



Flextech AKT Automation API Specification

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Table of Contents

Table of Contents.....	3
AKT Automation Powered by Lua.....	5
Product Support.....	6
RTOS.....	7
Require.....	7
Methods.....	7
Terminal.....	9
Require.....	9
Methods.....	9
System.....	10
Require.....	10
Methods.....	10
Qwiic.....	13
Require.....	13
Methods.....	13
Pocket I/O.....	14
Require.....	14
Methods.....	14
Pocket LED.....	17
Require.....	17
Enumerations.....	17
Methods.....	18
Filesystem.....	20
Require.....	20
Enumerations.....	20
Methods.....	21
Example.....	24
Bus Monitor.....	25
Require.....	25
General Operation.....	25
Enumerations.....	25
Methods.....	29
Notes.....	32
Audio Circular Buffer.....	33
Require.....	33
General Operation.....	33
Methods.....	33

Audio Signal Generator.....	38
Require.....	38
Constants.....	38
Methods.....	38
Audio Routing.....	41
Require.....	41
Constants.....	41
Methods.....	41
TDM.....	44
Require.....	44
Methods.....	44
Watchdog.....	48
Require.....	48
Methods.....	48

AKT Automation Powered by Lua

The Flextech AKT Automation environment provides a powerful way to customize and expand the functionality of all AKT products. The AKT Automation environment is based on the Lua programming language with access to internal subsystems provided by built-in Lua modules. This environment allows for completely autonomous operation enabling a wide variety of demo, bench and in-vehicle test and measurement setups.

The hardware can be expanded through the onboard [qwiic](#) and I/O ports. Using the qwiic and I/O Lua modules, it is possible to add displays, actuators, sensors, real-time clocks, and other peripheral devices to create user interfaces and interact with the local environment.

Refer to your product's [User Guide](#) for details downloading and running AKT Automation scripts.

When developing AKT Automation scripts, the following techniques can speed up script development:

- Use XMODEM to transfer scripts to the product instead of copying to the SD card from the PC
- Running Lua with no arguments starts an interactive Lua interpreter. Lua code "chunks" can be copied and pasted from the PC into the interpreter for quick prototyping of logic or code blocks.
- Use the on-board 'edit' command for quick bug fixes or script modifications.

Most modules include a brief 'help()' method to assist script development.

Product Support

Automation Module	Function	Industrial A ² B Bridge	Pocket A ² B Bridge	Pocket Bus Monitor	Pocket TDM
rtos	RTOS	✓	✓	✓	✓
term	Terminal	✓	✓	✓	✓
system	System	✓	✓	✓	✓
qwiic	Qwiic		✓	✓	✓
pio	Pocket I/O		✓	✓	✓
led	Pocket LED		✓	✓	✓
drive	Filesystem	✓	✓	✓	✓
cbuf	Audio Circular Buffer	✓	✓	✓	✓
gen	Audio Signal Generator	✓	✓	✓	✓
route	Audio Routing	✓	✓	✓	✓
bm	Bus Monitor			✓	
tdm	TDM				✓
watchdog	Lua watchdog	✓	✓	✓	✓
irq*	A ² B Bridge interrupt queue	✓	✓		
api*	A ² B Bridge API locking	✓	✓		
comm*	A ² B Bridge communication protocols	✓	✓		
master*	A ² B Bridge master mode control	✓	✓		
setup*	A ² B Bridge setup	✓	✓		
streaming*	A ² B Bridge streaming	✓	✓		
util*	A ² B Bridge utility	✓	✓		

*Refer to the [A²B Bridge API Specification](#) for details about the highlighted modules.

RTOS

The RTOS module provides access to basic RTOS services.

Require

```
rtos = require('rtos')
```

Methods

```
ret = rtos.delay(seconds)
```

```
ret = rtos.sleep(seconds)
```

Suspend script execution for the desired number of seconds

Parameters

Parameter	Type	Optional	Description
seconds	number	no	Number of seconds to suspend. Fractional seconds down to 0.001 are supported.

Return Values

Return	Type	Optional	Description
ret	number	N/A	Number of seconds suspended

```
sec = rtos.time()
```

```
sec = rtos.clock()
```

Return the time elapsed in seconds since power on.

NOTE: These methods are not the same as the Lua 'os' module methods of the same name. It is preferred to use the Lua `os.clock()` method as a monotonic time base for benchmarking and `os.time()` for the current time.

Parameters

Parameter	Type	Optional	Description
N/A	N/A	N/A	This command requires no parameters.

Return Values

Return	Type	Optional	Description
sec	number	N/A	Number of seconds elapsed since power on. This value has a granularity of 0.001 seconds

Terminal

The Terminal module provides access to terminal services. These services can be used to build terminal based user interfaces.

Require

```
term = require('term')
```

Methods

Refer to the [eLua term module](#) reference manual for a full description of this module.

System

The System module provides access to certain system services. Methods exist to execute shell commands, set the system time, and place messages in the system log.

Require

```
system = require('system')
```

Methods

```
ok = system.shell(cmd)
```

Execute a shell command

Parameters

Parameter	Type	Optional	Description
cmd	string	no	Shell command to execute

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

```
ok, rfc3339 = system.date('rfc3339')
```

Set or get the current date and time in [RFC3339](#) format. An example for April 1, 2025 at 20:00:00 would be '2025-04-01T20:00:00Z'. The terminating 'Z' is optional as the device has no concept of timezones or daylight savings time.

Parameters

Parameter	Type	Optional	Description
rfc3339	string	yes	Current date and time in RFC3339 format

Return Values

Return	Type	Optional	Description
ok	boolean string	N/A	True if successful setting the time. Current date and time in RFC3339 format when no arguments are supplied.
rfc3339	string	N/A	Current date and time in RFC3339 format when setting the time.

`ok = system.syslog(msg)`

Adds a message to the system log

Parameters

Parameter	Type	Optional	Description
msg	string	no	Message to add to the system log

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

`ok = system.reset(type)`

Reset a variety of subsystems

Parameters

Parameter	Type	Optional	Description		
type	string	no	Reset the full system or a subsystem. Valid resets are: <table><tr><td>Type</td><td>Reset</td></tr></table>	Type	Reset
Type	Reset				

Parameter	Type	Optional	Description	
			soft	Soft reset to power on reset values
			hard	Full power on system reset
			gen	Reset signal generator subsystem (when available)
			routes	Reset route subsystem
			cbuf	Reset circular buffer subsystem
			wav	Reset WAV file subsystem
			tdm	Reset TDM settings (Pocket TDM only)

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

Qwiic

The Qwiic module provides I²C access to the qwiic port for expansion.

Require

qwiic = require('qwiic')

Methods

ok, ret = qwiic.i2c(i2cAddr,wBuf[,nRead])

Execute an I²C transaction on the qwiic port.

Parameters

Parameter	Type	Optional	Description
i2cAddr	number	no	7-bit I ² C address of the qwiic device
wBuf	table	no	Data bytes to write. Can be an empty table with no data.
nRead	number	yes	Number of bytes to read. Omit for write only transactions.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false
ret	table	N/A	Bytes read from the device when nRead is greater than zero.

Pocket I/O

The Pocket I/O module provides access to hardware assets available on the Pocket I/O connector. These include I²C, SPI, and GPIO accesses (where available).

Require

```
pio = require('pio')
```

Methods

```
ok, ret = pio.i2c(i2cAddr,wBuf[,nRead])
```

Execute an I²C transaction on the Pocket device I/O connector I²C port

Parameters

Parameter	Type	Optional	Description
i2cAddr	number	no	7-bit I ² C address of the qwiic device
wBuf	table	no	Data bytes to write. Can be an empty table with no data.
nRead	number	yes	Number of bytes to read. Omit for write only transactions.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false
ret	table	N/A	Bytes read from the device when nRead is greater than zero.

NOTE: This method is only available on the Pocket TDM and Pocket A²B Bridge devices

```
ok, ret = pio.spi(cmd,val)
```

Execute a SPI transaction on the Pocket device I/O connector SPI port

NOTE: This method is only available on the Pocket TDM device

Parameters

Parameter	Type	Optional	Description		
cmd	string	no	Execute a SPI operation		
			<table><tr><th>cmd</th><th>val</th></tr></table>	cmd	val
			cmd	val	
			<table><tr><td>'speed'</td><td>SPI speed in Hz. The value should be less than or equal to 50MHz. Due to divisor constraints, the speed may be less than the value specified.</td></tr></table>	'speed'	SPI speed in Hz. The value should be less than or equal to 50MHz. Due to divisor constraints, the speed may be less than the value specified.
			'speed'	SPI speed in Hz. The value should be less than or equal to 50MHz. Due to divisor constraints, the speed may be less than the value specified.	
<table><tr><td>'mode'</td><td>SPI transfer mode. Valid values are 0-3.</td></tr></table>	'mode'	SPI transfer mode. Valid values are 0-3.			
'mode'	SPI transfer mode. Valid values are 0-3.				
<table><tr><td>'xfer'</td><td>SPI data transfer. Supply an array of bytes to write for 'val'. The SPI bytes read will be returned in 'ret'</td></tr></table>	'xfer'	SPI data transfer. Supply an array of bytes to write for 'val'. The SPI bytes read will be returned in 'ret'			
'xfer'	SPI data transfer. Supply an array of bytes to write for 'val'. The SPI bytes read will be returned in 'ret'				
val	number table	no	See 'cmd'		

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false
ret	table	N/A	Bytes read from the device during a 'xfer'

```
ok = pio.gpio([num[,cmd[,val]]])
```

Configures GPIO pins on the I/O connector. No arguments will return a table containing the current level of all GPIO pins.

NOTE: This method is only available on the Pocket Bus Monitor and Pocket A²B Bridge devices

Parameters

Parameter	Type	Optional	Description						
num	number	yes	GPIO number to operate on						
cmd	string	yes	Operate on a GPIO						
			<table><tr><th>cmd</th><th>val</th></tr><tr><td>dir</td><td>Set the direction of the GPIO pin. Valid values are 'in', and 'out'. Default is 'out'.</td></tr><tr><td>set</td><td>Sets the value of the GPIO output pin. Valid values are 'high', 1, true and 'low', 0, false. Default is 0.</td></tr></table>	cmd	val	dir	Set the direction of the GPIO pin. Valid values are 'in', and 'out'. Default is 'out'.	set	Sets the value of the GPIO output pin. Valid values are 'high', 1, true and 'low', 0, false. Default is 0.
			cmd	val					
			dir	Set the direction of the GPIO pin. Valid values are 'in', and 'out'. Default is 'out'.					
set	Sets the value of the GPIO output pin. Valid values are 'high', 1, true and 'low', 0, false. Default is 0.								
If no 'cmd' is given, the current level of the GPIO pin is returned.									
val	string number boolean	yes	See 'cmd'. If no value is given, the default will be used.						

Return Values

Return	Type	Optional	Description
ok	boolean table	N/A	True for success otherwise false Current values if no arguments

Pocket LED

The Pocket LED module provides access to the three multi-color LEDs available on the Pocket products.

Require

```
led = require('led')
```

Enumerations

LEDs

```
led.<LED>
```

LED Enumeration	Description
ALL_LED	All LEDs
STATUS	Status LED
USB	USB LED
IO	I/O LED

Colors

```
led.<COLOR>
```

Color Enumeration	Description
ALL_COLOR	All colors
RED	Red
GREEN	Green
BLUE	Blue

Methods

led.override()

Give control of the LEDs to the script. All LEDs will be initialized to off.

Parameters

Parameter	Type	Optional	Description
N/A	N/A	N/A	This method requires no arguments

Return Values

Return	Type	Optional	Description
N/A	N/A	N/A	This method has no return value

led.release()

Returns LED control to the firmware.

Parameters

Parameter	Type	Optional	Description
N/A	N/A	N/A	This method requires no arguments

Return Values

Return	Type	Optional	Description
N/A	N/A	N/A	This method has no return value

ok, msg = led.set(led,color,state)

NOTE: The 'Status' LED does not support BLUE

Parameters

Parameter	Type	Optional	Description
led	number string	no	Valid LED strings are 'usb', 'status', 'io'. Valid LED enumerations are ALL_LED, USB, IO, and STATUS. Enumerations can be or'd together to control more than one LED.
color	number string	no	Valid LED color strings are 'red', 'green', 'blue'. Valid LED color enumerations are ALL_COLOR, RED, GREEN, BLUE. Enumerations can be or'd together to mix more than one color.
state	number string boolean	no	Set the state of the selected LEDs. Value values are 'on', true, 1 and 'off', false, 0.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false
msg	string	N/A	Result string

Filesystem

The Filesystem module provides access to certain file operations not included in the standard Lua io or os libraries. These include drive and directory operations.

Require

```
drive = require('drive')
```

Enumerations

DIRENT

The DIRENT enumerations can be used to decode the 'fdate' and 'ftime' values returned by the ls() / dir() method. The BITP and BITM values can be used to isolate the bit fields. OFFSET should be added to the returned value.

Alternatively, use the hms() and yyyyymmdd() methods to decode these fields.

```
drive.<DIRENT>
```

LED Enumeration	Description
DIRENT_BITM_YEAR	Year bit mask for the 'fdate' bitfield
DIRENT_BITM_MONTH	Month bit mask for the 'fdate' bitfield
DIRENT_BITM_DAY	Day bit mask for the 'fdate' bitfield
DIRENT_BITM_HOUR	Hour bit mask for the 'ftime' bitfield
DIRENT_BITM_MIN	Minute bit mask for the 'ftime' bitfield
DIRENT_BITM_SEC	Second bit mask for the 'ftime' bitfield
DIRENT_BITP_YEAR	Year bit position for the 'fdate' bitfield
DIRENT_BITP_MONTH	Month bit position for the 'fdate' bitfield
DIRENT_BITP_DAY	Day bit position for the 'fdate' bitfield

DIRENT_BITP_HOUR	Hour bit position for the 'ftime' bitfield
DIRENT_BITP_MIN	Minute bit position for the 'ftime' bitfield
DIRENT_BITP_SEC	Second bit position the for 'ftime' bitfield
DIRENT_OFFSET_YEAR	Year offset for the 'fdate' bitfield
DIRENT_OFFSET_MONTH	Month offset for the 'fdate' bitfield
DIRENT_OFFSET_DAY	Day offset for the 'fdate' bitfield
DIRENT_OFFSET_HOUR	Hour offset for the 'ftime' bitfield
DIRENT_OFFSET_MIN	Minute offset for the 'ftime' bitfield
DIRENT_OFFSET_SEC	Second offset for the 'ftime' bitfield

Methods

`ok, drives = drive.drive([drive,attribute])`

Returns a list of support filesystem drives with attributes if no arguments are given. Otherwise sets a drive attribute. Common drives are 'sd:' for the SD card and 'sf:' for the internal flash filesystem.

Parameters

Parameter	Type	Optional	Description
drive	string	yes	Drive to modify
attribute	string	yes	Attribute to set on the drive. Accepted attributes are 'default' to set the drive as the default drive. Required if 'drive' is specified.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false
drives	table	N/A	List of supported drives and attributes

```
ok, full = drive.df([drive])
```

Disk full command. Returns the disk full status of all drives if no parameters are given. Otherwise returns the attributes for a specific drive. Common drives are 'sd:' for the SD card and 'sf:' for the internal flash filesystem.

Parameters

Parameter	Type	Optional	Description
drive	string	yes	Drive to query

Return Values

Return	Type	Optional	Description										
ok	boolean	N/A	True for success otherwise false										
full	table	N/A	Drive full attributes <table><tr><th>Attribute</th><th>Definition</th></tr><tr><td>available</td><td>Space available in 1k blocks</td></tr><tr><td>blocks</td><td>Total space available in 1k blocks</td></tr><tr><td>percent</td><td>Percentage full</td></tr><tr><td>used</td><td>Space used in 1k blocks</td></tr></table>	Attribute	Definition	available	Space available in 1k blocks	blocks	Total space available in 1k blocks	percent	Percentage full	used	Space used in 1k blocks
Attribute	Definition												
available	Space available in 1k blocks												
blocks	Total space available in 1k blocks												
percent	Percentage full												
used	Space used in 1k blocks												

```
yyyy, mm, dd = drive.yyyymmdd(fdate)
```

Returns the decoded year, month, and day from the 'fdate' bitfield returned by the ls() / dir() iterator.

Parameters

Parameter	Type	Optional	Description
fdate	number	no	'fdate' bitfield value

Return Values

Return	Type	Optional	Description
yyyy	number	N/A	Year
mm	number	N/A	Month
dd	number	N/A	Day

`h, m, s = drive.hms(ftime)`

Returns the decoded hour, minute, and second from the 'ftime' bitfield returned by the `ls()` / `dir()` iterator.

Parameters

Parameter	Type	Optional	Description
ftime	number	no	'ftime' bitfield value

Return Values

Return	Type	Optional	Description
h	number	N/A	Hour
m	number	N/A	Minute
s	number	N/A	Second

`iterator = drive.ls([drive])`

`iterator = drive.dir([drive])`

Returns a directory list iterator for the specified drive. If no drive is specified, the default drive is used.

Parameters

Parameter	Type	Optional	Description
drive	string	yes	Drive name. Normally 'sd:' for the SD card or 'sf:' for the internal filesystem.

Return Values

Return	Type	Optional	Description												
iterator	function	N/A	Directory iterator. Returns a table with the following fields. <table><tr><th>Attribute</th><th>Contents</th></tr><tr><td>fdate</td><td>File date bitfield</td></tr><tr><td>ftime</td><td>File time bitfield</td></tr><tr><td>fsize</td><td>File size in bytes</td></tr><tr><td>flags</td><td>0 = file, 1 = directory</td></tr><tr><td>fname</td><td>File name</td></tr></table>	Attribute	Contents	fdate	File date bitfield	ftime	File time bitfield	fsize	File size in bytes	flags	0 = file, 1 = directory	fname	File name
Attribute	Contents														
fdate	File date bitfield														
ftime	File time bitfield														
fsize	File size in bytes														
flags	0 = file, 1 = directory														
fname	File name														

Example

The following example iterates over all files on the SD card showing a simple directory listing.

```
drive = require('drive')
sd_dir = drive.dir('sd:')
while true do
  local dir_entry = sd_dir()
  if dir_entry == nil then break end
  local yyyy, mm, dd = drive.yyyymmdd(dir_entry.fdate)
  local h, m, s = drive.hms(dir_entry.ftime)
  print(string.format(
    '%04d-%02d-%02d %02d:%02d:%02d %9s %s',
    yyyy, mm, dd, h, m, s,
    dir_entry.flags == 1 and '<DIR>' or string.format('%d', dir_entry.fsize),
    dir_entry.fname
  ))
end
```

Bus Monitor

The Bus Monitor module provides access to the Bus Monitor event subsystem on the Pocket Bus Monitor. This can be used as a basis for in-situ autonomous A2B event and data logging.

Require

```
bm = require('bm')
```

General Operation

1. Require the Bus Monitor module
2. Subscribe to desired Bus Monitor events
3. Poll for events

Refer to the [Bus Monitor event logger on Github](#) for a comprehensive example of this module.

Enumerations

Bus Monitor Events

Events containing "A2B2" are specific to A2B 2.0 networks.

```
bm.event.<EVENT>
```

I2C I2C_A2B2	I2C register or peripheral event		
	Parameter	Type	Value
	tid	number	I2C transaction ID
	type	number	I2C event type. See I2C events.
	nodeAddr	number	Sub node address
	addr	number	Register or peripheral I2C address
	rw	boolean	True for read, false for write
	data	number	I2C data byte
	condition	number	I2C peripheral

			condition. See I2C conditions
	src	number	I2C source (A2B 2.0 only). See I2C sources.
SPI	SPI event		
	Parameter	Type	Value
	respNode	number	SPI node
	error	boolean	
	type	string	SPI transaction type "ATOMIC_READ" "ATOMIC_WRITE" "FULL_DUPLEX" "BULK_WRITE"
	ss	string	Slave select "ADR1" "SIO2" "ADR2"
	wLen	number	Write data length
	rLen	number	Read data length
	wr	number array	Write data
	rd	number array	Read data
BUS_LOCK_LOCKED	Bus Locked event		
BUS_LOCK_UNLOCKED	Bus Unlocked event		
BIAS_OK_DETECTED	Bias OK detected event		
BIAS_OK_REMOVED	Bias OK removed event		
BIAS_REV_DETECTED	Bias Reverse detected event		
BIAS_REV_REMOVED	Bias Reverse removed event		
DISCOVERY_MODE	Discovery mode event		
	Parameter	Type	Value
	status	string	"START" "STOP"
	respCycles	number	Response cycles
IRQ	IRQ event		

	<table><tr><th>Parameter</th><th>Type</th><th>Value</th></tr><tr><td>nodeAddr</td><td>number</td><td>Sub node address. First submode is zero.</td></tr><tr><td>status</td><td>number</td><td>IRQ status</td></tr></table>	Parameter	Type	Value	nodeAddr	number	Sub node address. First submode is zero.	status	number	IRQ status									
Parameter	Type	Value																	
nodeAddr	number	Sub node address. First submode is zero.																	
status	number	IRQ status																	
IRQ_QUERY_A2B2	IRQ query event (A2B 2.0) <table><tr><th>Parameter</th><th>Type</th><th>Value</th></tr><tr><td>nodeAddr</td><td>number</td><td>Sub node address. First submode is zero. Broadcast is 0x1F.</td></tr><tr><td>bprio</td><td>number</td><td>Bus Priority</td></tr></table>	Parameter	Type	Value	nodeAddr	number	Sub node address. First submode is zero. Broadcast is 0x1F.	bprio	number	Bus Priority									
Parameter	Type	Value																	
nodeAddr	number	Sub node address. First submode is zero. Broadcast is 0x1F.																	
bprio	number	Bus Priority																	
IRQ_ACK_A2B2	IRQ event (A2B 2.0) <table><tr><th>Parameter</th><th>Type</th><th>Value</th></tr><tr><td>nodeAddr</td><td>number</td><td>Sub node address. First submode is zero.</td></tr><tr><td>ack</td><td>boolean</td><td>IRQ Acknowledge</td></tr><tr><td>active</td><td>boolean</td><td>IRQ Active</td></tr><tr><td>invalid</td><td>boolean</td><td>IRQ Invalid</td></tr><tr><td>type</td><td>number</td><td>IRQ Type</td></tr></table>	Parameter	Type	Value	nodeAddr	number	Sub node address. First submode is zero.	ack	boolean	IRQ Acknowledge	active	boolean	IRQ Active	invalid	boolean	IRQ Invalid	type	number	IRQ Type
Parameter	Type	Value																	
nodeAddr	number	Sub node address. First submode is zero.																	
ack	boolean	IRQ Acknowledge																	
active	boolean	IRQ Active																	
invalid	boolean	IRQ Invalid																	
type	number	IRQ Type																	
DOWNSTREAM_SCF_ERROR UPSTREAM_SRF_ERROR	Downstream SCF error event <table><tr><th>Parameter</th><th>Type</th><th>Value</th></tr><tr><td>type</td><td>string</td><td>"SCF" "SRF"</td></tr><tr><td>missed</td><td>number</td><td>Control frames missed in last block.</td></tr><tr><td>hdcnt</td><td>number</td><td>Headers missed in last block</td></tr><tr><td>crc</td><td>number</td><td>Bad CRCs in last block</td></tr></table>	Parameter	Type	Value	type	string	"SCF" "SRF"	missed	number	Control frames missed in last block.	hdcnt	number	Headers missed in last block	crc	number	Bad CRCs in last block			
Parameter	Type	Value																	
type	string	"SCF" "SRF"																	
missed	number	Control frames missed in last block.																	
hdcnt	number	Headers missed in last block																	
crc	number	Bad CRCs in last block																	
SLAVE_ERROR	Slave error / ack event <table><tr><th>Parameter</th><th>Type</th><th>Value</th></tr></table>	Parameter	Type	Value															
Parameter	Type	Value																	

	nodeAddr	number	Sub node address. First submode is zero.
	error	number	Error number
	errorStr	string	"SRFMISSED_ERROR" "BROADCAST_ACK" "DISCOVERY_ERROR" "DOWNSTREAM_CRC_ERROR" "UNSPECIFIED_ERROR"
SEQUENCE_ERROR	Sequence error event		
	Parameter	Type	Value
	seq	Number	Sequence errors detected in last block
DSH_ERROR_A2B2 USH_ERROR_A2B2	Sequence error event (A2B 2.0)		
	Parameter	Type	Value
	crc	Number	CRC
NEWSTRCT	NEWSTRCT detected event		
	Parameter	Type	Value
	dn	table	Downstream slot info
	up	table	Upstream slot info
	[dn/up].slots	number	Total active downstream slots
	[dn/up].dtOffs	number	SPI data tunnel slot offset
	[dn/up].dtSlots	number	SPI data tunnel slots

I2C Events

bm.i2c.types.<TYPE>

I2C_REG	Register transaction
I2C_PERIPHERAL	Peripheral transaction
I2C_PERIPHERAL_CONDITION	Peripheral condition

I2C Peripheral Conditions

bm.i2c.conditions.<CONDITION>

I2C_RPTSTART	repeat start
I2C_ACK	ack
I2C_NACK	nack
I2C_NORMAL	data
I2C_STOP	stop
I2C_ERROR	error
I2C_UNKNOWN	unknown

I2C Sources (A2B 2.0 Only)

bm.i2c.src.<SOURCE>

PE	Protocol Engine
I2C	I2C
SPI0	SPI0
SPI1	SPI1
BSD	Bus Self Discovery

Methods

ok = bm.subscribe(event)

Subscribe to a Bus Monitor event

Parameters

Parameter	Type	Optional	Description
event	number	no	Event enumeration (i.e. bm.event.I2C)

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

`ok = bm.unsubscribe(event)`

Unsubscribe from a Bus Monitor event

Parameters

Parameter	Type	Optional	Description
event	number	no	Event enumeration (i.e. <code>bm.event.I2C</code>)

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

`status = bm.status()`

Returns the current status of the Bus Monitor event queue

Parameters

Parameter	Type	Optional	Description
N/A	N/A	N/A	This command requires no parameters.

Return Values

Return	Type	Optional	Description		
status	table	N/A			
			Parameter	Type	Value

Return	Type	Optional	Description		
			size	number	Size in bytes of the event buffer
			fill	number	Fill level in bytes of the event buffer
			events	number	Number of events in the event buffer
			max	number	Maximum fill size of the event buffer
			dropped	number	Number of dropped events

`ok = bm.reset(event)`

Reset the Bus Monitor event queue

Parameters

Parameter	Type	Optional	Description
N/A	N/A	N/A	This command requires no parameters.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

```
event = bm.getEvent()
```

Retrieve an event from the Bus Monitor event queue

Parameters

Parameter	Type	Optional	Description
N/A	N/A	N/A	This command requires no parameters.

Return Values

Return	Type	Optional	Description												
event	Table	N/A													
			<table><tr><th>Parameter</th><th>Type</th><th>Value</th></tr><tr><td>event</td><td>number</td><td>Event enumeration</td></tr><tr><td>timeStamp</td><td>number</td><td>Event timestamp</td></tr><tr><td>EVENT SPECIFIC</td><td></td><td>See event enumerations</td></tr></table>	Parameter	Type	Value	event	number	Event enumeration	timeStamp	number	Event timestamp	EVENT SPECIFIC		See event enumerations
			Parameter	Type	Value										
			event	number	Event enumeration										
			timeStamp	number	Event timestamp										
EVENT SPECIFIC		See event enumerations													

Notes

1. All events are automatically unsubscribed and cleared from the queue when the module is garbage collected.

Audio Circular Buffer

The Audio Circular Buffer module can be used to monitor and save a snapshot of audio to a file on demand.

Require

```
cbuf = require('cbuf')
```

General Operation

1. Require the circular buffer module
2. Reset
3. Configure
4. Enable
5. Save, clear, disable, enable

Methods

```
ok = cbuf.reset()
```

Resets the circular buffer configuration and all data

Parameters

Parameter	Type	Optional	Description
N/A	N/A	N/A	This command requires no parameters.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

`ok = cbuf.clear()`

Clears all data but maintains current configuration

Parameters

Parameter	Type	Optional	Description
N/A	N/A	N/A	This command requires no parameters.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

`ok = cbuf.enable()`

Enable / start the circular buffer

Parameters

Parameter	Type	Optional	Description
N/A	N/A	N/A	This command requires no parameters.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

`ok = cbuf.disable()`

Disable / stop the circular buffer

Parameters

Parameter	Type	Optional	Description
N/A	N/A	N/A	This command requires no parameters.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

`ok = cbuf.save(fname)`

Save the contents of the circular buffer to a file

Parameters

Parameter	Type	Optional	Description
fname	string	no	Filename

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

`ok = cbuf.config(channels, wsize, size, rate)`

Configures the circular buffer

Parameters

Parameter	Type	Optional	Description
channels	number	yes	Number of channels. Default 2. The maximum number of channels is 32.
wsize	number	yes	Audio sample word size in bytes.

Parameter	Type	Optional	Description
			Default 2 (16-bit)
size	number	yes	Size of circular buffer in bytes. Default 1,920,000 bytes (20 seconds @ 1 Channel @ 48 kHz @ 16-bit). The maximum size is 32 MB.
rate	number	yes	Audio sample rate in Hz. Default 48000 (48 KHz)

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

`ok = cbuf.domain(domain)`

Set the circular buffer clock domain.

Parameters

Parameter	Type	Optional	Description
domain	string	no	Audio clock domain

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

`status = cbuf.status()`

Reports the status of the circular buffer

Parameters

Parameter	Type	Optional	Description
N/A	N/A	N/A	This command requires no parameters.

Return Values

Return	Type	Optional	Description																								
status	table	N/A																									
			<table><tr><th>Parameter</th><th>Type</th><th>Value</th></tr><tr><td>configured</td><td>boolean</td><td>Configure status</td></tr><tr><td>enabled</td><td>boolean</td><td>Enable status</td></tr><tr><td>channels</td><td>number</td><td>Channels</td></tr><tr><td>wordSize</td><td>number</td><td>Sample word size</td></tr><tr><td>sampleRate</td><td>number</td><td>Sample rate</td></tr><tr><td>size</td><td>number</td><td>Buffer size in bytes</td></tr><tr><td>fill</td><td>number</td><td>Buffer fill level in bytes</td></tr></table>	Parameter	Type	Value	configured	boolean	Configure status	enabled	boolean	Enable status	channels	number	Channels	wordSize	number	Sample word size	sampleRate	number	Sample rate	size	number	Buffer size in bytes	fill	number	Buffer fill level in bytes
			Parameter	Type	Value																						
			configured	boolean	Configure status																						
			enabled	boolean	Enable status																						
			channels	number	Channels																						
			wordSize	number	Sample word size																						
			sampleRate	number	Sample rate																						
			size	number	Buffer size in bytes																						
fill	number	Buffer fill level in bytes																									

Audio Signal Generator

The Audio Signal Generator module provides access to the onboard signal generators (where available)

Require

```
gen = require('gen')
```

Constants

```
gen.<CONSTANT>
```

Constant	Type	Description
MAX_SIG_GENS	number	Maximum number of signal generators

Methods

```
ok = gen.clear()
```

Clears all signal generators

Parameters

Parameter	Type	Optional	Description
N/A	N/A	N/A	This command requires no parameters.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

```
info = gen.get(idx)
```

Retrieves the settings of the signal generator at the specified index

Parameters

Parameter	Type	Optional	Description
idx	number	no	Signal generator index. Valid values are zero to gen.MAX_SIG_GENS - 1

Return Values

Return	Type	Optional	Description												
info	boolean table	N/A	False for fail or table containing signal generator details. The table will always contain 'idx' and 'type' fields along with the following <table><tr><th>Type</th><th>Additional Fields</th></tr><tr><td>TONE</td><td>amplitude frequency</td></tr><tr><td>PINK</td><td>amplitude</td></tr><tr><td>WHITE</td><td>amplitude</td></tr><tr><td>HEX</td><td>value</td></tr><tr><td>UNKNOWN</td><td>N/A</td></tr></table>	Type	Additional Fields	TONE	amplitude frequency	PINK	amplitude	WHITE	amplitude	HEX	value	UNKNOWN	N/A
Type	Additional Fields														
TONE	amplitude frequency														
PINK	amplitude														
WHITE	amplitude														
HEX	value														
UNKNOWN	N/A														

```
ok = gen.set(idx,type[,args])
```

Configures the settings of the signal generator at the specified index

Parameters

Parameter	Type	Optional	Description
idx	number	no	Signal generator index. Valid values are zero to gen.MAX_SIG_GENS - 1
type	string	no	Valid types are 'tone', 'pink', 'white', 'hex', and 'off'
args		Yes	Default values shown below are used if

Parameter	Type	Optional	Description												
			not specified. <table><tr><th>Type</th><th>Additional Arguments</th></tr><tr><td>tone</td><td>amplitude (number, 1.0) frequency (number, 1000)</td></tr><tr><td>pink</td><td>amplitude (number, 1.0)</td></tr><tr><td>white</td><td>amplitude (number, 1.0)</td></tr><tr><td>hex</td><td>value (number, 0x00000000)</td></tr><tr><td>off</td><td>N/A</td></tr></table>	Type	Additional Arguments	tone	amplitude (number, 1.0) frequency (number, 1000)	pink	amplitude (number, 1.0)	white	amplitude (number, 1.0)	hex	value (number, 0x00000000)	off	N/A
Type	Additional Arguments														
tone	amplitude (number, 1.0) frequency (number, 1000)														
pink	amplitude (number, 1.0)														
white	amplitude (number, 1.0)														
hex	value (number, 0x00000000)														
off	N/A														

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

Audio Routing

The Audio Routing module provides access to the onboard audio routing engine.

Require

```
route = require('route')
```

Constants

route.<CONSTANT>

Constant	Type	Description
MAX_ROUTES	number	Maximum number of routes

Methods

```
ok = route.clear()
```

Clears all routes

Parameters

Parameter	Type	Optional	Description
N/A	N/A	N/A	This command requires no parameters.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

```
info = route.get(idx)
```

Retrieves the settings of the audio route at the specified index

Parameters

Parameter	Type	Optional	Description
idx	number	no	Route index. Valid values are zero to route.MAX_ROUTES - 1

Return Values

Return	Type	Optional	Description
info	boolean table	N/A	False for fail or table containing route details. See the product's User Guide for specific route information.

Example Routing Table Entry

```
{
  attenuation = -0.0,
  channels = 2.0,
  dst = {
    name = "A2B",
    offset = 0.0
  },
  idx = 0.0,
  mix = "set",
  src = {
    name = "GEN",
    offset = 0.0
  }
}
```

ok =

```
route.set(idx,src,srcOffset,dst,dstOffset,channels[,attenuation[, 'mix'|'set']])
```

Configures the settings of the route at the specified index. Refer to the product User Guide for route source and destination details.

Parameters

Parameter	Type	Optional	Description
idx	number	no	Route index. Valid values are zero to route.MAX_ROUTES - 1
src	string	no	Route source
srcOffset	number	no	Route source offset
dst	string	no	Route destination
dstOffset	number	no	Route destination offset
channels	number	no	Route channels
attenuation	number	yes	Attenuation in dB. Rounded down to the nearest 6dB. Default 0dB.
'mix' 'set'	string	yes	Mix with other overlapping routes or set to this route. Default 'set'.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

TDM

The TDM module provides access to the TDM subsystem on the Pocket TDM.

Require

```
tdm = require('tdm')
```

Methods

```
ok = tdm.reset()
```

Resets TDM settings to power on reset values.

Parameters

Parameter	Type	Optional	Description
N/A	N/A	N/A	This command requires no parameters.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

```
ok = tdm.start()
```

Starts the TDM interface

Parameters

Parameter	Type	Optional	Description
N/A	N/A	N/A	This command requires no parameters.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

```
ok = tdm.stop()
```

Stops the TDM interface

Parameters

Parameter	Type	Optional	Description
N/A	N/A	N/A	This command requires no parameters.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

```
ok = tdm.clk(dir[,options])
```

Sets the TDM bit clock direction and options

Parameters

Parameter	Type	Optional	Description
dir	string	no	Sets the TDM clock pin direction. Valid values are 'in' and 'out'.
options	table	yes	Optional array of clock options. Valid options are 'none', 'rising', 'falling'. Using 'none' as the first option clears any previously defined options.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

```
ok = tdm.sync(dir[,options])
```

Sets the TDM sync clock direction and options

Parameters

Parameter	Type	Optional	Description
dir	string	no	Sets the TDM clock pin direction. Valid values are 'in' and 'out'.
options	table	yes	Optional array of clock options. Valid options are 'none', 'rising', 'falling', 'early', 'pulse', and '50%'. Using 'none' as the first option clears any previously defined options.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

```
ok = tdm.data(pair[,dir[,pins]])
```

Sets the TDM data pin pair direction and pins

Parameters

Parameter	Type	Optional	Description
pair	string	no	Select the TDM data pin pair. Valid values are 'tdm01', 'tdm23', 'tdm45', 'tdm67', and 'tdm89'.

Parameter	Type	Optional	Description
dir	string	yes	Sets the TDM data pin pair direction. Valid values are 'in' and 'out'.
pins	string	yes	Sets the active TDM data pin pair pins. Valid values are 'primary', 'secondary', and 'both'.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

```
ok = tdm.size(word[,slot])
```

Sets the TDM word and slot size

Parameters

Parameter	Type	Optional	Description
word	number	no	Sets the TDM data word size in bits. Valid values are 16 and 32.
slot	number	yes	Sets the number of TDM slots. Valid values are 2, 4, 8, 16, and 32.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

Watchdog

The Watchdog module provides access to a simple Lua watchdog to protect AKT automation scripts from infinite loops.

Require

```
watchdog= require('watchdog')
```

Methods

```
ok = watchdog.enable(sec)
```

Enables and starts the watchdog

Parameters

Parameter	Type	Optional	Description
sec	number	No	Seconds elapsed until the watchdog expires. Fractional seconds down to 0.001 are supported.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

```
ok = watchdog.disable()
```

Disables and stops the watchdog

Parameters

Parameter	Type	Optional	Description
N/A	N/A	N/A	This command requires no parameters.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false

ok = watchdog.pet()

Pets the watchdog and resets the watch expiration counter

Parameters

Parameter	Type	Optional	Description
N/A	N/A	N/A	This command requires no parameters.

Return Values

Return	Type	Optional	Description
ok	boolean	N/A	True for success otherwise false