1   USB-Protocol for OCTane (SCPI)

Sub-sys	Parameter	Value	Command	Response
Trigger A	State	off|idle|arm|run	TRIGgerA:STATe OFF	<state>|<error>
	State		TRIGgerA:STATe IDLE	<state>|<error>
	State		TRIGgerA:STATe ARM	<state>|<error>
	State		TRIGgerA:STATe RUN	<state>|<error>
	Mode (freerun)	finite	TRIGgerA:MODE FINite	<mode> |<error>
	Mode	infinite	TRIGgerA:MODE INFinite	<mode> |<error>
	Input	USB	TRIGgerA:INput USB	<input>|<error>
	Input	external input	TRIGgerA:INput EXTernal	<input>|<error>
	Input	Trigger B	TRIGgerA:INput TRIGgerB	<input>|<error>
	Input	Trigger C	TRIGgerA:INput TRIGgerC	<input>|<error>
	Input	Button	TRIGgerA:INput BUTTon	<input>|<error>
	Signal-Rate	1.0e-1 ... 125e3	TRIGgerA:RATE <freq>	<time>|<error>
	Signal-Period	8e-6 ... 10	TRIGgerA:PERIod <time>	<time>|<error>
	Vector-Size	1...250000	TRIGgerA:SIZE <size>	<size>|<error>
Trigger B	State	off|idle|arm|run	TRIGgerB:STATe OFF	<state>|<error>
	State		TRIGgerB:STATe IDLE	<state>|<error>
	State		TRIGgerB:STATe ARM	<state>|<error>
	State		TRIGgerB:STATe RUN	<state>|<error>
	Mode (freerun)	finite	TRIGgerB:MODE FINite	<mode> |<error>
	Mode	infinite	TRIGgerB:MODE INFinite	<mode> |<error>
	Input	USB	TRIGgerB:INput USB	<input>|<error>
	Input	External	TRIGgerB:INput EXTernal	<input>|<error>
	Input	Trigger C	TRIGgerB:INput TRIGgerC	<input>|<error>
	Input	Button	TRIGgerB:INput BUTTon	<input>|<error>
	Signal-Rate	1.0e-1 ... 125e3	TRIGgerB:RATE <freq>	<time>|<error>
	Signal-Period	8e-6 ... 10	TRIGgerB:PERIod <time>	<time>|<error>
	Vector-Size	1...250000	TRIGgerB:SIZE <size>	<size>|<error>
Trigger C	State	off|idle|arm|run	TRIGgerC:STATe OFF	<state>|<error>
	State		TRIGgerC:STATe IDLE	<state>|<error>
	State		TRIGgerC:STATe ARM	<state>|<error>
	State		TRIGgerC:STATe RUN	<state>|<error>
	Mode (freerun)	finite	TRIGgerC:MODE FINite	<mode> |<error>
	Mode	infinite	TRIGgerC:MODE INFinite	<mode> |<error>
	Input	USB	TRIGgerC:INput USB	<input>|<error>
	Input	External	TRIGgerC:INput EXTernal	<input>|<error>
	Input	Button	TRIGgerC:INput BUTTon	<input>|<error>
	Signal-Rate	1.0e-1 ... 125e3	TRIGgerC:RATE <freq>	<time>|<error>
	Signal-Period	8e-6 ... 10	TRIGgerC:PERIod <time>	<time>|<error>
	Vector-Size	1...250000	TRIGgerC:SIZE <size>	<size>|<error>
Source-A	Mode	triggered	SOURceA:MODE TRIGgered	<mode>|<error>
	Mode	detached	SOURceA:MODE DETached	<mode>|<error>
	Mode	singleshot	SOURceA:MODE SINGleshot	<mode>|<error>
	Function	Ramp	SOURceA:FUNCtion:SHAPe RAMP	<func>|<error>
	Function	Arbitrary	SOURceA:FUNCtion:SHAPe ARBitrary	<func>|<error>
	Symmetry	0 ... 100	SOURceA:RAMP:RATIO <ratio>	<ratio>|<error>
	Arb load	-	SOURceA:ARBitrary:LOAD	<count>|<error>
	Arb val	±10.000	SOURceA:ARBitrary:VALUe <idx, val>	<idx, val>|<error>
	Amplitude	0.000...20.000	SOURceA:FUNCtion:AMPlitude <ampl>	<ampl>|<error>
	Offset	±10.000	SOURceA:FUNCtion:OFFset <offs>	<offs>|<error>
	High	±10.000	SOURceA:FUNCtion:HIgh <high>	<high>|<error>
	Low	±10.000	SOURceA:FUNCtion:LOw <low>	<low>|<error>
	Constant	±10.000	SOURceA:VOLTage:LEVel <volts>	<volts>|<error>
	Timeout	1...1000ms	SOURceA:PULSe:WIDth <time>	<time>|<error>
Source-B	Mode	trig|det|single	SOURceB:MODE TRIGgered	<mode>|<error>
	Mode	trig|det|single	SOURceB:MODE DETached	<mode>|<error>

	Mode	trig|det|single	SOURceB:MODE SINGleshot	<mode>|<error>
	Function	Ramp	SOURceB:FUNCtion:SHAPe RAMP	<func>|<error>
	Function	Arbitrary	SOURceB:FUNCtion:SHAPe ARBitrary	<func>|<error>
	Symmetry	0 ... 100	SOURceB:RAMP:RATIO <ratio>	<ratio>|<error>
	Arb load	-	SOURceB:ARBitrary:LOAD	<count>|<error>
	Arb val	±10.000	SOURceB:ARBitrary:VALUe <idx, val>	<idx, val>|<error>
	Amplitude	0.000...20.000	SOURceB:FUNCtion:AMPlitude <ampl>	<ampl>|<error>
	Offset	±10.000	SOURceB:FUNCtion:OFFset <offs>	<offs>|<error>
	High	±10.000	SOURceB:FUNCtion:HIgh <high>	<high>|<error>
	Low	±10.000	SOURceB:FUNCtion:LOw <low>	<low>|<error>
	Constant	±10.000	SOURceB:VOLTage:LEVel <volts>	<volts>|<error>
	Timeout	1...1000ms	SOURceB:PULSe:WIDth <time>	<time>|<error>
Relays	Galvo	close|open|read	ROUTe:<CLOSe|OPEN|STATE?> GAL	<state>|<error>
	SLD	close|open|read	ROUTe:<CLOSe|OPEN|STATE?> SLD	<state>|<error>
	AIM	close|open|read	ROUTe:<CLOSe|OPEN|STATE?> AIM	<state>|<error>
	CAM	close|open|read	ROUTe:<CLOSe|OPEN|STATE?> CAM	<state>|<error>
I2C	mode	OFF	I2C::MODE OFF	<mode>|<error>
	mode	USB	I2C::MODE USB	<mode>|<error>
	mode	slave-action	I2C::MODE SLAVeaction	<mode>|<error>
	write	0 ... 255	I2C::WRITe <val>	<val>|<error>
	read	0 ... 255	I2C::READ	<val>|<error>
UART	mode	OFF	UART:MODE OFF	<mode>|<error>
	mode	USB	UART:MODE USB	<mode>|<error>
	mode	slave-IRQ	UART:MODE SLAVeaction	<mode>|<error>
	write	0 ... 255	UART:WRITe <val>	<val>|<error>
	read	0 ... 255	UART:READ	<val>|<error>
DIO	mode	OFF	DIGIO:MODE OFF	<val>|<error>
	mode	input	DIGIO:MODE IN	<val>|<error>
	mode	output	DIGIO:MODE OUT	<val>|<error>
	write	0 .. 65535	DIGIO:WRIte <val>	<val>|<error>
	read	0 .. 65535	DIGIO:READ	<val>|<error>
AnalogIN	mode	OFF	ANAlog0|1|2|3:MODE OFF	<val>|<error>
	mode	USB	ANAlog0|1|2|3:MODE USB	<val>|<error>
	mode	triggered	ANAlog0|1|2|3:MODE TRIGA	<val>|<error>
	mode	triggered	ANAlog0|1|2|3:MODE TRIGB	<val>|<error>
	mode	triggered	ANAlog0|1|2|3:MODE TRIGC	<val>|<error>
	read	0 ... 4095	ANAlog0|1|2|3:READ	<val>|<error>
System	CRCmode	OFF	SYStem:CRC16 OFF	<state>|<error>
	CRCmode	on	SYStem:CRC16 ON	<state>|<error>
	ShutDown	-	SYStem:POWerdown	POWD|<error>
	ListSCPI	-	SYStem:LISt	<list>|<error>
	RESEt	-	SYStem:RESEt	RESE|<error>
	RESTart	-	SYStem:RESTart	REST|<error>
	Verbosity	OFF	SYStem:VERBose OFF	<mode>|<error>
	Verbosity	on	SYStem:VERBose ON	<mode>|<error>
	Watchdog	OFF	SYStem:WATchdog OFF	<mode>|<error>
	Watchdog	on	SYStem:WATchdog ON	<mode>|<error>
	Time	1...1000ms	SYStem:WATchdog <time>	<time>|<error>

Tabelle 1: OCTane USB-Protocol, commands

Sub-sys	Parameter	possible messages	occurence		
Trigger A|B|C	State	TrigX idling|armed|running	sent on every state change		
Trigger A|B|C	Input	-200	error, if button in use		
Trigger A|B|C	Signal-Rate	-200	error, if out-of-range		
Trigger A|B|C	Signal-Period	-200	error, if out-of-range		
Trigger A|B|C	Vector-Size	-200	error, if out-of-range		

Source A|B	Arb load	-200	error, if not in Arb-mode		
Source A|B	Arb val	VectorX complete	if sufficient amount of values was sent		
Source A|B	Arb val	-200	error, if out-of-range		
Source A|B	Arb val	-200	error, if exeeds vector-size		
Source A|B	Symmetry	-200	error, if out-of-range		
Source A|B	Amplitude	-200	error, if out-of-range		
Source A|B	Offset	-200	error, if out-of-range		
Source A|B	High	-200	error, if out-of-range		
Source A|B	Low	-200	error, if out-of-range		
Source A|B	Constant	-200	error, if out-of-range		
Source A|B	Timeout	-200	error, if out-of-range		
AIN	input value	AINx: <value>	sent on every corresp. Trigger		
DIN	input value	DIN: <value>	sent on every DIO:READ-Command		
UART	input value	UART: <value>	sent on every corresp. Trigger		
I2C	input value	I2C: <value>	sent on every corresp. Trigger		

Tabelle 2: OCTane USB-Protocol, responses

Command	Description	Action	Return
*CLS	Clear Status Command		
*ESE	Standard Event Status Enable Command		
*ESE?	Standard Event Status Enable Query	-	
*ESR?	Standard Event Status Register Query	-	
*IDN?	Identification Query	-	ID-String
*OPC	Operation Complete Command		
*OPC?	Operation Complete Query	-	
*RST	Reset Command		
*SRE	Service Request Enable Command		
*SRE?	Service Request Enable Query	-	
*STB?	Read Status Byte Query	-	Status Byte
*TST?	Self-Test Query	-	
*WAI	Wait-to-Continue Command		

Tabelle 3: IEEE 488.2 mandatory commands

Command	Description	Action	Return
*AAD	Accept Address Command		
*CAL?	Calibration Query		
*DDT	Define Device Trigger Command		
*DDT?	Define Device Trigger Query		
*DLF	Disable Listener Function Command		
*DMC	Define Macro Command	not imp'd	
*EMC	Enable Macro Command	not imp'd	
*EMC?	Enable Macro Query	not imp'd	
*GMC?	Get Macro Contents Query		
*IST?	Individual Status Query		
*LMC?	Learn Macro Query	not imp'd	
*LRN?	Learn Device Setup Query		
*OPT?	Option Identification Query		
*PCB	Pass Control Back		
*PMC	Purge Macros Command	not imp'd	
*PRE	Parallel Poll Enable Register Command		
*PRE?	Parallel Poll Enable Register Query		
*PSC	Power-On Status Clear Command		
*PSC?	Power-On Status Clear Query		
*PUD	Protected User Data Command		
*PUD?	Protected User Data Query		

*RCL	Recall Command		
*RDT	Resource Description Transfer Command		
*RDT?	Resource Description Transfer Query		
*SAV	Save Command		
*TRG	Trigger Command		
*RMC	Remove Individual Macro Command	not imp'd	
*SDS	Save Default Device Settings Command		

Tabelle 4: IEEE 488.2 optional commands