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Manual

SINGLE AND DUAL-CHANNEL OPTICAL METERS

MODEL 1936-R/2936-R SERIES
MODEL 1938-R/2938-R SERIES
MODEL 1940-R/2940-R SERIES
COMMUNICATION COMMAND REFERENCE

Table of Contents

CHAPTER 1   Communication Command Reference

1.1   Model 1936/2936, 1938/2938, 1940/2940 Series Remote Interface Commands

A complete listing of the commands supported by 1936/2936-R, 1938/2938-R, 1940/2940-R series power meters is provided below.

1.2   Command Overview

There are two types of commands: commands that cause the power meter to take a desired action, and queries that return a stored value or state of the power meter. Queries must end with a question mark (?), while commands may require parameter(s) to follow:

PM:Lambda 810

For example, the value "810" in the command **PM:Lambda 810** sets the wavelength for the currently selected channel to 810. The table below summarizes all the commands and queries supported by the 1936/2936-R series power meters. The command/query MUST contain all of the letters, which are shown in upper case in this table. The lower case letters shown with the commands are optional, and may be used for clarity. If any of the optional letters are used, then all of the optional letters are now required for the current command.

The commands may be sent to the instrument in either upper or lower case or in any combination. For example, the following commands are equal:

PM:Lambda 810

PM:L 810

pm:L 810

Pm:L 810

1.2.1   Command Execution

The controller interprets the commands in the order they are received and execute them sequentially. If a set of commands have to be executed closer to each other, these commands can be sent to the controller simultaneously by creating a command string with semicolon (;) used as a command separator. The command string length should not exceed 50 characters. In the example shown below, a command string was created with semicolon separating 5 queries. The controller responds to this command string with a response that has 5 values using a comma (,) as a separator.

COMMAND STRING:

PM:P?;PM:ATT?;PM:L?;ERR?

INSTRUMENT RESPONSE:

1.2450,1,810,0

1.2.2   Activate a Specific Channel

The command set of the power meter, by default, operates on channel A. In case of 2936-R, 2938-R, 2940-R power meters where there are 2 channels, the users can send commands for channel B after selecting this

channel through "PM:CHANnel" command. Once a desired channel is selected using this command, all subsequent commands sent to the power meter will be addressed to that channel until it is changed again. The power meter defaults to channel "A" following a reset.

Note that the channel selected is specific to the communication interface over which the PM:CHANnel command was issued. For instance, if "PM:CHANnel 1" command was issued over RS-232 interface and "PM:CHANnel 2" command was issued over USB interface, all subsequent commands issued through RS-232 and USB interfaces will be addressed to channels A and B respectively.

Some commands do not apply to a particular channel, such as "BEEP". The behavior of these commands is independent of the channel currently selected.

1.3   Command Description

1.3.1   Command Glossary

Root level Commands/Queries Summary

Name	Number of Parameters	Function	
*IDN?	NONE	Identification query	83
*RCL	1	Recall configuration settings	83
*SAV	1	Save configuration settings	84
ADDRess	1	Sets the instrument's USB address	84
ADDRess?	NONE	Returns the instrument's USB address	85
BEEP	1	Turns the beeper on or off, or beeps once.	85
BEEP?	NONE	Returns the status of the beeper.	85
ECHO	1	Sets the echo on or off	85
ECHO?	NONE	Returns the status of echo	86
ERRors?	NONE	Returns errors generated since the last query.	86
ERRSTR?	NONE	Returns errors and their corresponding error text generated since the last query.	86

Table 2   Root level Commands/Queries Summary

Tree Level Commands/Queries Summary

Name	Number of Parameters	Function	Page No.
DISP:BRIGHT	1	Sets the backlight level of the display and the keypad	82
DISP:BRIGHT?	NONE	Returns the backlight level of the display and the keypad	83
PM:ANALOGFILTER	1	Sets the analog filter to desired value	87
PM: ANALOGFILTER?	NONE	Returns the analog filter setting	87
PM:ANALOG:IMP	1	Sets the analog output impedance to desired value	87
PM:ANALOG:IMP?	NONE	Returns the analog output impedance value	88
PM:ANALOG:OUT	1	Sets the analog output range to the desired level	88
PM:ANALOG:OUT?	NONE	Returns the analog output range	88
PM:ATT	1	Selects if the attenuator's calibration data is included for power calculation.	89
PM:ATT?	NONE	Returns setting if attenuator data should or should not be used when calibrating the power meter.	89
PM:ATTSN?	NONE	Gets the attenuator serial number.	89
PM:AUTO	1	Sets the power meter ranging to manual or automatic.	89
PM:AUTO?	NONE	Returns 1 if automatic power meter ranging is selected.	90

PM:CALDATE?	NONE	Returns the calibration date of the detector.	90
PM:CALTEMP?	NONE	Returns the temperature at which the calibration was performed.	90
PM:CHANnel	1	Selects the power meter channel to display and control.	91
PM:CHANnel?	NONE	Returns the power meter channel currently selected.	91
PM:CORR	3	Sets the power measurement correction settings.	91
PM:CORR?	NONE	Power measurement correction settings query	92
PM:DETMODEL?	NONE	Returns the model number of the detector.	92
PM:DETSIZE?	NONE	Returns the detector surface area	92
PM:DETSN?	NONE	Returns the serial number of the detector.	92
PM:DIGITALFILTER	1	Sets the digital filter to desired value	93
PM: DIGITALFILTER?	NONE	Returns the digital filter setting	93
PM:DPower?	NONE	Detector Power query	93
PM:DS:BUFfer	1	Set data store behavior select.	94
PM:DS:BUFfer?	NONE	Returns data store behavior select.	94
PM:DS:CLear	NONE	Clear data store.	94
PM:DS:Count?	NONE	Returns data store count of items stored.	94
PM:DS:ENable	1	Set data store enable.	95
PM:DS:ENable?	NONE	Returns data store enable.	95
PM:DS:GET?	1	Returns data store data. {1,1-10,-5,+5} – value, range, oldest 5, newest 5	95
PM:DS:INTerval	1	Set data store interval.	96
PM:DS:INTerval?	NONE	Returns data store interval.	96
PM:DS:SAVEBUFER	1	Saves the data store buffer to a WinCE compatible USB flash disk	96
PM:DS:SIZE	1	Sets the size of the Data Store buffer	97
PM:DS:SIZE?	NONE	Returns the sizes of the Data Store buffer	97
PM:DS:UNITs?	NONE	Returns data store units.	97
PM:FILTer	1	Selects the filtering operation: no filtering, analog filter, digital filter, or analog and digital.	98
PM:FILTer?	NONE	Returns the filtering operation: no filtering, analog filter, digital filter, or analog and digital.	98
PM: FREQuency?	NONE	Returns the measured frequency value	98
PM:Lambda	1	Sets the wavelength for use when calculating power.	99
PM:Lambda?	NONE	Gets the selected wavelength in nanometers.	99
PM:MAX:Lambda?	NONE	Returns the longest calibrated wavelength in nanometers.	99
PM:MAX:Power?	NONE	Returns the maximum readable power in present range	100
PM:MIN:Lambda?	NONE	Returns the shortest calibrated wavelength in nanometers.	100
PM:MIN:Power?	NONE	Returns the minimum readable power in present range	100
PM:MEAS:TIMEOUT	1	Sets the measurement timeout period	100
PM:MEAS:TIMEOUT?	NONE	Returns the measurement timeout period	101

Table 3   Tree Level Commands/Queries Summary

1.3.2   Display Commands

1.3.2.1   DISP:BRIGHT

Description   Display brightness command

Syntax   BRIGHT *brightness*

Remarks   The BRIGHT command controls the brightness of the instrument display.

Argument   Type   Description

Brightness   int   Brightness, in levels from 0 to 7

Related

1.3.2.2   DISP:BRIGHT?

Description   Display brightness query

Syntax   DISP:BRIGHT?

Remarks   The BRIGHT? query returns the display brightness setting.

Response   Type   Description

Brightness   int   Display brightness, in levels from 0 to 7

Related
Commands: DISP:BRIGHT

1.3.3   Power Meter Commands

1.3.3.1   *IDN?

Description   Identification Query

Syntax   *IDN?

Parameters   None

Function

Remarks This query will cause the power meter to return an identification string.

Model name   Firmware version #   Firmware date   Controller Serial #

NEWPORT XXXX vYYY mm/dd/yy SNZZZZ
Examples:
NEWPORT 1936-R v1.0.0 12/12/05 SN0001
NEWPORT 2936-R v1.0.0 12/12/05 SN0001

1.3.3.2   *RCL

Description   Recall Configuration Settings

Syntax   *RCL bin

Remarks   The *RCL command restores the power meter to the setup state saved in its non-volatile flash memory.

Argument   Value   Description

bin   0   Reserved

        1 to 5 Valid configuration settings

Related

Commands: *SAV

1.3.3.3 *SAV

Description   Save Configuration Settings

Syntax   *SAV bin

Remarks

The ***SAV** command saves the present state of the power meter in its non-volatile flash memory. A particular state is then recalled using the ***RCL** command. If any one of these parameters are changed, the present state of the power meter will automatically be saved in configuration setting #1. When the power meter is reset, the state of the meter defaults to configuration setting #1. The setup parameters saved include:

Display brightness level

USB address

Color scheme

Measurement display mode

Custom wavelengths

Argument	Value	Description
bin	0	Reserved
	1 to 5	Valid configuration settings

Related

Commands: *RCL

1.3.3.4 ADDRess

Description   USB address command.

Syntax   ADDRess value

Remarks   The ADDRess command sets the power meter USB address. After changing USB address, communication with the power meter has to be re-initialized.

Argument   Value   Description

Value   0   Reserved

              1 to 31 Valid USB address range

Related
Commands: ADDRess?

1.3.3.5 ADDRess?

Description   USB address query.

Syntax   ADDRess?

Remarks   The ADDRess query returns the power meter's USB address.

Response   Value   Description

address   0   Reserved

              1 to 31 Valid USB address range

Related

Commands: ADDRess

1.3.3.6   BEEP

Description   Beep command

Syntax BEEP   beep set

Remarks   The BEEP command controls the power meter's beeper.

              The beeper can be used to signal error or warning conditions.

Response   Value   Description

beep set   0   Disable beeper

              1   Enable beeper

              2   Beep for 100ms

Note: The beeper is enabled at power on.

Related
Commands: BEEP?

1.3.3.7   BEEP?

Description   Beep query

Syntax BEEP?

Remarks   The BEEP? query returns the enable status of the power meter's beeper.

Response   Value   Description

beep set   0   Beeper disabled

              1   Beeper enabled

Related
Commands: BEEP

1.3.3.8   ECHO

Description   Echo command

Syntax ECHO echo set

Remarks

The ECHO command is used to turn ON or OFF the echoing of commands sent to the power meter over RS-232 communication interface. By default, the echo is turned ON.

Response   Value   Description

echo set   0   Echo OFF

              1   Echo ON

Related
Commands: ECHO?

1.3.3.9 ECHO?

Description   Echo query

Syntax   ECHO?

Remarks   The ECHO? query returns the echo status of the power meter.

Response   Value   Description

status 0   Echo OFF

        1   Echo ON

Related
Commands: ECHO

1.3.3.10 ERRors?

Description   Error query Syntax   ERRors?

Remarks

The ERRors? query returns a single error number that has occurred since the last query. This error is indicated by a number that corresponds to the type of error that occurred. This command also clears the read error from the Error buffer.

Response   Type   Description

Error code   int   Error code number per Appendix B, 0 if no

errors

Related
Commands: ERRSTR?

1.3.3.11 ERRSTR?

Description   Error string query

Syntax ERRSTR?

Remarks

The ERRSTR? query returns a single error number along with the corresponding error text string that have occurred since the last error query.

Response   Type   Description

Error code,   string   Error code number and text for error code

               as"text"per Appendix B, 0 if no errors

Related
Commands: ERRors?

1.3.3.12 PM:ANALOGFILTER

Description   Analog filter select command

Syntax PM:ANALOGFILTER value

Remarks   The PM:ANALOGFILTER command selects the analog filter setting.

Argument   Value   Analog Filter

Value	0	None
	1	250 kHz
	2	12.5 kHz
	3	1 kHz
	4	5 Hz

Related
Commands: PM:ANALOGFILTER?

1.3.3.13 PM: ANALOGFILTER?

Description   Analog filter query

Syntax   PM:ANALOGFILTER?

Remarks

The PM:ANALOGFILTER? query returns an integer indicating the present analog filter setting.

Argument	Value	Analog Filter
Value	0	None
	1	250 kHz
	2	12.5 kHz
	3	1 kHz
	4	5 Hz

Related
Commands: PM:ANALOGFILTER

1.3.3.14 PM:ANALOG:IMP

Description   Analog output impedance select command

Syntax   PM:ANALOG:IMP value

Remarks   The PM:ANALOG:IMP command selects the analog output impedance.

Argument	Value	Output Impedance
Value	0	50 Ω
	1	100 kΩ
	2	1 MΩ

Related
Commands: PM:ANALOG:IMP?

1.3.3.15 PM:ANALOG:IMP?

Description   Analog output impedance query

Syntax   PM:ANALOG:IMP?

Remarks

The PM:ANALOG:IMP? query returns an integer indicating the present analog output impedance.

Argument	Value	Output Impedance
Value	0	50 Ω
	1	100 kΩ
	2	1 MΩ

Related
Commands: PM:ANALOG:IMP

1.3.3.16 PM:ANALOG:OUT

Description   Analog output range select command

Syntax   PM:ANALOG:OUT range

Remarks   The PM:ANALOG:OUT command selects the analog output range.

Argument	Value	Max. Output
Range	0	1 V
	1	2 V
	2	5 V
	3	10 V

Related
Commands: PM:ANALOG:OUT?

1.3.3.17 PM:ANALOG:OUT?

Description   Analog output range query

Syntax PM:ANALOG:OUT?

Remarks   The PM:ANALOG:OUT? query returns an integer indicating the present analog output range.

Response	Value	Max. Output
Range	0	1 V
	1	2 V
	2	5 V
	3	10 V

Related
Commands: PM:ANALOG:OUT

1.3.3.18 PM:ATT

Description   Attenuator enable command

Syntax PM:ATT enable

Remarks   Indicates whether the attenuator for the 818 Series power detector is on the detector.

Argument	Type	Description
Enable	int	Enable use of detector responsivity with attenuator available in the calibration module for 818 detectors.

Related
Commands: PM:ATT?

1.3.3.19 PM:ATT?

Description   Attenuator enable query

Syntax   PM:ATT?

Remarks

The PM:ATT? query returns 1 when using attenuator calibration, 0 when calculating power without attenuator data.

Response	Value	Description
attenuator	0	Calibrating power without attenuator

Calibrating power using an attenuator

Related
Commands: PM:ATT

1.3.3.20 PM:ATTSN?

Description   Attenuator serial number query

Syntax PM:ATTSN?

Remarks

The PM:ATTSN? query returns the serial number of the attenuator. When no detector is found the power meter responds with "no detector".

Response	Type	Description
serial #	string	Serial number of the attenuator

Related
Commands: PM:DETMODEL?, PM:DETSN?

1.3.3.21 PM:AUTO

Description   Auto range enable command

Syntax   PM:AUTO mode

Remarks   The PM:AUTO command sets the power ranging to either manual or automatic.

Argument	Value	Description
mode	0	Manual power meter ranging
	1	Automatic power meter ranging

Related
Commands: PM:AUTO?, PM:RANge

1.3.3.22 PM:AUTO?

Description   Auto range mode query

Syntax   PM:AUTO?

Remarks   The PM:AUTO? query returns a value to indicate if auto ranging is enabled or not.

Response	Value	Description
mode	0	Manual power meter ranging
	1	Automatic power meter ranging

Related
Commands: PM:AUTO, PM:RANG

1.3.3.23 PM:CALDATE?

Description   Detector calibration date query

Syntax PM:CALDATE?

Remarks   The PM:CALDATE? query returns the calibration date of the detector.

For example: 21JUN1999.

Response	Type	Description
Date	string	DDMMMYYYYY

1.3.3.24 PM:CALTEMP?

Description   Temperature at which detector was calibrated query

Syntax   PM:CALTEMP?

Remarks

The PM:CALTEMP? query returns the temperature (degrees Celsius) at which the detector was calibrated. When no detector is present, "no detector" is returned.

Response	Type	Description
temperature	float	Returns the temperature at which the detector was calibrated.

1.3.3.25 PM:CHANnel

Description   Select power meter channel

Syntax   PM:CHAN channel

Remarks   The PM:CHAN command selects the power meter channel for control.

Argument	Type	Description
Channel	int	Power meter channel

Related
Commands: PM:CHAN?

1.3.3.26 PM:CHANnel?

Description   Power meter channel query

Syntax PM:CHAN?

Remarks   The PM:CHAN? query returns the power meter channel currently selected.

Response	Value	Description
channel	int	Currently selected power meter channel

Related

Commands: PM:CHAN

1.3.3.27 PM:CORR

Description   Power measurement correction settings

Syntax   PM:CORR value1, value2, value3

Remarks

The PM:CORR command sets the power measurement correction settings. These settings are used by the power meter to correct the actual power measurement. The corrected power is calculated using the formula provided below:

Corrected Measurement =

((Actual Measurement * value1) + value2) * value3

Argument	Type	Description
value1	float	Multiplier 1 (default = 1.000)
value2	float	Offset (default = 0.000)
value3	float	Multiplier 2 (default = 1.000)

Related
Commands: PM:CORR?, PM:Power?, PM:DPower?

1.3.3.28 PM:CORR?

Description   Power measurement correction settings query

Syntax   PM:CORR?

Remarks

The PM:CORR? command returns the power measurement correction settings. These settings are used by the power meter to correct the actual power measurement. The corrected power is calculated using the formula provided below:

Corrected Measurement =

((Actual Measurement * value1) + value2) * value3

Response	Type	Description
value1	float	Multiplier 1 (default = 1.000)
value2	float	Offset (default = 0.000)
value3	float	Multiplier 2 (default = 1.000)

Related
Commands: PM:CORR, PM:Power?, PM:DPower?

1.3.3.29 PM:DETMODEL?

Description   Detector model query

Syntax   PM:DETMODEL?

Remarks   The PM:DETMODEL? query returns the model number of the detector.

For example: 818-SL.

Response	Type	Description
model	string	Detector model number

1.3.3.30 PM:DETSIZE?

Description   Detector surface area

Syntax   PM:DETSIZE?

Remarks   The PM:DETSIZE? query returns the surface area of the detector in cm2.

Response   Type   Description

Area   float   Detector surface area

1.3.3.31 PM:DETSN?

Description   Detector serial number query

Syntax   PM:DETSN?

Remarks   The PM:DETSN? query returns the serial number of the detector.

For example: 0001

Response   Type   Description

Serial number String Detector serial number

1.3.3.32 PM:DIGITALFILTER

Description   Digital filter select command

Syntax   PM:DIGITALFILTER value

Remarks   The PM:DIGITALFILTER command specifies the digital filter setting.

Argument   Type   Description

Value   int   digital filter size between 0 and 10000

Related
Commands: PM:DIGITALFILTER?

1.3.3.33 PM:DIGITALFILTER?

Description   Digital filter query

Syntax   PM:DIGITALFILTER?

Remarks   The PM:DIGITALFILTER? query returns the present digital filter setting.

Argument   Type   Description

Value   int   digital filter size between 0 and 10000

Related
Commands: PM:DIGITALFILTER

1.3.3.34 PM:DPower?

Description   Detector power query

Syntax   PM:DPower?

Remarks

The PM:DPower? returns the actual power measurement. This measurement does not include any correction settings specified using "PM:CORR" command. When the correction settings are set to default values, the power measurement returned by this command is same as the measurement returned by "PM:P?" command.

Response	Type	Description
Power	float	Power in Watts

Related
Commands: PM:Power?

1.3.3.35 PM:DS:BUFfer

Description	Data Store buffer behavior selection
Syntax	PM:DS:BUFfer behavior
Remarks	The PM:DS:BUFfer command selects the behavior mode for control of the Data Store buffer.

Argument	Value	Description
Mode	0	Fixed Size
	1	Ring Buffer

The behavior of the ring buffer is to allow continual data collection after the buffer is full where the oldest values will be overwritten when new measurements are taken.

Related
Commands: PM:DS:BUFfer?

1.3.3.36 PM:DS:BUFfer?

Description	Data Store buffer behavior selection query
Syntax	PM:DS:BUFfer?
Remarks	The PM:DS:BUFfer? query returns the value of the Data Store buffer behavior.

Argument	Type	Description
Behavior	int	See PM:DS:BUFfer for a definition of the behavior status.

1.3.3.37 PM:DS:CLear

Description	Clear the Data Store of all data
Syntax PM:DS:CLear
Remarks	The PM:DS:CLear command resets the data store to be empty with no values.

Argument	Type	Description
none	-	

1.3.3.38 PM:DS: Count?

Description	Data Store data item count query
Syntax	PM:DS:Count?

Remarks

The PM:DS:Count? query returns the number of measurements that have been collected in the Data Store.

Argument	Type	Description
count	int	The number of measurements that have been collected.

1.3.3.39 PM:DS:ENable

Description   Enable Data Store Collection

Syntax PM:DS:ENable enable

Remarks   The PM:DS:ENable enables or disables the collection of measurements in the Data Store.

Argument	Value	Description
enable	0	Disabled
	1	Enabled

Data will be collected after the PM:DS:ENable command has been called with a parameter of 1. Data collection will stop when the PM:DS:ENable command has been called with a parameter of 0 or when a fixed size data buffer is full.

Related
Commands: PM:DS:ENable?

1.3.3.40 PM:DS:ENable?

Description   Enable Data Store Collection query

Syntax   PM:DS:ENable?

Remarks   The PM:DS:ENable? query returns the enabled status of the Data Store.

Argument	Type	Description
enable	int	See PM:DS:Enable for a description of the enable argument

1.3.3.41 PM:DS:GET?

Description   Retrieve Data Store data query

Syntax   PM:DS:GET? num

Remarks

The PM:DS:GET? command returns a number of measurements that have been collected in the Data Store.

Argument	Type	Description
selection	string	"1" – returns the single value specified
		"1-10" – returns values in the range from 1-10
		"-5" – returns the oldest 5 values (same as 1-5)
		"+5" – returns the newest 5 values

Note: depending on the number of data points requested, there may be several read operations required on the USB or RS-232 computer interfaces.

1.3.3.42 PM:DS:INTerval

Description   Data Store Interval Select

Syntax   PM:DS:INTerval <interval>

Parameters

The parameter <interval>is of type <number>that is an integer. The parameter represents the rate at which measurements are put in the data buffer.

Function

An interval value of 1 causes the power meter to put all measurements taken in the data store buffer; a value of 2 causes every other measurement to be put in the data buffer and so on.

If the measurement mode is "CW Continuous", an interval setting of 1 translates to putting measurements at the rate of 0.1ms in the data buffer.

If the measurement mode is "Peak-Peak Continuous", an interval setting of 1 translates to putting measurements at a rate dictated by measurement timeout duration. Refer "PM:MEAS:TIMEOUT" command for details.

If the measurement mode is "Pulse Continuous", an interval setting of 1 translates to putting every pulse measurement in the data buffer. Here, the rate of data storage depends upon the pulse repetition rate.

The total time taken to fill up the data buffer depends upon various factors such as the interval, data store size and measurement mode.

Related

Commands: PM:DS:SIZE,PM:DS:SIZE?,PM:DS:INTerval?

1.3.3.43 PM:DS:INTerval?

Description   Data Store Interval Query

Syntax   PM:DS:INTerval?

Parameters   None

Function

This query returns the interval in milliseconds currently used for data storing.

Related

Commands: PM:DS:SIZE,PM:DS:SIZE?,PM:DS:INTerval

1.3.3.44 PM:DS:SAVEBUFFER

Description   Save the current Data Store data to a file

Syntax PM:DS:SAVEBUFFER

Remarks

The PM:DS:SAVEBUFFER command saves the current user Data Store for the current channel to a file named PM2936xxx.dat, PM2938xxx.dat, PM2940xxx.dat respectively on the WinCE compatible USB Flash Disk plugged into the USB Host port on the front of the Power Meter.

1.3.3.45 PM:DS:SIZE

Description   Size of the Data Store query

Syntax   PM:DS:SIZE <size>

Parameters

The parameter <size>is of type <integer> in the range 1 to 250000.The parameter represents the size of the data buffer to be used for data storing.

Function

This command sets the size of the buffer for the currently selected channel used for data storing.

Note: The data buffer is cleared automatically when this command is used and all previously stored data will be gone.

Related

Commands: PM:DS:SIZE?,PM:DS:INTerval,PM:DS:INTerval?

1.3.3.46 PM:DS:SIZE?

Description   Data Store Buffer Size Query

Syntax   PM:DS:SIZE?

Parameters   None

Function   This query returns the data store buffer size for the currently selected channel.

Returns   <size> is of type <number>and represents an integer of the range 1 to 250000.

                Related

Commands: PM:DS:SIZE,PM:DS:INTerval,PM:DS:INTerval?

1.3.3.47 PM:DS:UNITs?

Description   Data store units query

Syntax   PM:DS:UNITS?

Remarks   The PM:DS:UNITS? query returns an integer indicating the units selected.

Response	Value	Description
units	0	Amps
	1	Volts
	2	Watts
	3	Watts/cm^2
	4	Joules
	5	Joules/cm^2
	6	dBm
	7-10	Reserved
	11	Sun

Related

Commands: PM:UNITS,PM:UNITS?

1.3.3.48 PM:FILTer

Description   Filter select command

Syntax PM:FILT filter type

Remarks   The PM:FILT command select the filtering operation to be performed on power readings.

Argument	Value	Description
Filter type	0	No filtering
	1	Analog filter
	2	Digital filter
	3	Analog and Digital filter

Related
Commands: PM:FILT?

1.3.3.49 PM:FILTer?

Description   Filter type query

Syntax   PM:FILT?

Remarks   The PM:FILT? query returns an integer indicating the present filter mode.

Response   Value Description

Filter type	0	No filtering
	1	Analog filter
	2	Digital filter
	3	Analog and Digital filter

Related

Commands: PM:FILT

1.3.3.50 PM:FREQuency?

Description   Measured frequency query

Syntax PM:FREQuency?

Remarks

The PM:FREQuency? query returns a value indicating the present measured frequency in Hertz.

1.3.3.51 PM:Lambda

Description   Wavelength set command

Syntax   PM:Lambda value

Remarks

The PM:Lambda command selects the wavelength to use when calculating power. The value must fall within the calibrated wavelength of the detector.

Argument	Type	Description
Value	int	Wavelength in nanometers (nm)

Related

Commands: PM:Lambda?, PM:MAX:Lambda?, PM:MIN:Lambda?

1.3.3.52 PM:Lambda?

Description   Wavelength query

Syntax   PM:Lambda?

Remarks

The PM:Lambda? query returns the selected wavelength in nanometers. This is the wavelength used to look up the responsivity from the calibration data.

Response	Type	Description
Wavelength	int	Wavelength in nanometers (nm)

Related

Commands: PM:Lambda, PM:MAX:Lambda?, PM:MIN:Lambda?

1.3.3.53 PM:MAX:Lambda?

Description   Maximum wavelength query

Syntax   PM:MAX:Lambda?

Remarks

The PM:MAX:Lambda? query returns the longest calibrated wavelength in nanometers. If no detector is preset, the max lambda for the last read detector is returned.

Response	Type	Description
Wavelength	int	Wavelength in nanometers (nm)

Related

Commands: PM:MIN:Lambda?

1.3.3.54 PM:MAX:Power?

Description   Maximum power query

Syntax   PM:MAX:Power?

Remarks

The PM:MAX: Power? returns current range's maximum readable power.

Response	Type	Description
Power	float	Power in Watts

1.3.3.55 PM:MIN:Lambda?

Description   Minimum wavelength query

Syntax PM:MIN:Lambda?

Remarks

The PM:MIN:Lambda? query returns the shortest calibrated wavelength in nanometers. If no detector is preset,min lambda for the last read detector is returned.

Response	Type	Description

Wavelength   int   Wavelength in nanometers (nm)

Related

Commands: PM:MAX:Lambda?

1.3.3.56 PM:MIN:Power?

Description   Minimum power query

Syntax   PM:MIN:Power?

Remarks   The PM:MIN: Power? returns current range's minimum readable power.

Response   Type   Description

Power   float   Power in Watts

Related

Commands: PM:MAX:Power?

1.3.3.57 PM:MEAS:TIMEOUT

Description   Measurement timeout set command

Syntax PM:MEAS:TIMEOUT value

Remarks

This command sets the measurement timeout period. This value is used for making the following measurements:

1. Peak-to-peak measurements: These measurements are updated once every timeout period when the power meter is in Peak-Peak Continuous mode.

2. Auto-ranging in Pulse Continuous mode: The power meter automatically shifts to a lower range once every timeout period when it determines that no pulse measurements could be taken in the existing range. Users must set this timeout value to 250ms or larger than their pulse repetition rate in order to be able to perform measurements accurately.

Argument	Type	Description
Value	int	Timeout value (milliseconds)

Related

Commands: PM:MEAS:TIMEOUT?

1.3.3.58 PM:MEAS:TIMEOUT?

Description   Measurement timeout query

Syntax   PM:MEAS:TIMEOUT?

Remarks

The PM:MEAS:TIMEOUT? query returns the selected measurement timeout value in milliseconds.

Response   Type   Description

Timeout   int   measurement timeout in milliseconds

Related

Commands: PM:MEAS:TIMEOUT

1.3.3.59 PM:MODE

Description   Acquisition mode select

Syntax PM:MODE mode

Remarks   The PM:MODE command selects the acquisition mode for acquiring subsequent readings.

Argument	Value	Description
Mode	0	DC Continuous
	1	DC Single
	2	Integrate
	3	Peak-to-peak Continuous
	4	Peak-to-peak Single
	5	Pulse Continuous
	6	Pulse Single
	7	RMS

Related
Commands: PM:MODE?

1.3.3.60 PM:MODE?

Description   Acquisition mode query

Syntax   M:MODE?

Remarks   The PM:MODE? query returns an integer indicating the present acquisition mode.

Response	Value	Description
Mode	0	DC Continuous
	1	DC Single
	2	Integrate
	3	Peak-to-peak Continuous
	4	Peak-to-peak Single
	5	Pulse Continuous
	6	Pulse Single
	7	RMS

Related

Commands: PM:MODE

1.3.3.61 PM:Power?

Description   Power query

Syntax   PM:P?

Remarks

The PM:P? query returns the power in the selected units. Response Type Description power exp Exponential form (i.e. 9.4689E-04)

Related

Commands: PM:UNITS?, PM:PWS?

1.3.3.62 PM:PWS?

Description   Read with status query

Syntax PM:PWS?

Remarks

The PM:PWS? query returns the status and values of the reading. The status should be used to validate the reading. The reading will be in units corresponding to the units field in the status word.

Response   Type   Description

Power reading 1 exp Power in present units for channel 1

Status 1   int   A bitfield in hexadecimal defining the current channel status

Power reading 2 exp Power in present units channel 2 (if present. 0.0 otherwise)

Status 2   int   A bitfield in hexadecimal defining the current channel status
Note: The bitfield is defined as follows:

Bits 9-7   Channel Units. See PM:UNITS?

Bits 6-4   Channel Range, See PM:RANge? Bit 3   Detector Present

Bit 2

Channel range change status. Indicates if a measurement has been taken while the unit is ranging

Bit 1   Detector Saturated (reserved, follows bit 0)

Bit 0   hannel overrange. Indicates that the current measurement is overrange for the current channel range

Related

Commands: PM:MODE?

1.3.3.63 PM:RANge

Description   Range select

Syntax   PM:RANge range

Remarks

The PM:RANge command selects the gain stage when making readings from the detector head. The range of this value depends on the detector being used.

Response   Type   Description

| range | int | Values range from 0 to 7 |

Related

Commands: PM:RANge?, PM:AUTO

1.3.3.64 PM:RANge?

Description   Range query

Syntax   PM:RANge?

Remarks

The PM:RANge? query returns an integer that indicates the present range. The range of this value depends on the detector being used.

| Response | Value | Description |
| range | 0 | Values range from 0 to 7 |

Related

Commands: PM:RANge, PM:AUTO

1.3.3.65 PM:REF:VALue

Description   Reference Value Define

Syntax PM:REF:VALue <val>

Parameters

The parameter <val>is of type <number>.

Function

This command provides a means of directly storing a reference value to be used in linear and logarithmic (dB) relative measurements. The units of this value are the current units being used by the instrument.

Related

Commands: PM:REF:STOre,PM:REF:VALue?

1.3.3.66 PM:REF:VALue?

Description   Reference Value Query

Syntax   PM:REF:VALue?

Parameters   None

Function

This query returns the user defined reference value. The units of this value are the current units being used by the instrument.

Returns <refval>

<refval> is of type <number>

Related

Commands: PM:REF:STOre,PM:REF:VALue

1.3.3.67 PM:REF:STOre

Description   Reference Value Store

Syntax   PM:REF:STOre

Parameters   None

Function

This command takes the latest reading and stores it as a reference reading to be used when making relative linear and dB measurements. The units of this value are the current units being used by the instrument.

Related

Commands: PM:REF:VALue,PM:REF:VALue?

1.3.3.68 PM:RESPonsivity?

Description   Responsivity query

Syntax PM:RESP?

Remarks   The PM:RESP? query returns the responsivity currently used in making power calculations.

Response   Type   Description

Responsivity   float   Power meter responsivity

Related

Commands: PM:UNITS?, PM:PWS?

1.3.3.69 PM:RUN

Description   Run command

Syntax   PM:RUN mode

Remarks   The PM:RUN command disables or enables the acquisition of data.

Argument   Value   Description

Mode   0   Stop

        1   Run

Related

Commands: PM:RUN?, PM:MODE?

1.3.3.70 PM:RUN?

Description   Run query

Syntax   PM:RUN?

Remarks   The PM:RUN? query returns an integer indicating the present run mode.

Response   Value   Description

Mode   0   Stopped

        1   Running

Related

Commands: PM:RUN, PM:MODE?

1.3.3.71 PM:SATLEVEL

Description   Set detector saturation current density or power level

Syntax   PM:SATLEVEL value

Remarks

This command sets or overrides the saturation density value recorded in the detector calibration

Argument   Type   Description

Value   float   saturation current density (A/cm^2) for semiconductor detector or saturation power (W) for thermopile detector.

Related

Commands: PM:SPOTSIZE, PM:SATLEVEL?

1.3.3.72 PM:SATLEVEL?

Description   Query detector saturation current density or power level

Syntax   PM:SATLEVEL?

Remarks   This command query the saturation density value which is set by PM:SATLEVEL command

Response	Type	Description
Value	float	saturation current density (A/cm^2) for semiconductor detector or saturation power (W) for thermopile detector.

Related

Commands: PM:SPOTSIZE, PM:SATLEVEL

1.3.3.73 PM:SPOTSIZE

Description   Set detector spot size

Syntax   PM:SPOTSIZE value

Remarks

This command sets the detector spot size. By default, the spot size is same as a detector's surface area. This value is used to when measurement units are set to W/cm2, J/cm2 or Sun.

Argument   Type   Description

Value float   Spot size (cm2)

Related

Commands: PM:SPOTSIZE?, PM:DETSIZE?

1.3.3.74 PM:SPOTSIZE?

Description   Detector spot size query

Syntax   PM:SPOTSIZE?

Remarks   The PM:SPOTSIZE? query returns the detector spot size in cm^2.

Response   Type   Description

Spot size   float   detector spot size in cm2

Related

Commands: PM:SPOTSIZE, PM:DETSIZE?

1.3.3.75 PM:STAT:MAX?

Description   Statistics Maximum Value Query

Syntax   PM:STAT:MAX?

Parameters   None

Function   This query returns the maximum value in the statistics buffer.

Returns   <max>

              <max>is of type <number>in exponent notation.

1.3.3.76 PM:STAT:MEAN?

Description   Statistics Mean Value Query

Syntax   PM:STAT:MEAN?

Parameters   None

Function   This query returns the mean or average of all the values in the statistics buffer.

Returns   <mean>

              <mean>is of type <number>in exponent notation.

1.3.3.77 PM:STAT:MIN?

Description   Statistics Minimum Value Query

Syntax   PM:STAT:MIN?

Parameters   None

Function   This query returns the minimum value in the statistics buffer.

Returns   <min>

              <min>is of type <number>in exponent notation.

1.3.3.78 PM:STAT:MAXMIN?

Description   Statistics Max-Min Query

Syntax   PM:STAT:MAXMIN?

Parameters   None

Function   This query returns the difference between the maximum and minimum readings in the statistics buffer.

Returns   <mxmn>

              <mxmn>is of type <number>in exponent notation.

1.3.3.79 PM:STAT:SDEViation?

Description   Statistics Standard Deviation Query

Syntax   PM:STAT:SDEViation?

Parameters   None

Function   This query returns the standard deviation of the readings in the statistics buffer.

Returns   <stddev>

<stddev>is of type <number>in exponent notation.

1.3.3.80 PM:Temp?

Description   918 detectors temperature query

Syntax   PM:Temp?

Remarks   The PM:Temp? query returns the 918 detector's temperature as a float in degrees Celsius.

Response   Type   Description

temp   float   Detector temperature in degrees Celsius (°C)

Related

Commands: PM:ATT?

1.3.3.81 PM:Temppoll

Description   Enable temperature polling of 918D detectors

Syntax   PM:Temppoll enable

Remarks   The PM:Temppoll enables or disables the periodic measurement of the 918D temperature
sensor.

Argument   Value Description

Enable   0   Disabled

           1   Enabled

Note: The default startup state of the 1936-R / 2936-R, 1938-R / 2938-R, 1940-R / 2940-R is that
temperature polling is enabled.

Related

Commands: PM:Temppoll?

1.3.3.82 PM:Temppoll?

Description   Queries the state of the 918D temperature

Syntax   PM:Temppoll?

Remarks   The PM:Temppoll? query returns the status of the 918D temperature measurement.

Argument   Type   Description

enable int   See PM:DS:Enable for a description of the enable argument

1.3.3.83 PM:THERM:PREDICT

Description   Thermopile prediction command

Syntax   PM:THERM:PREDICT mode

Remarks

The PM:THERM:PREDICT command disables or enables the thermopile prediction algorithm. When this algorithm is enabled, the instrument predicts the power measured by thermopile

detector very accurately, a few seconds faster than the natural response of the detector.

Argument	Value	Description
Mode	0	Disable prediction algorithm
	1	Enable prediction algorithm

Related

Commands: PM:THERM:PREDICT?

1.3.3.84 PM:THERM:PREDICT?

Description   Thermopile prediction query

Syntax   PM:THERM:PREDICT?

Remarks   The PM:THERM:PREDICT? query returns the state of thermopile prediction algorithm.

Response	Value	Description
Mode	0	Prediction algorithm is disabled
	1	Prediction algorithm is enabled

Related

Commands: PM:THERM:PREDICT

1.3.3.85 PM:TRIG:EXTernal

Description   External Trigger Enable

Syntax   PM:TRIG:EXTernal <enable>

Parameters

The parameter <state>is either 0, 1, 2, or 3. If <state>is 0 then the external trigger is disabled. If <state>is 1 then the external trigger is enabled on channel A. If <state>is 2 then the external trigger is enabled on channel B. If <state>is 3 then the external trigger is enabled on both channels.

Function

This command enables or disables the external trigger input on the back panel.

Related

Commands: PM:TRIG:EXTernal?

1.3.3.86 PM:TRIG:EXTernal?

Description   External Trigger Enable Query

Syntax   PM:TRIG:EXTernal?

Parameters   None

Function

This query returns a value showing whether the external trigger input is enabled or disabled.

Returns   <state>

<state>is of type <number>that represents the integer 0,if the external trigger input is disabled. If <state> is 1, 2, or 3, the external trigger is enabled on channel A, channel B, or both respectively.

Related

Commands: PM:TRIG:EXTernal,

1.3.3.87 PM:TRIG:EDGE

Description   External Trigger Edge Select

Syntax   PM:TRIG:EDGE <edge>

Parameters

The parameter <edge>is either 0 or 1.If <edge>is 0 then the external trigger is defined as a falling edge. If <edge>is 1 then the external trigger is defined as a rising edge.

Function

This command defines whether the external trigger input on the back panel is falling edge or rising edge active.

Related

Commands: PM:TRIG: EXTernal, PM:TRIG:EXTernal?, PM:TRIG:EDGE?

1.3.3.88 PM:TRIG:EDGE?

Description   External Trigger Edge Query

Syntax   PM:TRIG:EDGE?

Parameters   None

Function

This query returns a value showing which external trigger edge is the active edge.

Returns   <edge>

<edge>is of type <number>and represents 0,if the external trigger is defined as a falling edge, or 1,if the external trigger is defined as a rising edge.

Related

Commands: EXT PM:TRIG: EXTernal, PM:TRIG:EXTernal?, PM:TRIG:EDGE

1.3.3.89 PM:TRIG:HOLDoff

Description   External Trigger Holdoff Time Command

Syntax PM:TRIG:HOLDoff <time>

Parameters

The parameter <time>is of type <number> and is an integer from 0 to 1000.

<time> is the delay in milliseconds for the trigger to take effect.

Function

This command sets the delay interval before the trigger takes effect.

Related

Commands: PM:TRIG: EXTernal, PM:TRIG:EXTernal?, PM:TRIG:HOLDoff?

1.3.3.90 PM:TRIG:HOLDoff?

Description   External Trigger Holdoff Time Query

Syntax   PM:TRIG:HOLDoff?

Parameters   None

Function

This query returns the delay in milliseconds before the trigger takes effect.

Related

Commands: PM:TRIG: EXTernal, PM:TRIG:EXTernal?, PM:TRIG:HOLDoff

1.3.3.91 PM:TRIG:START

Description   This command sets the optional start event.

Syntax   PM:TRIG:START option

Parameters

The parameter <option> is of type <number> and is an integer from 0 to 3.

Argument	Value	Description
option	0	Continuous measurement
	1	Measurement starts when an external trigger occurs
	2	Measurement starts when a designated Soft key is pressed
	3	Measurement starts when PM:TRIG:STATE 1 command is issued.

Related

Commands: PM:TRIG: START?

1.3.3.92 PM:TRIG:START?

Description   Trigger START Query

Syntax PM:TRIG:START?

Parameters   None Function

This query returns the TRIGGER START condition.

Related

Commands: PM:TRIG: START

1.3.3.93 PM:TRIG:STOP

Description   This command sets the optional stop event.

Syntax   PM:TRIG:STOP <option>

Parameters

The parameter <option> is of type <number> and is an integer from 0 to 6.

Argument	Value	Description
option	0	The measurement never stops
	1	Measurement stops when an external trigger occurs
	2	Measurement stops when a designated Soft key is pressed
	3	Measurement stops when PM:TRIG:STATE 0 command is issued.
	4	Measurement stops when a pre-specified measurement level (PM:TRIG:VALUE) is reached
	5	Measurement stops when a pre-specified time interval (PM:TRIG:TIME) from TRIGGER START has been reached

Related

Commands: PM:TRIG: STOP?

1.3.3.94 PM:TRIG:STOP?

Description   Trigger STOP Query

Syntax   PM:TRIG:STOP?

Parameters   None

Function

This query returns the TRIGGER STOP condition.

Related

Commands: PM:TRIG: STOP

1.3.3.95 PM:TRIG:STATE

Description   This command sets the trigger state

Syntax PM:TRIG:STATE <option>

Parameters

The parameter <option> is of type <number> and is an integer 0 or 1.

Argument	Value	Description

| option | 0 | Trigger is armed. The system waits for a trigger start event to occur in order to make a measurement. |
| | 1 | System is triggered and at least one measurement occurred. |

Related

Commands: PM:TRIG: STATE?

1.3.3.96 PM:TRIG:STATE?

Description   Trigger STATE Query

Syntax   PM:TRIG:STATE?

Parameters   None Function

This query returns the TRIGGER STATE condition.

Related

Commands: PM:TRIG: STATE

1.3.3.97 PM:TRIG:VALUE

Description

This command sets the measurement level that indicates a trigger stop condition. The power meter will stop taking further measurements if a measurement taken exceeds the value specified by this command, and if trigger stop option is set to measurement level.

Syntax   PM:TRIG:VALUE value

Parameters

The parameter <value> is of type <number>

Argument	Value	Description
value	float	Measurement level

Related

Commands: PM:TRIG:STOP

1.3.3.98 PM:TRIG:VALUE?

Description   This command returns the measurement level that indicates a trigger stop condition.

Syntax   PM:TRIG:VALUE?

Parameters   None

Related

Commands: PM:TRIG:STOP

1.3.3.99 PM:TRIG:TIME

Description

This command sets the time duration that indicates a trigger stop condition. The power meter will stop

taking further measurements if the time from trigger start exceeds time duration specified by this command, and if trigger stop option is set to time.

Syntax PM:TRIG:TIME value

Parameters

The parameter <value> is of type <number>

Argument　Value　Description

value　int　Time (milli-seconds)

Argument	Value	Description
value	int	Time (milli-seconds)

Related

Commands: PM:TRIG:STOP

1.3.3.100 PM:TRIG:TIME?

Description　This command returns the time duration that indicates a trigger stop condition.

Syntax PM:TRIG:TIME?

Parameters　None

Related

Commands: PM:TRIG:STOP

1.3.3.101 PM:UNITs

Description　Units select

Syntax PM:UNITS units

Remarks　The PM:UNITS command selects the units for readings.

Argument	Value	Description
units	0	Amps
	1	Volts
	2	Watts
	3	Watts/cm^2
	4	Joules
	5	Joules/cm^2
	6	dBm
	7-10	Reserved
	11	Sun

Related

Commands: PM:MODE?

1.3.3.102 PM:UNITs?

Description　Units query

Syntax PM:UNITS?

Remarks   The PM:UNITS? query returns an integer indicating the units selected.

Response	Value	Description
units	0	Amps
	1	Volts
	2	Watts
	3	Watts/cm2
	4	Joules
	5	Joules/cm2
	6	dBm
	7-10	Reserved
	11	Sun

Related

Commands: PM:UNITS

1.3.3.103 PM:ZEROSTOre

Description   Zero value set command

Syntax   PM:ZEROSTO

Remarks   The PM:ZEROSTO command sets the zeroing value with the present reading.

Argument	Value	Description
none	-	

Related

Commands: PM:ZERO, PM:ZEROVAL?

1.3.3.104 PM:ZEROVALue

Description   Zero value set command

Syntax   PM:ZEROVAL value

Remarks   The PM:ZEROVAL command sets the zeroing value.

When enabled, zeroing subtracts the stored zero value from readings before making measurement calculations.

Argument   Type   Description

Value   float   Zeroing value

Argument	Value	Description
Value	float	Zeroing value

Related

Commands: PM:ZERO?, PM:ZEROSTO

1.3.3.105 PM:ZEROVALue?

Description   Zero value query

Syntax	PM:ZEROVAL?	
Remarks	The PM:ZEROVAL? query returns the zero value.	

Argument	Value	Description
Value	float	Zeroing exponent

Related

Commands: PM:ZEROVAL, PM:ZERO?

CHAPTER 2   Syntax and Definitions

2.1   Definition of <string>

For convenience, the 1936/2936, 1938/2938, 1940/2940 Series recognizes double quoted, single quoted, and unquoted strings with certain restrictions as detailed below. Any of these forms may be used where a <*strin*g> parameter is required.

1.　　<*strin*g>, using double quotes　**"this is a string"**

2.　　<*strin*g>, using single quotes.　**'this is a string'**

3.　　<*strin*g>, using no quotes.　　**thisisastring**

A description of each type of <string follows:

1.　　<string> defined using double quotes.

A double quote indicates that a string follows, and the string is terminated by another double quote. A double quote may be embedded within the string by using two double quotes together:

Example: "this string contains a ""double quote"

All characters within the two outer double quotes are considered part of the string. It is an error if the string does not terminate with a double quote. The string cannot contain the <CR>(ASCII decimal 13),

<LF>(ASCII decimal 10), or End or Identify characters.

2.　　<string> defined using single quotes.

This form is similar to double quoted string. A single quote indicates that a string follows, and the string is terminated by another single quote. A single quote may be embedded within the string by using two single quotes together:

Example: 'this string contains a''single quote'

All characters within the two outer single quotes are considered part of the string. It is an error if the string does not terminate with a single quote.

The string cannot contain the <CR>(ASCII decimal 13), <LF>(ASCII decimal 10), or End or Identify characters.

3.　　<string> defined using no quotes.

All strings using this format must start with an alphabetic character (A through Z, a through z). All other characters must be either alphabetic, digit (0 through 9)or the '_' character. Any other character will delimit the string.

Some examples are shown below:

　　Sent: **this is a string**

Interpreted: this　　　　　　(1st string)

　　　　　is　　　　　　(2nd string)

　　　　　a　　　　　　(3rd string)

　　　　　string　　　　　(4th string)

　　Sent: this,isastring

Interpreted: this　　　　　　(1st string)

,	(separator character)	
isastring	(2nd string)	

Sent: w/cm

Interpreted: w (1st string)

ERROR (unrecognized character)

cm (2nd string)

2.2 Definition of <number>

1936/2936, 1938/2938, 1940/2940 Series recognizes four types as <number>, thus any format may be used.

1. <number> defined as floating point.

2. <number> defined as binary.

3. <number> defined as octal.

4. <number> defined as hexadecimal.

Where necessary, integers are converted to floating point numbers. In all cases, a number is terminated by any of the below characters:

<NL> <EOI> <SPACE>

Any non-valid characters detected in any number received are considered an error in format, and an error condition will be generated in the system.

A description of each type of <number> follows:

1. <number> defined as floating point.

Any of the following characters, as the first character of an ASCII sequence, indicates that a number is being defined:

+-.0 1 2 3 4 5 6 7 8 9

A floating point number is defined as follows:

1. Optional +-sign. This defines the sign of the number. If missing, positive is assumed.

2. Optional 0-9 digits. These digits define the integer portion of the mantissa.

3. Optional . decimal point. This defines the end of the integer portion of the mantissa, and indicates that the fractional portion of the mantissa follows.

4. Optional 0 -9 digits. These digits define the fractional portion of the mantissa.

5. Optional exponent indicator, an ASCII 'E ' or 'e ',followed by a '+' or '-' (optional), followed by decimal digits.

Examples:

The numbers below all represent the value "1.2 "

1.2

1.2e0

+01.2E+00000 120E-2

.12e1

The numbers below all represent the value "-1.2 "

-1.2

-1.2e+00

-0001.2e+0

-120e-2

.12E1

2.   <number>defined as binary.

The 1936/2936 Series recognizes unsigned binary numbers in the range of 0 to 65535, decimal, or 0 to 1111111111111111 binary. Binary numbers are represented using only the digits 0 and 1.A binary number has the following format:

#B<*binary*>

Where

#B = mandatory binary number header

<binary> = binary digits (0's or 1's)

Example:

All numbers below represent the decimal value 129.

#B10000001

#b010000001

#b10000001

3.   <*number*> defined as octal.

The 1936/2936 Series recognizes unsigned octal numbers in the range 0 to 65535 decimal, or 0 to 177777 octal. Octal numbers are represented using digits from 0 to 7.An octal number has the following format:

#Q<octal>

Where

#Q =mandatory octal number header

<octal> =octal digits (0 to 7)

Example:

All numbers below represent the decimal value 129. #Q201

#q0201

#q201

4.   <number>defined as hexadecimal.

The 1936/2936 Series recognizes unsigned hexadecimal numbers in the range 0 to 65535 decimal, or 0 to FFFF hexadecimal. Hexadecimal numbers are represented using the digits 0 -9 and the characters A -F.A hexadecimal number has the following format:

#H<hexadecimal>

Where

#H =mandatory octal number header

<hexadecimal> =hexadecimal digits (0 -9 and A -F)

Example:

All numbers below represent the decimal value 127. #H7f

#H007F

#h7f

CHAPTER 3   Error Messages

3.1 Introduction

When using the RS-232 port the RS-232 Echo Mode controls when errors are returned. When the Echo Mode is enabled the errors are returned immediately. When the Echo Mode is disabled the errors are not returned immediately and the *ERR? or ERRSTR? commands must be used to retrieve the errors.

3.2 Command Errors

Command Errors are associated with the conversion of the data received into the commands and their parameters (parsing). Incorrect syntax, incorrect parameters, and improper command format will generate these errors. Any command error will cause the Command Error bit (bit 5) in the Standard Event Status Byte to be set.

104, Numeric Type Not Defined

Generated during the parsing of a number and an undefined number type is encountered.

106, Digit Expected

Generated during the parsing of a number and the parser encounters a non- number when a number is expected.

107, Digit Not Expected

Generated during the parsing of a number and the parser encounters a number when a different character is expected.

115, Identifier Not Valid

Generated when a parameter is not valid or not properly formed.

116, Syntax Error

Occurs when an error in command structure or parameter type is detected. Some typical causes are:

- Using a number as a command mnemonic.
- Using the wrong parameter type.
- Using ASCII characters outside of a string constant that are not defined by the command language syntax.
- Missing or too many parameters.

The above list in not exhaustive but does give the basic idea of what to look for.

126, Too Many Or Few Arguments

Generated when command arguments are missing or too many.

3.3 Execution Errors

Execution Errors are associated with the interpretation of the converted commands and parameters received. Incorrect parameter values and numerical range errors are types of execution errors. Any execution error will cause the Execution Error bit (bit 4) in the Standard Event Status Byte to be set.

1, Out of memory

This error is caused by an internal program fault, and may be followed by an automatic instrument reset.

201, Value Out Of Range

This error will occur if a parameter is out of a valid range or not in the set of valid parameters for a given command.

214, Exceeds Maximum Length

Generated when the command exceeds the maximum command length. Try shortening the command string.

217, No saved information in recalled bin

Generated when the user attempts to recall a bin which has no previous stored data.

301, Query Error

The Query Error occurs when the instrument is in the midst of transmitting a message over a communication bus and the instrument exits remote mode.

303, Input Buffer Overflow

Error generated when the system parser runs out of space during reception of command. It may occur if commands are not terminated correctly. Input buffer is 1,024 characters long.

304, Output Buffer Overflow

Error generated when the system parser runs out of space for query results. It may occur if query results in too much data to be returned in a single response, or if multiple command queries are issued but not read. Output buffer is 4,096 characters long.

305, Parser Buffer Overflow

Error generated when the system parser runs out of space for commands. A command is received into the input buffer then transferred to the parser buffer.

This error is generated if the command in the input buffer is too large to fit into the available space in the parser buffer. It is usually generated when commands are sent to the instrument faster than it can process. Parser buffer is 2,048 characters long.

3.4   Device Errors

Device Errors are associated with some system conditions that affect the operation of the meter. Errors associated with data reading will set the appropriate bit but will not generate an error message to avoid jamming the error queue or the interface.

701, Detector Calibration Read or Write Failed.

An error was encountered during a read/write operation to the calibration EPROM in the detector. If the problem persists, contact the factory.

703, Power Meter set to defaults due to Firmware update

After upgrading the firmware, in some cases the changes are significant enough to require resetting the instrument to factory defaults.

704, User reference cannot be changed/stored while you are in units of Watts or dBm. Change to dB or Rel to set the user reference value.

User reference can only be stored in dB or Rel mode.

705, Illegal data store parameter change. Queue cleared.

An action that affects the data store caused the data store queue to be cleared.

706, Digital Filter Interval changed, must not be greater than Data Store interval.

The digital filter interval cannot be greater than the data store interval.

707, Digital Filter Disabled with External Trigger.

Digital filter must be disabled during external trigger mode.

708, There is no new data for a statistics update.

No new data has been stored in the data store since the last statistics update.

709, Statistics are not calculated while Data Store is running.

User attempted to compute statistics while data store was active. Turn off data store and computer.

CHAPTER 4   Sample Programs

4.1   Programming Samples

The CD will install some simple programming samples to get computer interfacing started. These are minimal samples and provided only for reference.

4.2   LabVIEW

LabVIEW programming samples separated in folders based on version of LabVIEW compiled with. SampleQuery.vi demonstrates the use of the drivers.

4.3   Microsoft® Visual Basic

A zip file in the application folder contains a simple Visual Basic project for communicating with the meter.

4.4   Microsoft Visual C++

A zip file in the application folder contains a simple Visual C++ project for communicating with the meter.

4.5   Microsoft .NET

A zip file in the application folder contains a simple .NET project for communicating with the meter.

Notes:

Notice