

# OPERATION MANUAL

## MODEL QPA REMOTE CONTROLLED ATTENUATOR

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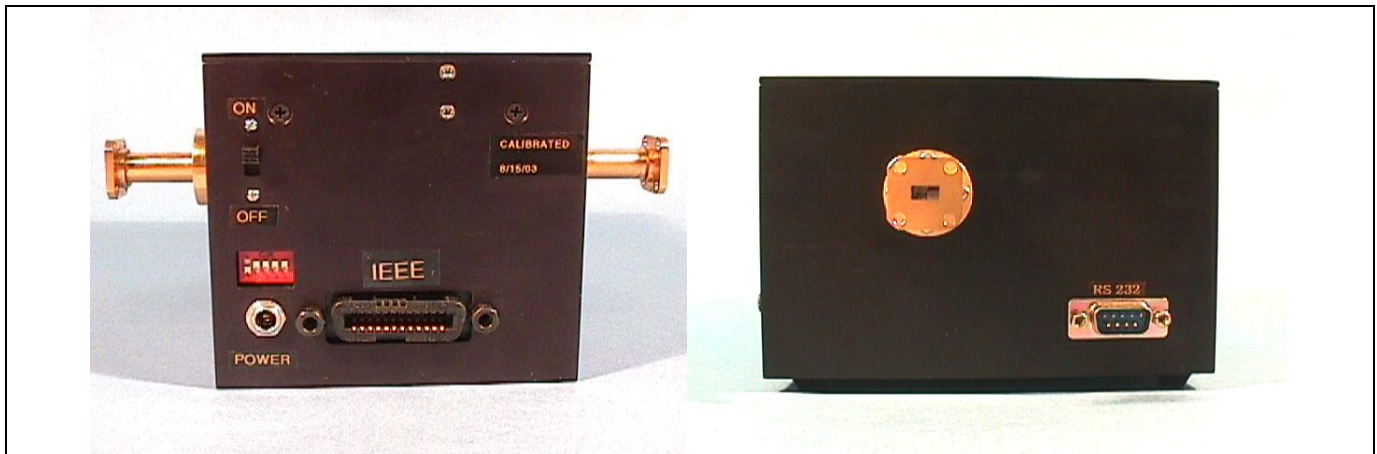
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The QuinStar QPA model is a motorized programmable rotary vane attenuator for use in the microwave and millimeter wave systems. It is available in most standard frequency bands. This model is versatile for it can be used manually or through remote programming. Attenuation levels are clearly displayed through a digital display.

To accommodate remote programming operations the QPA model provides an IEEE-488 (parallel) interface or a RS232 (serial) port. For local adjustments there is a rocker switch located right next to the digital display on the front of the unit. This switch can also be disabled or locked to prevent tampering or inadvertent adjustments while in remote use. Attenuation levels can be adjusted remotely or manually from the range of 0-60 dB. Attenuation increments are 0.05 dB between 0 dB and 20 dB and 0.1 dB from 20 dB and 60 dB.

The motor controller and interface circuits are custom designed and uniquely packaged within the durable attenuator housing. The custom microprocessor based electronics ramp the speed of a precision stepper motor to insure fast accurate positioning.



# INSTRUCTIONS FOR OPERATION

## 1.0 POWER REQUIREMENTS

The QPA model requires a single DC input of +24 VDC, 500 mA from regulated source, which can be applied through the 2.5mm connector on the back panel.

## 2.0 START UP

To start up the unit apply the DC input voltage and turn the power switch to the ON position. The default attenuation level is 60 dB. This provides a fail-safe setting when units are initially powered up.

Resetting the unit is accomplished by turning the power switch OFF and then back to the ON position or by removing and then reapplying the DC input power.

## 3.0 LOCAL OPERATION

When initially turned on, the unit is ready for local operation. The INC/DEC rocker switch located next to the digital display on the front of the unit is used to increment and decrement the attenuation level. Holding the INC/DEC switch in either direction for more than four seconds causes an increase in the motor speed thus allowing faster attenuation changes. The attenuation does not change until the switch is released at the desired setting.

Upon turning the unit on, an audible sound generated by the stepper motor is present. This low frequency growl is a normal resonant sound produced by the stepper motor at certain positions or speeds and it is not an indication of an unhealthy condition. The sound is most notable when approaching the highest attenuation levels. The lower motor speeds are needed to synchronize the motor with the digital readout and provide easier manual adjustments.

## 4.0 REMOTE MODE

The remote mode is accessed and controlled through either the IEEE-488 (parallel) or RS232 (serial) port.

The attenuator is capable of responding to the following commands:

- 1: Basic Listener
- 2: Device Clear
- 3: Remote Enable
- 4: Go to Local
- 5: Local Lockout
- 6: Serial Poll
- 7: Interface Clear
- 8: Read back attenuation

The Instruments on the bus are assigned unique addresses. At QuinStar the addresses of the QPA models are set to 17. Address change is accomplished by setting the BCD switch located on the rear panel to the desired binary number. Reset the unit by turning the power off and then on again.

### **GPIB I/O**

Command Set:

nn.nn = move to a given attenuation value

R = Reset

I = Report identification string for unit

S = Report value of serial poll byte

G = Report value of attenuation

The GPIB address is determined by the address switch settings upon power-on. Input command messages should be terminated by the GPIB EOI signal and may have trailing carriage-return (ASCII 13) or linefeed (ASCII 10) characters.

### Serial Poll Bit Values:

Bit	Definition
7	Unit is busy
6	Unit request service (not busy)
5	(reserved)
4	Message ready for transmit from unit
3	Transmit error detected
2	Receive buffer overflow
1	(reserved)
0	Command error in received message

The serial poll busy bit (#7) should be read and verified as clear before each input command message is sent to the unit. The message ready bit (#4) will be set when the unit has a message ready to be transmitted to the host. The command error bit (#0) will be set after an error is detected in a command message received by the unit.

**NOTE: BEFORE THE ATTENUATOR WILL ACCEPT IEEE COMMANDS, A CLEAR FUNCTION HAS TO BE PERFORMED ON THE BUS.**

The unit will respond the GPIB Device Clear command by executing a "Reset" command (moving to 60 dB attenuation). The unit will respond to the GPIB Local-Lockout state by disabling the step-attenuation switches. The unit will respond to the GPIB Go-To-Local command by enabling the step-attenuation.

### **SERIAL PORT I/O (optional)**

The serial port baud rate is fixed at 9600 with no parity, eight data bits and one stop bit. Input command messages should be terminated by a carriage-return (ASCII 13) or a linefeed (ASCII 10) character. Upon power-on the unit will transmit a "sign-on" message. A command prompt will be transmitted after the "sign-on" message and after each command is processed. It will normally consist of a carriage-return (ASCII 13), a linefeed (ASCII 10) and the character ">". After a command error is detected, the command prompt will consist of a carriage-return (ASCII 13), a linefeed (ASCII 10) and then the character "?".

The "S" command may be used to report the current GPIB serial poll byte value. It will be transmitted as a numeric string from "0" to "255".

When the unit is busy, the serial ports “CTS” line will be held in the inactive state; otherwise the “CTS” line is in the active state. No commands should be sent to the unit while the “CTS” line is in the active state.

<u>Comm parameters</u>		<u>DBP Connector PIN</u>
Rate	9600	1 N/C
Data Bits	8	2 RxD
Hardware Handshake	OFF	3
TxD		
Flow Control	OFF	4 N/C
Xon/Xoff	OFF	5
GRD		
Stop Bits	1	6 N/C
Parity	NONE	7 RTS
Local Echo	ON	8 CTS
Comm Port	SELECT	9 N/C