

Φ INFRARED SYSTEMS DEVELOPMENT CORPORATION

**INFRARED TEST AND MEASUREMENT
PRODUCT CATALOG**



Φ INFRARED SYSTEMS DEVELOPMENT CORPORATION

Infrared Systems Development Corporation (ISDC) was formed in 1997 with the acquisition of Graseby Infrared's instrument product lines, which were acquired from Infrared Industries (IRI), Infrared Systems (IRS), and Barnes Engineering Company. These products include blackbody sources, spectral radiometer systems, energy modulators and accessories.

At Infrared Systems Development Corporation we offer a wide variety of infrared test equipment.

- Calibrated blackbody sources
 - Infrared detector preamplifiers
 - Spectral radiometer systems
 - Energy modulators
 - High speed pulse integration systems
 - Complete Spectrometer Acquisition
- And much more



All of our products are developed and manufactured in our newly expanded facility in Orlando, Florida.

We also develop systems for custom applications, and offer design-consulting services for many infrared instrument and sub-system projects.

If one of our standard products does not meet all of your requirements, speak with one of our engineers. We can often modify the specifications to fit your application.

WE HAVE A SOLUTION FOR YOU

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FEMTO-SECOND PULSE ACQUISITION SPECTROMETER



- Φ **Complete High-Speed Pulse Spectrometer System**
- Φ **3-10 μm Spectral Range Coverage (1-20 μm Available)**
- Φ **6.2 nm Standard Resolution (3.1 nm Optional)**
- Φ **1.5 μm , 0.9 μm and 0.45 μm Bandwidth**
- Φ **.01-1.9Khz Laser Repetition Rate with No Lost Data**
- Φ **Integrated Labview Software Control**

The New FPAS spectrograph provides a turn-key, drop-in solution for femto-second Pump-Probe 2D Vibrational Spectroscopy. All required components are provided, including a host computer and LabView based LASPEC software. Simply focus the laser energy into the entrance slit and start acquiring data. Infrared Systems Development Corporation has teamed with the J.Y. Horiba Company to integrate a high resolution spectrometer with detector and acquisition electronics to provide an easy to use system for complete spectral acquisition. Interchangeable grating turrets allow complete coverage of the mid and long wave infrared bands. All components of the spectrometer and data acquisition system are controlled by the supplied LASPEC software. The open architecture and supplied source code provide the user with unlimited ability to integrate all computer controlled assets with one application.

The FPAS Spectrometer is the most compact imaging spectrometer available. Offering interchangeable triple grating turrets, automated dual exit port selection and motorized slit and grating positioning. Array and detector exit ports are selected by a motorized flip mirror. Many users have collected data with their single element detectors and need a method to correlate the previous data with new data acquired with the Array.

Our Femto-Second Laser Pulse Acquisition System is the heart of the data acquisition system, providing simultaneous sampling of all array elements and external user-provided inputs. The FPAS integrates and captures detector signals from short pulse, high-energy laser systems with excellent linearity and 16-Bit resolution from single pulses or up to 1×10^6 pulses in sequence, with no lost data.

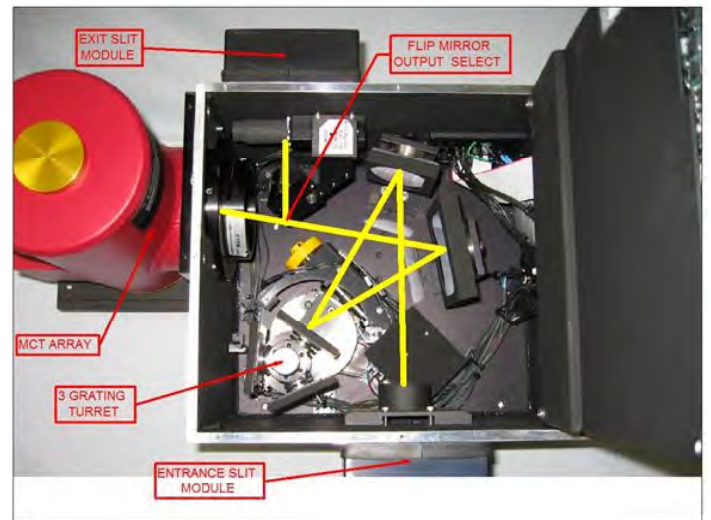
Coupled with a high performance Infrared Associates Linear MCT Array, the system provides unmatched spectral performance. Dual row detector arrays can be used to provide isolated reference and sample paths through the spectrometer to compensate for variations in amplitude and energy distribution typically associates with ultra-short pulse lasers.

A complete offering of gratings and detectors can meet any application for high-speed pulse acquisition spectrometry. Our customer support team has experience with many techniques and is ready to assist with hardware and software support and modifications to suit your need.

Specifications:

Laser Pulse Repetition Rate:	Single Shot to 1.9 KHz
Standard Detector:	LN2 cooled MCT Array 64 Element 0.2mm W x 0.5 mm H 16 mm Total Array Length (128 element available)
Spectrometer Type:	Corrected Cross Czerny Turner with On Axis Grating
Focal Length:	0.19 meters
Entrance Aperture:	F/3.9 15 Degrees
Entrance Slit:	Motorized 0 – 2 mm in 2 um steps (0.25 mm nominal)
Exit Slit:	Motorized 0 – 2 mm in 2 um steps
Exit Ports:	Array and Single element – Selected by Flip Mirror
Flat Image Field:	30 mm H x 12 mm V – Array port
Standard Gratings:	150 g/mm @ 5 um, 75 g/mm @ 5 um and 50 g/mm @ 6 um. (50 to 1200 g/mm available) 50 x 50 mm
Standard Spectral Range and Dispersion:	3-9 um with 150 g/mm 0.40 um BW, 6.2 nm per pixel 4-10 um with 75 g/mm 0.80 um BW, 12.4 nm per pixel 3-9 um with 50 g/mm 1.2 um BW, 18.6 nm per pixel 0.35 nm with 1200 g/mm grating
Maximum Resolution:	
Spectral Acquisition Rate:	Single to 1900 Spectra/sec
Maximum Sequential Spectra:	Typically 1×10^6 Limited by computer memory.
Communications Interfaces:	Data read out by a 10 MHz digital communications port. Spectrometer controlled by RS-232/USB port

Model	Array	External Inputs
FPAS-3216	Single Row of 32	16
FPAS-6400	Single Row of 64	
FPAS-6400-D	Dual Rows of 32	0
FPAS-6416	Single Row of 64	
FPAS-6416-D	Dual Rows of 32	16
FPAS-0128	Single Row of 128	
FPAS-0128-D	Dual Rows of 64	0
FPAS-0144	Single Row of 128	
FPAS-0144-D	Dual Rows of 64	16



FPAS Spectrometer System Configuration

FEMTO-SECOND LASER PULSE ACQUISITION SYSTEM



- Φ High-Speed Box Car Integrator System for MCT Arrays
- Φ 16 to 256 Channels Simultaneously Acquired
- Φ Femtosecond to Microsecond Pulse Durations
- Φ 1.9Khz Maximum Repetition Rate with No Lost Data
- Φ Very Low Noise 16 Bit Data Acquisition
- Φ Complete Detector Array Interface, Data Acquisition and Storage
- Φ Labview Software Controlled with 10 Mhz Data Rate

The New Femto-Second Laser Pulse Acquisition System (FPAS) was developed for high speed laser "Pump-Probe" spectroscopy providing simultaneous sampling of Multi-Element HgCdTe (MCT) Detector Arrays. The FPAS integrates and captures detector signals from short pulse, high-energy laser systems with excellent linearity and a true 16-Bit resolution.

The FPAS provides all of the system components required to acquire Femto-Second spectroscopy data, including user inputs to monitor chopper phase, stepper motor positions, single detectors, and any other user data needed to be acquired with the Array data. The system includes Preamplifiers, Integrators, Sample & Holds, Multiplexers, 16-Bit A/D Converters, FIFO Memory, Digital I/O PCI Card and Host Computer System with custom LABVIEW Software for complete control and data presentation. Labview source code is included to allow the user to integrate other functions and controls within one software application.

The acquisition starts with the rising edge of the Laser sync pulse, which initiates the delay time. The signal appears at the MCT Array 50-500 ns after the laser fires. The Integration Gate then acquires the preamplifier output signal and Holds until the ADC can digitize and store the data. A user selectable number of laser shots, up to 1 million shots can be acquired in a single operation.

The MCT detector can be configured as a single row or as two rows. The single row configuration acquires data that can be chopped or monitored to compensate for amplitude variations from shot to shot of the laser. The dual row configuration allows compensation for amplitude variations and wavelength variations to cancel the unstable effects of the laser.

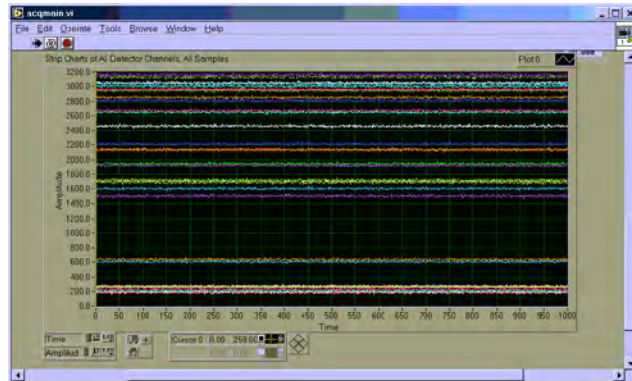
Versatility is required in many 2D Vibrational Spectroscopy measurements and the FPAS system allows the user to take measurements in many experimental configurations. Our customer support team has experience with many techniques and is ready to assist with hardware and software support and modifications to suit your needs.

Specifications:

- Laser Pulse Repetition Rate:** 0 to 1.9 KHz
Integration Time: Adjustable in 10 ns steps between 54 to 2600 ns.
Integration Delay: Adjustable in 2 ns steps between 30 to 520 ns. Other ranges are available
Integrator Type: Boxcar type, Low noise, current steering, auto-reset, integrator section. Simultaneous acquisition of 16 to 256 channels. Using multiple units in parallel provides more than 1024 channels.

Detector Interface

- Photoconductive:** HgCdTe (MCT)-Low Noise Amplifier with Bias
Photovoltaic: InSb- Low Noise FET Amplifier with Zero Volt Bias
 HgCdTe (PVMCT)- Low Noise Amplifier with Zero Volt Bias.
A/D Conversion: 16 Bit, +10V to -10V input Multiplexed 16 channels per A/D converter
Maximum Number of Samples: 1 Million complete scans of all channels
FIFO Memory: 1024 x 16 FIFO Memory
Data Communications: FIFO Memory is read out by a 10 MHz digital communications port. Requires PC Plug-in Card
Signal: Approximately 7 Volts from 80 femtosecond laser at 7 μ m
EQV Noise: Less than 1.5 $\text{nv}/\text{Hz}^{1/2}$ at input
System Signal to Noise: $\gg 80$ db(10,000:1) at 1000 scans
Digital Noise: +/- 1/2 LSB
Typical System Noise: +/- 2 LSB rms (1000 Scans @ 2KHz Laser Rep Rate)
Digital Dynamic Range: -32767 to + 32767 = 65535 (16 Bits)
Analog Dynamic Range: -10 V to +10V



Model	Array Size	External Inputs
IR-3216	32	16
IR-6400	64	0
IR-6416	64	16
IR-0128	128	0
IR-0144	128	16

SPECTRALMASTER MARK III RADIOMETER



FIELD RESEARCH RADIOMETER UNMATCHED PERFORMANCE FIELD PROVEN RELIABILITY

Outstanding Features:

- ∅ Unmatched sensitivity and reliability
- ∅ Field-proven rugged optical system
- ∅ New slim profile electroics/processor
- ∅ Upgrade for IRSI or Barnes Mark II System
- ∅ Spectral scanning modules and fore optics options
- ∅ Works with any PC Serial Port
- ∅ Faster menu-driven processing with pop up menus

Typical Applications:

- ∅ Emission Signatures
- ∅ Countermeasures
- ∅ Transfer Calibration
- ∅ Transmissometry
- ∅ Transient Phenomena
- ∅ Laser Target Diagnostics
- ∅ Combustion and Flame Front Analysis

The ISDC SpectralMaster Mark III combines proven field ruggedness, new lightweight portability, unmatched sensitivity and the fastest, most advanced data acquisition and processing available in systems of its type. The standard system includes the Mark III Radiometer, Laptop Computer and Computrad 5 Windows Software. In addition to commanding the mission, the computer now performs all of the calculations that were previously the painstaking responsibility of the user.

The electronics/data processing package allows the entire measurement mission to be controlled by means of the computer. The disk storage capacity provides space for storing considerable real time measurement data as well as all of the throughput characteristics (transfer functions) necessary to convert raw measurements to quantitative radiometric data. The operator needs to have only a rudimentary knowledge of the calculations involved. Human error is virtually eliminated and system field calibration is reduced to a few simple steps.

Unmatched Sensitivity and Reliability

The patented signal processing method introduced by the Mark III System results in approximately an order of magnitude testable improvement in measurement sensitivity over previous and competitive systems. Example: NET (noise equivalent temperature), the traditional figure of merit yardstick by which radiometric systems are compared, has been constantly measured to be 0.0003° C (RMS, Bandwidth = 1 Hz, Target temperature at 25° C, CVF open) using our standard 4.25" high-resolution Cassegrain fore optics. What this means in practice is that you can expect better than four times the performance using our standard optics than you can obtain with 6" optics on other commercial systems.

Field Proven Rugged Optical System

The original Barnes-designed rigid optical bench construction of the radiometer head has been retained and improved as ease of field interchangeability of operating modules has been emphasized. A history of 25 years in the field supports your confidence in the stability of your sensor unit.

New Slim Profile Electronics/Processor

Our new approach to signal processing has resulted in a most welcome reduction in size, weight and complexity of the electronics/processor unit. The new unit is one-fifth the volume and one-half the weight of the Mark II and most competitive units. It mounts directly below the sensing head, and the total combined weight is less than 40 lbs. To the user, the reduced complexity of the new processor (3 processing boards replace 14 on the Mark II) also means drastically reduced parts count for higher reliability. The new processor also has twice the RAM (random access memory) capacity of previous models.

Upgrade for Barnes Mark II System

The SpectralMaster Mark III electronics/processor can be retrofitted easily and economically to operate with any Barnes Mark II System sensing head with no changes to the sensing head. This extremely cost-effective retrofit will preserve the versatility of your present system with all of its interchangeable modules. Your gains will be in greatly improved sensitivity, field portability and reliability.

Fully Field-Interchangeable Detector Modules

The Mark III sensing head accepts a broad selection of fully field-interchangeable detector preamplifier assemblies featuring the liquid nitrogen cooled InSb/HgCdTe “sandwich” detector, Si/PbS, Si/PbSe, InSb and Pyroelectric detectors.

Spectral Scanning Modules and Fore Optics Options

A variety of spectral scanning modules featuring discrete filters and CVF elements are available, as on previous models, all easily field-interchangeable. The SpectralMaster Mark III comes with high resolution 4.25 inch Cassegrain fore optics. Standard fields of view are 2.5 milliradian, 0.5 degree and 1 degree, with optional 1 milliradian field of view available. Wide field attachments for 3, 10 and 20 degrees are available with all standard fields of view. Other special fore optics and attachments are available.

Works with any Computer

The SpectralMaster Mark III system package includes a Laptop Computer. However, it will operate with any computer with Windows 2000, XP.

Faster Menu-driven Processing with Pop-Up Menus

The new COMPURAD 5 software comes installed in the computer. The software features pop-up menus and sub-menus that appear on the display to guide you through the processing routines. Some of the processing capabilities under keyboard control are:

Command the CVF (one position, increment, full scan or multiple scans), chop speed (0-1000 Hz), reference cavity temperature (0-55°C) and system gain (1-1000).

Save incoming raw data to your disk or diskette and/or **Hold** in RAM data matrix arrays (21 data arrays in random access memory).

Autocompute radiance or irradiance for full-field and point-source targets.

Plot raw data, radiance or irradiance vs. wavelength, or data at any wavelength vs. time.

Plot raw data vs. wavelength in near real-time.

Save all data to disk or diskette for immediate recall.

Printout or **Plot** all data displayed on the color monitor.

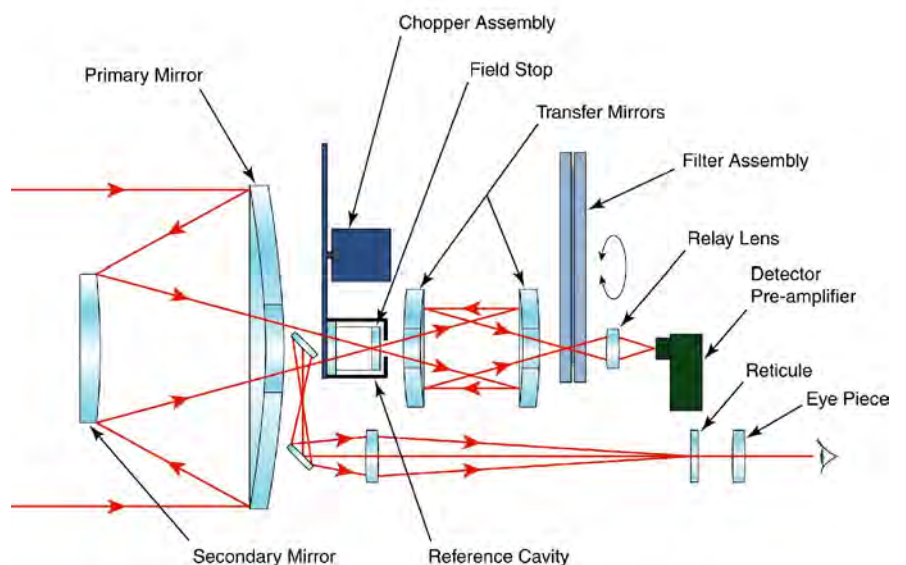
Create and **Plot** a blackbody curve for any temperature increment in the radiance curve.

Display multiple plots including blackbodies with autoscale, manual scaling or log scaling.

Compare (autosubtract) any two scans and tabulate, plot or save the "delta" to disk or diskette.

Zoom on graphics to magnify any spectral interval.

RADIOMETER OPTICAL SYSTEM





DUAL CHANNEL PYROELECTRIC RADIOMETER SYSTEM IR INTENSITY TEST SYSTEM

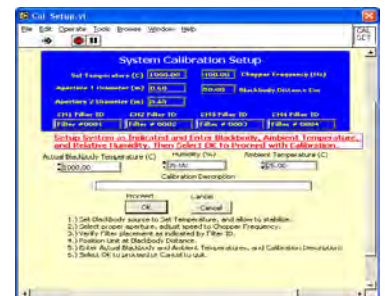
The PRS-2000 Dual Pyro-Radiometer Measures Energy in Two Spectral bands simultaneously. Its applications include Counter-Measure Flare Analysis, and Radiant Intensity Measurements. Custom Radiant Intensity Profile Software is Included.



MAIN SELECTION SCREEN



DATA ACQUISITION SCREEN



CALIBRATION SETUP SCREEN



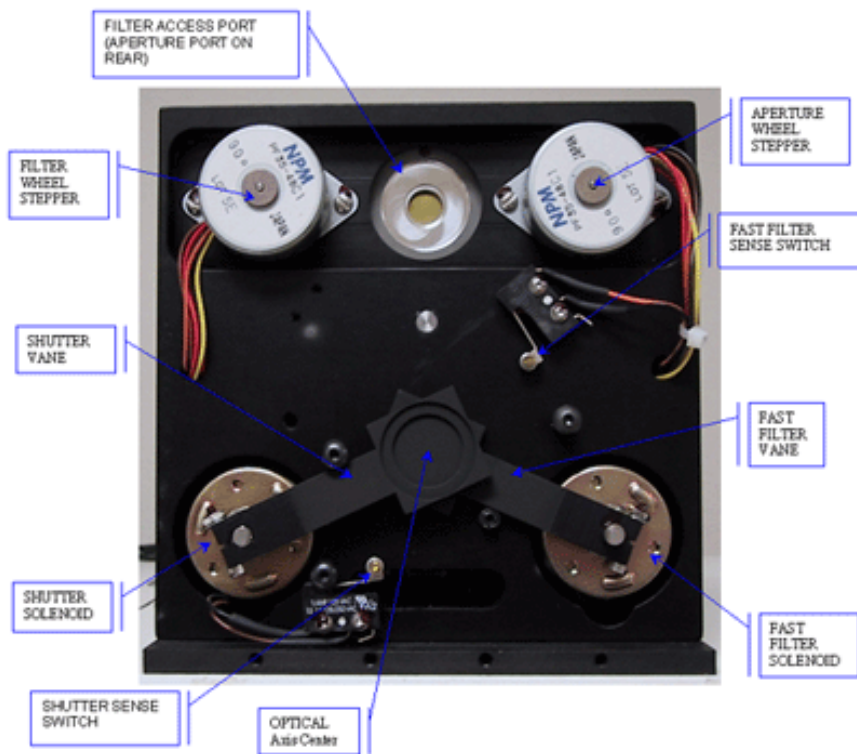
MULTI-SPECTRAL IR TARGET SYSTEM

The IR-704 system integrates a Blackbody source, Motorized Aperture wheel, Motorized Filter Wheel, High Speed Shutter and High Speed Filter Shutter. The system was designed as a forced air-cooled Multi-Spectral, Multi-Aperture target system for direct integration with collimator / target projection systems, but can also be used as a direct target system. System operations are controlled by an internal microprocessor with RS-232 / RS-485 control interface, or an auxiliary direct hardware port.

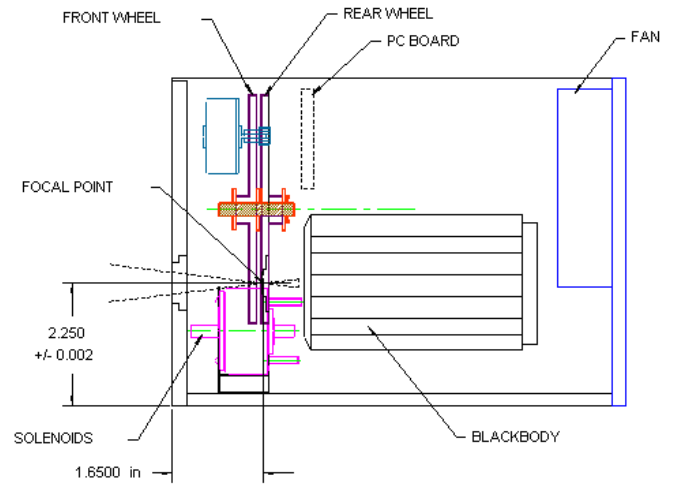
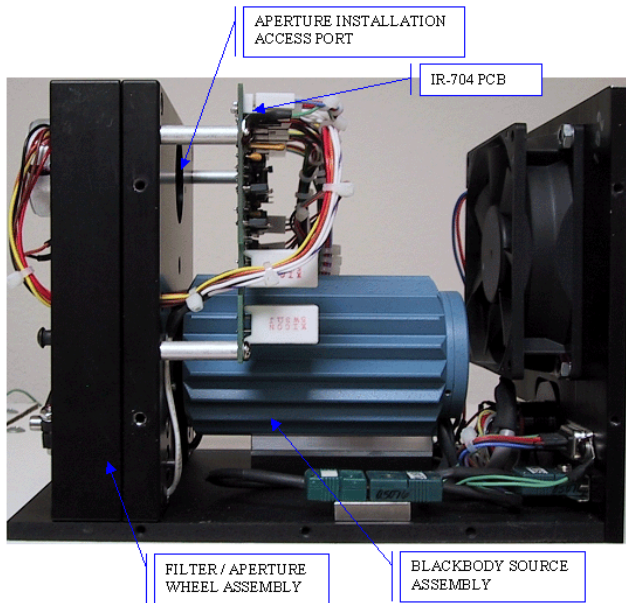
The system is optically arranged with a ¼" Cavity Blackbody source, 4 position aperture wheel, 4 position filter wheel, filter solenoid and shutter solenoid. Each of the assets are individually controlled via Serial port commands to allow Blackbody temperature control, Aperture selection, Filter selection, Shutter solenoid activation and Filter solenoid activation. The activation time of the shutter and filter solenoids is less than 5 milliseconds to allow target high-speed progression from Off to Dual filtered to filtered in less than 10 milliseconds.

The individual control ability of each of the IR-704's systems allows for 32 different combinations of Filter / Aperture / Shutter selections coupled with a variable temperature blackbody source, from 50°C to 1050°C provide virtually limitless variability in Infrared energy output levels.

Temperature Range:	50-1050C
Emitter Size:	0.25" Cavity
Stability Short / Long:	0.1C +/- 0.2C
Fixtures / Apertures:	14 Positions on 2 Wheels
Shutter Response:	<5ms
Computer Interface:	RS-232 / USB
Dimensions: Target System:	6.125"H x 8.5" D x 6.125" W (156x216x156)
In (mm) Controller:	5.1"H x 13.4"D x 12"W (130x340x304)



**FRONT VIEW
WITH FRONT PLATE REMOVED**



SIDE VIEW

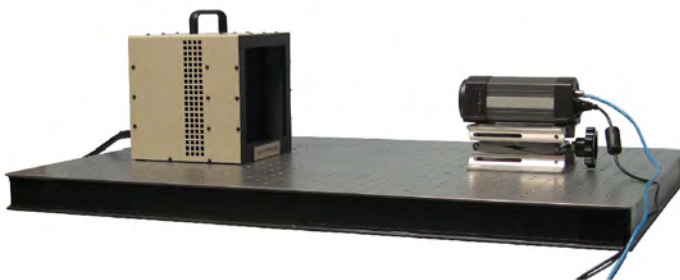
APPLICATIONS

At Infrared Systems Development, we offer a wide variety of Infrared Test Equipment. We have many standard products as well as design services to produce products to fit your application.

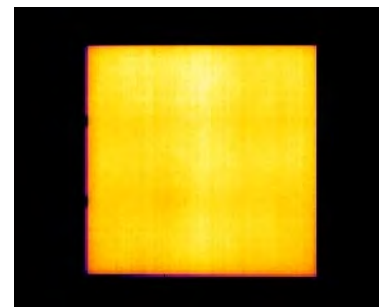
1" CAVITY BLACKBODY (IR-563/IR-564) SYSTEM WITH INTELLIGENT FILTER WHEEL, INSB-1000 PREAMPLIFIER, DETECTOR AND X-Y TRANSLATION TABLE



TESTING IR-6416 FEMTOSECOND DATA ACQUISITION SYSTEM WITH SPECTROMETER LASER DIODE, AND X-Y-Z TRANSLATION TABLE



IR-2106 BLACKBODY SYSTEM WITH 640x480 IR CAMERA



The Cavity Blackbody Systems are an ideal source for the Near (1-3 μm), Mid (3-8) and Far (8-30+ μm) infrared bands. They are designed to provide infrared radiation as an ideal blackbody emitter. The output energy from the cavity closely follows the theoretical maximum energy curve described by Max Planck's equation, and allows users to calibrate, align, and measure infrared devices and phenomena of all types.

The 20° tapered - recessed - cone, surface emissivity, and cavity aspect ratio combine to provide blackbody radiation by multiple reflection, absorption and re-emission of its thermal energy. The thermal energy of the cavity is provided by a ceramic-sealed heater coil that uniformly heats the cavity cylinder.

The IR-563 and IR-508 system carry a full, two-year warranty due to the reliability of actual field units used over the last 30 years.

IR-508/301: The smaller size and lower power consumption make the IR-508 ideal for applications with limited space and power, such as in environmental chambers down to -80° C. Using the optional 8 position aperture wheel, the infrared flux can be varied by known amounts without disturbing critical optical setups, and combining apertures and distance changes, the flux at any point can easily be determined.

The IR-563 has been the industry standard 1000°C blackbody for more than 30 years, and continues to provide excellent service to infrared applications throughout the industry. The IR-564 extends the temperature range of the IR-563 to 1200 ° C by changing cavity materials to Silicon Carbide and high purity Alumina ceramics; otherwise the two units are virtually identical.

Using an aperture wheel, which comes standard on the IR-563 and IR-564, the infrared flux can be varied by known amounts without disturbing critical optical setups, and combining apertures and distance changes, the flux at any point can easily be determined.

Φ CAVITY BLACKBODY SYSTEMS

<i>MODEL</i>	<i>TEMPERATURE</i>	<i>CAVITY OPENING</i>	<i>PAGE</i>
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IR-508/301	50-1050°C	0.25"	15
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IR-518/301	50-1050°C	0.40"	16
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IR-563/301	50-1050°C	1"	17
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IR-564/301	50-1200°C	1"	17
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IR-574/301	50-1200°C	2.25"	18
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IR-301 CONTROLLER
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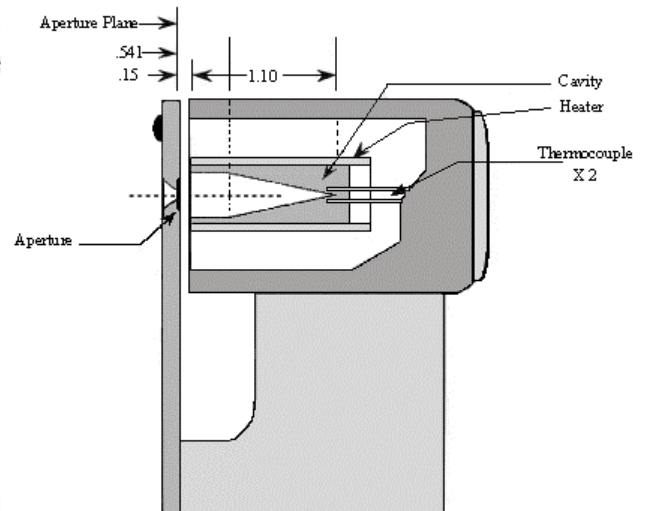
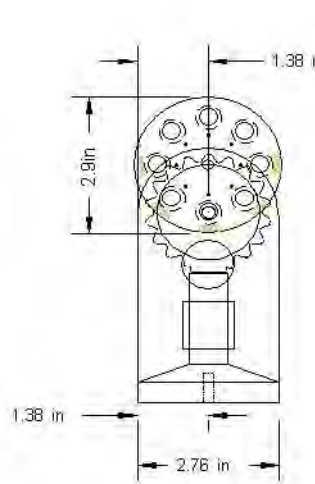
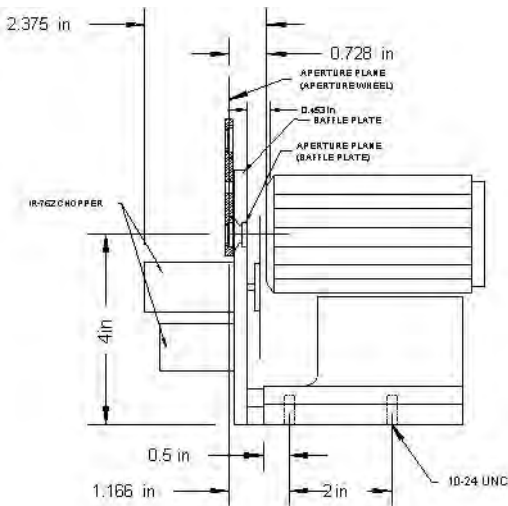
**0.25"
1050 °C**

Specifications:

Temperature Range:	50 to 1050°C
Emittance Watts/Cm² (Watts):	17.36 (5.5)
Wavelength Range:	0.5 - 99um
Emissivity:	>0.99
Emitter Size: in (mm)	0.25" (6.3)
Source Type:	Cavity
Temperature Resolution:	0.1°C
Calibration Accuracy:	+/- 0.2°C to NIST Standard
Stability: Short (Long) Term:	+/- 0.1°C (+/- 0.2°C)
Response Time:	100-1000 <30 Minutes
Temperature Sensors:	Embedded 0.01% Matched Type S
Control Type:	Active Multi-Band P.I.D.
Line Voltage:	90 to 125 or 208-240 VAC 50-60 Hz
Power Requirements:	100 Watts Max
Cable Length:	8 Feet (2.4 m)
Dimensions: in (mm) Source:	3" Diam x 5.9" H x 4.9" D (76.2x150x125)
Controller:	5.1"H x 13.4"D x 12"W (130x340x304)
Warranty:	2 Year
Standard Apertures:	0.1" (2.54)

Optional Accessories:

- ~ RS-232, RS-485 or IEEE-488/GPIB
- ~ IR-762 Energy Modulator
- ~ Aperture Wheel with Aperture sizes:
0.200", 0.100", 0.050", 0.0250", 0.0125"





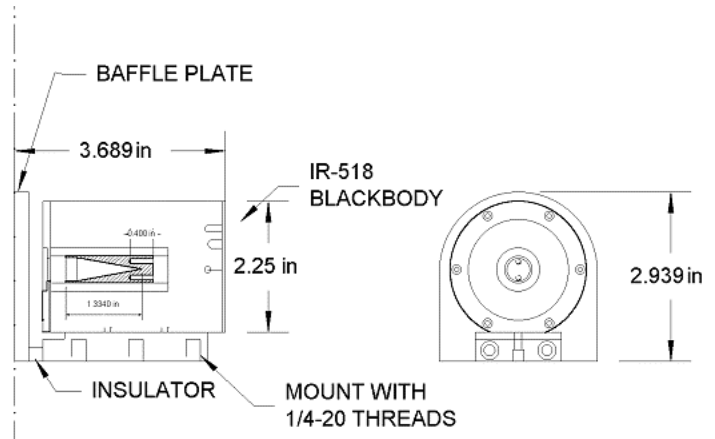
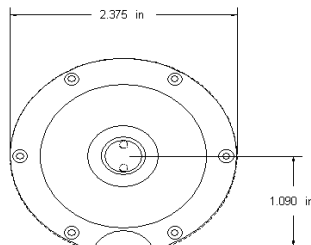
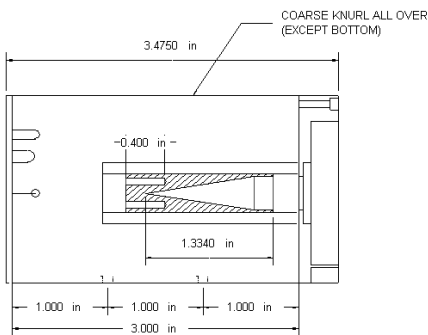
0.40"
1050 °C

Specifications:

Temperature Range:	50 to 1050°C
Emittance Watts/Cm² (Watts):	17.36 (14)
Wavelength Range:	0.5 - 99um
Emissivity:	>0.99
Emitter Size: in (mm)	0.4" (10)
Source Type:	Cavity
Temperature Resolution:	0.1°C
Calibration Accuracy:	+/- 0.2°C to NIST Standard
Stability: Short (Long) Term:	+/- 0.1°C (+/- 0.2°C)
Response Time:	100-1000 <40 Minutes
Temperature Sensors:	Embedded 0.01% Matched Type S
Control Type:	Active Multi-Band P.I.D.
Line Voltage:	90 to 125 or 208-240 VAC 50-60 Hz
Power Requirements:	100 Watts Max
Cable Length:	8 Feet (2.4 m)
Dimensions: in (mm) Source:	2.375" Diam x 3" Deep (60 x 76.2)
Controller:	5.1"H x 13.4"D x 12"W (130x340x304)
Warranty:	1 Year
Standard Apertures:	0.4" (10)

Optional Accessories:

- ~ RS-232, RS-485 or IEEE-488/GPIB
- ~ IR-762 Energy Modulator
- ~ Aperture Wheel with Aperture sizes: 0.200", 0.100", 0.050", 0.0250", 0.0125"





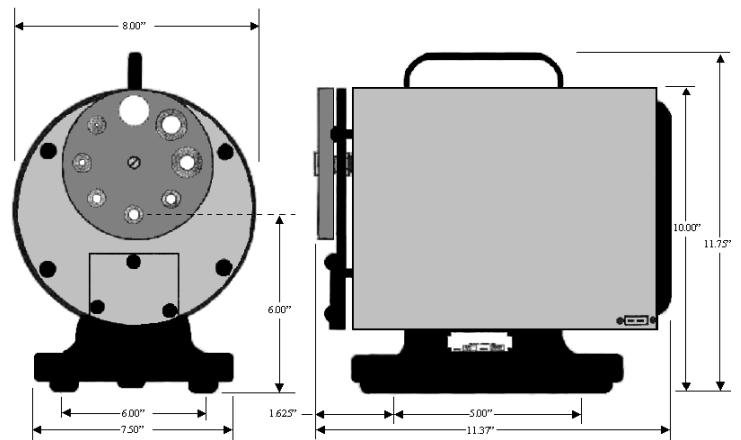
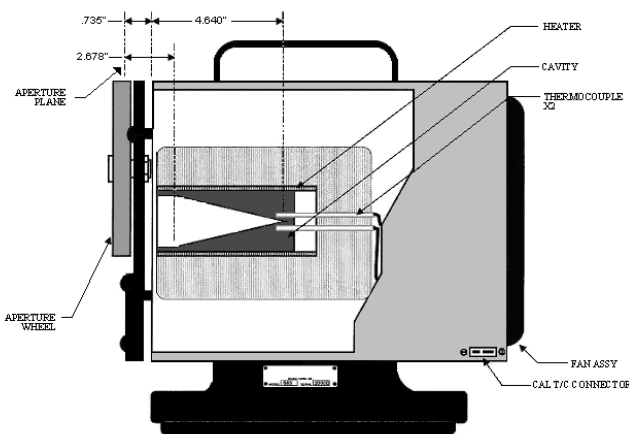
1.0"
1050° C
1200° C

Specifications:

Temperature Range:	IR-563: 50 to 1050° C IR-564: 50 to 1200° C
Emittance Watts/Cm² (Watts):	IR-563: 17.36 (88) IR-564: 26.68 (135)
Wavelength Range:	0.5 - 99um
Emissivity:	>0.99
Emitter Size: in (mm)	1" (25.4)
Source Type:	Cavity
Temperature Resolution:	0.1 C
Calibration Accuracy:	+/- 0.2 C to NIST Standard
Stability: Short (Long) Term:	+/- 0.1 C (+/- 0.2C)
Response Time:	IR-563: 100-1000 <45 Minutes IR-564: 100-1200 <70 Minutes
Temperature Sensors:	Embedded 0.01% Matched Type S
Control Type:	Active Multi-Band P.I.D.
Line Voltage:	90 to 125 or 208-240 VAC 50-60 Hz
Power Requirements:	IR-563: 550 Watts Max IR-564: 800 Watts Max
Cable Length:	8 Feet (2.4 m)
Dimensions: in (mm) Source:	11.75" H x 11.4" D x 8" W (298x289x203)
Controller:	5.1"H x 13.4"D x 12"W (130x340x304)
Warranty:	IR-563: 2 Year IR-564: 1 Year
Standard Apertures:	0.0125, 0.025, 0.050, 0.10, 0.20, 0.40, 0.60 and 1.0 In

Optional Accessories:

- ~ RS-232, RS-485 or IEEE-488/GPIB
- ~ IR-860 Energy Modulator
- ~ 1" Remote Control Motorized Indexed Aperture Wheel





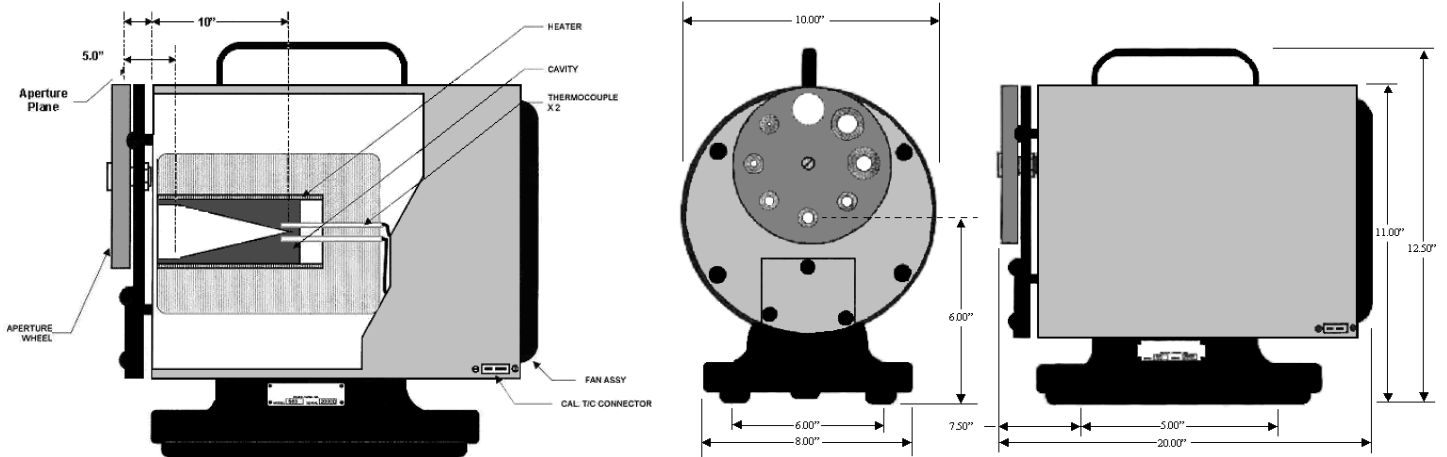
2.25"
1200 °C

Specifications:

Temperature Range:	50 to 1200° C
Emittance Watts/Cm² (Watts):	26.68 (684)
Wavelength Range:	0.5 - 99um
Emissivity:	>0.99
Emitter Size: in (mm)	2.25" (57)
Source Type:	Cavity
Temperature Resolution:	0.1 C
Calibration Accuracy:	+/- 0.2 C to NIST Standard
Stability: Short (Long) Term:	+/- 0.1 C (+/- 0.2C)
Response Time:	100-1200 <80 Minutes
Temperature Sensors:	Embedded 0.01% Matched Type S
Control Type:	Active Multi-Band P.I.D.
Line Voltage:	90 to 125 or 208-240 VAC 50-60 Hz
Power Requirements:	1400 Watts Max
Cable Length:	8 Feet (2.4 m)
Dimensions: in (mm) Source:	12.5" H x 20" D x 10" W (317x508x254)
Controller:	5.1"H x 13.4"D x 12"W (130x340x304)
Warranty:	1 Year
Standard Apertures:	2.0" (50.8)

Optional Accessories:

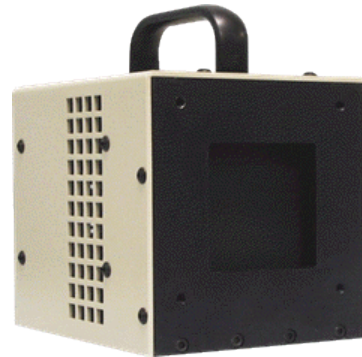
- ~ RS-232, RS-485 or IEEE-488/GPIB
- ~ 2" Remote Control Motorized Indexed Aperture Wheel
- ~ 2" Manual Aperture Wheel
- ~ 2" Apertures





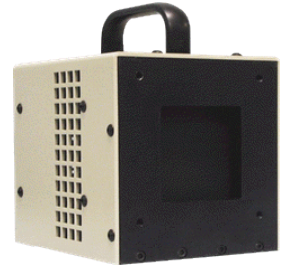
Our extended area sources are flat plate emitters with special high emissivity coating providing 0.96 average emissivity. Extended area sources provide large target with high radiant intensity for application where a cavity blackbody is too small.

The NEW Low-Cost Thermo-Electrically cooled / Heated blackbody sources with a solid Copper Emitter plate provides superior uniformity and energy emission. Our Proprietary High Emissivity Black Coating provides >0.95 uniform Emissivity from 0.8 to 30 μm . A Type "T" Thermocouple is embedded in the emitter plate to allow independent monitoring and calibration of the surface temperature. The IR-2100 series offers stability and uniformity comparable to competitive systems costing more than \$20,000 for a fraction of their costs, providing the best cost to performance ratio.

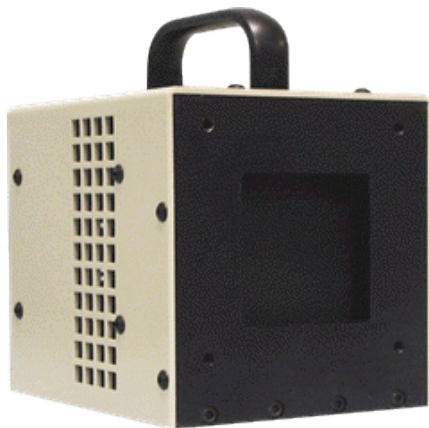


EXTENDED AREA BLACKBODY SYSTEMS

MODEL	TEMPERATURE	CAVITY OPENING	PAGE
IR-2100	-5 to 145°C	2.5" x 2.5"	21
IR-2101	-30 to 75°C	2.5" x 2.5"	21
IR-2103	-5 to 145°C	3" x 3"	22
IR-2106	5 to 150°C	6" x 6"	23
IR-140	AMBIENT TO 230°C	12" x 12"	24
IR-160	AMBIENT TO 350°C	12" x 12"	24
IR-150	AMBIENT TO 500°C	12" x 12"	24



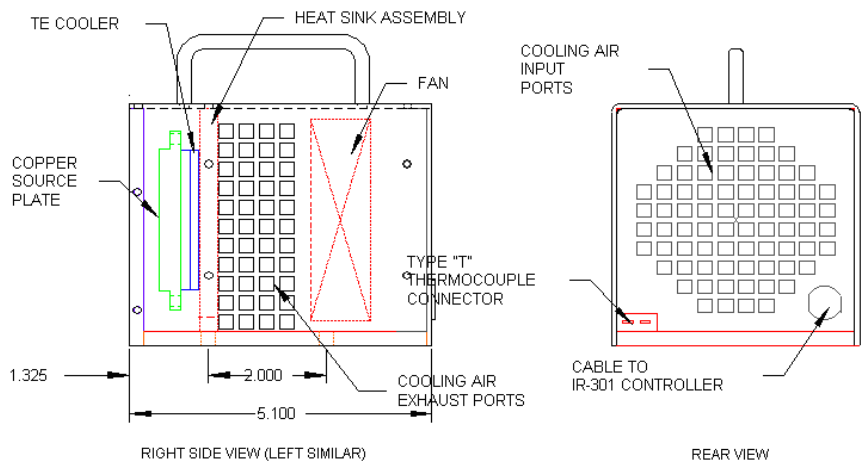
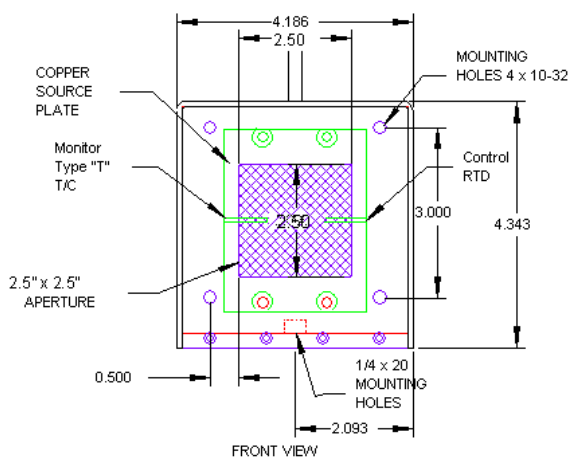
IR-301 CONTROLLER
PAGE 26

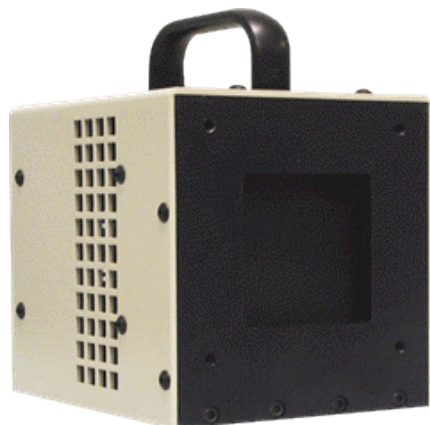


2.5" x 2.5"
-5 to 145 °C
-30 to 75 °C

Specifications:

Temperature Range:	IR-2100: -5 to 145 C IR-2101: -30 to 75°C
Emittance Watts/Cm² (Watts):	.17 (5.4)
Wavelength Range:	1-99 um
Emissivity:	0.96 +/- 0.02
Emitter Size: in (mm)	2.5" x 2.5" (63.5 x 63.5)
Source Type:	Extended Area
Temperature Resolution:	0.1 C
Calibration Accuracy:	+/- 0.2 C to NIST Standard
Stability: Short (Long) Term:	+/- 0.1 C (+/- 0.2C)
Response Time:	Ambient – Max <20 Min
Temperature Sensors:	Platinum RTD & Type T
Control Type:	Active Multi-Band P.I.D.
Line Voltage:	90 to 125 or 208-240 VAC 50-60 Hz
Power Requirements:	200 Watts Max
Cable Length:	8 Feet (2.4 m)
Dimensions: in (mm) Source:	4.25" H x 4.25" D x 5" W (108x108x127)
Controller:	5.1"H x 13.4"D x 12"W (130x340x304)
Warranty:	1 Year
Standard Apertures:	2.5" x 2.5" (63.5 x 63.5)
Remote Interface:	RS-232, RS-485 or IEEE-488/GPIB

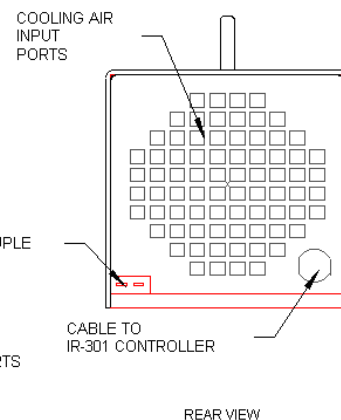
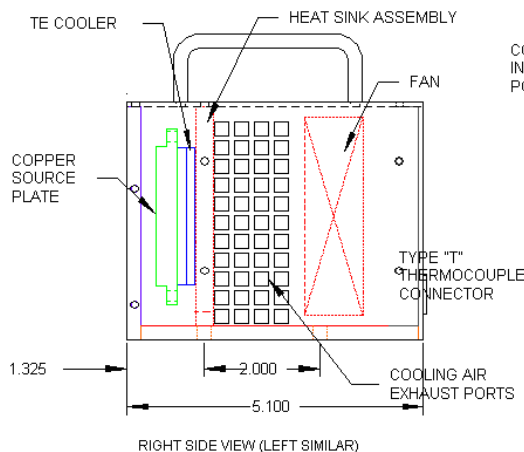
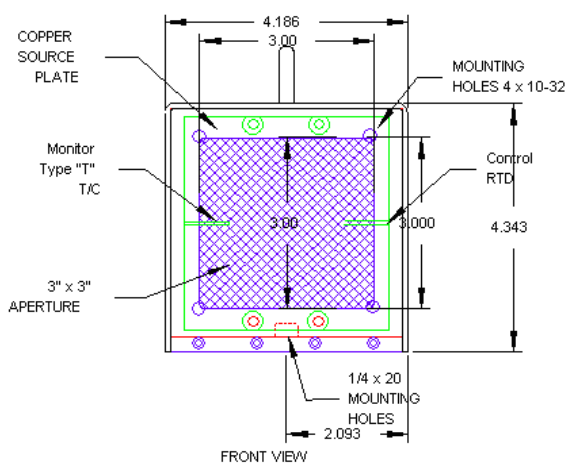




3" x 3"
-5 to 145 °C

Specifications:

Temperature Range:	-5 to 145 °C
Emittance Watts/Cm ² (Watts):	.17 (7.75)
Wavelength Range:	1-99 um
Emissivity:	0.96 +/- 0.02
Emitter Size: in (mm)	3" x 3" (76.2 x 76.2)
Source Type:	Extended Area
Temperature Resolution:	0.1 C
Calibration Accuracy:	+/- 0.2 C to NIST Standard
Stability: Short (Long) Term:	+/- 0.1 C (+/- 0.2C)
Response Time:	Ambient – Max <20 Min
Temperature Sensors:	Platinum RTD & Type T
Control Type:	Active Multi-Band P.I.D.
Line Voltage:	90 to 125 or 208-240 VAC 50-60 Hz
Power Requirements:	200 Watts Max
Cable Length:	8 Feet (2.4 m)
Dimensions: in (mm) Source:	4.25" H x 4.25" D x 5" W (108x108x127)
Controller:	5.1"H x 13.4"D x 12"W (130x340x304)
Warranty:	1 Year
Standard Apertures:	3" x 3" (76.2 x 76.2)
Remote Interface:	RS-232, RS-485 or IEEE-488/GPIB

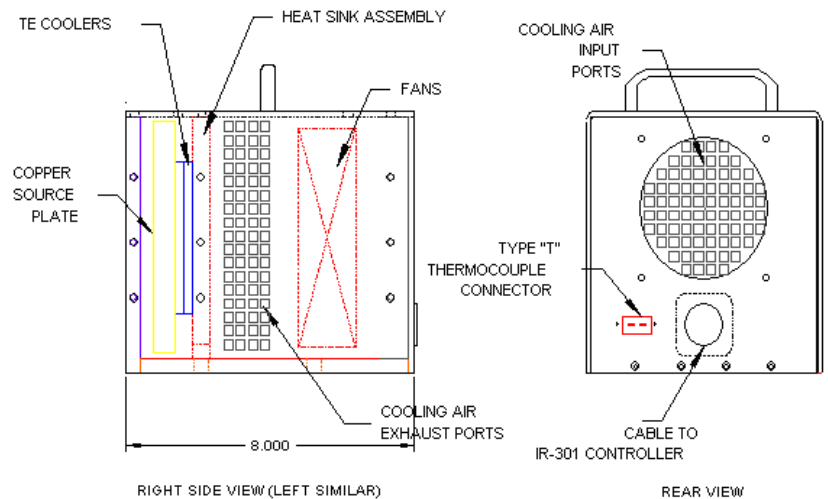
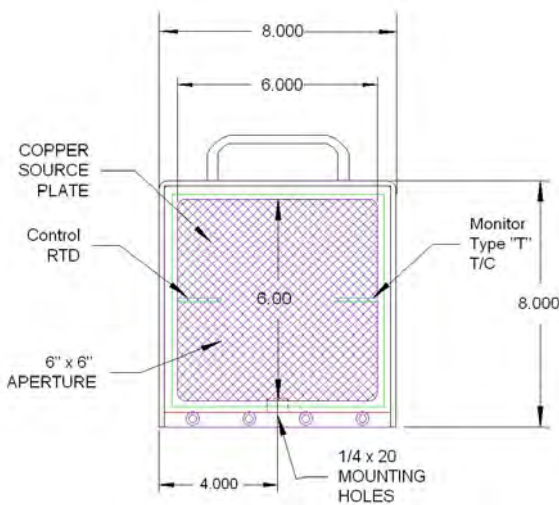




6" x 6"
5 to 150 °C

Specifications:

Temperature Range:	5 to 150° C
Emittance Watts/Cm² (Watts):	0.17 (5.4)
Wavelength Range:	1-99 um
Emissivity:	0.96 +/- 0.02
Emitter Size: in (mm)	6" x 6" (152.4 x 152.4)
Source Type:	Extended Area
Temperature Resolution:	0.1 C
Calibration Accuracy:	+/- 0.2 C to NIST Standard
Stability: Short (Long) Term:	+/- 0.1 C (+/- 0.2C)
Response Time:	Ambient – Max <20 Min
Temperature Sensors:	Platinum RTD & Type T
Control Type:	Active Multi-Band P.I.D.
Line Voltage:	90 to 125 or 208-240 VAC 50-60 Hz
Power Requirements:	200 Watts Max
Cable Length:	8 Feet (2.4 m)
Dimensions: in (mm) Source:	8" H x 8" D x 8" W (203.2x203.2x203.2)
Controller:	5.1"H x 13.4"D x 12"W (130x340x304)
Warranty:	1 Year
Standard Apertures:	6" x 6" (152.4 x 152.4)
Remote Interface:	RS-232, RS-485 or IEEE-488/GPIB



IR-140, 150, 160

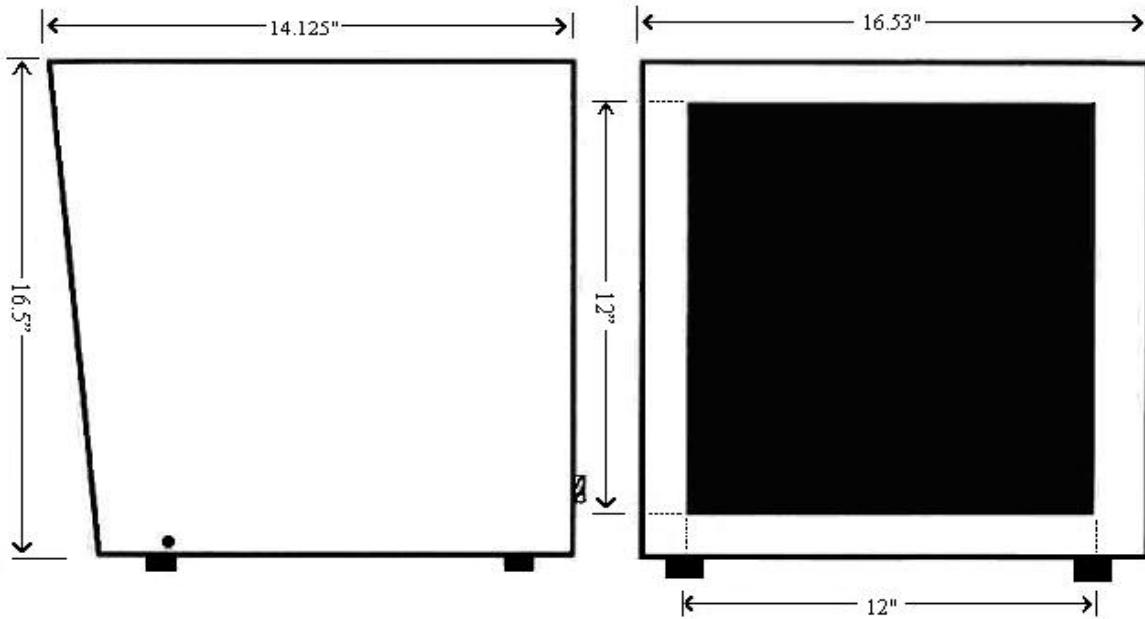
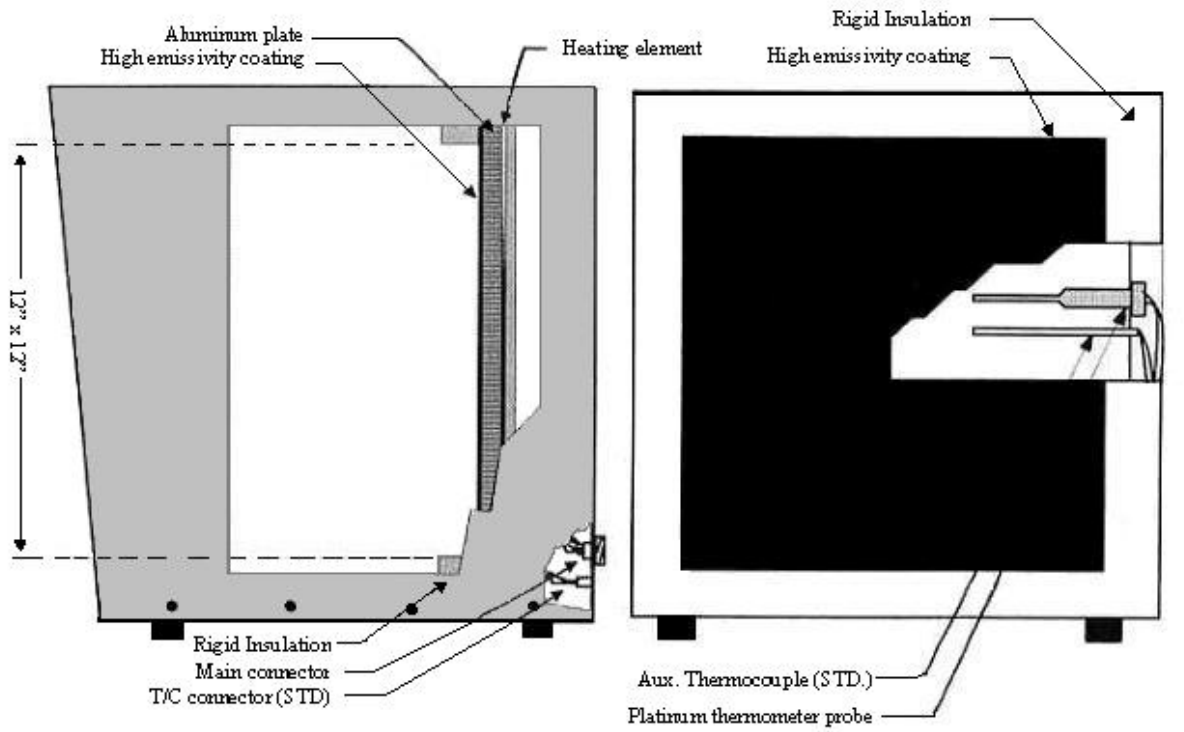


12" x 12"

Specifications:

Temperature Range:	IR-140: Amb to 230° C IR-160: Amb to 350° C IR-150: Amb to 500° C
Emittance Watts/Cm² (Watts):	IR-140: 0.36 (334) IR-160: 0.85 (789) IR-150: 2.02 (1876)
Wavelength Range:	1 - 99um
Emissivity:	0.96 +/- 0.02
Emitter Size: in (mm)	12" x 12" (304 x 304)
Source Type:	Extended Area
Temperature Resolution:	0.1C
Calibration Accuracy:	+/- 0.2 C to NIST Standard
Stability: Short (Long) Term:	+/- 0.1 C (+/- 0.2C)
Response Time:	Ambient – Max < 50 Minutes
Temperature Sensors:	IR-140: Platinum RTD & Type T IR-160: Platinum RTD & Type T IR-150: Platinum RTD & Type S
Control Type:	Active Multi-Band P.I.D.
Line Voltage:	IR-140: 90-125 or 208-240 VAC 50-60 Hz IR-160: 90-125 or 208-240 VAC 50-60 Hz IR-150: 208-240 VAC 50-60 Hz
Power Requirements:	IR-140: 1500 Watts Max IR-160: 2000 Watts Max IR-150: 4500 Watts Max
Cable Length:	8 Feet (2.4 m)
Dimensions: in (mm) Source:	17" H x 17" D x 17" W (432x432x432)
Controller:	5.1"H x 13.4"D x 12"W (130x340x304)
Warranty:	1 Year
Standard Apertures:	12" x 12" (304 x 304 mm)
Remote Interface:	RS-232, RS-485 or IEEE-488/GPIB

DIMENSIONS



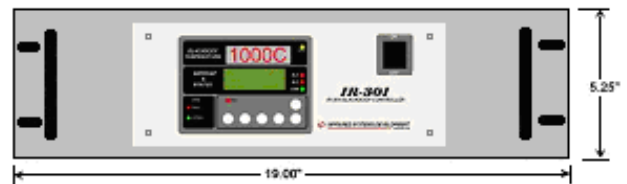
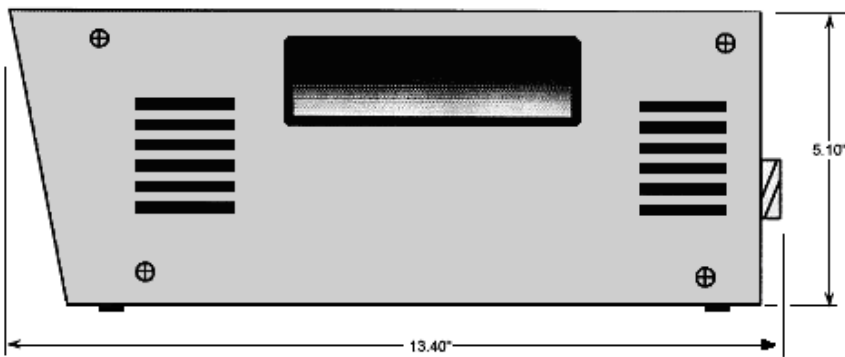
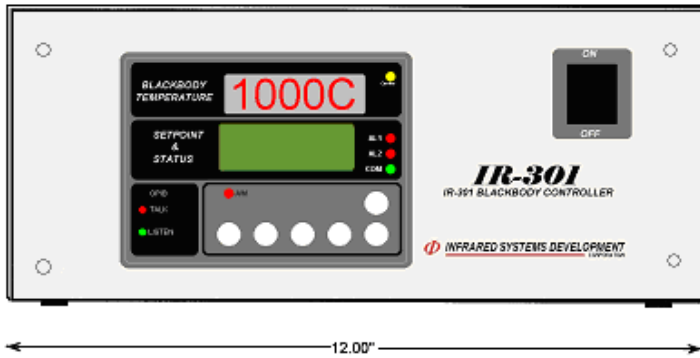


Temperature Range:	50°C to 1200°C	Sample Rate:	Cavity Temp is updated 10 times per second; digitally filtered to eliminate noise Selected at Factory
Calibration Accuracy:	+/- 0.2°C +/- 1 digit	°F/°C	Selected at Factory
Stability:	+/- 0.02% of full scale	Alarms:	5.0 amps at 120 VAC, 2.5 amps at 230 VAC
Resolution:	1°C or 0.1°C Selectable	Operating Environment:	0 to 40°C ambient temp with relative humidity less than 95% non-condensing
Warm-Up Time:	35 Minutes	Power Requirement:	105-125 Volts, 50-60 Hz., 500 Watts Max
Control:	PID dual Zero voltage firing state power relays	Dimensions (HxWxL):	5.10" x 12" x 13.4" (Rackmounted 5.25" x 19" x 14.4")
Readout:	Dual display: BB Temp is shown on upper LED display; Set Point and Parameters are shown on lower LCD Display	Weight:	9 lbs. (Rackmounted 10lbs.) (Shipping Weight: 13 lbs. 17lbs.)

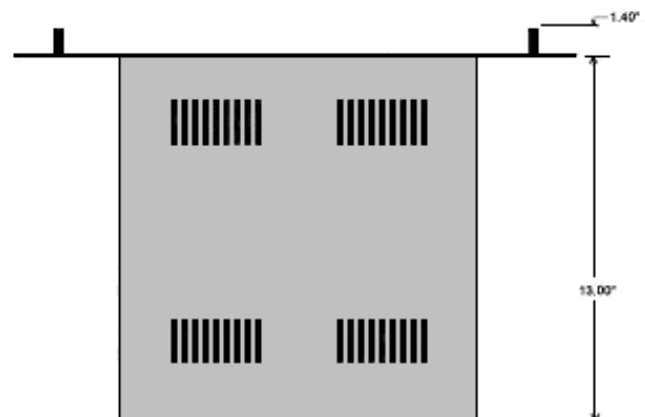
The IR-301 controller is a microprocessor based PID (Proportional, Integral and Derivative) system for regulating the Blackbody's Radiating Surface. At Infrared Systems Development, we have taken a leap forward from the standard PID Controller types of past years. We do this by utilizing five (5) independent PID parameter groups, each for a specific temperature range, internally selected based on the Setpoint. To control stability, the Standard Proportional Band with Automatic Reset and Derivative method is utilized. Unlike standard PID control, these parameters are totally dedicated to control stability only. This allows us to reduce the Proportional Band, creating a much more stable Blackbody system.

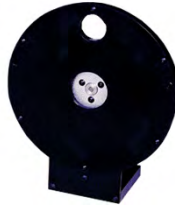
To control warm-up characteristics, we start with an independent Proportional Band, much wider than the stability Proportional Band. We then take the operational span and divide it into five smaller spans. Each of these spans is assigned a factory-selected range of PID Parameters values. Selecting a set temperature automatically loads the proper warm-up parameters into memory for that specific temperature. This process practically eliminates the need for continuous reactionary parameter changes as required by standard PID.

All control parameters, selections, and calibration procedures are accomplished through simple MENU selections using the four front panel buttons. These MENU selections are organized into Sections. Each Section presents a specific set of related functions. Internally the IR-301 was designed for maximum accuracy while maintaining our trademark reliability and quality. As is apparent with the use of dual redundant solid state (zero-voltage switching) power relays, RFI filters and an entire temperature sensor feedback loop; wire, cable, pins and connectors, being manufactured from special thermocouple alloys to eliminate the effects of ambient temperature change. The Thermocouple Cold Junction is mounted to a high precision RTD sensor to accurately monitor the CJC to provide compensation for ambient temperature variations. All connections are made from the rear for true Rackmount capabilities.



IR-301 WITH RACKMOUNT ACCESSORY





**IR-860
Modulator for
IR-563
IR-564
Page 42**

**IR-762
Modulator for
IR-508
IR-518
Page 43**

The Energy Modulator is a variable speed rotating disk chopper designed for use with radiation sources, including blackbody, tungsten filament, mercury lamps Nernst glowers and as part of instruments where modulated radiation is needed.

The IR-860 has been specially designed to integrate with the IR-563 & IR-564 Blackbody Sources while the IR-762 is designed for the IR-508 and IR-518 blackbody Sources. For other applications a table mount is available. The System consists of the Modulator head assembly and Modulator controller. The controller operates the motor and blade rotation and controls the speed of the modulation frequency.

The Modulator unit of the IR-860 contains an interchangeable chopper blade attached to a hub of a Brushless DC Motor. This motor allows the blade to stop at an open position by depressing the HOLD switch or shorting the remote hold BNC. The blade is attached to the motor shaft and rotated to align the hold position of the motor with an open position of the blade.

Three sensors detect the rotor motion in the motor and feedback the signal to the drive circuitry to ensure accurate closed loop speed control. A BLDC motor controller is used to provide the motor drive and sensor signal processing. A built in phase reference pickup, or optical sensor is provided to allow the user to measure and monitor the actual chopping frequency through the front panel meter or the rear panel Freq Out BNC. This signal is a TTL 0-5V square wave.

ENERGY MODULATOR SYSTEMS

IR-860

Specifications:

Motor Spindle Speed Range:	75-7500 RPM
Warm Up Time:	1 Hour for Optimum Stability
Stability:	0.5% of set frequency or 0.25% of full scale over 4 hours
Control Type:	Closed Loop Brushless DC Motor Controller with Phase Sensors
Meter Indication:	Chopping Frequency in Hertz
Meter Accuracy:	± 1 Digit
Reference Frequency Output:	0-5 V TTL Level, 600 Ohms Output
Power Requirements:	200 Watts 110 or 220 VAC 50-60 Hz
Dimensions: Modulator:	6.88" Diameter (175mm)
Controller:	8.5" x 8" x 3.75" (216x203x95mm)
Weight:	6.5 lbs

BLADE TYPES:

Blade	Freq Range	Number of Slots	Slot Width @ Center	Maximum Aperture
A	1.25-125HZ	1	7.854"	1.0"
B	2.5-250HZ	2	3.927	1.0
<i>STANDARD BLADE</i>				
C	10-1000HZ	8	0.982	0.992
D	30-3000HZ	24	0.327	0.327
E	50-5000HZ	40	0.196	0.196
F	100-10000HZ	80	0.098	0.098
G	300-30000HZ	240	0.0327	0.0327
H	62.5-6250HZ	50	0.157	0.157
J	450-45000HZ	360	0.022	0.022
K	3.75-375HZ	3	2.618	1.0

IR-762

Specifications:

Dimensions:	5.8"W x 2.8"H x 12.5"D
Input and Output Connectors:	BNC's
Frequency Control:	Up/Down Keypad Switches
Mode Control:	Keypad Switch Enable with LED Illuminated Selection
External Control:	Keypad Switch Enable with LED Indication
Input Power Connection:	IEC Connector with US style power cord
Weight:	5lbs (10 lbs. Shipped weight)
Operating Temp:	10-40° C
Display Type:	Green LED Segments
No of Digits:	4
Frequency Resolution:	1 HZ
762 HEAD	
Motor:	11 pole dc motor, sleeve bearing, precious metal brushes
Ambient Temp:	-20°C to + 65°C
Optical Sensor:	High speed, IR LED Phototransistor Switch
POWER SUPPLY	
Supply Type:	Linear
Voltage Selection:	115 / 230 VAC
Input Voltage:	110 / 115 VAC +/- 10%, 230VAC +/- 10%
Line Frequency:	50-60Hz
Input Power:	20VA MAX
Fuse Ratings:	250mA @ 115VAC 125mA @ 230VAC
Fuse Type:	IEC60127-2/III (250V, Slow Blow Type 'T')

BLADE TYPES:

Freq Range	Number of Slots	Maximum Aperture	Jitter
20-200HZ	2	1.85"	+/- 0.2° max
<i>STANDARD BLADE</i>			
20Hz-1KHZ	10	0.40"	+/- 1° max
60JZ-3KHZ	30	0.13"	+/- 3°max

INTELLIGENT FILTER WHEEL



- Φ Remote Motorized Wheel
- Φ 5 or 8 Position Wheel
- Φ Filters or Apertures
- Φ PC Controllable via RS-232

The IFW has the ability to determine the identification (ID) of a particular wheel and apply that wheel ID to a preprogrammed set of filters or apertures. The names, not just position numbers of these filters, are displayed on the eight character display and are also available to the operating software via an RS-232 interface using a simple command structure. Up to 5 different filter wheels can have separate IDs and each wheel can have up to 5 filters for a total of 25 identifiable filters.

The IFW filter wheel can easily be removed from the IFW system without tools or removal from the equipment. A hinged door is secured by a single captive thumbscrew. Once opened, the wheel can be extracted and another inserted in its place. The entire process takes only a few seconds. Hitting the HOME switch on the hand control or invoking the HOME function in the operating program will set the wheel to position one and bring up the available filters for that wheel.

The IFW can be controlled by either the switches on the hand control, an SBIG camera controller, or by an external computer via an RS-232 interface. The RS-232 operating protocol is a set of simple ASCII commands that any programmer can easily implement. While any software capable of controlling the SBIG CFW-8 filter wheel can immediately control the IFW, we believe developers will incorporate the IFW serial operating protocol since it offers full feedback including filter names. The IFW control software can be used for the filter description programming and also for filter selection and control.

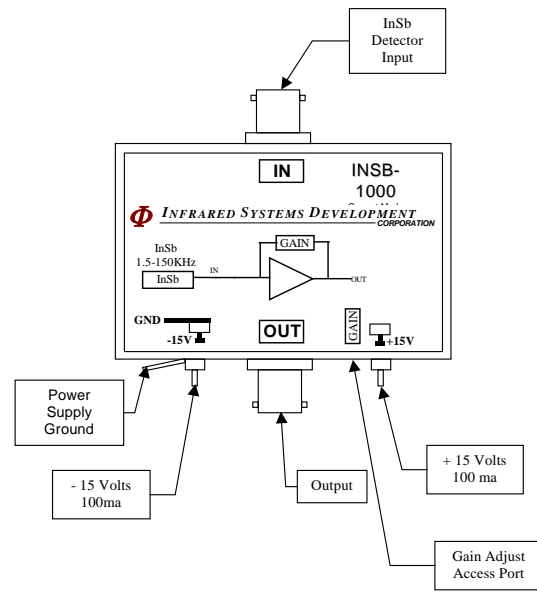
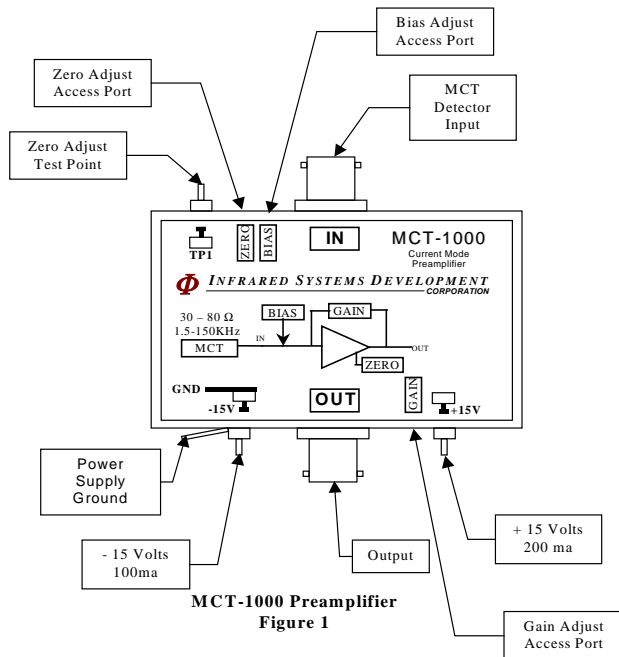
A control cable with 8-pin modular connector on one end and a 9-pin sub-D connector on the other is used to connect the IFW to the hand control box. Lengths of cable 6, 12, 25 and 50 feet as well as custom lengths are available. This is the same cable used with the TCF focuser and can be interchanged.

PREAMPLIFIERS SINGLE ELEMENT



Infrared Systems Development produce preamplifiers, which provide complete detector interfacing. The proper bias voltage and input stage are selected for each detector type. The preamplifier output is suitable for driving test equipment, A/D cards and instrument circuitry. We fully test and integrate the detector with the preamplifier when supplied, or simulated detector components. Each amplifier is tested with methods most closely matching the final application. From DC response to femtosecond laser pulse, our preamps are optimized to provide the best performance for each task.

<u>MODEL</u>	<u>Type</u>	<u>Bandwidth</u>	<u>Gain</u>
MCT-1000	PC HgCdTe	1.5Hz – 150kHz	50-1000
MCT-1000DC	PC HgCdTe	DC – 150kHz	50-1000
MCT-1000H	PC HgCdTe	1.5Hz – 150kHz	200-4000
MCT-1000HS	PC HgCdTe	500Hz – 1.0MHz	50-1000
PVMCT-1000	PV HgCdTe	1.5Hz – 150kHz	5-100
MCT Array	PC or PV HgCdTe	Any DC-1.0Mhz	5-1000
INSB-1000	PV InSb	1.5Hz – 200kHz	5-100
INSB-1000DC	PV InSb	DC – 200kHz	5-100
INSB-1000HS	PV InSb 2mm	500HZ – 1.0MHz	0.5-10
INSB-1000HS	PV InSb 1mm	500Hz – 1.0MHz	2.5-30
PYRO-1000	DTGS and LiTaO3	1.5Hz – 10kHz	50-1000
PB-1000	PbS/PbSe	1.5Hz – 50kHz	2-200
INGAAS-1000	InGaAs	1.5Hz – 50kHz	5-100
VA-1000	Any	10Hz – 500Hz	100-3000





MCT-6400

ARRAY DETECTOR PREAMPLIFIERS

Infrared Systems Development Corporation offers multi-channel preamplifiers for small and large array detectors. These preamplifiers are the same high quality low noise amplifiers as the single channel unit, packaged in multi-channel housings. Bias and Gain adjustments allow corrections for signal differences between array elements. Each element can be adjusted to compensate for responsivity variations.

Bias and Responsivity (gain) of each individual array element can be tuned to provide uniform response from all elements. Front Panel input BNC connectors attach to the detector terminals and Rear Panel output BNC's connect to signal acquisition and analysis circuitry. Low impedance output (50 Ohm) allows direct connection to PC based A/D boards, and drive long length cables. Several multi-channel arrays can be used for larger arrays; two MCT-6400's will interface with a 128 Element array.

PREAMP MODEL	ARRAY SIZE (# OF ELEMENTS)
MCT-4000	4
MCT-8000	8
MCT-1600	16
MCT-3200	32
MCT-6400	64



MCT-4000



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Φ INFRARED SYSTEMS DEVELOPMENT

CORPORATION

Infrared Systems Development Corporation (ISDC) Designs and Manufactures High Quality Electro-Optical Systems and Components for all aspects of Infrared Sciences.

WE HAVE A SOLUTION FOR YOU

We also develop systems for custom applications, and offer design consulting services for many infrared instrument and sub-system projects. Our experienced staff can offer assistance in almost any IR field, and offer suggestions for your system needs.

Contact us for more information.

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