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HPSC1 / IPSC-Series Configuration using RAW Commands

LED Strobe Controller
HPSC1
IPSC1
IPSC2
IPSC4-r2

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1. Connection Settings

The following chapter includes basic preferences to be followed to successfully establish the connection and send commands to a strobe controller HPSC1 or a device of the IPSC-series.

1.1. RS232 Connection Parameters

After establishing a physical connection to the strobe controller using its RS232 port, the data connection can be opened using the parameters listed in Table 1.

Parameter	Value
Protocol	RS232
Baud Rate	9600
Data Size	8
Parity	none
Delimiter	#
Command Delimiter	Carriage Return, (<CR>)

Table 1: Protocol Information (RS232)

The described *Delimiter* (#) is used to separate a command and its parameters. It can also be used to connect multiple commands in chain. The Command Delimiter <CR> has to be sent to complete and end a command.

1.2. Ethernet Connection Parameters

When using the physical Ethernet interface, no matter if in a peer-to-peer or network setup, the communication is split into two phases. The UDP protocol is used for device discovery and setup until a device is being chosen and connectable via a valid IP address. After this a TCP/IP connection can be establish to apply the general setup.

1.2.1. Using UDP Protocol

For several low level tasks, like e.g. device discovery and IP setup, the UDP protocol is used for sending and receiving commands / data. All controllers listen to UDP port 30311.

Parameter	Value
Protocol	UDP
Port	30311
Delimiter	#
Command Delimiter	Carriage Return

Table 2: Protocol Information (UDP)

The described *Delimiter* (#) is used to separate a command and its parameters. It can also be used to connect multiple commands in chain. The Command Delimiter <CR> has to be sent to complete and end a command.

1.2.2. Using TCP/IP Protocol

After a valid IP configuration has been assigned to the device, a TCP/IP connection can be established to configure the strobe controller. The devices listen to TCP/IP Port 30313, only one connection is allowed at one time.

Parameter	Value
Protocol	TCP / IP
Port	30313
Delimiter	#
Command Delimiter	Carriage Return

Table 3: List of general commands

The described *Delimiter* (#) is used to separate a command and its parameters. It can also be used to connect multiple commands in chain. The Command Delimiter <CR> has to be sent to complete and end a command.

2. Ethernet Specific Commands (UDP)

In case of an Ethernet connection, the device needs to be localized in a network and configured appropriately to allow for TCP/IP connections.

The Table below shows a list of the applicable commands, their parameters and return values.

Command	Description	Parameters	Return Value
Smartek#D	Discovery	---	VV#VI#VN#VA#VT#VL#VF#VF#VF#VF#
Smartek#I	Set IP Address	#[MAC]#[IsDHCPMode]#[IP]#[MASK] #[USERNAME]	"Smartek!"
Smartek#C	Clear parameters to default	#[MAC]	"Smartek!"
Smartek#B	Send Reboot	#[MAC]	"Smartek!"

Table 4: List of UDP commands

The appropriate parameters and return values are described below, the individual return values of the return chain (separated by #) for e.g. the *Discovery* command are described in Chapter 3.3.

Parameter	Type	Description	Sample
MAC	String	Target MAC Address	0050C270835D
IsDHCPMode	Char	IP fixed or by DHCP	D = DHCP F = Fixed IP
IP	String	IP Address to be set	169.254.0.100
MASK	String	Subnet mask to be set	255.255.0.0
USERNAME	String	Device user name	String defined by user

Table 5: List of Parameters for UDP commands

3. Device Configuration Commands (RS232 and TCP/IP)

After an RS232 or TCP/IP connection has been opened, the commands described in the following chapters can be send for configuration or status purpose. Each command must be followed by a <CR> (Carriage Return) and no Line Feed. On each command, the controller returns the received command followed by the return value, if available.

3.1. General Commands

The table below shows a list of general commands.

Description	Cmd	Parameters	Return Value
SW Trigger over Ethernet	XT	#[TriggerIndex]	#[TriggerIndex]
Status Lock / Heartbeat	=	---	#[LockStatus]
Try Acquire Lock (with timeout)	+	---	#[LockStatus]
Try Acquire Lock Manual	*	---	#[LockStatus]
Lock Release	-	---	#[LockStatus]
Read All	RA	---	VA#VT#VL#VF#VF#VF#VF#LA#LS#NN#NN#NN#NN
Send Reboot (Reset)	SB		S!
Send Clear all to default	SC	---	XL#S!

Table 6: List of general commands

The appropriate parameters and return values are described below, the individual return values of the return chain (separated by #) for e.g. the *Read All* command are described in the following chapters.

Parameter	Description	Sample
TriggerIndex	Index of the SW trigger line	0 - 3
LockStatus	Status of lock	0 = no lock 2 = locked

Table 7: List of general parameters

The full parameter set of the strobe controller series can be accessed by ASCII commands. To make the controller listen for commands, the device has first to be locked as described in Chapter 3.1.

```
+<CR>                # Apply lock
XXXXXXXXXXXXXXXXXXXX  # Send and apply parameter(s)
-<CR>                # Release lock
```

Only software (SW) trigger commands can be sent without applied lock:

Example – Triggering channel 1:

```
XT#0<CR>            # Executes trigger without lock
```

It is recommended to send the unlock command right after the communication has been finished.

3.2. Parameterization Commands

To send configuration parameters to the device, the command and its parameters must be sent followed by a <CR>. Parameters are first applied with the *SP* command, the device must be locked as described before.

Example - Changing output voltage to 48V, enable Autosense:

```
PO#0#48#1<CR>SP<CR> # Send and apply parameter(s)
```

This way also multiple commands can be sent together, separated by a carriage return. Only one *SP* is needed at the end of the command.

Example – Changing output voltage as well as current on Channel 1 and 3 to 300mA:

```
PO#0#48#1<CR>PC#0#300<CR>PC#2#300<CR>SP<CR>
```

Note: Indices are counted from 0!

Table 8 shows the list of commands as well as their parameters and return values. Table 9 contains a description of the parameters.

Description	Cmd	Parameters	Return Value
Apply New Params	SP	---	S!
Read Params (All)	RP	---	PE#PT#PN#PT#PN#PT#PN#PT#PN#PO#PC#PI#PC#PI#PC#PI#PC#PI#PM#P!
Param Trigger Edge	PE	#[TriggerEdge]	Command echo.
Param Trigger Timing	PT	#[TriggerIndex]#[DelayTime]#[OnTime]#[OffTime]	Command echo.
Trigger Enabled	PN	#[TriggerIndex]#[Enabled]	Command echo.
Param Output Voltage	PO	#[VoltageIndex]#[MaxVoltage]#[Autosense]	Command echo.
Param Output Current	PC	#[ChannelIndex]#[Current]	Command echo.
Param Output TriggerIndex	PI	#[ChannelIndex]#[TriggerIndex]	Command echo.
Param Running Mode	PM	#[ParamsType]#[RunningMode]	Command echo.

Table 8: List of Parameterization Commands

Note: The return values *S!* and *P!* are acknowledges for successful communication.

Parameter	Type	Description	Values
CMD	String	Returns the sent command	---
TriggerEdge	Integer	Set if the controller shall react on positive or negative trigger edges	0 = Positive 1 = Negative
TriggerIndex	Integer	Index of trigger line	0 – n
DelayTime	Integer	Delay of input signal	[μ s]
OnTime	Integer	On Time of output signal	[μ s]
OffTime	Integer	Off Time of output signal	[μ s]
Enabled	Integer	Switch to enable/disable a feature	0 = Disable 1 = Enable
VoltageIndex	Integer	Voltage power supply selector	0 for all devices
MaxVoltage	Integer	Output voltage	[V]
Autosense	Integer	Enable/disable Optimal Autosense	0 = Fixed Voltage 1 = Autosense
ChannelIndex	Integer	Output channel index	0 – n
Current	Integer	Output current	[mA]
ParamsType	Integer	---	0
RunningMode	Integer	Running mode	0 = Off 1 = External Trigger 2 = Continuous 3 = Software Trigger 4 = External Switch 5 = Internal Trigger

Table 9: List of configuration parameters

3.3. Device Status Commands

With the Read Status (RT) command, the status of all internal device sensors as well as current operation limits can be retrieved. Table 10 shows all the properties returned with this command.

Description	Command	Return Value
Read Status (All)	RT	T! #TO#TL#TC[0]#TV[0]#TC[1]#TV[1]#TC[2]#TV[2]#TC[3]#TV[3]#TR[0]#TR[1]#TR[2]#TR[3]#TH#TE#T!

Table 10: Return value of Read Status (RT) command

Note: The return value *T!* is the acknowledge for successful communication.

The returned property chain can be resolved using the description in Table 11.

Description	Property	Parameters
Measured Input Voltage	TI	#[Voltage]
Measured Input Power Limit	TL	#[PowerLimit (W)]
Measured Output Voltage	TO	#[VoltageIndex]#[OptimalVoltage]#[MeasuredVoltage]
Measured Load Current per Channel	TC	#[ChannelIndex]#[Current]
Measured Load Voltage per Channel	TV	#[ChannelIndex]#[Voltage]
Measured Temperature	TH	#[Temperature]
Status Trigger Counter per Trigger	TR	#[TriggerIndex]#[TriggerCounter]
Status Fault Code	TE	#[FaultCode]
Status Trigger Input per Trigger	TT	#[TriggerIndex]#[Status]

Table 11: Return parameters of Read Status (RT) command

Similar to all previously described commands, also the RT needs to be sent applying the lock before:

```

+<CR>                # Apply lock
RT<CR>               # Send RT command
-<CR>                # Release lock

```

3.4. Device Information Commands

With the Read Version (RV) command, the version as well as model identifying information can be received from a device. Table 12 shows all properties returned with this command.

Description	Command	Return Value
Read Version	RV	VV#VI#VN#VA#0VT#VL#VF[0]#VF[1]#VF[2]#VF[3]#V!

Table 12: Return value of Read Version (RV) command

Note: The return value *V!* is the acknowledge for successful communication.

The returned property chain can be resolved using the description in Table 13.

Description	Property	Parameters
Version Vendor	VV	#[Vendor]#[Model]#[HardwareVersion]#[FirmwareVersion]
Version IP	VI	#[MAC Address]#[IsDHCPMode (D, F)]#[IP Address]#[IP Mask]
Status User Name	VN	#[UserName]
ID Check mode	VA	#[ID Check Mode]
Model Type, Channels Count	VT	#[TypeName]#[ChannelsCount]#[VoltagesCount]#[TriggersCount]
Current, Voltage Limits	VL	#[MaxChannelCont]#[MaxChannelStrobe]#[MinVoltage]#[MaxVoltage]
DAC Offset	VF	#[ChannelIndex]#[DAC Offset]

Table 13: Return parameters of Read Version (RV) command

Similar to all previously described commands, also the RV needs to be sent applying the lock before:

+<CR>	# Apply lock
RV<CR>	# Send RV command
-<CR>	# Release lock