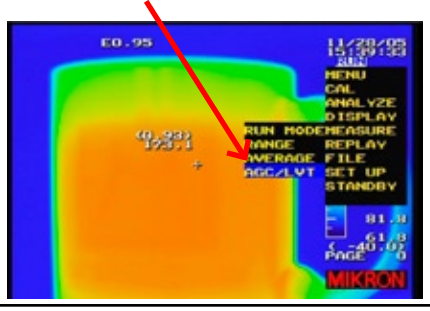
2) **Go to [MENU] → [MEASURE] → [AGC/LVT].**

[AGC/LVT HIGHLIGHTED]



Standard View Menu

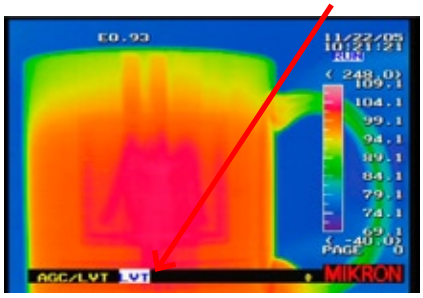
[AGC/LVT HIGHLIGHTED]



Classic View Menu

3) **Press the** JOYSTICK [E] **button to select the AGC/LVT option.**

[AGC/LVT OPTION SELECTED]



A bar will appear at the bottom of the screen showing the current AGC/LVT option:

NOTE

The Gain Control Feature can be activated and de-activated by pressing the MENU button during the temperature tracking.

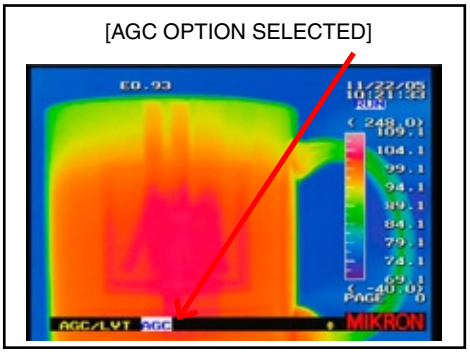
A white gain control label indicates that the Gain Control option has been activated, while a green label indicates that the Gain Control feature has been deactivated.

NOTE

The temperature at the cursor position is displayed at the bottom of the temperature scale, immediately above the MIKRON logo, and is updated continuously as the cursor is moved. The cursor coordinates are also displayed and updated continuously as the cursor is moved.

4) Toggle the JOYSTICK **up or down if needed until the desired option has been selected.**

[AGC OPTION SELECTED]

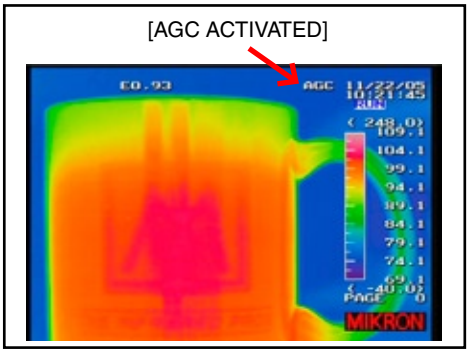


The three gain control options are:

- OFF GAIN CONTROL OFF
- LVT PERFORM LEVEL TRACE GAIN CONTROL
- AGC PERFORM AUTO GAIN CONTROL

5) Press the JOYSTICK [E] **button to save the setting and to return to the main display.**

[AGC ACTIVATED]



Once a Gain Control option has been selected the appropriate label will appear in the status bar on the main display screen.

OR

Press the CANCEL/VISIBLE [C] **button to cancel out of the menu mode and to return to the main display.**

NOTE

The temperature at the new cursor position is displayed at the bottom of the temperature scale (directly below the previous cursor point temperature) and is updated continuously as the cursor is moved. The cursor coordinates are also displayed and updated continuously as the cursor is moved.

6.3.2 Disabling the Gain Control Option

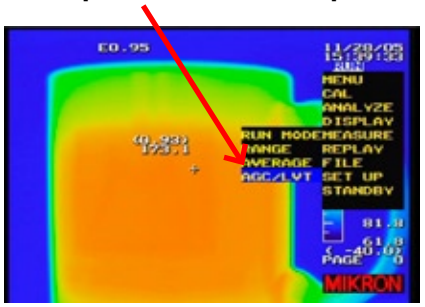
1) **Verify the camera is operating in [RUN] mode.**

2) **Go to [MENU] → [MEASURE] → [AGC/LVT].**

[AGC/LVT HIGHLIGHTED]

Standard View Menu

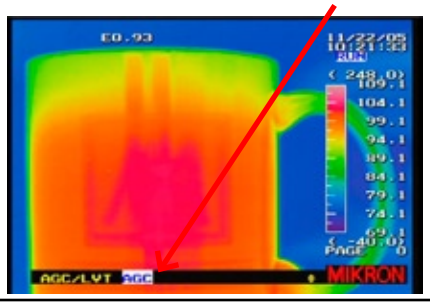
[AGC/LVT HIGHLIGHTED]



Classic View Menu

3) **Press the** JOYSTICK [E] **button to select the AGC/LVT option.**

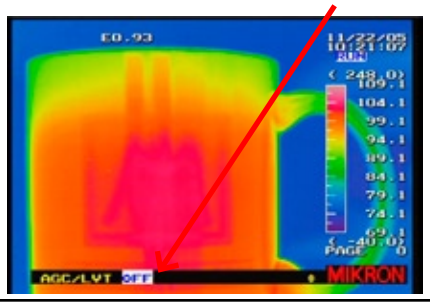
[AGC/LVT OPTION SELECTED]



A bar will appear at the bottom of the screen showing the current AGC/LVT option:

4) **Toggle the** JOYSTICK **up or down if needed until the AGC/LVT [OFF] option has been selected.**

[AGC/LVT OFF SELECTED]



5) **Press the** JOYSTICK [E] **button to save the setting and to return to the main display.**

6.4 Working with the Multi-Point Temperature Display Options

The MikroScan 7600PRO allows you to view the temperature data of one or more points at selected locations anywhere within the field of view. It also allows you to establish individual emissivity values for one or more points and to obtain information on how the temperatures of the various points are affected by differences in emissivity settings. The Multi-Point Temperature Display Options can be used in either the RUN or FREEZE modes.

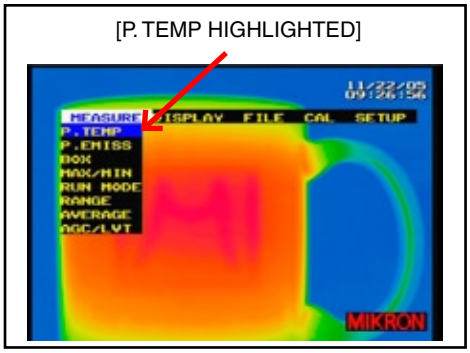
The Multi-Point Temperature Display offers four mode choices:

Mode	Details
[TEMP]	Displays the temperature of the points under the color bar. Does not, however, allow emissivity settings to be changed or displayed.
[TEMP & EMISS]	Displays the temperature and emissivity of each point near the point cursor. Also allows emissivity of each point to be set individually.
[ΔTEMP]	Displays the specified point temperature under the color bar. Also displays the temperature difference ΔT between point A and point B. However, this mode does not allow the emissivity to be corrected on an individual basis.
[ΔTEMP & EMISS]	Displays the specified point temperature under the color bar and displays the emissivity setting of the point near the point cursor. Also displays the temperature difference ΔT between point A and point B. However, the emissivity is displayed only when the emissivity of the point is different from the emissivity of the whole screen.

6.4.1 Setting a Single Point

1) **Follow steps 1-6 for Setting the Multipoint Display Mode (See Section 3.9.3.1).**

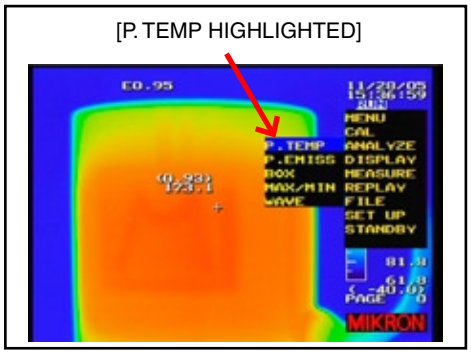
2) **If using the Standard Type Menu, go to [MENU] → [MEASURE] → [P. TEMP].**



Standard View Menu

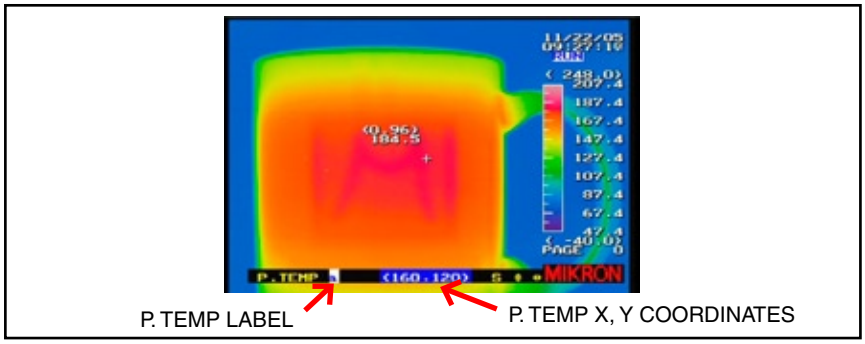
OR

If using the Classic Type Menu, go to [MENU] → [ANALYZE] → [P. TEMP].



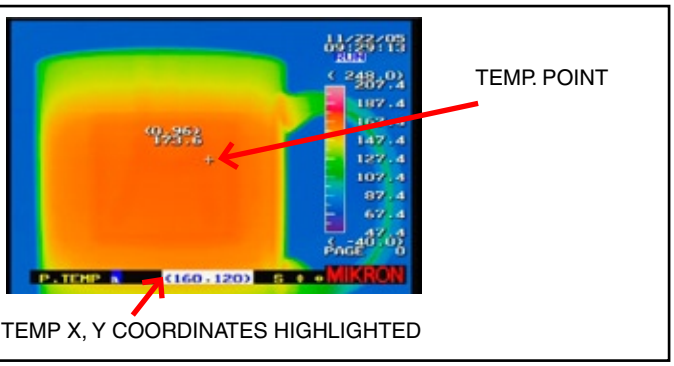
Classic View Menu

3) **Press the** JOYSTICK [E] **button to select the P. TEMP option.**

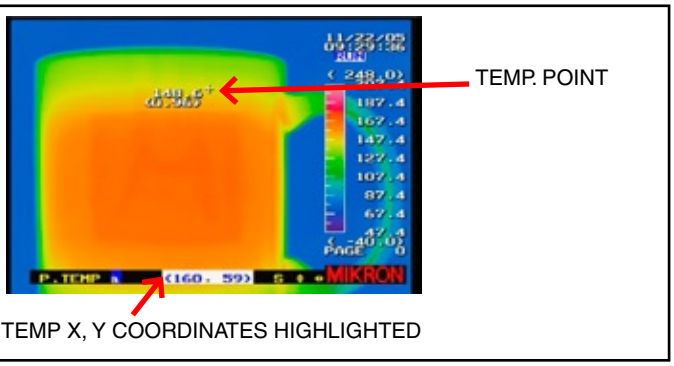


The new display will appear showing the temperature point, the temperature point label and the temperature point coordinates.

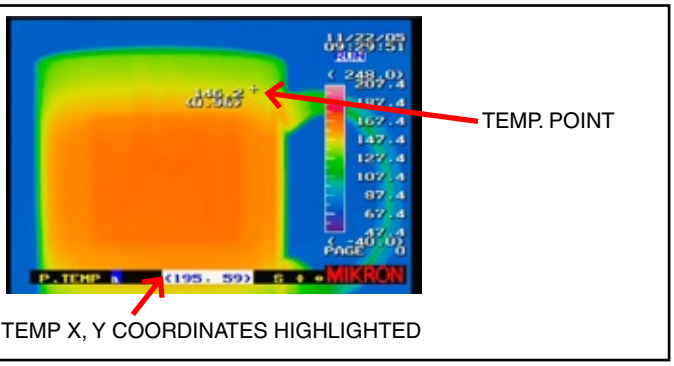
4) Press the S [SAVE] **button to establish the temperature point and to highlight the** [P. TEMP X, Y COORDINATES]**.**



5) Toggle the JOYSTICK **up or down as needed to move the temperature point along the vertical plane to the desired location on the image display.**



6) Toggle the JOYSTICK **left or right as needed to move the temperature point along the horizontal plane to the desired location on the image display.**



7) Press the JOYSTICK [E] **button to set the current temperature point location and return to the main display.**

Pressing JOYSTICK [E] button will lock the new temperature point to its current position.

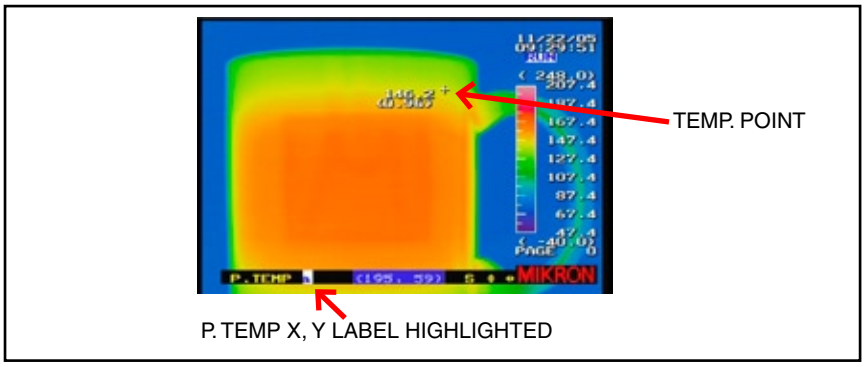
TIP

Continuing to Toggle the JOYSTICK button up, down, left, or right will allow rapid movement of the cursor.

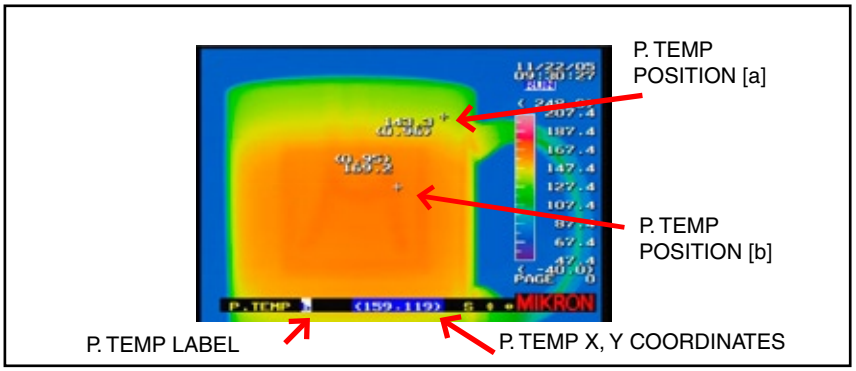
6.4.2 Setting Multiple Points

1) **Follow steps 1-6 for Setting a Single Point Temperature (See Section 6.4.1).**

SAVE (S) 2) **Press the** S [SAVE] **button to establish the temperature point location and to once again highlight the** [P. TEMP LABEL]**.**

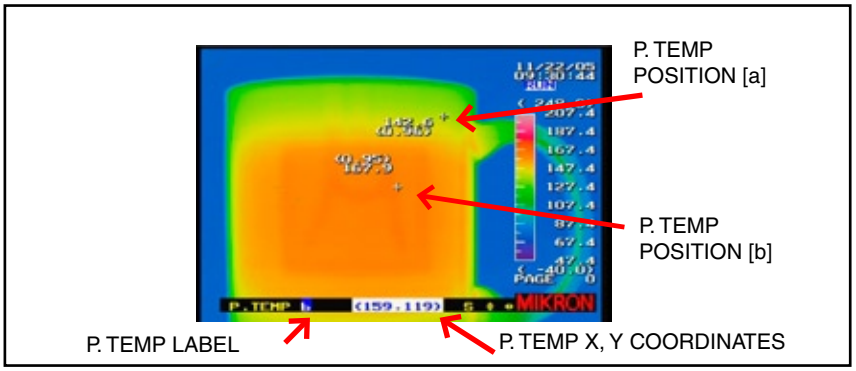


3) **Toggle the** JOYSTICK **up to add another temperature point to the display.**



The first temperature point will be labeled [a]. The next temperature point will be labeled [b].

SAVE (S) 4) **Press the** S [SAVE] **button to establish the temperature point and to highlight the new** [P. TEMP X, Y COORDINATES]**.**



NOTE

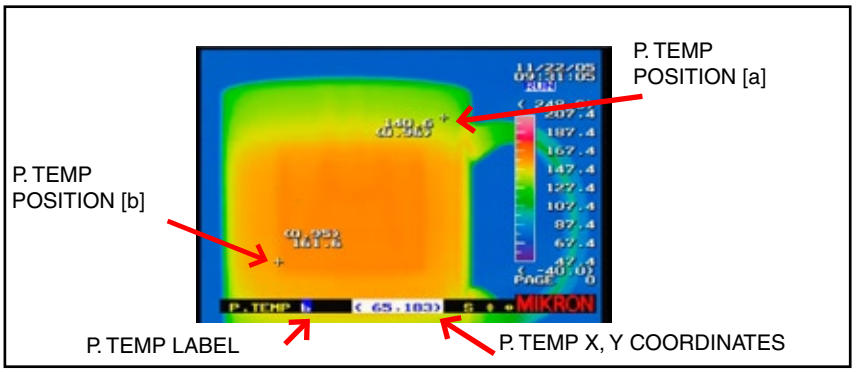
Continuing to Toggle the JOYSTICK button upward in Step 3 will result in adding successive points in a rapid sequence and in random locations. The remaining steps in this section will only affect the most recent cursor point selected.

TIP

Continuing to Toggle the JOYSTICK button up, down, left, or right will allow rapid movement of the cursor.

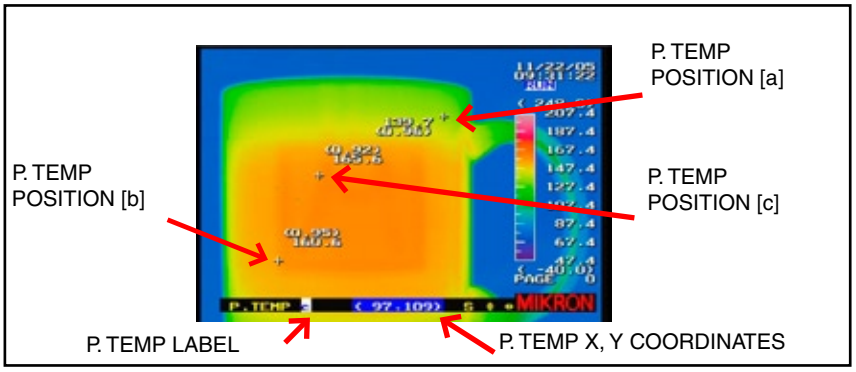
5) Toggle the JOYSTICK up or down as needed to move the temperature point along the vertical plane to the desired location on the image display.

6) Toggle the JOYSTICK left or right as needed to move the temperature point along the horizontal plane to the desired location on the image display.



7) Press the S [SAVE] button to establish the temperature point location and to once again highlight the new [P. TEMP LABEL].

8) Follow the previous steps 3-7 to add and place additional temperature points.



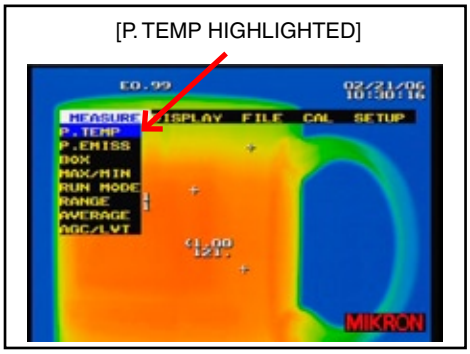
The first temperature point was labeled [a]. The second temperature point was labeled [b]. Successive points will be labeled [c] through [j] respectively.

9) Press the JOYSTICK [E] button to set the current temperature point locations and return to the main display.

Pressing JOYSTICK [E] button will lock the new temperature points to their current positions.

6.4.3 Changing Set Point Positions

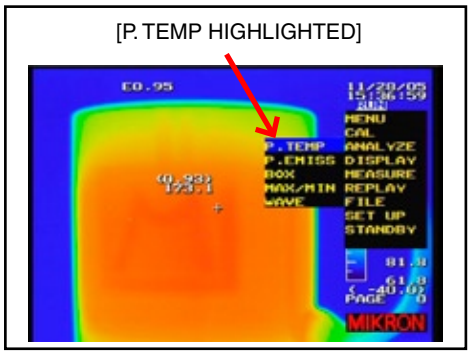
1) If using the Standard Type Menu, go to [MENU] → [MEASURE] → [P. TEMP].



Standard View Menu

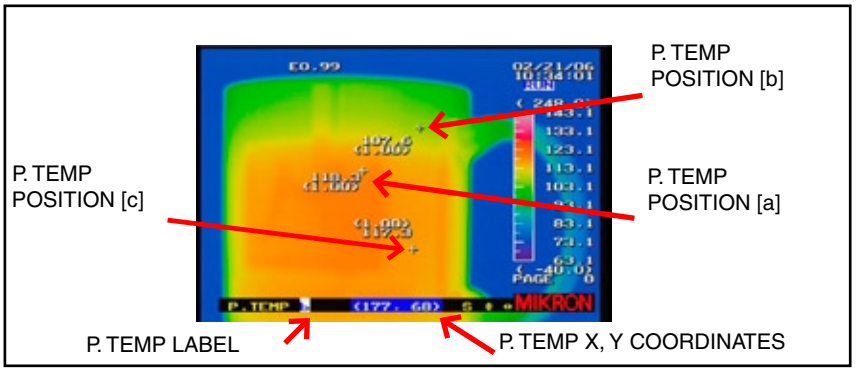
OR

If using the Classic Type Menu, go to [MENU] → [ANALYZE] → [P. TEMP].



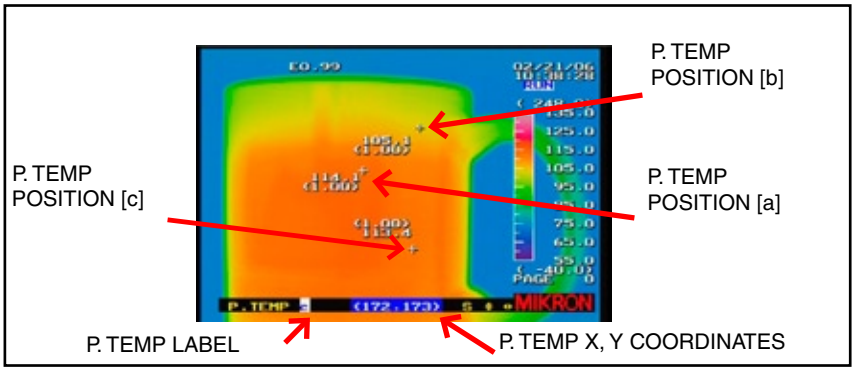
Classic View Menu

2) Press the JOYSTICK [E] **button to select the P. TEMP option.**



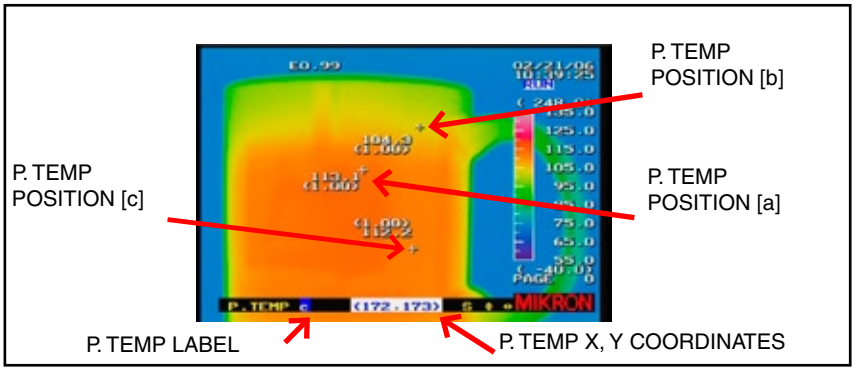
The new display will appear showing the temperature point, the temperature point label and the temperature point coordinates.

3) Toggle the JOYSTICK up or down as needed to scroll through the highlighted temperature point labels to select the temperature point that needs modification.



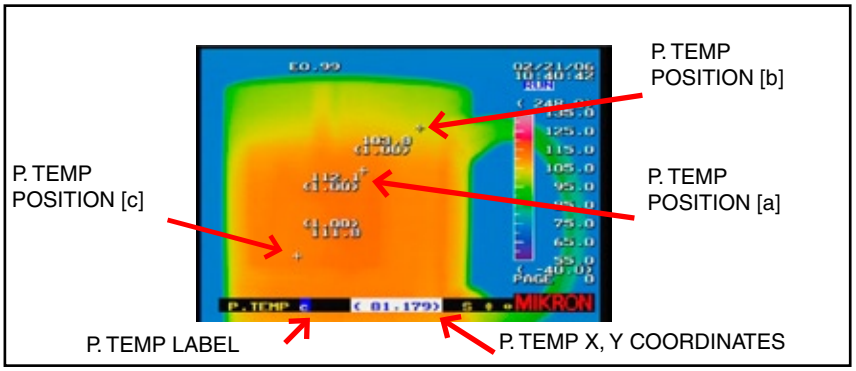
SAVE

4) Press the S [SAVE] button to select the temperature point and to highlight the [P. TEMP X, Y COORDINATES].



5) Toggle the JOYSTICK up or down as needed to move the temperature point along the vertical plane to the desired location on the image display.

6) Toggle the JOYSTICK left or right as needed to move the temperature point along the horizontal plane to the desired location on the image display.



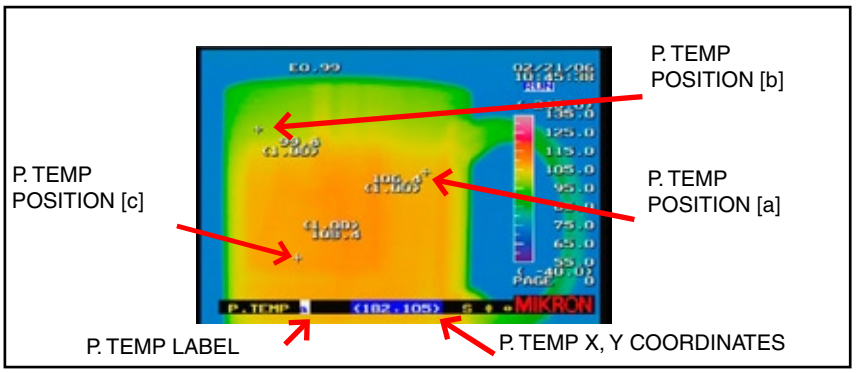
TIP

Continuing to Toggle the JOYSTICK button up, down, left, or right will allow rapid movement of the cursor.

SAVE

7) **Press the** S [SAVE] **button to save the new temperature point location and to once again highlight the** [P. TEMP LABEL]**.**

8) **Follow the previous steps 3-7 to move additional temperature points.**



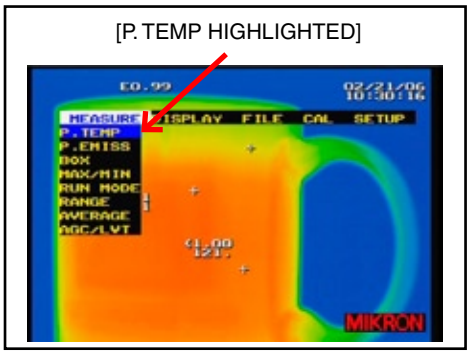
ENTER

9) **Press the** JOYSTICK [E] **button to set the new temperature point locations and return to the main display.**

Pressing JOYSTICK [E] button will lock the new temperature points to their current positions.

6.4.4 Deleting Individual Set Point Positions

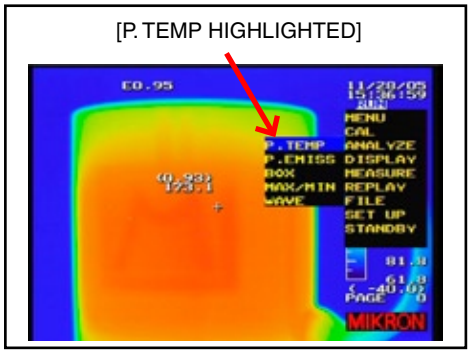
1) **If using the Standard Type Menu, go to [MENU] → [MEASURE] → [P. TEMP].**



Standard View Menu

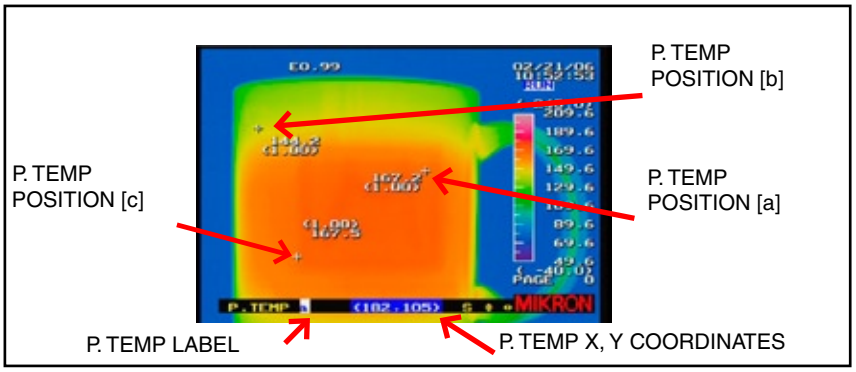
OR

If using the Classic Type Menu, go to [MENU] → [ANALYZE] → [P. TEMP].



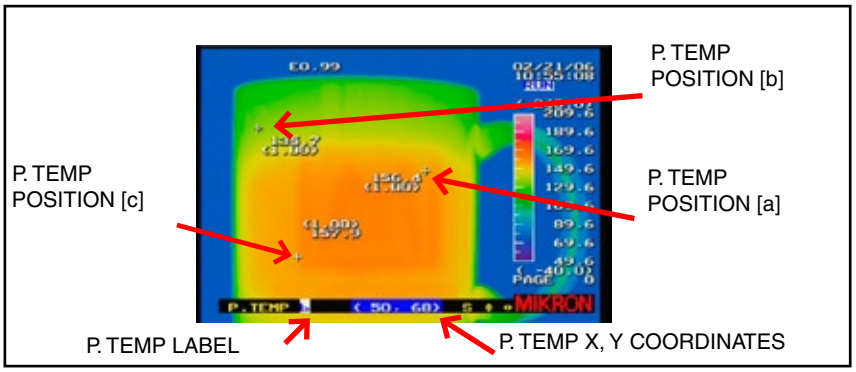
Classic View Menu

2) Press the JOYSTICK [E] **button to select the P. TEMP option.**

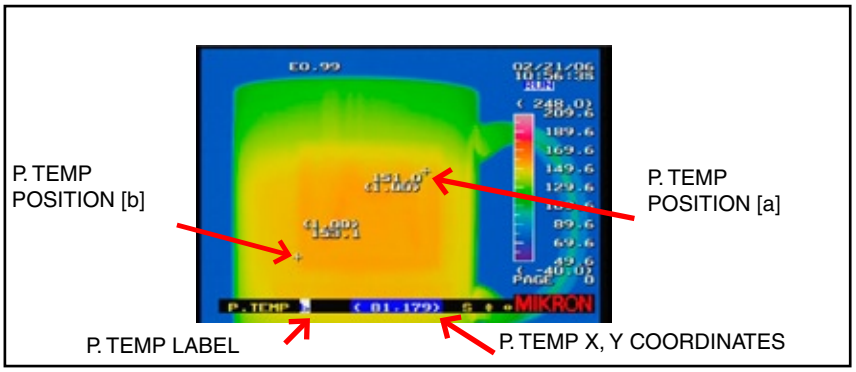


The new display will appear showing the temperature point, the temperature point label and the temperature point coordinates.

3) Toggle the JOYSTICK **up or down as needed to scroll through the highlighted temperature point labels to select the temperature point that needs to be deleted.**

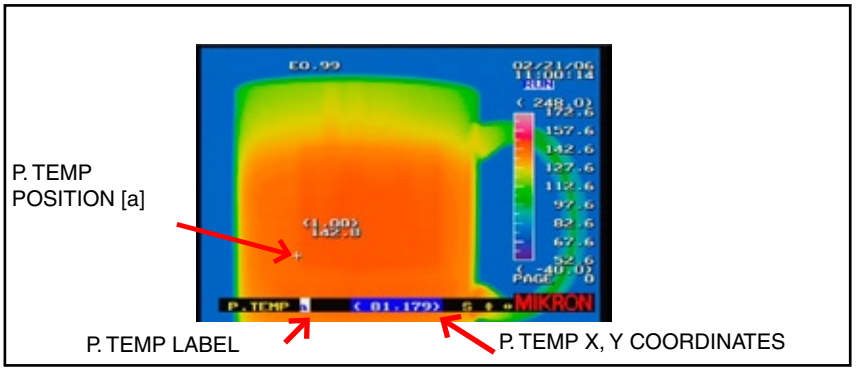


4) Press the C [CANCEL/VISIBLE] **button to delete the selected cursor point.**



When a selected cursor point has been deleted, the remaining cursor points are relabeled.

5) Follow the previous steps 3-4 to delete additional temperature points.

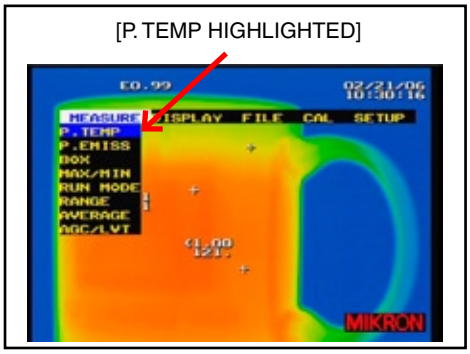


6) Press the JOYSTICK [E] **button to set the remaining temperature point location(s) and return to the main display.**

Pressing JOYSTICK [E] button will lock the new temperature points to their current positions.

6.4.5 Deleting All Set Point Positions

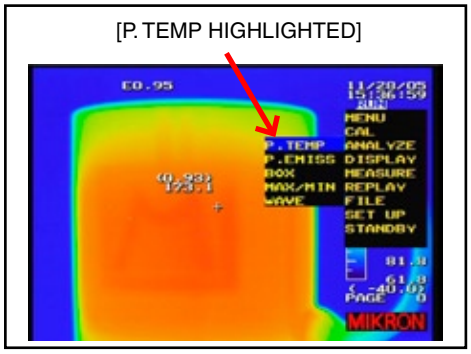
1) If using the Standard Type Menu, go to [MENU] → [MEASURE] → [P. TEMP].



Standard View Menu

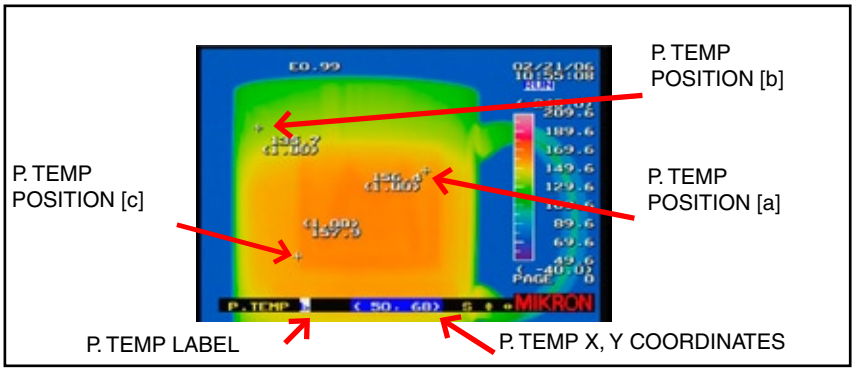
OR

If using the Classic Type Menu, go to [MENU] → [ANALYZE] → [P. TEMP].



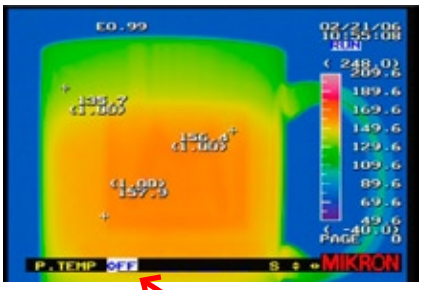
Classic View Menu

2) Press the JOYSTICK [E] **button to select the P. TEMP option.**



The new display will appear showing the temperature point, the temperature point label and the temperature point coordinates.

3) **Toggle the** JOYSTICK **down as needed to scroll through the highlighted temperature point labels to select the temperature point [OFF] option.**



4) **Press the** JOYSTICK [E] **button to return to the main display.**

Pressing JOYSTICK [E] button will clear all temperature points from the display.

6.5 Working with Emissivity Settings

Emissivity is the ratio of the infrared energy radiated from the surface of a target to the infrared energy radiated from a blackbody at the same temperature. The emissivity varies with the surface condition of the object and also with temperature variation and wavelength. If this value is not accurate, then the true temperature cannot be measured. In other words, a variation or change in emissivity will cause a change in the image results from the MikroScan 7600PRO.

The MikroScan 7600PRO allows you to manually set these emissivity values within the range of 0.10 to 1.00 in increments of 0.01. It also provides an option to choose the appropriate value from an on-board emissivity table.

6.5.1 Setting the Display Emissivity Using a Numerical Value (Run Mode)

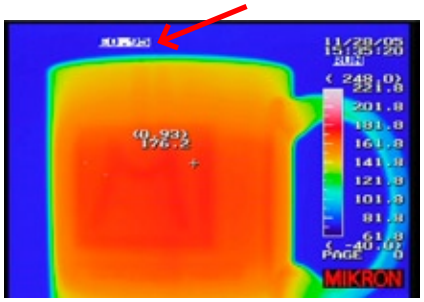
6.5.1.1 Using the Standard Type Menu

1) **Verify the camera is operating in** [RUN] **mode. (See Section 4.1 of this manual for more information on Toggling between the Run and Freeze Modes)**

2) **Press and hold the** JOYSTICK [E] **button to gain access to the MikroScan 7600PRO quick menu functions.**

3) **Press the** JOYSTICK [E] **button again until the emissivity setting becomes highlighted on the display.**

[EMISSIVITY VALUE HIGHLIGHTED]



4) **Toggle the** JOYSTICK **button up or down to increase or decrease the emissivity value of the display.**

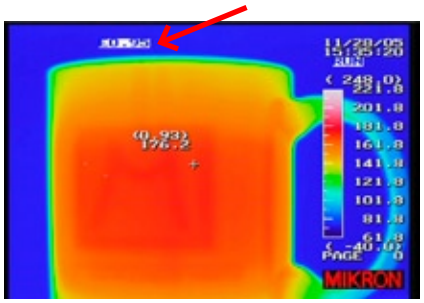
5) **Press the** JOYSTICK [E] **button set the new emissivity value and return to main display.**

6.5.1.2 Using the Classic Type Menu

1) **Press the** JOYSTICK [E] **button to activate the display functions.**

2) **Toggle the** JOYSTICK **left or right as needed until the emissivity setting becomes highlighted on the display.**

[EMISSIVITY VALUE HIGHLIGHTED]



3) **Toggle the** JOYSTICK **button up or down to increase or decrease the emissivity value of the display.**

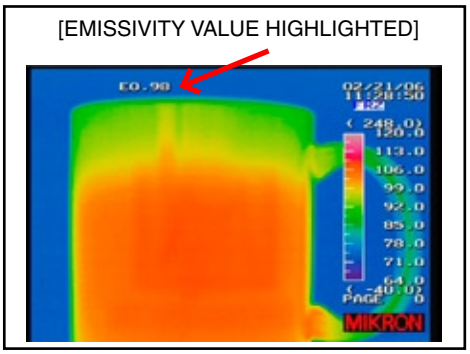
4) **Press the** JOYSTICK [E] **button set the new emissivity value and return to main display.**

6.5.2 Setting the Display Emissivity and Ambient Temperature Using a Numerical Value (Freeze Mode)

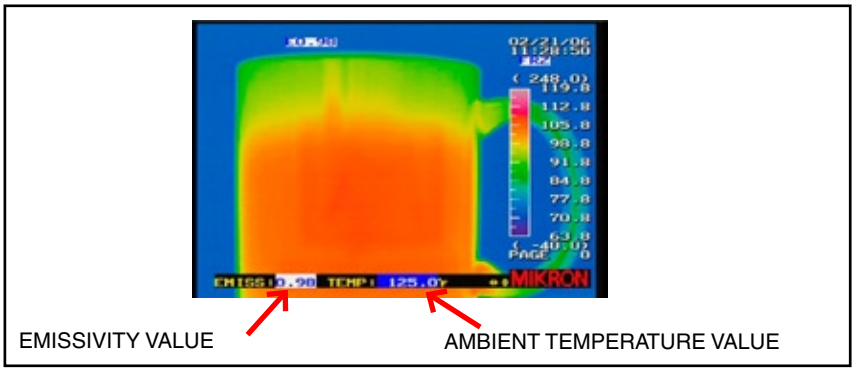
6.5.2.1 Using the Standard Type Menu

1) **Verify the camera is operating in** [FREEZE] **mode. (See Section 4.1 of this manual for more information on Toggling between the Run and Freeze Modes)**

2) **Press and hold the** JOYSTICK [E] **button to gain access to the MikroScan 7600PRO quick menu functions and highlight the emissivity setting at the top of the display.**

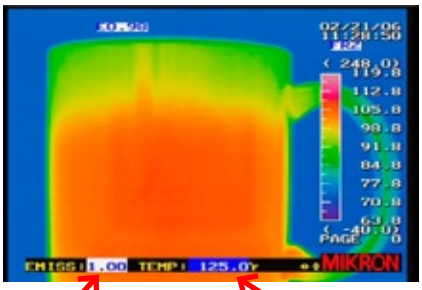


3) **Toggle the** JOYSTICK **button up or down to activate the emissivity correction option.**

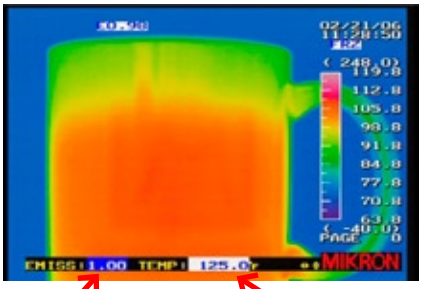


A bar will appear at the bottom of the screen allowing you to change the emissivity value and/or ambient temperature value.

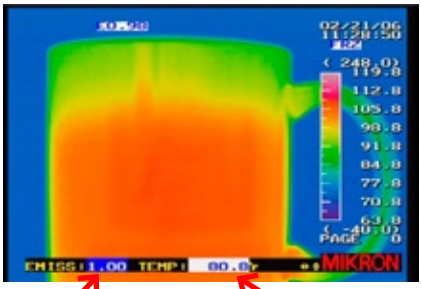
4) Toggle the JOYSTICK button up or down to increase or decrease the emissivity value of the display.



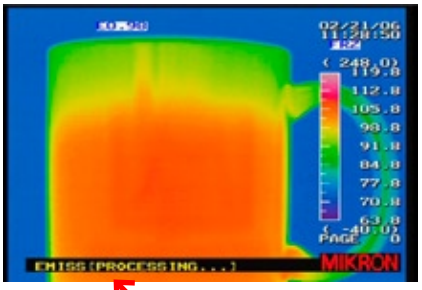
5) Toggle the JOYSTICK left or right if needed to highlight the atmospheric temperature value.



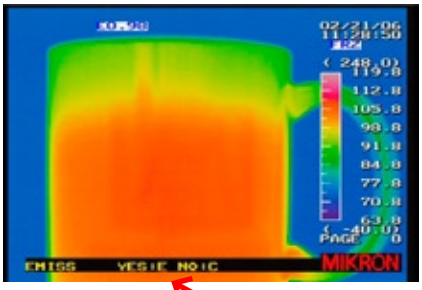
6) Toggle the JOYSTICK button up or down to increase or decrease the atmospheric temperature value.



7) Press the JOYSTICK [E] **button process the new emissivity value and/or atmospheric temperature value.**



An Emissivity Processing message will appear at the bottom of the screen while the values are being processed. Once the values have been processed, another message bar will appear at the bottom of the screen asking if you would like to accept or cancel the change in values.



8) Press the JOYSTICK [E] **button to save the setting(s) and to return to the main display.**

OR

Press the CANCEL/VISIBLE [C] **button to cancel the change and return to the emissivity correction screen.**

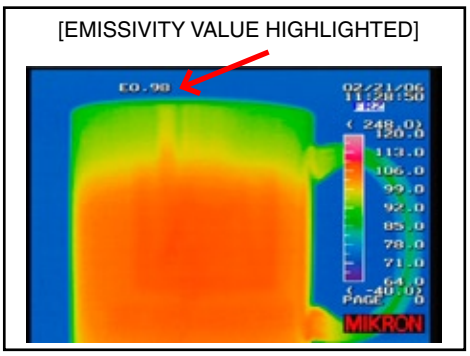
9) Press the R **[RUN/FRZ] key button to place the camera back into Run Mode.**

6.5.2.2 Using the Classic Type Menu

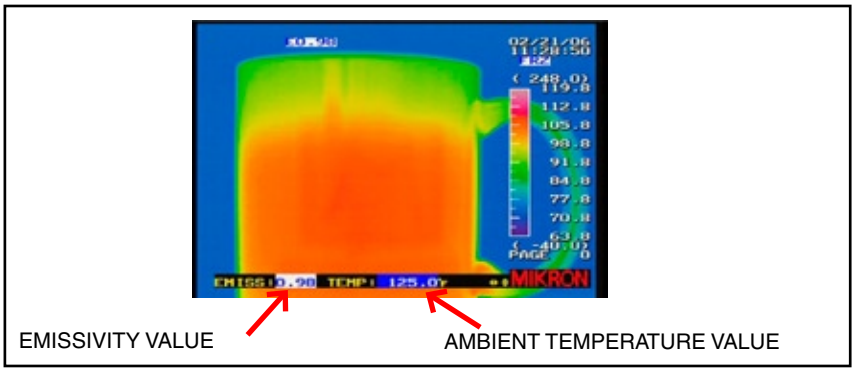
1) **Verify the camera is operating in** [FREEZE] **mode. (See Section 4.1 of this manual for more information on Toggling between the Run and Freeze Modes)**

2) **Press the** JOYSTICK [E] **button to activate the display functions.**

3) **Toggle the** JOYSTICK **left or right as needed until the emissivity setting becomes highlighted on the display.**

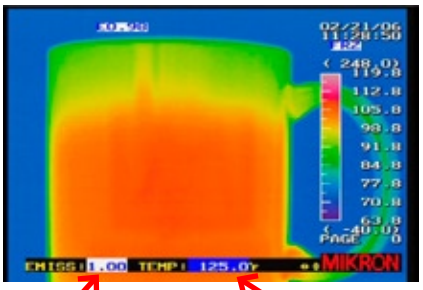


4) **Toggle the** JOYSTICK **button up or down to activate the emissivity correction option.**

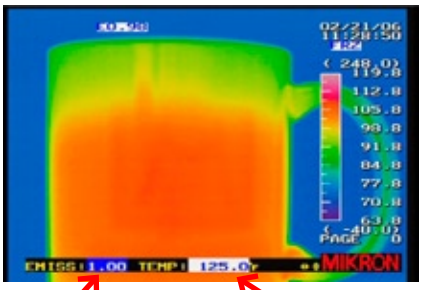


A bar will appear at the bottom of the screen allowing you to change the emissivity value and/or ambient temperature value.

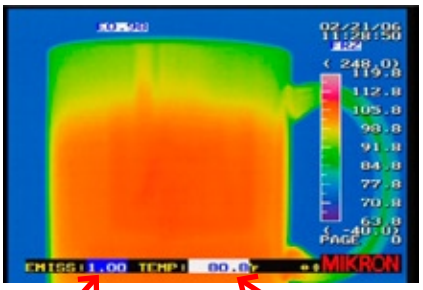
5) Toggle the JOYSTICK button up or down to increase or decrease the emissivity value of the display.



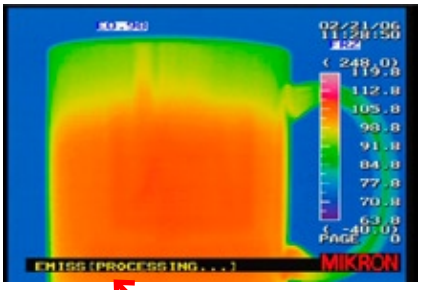
6) Toggle the JOYSTICK left or right if needed to highlight the atmospheric temperature value.



7) Toggle the JOYSTICK button up or down to increase or decrease the atmospheric temperature value.

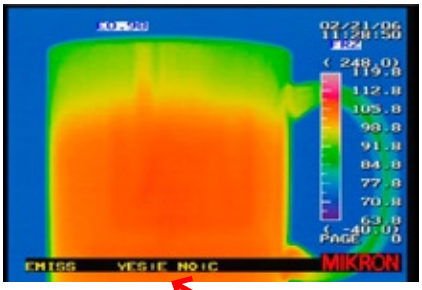


8) Press the JOYSTICK [E] **button process the new emissivity value and/or atmospheric temperature value.**



EMISSIVITY PROCESSING MESSAGE

An Emissivity Processing message will appear at the bottom of the screen while the values are being processed. Once the values have been processed, another message bar will appear at the bottom of the screen asking if you would like to accept or cancel the change in values.



EMISSIVITY CHANGE MESSAGE

9) Press the JOYSTICK [E] **button to save the setting(s) and to return to the main display.**

OR

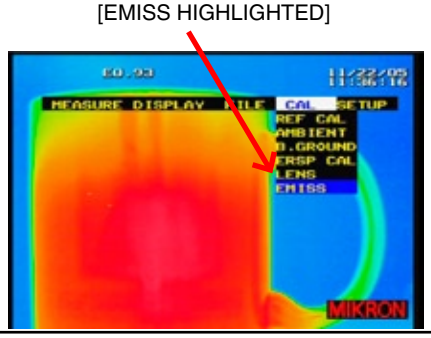
Press the CANCEL/VISIBLE [C] **button to cancel the change and return to the emissivity correction screen.**

10) Press the R **[RUN/FRZ] key button to place the camera back into Run Mode.**

6.5.3 Setting the Display Emissivity Using the On-Board Emissivity Tables

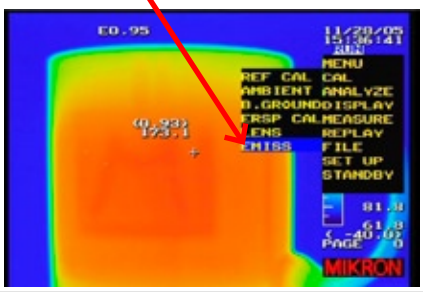
1) **Verify the camera is operating in [RUN] mode.**
2) **Go to [MENU] → [CAL] → [EMISS].**

[EMISS HIGHLIGHTED]



Standard View Menu

[EMISS HIGHLIGHTED]



Classic View Menu

3) **Press the** JOYSTICK [E] **button to gain access to the EMISS TABLE Display.**

[EMISS TABLE DISPLAY]

4) **Toggle the** JOYSTICK **up or down, if needed, to highlight the applicable material from the list of menu choices.**

[MATERIAL HIGHLIGHTED]

NOTE

The emissivity tables on-board this camera are taken from "Infrared Radiation, a Handbook for Applications "by Mikael A. Bramson (p.535-536, Plenum 1968)

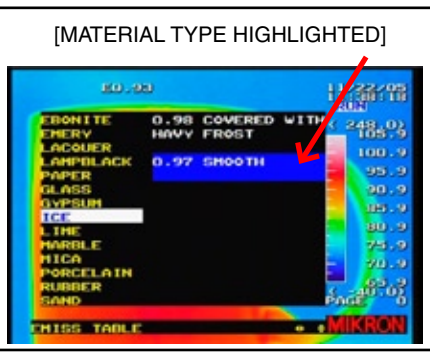
An additional reference to this table can be found in Section 8 of this manual.

5) Toggle the JOYSTICK **to the right to highlight the material types.**

[MATERIAL TYPE HIGHLIGHTED]

6) Toggle the JOYSTICK **up or down, if needed, to select the desired material type from the list of menu choices.**

[MATERIAL TYPE HIGHLIGHTED]



7) Press the JOYSTICK [E] **button to save the setting and to return to the main display.**

OR

Press the CANCEL/VISIBLE [C] **button to cancel out of the EMISS TABLE function.**

6.5.4 Working with Point Emissivities

In addition to viewing point temperature data, the MikroScan 7600PRO also allows you to establish individual emissivity values for one or more points and to obtain information on how the temperatures of the various points are affected by differences in emissivity settings. These emissivity options can be used in either the RUN or FREEZE modes.

6.5.4.1 Setting the Display to Show Emissivity Effects on Various Points

1) **Follow steps 1-5 for Setting the Multipoint Display Mode (See Section 3.9.3.1).**

   The point mode options are:
   - TEMP (DEFAULT)
   - TEMP & EMISS
   - ΔTEMP
   - ΔTEMP & EMISS

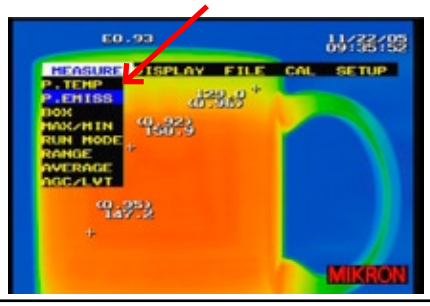
2) **In step 5, select either** [TEMP & EMISS] **mode or** [ΔTEMP & EMISS] **mode.**

[POINT MODE OPTION HIGHLIGHTED]

3) **Press the** JOYSTICK [E] **button to lock the setting and to return to the main display.**

4) **If using the Standard Type Menu, go to [MENU] → [MEASURE] → [P. EMISS].**

[P. EMISS HIGHLIGHTED]

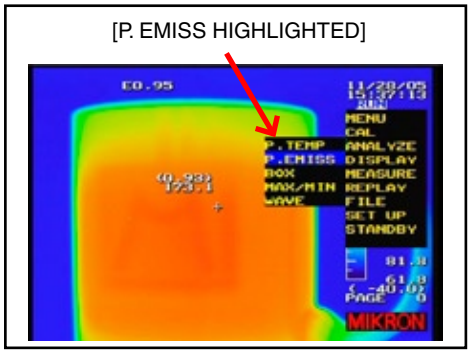


Standard View Menu

OR

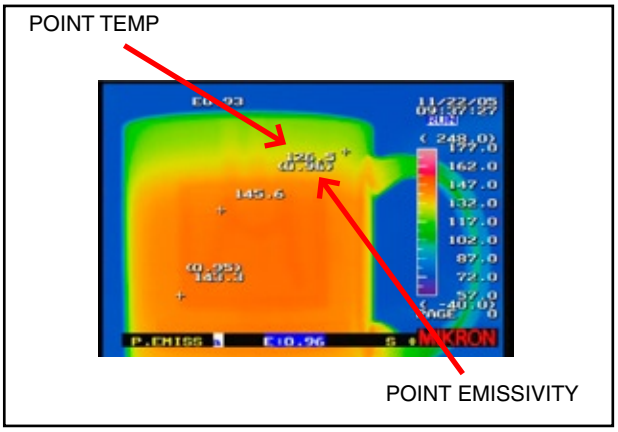
> **NOTE**
>
> **[TEMP]**
>
> Displays the temperature of the points under the color bar. Does not, however, allow emissivity settings to be changed or displayed.
>
> **[TEMP & EMISS]**
>
> Displays the temperature and emissivity of each point near the point cursor. Also allows emissivity of each point to be set individually.
>
> **[ΔTEMP]**
>
> Displays the specified point temperature under the color bar. Also displays the temperature difference ΔT between point A and point B. However, this mode does not allow the emissivity to be corrected on an individual basis.
>
> **[ΔTEMP & EMISS]**
>
> Displays the specified point temperature under the color bar and displays the emissivity setting of the point near the point cursor. Also displays the temperature difference ΔT between point A and point B. However, the emissivity is displayed only when the emissivity of the point is different from the emissivity of the whole screen.

If using the Classic Type Menu, go to [MENU] → [ANALYZE] → [P. EMISS].



Classic View Menu

5) Press the JOYSTICK [E] **button to select the P. EMISS option.**



The new display will appear showing the cursor points, the point temps and the point emissivity values.

NOTE

[TEMP & EMISS]

Displays the temperature and emissivity of each point near the point cursor. Also allows emissivity of each point to be set individually.

[ΔTEMP & EMISS]

Displays the specified point temperature under the color bar and displays the emissivity setting of the point near the point cursor. Also displays the temperature difference ΔT between point A and point B. However, the emissivity is displayed only when the emissivity of the point is different from the emissivity of the whole screen.

NOTE

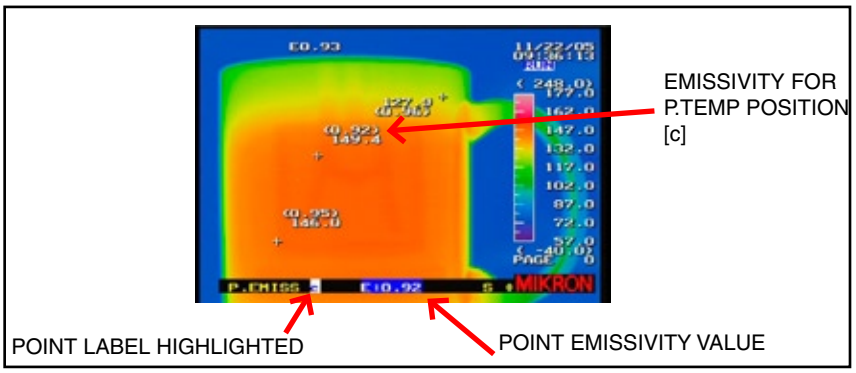
When an emissivity value has been set for a cursor point, that emissivity value stays with the designated point until it is changed. Deleting Emissivity values will have no affect on new cursor points. In other words, when a new cursor point is created, make sure that it has not taken on an old emissivity value.

Emissivity Values of points do not automatically default back to E1.00.

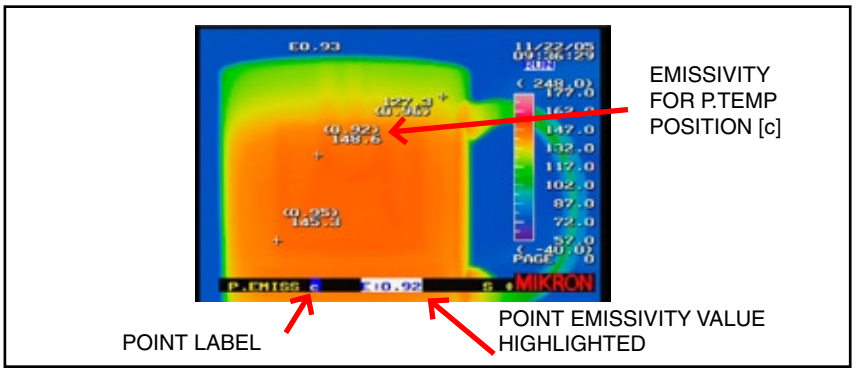
6.5.4.2 Setting Emissivity Values for One or More Points

1) Follow steps 1-5 for Setting the Display to Show Emissivity Effects on Various Points (See Section 6.5.4.1).

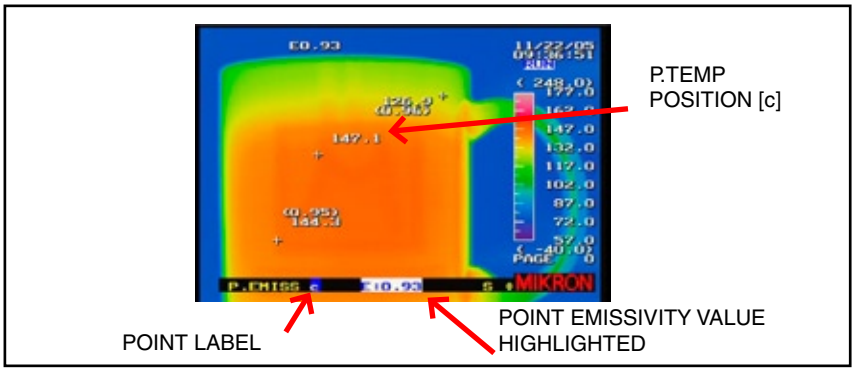
2) Toggle the JOYSTICK up or down as needed to scroll through the highlighted cursor point labels to select the cursor point that needs modification.



3) Press the S [SAVE] button to highlight the [EMISSIVITY VALUE] of the cursor point.

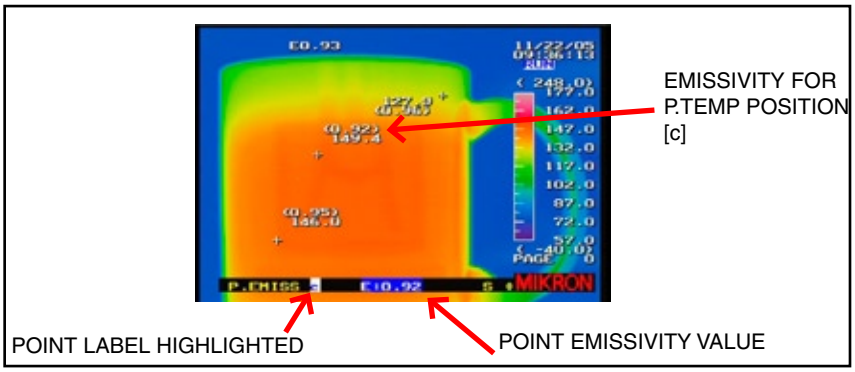


4) Toggle the JOYSTICK up or down as needed to increase or decrease the emissivity value of the selected cursor point.



SAVE

5) **Press the** S [SAVE] **button to set the emissivity value and to once again highlight the** [P. EMISS LABEL]**.**



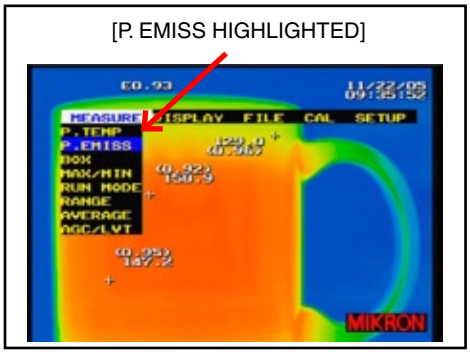
6) **Repeat steps 3-5 to change additional cursor point emissivity values.**

ENTER

7) **Press the** JOYSTICK [E] **button to lock the settings and to return to the main display.**

6.5.4.3 Deleting Individual Emissivity Values

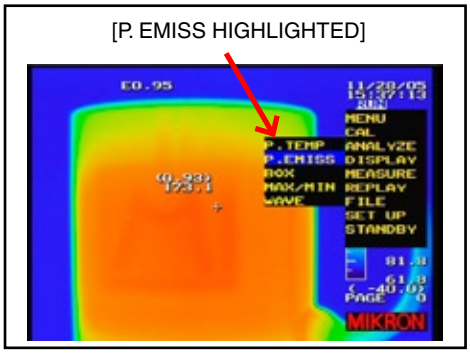
1) **If using the Standard Type Menu, go to [MENU] → [MEASURE] → [P. EMISS].**



Standard View Menu

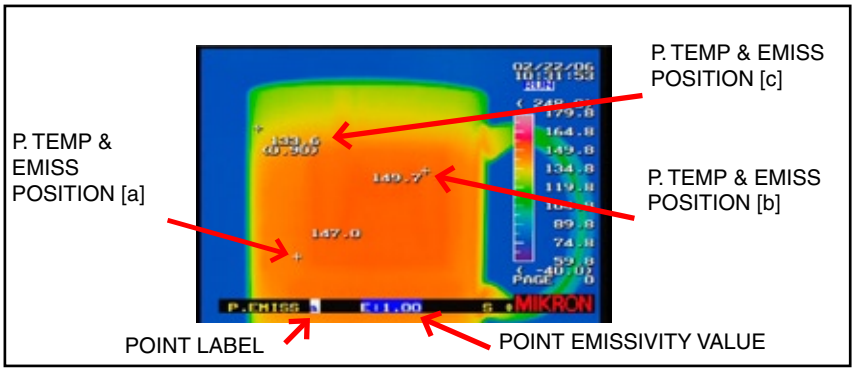
OR

If using the Classic Type Menu, go to [MENU] → [ANALYZE] → [P. EMISS].



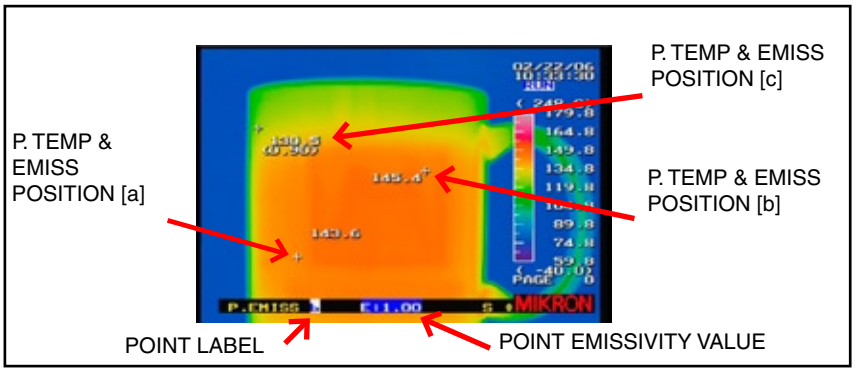
Classic View Menu

2) Press the JOYSTICK [E] **button to select the P. EMISS option.**



The new display will appear showing the points, the point temps and the point emissivity values.

3) Toggle the JOYSTICK **up or down as needed to scroll through the highlighted cursor point labels to select the cursor point that needs to be deleted.**

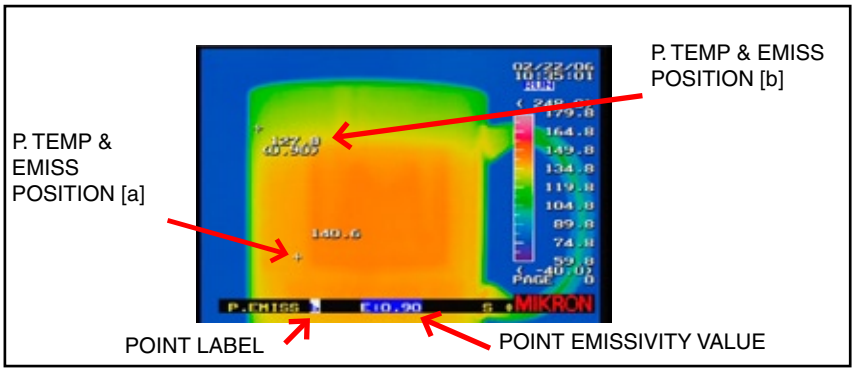


NOTE

When an emissivity value has been set for a cursor point, that emissivity value stays with the designated point until it is changed. Deleting Emissivity values will have no affect on new cursor points. In other words, when a new cursor point is created, make sure that it has not taken on an old emissivity value.

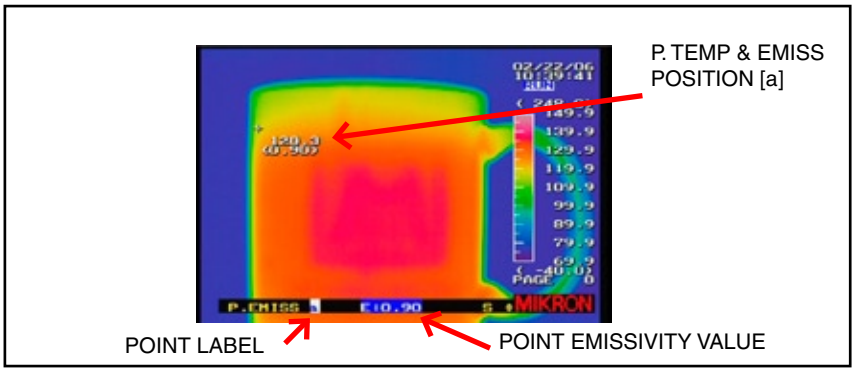
Emissivity Values of points do not automatically default back to E1.00.

4) Press the C [CANCEL/VISIBLE] **button to delete the selected cursor point.**



When a selected cursor point has been deleted, the remaining cursor points are relabeled.

5) Follow the previous steps 3-4 to delete additional cursor points.

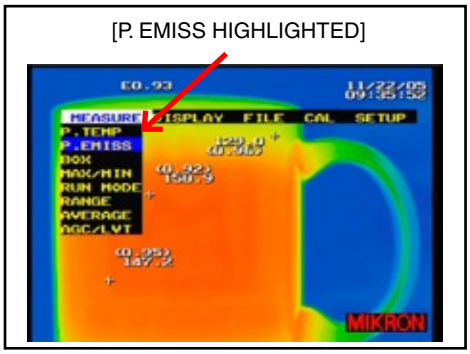


6) Press the JOYSTICK [E] **button to set the remaining cursor point location(s) and return to the main display.**

Pressing JOYSTICK [E] button will lock the new cursor points to their current positions.

6.5.4.4 Deleting All Set Emissivity Values

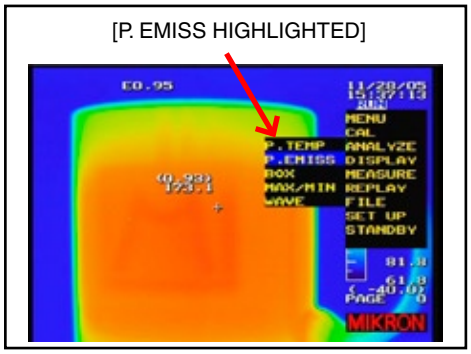
1) If using the Standard Type Menu, go to [MENU] → [MEASURE] → [P. EMISS].



Standard View Menu

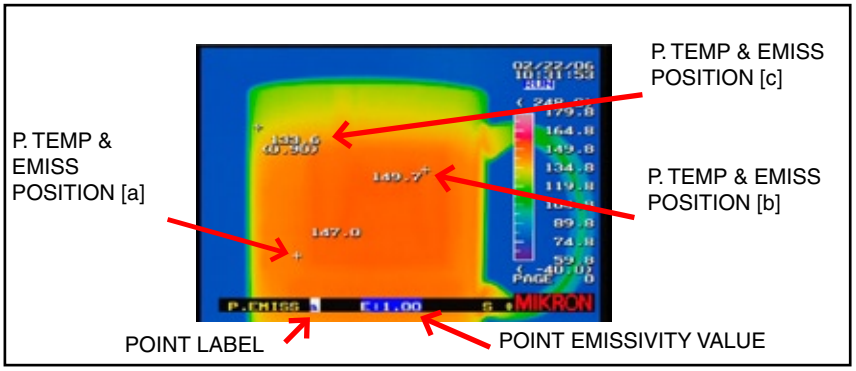
OR

If using the Classic Type Menu, go to [MENU] → [ANALYZE] → [P. EMISS].



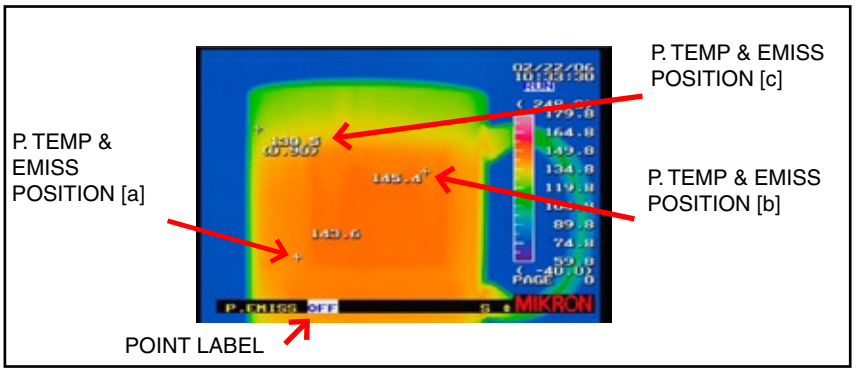
Classic View Menu

2) Press the JOYSTICK [E] **button to select the P. EMISS option.**



The new display will appear showing the cursor points, the point temps and the point emissivity values.

3) **Toggle the** JOYSTICK **down as needed to scroll through the highlighted cursor point labels to select** [OFF].



4) **Press the** JOYSTICK [E] **button to lock the setting and to return to the main display.**

Pressing the JOYSTICK [E] button will clear all cursor points from the display.

6.6 Working with Boxes

By using the Box function, it is possible to determine the maximum, minimum, and average temperatures within a defined region of interest in the field of view. The Box function displays a single box and can be used in either the RUN or FREEZE modes.

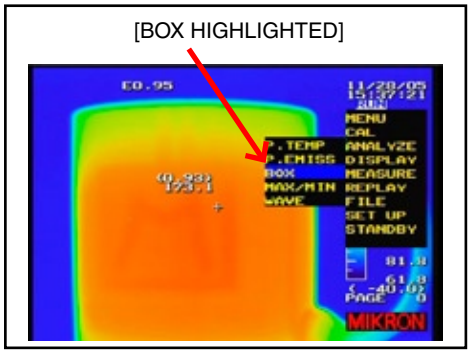
6.6.1 Adding a Box

1) **If using the Standard Type Menu, go to [MENU] → [MEASURE] → [BOX].**

Standard View Menu

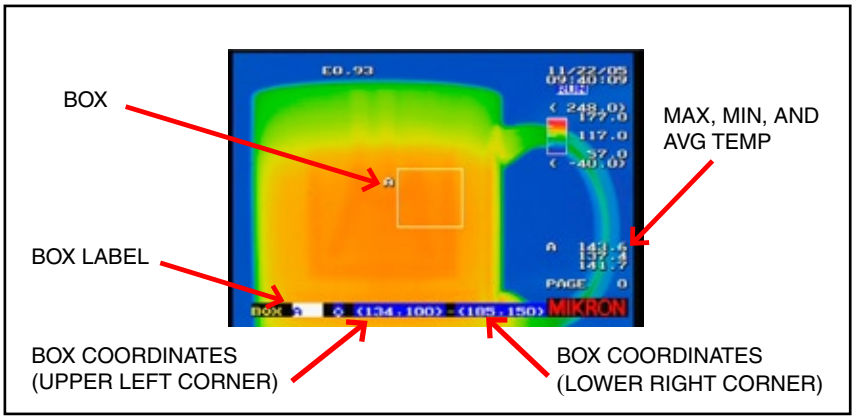
OR

If using the Classic Type Menu, go to [MENU] → [ANALYZE] → [BOX].



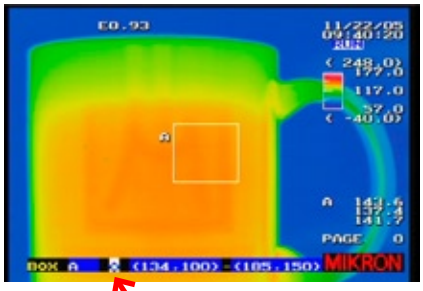
Classic View Menu

2) Press the JOYSTICK [E] **button to select the BOX option.**



The new display will appear showing the box, the box label, the start point box coordinates for the upper left corner of the box, and the start point box coordinates for the lower right corner of the box. If the [TEMP ON] option was selected, the display will also show the maximum, minimum, and average temperature of the area defined by the box. See Section 3.9.3.2 for more information on Activating/Deactivating the Box Temperature Option.

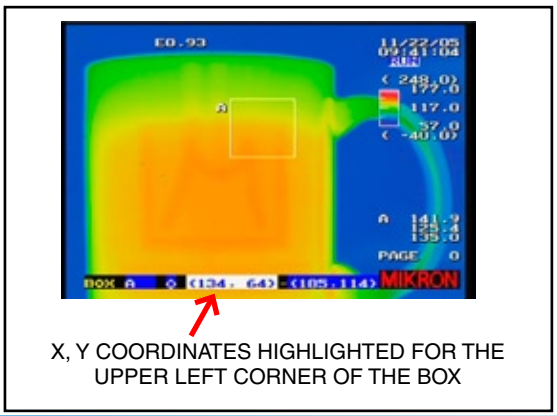
3) Press the SAVE button to set the box and highlight the Box Move Label [◊].



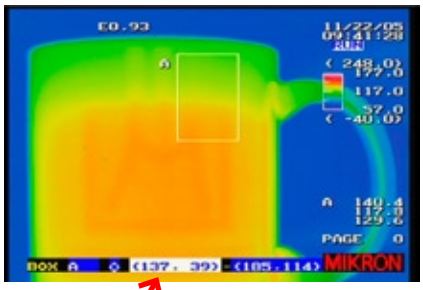
4) Toggle the JOYSTICK up or down as needed to move the box along the vertical plane to the desired location point on the image display.

5) Toggle the JOYSTICK left or right as needed to move the box along the horizontal plane to the desired location point on the image display.

6) Press the SAVE button to set the box and highlight the first set of X, Y Coordinates for the Box.

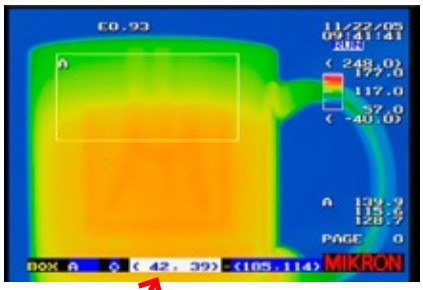


7) Toggle the JOYSTICK up or down as needed to move the designated corner along the vertical plane to the desired location point on the image display.



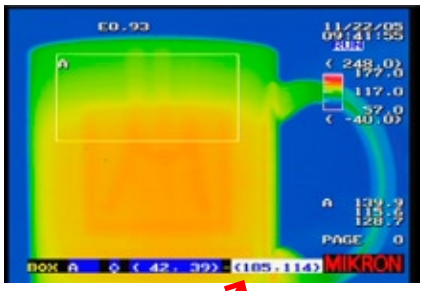
X, Y COORDINATES HIGHLIGHTED FOR THE UPPER LEFT CORNER OF THE BOX

8) Toggle the JOYSTICK left or right as needed to move the designated corner along the horizontal plane to the desired location point on the image display.



X, Y COORDINATES HIGHLIGHTED FOR THE UPPER LEFT CORNER OF THE BOX

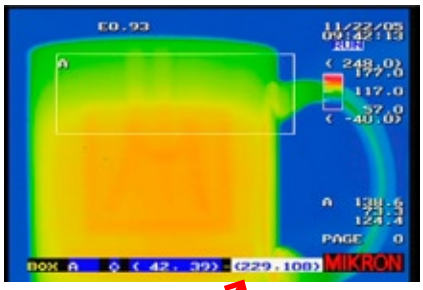
9) Press the SAVE button to set the first set of coordinates and highlight the second set of X, Y Coordinates for the Box.



X, Y COORDINATES HIGHLIGHTED FOR THE LOWER RIGHT CORNER OF THE BOX

> **NOTE**
>
> The max, min, and average temperatures of the region inside the box are displayed at the bottom of the temperature scale, immediately above the MIKRON logo, and are updated continuously as the box is moved. The box coordinates are also displayed and updated continuously as the box is moved.

10) Toggle the JOYSTICK **up or down as needed to move the designated corner along the vertical plane to the desired location point on the image display.**



X, Y COORDINATES HIGHLIGHTED FOR THE LOWER RIGHT CORNER OF THE BOX

11) Toggle the JOYSTICK **left or right as needed to move the designated corner along the horizontal plane to the desired location point on the image display.**

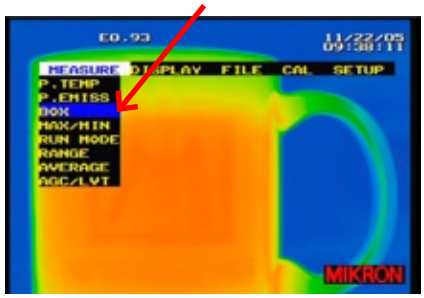
12) Press the JOYSTICK [E] **button to lock the box to its current position and return to the main display.**

Pressing the **JOYSTICK [E]** button will lock the revised box to its current position. If the [TEMP ON] option was selected, the display will also show the maximum, minimum, and average temperature of the area defined by the box. See Section 3.9.3.2 for more information on Activating/Deactivating the Box Temperature Option.

6.6.2 Adding Multiple Boxes

1) If using the Standard Type Menu, go to [MENU] → [MEASURE] → [BOX].

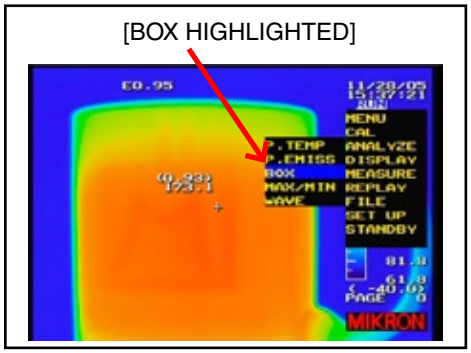
[BOX HIGHLIGHTED]



Standard View Menu

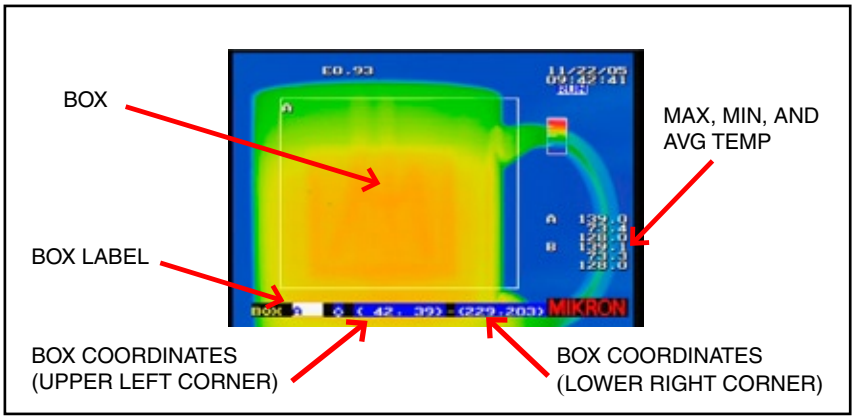
OR

If using the Classic Type Menu, go to [MENU] → [ANALYZE] → [BOX].



Classic View Menu

2) Press the JOYSTICK [E] **button to select the BOX option.**

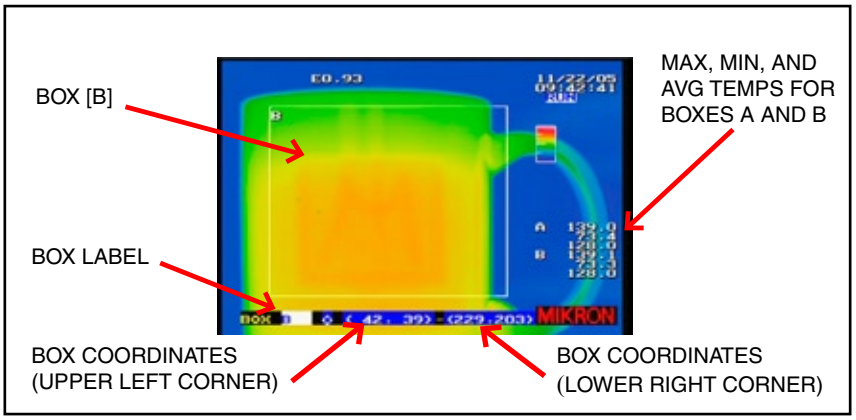


The new display will appear showing the box, the box label, the start point box coordinates for the upper left corner of the box, and the start point box coordinates for the lower right corner of the box. If the [TEMP ON] option was selected, the display will also show the maximum, minimum, and average temperature of the area defined by the box. See Section 3.9.3.2 for more information on Activating/Deactivating the Box Temperature Option.

NOTE

The max, min, and average temperatures of the region inside the box are displayed at the bottom of the temperature scale, immediately above the MIKRON logo, and are updated continuously as the box is moved. The box coordinates are also displayed and updated continuously as the box is moved.

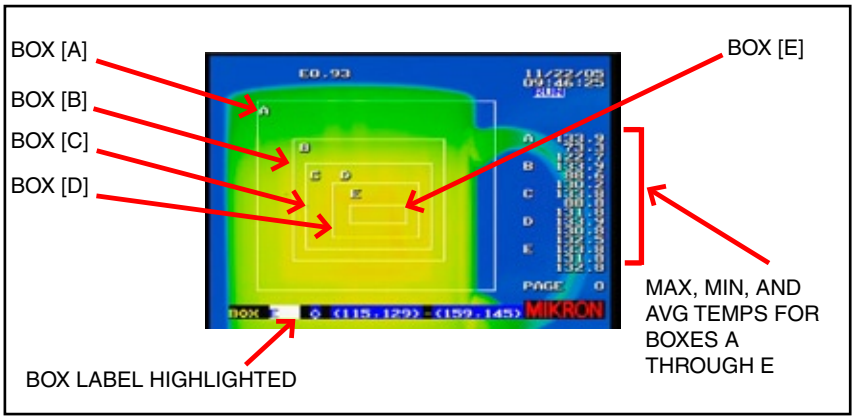
3) Toggle the JOYSTICK button up to add an additional box to the display.



The new box, which is labeled [B] is placed (by default) on top of the first box which was labeled [A].

4) Follow steps 3-11 of Section 6.6.1 entitled Adding a Box to change the size and location of the box.

5) Follow the previous steps 4 and 5 to add and place additional boxes.



The first box was labeled [A]. The second box was labeled [B]. Successive boxes will be labeled [C] through [E] respectively.

6) Press the JOYSTICK [E] button to return to the main display.

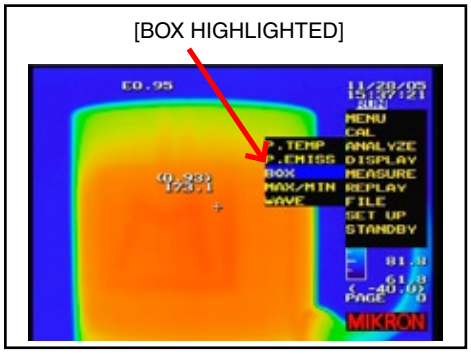
6.6.3 Deleting a Box

1) If using the Standard Type Menu, go to [MENU] → [MEASURE] → [BOX].

Standard View Menu

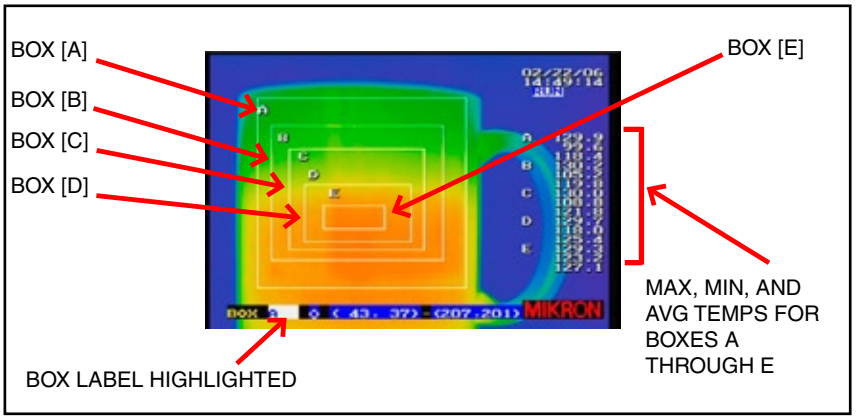
OR

If using the Classic Type Menu, go to [MENU] → [ANALYZE] → [BOX].

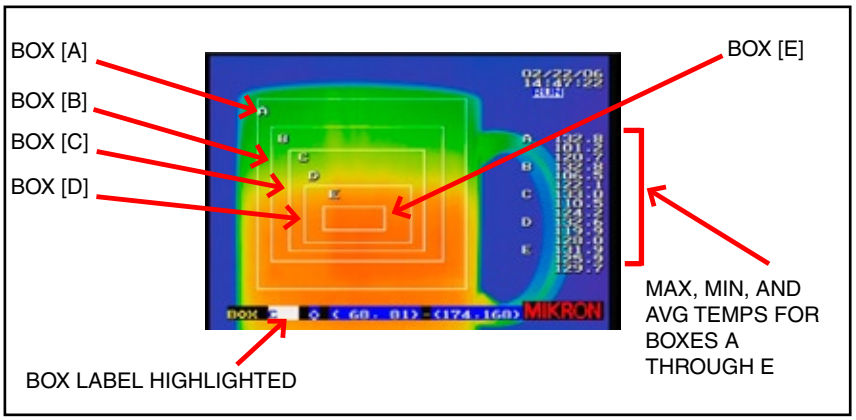


Classic View Menu

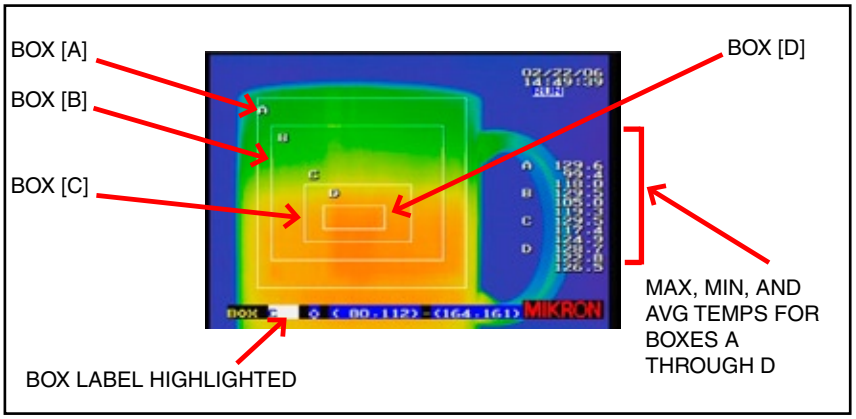
2) Press the JOYSTICK [E] **button to select the BOX option.**



3) Toggle the JOYSTICK **up or down as needed to select the desired box label.**

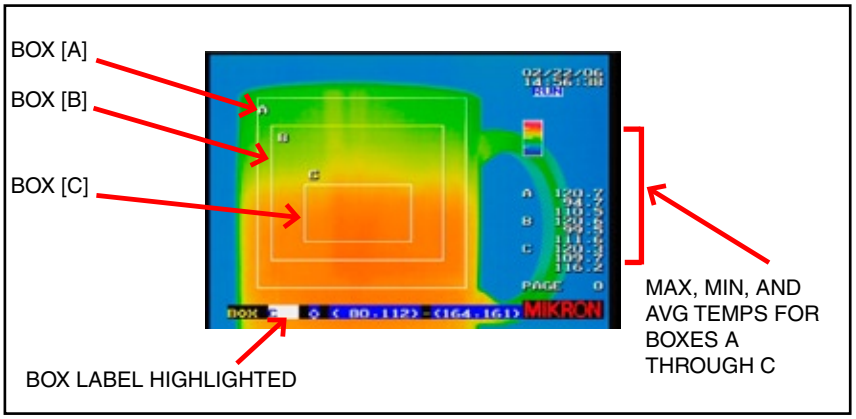


4) Press the C [CANCEL/VISIBLE] **button to delete the selected box.**



When a selected box has been deleted, the remaining boxes are relabeled.

5) Follow the previous steps 3-4 to delete additional boxes.



6) Press the JOYSTICK [E] **button to return to the main display.**

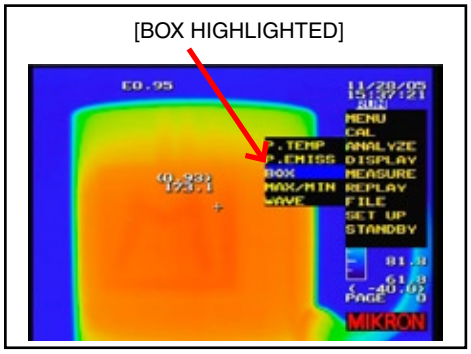
6.6.4 Deleting all Boxes

1) If using the Standard Type Menu, go to [MENU] → [MEASURE] → [BOX].

Standard View Menu

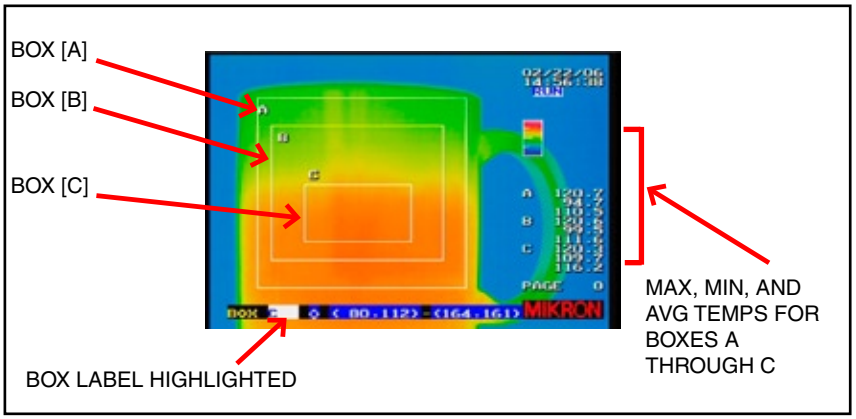
OR

If using the Classic Type Menu, go to [MENU] → [ANALYZE] → [BOX].

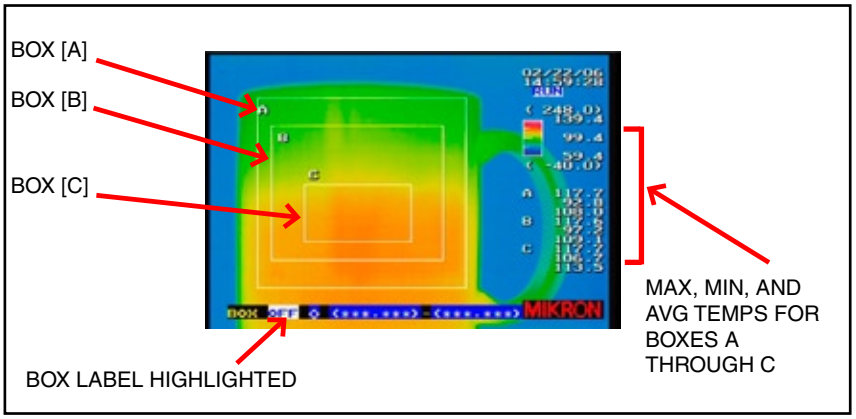


Classic View Menu

2) Press the JOYSTICK [E] **button to select the BOX option.**



3) **Toggle the** JOYSTICK **down to scroll through the highlighted box labels to select the box [OFF] option .**



4) **Press the** JOYSTICK [E] **button to return to the main display.**

6.7 Working with the Max/Min Temperature Display

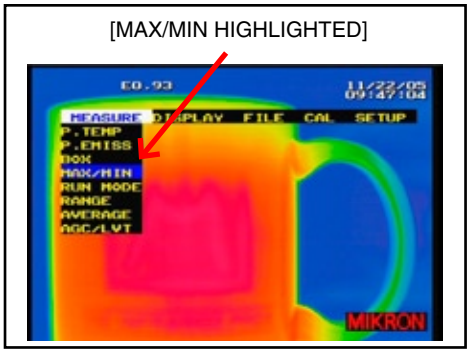
The MikroScan 7600PRO allows you to detect and display the locations of the Maximum and Minimum temperatures on a thermal image for the whole display or for a defined box. The Max/Min Temperature Display Options can be used in either the RUN or FREEZE modes.

The Max/Min Temperature Display offers five mode choices:

Mode	Details
[OFF]	Deactivates the maximum/minimum temperature display.
[MAX]	Displays the maximum temperature value of the thermal image and tracks it with the cursor.
[MIN]	Displays the minimum temperature value of the thermal image and tracks it with the cursor.
[MAX HOLD]	Displays the maximum temperature value of the thermal image and holds its value.
[MIN HOLD]	Displays the minimum temperature value of the thermal image and holds its value.

6.7.1 Selecting the Max/Min Temperature Option—Whole Display

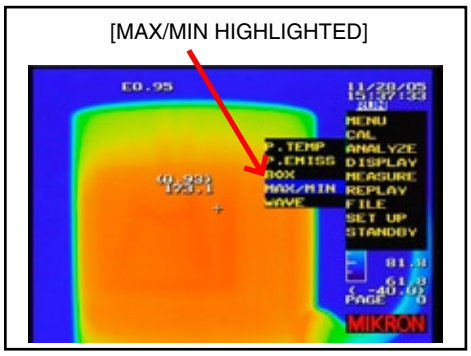
1) If using the Standard Type Menu, go to [MENU] → [MEASURE] → [MAX/MIN].



Standard View Menu

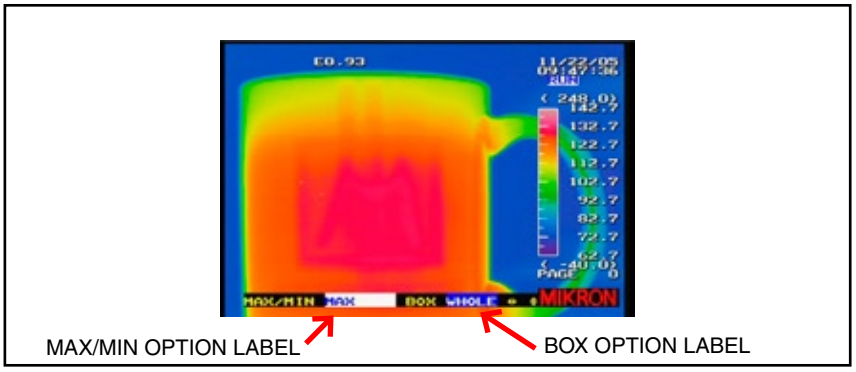
OR

If using the Classic Type Menu, go to [MENU] → [ANALYZE] → [MAX/MIN].



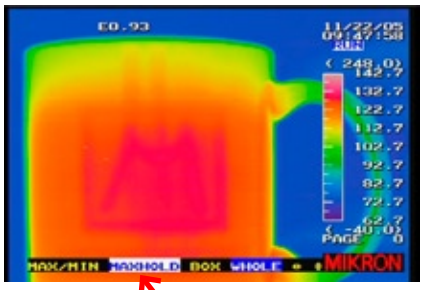
Classic View Menu

2) Press the JOYSTICK [E] **button to select the MAX/MIN TEMP option.**



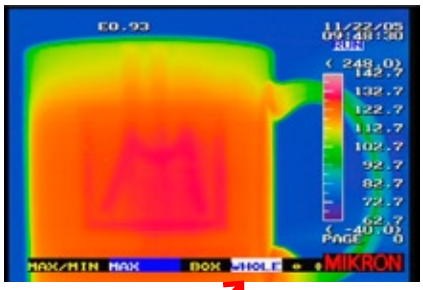
The new display will appear showing the MAX/MIN OPTION LABEL as well as the MAX/MIN BOX OPTION LABEL.

3) Toggle the JOYSTICK **up or down as needed to select** [OFF], [MAX], [MIN], [MAX HOLD], **or** [MIN HOLD], **from the highlighted options.**



MAX/MIN OPTION LABEL SELECTED

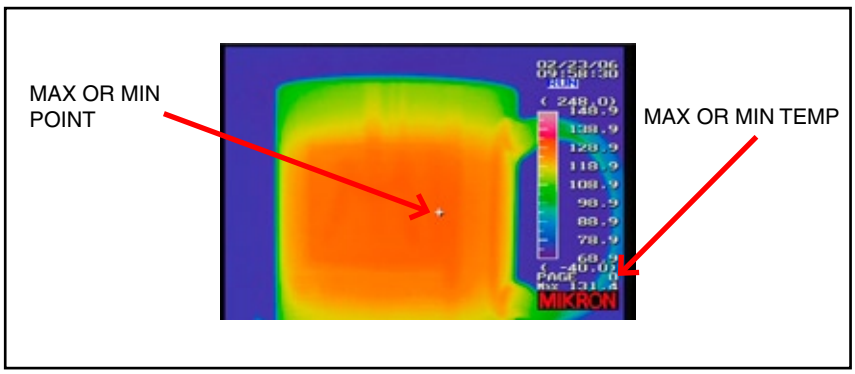
4) Toggle the JOYSTICK **to the right to highlight the box option label.**



MAX/MIN BOX OPTION LABEL SELECTED

5) Toggle the JOYSTICK **up or down as needed to select [WHOLE] from the highlighted box option labels.**

6) Press the JOYSTICK [E] **button to return to the main display.**



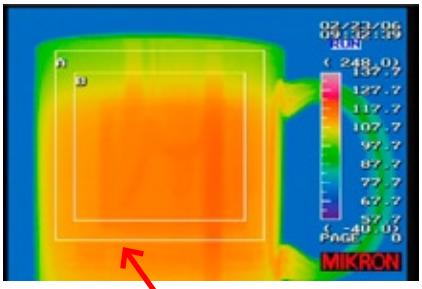
The new display will appear showing the MAX or MIN temperature point of the entire display along with the MAX or MIN temperature at the cursor point.

NOTE

The max, min, and average temperatures of the region inside the box are displayed at the bottom of the temperature scale, immediately above the MIKRON logo, and are updated continuously as the box is moved. The box coordinates are also displayed and updated continuously as the box is moved.

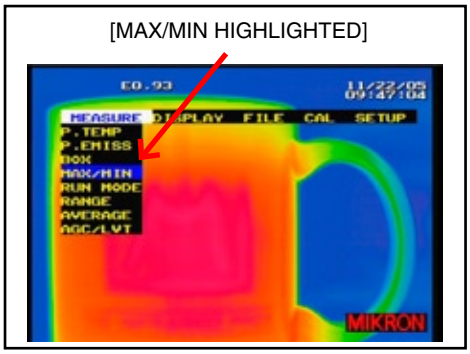
6.7.2 Setting the Max/Min Temperature Option—Defined Box

1) Create one or more boxed regions of interest on the display.



Refer to Section 6.5 entitled **Working with Boxes** for more information on creating and modifying a defined box.

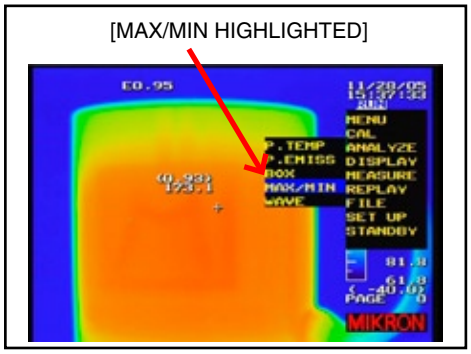
2) If using the Standard Type Menu, go to [MENU] → [MEASURE] → [MAX/MIN].



Standard View Menu

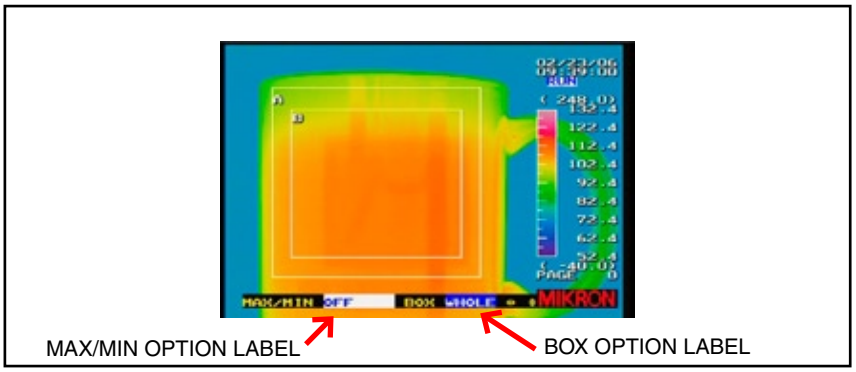
OR

If using the Classic Type Menu, go to [MENU] → [ANALYZE] → [MAX/MIN].



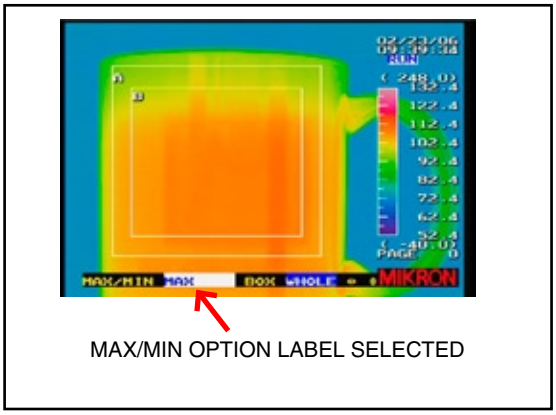
Classic View Menu

3) Press the JOYSTICK [E] **button to select the MAX/MIN TEMP option.**

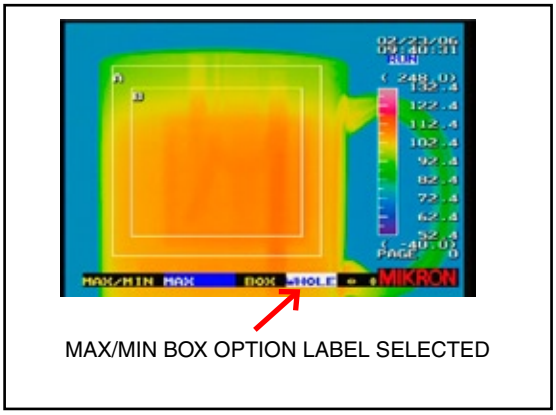


The new display will appear showing the MAX/MIN OPTION LABEL as well as the MAX/MIN BOX OPTION LABEL.

4) Toggle the JOYSTICK **up or down as needed to select** [OFF], [MAX], [MIN], [MAX HOLD], **or** [MIN HOLD], **from the highlighted options.**



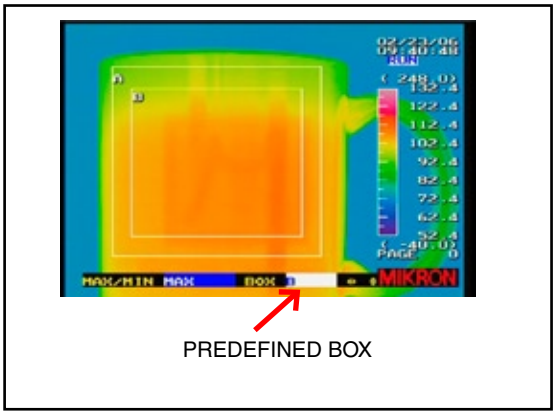
5) Toggle the JOYSTICK **to the right to set the desired option and to highlight the box option label.**



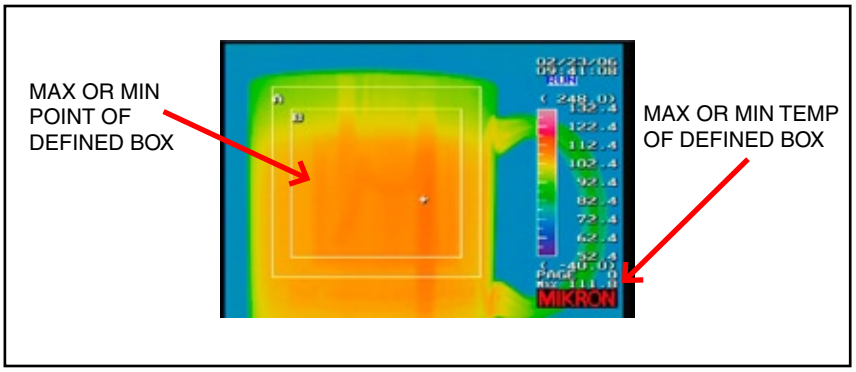
NOTE

The max, min, and average temperatures of the region inside the box are displayed at the bottom of the temperature scale, immediately above the MIKRON logo, and are updated continuously as the box is moved. The box coordinates are also displayed and updated continuously as the box is moved.

6) **Toggle the** JOYSTICK **up or down as needed to select the desired box label from the highlighted option.**



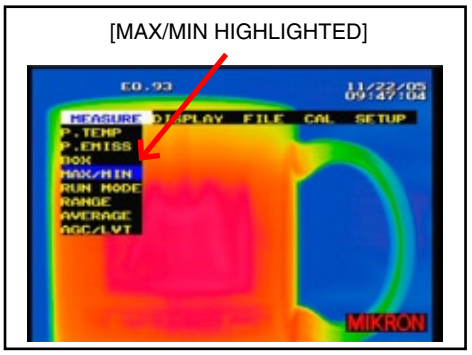
7) **Press the** JOYSTICK [E] **button to return to the main display.**



The new display will appear with the cursor point located at the defined MAX or MIN temperature point of the defined box.

6.7.3 Canceling the Max/Min Temperature Option

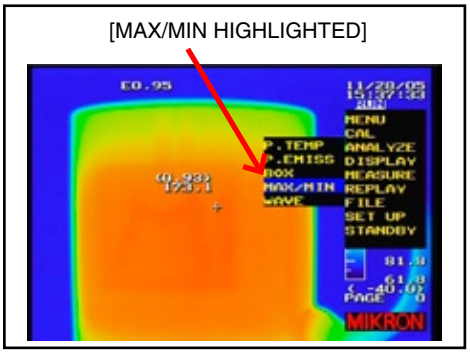
1) **If using the Standard Type Menu, go to [MENU] → [MEASURE] → [MAX/MIN].**



Standard View Menu

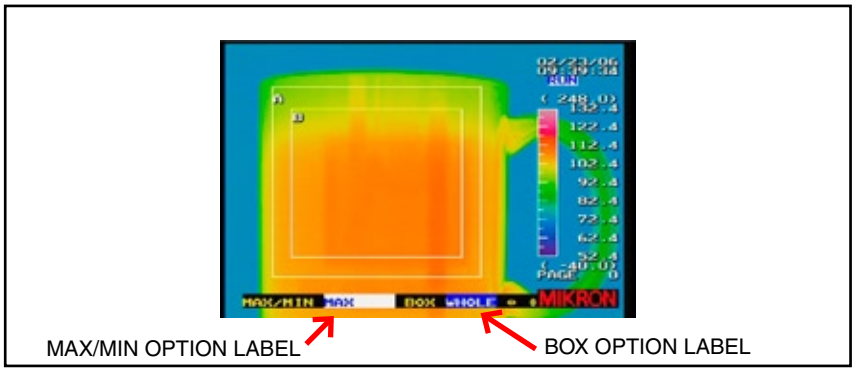
OR

If using the Classic Type Menu, go to [MENU] → [ANALYZE] → [MAX/MIN].



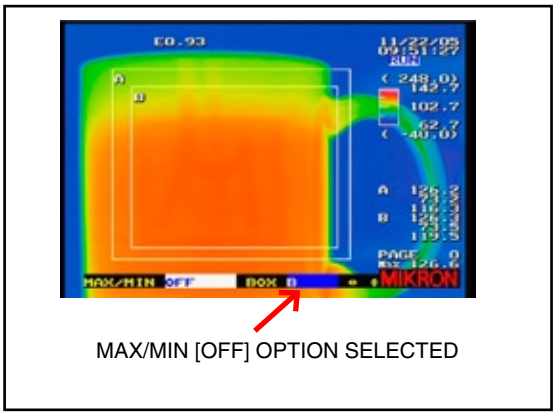
Classic View Menu

2) Press the JOYSTICK [E] **button to select the MAX/MIN TEMP option.**



The new display will appear showing the MAX/MIN OPTION LABEL as well as the MAX/MIN BOX OPTION LABEL.

3) Toggle the JOYSTICK **up or down as needed to select** [OFF] **from the highlighted options.**



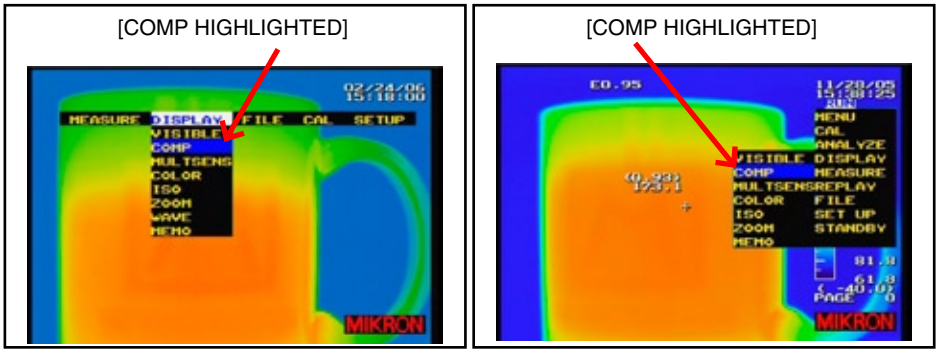
4) Press the JOYSTICK [E] **button to return to the main display.**

6.8 Working with the Composite Image Function

The 7600PRO provides thermal/visual composite image functionality which allows you to set a temperature zone and create a thermal/visual composite image for a more detailed analysis.

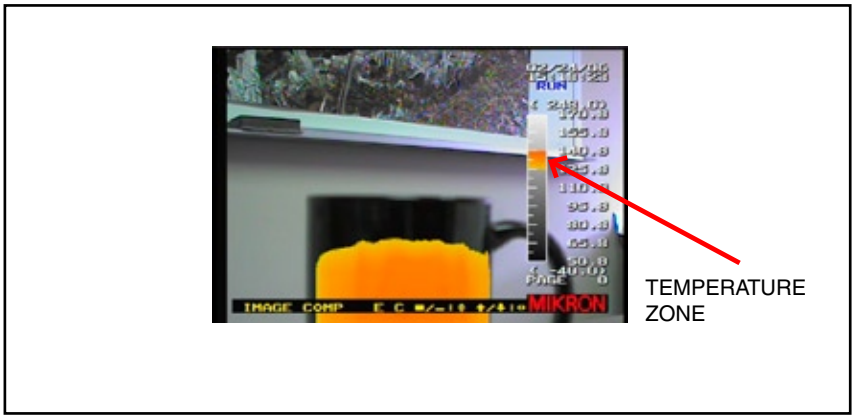
6.8.1 Creating a Composite Image

1) Go to [MENU] → [DISPLAY] → [COMP].



Standard View Menu Classic View Menu

2) Press the JOYSTICK [E] **button to select the COMP option.**



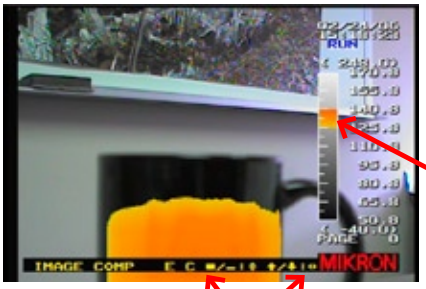
A bar will appear at the bottom of the screen showing the temperature zone change symbols.

NOTES

1. Make sure to focus on the measuring object BEFORE setting the composite image function. If the object is out of focus, the composite image will be misaligned.
2. A composite image cannot be displayed when the temperature of the surrounding environment exceeds 45°C.
3. Composite images can not be created correctly if the zoom function is on. Please cancel the zoom function before viewing a composite image.
4. Certain functions can not be used when the composite image is displayed. These functions include: wave, zoom, memo, run mode, isothermal, AGC/LVT, and external lens correction.
5. The composite image function can not be used in conjunction with the telephoto lens.
6. The composite image function will not work when recalling stored .BMP files or those saved to real-time memory.

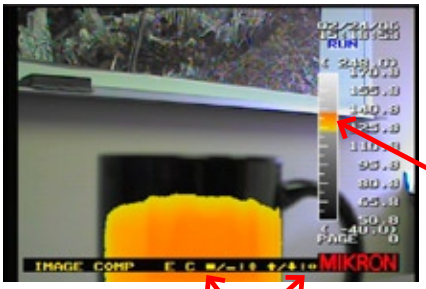
SAVE

3) Press the SAVE button to access the temperature zone change symbols.



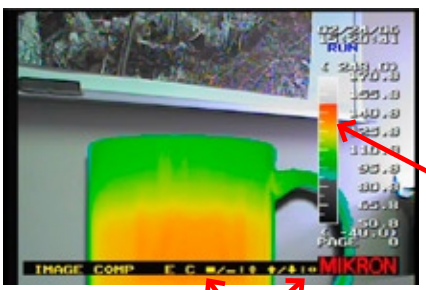
LEFT RIGHT

4) Toggle the JOYSTICK right to increase the level of the temperature zone or toggle the JOYSTICK left to decrease the level of the temperature zone.



UP DOWN

5) Toggle the JOYSTICK up to increase the range of the temperature zone or toggle the JOYSTICK down to decrease the range of the temperature zone.



6) **Press the** JOYSTICK [E] **button to return to the main display.**

OR

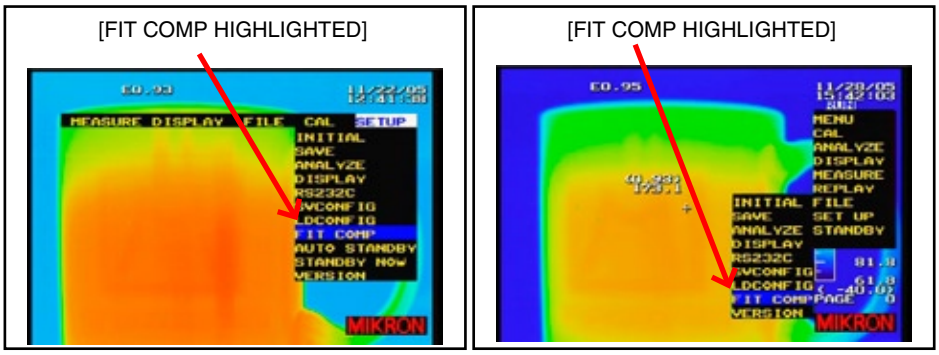
Press the CANCEL/VISIBLE [C] **button to cancel the change and return to the main display.**

6.8.2 Fitting the Composite Image

The Fit Comp function allows you to fit the size of the thermal image to the visual image when a composite image is displayed.

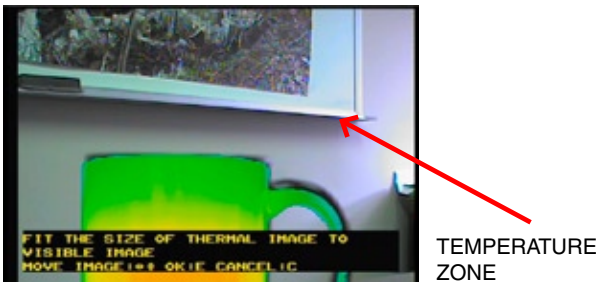
1) **Verify the camera is operating in** [FRZ] **mode.**

2) **Go to [MENU] → [SETUP] → [FIT COMP].**



Standard View Menu | Classic View Menu

3) **Press the** JOYSTICK [E] **button to select the FIT COMP option.**



A bar will appear at the bottom of the screen showing the fit comp options.

4) **Toggle the** JOYSTICK **right or left to move the thermal image into position horizontally.**

5) **Toggle the** JOYSTICK **up or down to move the thermal image into position vertically.**

6) **Press the** JOYSTICK [E] **button to return to the main display.**

OR

Press the CANCEL/VISIBLE [C] **button to cancel the change and return to the main display.**

6.9 Working with the Multi Sense Display Settings

The 7600PRO provides a Multi Sense Display feature that will adjust the color palette to allow you to focus on the details surrounding the center temperature on the display or on the high and low temperatures of the display.

To set the Multi Sense display options:

1) **Verify the camera is operating in [RUN] mode.**
2) **Go to [MENU] → [DISPLAY] → [MULTI SENSE].**

[MULTI SENSE HIGHLIGHTED]

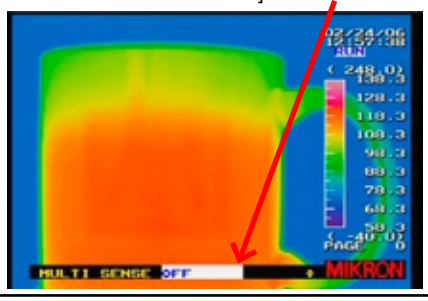
Standard View Menu

[MULTI SENSE HIGHLIGHTED]

Classic View Menu

3) **Press the** JOYSTICK [E] **button to access the MULTI SENSE Display.**

[MULTI SENSE COMPENSATION DISPLAY]



A bar will appear at the bottom of the screen allowing you to select a multi sense option.

The options are:

[OFF] **no adjustments are made to the color palette.**

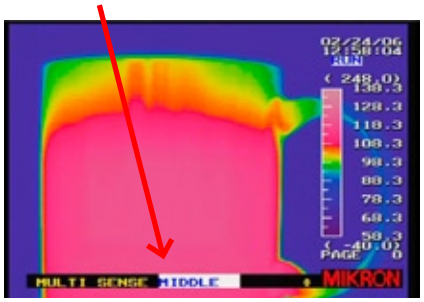
[MIDDLE] **adjusts the color palette to allow you to focus on the details surrounding the center temperature on the display.**

[HIGH/LOW] **adjusts the color palette to allow you to focus on the details surrounding the higher and lower temperature regions on the display.**

4) Toggle the JOYSTICK **up or down as needed to select the desired MULTI SENSE option.**

[MULTI SENSE HIGH/LOW SELECTED]

[MULTI SENSE MIDDLE SELECTED]



5) Press the JOYSTICK [E] **button to save the setting and to return to the main display.**

6.10 Working with the ISO Thermal Function

An Isotherm is a visual representation of the temperature breakdown on a thermal image. The MikroScan 7600PRO Isothermal Function allows you to isolate up to four ISO Thermal bands, with each band representing a specified temperature range.

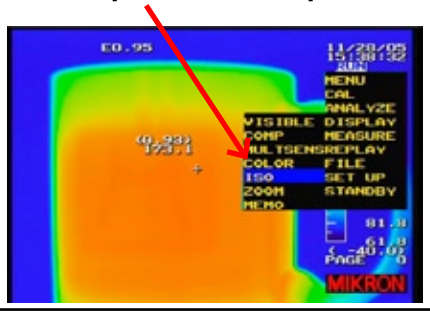
6.10.1 Customizing the Range of a Single ISO Thermal Band

1) Go to [MENU] → [DISPLAY] → [ISO].

[ISO HIGHLIGHTED]

Standard View Menu

[ISO HIGHLIGHTED]

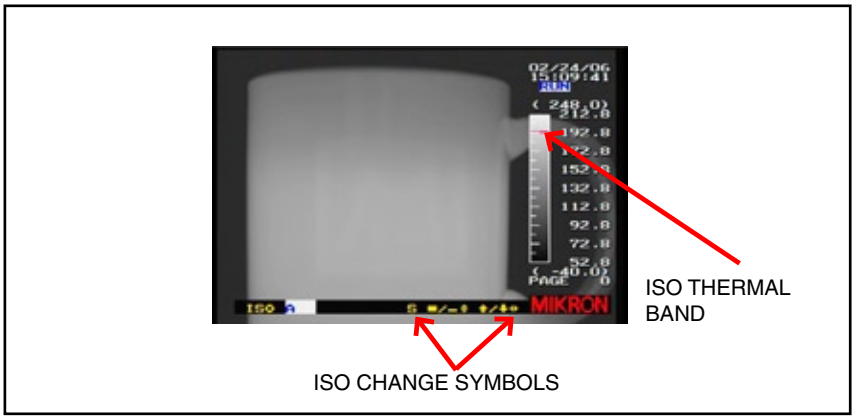


Classic View Menu

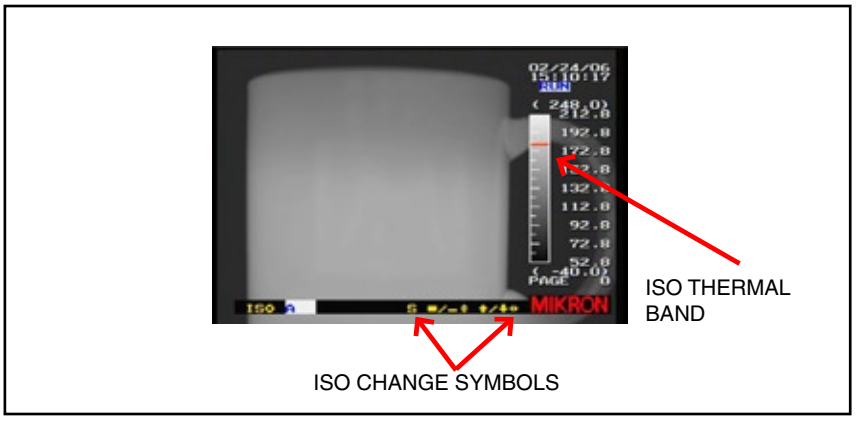
2) Press the JOYSTICK [E] **button to select the ISO option.**

A bar will appear at the bottom of the screen showing the ISO Band Label and the corresponding band.

3) Press the SAVE **button to access the ISO change symbols.**

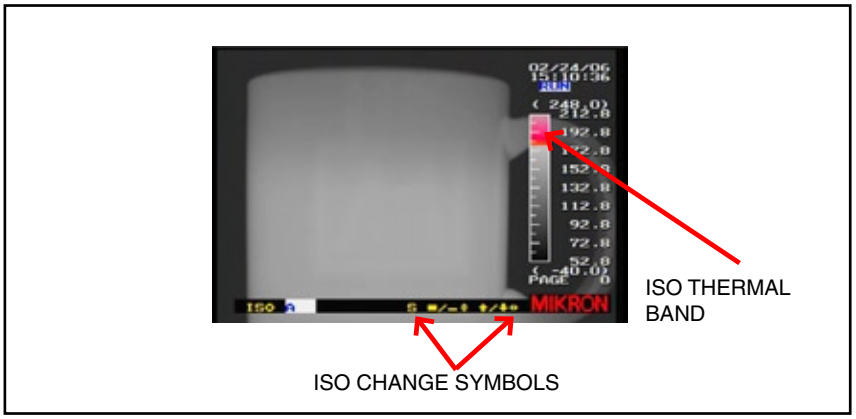


4) Toggle the JOYSTICK **left to move the ISO Band up the temperature range scale or toggle the** JOYSTICK **right to move the ISO Band down the temperature range scale.**



> **NOTE**
>
> If the display color settings are changed after an isothermal area has been displayed, the display of the isothermal areas will be cancelled.

5) Toggle the JOYSTICK up to expand the size of the ISO Band or toggle the JOYSTICK down to contract the size of the ISO Band.



6) Press the SAVE button to set the ISO band and to return to the ISO Band Labels.

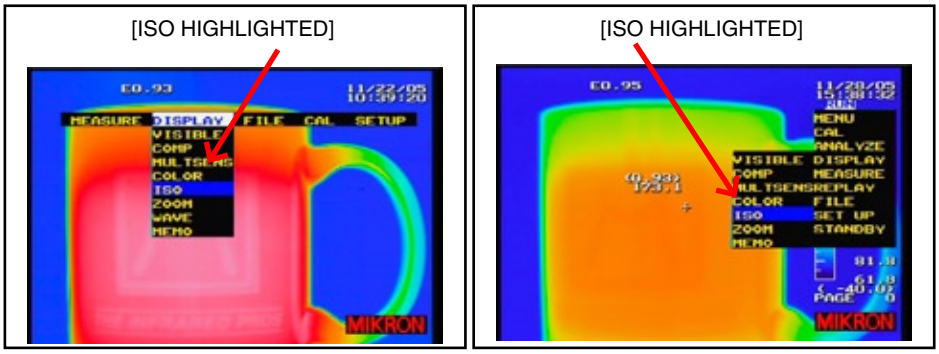
7) Add additional ISO bands (See Section 6.9.2 for more information)

OR

Press the JOYSTICK [E] button to return to the main display.

6.10.2 Adding Multiple ISO Thermal Bands

1) Go to [MENU] → [DISPLAY] → [ISO].



Standard View Menu

Classic View Menu

2) Press the JOYSTICK [E] **button to select the ISO option.**

A bar will appear at the bottom of the screen showing the ISO Band Label and the corresponding band.

3) Toggle the JOYSTICK **button up to add an additional ISO Band to the Temperature Range Scale.**

4) Press the SAVE **button to access the ISO change symbols.**

NOTE

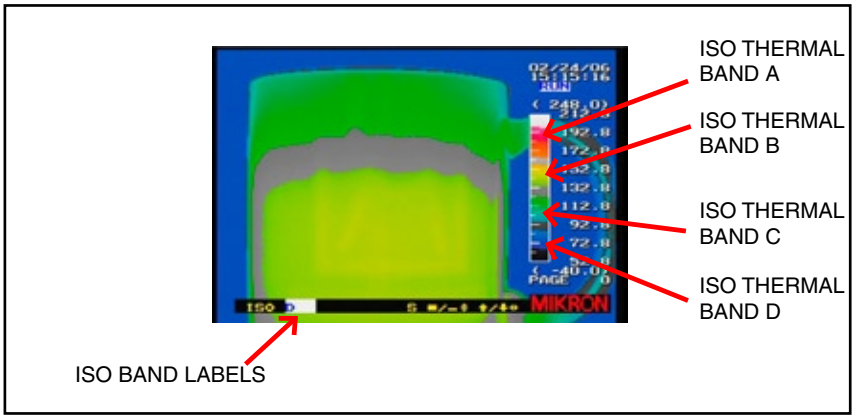
If the display color settings are changed after an isothermal area has been displayed, the display of the isothermal areas will be cancelled.

5) **Toggle the JOYSTICK left to move the ISO Band up the temperature range scale or toggle the JOYSTICK right to move the ISO Band down the temperature range scale.**

6) **Toggle the JOYSTICK up to expand the size of the ISO Band or toggle the JOYSTICK down to contract the size of the ISO Band.**

7) **Press the SAVE button to set the ISO band and to return to the ISO Band Labels.**

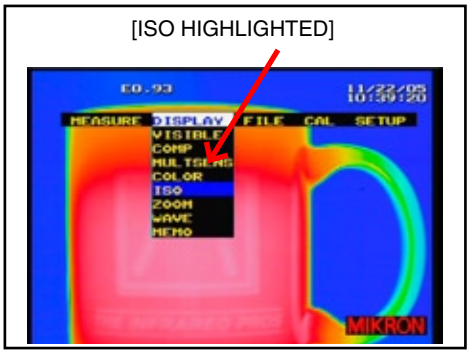
8) **Repeat steps 3-7 to add the remaining ISO Bands**



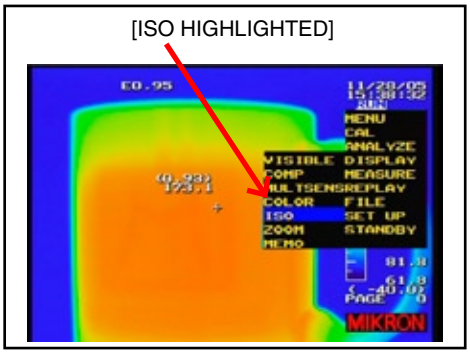
9) **Press the JOYSTICK [E] button again to return to the main display.**

6.10.3 Modifying Existing ISO Thermal Bands

1) **Go to [MENU] → [DISPLAY] → [ISO].**

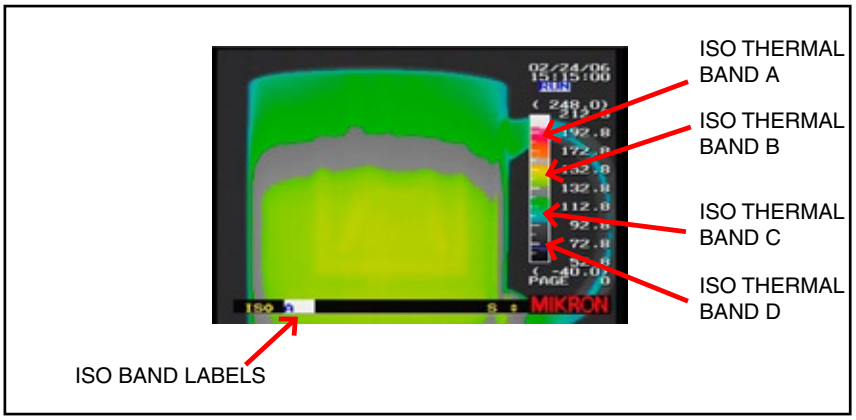


Standard View Menu



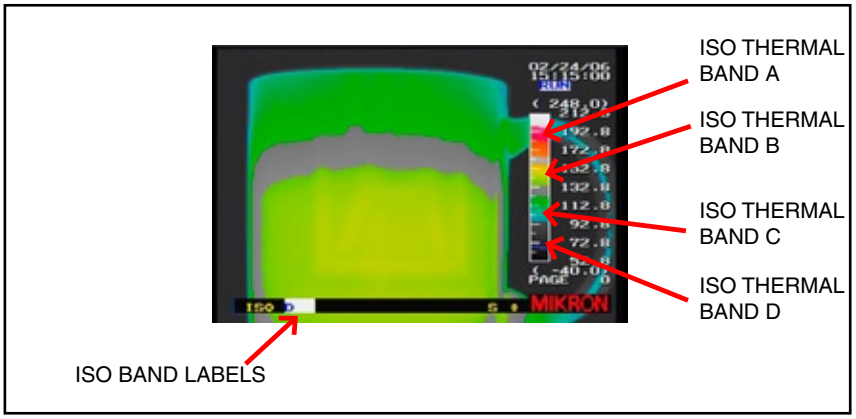
Classic View Menu

2) Press the JOYSTICK [E] **button to select the ISO option.**

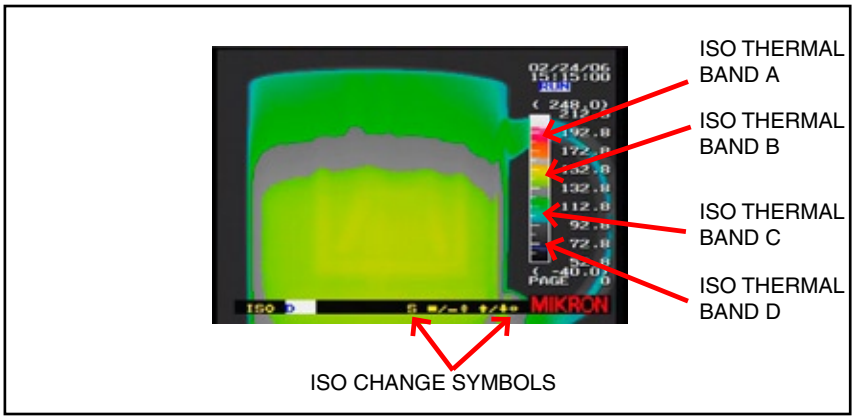


A bar will appear at the bottom of the screen showing the ISO Band Label and the corresponding band.

3) Toggle the JOYSTICK **up or down as needed to select the desired ISO Thermal Label.**



4) Press the SAVE **button to select the ISO label and to access the ISO change symbols.**



NOTE

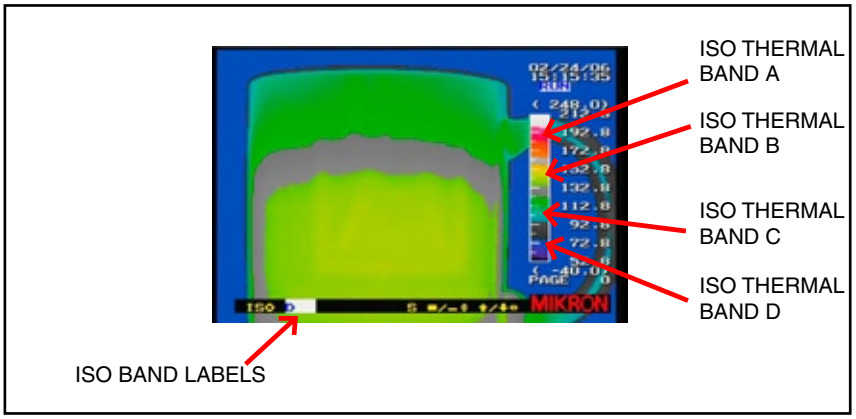
If the display color settings are changed after an isothermal area has been displayed, the display of the isothermal areas will be cancelled.

5) **Toggle the JOYSTICK left to move the ISO Band up the temperature range scale or toggle the JOYSTICK right to move the ISO Band down the temperature range scale.**

6) **Toggle the JOYSTICK up to expand the size of the ISO Band or toggle the JOYSTICK down to contract the size of the ISO Band.**

7) **Press the SAVE button to set the ISO band and to return to the ISO Band Labels.**

8) **Repeat steps 3-7 to change the remaining ISO Bands.**

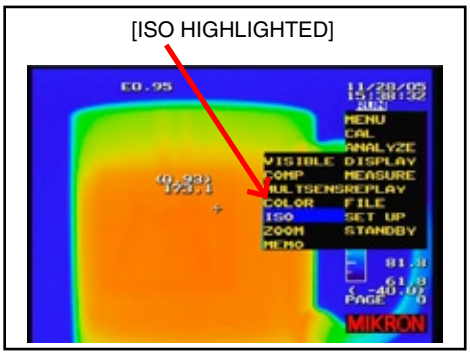


9) **Press the JOYSTICK [E] button again to return to the main display.**

6.10.4 Erasing an Individual ISO Thermal Band

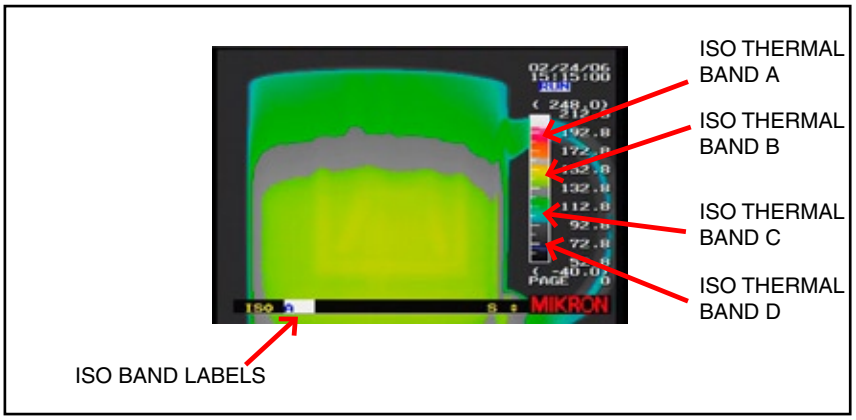
1) **Go to [MENU] → [DISPLAY] → [ISO].**

Standard View Menu



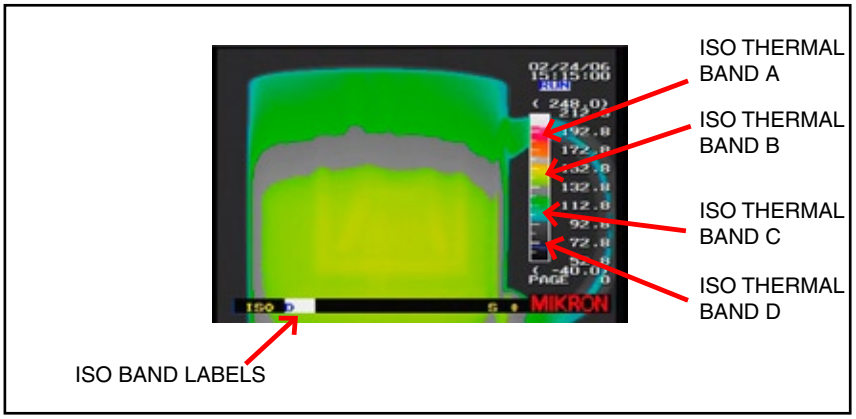
Classic View Menu

2) Press the JOYSTICK [E] **button to select the ISO option.**

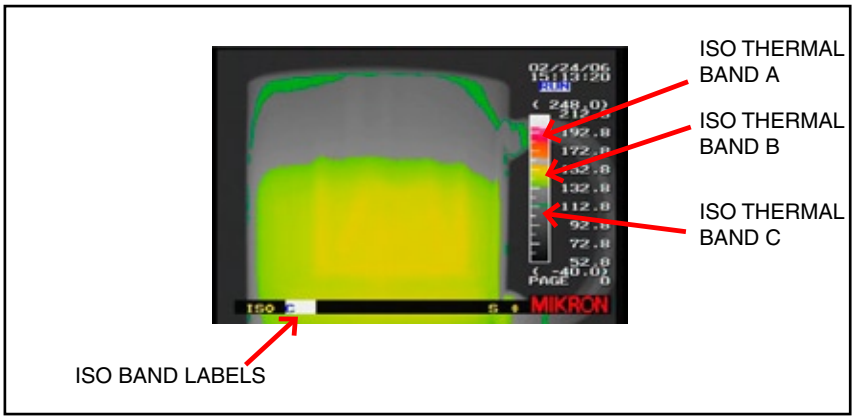


A bar will appear at the bottom of the screen showing the ISO Band Label and the corresponding band.

3) Toggle the JOYSTICK **up or down as needed to select the desired ISO Thermal Label.**



4) **Press the** C [CANCEL/VISIBLE] **button to clear the ISO band from the display.**

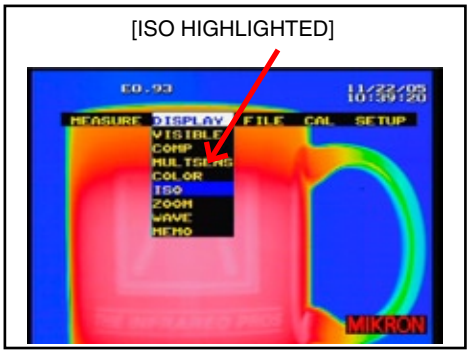


5) **Repeat steps 3-4 to clear additional ISO Bands from the display.**

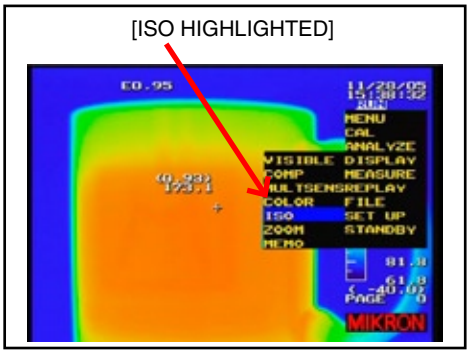
6) **Press the** JOYSTICK [E] **button to return to the main display.**

6.10.5 Erasing all ISO Thermal Bands

1) **Go to [MENU] → [DISPLAY] → [ISO].**

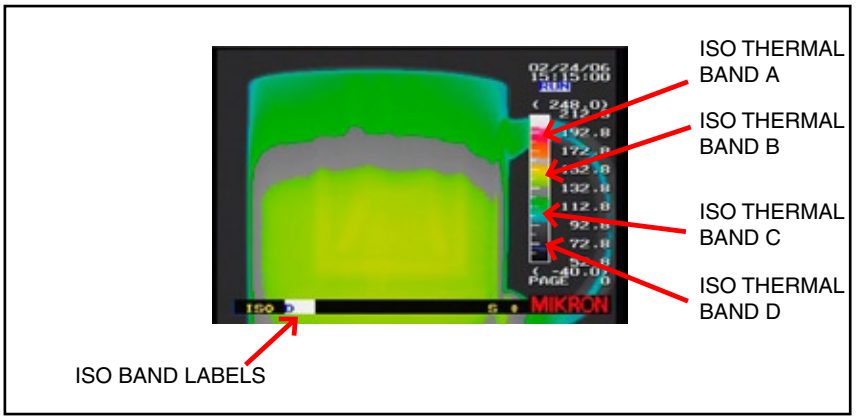


Standard View Menu



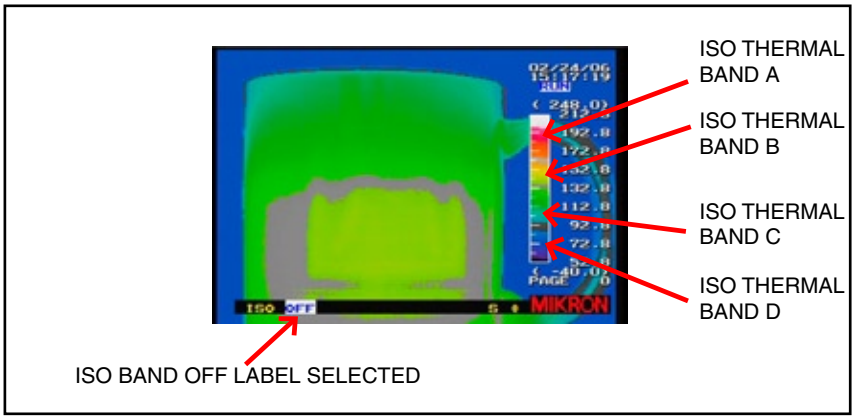
Classic View Menu

2) Press the JOYSTICK [E] **button to select the ISO option.**



A bar will appear at the bottom of the screen showing the ISO Band Label and the corresponding band.

3) Toggle the JOYSTICK **button down as needed to select the ISO Thermal** [OFF] **Label.**

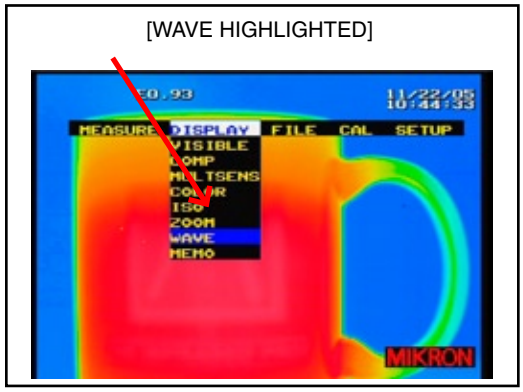


4) Press the JOYSTICK [E] **button to return to the main display.**

6.11 Working with the Wave Function

The MikroScan 7600PRO provides a waveform (line profile) function that provides temperature data To set the image zoom:

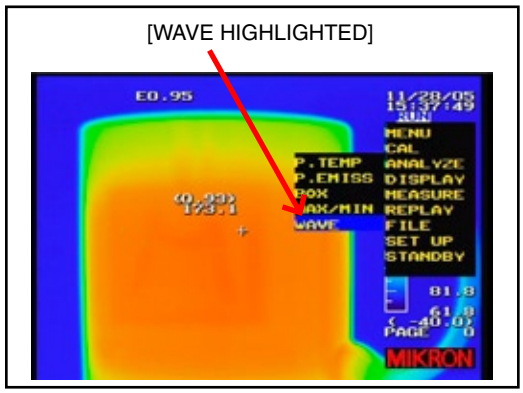
1) **Verify the display is in** [FREEZE] **mode and that no other parameter is highlighted.**
2) **If using the Standard Type Menu, go to [MENU] → [DISPLAY] → [WAVE].**



Standard View Menu

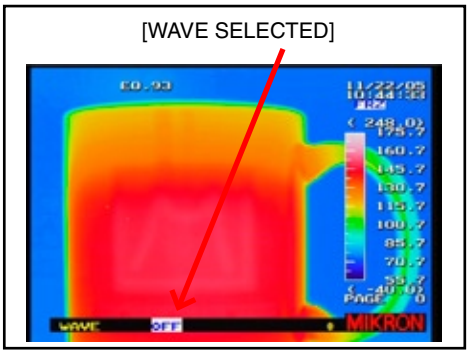
OR

If using the Classic Type Menu, go to [MENU] → [ANALYZE] → [WAVE].



Classic View Menu

2) Press the JOYSTICK [E] **button to select the WAVE option.**

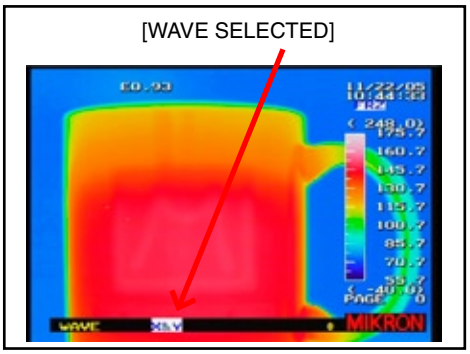


A bar will appear at the bottom of the screen allowing you to select the desired waveform (line profile) option.

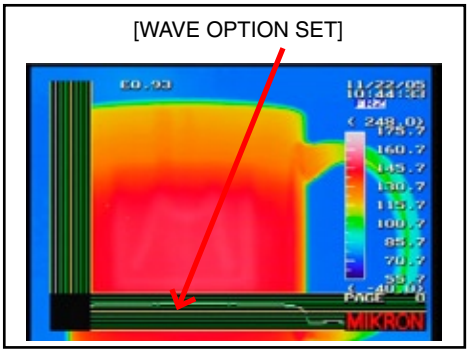
The waveform (line profile) options are:

- X
- Y
- X & Y
- OFF

3) Toggle the JOYSTICK **up or down as needed to scroll through the waveform (line profile) options.**



4) Press the JOYSTICK [E] **button to select the desired setting and to return to the main display.**



OR

Press the CANCEL/VISIBLE [C] **button to cancel out of the menu mode and to return to the main display.**

6.12 Working with the Event Functions

The Event Functions of the MikroScan 7600PRO allow you to detect when the temperature on a thermal image moves above or below a specified temperature range. When such an event occurs, the instrument has the ability to display an alarm message, sound an audible alarm, and/or freeze the image for a closer view of the triggering event. The instrument also provides the option of recording the triggering event and saving the frames to the compact flash card or the instrument's internal memory.

These event function options can be used in either the RUN or FREEZE modes.

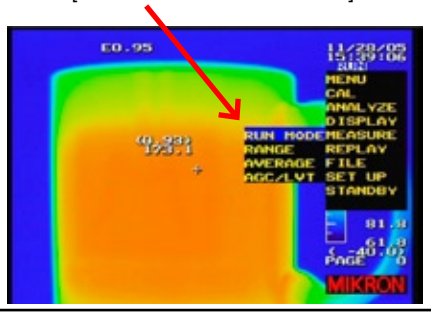
6.12.1 Setting the Event Condition

1) Go to [MENU] → [MEASURE] → [RUN MODE].

[RUN MODE HIGHLIGHTED]

Standard View Menu

[RUN MODE HIGHLIGHTED]



Classic View Menu

2) Press the JOYSTICK [E] **button to access the RUN MODE menu.**

[RUN MODE DISPLAY]

3) Toggle the JOYSTICK up or down, if needed, to highlight [EVENT] from the list of menu choices.

[EVENT HIGHLIGHTED]

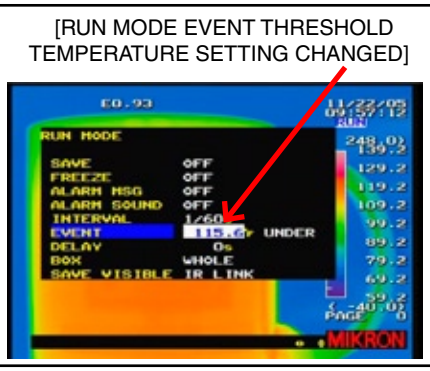
4) Toggle the JOYSTICK to the right to highlight the threshold temperature setting.

[RUN MODE EVENT THRESHOLD TEMPERATURE SETTING SELECTED]

If a threshold value is not specified, an event condition will be triggered according to the maximum or minimum temperature values of the thermal image.

5) Toggle the JOYSTICK up or down as needed to increase or decrease the temperature threshold value.

[RUN MODE EVENT THRESHOLD TEMPERATURE SETTING CHANGED]



NOTE

If a threshold value is not specified, the alarm will be triggered according to the maximum or minimum temperature values of a specific box or the whole image as specified through the box range options.

NOTE

If a threshold value is not specified, the event condition will be triggered according to the maximum or minimum temperature values of a specific box or the whole image as specified through the box range options.

6) Toggle the JOYSTICK to the right to highlight the threshold temperature condition settings.

[RUN MODE EVENT THRESHOLD TEMPERATURE CONDITION SELECTED]

The two threshold temperature condition settings are:

[UNDER] **which triggers an event condition when the temperature decreases below the threshold value.**

[OVER] **which triggers an event condition when the temperature rises above the threshold value.**

7) Toggle the JOYSTICK up or down as needed to select the desired threshold temperature condition.

8) Toggle the JOYSTICK to the right to set the option and return to the list of displayed options.

[RUN MODE EVENT THRESHOLD TEMPERATURE CONDITION SELECTED]

9) Proceed through the list of additional menu choices

OR

Press the JOYSTICK [E] button to return to the main display.

6.12.2 Selecting a Range Area

1) Go to [MENU] → [MEASURE] → [RUN MODE].

[RUN MODE HIGHLIGHTED]

Standard View Menu

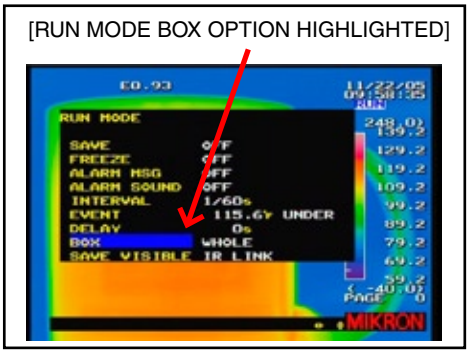
[RUN MODE HIGHLIGHTED]

Classic View Menu

2) Press the JOYSTICK [E] button to access the RUN MODE menu.

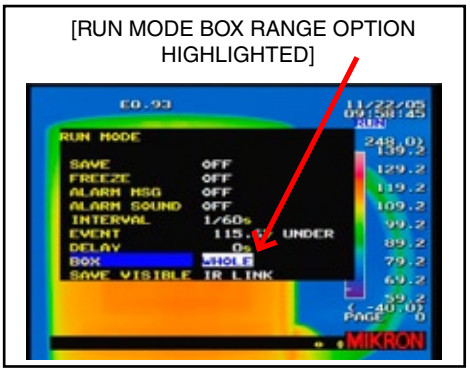
3) Toggle the JOYSTICK up or down as needed to select [BOX] from the list of menu options.

[RUN MODE BOX OPTION HIGHLIGHTED]



4) Toggle the JOYSTICK to the right to highlight the box range options.

[RUN MODE BOX RANGE OPTION HIGHLIGHTED]



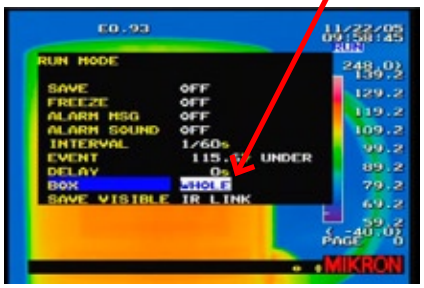
The box range options are:

[A-E] **the event condition is determined by the established threshold value or the minimum/maximum temperature of a specific box as previously defined on the image (See Section 6.6 for more information on Working with Boxes).**

[WHOLE] **the event condition is determined by the established threshold value or the minimum/maximum temperature of the entire image.**

5) Toggle the JOYSTICK **up or down as needed to select the desired box range option from the displayed options.**

[RUN MODE BOX RANGE OPTION HIGHLIGHTED]



6) Toggle the JOYSTICK **to the right to set the option and return to the list of displayed options.**

7) Proceed through the list of additional menu choices

OR

Press the JOYSTICK [E] **button to return to the main display.**

6.12.3 Choosing to Display an Alarm Warning Message

1) Go to [MENU] → [MEASURE] → [RUN MODE].

[RUN MODE HIGHLIGHTED]

Standard View Menu

[RUN MODE HIGHLIGHTED]

Classic View Menu

2) Press the JOYSTICK [E] **button to access the RUN MODE menu.**

3) Toggle the JOYSTICK **up or down as needed to select [ALARM MSG] from the list of menu options.**

[RUN MODE ALARM MESSAGE OPTION HIGHLIGHTED]

4) Toggle the JOYSTICK **to the right to highlight the alarm message settings.**

[RUN MODE ALARM MESSAGE OPTION HIGHLIGHTED]

5) Toggle the JOYSTICK **up or down as needed to select the desired alarm message setting.**

[RUN MODE ALARM MESSAGE OPTION HIGHLIGHTED]

The alarm message options are:

[OFF] **no alarm message will appear when the event condition is triggered.**

[ON] **an alarm message of [OVER] or [UNDER] will appear on the display when the event condition is triggered. See section 6.11.1 for more information on Setting the Event Condition.**

6) Toggle the JOYSTICK **to the right to set the option and return to the list of displayed options.**

7) Proceed through the list of additional menu choices

OR

Press the JOYSTICK [E] **button to return to the main display.**

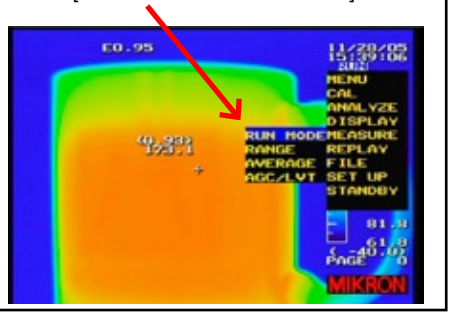
6.12.4 Choosing to Sound an Audible Warning

1) Go to [MENU] → [MEASURE] → [RUN MODE].

[RUN MODE HIGHLIGHTED]

Standard View Menu

[RUN MODE HIGHLIGHTED]

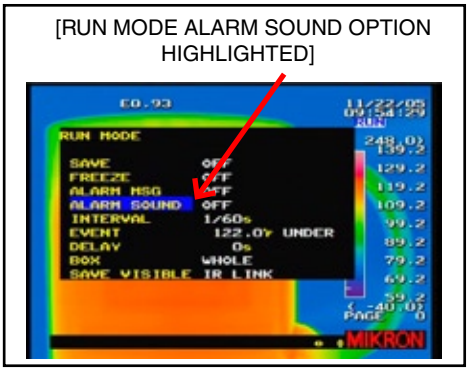


Classic View Menu

2) Press the JOYSTICK [E] **button to access the RUN MODE menu.**

3) Toggle the JOYSTICK **up or down as needed to select [ALARM SOUND] from the list of menu options.**

[RUN MODE ALARM SOUND OPTION HIGHLIGHTED]



4) **Toggle the JOYSTICK to the right to highlight the alarm sound settings.**

[RUN MODE ALARM SOUND OPTION HIGHLIGHTED]

5) **Toggle the JOYSTICK up or down as needed to select the desired alarm message setting.**

[RUN MODE ALARM SOUND OPTION HIGHLIGHTED]

The alarm sound options are:

[OFF] **there will be no audible warning when the event condition is triggered.**

[ON] **an audible beep will be heard when the event condition is triggered. See section 6.11.1 for more information on Setting the Event Condition.**

6) **Toggle the JOYSTICK to the right to set the option and return to the list of displayed options.**

7) **Proceed through the list of additional menu choices**

OR

Press the JOYSTICK [E] button to return to the main display.

6.12.5 Choosing to Freeze Measurements

1) Go to [MENU] → [MEASURE] → [RUN MODE].

[RUN MODE HIGHLIGHTED]

Standard View Menu

[RUN MODE HIGHLIGHTED]

Classic View Menu

2) Press the JOYSTICK [E] **button to access the RUN MODE menu.**

3) Toggle the JOYSTICK **up or down as needed to select [FREEZE] from the list of menu options.**

[RUN MODE FREEZE OPTION HIGHLIGHTED]

4) Toggle the JOYSTICK **to the right to highlight the freeze settings.**

[RUN MODE FREEZE OPTION HIGHLIGHTED]

5) Toggle the JOYSTICK up or down as needed to select the desired freeze setting.

[RUN MODE FREEZE OPTION HIGHLIGHTED]

The freeze options are:

[OFF] **the instrument will continue to operate in run mode even when an event condition is triggered.**

[ON] **the instrument will enter freeze mode as soon as an event condition is triggered. See section 6.11.1 for more information on Setting the Event Condition.**

6) Toggle the JOYSTICK to the right to set the option and return to the list of displayed options.

7) Proceed through the list of additional menu choices

OR

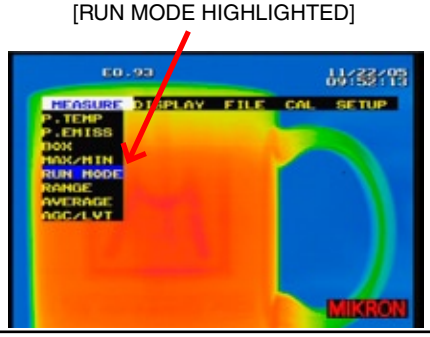
Press the JOYSTICK [E] button to return to the main display.

6.12.6 Saving Measurements to a Compact Flash Card

6.12.6.1 Selecting the PC Card Option

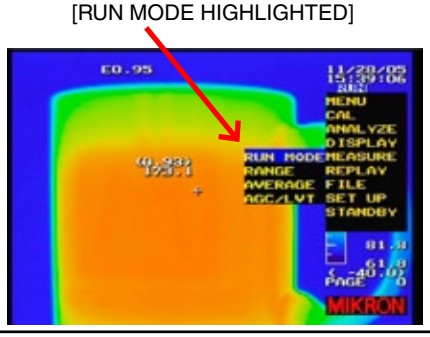
1) Go to [MENU] → [MEASURE] → [RUN MODE].

[RUN MODE HIGHLIGHTED]



Standard View Menu

[RUN MODE HIGHLIGHTED]



Classic View Menu

2) Press the JOYSTICK [E] button to access the RUN MODE menu.

3) Toggle the JOYSTICK up or down as needed to select [SAVE] from the list of menu options.

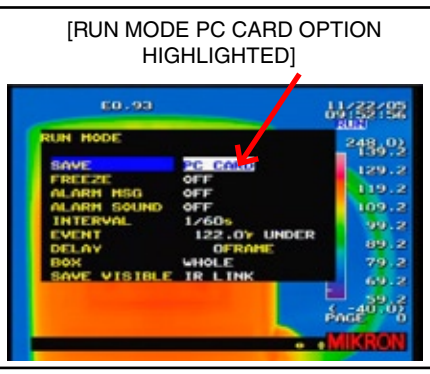
[RUN MODE SAVE OPTION HIGHLIGHTED]

4) Toggle the JOYSTICK to the right to highlight the save settings.

[RUN MODE SAVE OPTION HIGHLIGHTED]

5) Toggle the JOYSTICK up or down as needed to select [PC CARD] from the list of save settings.

[RUN MODE PC CARD OPTION HIGHLIGHTED]



6) **Toggle the** JOYSTICK **to the right to set the [PC CARD] option and return to the list of displayed options.**

7) **Proceed through the list of additional menu choices**

OR

Press the JOYSTICK [E] **button to return to the main display.**

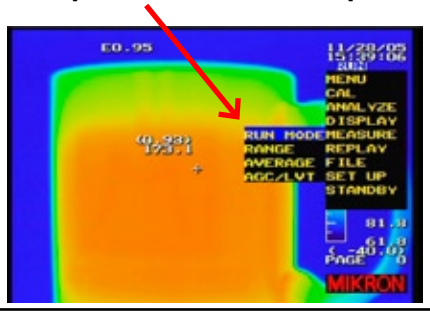
6.12.6.2 Selecting the PC Card Interval Option

1) **Go to [MENU] → [MEASURE] → [RUN MODE].**

[RUN MODE HIGHLIGHTED]

Standard View Menu

[RUN MODE HIGHLIGHTED]



Classic View Menu

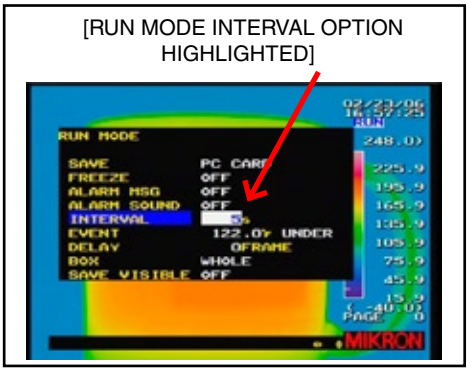
2) **Press the** JOYSTICK [E] **button to access the RUN MODE menu.**

3) **Toggle the** JOYSTICK **up or down as needed to select [INTERVAL] from the list of menu options.**

[RUN MODE INTERVAL OPTION HIGHLIGHTED]

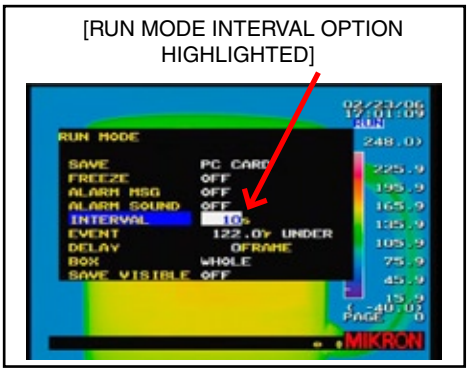
4) **Toggle the JOYSTICK to the right to highlight the interval time settings.**

[RUN MODE INTERVAL OPTION HIGHLIGHTED]



5) **Toggle the JOYSTICK up or down as needed to select the desired interval delay time from the list of save settings.**

[RUN MODE INTERVAL OPTION HIGHLIGHTED]



6) **Toggle the JOYSTICK to the right to set the interval delay time value and return to the list of displayed options.**

7) **Proceed through the list of additional menu choices**

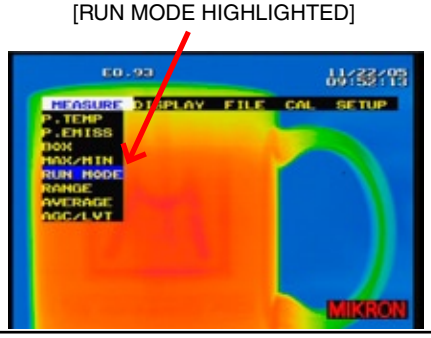
OR

Press the JOYSTICK [E] button to return to the main display.

6.12.6.3 Selecting the PC Card Time Delay Option

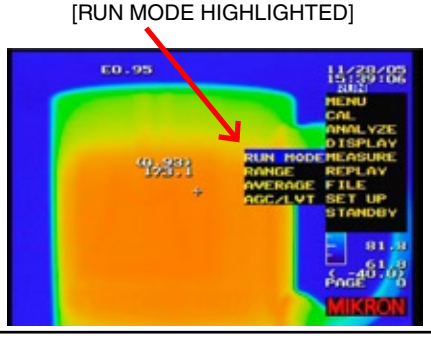
1) **Go to [MENU] → [MEASURE] → [RUN MODE].**

[RUN MODE HIGHLIGHTED]



Standard View Menu

[RUN MODE HIGHLIGHTED]



Classic View Menu

2) **Press the** JOYSTICK [E] **button to access the RUN MODE menu.**

3) **Toggle the** JOYSTICK **up or down as needed to select [DELAY] from the list of menu options.**

[RUN MODE DELAY OPTION HIGHLIGHTED]

4) **Toggle the** JOYSTICK **to the right to highlight the delay time settings.**

[RUN MODE DELAY OPTION HIGHLIGHTED]

5) Toggle the JOYSTICK up or down as needed to select the desired delay time from the list of save settings.

[RUN MODE DELAY OPTION HIGHLIGHTED]

6) Toggle the JOYSTICK to the right to set the delay time value and return to the list of displayed options.

7) Proceed through the list of additional menu choices

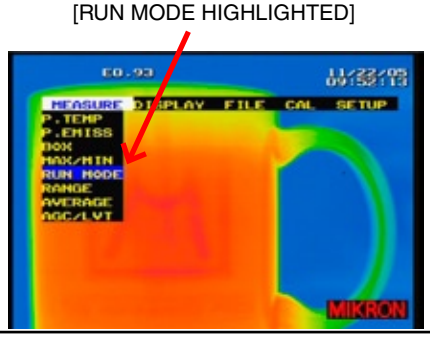
OR

Press the JOYSTICK [E] button to return to the main display.

6.12.6.4 Selecting the PC Card Save Visible Image Option

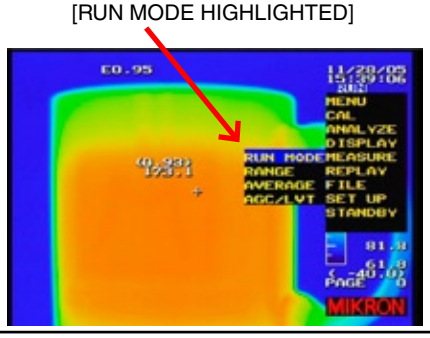
1) Go to [MENU] → [MEASURE] → [RUN MODE].

[RUN MODE HIGHLIGHTED]



Standard View Menu

[RUN MODE HIGHLIGHTED]

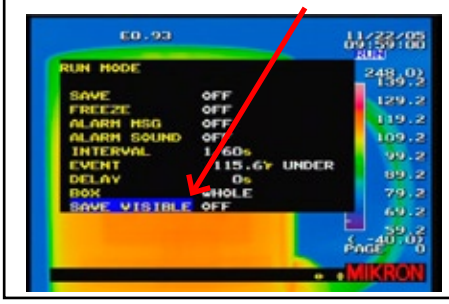


Classic View Menu

2) Press the JOYSTICK [E] button to access the RUN MODE menu.

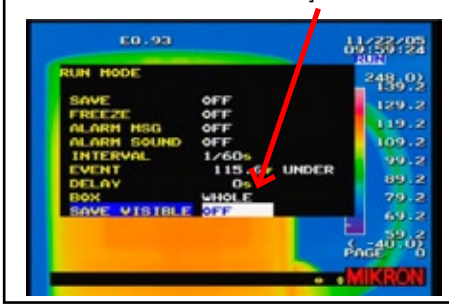
3) Toggle the JOYSTICK up or down as needed to select [SAVE VISIBLE] from the list of menu options.

[RUN MODE SAVE VISIBLE OPTION HIGHLIGHTED]



4) Toggle the JOYSTICK to the right to highlight the visible save settings.

[RUN MODE SAVE VISIBLE OPTION HIGHLIGHTED]



5) Toggle the JOYSTICK up or down as needed to select the desired visible save option from the list of settings.

[RUN MODE INTERVAL OPTION HIGHLIGHTED]

The visible save options are:

[OFF] **the instrument will only record the thermal image and image data when an event condition is triggered.**

[IR LINK] **the instrument will record the visible light image along with the thermal image and image data as a single .sit file when an event condition is triggered. See section 6.8.1 for more information on Setting the Event Condition.**

6) Toggle the JOYSTICK to the right to set the save visible option and return to the list of displayed options.

7) Proceed through the list of additional menu choices

OR

Press the JOYSTICK [E] button to return to the main display.

6.12.7 Saving Measurements to Real-time Memory (RTM)

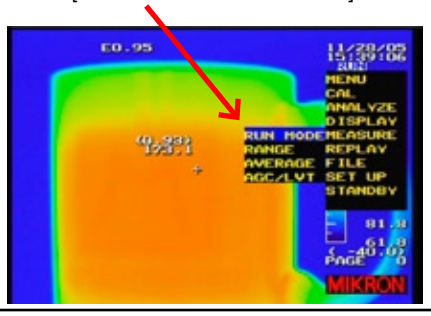
6.12.7.1 Selecting the RTM Option

1) Go to [MENU] → [MEASURE] → [RUN MODE].

[RUN MODE HIGHLIGHTED]

Standard View Menu

[RUN MODE HIGHLIGHTED]

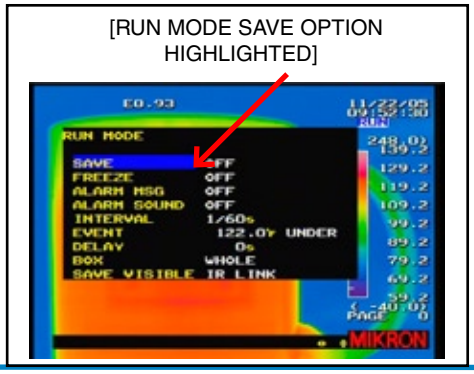


Classic View Menu

2) Press the JOYSTICK [E] button to access the RUN MODE menu.

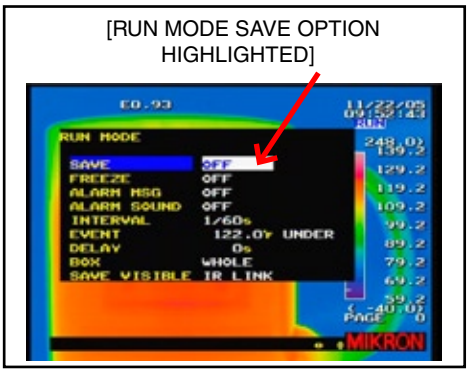
3) Toggle the JOYSTICK up or down as needed to select [SAVE] from the list of menu options.

[RUN MODE SAVE OPTION HIGHLIGHTED]



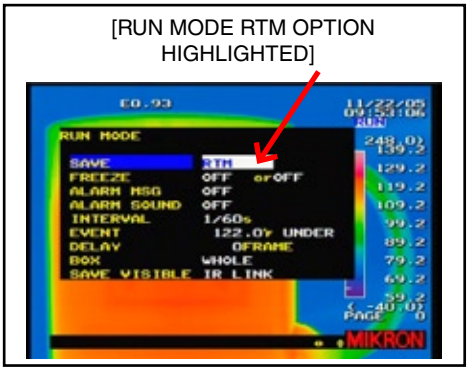
4) Toggle the JOYSTICK to the right to highlight the save settings.

[RUN MODE SAVE OPTION HIGHLIGHTED]



5) Toggle the JOYSTICK up or down as needed to select [RTM] from the list of save settings.

[RUN MODE RTM OPTION HIGHLIGHTED]



6) Toggle the JOYSTICK to the right to set the [RTM] option and return to the list of displayed options.

7) Proceed through the list of additional menu choices

OR

Press the JOYSTICK [E] button to return to the main display.

6.12.7.2 Setting the RTM Freeze Option

The 7600PRO allows you to set certain parameters for having the instrument automatically enter freeze mode while running the real-time memory. The parameters are as follows:

Freeze Condition 1	Freeze Condition 2	Description
OFF	OFF	Camera does not automatically enter freeze mode while recording to RTM.
EVENT	OFF	Camera automatically enters FREEZE mode when an event condition has been triggered. See section 6.11.1 for more information on Setting the Event Condition.
OFF	MAX FRAME (1664)	The camera automatically enters FREEZE mode when the maximum number of frames held in the internal memory has been reached.
EVENT	MAX FRAME (1664)	The camera automatically enters FREEZE mode when an event condition has been triggered OR when the maximum number of frames held in the internal memory has been reached. See section 6.11.1 for more information on Setting the Event Condition.

To set the RTM Freeze Option:

1) **Go to [MENU] → [MEASURE] → [RUN MODE].**

[RUN MODE HIGHLIGHTED]

Standard View Menu

[RUN MODE HIGHLIGHTED]

Classic View Menu

2) Press the JOYSTICK [E] **button to access the RUN MODE menu.**

3) Toggle the JOYSTICK **up or down as needed to select [FREEZE] from the list of menu options.**

[RUN MODE FREEZE OPTION HIGHLIGHTED]

4) Toggle the JOYSTICK **to the right to highlight the first set of freeze conditions.**

[RUN MODE FREEZE CONDITION 1 HIGHLIGHTED]

5) Toggle the JOYSTICK **up or down as needed to select the desired condition from the list of menu options.**

[RUN MODE FREEZE CONDITION 1 HIGHLIGHTED]

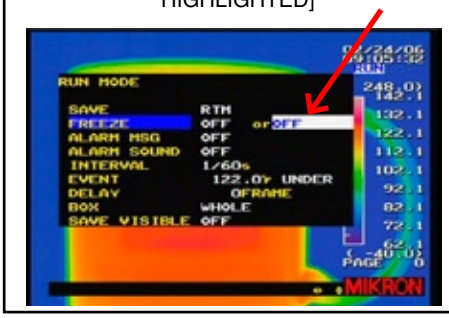
The options are:

[OFF] **the instrument will continue to operate in run mode even when an event condition is triggered.**

[EVENT] **the instrument will enter freeze mode as soon as an event condition is triggered. See section 6.11.1 for more information on Setting the Event Condition.**

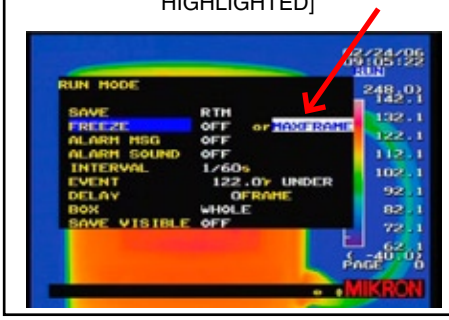
6) Toggle the JOYSTICK to the right to highlight the second set of freeze conditions.

[RUN MODE FREEZE CONDITION 2 HIGHLIGHTED]



7) Toggle the JOYSTICK up or down as needed to select the desired condition from the list of menu options.

[RUN MODE FREEZE CONDITION 2 HIGHLIGHTED]



The options are:

[OFF] **the instrument will continue to operate in run mode even when the maximum number of frames (1664) held in memory have been reached. If the maximum number has been reached, the instrument will continue recording by overwriting the data which had been previously saved to the internal memory.**

[MAX FRAME] **the instrument will enter freeze mode as soon as the maximum number of frames (1664) held in memory have been reached.**

8) Toggle the JOYSTICK to the right to set the interval delay time value and return to the list of displayed options.

9) Proceed through the list of additional menu choices

OR

Press the JOYSTICK [E] button to return to the main display.

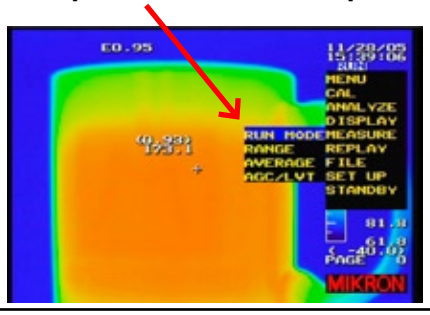
6.12.7.3 Selecting the RTM Interval Option

1) Go to [MENU] → [MEASURE] → [RUN MODE].

[RUN MODE HIGHLIGHTED]

Standard View Menu

[RUN MODE HIGHLIGHTED]



Classic View Menu

2) Press the JOYSTICK [E] button to access the RUN MODE menu.

3) Toggle the JOYSTICK up or down as needed to select [INTERVAL] from the list of menu options.

[RUN MODE INTERVAL OPTION HIGHLIGHTED]

4) Toggle the JOYSTICK to the right to highlight the interval time settings.

[RUN MODE INTERVAL OPTION HIGHLIGHTED]

5) Toggle the JOYSTICK up or down as needed to select the desired interval delay time from the list of save settings.

[RUN MODE INTERVAL OPTION HIGHLIGHTED]

6) Toggle the JOYSTICK to the right to set the interval delay time value and return to the list of displayed options.

7) Proceed through the list of additional menu choices

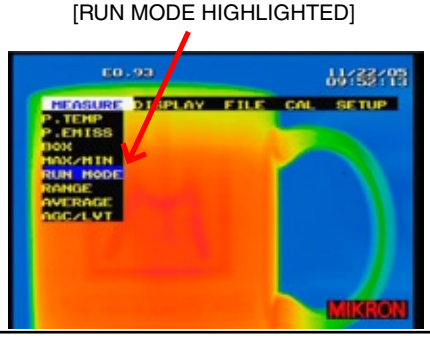
OR

Press the JOYSTICK [E] button to return to the main display.

6.12.7.4 Selecting the RTM Frame Delay Option

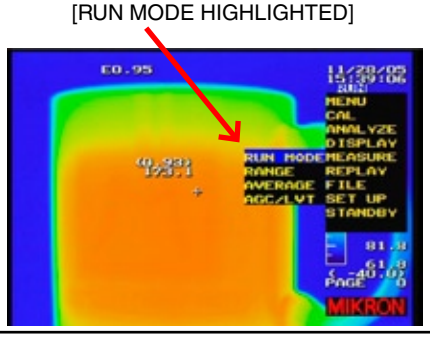
1) **Go to [MENU] → [MEASURE] → [RUN MODE].**

[RUN MODE HIGHLIGHTED]



Standard View Menu

[RUN MODE HIGHLIGHTED]



Classic View Menu

2) **Press the** JOYSTICK [E] **button to access the RUN MODE menu.**

3) **Toggle the** JOYSTICK **up or down as needed to select [DELAY] from the list of menu options.**

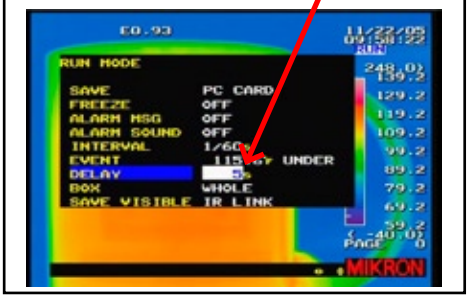
[RUN MODE DELAY OPTION HIGHLIGHTED]

4) **Toggle the** JOYSTICK **to the right to highlight the frame delay settings.**

[RUN MODE DELAY OPTION HIGHLIGHTED]

5) Toggle the JOYSTICK up or down as needed to select the desired frame delay from the list of save settings.

[RUN MODE DELAY OPTION HIGHLIGHTED]



6) Toggle the JOYSTICK to the right to set the frame delay value and return to the list of displayed options.

7) Proceed through the list of additional menu choices

OR

Press the JOYSTICK [E] button to return to the main display.

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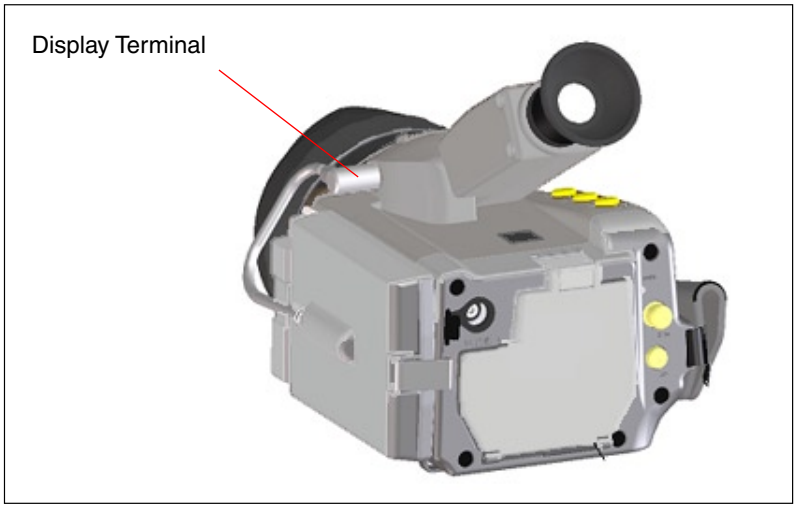
Advanced Operations

7.1 Working with External LCD Displays

The MikroScan 7600PRO provides an S-Video/RS-232C port which is used for providing an interface for an external monitor or remote control LCD Display.

7.1.1 Connecting the LCD Display

Before connecting the display cable to your MikroScan 7600PRO, it is important that the power switch on the camera be in the off position. It is also important that the power to the LCD display remains off until all connections have been made.



Caution

The MikroScan 7600PRO does not meet IP54 standards while the rear cover remains open.

1) **Verify that the power switch is in the off position on both the camera and the external LCD Display.**
2) **Remove the existing display connector from the display terminal located on the side of the camera.**
3) **Connect the display cable connector for the external LCD to the S-Video/RS-232C Port on the camera.**
4) **Turn the power switch on the camera to the on position.**
5) **Turn the power switch on the external LCD Display to the on position.**

7.1.2 Disconnecting the LCD Display

1) **Turn the power switch on the external LCD Display to the off position.**
2) **Turn the power switch on the camera to the off position.**
3) **Disconnect the display cable connector for the external LCD from the S-Video/RS-232C Port on the side of the camera.**
4) **Attach the camera's LCD display cable connector to the display terminal.**

   The MikroScan 7600PRO does not meet IP54 standards while the display terminal remains open.

RS-232C DATA FORMAT		
DATA LENGTH	STOP BIT	PARITY
8	1	NONE
8	1	EVEN
8	1	ODD
8	2	NONE
8	2	EVEN
8	2	ODD
7	1	NONE
7	1	EVEN
7	1	ODD
7	2	NONE
7	2	EVEN
7	2	ODD

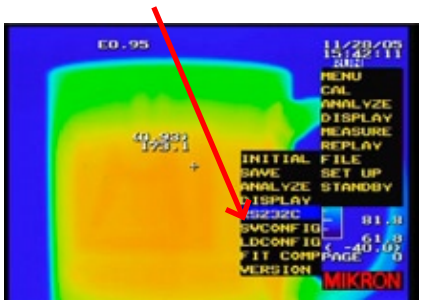
7.1.3 Setting the RS-232C Baud Rate (if necessary)

1) Go to [MENU] → [SET UP] → [RS232C].

[RS232C HIGHLIGHTED]

Standard View Menu

[RS232C HIGHLIGHTED]

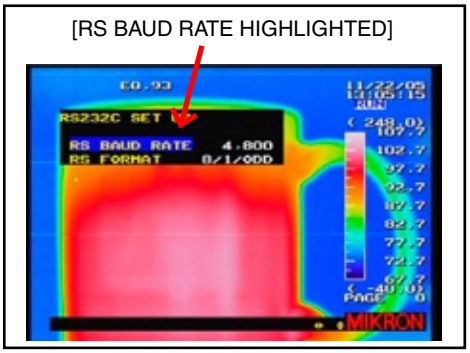


Classic View Menu

2) Press the JOYSTICK [E] **button to gain access to the RS232C SET UP Menu.**

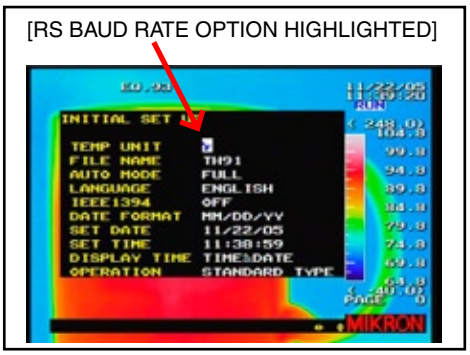
3) Toggle the JOYSTICK **up or down if needed to highlight [RS BAUD RATE].**

[RS BAUD RATE HIGHLIGHTED]



4) Toggle the JOYSTICK **to the right to highlight the RS BAUD RATE option.**

[RS BAUD RATE OPTION HIGHLIGHTED]



5) **Toggle the** JOYSTICK **up or down as needed to select the desired baud rate from the list of menu options.**

The nine baud rate options are:

110, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400

6) **Press the** JOYSTICK [E] **button to save the setting and to return to the main display.**

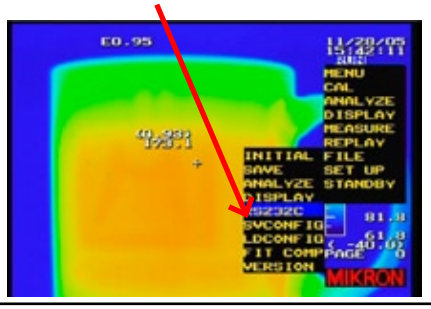
7.1.4 Setting the RS-232C Data Format (if necessary)

1) **Go to [MENU] → [SET UP] → [RS232C].**

[RS232C HIGHLIGHTED]

Standard View Menu

[RS232C HIGHLIGHTED]

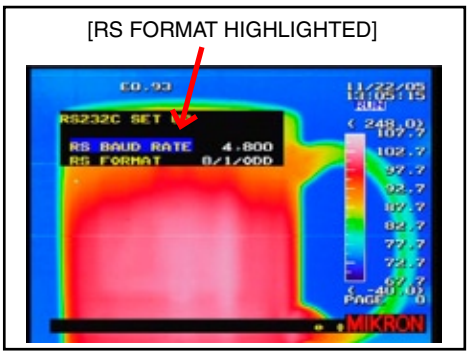


Classic View Menu

2) **Press the** JOYSTICK [E] **button to gain access to the RS232C SET UP Menu**.

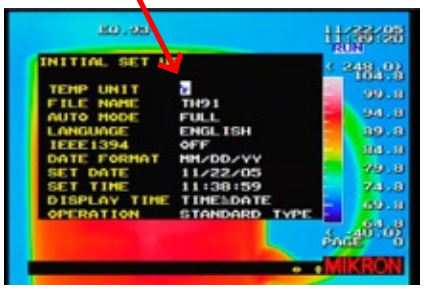
3) **Toggle the** JOYSTICK **up or down if needed to highlight [RS FORMAT].**

[RS FORMAT HIGHLIGHTED]



4) Toggle the JOYSTICK **to the right to highlight the RS FORMAT option.**

[RS BAUD RATE OPTION HIGHLIGHTED]



5) Toggle the JOYSTICK **up or down as needed to select the desired baud rate from the list of menu options.**

The variable options appear in the following order:

DATA LENGTH/STOP BIT/PARITY

6) Press the JOYSTICK [E] **button to save the setting and to return to the main display.**

The variable options appear in the following order:

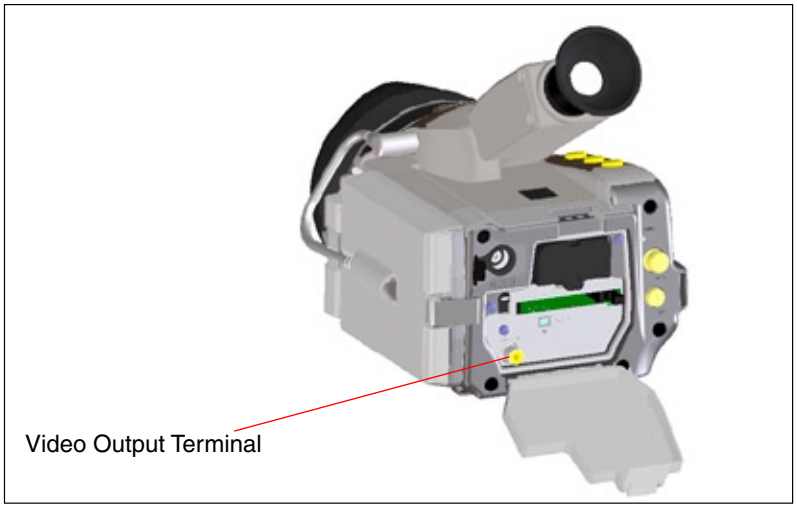
- Data Length/Stop Bit/Parity

7.2 Working with External Video Displays

The MikroScan 7600PRO provides a NTSC/PAL composite video port which is used for providing an interface for external video displays.

7.2.1 Connecting the Video Display Cable

Before connecting the display cable to your MikroScan 7600PRO, it is important that the power switch on the camera be in the off position. It is also important that the power to the video display remains off until all connections have been made.



1) **Verify that the power switch is in the off position on both the camera and the Video Monitor.**
2) **Open the cover on the back side of the camera.**
3) **Connect the display cable connector to the video output terminal on the camera.**
4) **Turn the power switch on the camera to the on position.**
5) **Turn the power switch on the Video Monitor to the on position.**

7.2.2 Setting the Video Display Parameters

7.2.2.1 Setting the TV System (Video Output Mode)

The 7600PRO offers two video output mode choices:

Mode	Details
[NTSC] (DEFAULT)	Used to select the 60-Hz American Standard (NTSC) video output option.
[PAL]	Used to select the 50-Hz European Standard (PAL) video output option. (Note: When the instrument has been set to the PAL video output mode, the LCD or visual image display, save, and replay are not available).

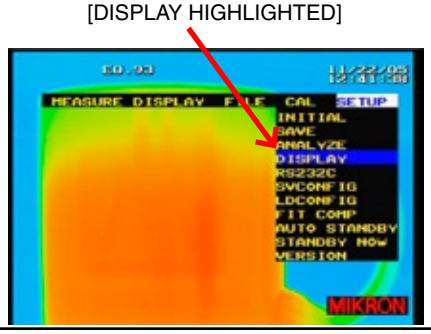
Caution

The MikroScan 7600PRO does not meet IP54 standards while the rear cover remains open.

To set the TV System (Video Output Mode):

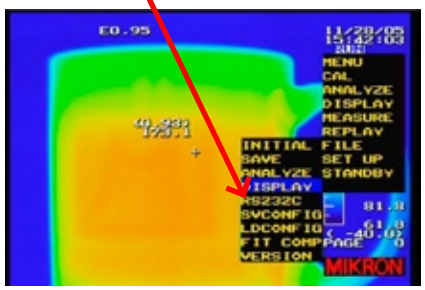
1) **Go to [MENU] → [SETUP] → [DISPLAY].**

[DISPLAY HIGHLIGHTED]



Standard View Menu

[DISPLAY HIGHLIGHTED]

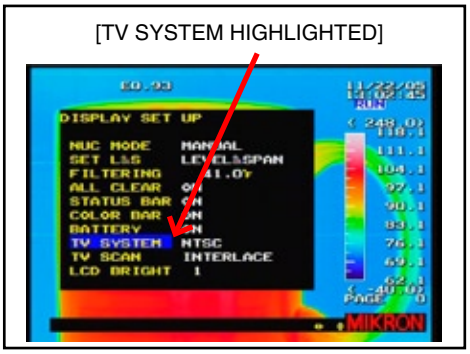


Classic View Menu

2) **Press the** JOYSTICK [E] **button to gain access to the DISPLAY SET UP Menu**.

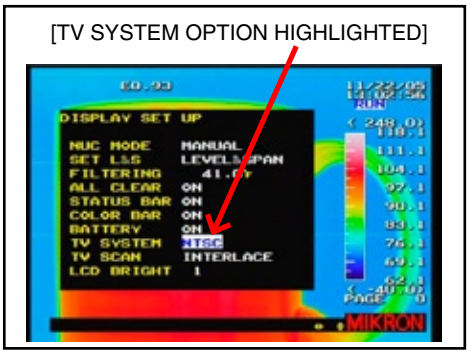
3) **Toggle the** JOYSTICK **up or down to highlight TV SYSTEM from the list of menu choices.**

[TV SYSTEM HIGHLIGHTED]



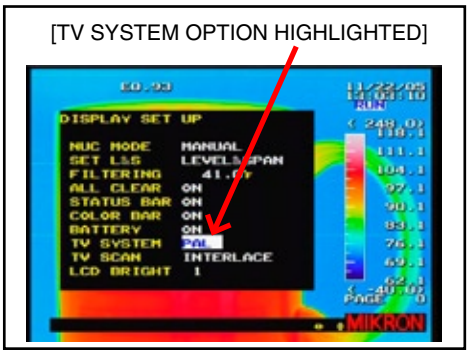
4) **Toggle the** JOYSTICK **to the right to highlight the TV System (video output mode) option.**

[TV SYSTEM OPTION HIGHLIGHTED]



5) Toggle the JOYSTICK **up or down as needed to select the desired option.**

[TV SYSTEM OPTION HIGHLIGHTED]



The TV System (video output mode) options are:

- NTSC (DEFAULT)
- PAL

6) Press the JOYSTICK [E] **button to lock the setting and to return to the main display.**

7.2.2.2 Setting the TV Scanning Mode

When images or image frames are displayed on a monitor, they are displayed as rows of pixels with each row being “painted” on the screen from left to right. Once the first row of pixels has been scanned the process continues until the entire ‘scene’ has been scanned and displayed. Because the 7600PRO offers a resolution of 640 x 480, this means that each image or image frame would include 480 individual rows of pixels.

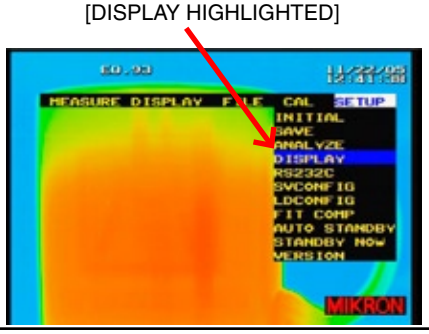
The 7600PRO offers two scanning modes. The first is the default non-interlace mode. With the non-interlace mode of scanning, the whole frame is painted at one time with each line being scanned in succession (i.e. 1,2,3,4,5, etc.) from top to bottom.

The second mode is the interlace mode. With the interlace mode of scanning, each frame is split in two with the first pass scanning all the odd number rows, and the second pass scanning all the even number rows. Basically, this results in the display being refreshed from top to bottom twice as frequently as in the non-interlaced case

To set the TV Scanning Mode:

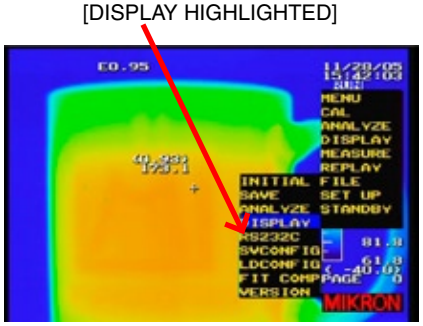
1) Go to [MENU] → [SETUP] → [DISPLAY].

[DISPLAY HIGHLIGHTED]



Standard View Menu

[DISPLAY HIGHLIGHTED]

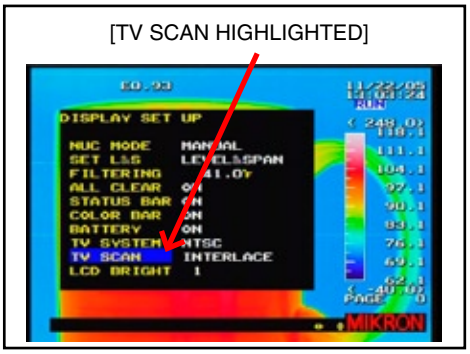


Classic View Menu

2) Press the JOYSTICK [E] **button to gain access to the DISPLAY SET UP Menu**.

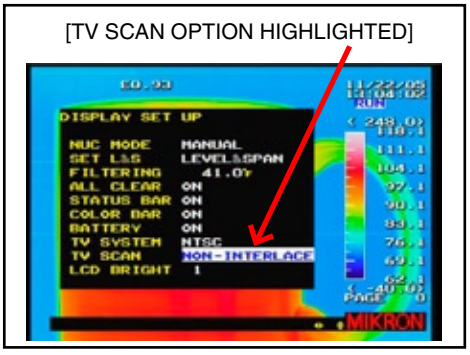
3) Toggle the JOYSTICK **up or down to highlight TV SCAN from the list of menu choices.**

[TV SCAN HIGHLIGHTED]



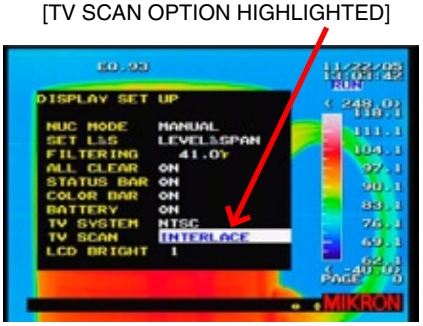
4) Toggle the JOYSTICK **to the right to highlight the TV Scan option.**

[TV SCAN OPTION HIGHLIGHTED]



5) **Toggle the** JOYSTICK **up or down as needed to select the desired option.**

[TV SCAN OPTION HIGHLIGHTED]



The TV Scan options are:

- NON-INTERLACE (DEFAULT)
- INTERLACE

7.3 Working with Communication Interfaces

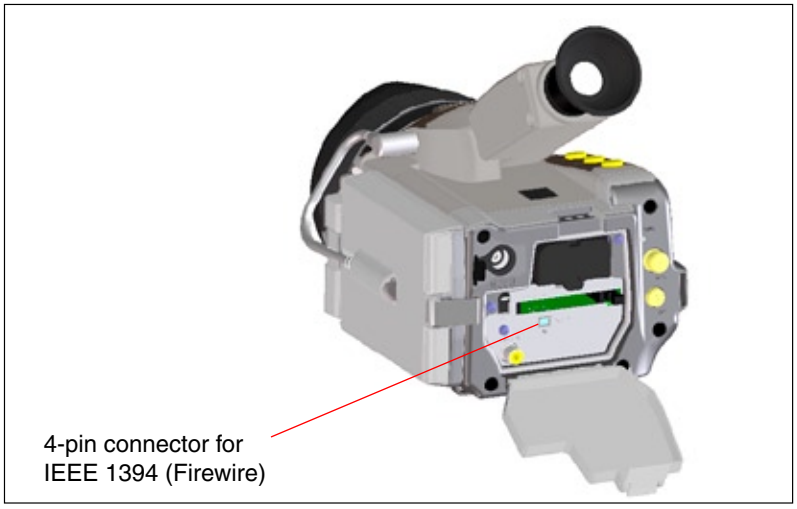
The MikroScan 7600PRO has the ability to communicate in Real-Time with a remote computer (running the MikroSpec RT software) through the IEEE 1394 (FireWire®) interface, which provides remote camera control functionality and real-time data acquisition and analysis.

7.3.1 Connecting the communication cable

Caution

The MikroScan 7600PRO does not meet IP54 standards while the rear cover remains open.

Before connecting the communication cable to your MikroScan 7600PRO, it is important that the power switch on the camera be in the off position. It is also important that the power to remote computer remains off until all connections have been made.



1) **Verify that the power switch is in the off position on both the camera and the remote computer.**
2) **Open the cover on the back side of the camera.**

3) **Connect the appropriate communication interface cable to the FireWire port.**

4) **Turn the power switch on the camera to the on position.**

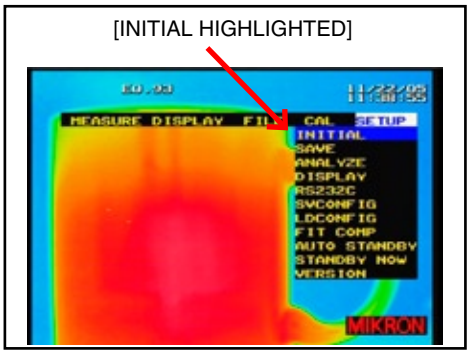
5) **Turn the power switch on the remote computer to the on position.**

6) **Follow the instructions outlined in the MikroSpec RT Manual.**

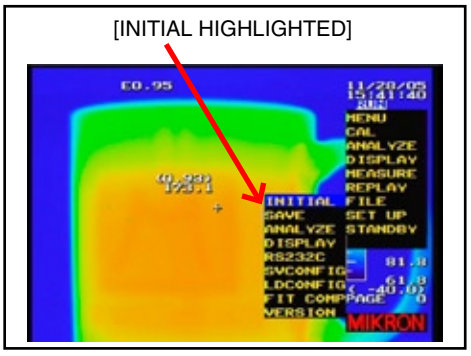
7.3.2 Activating the IEEE 1394 Functionality

To activate the IEEE 1394 Functionality:

1) **Go to [MENU] → [SET UP] → [INITIAL].**



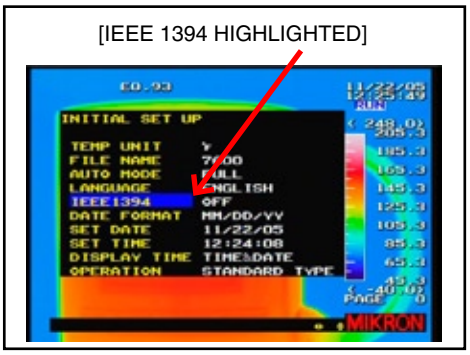
Standard View Menu



Classic View Menu

2) **Press the** JOYSTICK [E] **button to gain access to the INITIAL SET UP Menu**.

3) **Toggle the** JOYSTICK **up or down if needed to highlight [IEEE 1394].**



4) Toggle the JOYSTICK **to the right to highlight the IEEE 1394 option.**

[IEEE 1394 OPTION HIGHLIGHTED]

5) Toggle the JOYSTICK **up or down as needed to select the desired IEEE 1394 option.**

The IEEE 1394 options are:

- ON [IEEE1394 supported] (DEFAULT)
- OFF [IEEE1394 no supported]

6) Press the JOYSTICK [E] **button to lock the setting and to return to the main display.**

7.4 Calibrating the Instrument

The calibration function has two modes: REF CAL and ERSP CAL.

The two CALIBRATION modes are as follows:

Mode	Function
REF CAL	The REF CAL (Reference Calibration) mode is used when the surface to be measured has a low emissivity (high reflectivity) and the surface temperature is low or close to ambient. It is also used when the surface is reflecting energy originating from ambient conditions or some other source that cannot be shielded or compensated for by use of the emissivity setting. To correct for the error, the MikroScan 7600PRO is first aimed at the ambient or other source of error. It then generates a compensation signal to correct all subsequent measurements of the same scene.
ERSP CAL	The ERSP CAL (External Response Calibration) mode is used when the instrument is being operated in ambient temperatures close to the upper (40°C) or lower (0°C) ambient limits of the instrument's operation specification. The use of a blackbody source capable of temperatures in excess of 60°C to 70°C is recommended. In performing this calibration, REF CAL is performed in advance.

Caution

Users who are not familiar with terms such as emissivity, reflectance, and blackbody are recommended to read the section on Principles of Infrared Temperature Measurement in Section 8 of this manual.

Caution

In both the REF CAL and the ERSP CAL procedures, the instrument must be allowed to stabilize for 10 minutes after the Power has been turned "on." The instrument should be calibrated prior to making any set of measurements.

7.4.1 Performing a REF CAL (Reference Calibration)

1) **Verify the display is in Run mode.**

2) **Go to [MENU] → [CAL] → [REF CAL].**

[REF CAL HIGHLIGHTED]

Standard View Menu

[REF CAL HIGHLIGHTED]

Classic View Menu

3) **Press the** JOYSTICK [E] **button to begin the REF CAL function.**

The task bar will display PUT THE LENS CAP ON.

4) **Attach the Lens Cap**

5) **Press the** JOYSTICK [E] **button to begin the** REF CAL

The instrument will go into the FREEZE mode and PROCESSING will be displayed on the task bar for about 5 or 6 seconds, during which time the calibration will be completed.

6) **Remove the Lens Cap**

7.4.2 Performing a ERSP CAL (External Response Calibration)

Caution

In both the REF CAL and the ERSP CAL procedures, the instrument must be allowed to stabilize for 10 minutes after the Power has been turned "on." The instrument should be calibrated prior to making any set of measurements.

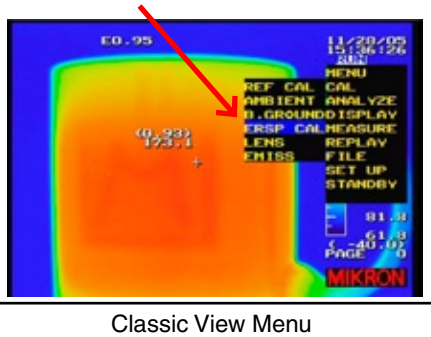
1) **Verify the display is in Run mode.**

2) **Go to [MENU] → [CAL] → [ERSP CAL].**

[ERSP CAL HIGHLIGHTED]

Standard View Menu

[ERSP CAL HIGHLIGHTED]



Classic View Menu

3) **Press the** JOYSTICK [E] **button to begin the REF CAL function.**

The task bar will display PUT THE LENS CAP ON.

Caution

The blackbody or hot plate must be higher than 70°C if Range 1 is being used and higher than 150°C if Range 2 is being used. The diameter of the source must be greater than the Field of View of the instrument at any given distance. A typical source diameter for calibration is 100cm at 10 cm distance.

4) Attach the Lens Cap

5) Press the JOYSTICK [E] **button to begin a** REF CAL

The instrument will go into the FREEZE mode and PROCESSING will be displayed on the task bar for about 5 or 6 seconds, while a REF CAL is being completed. After the REF CAL has been completed, the task bar will display HIGH TEMP PLEASE.

6) Remove the Lens Cap

7) Point the instrument at a blackbody source or uniform hot plate.

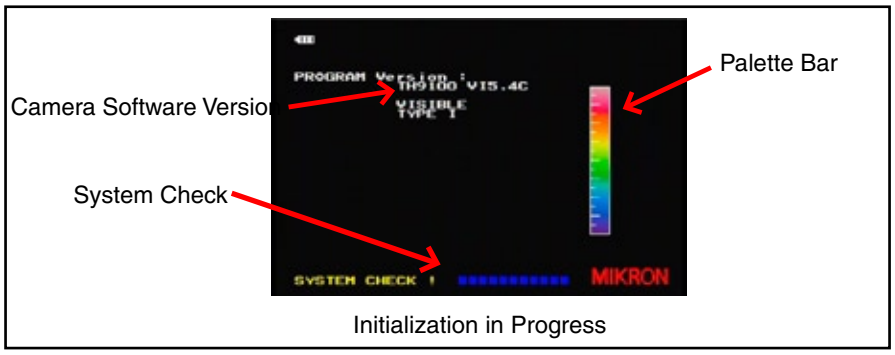
8) Press the JOYSTICK [E] **button to begin an** ERSP CAL.

The instrument will go into the FREEZE mode and PROCESSING will be displayed on the task bar for about 5 or 6 seconds, while the ERSP CAL is being completed.

9) Press the JOYSTICK [E] **button to return to normal operation.**

7.5 Returning all Settings to Default Values

1) Press and hold the RUN/FREEZE [R] **button and the** AUTO [A] **button simultaneously while moving the power switch to the on position.**



Initialization in Progress

Once the power switch has been turned on, the camera will enter an initialization mode. As this process begins, a [CONDITION INITIAL] message will appear on the display offering you the choice of returning the instrument to its default values or to have the instrument retain its former settings.

2) Press the RUN/FREEZE [R] **button to select OK:enter**

Once the RUN/FREEZE button has been selected, the camera will continue through the initialization process. Once the initialization process has been completed, the camera enters the run mode and all settings will have been returned to the instruments default values.

OR

2) Press the CANCEL [C] **button to select NO:cancel**

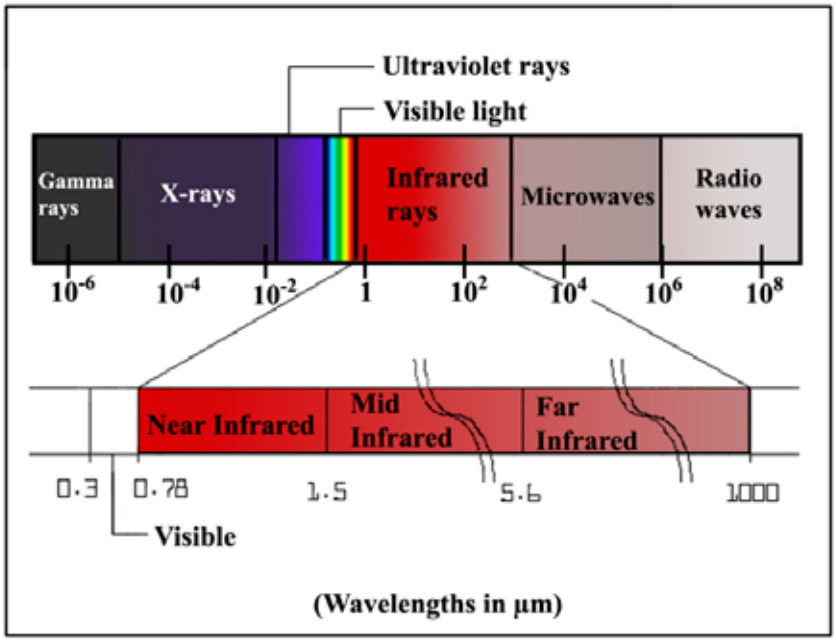
Once the MODE button has been selected, the camera will continue through the initialization process. Once the initialization process has been completed, the camera enters the run mode and all settings will have retained their former values.

Principle of Thermal Imaging

All materials, which are above 0 degrees Kelvin (-273 degrees C), emit infrared energy. The infrared energy emitted from the measured object is converted into an electrical signal by the imaging sensor (microbolometer) in the camera and displayed on a monitor as a color or monochrome thermal image. The basic principle is explained as follows:

8.1 Infrared Radiation

The infrared ray is a form of electromagnetic radiation the same as radio waves, microwaves, ultraviolet rays, visible light, X-rays, and gamma rays. All these forms, which collectively make up the electromagnetic spectrum, are similar in that they emit energy in the form of electromagnetic waves traveling at the speed of light. The major difference between each 'band' in the spectrum is in their wavelength, which correlates to the amount of energy the waves carry. For example, while gamma rays have wavelengths millions of times smaller than those of visible light, radio waves have wavelengths that are billions of times longer than those of visible light.



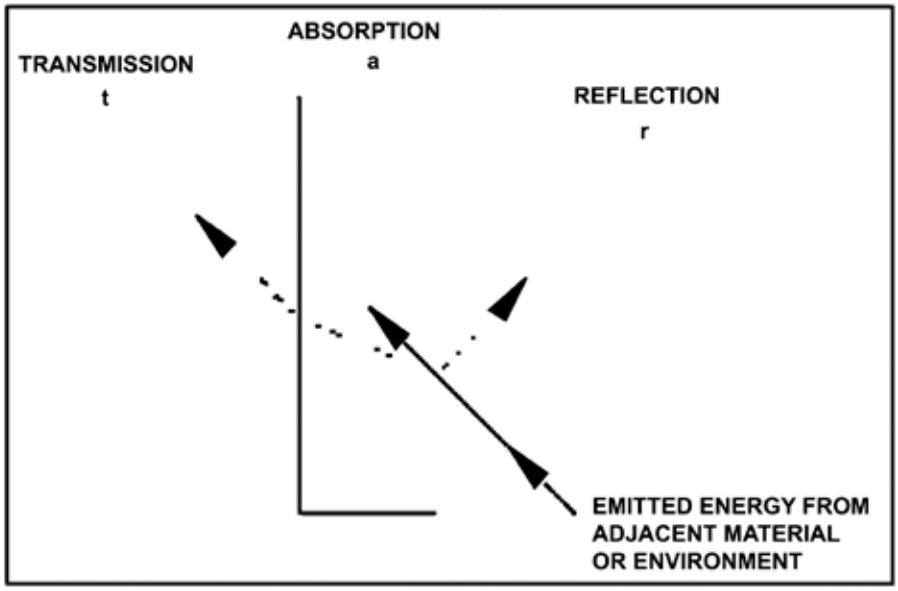
A Spectrum of Electromagnetic Radiation

The wavelength of the infrared radiation 'band' is 0.78 to 1000µm (micrometers). This is longer than the wavelength of visible light yet shorter that radio waves. The wavelengths of infrared radiation are classified from the near infrared to the far infrared.

8.2 Emissivity

Infrared radiation is energy radiated by the motion of atoms and molecules on the surface of object, where the temperature of the object is more than absolute zero. The intensity of the emittance is a function of the temperature of the material. In other words, the higher the temperature, the greater the intensity of infrared energy that is emitted. As well as emitting infrared energy, materials also reflect infrared, absorb infrared and, in some cases, transmit infrared. When the temperature of the material equals that of its surroundings, the amount of thermal radiation absorbed by the object equals the amount emitted by the object.

Transmission, Absorption, and Reflection of Infrared Energy



The figure above shows the three modes by which the radiant energy striking an object may be dissipated. These modes of dissipation are:

a = absorption
t = transmission
r = reflection

The fractions of the total radiant energy, which are associated with each of the above modes of dissipation, are referred to as the absorptivity (a) transmissivity (t) and the reflectivity (r) of the body. According to the theory of conservation of energy, the extent to which materials reflect, absorb and transmit IR energy is known as the emissivity of the material.

8.3 Blackbody Radiation

The emissivity of a body is defined formally by the equation below as the ratio of the radiant energy emitted by the body to the radiation, which would be emitted by a blackbody at the same temperature.

$$e = \frac{W_o}{W_{bb}}$$

Where,

W_o = total radiant energy emitted by a body at a given temperature T.
W_{bb} = total radiant energy emitted by a blackbody at the same temperature T.

Note:
A blackbody is a theoretical surface, which absorbs and re-radiates all the IR energy it receives. It does not reflect or transmit any IR energy. Perfect blackbody surfaces do not exist in nature.

If all energy falling on an object were absorbed (no transmission or reflection), the absorptivity would equal to 1. At a steady temperature, all the energy absorbed could be re-radiated (emitted) so that the emissivity of such a body would equal 1. Therefore in a blackbody,

absorptivity = emissivity = 1

Practical real life objects do not behave exactly as this ideal, but as described with transmissivity and reflectivity,

absorptivity + transmissivity + reflectivity = 1

Energy radiated from the blackbody is described as follows [“Planck’s Law”.]

Planck’s Law

(1) $$W_\lambda = \frac{C_1}{\lambda^5 (e^{C_2/\lambda T} - 1)}$$

In order to obtain total radiant emittance of the blackbody, integrate the equation (1) through all wavelengths (0 to infinity). The result is as follows and is called “Stefan-Bolzmann equation.”

Stefan Bolzmann’s equation

(2) $$W = e\sigma T^4$$

The temperature of blackbody can be obtained directly from the radiant energy of the blackbody by this equation. In order to find out the wavelength on the maximum spectral radiant emittance, differentiate Planck’s law and take the value to 0.

Wien’s displacement law

(3) $$\lambda_m T = 2897.8 \mu m \cdot K$$

This equation is called “Wien’s displacement law”.

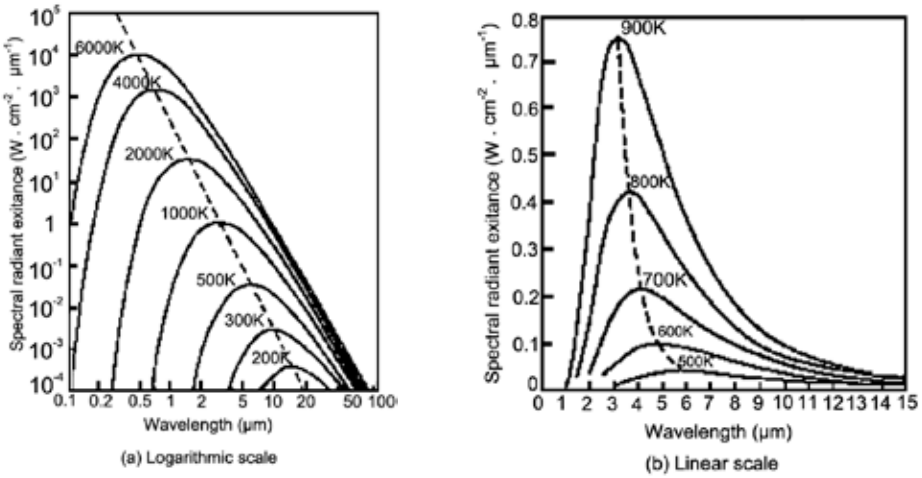
Where in (1) to (3),

$W\lambda$: *Spectral radiant emittance per unit wavelength and unit area* $[W/cm^2\ \mu m]$
λm : *Wavelength of maximum spectral radiant emittance* $[\mu m]$
λ : *Wavelength* $[\mu m]$
h : *Planck’s constant* $= 6.6261\times10^{-34}\ [W\cdot s^2]$
T : *Absolute temperature* $[K]$
c : *Light velocity* $= 2.9979\times10^{10}\ [cm/s]$
K : *Bolzmann constant* $= 1.3807\times10^{-23}\ [W\cdot s/K]$
s : *Stefan-Bolzmann constant* $= 5.6705\times10^{-12}\ [W/cm^2\cdot K^4]$
$c1$: *Fist radiation constant* $= 3.7418\times10^{4}\ [/cm^2\cdot \mu m^4]$
$c2$: *Second radiation constant* $= 1.4388\times10^{4}\ [\mu m\cdot K]$

In radiation of a normal object, as the emissivity is (<1) times of the blackbody, multiply above equation by the emissivity. The following figures show the spectral radiant emittance of a blackbody.

(a) is shown by logarithmic scale and (b) is shown by linear scale.

Spectral radiant emittance of a blackbody



The graphs show that wavelength and spectral radiant emittance vary with the temperature. They also show that as the temperature rises, the peak of spectral radiant emittance is shifting to shorter wavelengths. This phenomenon is observable in the visible light region as an object at a low temperature appears red, and as the temperature increases, it changes to yellowish and then whitish color—thus shifting to shorter & shorter wavelengths as the temperature increases.

8.4 Blackbody Type Source and Emissivity

Although a blackbody is actually only a theoretical ideal, an object can be manufactured which approximates it. A law closely related to the blackbody is Kirchhoff's law that defines reflection, transmission, absorption and radiation.

a = e = 1

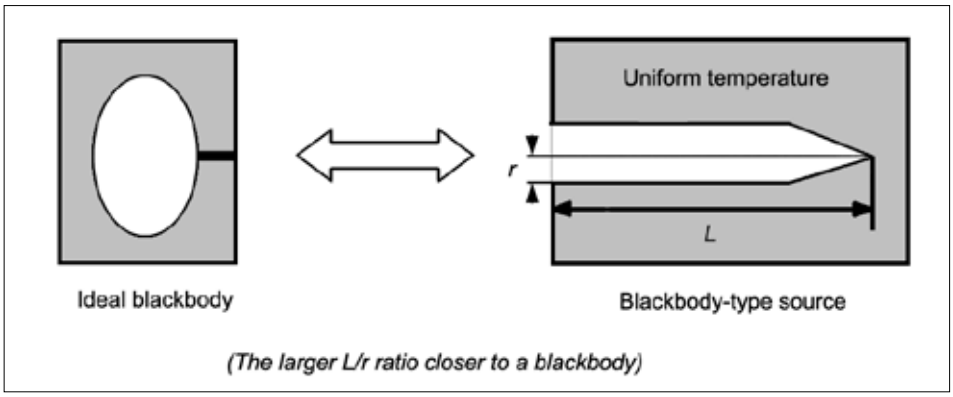
Absorptivity equals emissivity, thus emissivity can be described by reflectivity and transmissivity.

a + t + r = 1

Key:
a = absorptivity
t = transmissivity
r = reflectivity
e = emissivity

In order to obtain the true temperature of an object, it is necessary to obtain the emissivity correctly. Therefore, the emissivity of the object has to be measured by using a blackbody-type source which is closest to an ideal blackbody as possible. The blackbody-type source can be designed to meet the conditions pointed out by Kirchoff where "the radiation within an isothermal enclosure is blackbody radiation."

As a blackbody-type source for a measurement must radiate outside of the enclosed surface, a small hole is cut through the wall of the enclosure small enough not to disturb the blackbody condition. The radiation leaving this hole should closely approximate that of a blackbody. When the diameter of the hole is as 2r and the depth is as L, if L/r is equal or more than 6, it is used as a blackbody-type source for practical use. The following figure shows an example of a blackbody-type source based on blackbody conditions.



(The larger L/r ratio closer to a blackbody)

8.5 Determining Emissivity

Emissivity is the ratio of energy radiated from an object to the exterior and energy radiated from a blackbody. The emissivity varies with the surface condition of the object and also with temperature and wavelength. If this value is not accurate, then the true temperature cannot be measured. In other words, a variation or change in emissivity will cause a change in the indications on a thermal imager.

To approach the true temperature therefore,

> The emissivity must approximate 1.0 (➡ The measured object must be nearly a blackbody.)
>
> The emissivity must be corrected. (➡ The emissivity of the measured object must be internally corrected to 1 by the thermal imager.)

Therefore, in order to perform correct measurement for true temperature, the emissivity is determined as follows:

1) By means of a printed table

Various books and literature carry physical constants tables, but if the measuring condition is not identical, the constants may not usable. In such cases the literature should be used only for reference.

2) Determination by ratio — Option 1

A contact-type thermometer is used to confirm that the measured object is in thermal equilibrium and that the blackbody-type source is at the same temperature. The object and the blackbody-type source are then measured with the radiation thermometer and the resulting energy ratio is then used to define the emissivity as follows:

> EK : energy of blackbody-type source
>
> ES: energy of measured object
>
> X: emissivity of measured object

EK : ES = 1 : X

Where,

3) Determination by ratio — Option 2

An object, resembling a blackbody, is attached to a heat source to make the temperature of the blackbody part and the measuring object the same. The ratio of infrared radiation energies are then determined as in #2 above.

4) Comparison with blackbody surface — Option 1

A very small hole is made in the measured object to satisfy the aforementioned blackbody conditions, and to make the temperature of the entire object uniform. Then, using the emissivity correcting function of thermal imager, the emissivity is reduced until the temperature of the point to be measured equals the temperature of the small hole measured at an emissivity of 1. The emissivity setting should be the emissivity of the object. (This applies only when the conditions are the same as at measurement.)

5) Comparison with blackbody surface — Option 2

If a small hole cannot be made in the object, then the emissivity can be obtained by applying black paint to the object and reaching a thermal equilibrium through similar procedures. But since the painted object will not provide a complete blackbody, the emissivity of the painted object needs to be set first and then the temperature can be measured. The following figure shows examples of blackbody paint.

Examples of Blackbody Paint

Item Name	Emissivity	Measuring Wavelength
Heat-Resistant Paint (Black)	0.96	8 to 13µm
Heat-Resistant Paint (Black)	0.95	3 to 5.3µm
Niflon Tape	0.94	8 to 13µm

Note:
For low temperatures, masking tape or cornstarch can be used.

8.6 Background Noise

When measuring the temperature of an object by a radiation thermometer, it is important to take into consideration the above-mentioned emissivity correction as well as the environmental conditions where the measurements will be performed.

Infrared rays enter the thermal imager from the measuring object as well as all other objects nearby. Therefore, in order to avoid this influence, a function of environment reflection correction, etc. is required. Also, when accurate data is required, it is necessary to minimize the influence by shortening the transmission route of the infrared ray, for example.

The following methods may be useful to reduce background noise.

1) Shorten the distance between the measured object and of the thermal imager. Please keep a safe distance to protect the operator as well as the instrument.
2) Have no high temperature object behind the measured object, such as the sun shining on the back of the measured object.
3) Do not allow direct sunlight to strike thermal imager.
4) Do not allow obstacles such as dust or vapor (which attenuates the infrared signal) between the measured object and the thermal imager.

8.7 Practical Measurement

There are a number of methods for correcting emissivity in order to obtain the true temperature. The correction procedure with each method will be explained next.

(1) Method of comparison or direct measurement with emissivity equal to approximately 1.0

a) Stabilize the temperature of the measured object or similar material.

b) Open a very small hole (hereafter called blackbody part) in the object which the thermal imager must measure as to satisfy blackbody conditions.

c) Then set the emissivity correcting function of thermal imager so that the temperature of the blackbody part and the measured surface will be the same. The obtained emissivity will be the emissivity of the measured surface.

d) Thereafter when measuring the same type object, it is unnecessary to change the emissivity setting.

Note:
If you already know the emissivity, you can make thermal imaging measurements immediately.

(2) Method of direct measurement of emissivity

If a hole cannot be made as in method 1, then apply black high emissivity paint and carry out the same procedures to obtain the emissivity. Since the black paint will not provide a perfect blackbody, first set the emissivity of the black paint and then measure the temperature.

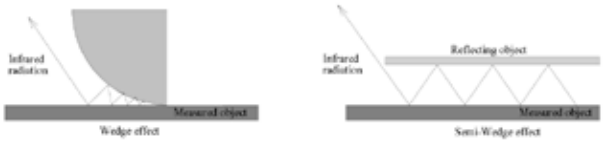
(3) Indirect measurement

Measure a sample similar to the measured object, and place it in a condition able to be heated by a heater, etc. Then measure the object and the sample alternately with the camera and when the indicated values are identical, measure the sample with a contact-type thermometer. Adjust the emissivity of the thermal imager to cause the temperature readout to match that of the contact measurement. The resulting emissivity is that of the sample.

(4) Measuring by Wedge effect

With this method, the emissivity of the measured surface itself is enhanced through use of the wedge or semi-wedge effect. But one must be careful about the number of reflections and/or the measuring angle.

A small change in angle will reduce the emissivity enhancement.



Measuring by Wedge effect

8.8 Emissivity of Various Materials

From "Infrared Radiation, a Handbook for Applications "by Mikael A. Bramson

Material		Temperature °C	Emissivity ε
Aluminum	Polished	50 to 100	0.04 to 0.06
	Rough surface	20 to 50	0.06 to 0.07
	Strongly oxidized	50 to 500	0.20 to 0.3
	Aluminum bronze	20	0.6
	Aluminum oxide, pure, powder	Normal temperature	0.16
Brass	Dull, tarnished	20 to 350	0.22
	Oxidized at 600°C	200 to 600	0.59 to 0.61
	Polished	200	0.03
	Sheet, worked with emery	20	0.2
Bronze	Polished	50	0.1
	Porous, rough	50 to 150	0.55
Chromium	Polished	50	0.1
		500 to 1000	0.28 to 0.38
Copper	Commercial, burnished	20	0.07
	Electrolytic, carefully polished	80	0.018
	Electrolytic, powder	Normal temperature	0.76
	Molten	1100 to 1300	0.13 to 0.15
	Oxidized	50	0.6 to 0.7
	Oxidized to blackness	5	0.88
Iron	Covered with red rust	20	0.61 to 0.85
	Electrolytic, carefully polished	175 to 225	0.05 to 0.06
	Freshly worked with emery	20	0.24
	Oxidized	100	0.74
		125 to 525	0.78 to 0.82
	Hot rolled	20	0.77
		130	0.60
Lead	Gray, oxidized	20	0.28
	Oxidized at 200°	200	0.63
	Red, powder	100	0.93
	Lead sulfate, powder	Normal temperature	0.13 to 0.22
Mercury		0 to 100	0.09 to 0.12
Molybdenum		600 to 1000	0.08 to 0.13
	Filament	700 to 2500	0.10 to 0.30
Nichrome	Wire, clean	50	0.65
		500 to 1000	0.71 to 0.79
	Wire, oxidized	50 to 500	0.95 to 0.98
Nickel	Commercially pure, polished	100	0.045
		200 to 400	0.07 to 0.09
	Oxidized at 600°C	200 to 600	0.37 to 0.48
	Wire	200 to 1000	0.1 to 0.2
	Nickel oxide	500 to 650	0.52 to 0.59
		1000 to 1250	0.75 to 0.86

8.8 Emissivity of Various Materials (continued)

Material		Temperature °C	Emissivity ε
Platinum		1000 to 1500	0.14 to 0.18
	Pure, polished	200 to 600	0.05 to 0.10
	Ribbon	900 to 1100	0.12 to 0.17
	Wire	50 to 200	0.06 to 0.07
		500 to 1000	0.10 to 0.16
Silver	Pure, polished	200 to 600	0.02 to 0.03
Steel	Alloy (8% Ni , 18% Cr)	500	0.35
	Galvanized	20	0.28
	Oxidized	200 to 600	0.80
	Oxidized strongly	50	0.88
		500	0.98
	Rolled freshly	20	0.24
	Rough plane surface	50	0.95 to 0.98
	Rusty, red	20	0.69
	Sheet, ground	950 to 1100	0.55 to 0.61
	Sheet, nickel-plated	20	0.11
	Sheet, polished	750 to 1050	0.52 to 0.56
	Sheet, rolled	50	0.56
	Stainless, rolled	700	0.45
	Stainless, sandblasted	700	0.70
Cast iron	Casting	50	0.81
	Ingots	1000	0.95
	Liquid	1300	0.28
	Oxidized at 600°C	200 to 600	0.64 to 0.78
	Polished	200	0.21
Tin	Burnished	20 to 50	0.04 to 0.06
Titanium	Oxidized at 540°C	200	0.40
		500	0.50
		1000	0.60
	Polished	200	0.15
		500	0.20
		1000	0.36
Tungsten		200	0.05
		600 to 1000	0.1 to 0.16
	Filament	3300	0.39
Zinc	Oxidized at 400°C	400	0.11
	Oxidized surface	1000 to 1200	0.50 to 0.60
	Polished	200 to 300	0.04 to 0.05
	Sheet	50	0.20
Zirconium	Zirconium oxide, powder	Normal temperature	0.16 to 0.20
	Zirconium silicate, powder	do.	0.36 to 0.42

8.8 Emissivity of Various Materials (continued)

Material		Temperature °C	Emissivity ε
Asbestos	Board	20	0.96
	Paper	40 to 400	0.93 to 0.95
	Powder	Normal temperature	0.40 to 0.60
	Slate	20	0.96
Carbon	Filament	1000 to 1400	0.53
	Purified (0.9% ash)	100 to 600	0.81 to 0.79
Cement		Normal temperature	0.54
Charcoal	Powder		0.96
Clay	Fired	70	0.91
Cloth	Black	20	0.98
Ebonite		Normal temperature	0.89
Emery	Coarse	80	0.85
Lacquer	Bakelite	80	0.93
	Black, dull	40 to 100	0.96 to 0.98
	Black, shiny, sprayed on iron	20	0.87
	Heat-resistant	100	0.92
	White	40 to 100	0.8 to 0.95
Lampblack		20 to 400	0.95 to 0.97
	Applied to solid surface	50 to 1000	0.96
	With water glass	20 to 200	0.96
Paper	Black	Normal temperature	0.90
	Black, dull	Do.	0.94
	Green	Do.	0.85
	Red	Do.	0.76
	White	20	0.7 to 0.9
	Yellow	Normal temperature	0.72
Glass		20 to 100	0.94 to 0.91
		250 to 1000	0.87 to 0.72
		1100 to 1500	0.70 to 0.67
	Frosted	20	0.96
Gypsum		20	0.80 to 0.90
Ice	Covered with heavy frost	0	0.98
	Smooth	0	0.97
Lime		Normal temperature	0.30 to 0.40
Marble	Grayish, polished	20	0.93
Mica	Thick layer	Normal temperature	0.72
Porcelain	Glazed	20	0.92
	White, shiny	Normal temperature	0.70 to 0.75
Rubber	Hard	20	0.95
	Soft, gray, rough	20	0.86
Sand		Normal temperature	0.60
Shellac	Black, dull	75 to 150	0.91
	Black, shiny, applied on tin plate	20	0.82

8.8 Emissivity of Various Materials (continued)

Material		Temperature °C	Emissivity ε
Silica	Granular powder	Normal temperature	0.48
	Silicon (silica gel), powder	do.	0.30
Slag	Boiler	0 to 100	0.97 to 0.93
		200 to 500	0.89 to 0.78
		600 to 1200	0.76 to 0.70
Snow			0.80
Stucco	Rough, lime	10 to 90	0.91
Tar			0.79 to 0.84
	Tar paper	20	0.91 to 0.93
Water	Film on metal surface	20	0.98
	Layer > 0.1mm thick	0 to 100	0.95 to 0.98
Brick	Red, rough	20	0.88 to 0.93
	Fireproof clay	20	0.85
		1000	0.75
		1200	0.59
	Fireproof corundum	1000	0.46
	Refractory, strongly radiating	500 to 1000	0.80 to 0.90
	Refractory, weakly radiating	500 to 1000	0.65 to 0.75
	Silica (95% SiO2) brick	1230	0.66

Appendix

9.1 After Use Care

Proper care and storage of the instrument after measurement tasks have been completed will help to prolong the life of the instrument and avoid malfunction.

When measurements have been completed:

1) **Clean off any dirt or contamination from the camera with a soft, dry cloth.**
2) **Remove any remaining dirt and contamination with a damp cloth and a small amount of neutral detergent, then wipe dry.**
3) **Inspect the lens and the LCD for smears or dust.**

   Remove dust using a lens brush available from many camera stores. Remove smears with a lens tissue and lens cleaning fluid, also available from many camera stores.
4) **Turn the power off and replace the lens cap.**
5) **Remove any cables by gripping the connector and not the cable.**
6) **Fold down the LCD Display Hatch on the back of the camera and ensure the door is latched.**
7) **Replace the terminal covers located on the sides of the camera.**
8) **Remove and recharge the battery, if one has been used.**
9) **Place the instrument and accessories in the case provided and store it in ambient conditions that do not exceed -40°C to 70°C and 90% relative humidity.**

Caution

Do not use thinners, benzene or other chemicals to clean the lens as these will damage the lens coating.

Caution

The MikroScan 7600PRO instrument is a sealed unit. Do not attempt to open the instrument housing as this will void the Mikron warranty. Please refer to the warranty statement found in Section 1.5 of this manual.

NOTE

If you do not possess a certified calibration source, units can be purchased from Mikron, certified traceable to NIST.

Alternatively, the instrument may be returned to Mikron for calibration and certification. (See Section 1.8 of this manual to review the Procedure for Factory Repair and Return).

9.2 Maintenance

In addition to carrying out the after use care procedures listed in Section 9.1 of this manual, it is recommended that the instrument be calibrated against a certified black-body source at least once a year and that a log be kept of the calibration date and results, together with hours of operation.

If you do not possess a certified calibration source, units can be purchased from Mikron, certified traceable to NIST. Alternatively, the instrument may be returned to Mikron for calibration and certification.

9.3 Troubleshooting Symptoms

	Symptom	Probable cause	Corrective Action
1	Instrument does not power up.	Power is not turned on.	Turn on the power switch located behind the hatch cover on the back of the camera (See Section 3.5 for more information on Obtaining the First Image).
		AC Adapter is not connected.	Connect the AC adapter. (See Section 3.2.3 for more information on Connecting the AC Adapter).
		Battery is not inserted.	Install the battery. (See Section 3.2.2 for more information on Attaching the Battery Pack).
		The battery is inserted but not charged.	Charge the battery or use the AC Adapter. (See Section 3.1 for more information on Charging the Batteries or Section 3.2.2 for more information on Connecting the AC Adapter).
2	No image in viewfinder.	The display seeting for the LCD is set to LCD Off	Set the display setting for LCD to LCD On (See Section 3.7.2 for more information on Switching the Camera from Viewefinder mode to LCD Mode)
		The lens cap is on.	Remove the lens cap. (See Section 3.3 for more information on Handling the Lens Protection Cap).
		The display cable is not connected.	Connect the display cable (See Section 7.1 for more information on working with LCD Displays)
		The RS232C setting is not set to the initial value.	Set the RS232C setting to its initial value (See Section 7.1.3 and 7.1.4 for more informtion on wotking with the RS232C settings)
3	No image in viewfinder or on LCD Display	The RS232C setting is not set to the initial value.	Set the RS232C setting to its initial value (See Section 7.1.3 and 7.1.4 for more informtion on wotking with the RS232C settings)

	Symptom	Probable cause	Corrective Action
4	Measured temperature is suspected to be inaccurate.	Incorrect emissivity value is being used.	Adjust emissivity. (See Section 6.5 for more information on Working with Emissivity Settings. Also See Section 6.5.4 for more information on working with Point Emissivities).
		Error is being caused by reflected radiation.	Perform a Reference Calibration (See Section 7.4.1 for more information on Performing a REF CAL).
		Camera is not focused accurately.	Adjust focus. (See Section 4.6 for more information on Adusting the Focus).
		Calibration has not been performed recently.	Have the camera calibrated and recertified. (See Section 9.2 for information on Maintenance).
5	Image exhibits noise interference	High voltage source is located nearby.	Move camera away from source.
		Atmospheric conditions are creating static discharge.	Turn camera power “off” and delay measurements until conditions improve.
		Instrument cables are adjacent to or touching a source of electrical noise such as induction heating equipment.	Turn the camera power “off” and either turn off the source of the noise or move camera to a less noisy location.
6	Camera can not be focused	The Lens unit is not properly attached to the camera.	Turn the mounting ring of the main unit towards close and attach the lens nit to the main unit tightly.
7	Backup is impossible	The charge on the unit’s internal battery has been exhausted	Connect the AC adapter for approximately 1 hour to recharge the camer’s internal battery. (See Section 3.2.3 for more information on Connecting the AC Adapter).

9.4 Troubleshooting Error Messages

NOTE

If error messages are displayed other than those listed, please note the exact message text and notify your local Mikron representative (or call 1-201-405-0900), or fax the Mikron Service Department at 1-201-405-0090).

See Section 1.7 of this manual for information on the Procedures for Factory Repair and Return.

	Error Message	Cause	Corrective Action
1.	FILTER	Instrument is defective.	Turn off power and contact Mikron.
2.	FOCUS	Instrument is defective.	Turn off power and contact Mikron.
		The lens unit is not properly attached to the main unit.	Turn the mounting ring of the main unit towards close and attach the lens nit to the main unit tightly.
3.	STABILIZE	Instrument is defective.	Turn off power and contact Mikron.
4.	MEMORY	Instrument is defective.	Turn off power and contact Mikron.
5.	BATTERY	The battery is connected but not charged.	Charge the battery or use the AC Adapter. (See Section 3.1 for more information on Charging the Batteries or Section 3.2.3 for more information on Connecting the AC Adapter).
6.	NOT READY	The memory card has not been inserted	Insert the Memory Card.
7.	DATA MISS-MATCH	The data is not compatible with the MikroScan 7600PRO file structure.	Reformat the card using the MikroScan 7600PRO. (See Section 5.3.7 for more information on Formatting the Memory Card).
8	FULL	There is no more space on the memory card.	Make more space available by deleting unwanted files or insert a new memory card (See Section 5.3.3 for more information on deleting files).
9.	NO VISIBLE LIGHT DATA	The image was saved without a corresponding visible light image.	Activate the visible save option before saving images. (See Section 3.9.2.3 for more information on Working with the Visible Save Option).
10.	FILE NOT FOUND	Specified page of the file does not exist.	Verify that you have the correct memory card inserted in the camera
11.	I/O ERROR	The memory card is not formatted	Reformat the memory card (See Section 5.4.5 for more information on Formatting the Memory Card)

9.5 MikroScan 7600PRO Specifications

MikroScan 7600 PRO		
Performance	Temperature Range:	Range 1: -40°C to 120°C Range 2: 0°C to 500°C Range 3: 200°C to 2000°C (Optional)
	Measurement Accuracy:	±2% or 2°C of reading
	Field of View:	21.7°(H) x 16.4°(V)
	Focus Range:	30 cm to infinity
	Instantaneous FOV / Spatial Resolution:	1.2 mrad
	Image Update Rate:	60 frames per second
	Resolution:	0.06°C (at 30°C 60Hz) or 0.03°C (at 30°C Σ12)
	Detector:	320 x 240 Uncooled Focal Plane Array Microbolometer
	Spectral Band:	8.0 to 14.0 µm
Display Functions	B&W/Color Image:	Several palettes available
	Thermal/Visual Composite Image Display:	Provided
	Isothermal Band Display:	Max. 4 bands
	Multi-image display:	Replay 12 thermal images
	Multi-Sense Display:	Provided
	Line Profile:	X, Y line profile (waveform display)
Presentation	A/D Resolution	14 bit
	Annotation:	Text and voice annotation (30 sec. per image)
	Movie Recording:	Real-time memory (1664 images @ 60Hz)
	Image Processing Functions:	Variable level/sense; Multi-point temperature display (10 pts); Multi-point emissivity display (10 pts); ΔT Display; Max/Min (peak hold) temperature display; Alarm (full screen or specified box); 2x and 4x digital zoom (Run/Freeze); Box setting (max 5 boxes)
	Display:	Viewfinder and 3.5 inch LCD monitor with auto switch
	Video Output:	NTSC/PAL composite video signal, S-Video
	Image Zoom:	2:1, 4:1 (with spatial filtering)
Visual Camera	Pixels:	0.41 Mega pixels
	Effective Image Pixels:	752 (H) x 480 (V) pixels
	Field of View:	30.1° (H) x 22.7°(V)
	Sensitivity:	1 lux
	Focusing distance:	30 cm to infinity
	Auto Exposure:	Provided
	Video Signal:	NTSC
Measurement	Measuring Functions:	Run/Freeze
	S/N improvement:	Σ2, Σ8, Σ16, and spatial filter ON/OFF
	Alarm:	Screen display and alarm sound (ON/OFF)
	Interval Measurement:	Recording on memory card: 2 to 3600 sec. interval; trigger function
	Emissivity Correction:	0.10 to 1.00 (at 0.01 steps)
	Environmental Temperature Correction:	Provided (including interval NUC)
	Background Compensation:	Provided
	User Setup:	Pre-registration of user setup (max. 10 setups)
	Auto Functions:	Full automatic (level, sense, focus); level trace, auto gain control
Interface	Communication:	RS-232/C
	Storage Device:	Compact Flash Memory Card (stores thermal images in .SIT or .BMP file format; visible images in .SIT or .JPEG file format; and thermal/visual composite images in .BMP file format)
	Video Signal Output:	NTSC/PAL composite video signal, S-video
	Remote Control Operation:	IEEE1394 (Firewire®) Interface
Environmental	Operating Temperature:	-15°C to 50°C 90% Relative Humidity or less (not condensed)
	Storage Temperature:	-40°C to 70°C 90% Relative Humidity or less (not condensed)
	Environmental Protection:	IP 54 (IEC60529)
	Shock:	30G (IEC60068-2-27)
	Vibration:	3G (IEC60068-2-6)
Electrical	Power Supply:	AC adaptor: 100V to 240V, DC 7.2V (nominal)
	Power Consumption:	Approx. 6W (typical)
	Battery Operation:	Approx. 2 hours 30 minutes
Physical Characteristics:	Camera Dimensions:	4.3" x 4.5" x 7.4" (excluding projection)
	Camera Weight:	2.9 lb (excluding battery and LCD) 3.5 lb. (including battery and LCD)

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