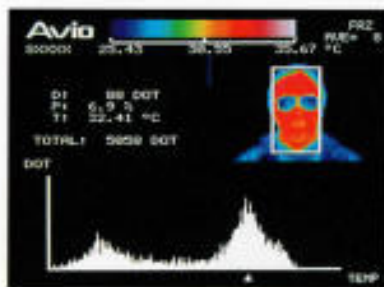


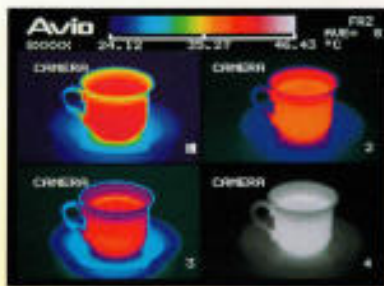


THERMAL VIDEO SYSTEM

TVS-2000MkII SERIES



*Advanced Functionality
for Process Control,
R&D and Q.C.*



NIPPON AVIONICS CO., LTD.

Advance Data Analysis Functions re-define

TVS-2000MkI is here with new features.

Three types of camera heads provide the flexibility necessary for most user applications.

■ Features

Real Time Measurement, Display and Data Storage

Frame time of 1/30 second (ST and gas type) allows measurement of moving objects and rapid temperature variations. Real Time Recorder (option) records up to 512 frames of data in real time.

12 Bit Data Storage

The 12 bit full range of thermal data is stored allowing adjustment of all parameters after recalling stored data from disk or the real time recorder.

Data Analysis Functions

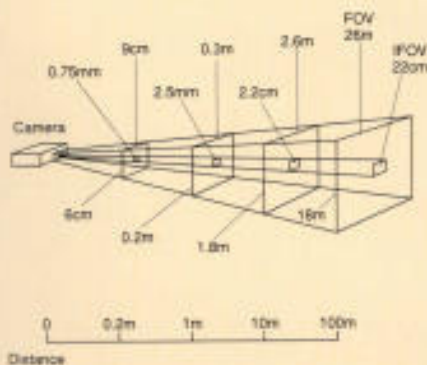
Advance data analysis functions are integral to the TVS-2000MkI.

Post analysis software, "PicEd AVIO" is available for enhanced data analysis on a personal computer.

Computer Interfaces

Both SCSI-2 and RS-232C format interfaces are available for connection to external equipment. The SCSI-2 interface allows fast data transfer to on line personal computers.

■ FOV and Distance



**Fast Frame Rate (30 frames/sec)
Low cost with
high performance.**

TVS-2000MkII

The lowest cost model of the series. The IR detector remains stable at -186°C utilizing Joule-Thompson cooling with Argon gas. This system accurately measures temperatures over the range of -40 to 2000°C .



**Fast Frame Rate (30 frames/sec)
All electric operation
by use of a Stirling Cooler.**

TVS-2000MkIIST

The Stirling cooler operates by compression and expansion of internal helium to cool the detector. This eliminates the need for the user to supply external cooling medium.



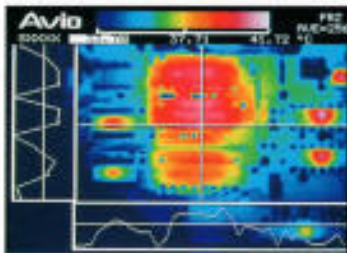
**Ideal for outdoor measurements.
Long Wave and Stirling Cooled
(All Electric Operation)**

TVS-2000MkIILW

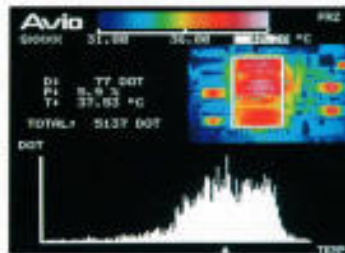
MCT (Mercury Cadmium Telluride) detector is sensitive in the $8 - 12 \mu\text{m}$ range. This eliminates the effects of sunlight reflections and enhances the accuracy of outdoor temperature measurement.

State of the art scanning thermal video systems.

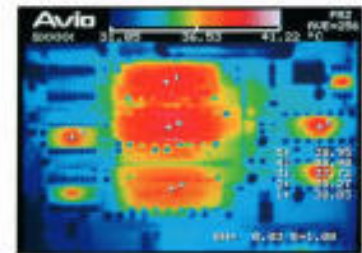
Function



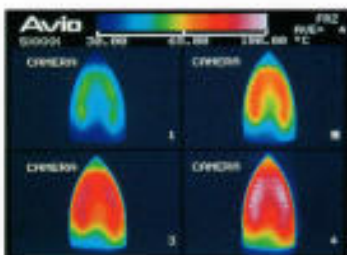
Profile



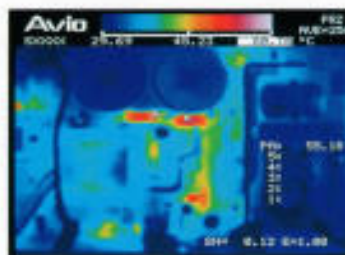
Histogram



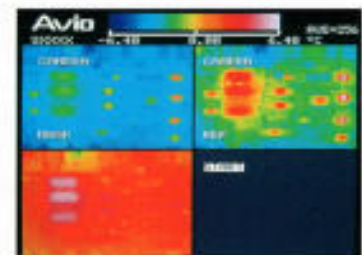
Multi Point Temperature



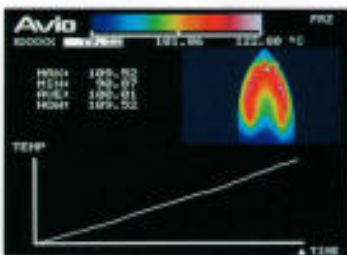
Multi Display



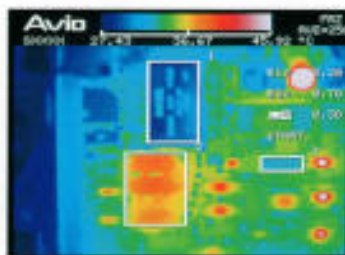
Max. Temperature



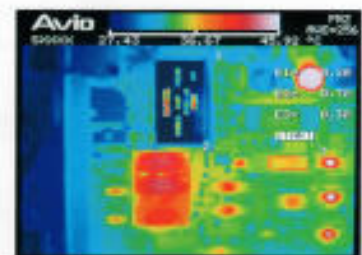
Subtraction



Trending

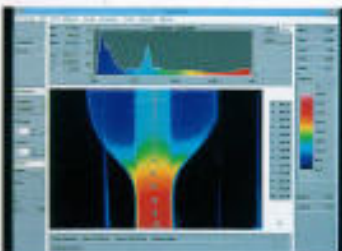


Partial Emissivity Correction

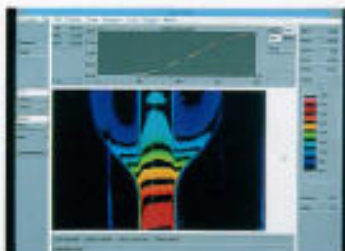


Post Analysis Software (Option)

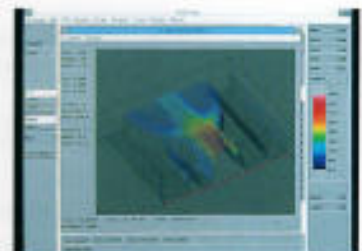
Using the data on floppy disk, more detailed analysis can be done with the user's PC and "PicEd AVIO", post analysis software. PicEd AVIO can analyze the data from the conventional TVS-2000 imagers as well as that of other TVS images.



Histogram and Multi Point Temperature

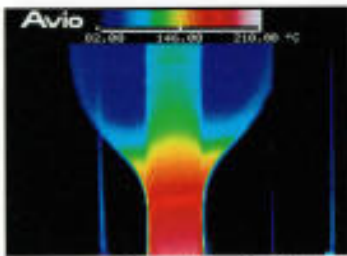


Isotherm and Temperature Profile

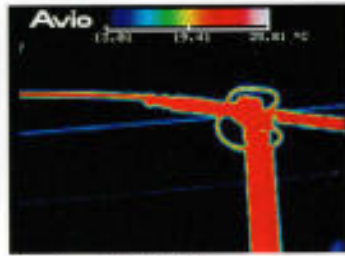


3D Display

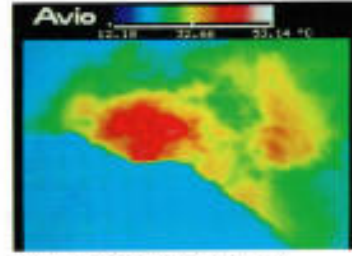
Examples of Thermographic Application



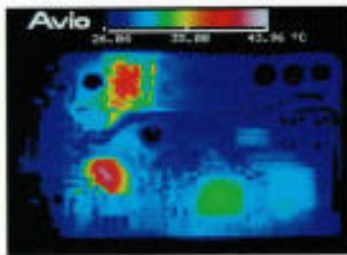
Temperature Control in Film Manufacturing



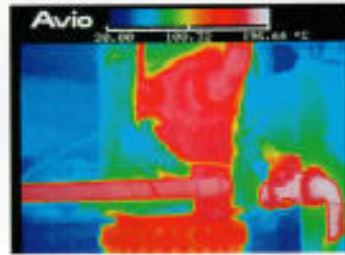
Transformer Facility (LS)



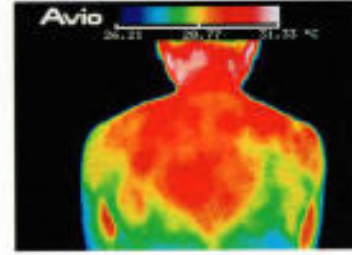
Study and Observation of Nature



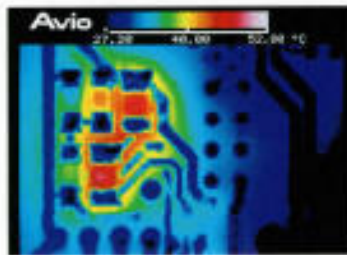
Printed Circuit Board Inspection



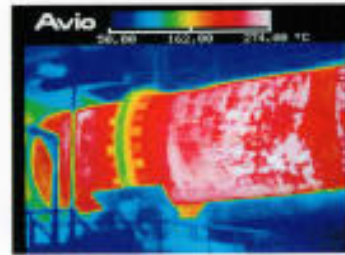
Reactor Furnace and Pipe Monitoring



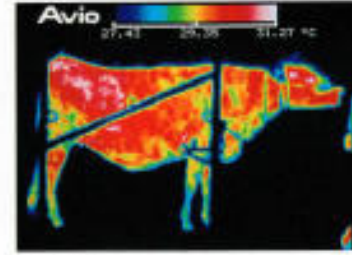
Medical



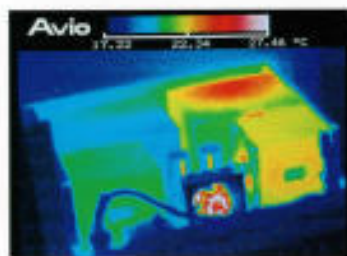
Hybrid IC Inspection



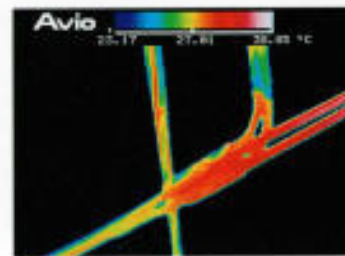
Rotary Kiln



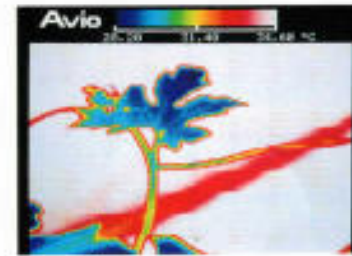
Veterinary



Thermal Design of Electronic Products



Rail Road (Feeder)



Biology (Plant)

Industrial Use

● Research & Diagnosis

Electronic Products

- Evaluation of Operating Electronic Device
- PCB Design and Evaluation
- Quality Control of LCD
- Battery Heat
- Thermal Printer Head
- Home Application (Refrigerator, Iron, Microwave, etc.)

Automotive

- Engine Diagnosis
- Tires and Brake Operation

Metal/Mechanics

- Metal Welding
- Diecast and Molding

● PPM

Electric Power

- Detection of Loose Electrical Contact
- Boiler and Turbine

Plant

- Inspection of Chimney Lining
- Inspection of Rotary Kiln
- Combustion of Stored Coal
- Building & Construction
- Surface Material Quality
- Heating and Air Conditioning
- Insulation

University/Government/Miscellaneous

Medical Biological

- Blood Flow
- Research
- Athletics
- Plants
- Animals

Miscellaneous

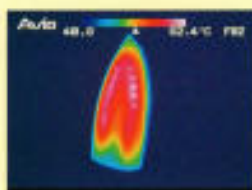
- Natural Disasters
- Cosmetics
- Foods

Flexibility of the System

TVS-2000MkII Options

Visible Mixer Unit TV-2003

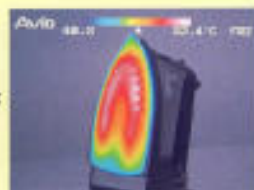
Visible Mixer Unit displays overlays of the thermal image (color) on a visible image (B/W) on the monitor. The degree of mix level is adjustable allowing easier identification of the target object.



Thermal Image



Visible Image



Mixed Image

Optics



Wide Angle Lens

- 2X
- 3X
- 4X



Telescope Lens

- 2X
- 4X (※)



Close Up Lens

- Resolution: 250 μm
- Resolution: 85 μm



Microscope Set

- Resolution: 25 μm (※)

※ not available for LW

Camera Head



Extender Cable
20m



Processor



Film Recorder
FR-1100/FR-2000
Makes the clear hard copy of thermal images.



RGB Monitor

On Line - SCSI-2

Off Line

FD



PC
Data can be transferred by SCSI-2 or FD. PicED AVIO analyzes the data.



Printer



Real Time Recorder

The Real Time Recorder is installed with MOD (magnetic-optical disk) drive inside the processor unit. 512 images may be recorded at time intervals of 60 minutes down to real time (1/30 second on ST and gas type). The MOD will store up to 2048 images and allows easy transfer to any compatible PC with a MOD reader. Once transferred to the PC, the images may be analyzed with the post analysis software.

Argon Gas Cylinder for TVS-2000MkI

200cc cylinder w/o gas (PE-G11S)

For cooling the infrared sensor.

Gas pressure 350kg/cm²

Hours about 4 hours



51mm (φ) X 255mm (L) 1.0kg

Fitting Hose for TVS-2000MkI

Special hose for connecting the camera head to large argon gas cylinders.

• Standard pressure: 150kg/cm²

• Length: 2m (PE-G13) 20mm (φ) 0.8kg

• Length: 5m (PE-G16) 20mm (φ) 1.8kg



Carrying Case

Fiber reinforced plastic case for carrying standard items (except the tripod).



Specification

	TVS-2000MkII	TVS-2000MkIIIST	TVS-2000MkIILW	
Cooling Method	Argon gas	Stirling Cooler		
Detector	InSb (Indium Antimonide)	MCT (Mercury Cadmium Telluride)		
Spectral Range	3 - 5.4 μ m	8 - 12 μ m		
Scan Speed	30 frames/second	15 frames/second		
Temperature Resolution	0.1°C at 30°C black body, 0.05°C with signal/noise improvement made by frame averaging			
Accuracy	$\pm 0.4\%$ (full scale)			
Field of View (FOV)	15° (H) \times 10° (V)			
IFOV	2.2mrad			
Focus Distance	20cm - ∞			
Displayable Pixels	256 (H) \times 200 (V)			
A/D Conversion	12 bit full range			
Auto Temperature Compensation	Yes			
Functions	Multi Point Temperature Readout (max. 5 points), Temperature Profile, Zoom (2X), 4 Frame Display, Subtraction, Max. Temperature Display, Peak Hold, Emissivity Compensation (whole or partial), Temperature Trending, Histogram, Alarm			
Display Functions	Display Level (256,64,32,16), Color Palettes (3 colors & B/W, reverses), Frame Averaging, Freeze, Message, Date and Time, Line Scan (available on TVS-2000MkIILW)			
Auto Tracking	AS (Auto Sense), AM (Max. Temperature Tracking), AP (Point Temperature Tracking)			
Operation	Keyboard and Jog Dial			
Image Storage	3.5" FDD (built in), 20 frames/disk (3.5", 2HD), 5 second-60 min. interval Real Time Recorder (option) 512 frames, 1/30 second 60-min. interval (1/15 sec. - 60min. for LW)			
Output	Analog RGB, NTSC or PAL, TTL Alarm Out			
External Interface	SCSI-2, RS-232C			
Power Requirement	AC100-120/220-240V, 50/60Hz			
Power Consumption	100VA or less	150VA or less	200VA or less	
Operation Temperature	Camera Head	-10~45°C	0~45°C	
	Processor	0~40°C		
Humidity	less than 90% RH (without condensation)			
Dimensions (except protrusion)	Camera Head	175 (W) \times 184 (D) \times 80 (H) mm 2.3kg	205 (W) \times 206 (D) \times 83 (H) mm 3kg	185 (W) \times 300 (D) \times 181 (H) mm 3.8kg
	Processor	300 (W) \times 400 (D) \times 170 (H) mm 9kg		

Type TVS-2000MkII

Model	Temp. Range	Cooling Method
TVS-2100MkII	-40~ 950°C	Argon Gas
TVS-2200MkII	-40~ 2,000°C	
TVS-2100MkIIIST	-20~ 950°C	Stirling Cooler
TVS-2200MkIIIST	-20~ 2,000°C	
TVS-2300MkIIIST	-20~ 300°C	
TVS-2000MkIILW	-40~ 300°C	

Standard Configuration

Camerahead	1
Processor	1
Camerahead Cable	1
AC Cable	1
Floppy Disk (3.5", 2HD)	1
Tripod	1
Operation Manual	1

● Specifications and external appearances shown in this brochure are subject to change without notice for improvement.
● Stirling Cooler requires helium gas recharge after 1,500 hours of operation.

 **NIPPON AVIONICS CO., LTD.**

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