Remote Control Commands

INTRODUCTION

When attached to a LeCroy oscilloscope equipped with ProBus interface, the DA1855A Amplifier can be remotely controlled along with the other oscilloscope functions. The control interface can be either the RS-232 or IEEE-488 (GPIB) bus. The commands which control the amplifier are described below. The text for the command descriptions is formatted in a style consistent with the oscilloscope command descriptions contained in the *LeCroy Digital Oscilloscopes Remote Control Manual* supplied with the oscilloscope. Please refer to this manual for additional information on the remote control buses and the conventions used in the command descriptions.

Many of the commands begin with the "PRx:" prefix, where "x" is the channel which the DA1855A amplifier is connected to. These commands are similar to the channel commands which use the prefix "Cx:". The difference being that the "PRx:" form refers to the probe tip, whereas the "Cx:" form refers to the oscilloscope input connector. For example, "PRx:VDIV" sets the Volts per division at the probe tip, while "Cx:VDIV" sets the Volts per division at the BNC input connector, without factoring the gain or attenuation factor of DA1855A amplifier and attached probes. The "PRx:" form of these commands are only active when the DA1855A amplifier is connected to the selected channel. An error will result when an DA1855A specific command is sent to the oscilloscope without a differential probe attached to the selected channel.

COMMAND LIST

PRx:ATTENUATION	Selects the input attenuation of the amplifier.
PRx:AUTOZERO	Initiates an auto zero cycle in the amplifier.
PRx:BWL	Selects the upper bandwidth limit.
PRx:COUPLING	Selects the input coupling of the + and – inputs.
PRx:GAIN	Selects the gain of the amplifier
PRx:OFFSET	Selects the Precision Voltage Generator voltage.
PRx:PINPUTR	Selects the input resistance of both inputs.

PRx:PROBEATTENUATION?	Reports the attenuation of the passive probe attached to the amplifier.
PRx:PVGMODE	Selects the Precision Voltage Generator Offset mode.
PRx:VDIV	Selects the vertical scale factor of the probe/amplifier/oscilloscope system.

GAIN CONTROL MODE

The DA1855A amplifiers have two modes for setting the amplifier gain and attenuation; Auto and Manual. (Refer to *Gain Control Modes* in Section 3, Operation, for more information.) The gain control mode can be selected in the DA1855A control menu through the oscilloscope front panel, or through remote control by sending the commands which correspond tot the gain mode.

Sending the PRx:ATTEN or PRx:GAIN commands will set the DA1855A amplifier to Manual gain control mode.

Sending the PRx:VDIV command will set the DA1855A amplifier to Auto gain control mode.

ATTENUATION

PRx:ATTENUATION,PRx:ATTEN
Command/Query

Description

The PRx:ATTENUATION command sets the attenuation of the differential amplifier, including the factor of any passive probe attached to the input. The command will also switch the Atten/Gain control mode to Manual if it was to Auto mode. The valid arguments with no probe attached is 1 or 10 when the input resistance is set 1 MΩ, or only 1 when the input resistance is set to 100 MΩ. The valid arguments must be scaled by the attenuation factor of any passive probe which is attached to the amplifier.

The PRx:ATTENUATION? query returns the attenuation of the differential amplifier, including the attached probe connected to the specified channel.

Command Syntax

<channel>:ATTeNuation<attenuation>

<channel>:={PR1, PR2, PR3, PR4}

<channel>:={1,10*}when input resistance is set to 1 MΩ or {1*} when the input resistance is set to 100 MΩ.

* Attenuation arguments must be scaled by the attenuation of any passive probe which is attached to the differential amplifier inputs.

Query Syntax

<channel>:ATTeNuation?

Response Format

<channel>:ATTN<attenuation>

Example

The following command sets the attenuation of the differential amplifier connected to channel 1 to ÷100 when a ÷10 probe is attached:

```
CMD$="PR1:ATTN 100":CALL IBWRT(SCOPE%,CMD$)
```

AUTO ZERO

PRx:AUTOZERO, PRx:AZ
Command

Description

The PRx:AUTOZERO command initiates an auto zero cycle of the differential amplifier to remove any offset drift from the output.

The amplifier inputs will be disabled for a fraction of a second during the autozero cycle.

Command Syntax

```
<channel>:AutoZero
```

```
<channel>:={PR1, PR2, PR3, PR4}
```

Example

The following command initiates an auto zero in the DA1855A Differential Probe attached to channel 1:

```
CMD$="PR1:AZ":CALL IBWRT(SCOPE%,CMD$)
```

BANDWIDTH LIMIT

PRx:BANDWIDTH_LIMIT, PRx:BWL
Command/Query

Description

The PRx:BWL command sets the upper (HF) -3 dB bandwidth limits of the DA1855A. The arguments are in Hertz.

The PRx:BWL? query returns the upper bandwidth limit setting for the differential amplifier connected to the specified channel.

Command Syntax

```
<channel>:BWL<upper bandwidth>
<channel>:={PR1, PR2, PR3, PR4}
<upper bandwidth>:={FULL, 100K, 1M or 20M}
```

Query Syntax

```
<channel>:BWL?
```

Response Format

```
<channel>:BWL <upper bandwidth>
```

Example

The following command sets the upper bandwidth of the DA1855A connected to channel 1 to 100 kHz.

```
CMD$=”PR1:BWL 100K”: CALL IBWRT(SCOPE%,CMD$)
```

COUPLING

PRx:COUPLING, PRx:CPL
Command/query

Description

The `PRx:COUPLING` command sets the input coupling for the + and – inputs of the differential amplifier. The valid arguments are AC, Ground and DC.

The `PRx:COUPLING?` query returns the input coupling setting of the + and – inputs of the differential amplifier connected to the specified channel.

The – input coupling is ignored when PVG Mode is set to VCOMP. Likewise, the – input coupling argument is not returned from a query when PVG Mode is set to VCOMP.

Command Syntax

```
<channel>:CouPLing<+coupling>|,<–coupling}|
<channel>:={PR1, PR2, PR3, PR4}
<+coupling>:={AC, DC or GND}
<–coupling>:={AC, DC or GND}
```
(ignored when PVG Mode is set to VCOMP)

Query Syntax

```
<channel>:CouPLing?
```

Response Format

```
<channel>:CPL<+coupling>,<–coupling>
```

Example

The following command sets the + input coupling to DC and the – input coupling to ground for the differential amplifier connected to channel 2.

```
CMD$=:”PR2:CPL DC,GND”: CALL IBWRT(SCOPE%,CMD$)
```

GAIN

PRx:GAIN,PRx:GAI
Command/Query

Description

The PRx:GAIN command sets the differential amplifier gain. The command will also switch the Atten/Gain control mode to Manual if it was in Auto. The valid arguments are 1 and 10.

The PRx:GAIN? query returns the gain of the differential amplifier connected to the selected channel.

Command Syntax

```
<channel>:GAIn<gain>

<channel>:={PR1, PR2, PR3, PR4}

<gain>:={1, 10}
```

Query Syntax

```
<channel>:GAIn?
```

Response Format

```
<channel>:GAIn<gain>
```

Example

The following commend sets the gain of the differential amplifier connected to channel 1 to X10:

```
CMD$=”PR1:GAI 10”: CALL IBWRT(SCOPE%,CMD$)
```

OFFSET

PRx:OFFSET, PRx:OFST
Command/Query

Description

The PRx:OFFSET command sets the Precision Voltage Generator (PVG) value of the DA1855A Differential Amplifier connected to the specified input channel. The oscilloscope channel offset is always set to 0 Volt.

The maximum range and resolution is determined by the effective gain of the differential amplifier. Refer to Section 3, Tables 3-3 and 3-4 for the list of available ranges.

Note:

The attenuation of any external probe is factored into the effective gain. Changing or removing the probe from the differential amplifier may change the maximum range.

If an out-of-range value is entered, the differential amplifier will set the PVG to the closest valid value and the VAB bit (bit 2) in the STB register will be set.

The PRx:OFFSET? query returns the offset voltage of the differential probe connected to the specified channel.

Command Syntax

```
<channel>: OFfSeT<voltage>

<channel>:={PR1, PR2, PR3, PR4}

<voltage>:= See Section 3 tables 3-3 and 3-4 for valid ranges.
```

Query Syntax

```
<channel>:OFfSeT?
```

Response Format

```
<channel>:OFST<voltage>
```

Example

The following command sets the PVG voltage of the differential amplifier connected to channel 1 to 6.38 Volt:

```
CMD$="PR1:OFST 6.38": CALL IBWRT(SCOPE%,CMD$)
```

INPUT RESISTANCE

PRx:PINPUTR,PRx:PINR
Command/Query

Description

The PRx:PINPUTR command sets the input resistance for both inputs of the differential amplifier. The valid arguments are 1M or 100M when the differential amplifier input attenuation is set to ÷1 and an attenuating probe is not being used. When an attenuating probe is attached to the differential amplifier, or the internal attenuation is set to ÷10, only 1M may be selected. The units of the arguments are Ohm.

The PRx:PINPUTR? query returns the input resistance setting for the differential amplifier connected to the specified channel.

Command Syntax

<channel>:PINputR<input resistance>

<channel>:{PR1, PR2, PR3, PR4}

<input resistance>:={1M or 100M} when the internal attenuation is ÷1, without attenuating probe, or

={1M} when the internal attenuation is ÷10 or an attenuating probe is used.

Query Syntax

<channel>:PINputR?

Response Format

<channel>:PINR<input resistance>

Example

The following command sets the input resistance of the differential amplifier connected to channel1 to 1 MΩ.

```
CMD$="PR1:PINR 1M":CALL IBWRT(SCOPE%,CMD$)
```

PROBE ATTENUATION

PRx:PROBEATTENUATION?,PRxPATTN?
Query

Description

The PRx:PROBEATTENUATION? query returns the attenuation value of the probe connected to the input of the DA1855A. Only probes which support probe code sensing will be correctly reported. Attenuation values of 1, 10, 100 or 1000 are sensed and can be reported. Probes which do not support probe code sensing will be reported having an attenuation of 1.

Query Syntax

<channel>:PATTeNuation?

Response Format

<channel>:PATTN<attenuation>

<channel>:={PR1, PR2, PR3, PR4}

<attenuation>:={1, 10, 100, 1000}

Example

The following query reads the attenuation of the probe connected to the differential amplifier which is connected to channel 1:

```
CMD$="PR1:PATTN?": CALL IBWRT(SCOPE%,CMD$):
CALL IBRD(SCOPE%<RSP$):PRINT RSP$
```

Response message with a ÷100 probe attached:

ATTN 100

PRECISION VOLTAGE GENERATOR

PRx:PVGMODE,PRx:PVGM
Command Query

Description

The PRx:PVGMODE command sets the operating mode of the Precision Voltage Generator (PVG) of the differential amplifier. The valid arguments are VCOMP, VDIFF and OFF.

The PRx:PVGMODE? query returns the operating mode of the Precision Voltage Generator (PVG) of the differential amplifier connected to the specified channel.

Command Syntax

<channel>:PVGMode<mode>

<channel>:={PR1, PR2, PR3, PR4}

<mode>:={VCOMP, VDIFF or OFF}

Query Syntax

<channel>:PVGMode?

Response Format

<channel>:PVGM<mode>

Example

The following command sets the PVG operating mode of the differential amplifier connected to channel 3 to VDIFF:

```
CMD$="PR3:PVGM VDIFF":CALL IBWRT(SCOPE%<CMD$)
```

VOLT/DIV

PRx:VOLT_DIV,PRx:VDIV
Command/Query

Description

When used with the "PRx" argument for channel number, the VOLT/DIV command sets the vertical sensitivity at the probe tip.

The effective gain of the differential amplifier, including any attenuating passive probes, is factored into the vertical sensitivity. The command will also set the Atten/Gain control mode to Auto if it was set to Manual mode.

The valid range of arguments is effected by the presence of an attenuating probe on the input. If an out-of-range value is entered, the oscilloscope will set the vertical sensitivity to the closest valid value and set the VAB bit (bit 2) in the STB register.

The PRx:VOLT_DIV? query returns the vertical sensitivity at the probe input of the specified channel.

Command Syntax

```
<channel>:Volt_DIV<sensitivity>

<channel>:={PR1, PR2, PR3, PR4}

<sensitivity>:=See section 3, Operation, Table 3-1 for valid arguments.
```

Query Syntax

```
<channel>:Volt_DIV?
```

Response Format

```
<channel>:VDIV <sensitivity>
```

Example

The following command sets the vertical sensitivity at the probe tip of the differential amplifier connected to channel 3 to 2 Volt/div:

```
CMD$=”PR3:VDIV 2”:CALL IBWRT(SCOPE%,CMD$)
```

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