POWER-OVER-ETHERNET SYSTEM ATTENUATOR MODEL 624

INSTRUMENT MANUAL

Ver 1.1

July 2015

CONTENTS

GENERAL INFORMATION

WARRANTY

Flann Microwave Ltd. warrants each product of its manufacture to be free from defects in material and workmanship. Our obligation under this warranty is limited to servicing or adjusting any products returned to our address for that purpose and to make good at our facility any part or parts thereof (power supplies, transistors, integrated circuits, batteries, diodes and displays) within one year after making delivery to the original purchaser and which in our examination shall disclose to our satisfaction to have been thus defective. Such returns must have prior authorization from Flann and must be returned as our detailed instructions with transportation charges prepaid. Warranty returns or repairs must first be authorized by Flann. Flann does not authorize any third party to assume for them any other liability in connection with the original sale than the foregoing. *Unauthorized tampering with sealed screws will invalidate the warranty and may result in damage to the product.*

DESIGN CHANGES

Flann Microwave Ltd. reserves the right to make changes in the design of its products without reference and without incurring any obligation to make the same alterations on products previously purchased.

SPECIFICATION CHANGES

Flann Microwave Ltd. reserves the right to change any specification noted herein without prior notice.

REPAIRS

When wishing to return instruments for repairs, or for any other reason, please contact this Company for shipping instructions. To expedite repair service, it is important to provide type number, serial number and a detailed description of the reason, including all fault symptoms, for the return of the instrument.

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Getting started

Plug Ethernet cable into a switch or router capable of providing Power over Ethernet to IEEE 802.3af.

The Ethernet interface is provided by a Lantronix XPort AR device. For detailed information on the configuration of this interface, please see the Lantronix website http://www.lantronix.com/device-networking/embedded-device-servers/xport-ar.html .

When supplied from the factory, the device is configured to connect automatically to a network using the DHCP protocol – the device name is shown on the instrument label.

Environmental Considerations

The attenuator is designed to operate in 'non-hazardous' areas. The environment in which the product is to be used is commercial, light industrial, either indoors or in a protected outdoor environment.

The operating environment must conform to the conditions shown in Table 1. Operation outside these ranges cannot be guaranteed and may pose dangerous implications to the operator or cause mechanical or electrical failure to the equipment. *__The device will generate heat during operation, and it is important to maintain adequate ventilation or cooling at all times.__*

Environmental Condition	Ranges
Temperature Operating	+5 to +35 degrees C
Temperature Non-Operating	0 to +40 degrees C
Humidity operating (max)	90 % without condensation
Humidity Non-operating (max)	95 % without condensation

Table 1: Environmental Considerations

REFERENCE SECTIONS

System Functions and Features

Power up Procedure

When the instrument is connected to a PoE compatible network the instrument resets to the 50dB reference position. This action may be disabled if required, however the instrument must be reset as soon as possible to establish the correct reference alignment. Refer to the 'PWR_ON_RST' and 'RESET_INST' commands.

The instrument can be programmed to return to the last setting prior to power being removed. Refer to the 'HOLD_SET' command.

The instrument is supplied in Value mode, covering the range of 0.0dB to 50.0dB, with the smallest incremental value being 0.1dB. It is possible to position the instrument using motor steps in the range 0 to 2410, giving increased resolution at lower attenuation settings. Refer to the 'STEPS_SET' command and Table 2 below.

Note that the steps are from the reference position of 50.0dB.

Attenuation dB	Steps	Attenuation dB	Steps	Attenuation dB	Steps
50.0	0	33.0	149	16.0	562
49.0	5	32.0	164	15.0	603
48.0	11	31.0	179	14.0	647
47.0	17	30.0	195	13.0	695
46.0	23	29.0	212	12.0	746
45.0	30	28.0	230	11.0	801
44.0	37	27.0	249	10.0	861
43.0	45	26.0	270	9.0	926
42.0	52	25.0	291	8.0	997
41.0	61	24.0	314	7.0	1075
40.0	70	23.0	339	6.0	1162
39.0	79	22.0	365	5.0	1260
38.0	89	21.0	393	4.0	1371
37.0	100	20.0	422	3.0	1501
36.0	111	19.0	454	2.0	1661
35.0	123	18.0	488	1.0	1875
34.0	136	17.0	524	0.0	2410

Table 2: Attenuation – Steps from Reference

When the high attenuation setting is active, this enables a coarse attenuation setting of approximately 85dB. Refer to the 'HIGH_ATTEN' command.

In Steps mode, it is possible to enter a negative value up to -78 to achieve a very approximate high attenuation value. For example, -39 steps roughly equates to 60dB. The attenuation accuracy beyond 50dB cannot be guaranteed.

Instrument Errors

Instrument errors can be identified by interrogating the Status Byte. Refer to the INST_STAT? command on page 8 and the interpretation list, Table 4, on page 9.

Ethernet Command Structure

This section details the commands available and the valid operands that may accompany them.

Notation

Upper case bold characters represent the program codes, which must appear exactly as listed. Program code commands are not case sensitive, i.e. upper and lower case characters are accepted. Note that the input buffer is 20 bytes maximum.

Characters enclosed in the { } brackets are qualifiers attached to the root mnemonic. A space may be inserted between it and the root mnemonic. e.g. {ON|OFF} shows that either ON or OFF can be attached to the root mnemonic.

For example, the PWR_ON_RST command has three possible applications: -

1. **PWR_ON_RST ON**   -   Switch on the Power-on Reset
2. **PWR_ON_RST OFF** -   Switch off the Power-on Reset
3. **PWR_ON_RST?**   -   Query the present state of the Power-on Reset

Each program command must be terminated with \n (Hex 0x0a).
For Example: "VALUE_SET45.3\n"

Query Commands

For instrument state commands (identified with "Query: Valid"), append the question mark character (?) instead of the {ON|OFF} to interrogate the state of the functions. The instrument responds to the query with a "1" or a "0" to indicate On or Off, respectively. For a settable function such as VALUE_SET *value*, using VALUE_SET? causes the instrument to respond by sending the function's current value.

Command Set

VALUE_SET [*value*]
Switches to value mode and sets the Microwave Instrument to *value*
Query: Valid, returns setting
Value   0 to 50.00 (dB)

STEPS_SET [*value*]
Switches to Steps mode and sets the Microwave Instrument to *value*
Query: Valid, returns number of steps from reference
Value   -78 to 2410

INCR_SET *value*
Sets the Stored Increment to *value*
Query: Valid, returns stored Increment
Value   0 to 50.00 (dB) if in value mode, or 0 to 2410 if in Steps mode

INCREMENT
Increase the Microwave Instrument Setting by the stored Increment
Query: Invalid

DECREMENT
Decrease Microwave Instrument setting by the stored Increment
Query: Invalid

STORE_VAL *value*
Sets the Stored Setting to *value*
Query: Valid, returns stored setting
Value   0 to 50.00 (dB) if in value mode, or 0 to 2410 if in Steps mode

REC_SETTING
Sets the instrument to the stored setting
Query: Invalid

HIGH_ATTEN {ON|OFF}
Sets the high attenuation feature on or off
Query: Valid, returns 1 for on, or 0 for off

HOLD_SET {ON|OFF}
Returns the Microwave Instruments to the position when power was removed
Query: Valid, returns 1 for on, or 0 for off

INST_MODE?
Outputs the current operating mode
Query: Valid, returns either 0 for VALUE MODE or 1 for STEPS MODE

PRECISION {ON|OFF}
Enables or Disables the Precision Setting feature
Query: Valid, returns 1 for on, or 0 for off

Note: When ON, this feature gives higher attenuation accuracy and repeatability by always driving to the required position from the same direction. The attenuation value will go higher than the required setting momentarily during positioning from the 0dB direction. This applies to both Steps and Value modes.

PWR_ON_RST {ON|OFF}
Enables or Disables the Power-On reset
Query: Valid, returns 1 for on, or 0 for off

PWR_STAT?
Outputs the power-up statistics
Query: Valid, returns a string of 50 characters maximum

RESET_INST
Resynchronise the instrument by driving to the reference position of 50.0dB
Query: Invalid

IDENTITY?
Outputs the identity string.
Query: Valid, returns the identity string of the instrument.

INST_STAT?
Request the value of the status register.
Query: Valid, return the status register value, a value from 0 to 255

Status Byte

Bit	Value	Error
0	1	EEPROM error – failure to read or write to the EEPROM
1	2	Out of range request – incorrect value requested
2	4	Power on – a power-on has occurred since the last read of the register
3	8	Command error – incorrect syntax in a command line
4	16	Execution error – failure to achieve setting
5	32	Not used
6	64	Error E2 – no encoder output found
7	128	Error E1 – encoder index not found

Table 4 – Status Byte interpretation

Note: The value of the Status Register will return to zero after being read.

Command Summary

Command	Suffix	Action	Query
INCREMENT		Increase setting by stored increment	
DECREMENT		Decrease setting by stored increment	
VALUE_SET	Value	Switches to value mode and sets to value	✓
STEPS_SET	Value	Switches to steps mode and sets to value	✓
INCR_SET	Value	Stores increment in the present operating mode	✓
RESET_INST		Reinitialise the instrument on the active channel	
INST_MODE?		Outputs the current operating mode	✓
HIGH_ATTEN	ON/OFF	Enable or disable the high attenuation feature	✓
PRECISION	ON/OFF	Enable or disable the precision setting feature	✓
REC_SETTING		Returns the instrument to the stored setting (see below)	
STORE_VAL	Value	Store a setting determined by value (mode dependent)	✓
IDENTITY?		Returns the instrument identity string	✓
INST_STAT?		Returns the Status Register value from 0 to 255	✓
PWR_STAT?		Returns the power-up statistics	✓
PWR_ON_RST	ON/OFF	Enable/Disable power-on reset	✓
HOLD_SET	ON/OFF	Return instrument to last power-on condition	✓

Table 5 – Command Summary

Examples:

RESET_INST\n   reset the instrument
VALUESET? \n   returns a value of 50

VALUE_SET23.4 \n   position to 23.4db
VALUE_SET?\n   returns the value 23.4

STEPS_SET453\n   switch to steps mode and position to 453
STEPS_SET?\n   returns the value 453

INCR_SET10\n   store an incremental value of 10 steps
INCREMENT\n   move +10 steps
DECREMENT\n   move -10 steps

A command string must be between 10 and 20 bytes, and terminated by a newline (Hex 0x0a) .

Regulatory Information

Declaration of Conformity

Manufacturer	Flann Microwave Ltd Dunmere Road Bodmin Cornwall PL31 2QL United Kingdom
Product	Programmable System Attenuator Model Number: xx624-8395 where 'xx' is the waveguide size. For example, model 26624 is WG26
European Standards	EN61000-6-1:2007 EN61000-6-3:2007
Technical File Number	TCF11

It is declared that the above product conforms to the essential requirements of the Electromagnetic Compatibility Directive 2004/108/EC and the Low Voltage Directive 2006/95/EC when used in accordance with the instructions for use, as detailed in the appropriate technical file.

Signed

Dr. James Watts
For and on behalf of Flann Microwave Ltd.
Date: 19 January 2015

Waste Electrical and Electronic Equipment (WEEE) Regulations

The Model xx624-8395 PRVA is not classified as Electrical and Electronic Equipment for the purposes of the WEEE Regulations.

Should you wish to dispose of the equipment at the end of its life, please locate suitable local disposal facilities or contact the company for advice.