Pocket TDM Bridge User Guide

1.2 November 2025

Contents

Chapter 1. Overview of the Pocket TDM Bridge

The Pocket TDM Bridge is designed for low-level TDM and I^{2}S audio system evaluation, development testing, and debugging. In addition to TDM digital audio, the Pocket TDM Bridge can configure audio ICs through I^{2}C and SPI.

Pocket TDM Bridge Capabilities
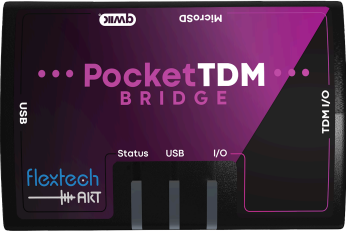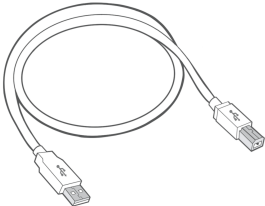
The **Pocket TDM Bridge** can be used as a bench tool for developing, testing, and evaluating digital audio systems. These systems include a wide variety of ADCs, DACs, DSPs, Digital Power Amplifiers, A^{2}B transceivers and more.

The Pocket TDM Bridge has the following features:

- Support up to 32 input / 32 output **audio channels** over USB

- Support for most TDM and I^{2}S **framing** formats

- Independent **SYNC and BCLK** input or output

- Five independent input / output **DATA** pin pairs

- Highly flexible **Audio Routing** engine

- **Built in** signal generators and audio VU meters

- Record or playback **WAV files** from the Micro SD card

- Built-in support for **Analog Devices A^{2}B** network discovery

- **AKT Automation**

Pocket TDM Bridge Delivery Parts List

The following parts are included and shipped with the Pocket TDM Bridge

1 Pocket TDM Bridge device	
1 USB cable, for connecting the Pocket TDM to your host PC	
1 JST Harness Connection Kit	
1 SanDisk Industrial Micro_SD Card	

This chapter introduces the ports and LEDs found on the device

Ports

Front View

1 USB 2.0 high speed type B interface. Main connection to PC.

Note: The Pocket TDM Bridge is powered over the USB connection.

Back View

24 Pin Multi I/O Connector. Includes bi-directional TDM SYNC, BCLK, and DATA pins; I^2C and SPI pins.

Side View

SD Card Slot for file storage and **AKT Automation**.

[Sparkfun Qwiic Expansion Connector](#)

Bottom View

Safe-Boot Recovery button

HW ID and **Serial Number**

MODEL: AKT-1000-X
SER #: xxxxxxxxx
HWID: xxxx-xxxx-xxxx-xxxx

Note: For further details on cables and connectors, see [Chapter 4. Connectors & Cables](#)

LEDs

LEDs on the top indicate the status of the device when it's powered on.
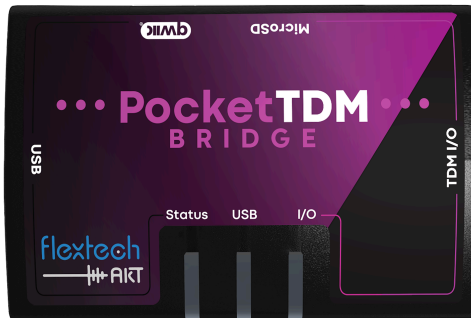
Each LED reports status two ways:

- **Background color** – Main display color.
- **Blink color** — Cycles on and off, temporarily overriding the background color.

Status LED

LED State	Color	Description
Fast Flash	Green	System OK
	Red	Invalid / missing feature key file. See Troubleshooting.
Slow Blink	Yellow	Bootloader mode active

USB LED

LED State	Color	Description
Blink	Blue	Activity on the USB bus
Steady	Blue	Active USB Audio stream

I/O LED (Input / Output)

LED State	Color	Description
Steady	Blus	TDM active

Chapter 3. Working with the Pocket TDM Bridge

Initial Setup

Installing the Flextech AKT USB device driver

To install the USB serial device driver, perform the following steps:

1. Download the ftakt-comm driver from www.flextechakt.com

Name	Date modified	Type	Size
ftakt-comm.cat	8/20/2024 9:22 AM	Security Catalog	13 KB
ftakt-comm.inf	8/20/2024 9:22 AM	Setup Information	4 KB

2. Unzip the supplied zip file
3. Right Click on the *ftakt-comm.inf setup file* and select *install.*
4. *After installation you will see the FlexTech AKT Comm Port and sound card listed on Windows Device Manager under Ports (Com & LPT).*
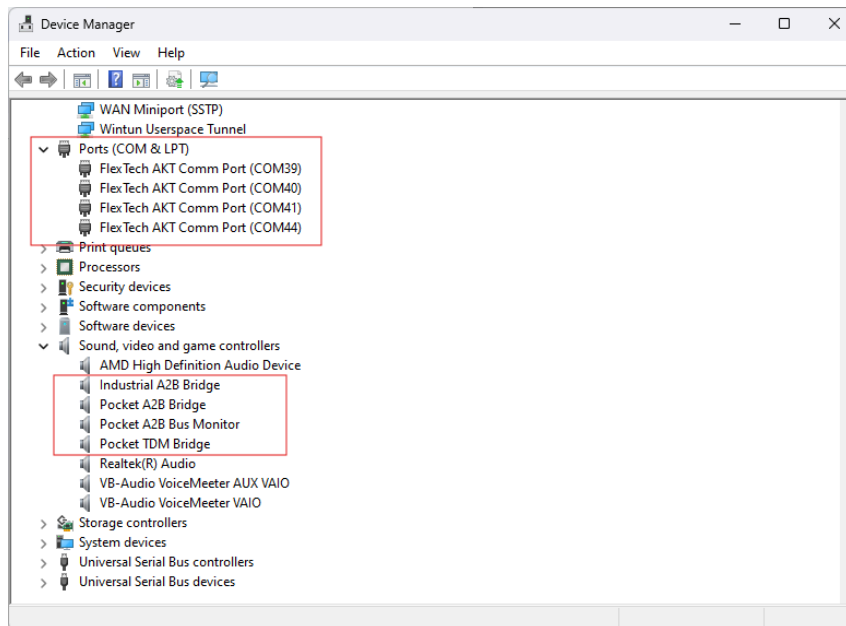
Download and Install a Terminal Emulator Utility (Tera Term)

To access the command line interface, you must install a terminal emulator such as Tera Term, Putty, GTKTerm, or screen.

Tera Term under Windows is recommended because it has built in support for X/YMODEM that can be used to transfer files over USB.

Click Here to Access the latest version of **Tera Term**

Hookup
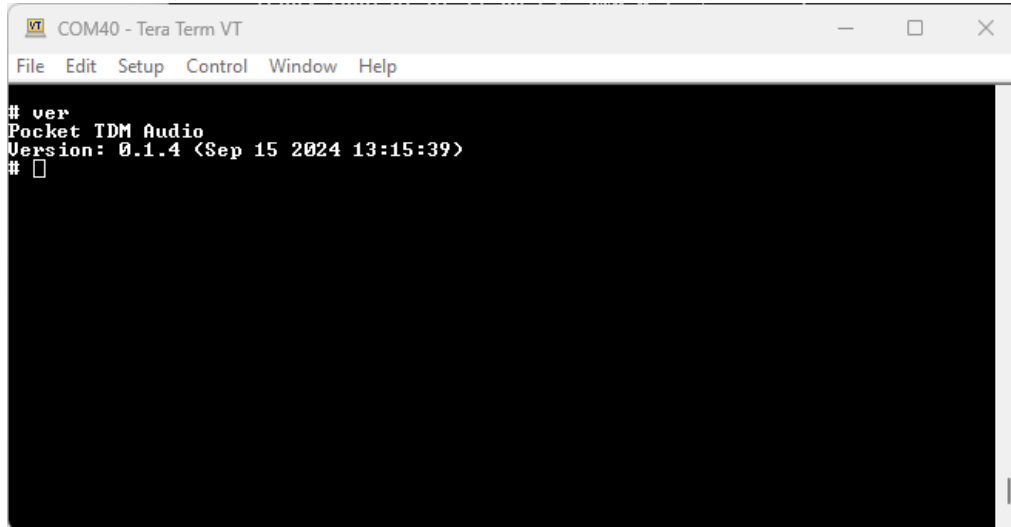
Use the supplied USB Type B cable to attach the TDM Bridge to the PC.

Use the supplied wiring kit to connect the Pocket TDM Bridge to your TDM device.

Start a terminal emulator on the "FlexTech AKT Comm Port" USB UART. Since this is a virtualized USB serial port, the terminal settings are not critical, but suggested to be 115200 Baud, No parity, 8 data bits, 1 stop bit (115200,N,8,1).

Once connected, press `<ENTER>` a few of times until a `'#'` prompt appears. Type `'ver'` and press `<ENTER>`.

A welcome/version message similar to the following will be displayed:

Using the Command Line

The TDM Bridge has a number of useful commands for setup, debug, automation, and maintenance activities.

Type `'help'` at the command prompt to see the full list of available commands. Additional help specific to each command can be accessed by typing `'help <command>'`.

There are many commands available on the TDM Bridge so the contents of the `help` command varies depending on the Command Level.

- **Command Level 0** - Available at startup and only shows the most common commands.
- **Command Levels 1 and 2** - Display additional system maintenance and troubleshooting commands.

Note: *All commands can be run at all levels to facilitate scripting. Only the help is filtered by the command level.*

Use the `shell` command to change command levels. For example to switch to command level 2, enter the following command:

```
    # shell level 2
```

General Commands

Command	Purpose
edit	Simple text editor that can be used to modify small text files directly on the TDM Bridge.
hwid	Show device HW ID
reset	Resets system components. A "soft" returns the TDM Bridge to its power on reset state.
resize	Resize or Sync the terminal window size. Run this command after the Tera Term command window is resized to synchronize the new terminal size or specify a size to resize the terminal window.
ver	Show version information
help	Shows specific help for commands

For additional help on any command use the built-in help command.

```
    # help help
    help - shell help
    Usage: help [<command>]
      [<command>] - the command to get help on.
    Without arguments it shows a summary of all the shell commands.
```

File Management

It is often necessary to install files onto the TDM Bridge for a variety of reasons including audio playback and recording. The most direct method is to simply copy files to or from a PC on the SD card. The SD card can be safely removed and reinstalled when not in use.

NOTE: *Always remember to eject the card from the PC prior to removing it.*

In addition to the SD card, the TDM Bridge has a small internal "Flash" file system. This file system is meant for system files that must be maintained even when the SD card is ejected and for files used early at startup. Such files include:

File	Purpose
`XXXX-XXXX-XXXX-XXXX.key`	This file is the product activation key and required for proper operation. ***Never modify or erase this file. It is recommended to make a backup of this file and store it somewhere safe.***
`shell.cmd`	Commands in this file are automatically run at system startup.
`cfg.ini`	Accessed early in the boot process to override system defaults such as USB audio channels and bit depth.

Wherever file names are mentioned in this document, prefix the actual file name with `'sf:'` to access files on the internal Flash file system or `'sd:'` to access files on the SD card. File names with no prefix will default to the SD card.

NOTE: *The maximum file name length on the internal Flash filesystem is 30 characters*

File Commands

The following commands are available on the TDM Bridge for manipulating files. Type `'help <cmd>'` on the command line for detailed usage instructions.

Command	Purpose
`cat`	Show the contents of a text file. Do not use this command with binary files. Use the 'dump' command to display binary files.
`cp / copy`	Copy a file
`df`	Show the drive full status
`drive`	Show or set the default drive

dump	Show the contents of a file in hex
format	Format a drive. **WARNING:** *Formatting the internal flash file system will erase the activation key rendering the TDM Bridge inoperable. It should never be necessary to format the internal sf: filesystem.*
fsck	Check the integrity of a drive
edit	Edit a text file
ls / dir	Show a directory listing of a drive
recv	Receive a single file via XMODEM. If no file name is given, receive multiple files via YMODEM.
send	Sends one or more files via YMODEM
rm / del	Delete a file
run	Run a command script
tail	Show the last <n> lines of a text file

File Transfers

The TDM Bridge supports a variety of methods to transfer or create files for system setup.

SDCARD

The most direct method is to simply copy files to or from a PC using the SD card. The SD card can be freely removed and reinstalled in the TDM Bridge when not in use.

NOTE: Always remember to eject the card from the PC prior to removing it.

Edit Command

Simple text files can be created or modified directly from the command line using the 'edit' command. Press <CTRL-S> to save the file. Press <CTRL-Q> to quit editing.

X/YMODEM

Files can be downloaded to the TDM Bridge using the XMODEM or YMODEM protocols via the 'recv' command. XMODEM is used to transfer a single file and used when a file name is provided. YMODEM is used to transfer multiple files when no file name is specified.

TeraTerm supports both XMODEM and YMODEM file transfer protocols. After issuing the 'recv' command, select File -> Transfer -> [X][Y]MODEM -> Send to initiate a transfer.

Files can be uploaded from the TDM Bridge using the YMODEM protocol via the `'send'` command. Multiple files can be sent in a single transfer.

Select the 1k file transfer option for faster transfers.

USB Sound Card Re-Configuration

By default the TDM Bridge is configured as a 20 Speaker OUT x 20 Microphone IN x 16 bit USB sound card.

To modify the default values, create a text file called `cfg.ini` with the contents below. If you already have a `cfg.ini` file, add a `[usb-audio]` section to it.

```
[usb-audio]
out-channels = <2-32 channels>
in-channels = <2-32 channels>
word-size-bits = <16 or 32>
```

Set the values as required for the application. The example below configures 32 OUT channels (from the PC to the TDM Bridge), 2 IN channels (from the TDM Bridge to the PC) with a bit-depth of 16-bits:

```
[usb-audio]
out-channels = 32
in-channels = 2
word-size-bits = 16
```

The USB product string can be overridden by defining `'product-string'` in the `[usb-audio]` section.

Copy this file onto the SD card, insert the SD card into the TDM Bridge, then copy the file from the SD card to the internal flash filesystem with the following command:

```
cp cfg.ini sf:cfg.ini
```

The `sf:cfg.ini` file can also be created or modified directly on the TDM Bridge using the `'edit'` command.

For Windows 10/11, you must uninstall the existing TDM Bridge audio driver in the Device Manager after changing any of the USB audio settings.

With the TDM Bridge powered and connected, right click on the "TDM Bridge" sound card and select uninstall:
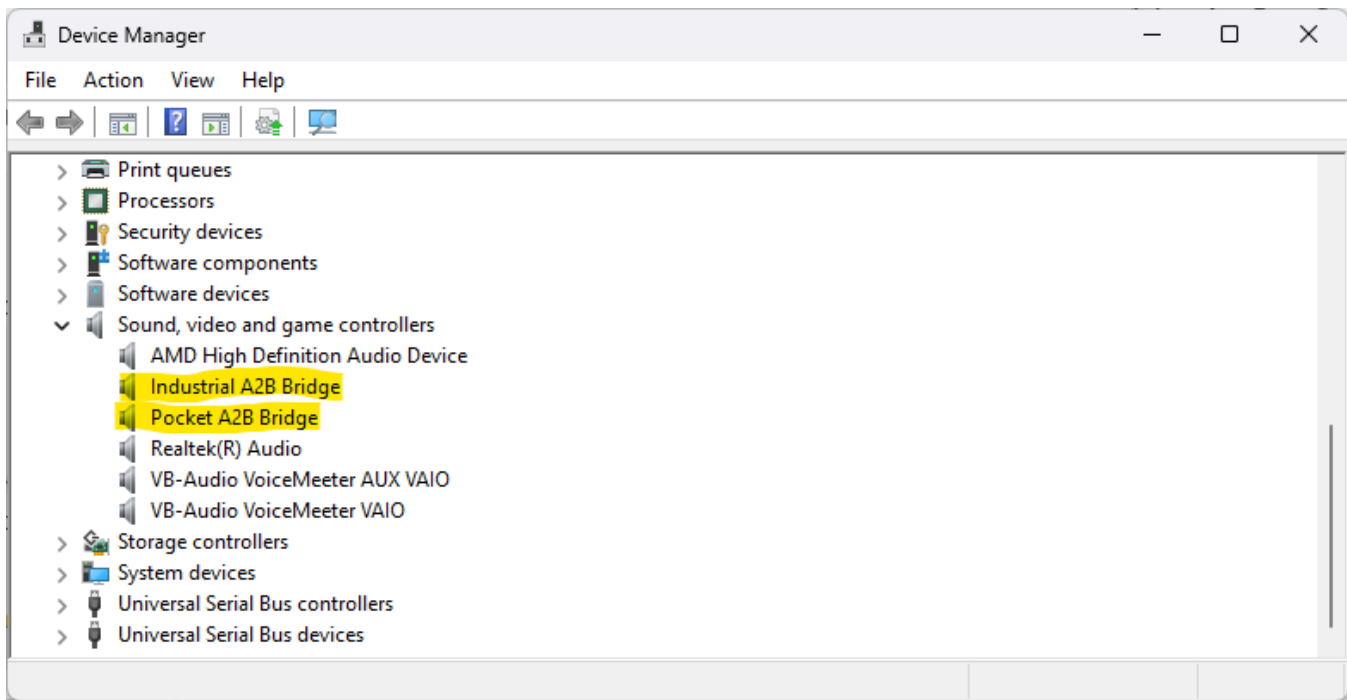
Reset the TDM Bridge and Windows will apply the new settings.

NOTE: *Be very careful when configuring this file. Incorrect settings can result in a boot failure that may require a [Safe-Boot Recovery](#) of the TDM Bridge.*

NOTE: *Do not set the number of channels or bit-depth higher than required by the application. Unused channels still consume CPU cycles on the TDM Bridge and USB bandwidth on the PC.*

TDM Interface

Clocks

The TDM Bridge has dedicated Bit Clock (BCLK) and Frame Sync (SYNC) pins. Both pins can be independently input or output. It is possible to output a SYNC from an input BCLK. The BCLK frequency is determined by the SYNC frequency, TDM / I^{2}S frame size, and data word size through the following equation:

BCLK = (SYNC * frame size words * data word size bits) / enabled data pins

For example, if the SYNC frequency is 48 KHz, stereo (2 channel), 32-bit data words, with one data pin enabled, the BCLK will be 3.072 MHz

3.072 MHz = (48 KHz * 2 words * 32 bits) / 1

If the BCLK signal is an input, ensure the frame and data word sizes satisfy the BCLK equation.

Data

The TDM Bridge has five data pin pairs. The pairs are referenced as "01", "23", "45", "67", and "89". Both pins of a data pin pair have the same direction, either input or output. Each pin of the data pin pair can be independently enabled using the keyword "primary", "secondary", or "both". When "both" data pins are enabled, even and odd data words will be interleaved between them - i.e. word 0 will be on the primary pin, word 1 on the secondary pin, word 2 on the primary pin, etc.

NOTE: *Data pin pair "89" can be assigned to other functions.*

NOTE: *Unconfigured TDM data pin pairs default to output and are driven low.*

TDM Commands

Command	Purpose
`tdm`	The tdm command is used to configure and control the TDM interface

The TDM command has a number of sub-commands to configure the TDM interface.

Command	Purpose
`tdm reset`	Resets the TDM interface to its power on reset value. The TDM interface defaults to 48KHz stereo I^{2}S framing.
`tdm stop`	Stops the TDM interface. The TDM interface can only be reconfigured while stopped.
`tdm start`	Starts the TDM interface. The TDM interface cannot be reconfigured

	while running.
`tdm clk dir`	Sets the direction of the BCLK pin. Valid values are "`in`", "`out`".

`tdm clk option`	Sets bit clock options. Valid values are:
	
	    `none` - Clear clk options
	    `rising` - Assert sync/data rising edge, sample falling
	    `falling` - Assert sync/data falling edge, sample rising (I^2S)
	
	More than one option can be given at a time. Always start a string of options with "none" to reset any previous options.

`tdm sync dir`	Sets the direction of the SYNC pin. Valid values are "in", "out".

`tdm sync option`	Sets sync clock options. Valid values are:
	
	    `none` - Clear sync options
	    `rising` - Rising edge (high)
	    `falling` - Falling edge (low, I^2S)
	    `early` - Assert 1 clk cycle before data MSb (I^2S)
	    `pulse` - Single clk pulse
	    `50%` - 50% duty cycle
	
	More than one option can be given at a time. Always start a string of options with "none" to reset any previous options.

`tdm word size`	Sets the TDM data word size. Valid values are "`16`" and "`32`".
`tdm frame size`	Sets the TDM frame size. Valid values are "`2`", "`4`", "`8`", "`16`", and "`32`".
`tdm [pair] dir [dir]`	Sets the direction of a TDM data pin pair. Valid values for "`pair`" are "`01`", "`23`", "`45`", "`67`", and "`89`". Valid values for "`dir`" are "`in`" and "`out`". Unconfigured data pin pairs default to output and are driven low.
`tdm [pair] pins [pins]`	Sets the active pins of a TDM data pin pair. Valid values for "`pair`" are "`01`", "`23`", "`45`", "`67`", and "`89`". Valid values for "`pair`" are "`primary`", "`secondary`", and "`both`".

The following example configures the TDM port for standard stereo I^2S with one data in and out pin

```
    tdm reset
    tdm clk dir out
    tdm clk option none falling
    tdm sync dir out
    tdm sync option none falling early 50%
    tdm word size 32
    tdm slot size 2
    tdm 01 dir out
```

```
    tdm 01 pins primary
    tdm 23 dir in
    tdm 23 pins primary
    tdm start
```

NOTE: *The output of the "tdm" command with no arguments fully describes the TDM configuration and can be used on the command line to configure the TDM to the same state.*

I²C, SPI, and Qwiic Peripheral IC Configuration

Peripheral IC configuration via I²C or SPI on the qwiic or I/O connectors is supported through the command line and AKT Automation scripts.

I²C and SPI Commands

Command	Purpose
io_i2c	Performs an I²C write, read, or write/read transaction on the I/O connector
io_scan	Scans the I²C bus on the I/O connector for active devices
io_spi	Performs a SPI write/read transaction on the I/O connector
qwiic_i2c	Performs an I²C write, read, or write/read transaction on the qwiic connector
qwiic_scan	Scans the I²C bus on the qwiic connector for active devices
discover	Performs an A²B discovery using an Analog Devices Sigma Studio Command List XML file
cmdlist	Performs an I²C configuration using an Analog Devices Sigma Studio Command List XML file

NOTE: *The I²C bus speed is fixed at 400KHz*

NOTE: *The SPI clock speed is programmable up to 37.5MHz*

I²C and SPI Examples

Scan the qwiic connector for I²C devices

```
# qwiic_scan
Probing I2C port 2:
 Found device 0x68
```

1 byte write / 16 byte read I²C transaction to device 0x68 on the qwiic connector

```
# qwiic_i2c 0x68 "0" 16
I2C Device 0x68, Read Bytes 16 (0x10)
00000000: 34 07 20 02 06 11 24 00 00 00 00 00 00 00 1c 88
```

Set I/O connector SPI clock speed to 12.5MHz and SPI mode to 3

```
# io_spi speed 12500000
SPI speed set to 12500000 Hz
# io_spi mode 3
SPI mode set to 3
```

Perform 8 byte SPI write and show the bytes read

```
# io_spi xfer "0,1,2,3,4,5,6,7" show
00000000: 00 01 02 03 04 05 06 07
```

Audio

General

The TDM Bridge processes audio in blocks of 48 samples. At a 48 kHz sample rate, latency through the TDM Bridge for all sources and sinks, except for USB, is 1mS. USB audio latency is approximately 960 samples, or 20mS. Latency through USB is generally controlled to within +/- 10 samples of nominal.

Internal audio samples are all 32-bits wide. Audio is up / down converted as required to 32-bits from 16-bit sources / sinks. Samples down-converted from 32-bit to 16-bit are truncated.

Audio routing is "bit perfect" from source to sink.

USB Audio

By default the TDM Bridge supports 20 IN (to PC), 20 OUT (from PC), by 16-bit audio. These settings can be modified by the `cfg.ini` file as necessary. The `'usb'` command can be used to view USB audio statistics.

View the audio statistics during long-term USB audio recording or playback when testing is sensitive to gaps in audio. Windows 10/11 are not real-time operating systems and can fail to transfer USB audio in a timely manner during periods of high system load.

To listen directly to USB audio from the TDM Bridge on Windows, do the following.

1. "Navigate to Control Panel -> Hardware and Sound -> Sound" or search and launch "mmsys.cpl" on Windows 11.
2. Select the "Recording" tab and locate the Pocket TDM Bridge
3. Select the Pocket TDM Bridge then click Properties
4. Select the "Listen" tab and check "Listen to this device"

A short YouTube video demonstrating this can be found [here](#).

Internal Signal Generators

The TDM Bridge has eight built-in signal generators for testing. Sine tones, Pink noise, White noise, and fixed digital HEX values are all supported.

Use the `'gen'` command to configure signal generators.

WAV Files

The TDM Bridge can play and record 16-bit or 32-bit multi-channel WAV files. WAV files up to thirty two 32-bit channels are supported assuming the SD card has sufficient bandwidth. Use the `'sdtest'` command to confirm SD card bandwidth.

Multiple routes can source/sink from/to a single WAV file. If an audio route (offset plus channels) extends beyond the number of channels available in a WAV file sink the extra channels are dropped. Empty WAV sink channels are zero filled. If a route extends beyond the channels available in a WAV file source, the missing channels are zero-filled.

Use the `'wav'` command to start and stop WAV file playback or recording.

NOTE: *Always use a minimum [Class 10 or UHS Class 1 SD card](#) if the card will be used for WAV file audio. Use a [freshly formatted SD card](#) when recording high bit-rate WAV files to reduce the risk of audio drops. Use the `'sdtest'` command to confirm acceptable SD card bandwidth.*

VU Meters

The TDM Bridge has a set of simple built in VU meters. The VU meters are very useful for locating TDM audio. Any TDM slot can be routed to the VU meters.

Multiple routes can sink simultaneously to the VU meters.

ASIO

The A^{2}B Bridge supports ASIO on Windows through the FlexASIO driver. Please refer to the [FlexASIO Github](#) page for more information.

Audio Routing

The "`route`" command is the key command for transferring audio between audio streams on the TDM Bridge. The TDM Bridge supports simultaneous multi-channel routes enabling very sophisticated audio routing schemes. The routing engine is a full crossbar between any source and any sink within a clock domain.

The table below describes the routing capabilities of the TDM Bridge

Stream	Source / Sink	Notes
usb	Both	
wav	Both	
gen	Source	

vu	Sink	
tdm01	Both	
tdm23	Both	
tdm45	Both	
tdm67	Both	
tdm89	Both	The tdm89 pins are multi-purpose and may not always be data pins.

An audio route starts with a source stream and source channel offset. The route source must then connect to a destination. Destination streams are identified by a stream and offset exactly like source streams.

A route copies a defined number of channels from the source to the destination. Audio can be optionally attenuated and mixed during this copy.

Route command arguments are :

```
route [ <idx> <src> <src offset> <dst> <dst offset> <channels> [attenuation] [mix|set] ]
```

Below are some routing examples

Route 16 channels from USB channel offset 0 to tdm01 slot offset 0 with no attenuation

```
# route 0 usb 0 tdm01 0 16
```

A route that exceeds the number of source channels (i.e. source offset + channels > source channels) will zero fill the missing channels. Routes that exceed the number of destination channels (destination offset + channels > destination channels) will terminate after the last destination channel.

Recording Audio

After routing TDM audio channels to USB **you can use a Digital Audio Workstation (DAW),** such as Audacity, Reaper, and others to capture, record, analyze and playback any audio stream from the TDM Bridge.

Audacity is a free and easy to use Audio Workstation program. Click here to access the latest version and user guide.

AKT Automation
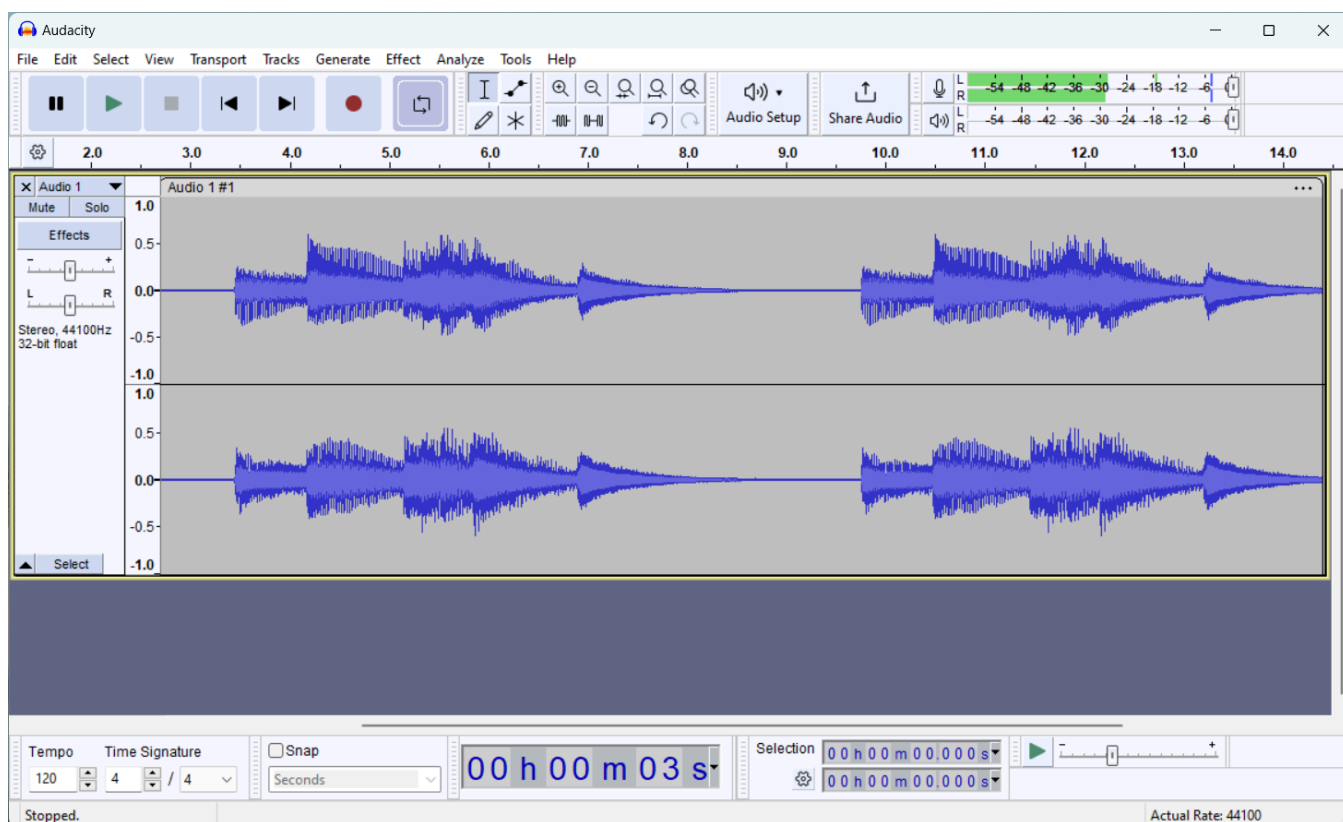
Command Scripts

Any series of commands can be grouped together into a command script and executed together using the `'run'` command. Command scripts are simple text files containing one command per line. Lines starting with a semicolon or hash mark are ignored and treated as comments. Any file name can be used for command scripts.

Some commands are especially useful in command script processing

Command	Purpose
delay	Delays script execution for a specified number of milliseconds
echo	Displays a line of text
shell redirect	Silences or redirects output of a script to the syslog
reset	Reset various subsystems to power on reset values. No arguments performs a full system reset.

Be careful scripting interactive commands as the script will not proceed until the interactive command has completed. Interactive commands include `'syslog'`, `'vu'`, and interactive `'lua'` scripts.

Below is an example command that performs a soft reset then delays for 200mS.

```
# Perform a soft reset
reset soft
# Delay for 200mS
delay 200
```

Running commands at startup

If present, the TDM Bridge runs `'sf:shell.cmd'` at startup. This feature allows for autonomous configuration of the TDM Bridge at startup.

NOTE: The SD card takes some time after startup to initialize. Be sure to add a delay of at least 500ms at the start of any startup script that uses files on the SD card.

NOTE: Be careful including interactive commands in the startup script. For example, launching a Lua script that never terminates will lock out the command line requiring a Safe Boot Recovery to correct.

AKT Automation with Lua

Fully autonomous operation on the Pocket TDM Bridge is made possible through the Lua based AKT Automation environment. This feature is an optional add-on for the Pocket TDM Bridge.

Lua is a fully-featured open source scripting language. More information on Lua, including programmer reference manuals, can be found at https://lua.org/.

The pairing of Lua with the TDM command and control APIs results in an extremely rich interactive automation environment.

User interfaces can be created using the 'term' module. Low-level operations are possible using the 'rtos', 'system', modules. Qwiic compatible peripherals, such as RTCs, displays, pushbuttons, etc., are accessible via the 'qwiic' module.

For more detailed information on the API, refer to the ***FlexTech AKT Automation API Guide***.

Example AKT Automation scripts can be found in the **AKT-Automation** repository on Github.

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

1. Use XMODEM to transfer scripts to the TDM Bridge instead of the SD card
2. 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.
3. Use the on-board 'edit' command for quick bug fixes or script modifications.

Updating the TDM Bridge Firmware

WARNING: *Prior to updating the firmware, always be sure to disable any custom **sf:cfg.ini** and **sf:shell.cmd** startup files. These may interfere with the proper startup of the new firmware causing the update to fail unexpectedly.*

Download the AKT Flasher Utility shown below from www.flextechakt.com and install.

Methods to Update the Firmware

Command-line Initiated AKT Flasher Over USB.

To start this update, issue the following [commands](#) from the Tera Term command line:

```
# bootmode 1
# reset
```

Proceed to update with AKT Flasher utility. Once the `'reset'` command is issued, the unit must be updated using the AKT Flasher.

Command-line via SD card file

To initiate this update, the desired firmware binary must be on the SD card. One can simply copy it from the PC or use the `'recv'` [command](#) to transfer it through TeraTerm via XMODEM over USB.

Once the file is on the SD card, issue the following command:

```
# update <file>
```

Where `<file>` is the firmware binary. Reset the unit once the update is complete using the `'reset'` command or cycling power.

Bootloader initiated AKT Flasher over USB

Press and hold the "Boot Recovery" button while powering on the unit. The unit will immediately enter the bootloader mode and can be updated using the AKT Flasher utility. If the unit is reset before updating the firmware, it will boot normally. Once an update is initiated with AKT Flasher, the update must complete.

Bootloader mode is indicated by a slow yellow blink of the Status LED on the Pocket products.

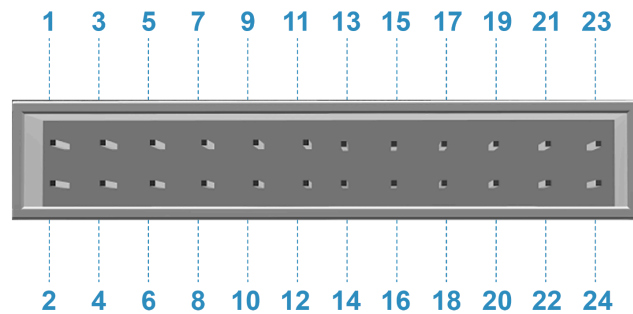**NOTE:** The "Boot Recovery" button is located under the small hole on the underside of the Pocket TDM Bridge.

Pocket TDM Bridge Connectors

USB

The USB connector is a standard USB 2.0 Type B receptacle.

24 Pin Multi I/O Connector
JST S24B-PHDSS

| 1 | 3 | 5 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 |

| 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |

Pin	1	3	5	7	9	11	13	15	17	19	21	23
Description	GND	D9	D0	D2	D4	D6	SYNC	SCK	GND	GND	GND	GND
Function		TDM	TDM	TDM	TDM	TDM	TDM	SPI				

Pin	2	4	6	8	10	12	14	16	18	20	22	24
Description	IOVDD	D8	D1	D3	D5	D7	BCLK	MISO	MOSI	CS	SDA	SCL
Function		TDM	TDM	TDM	TDM	TDM	TDM	SPI	SPI	SPI	I^{2}C	I^{2}C

Note: *Color shown matches provided cable for each sign. Gray sections represent unused or unpopulated pins.*

The I/O pins are 3.3V CMOS compatible. The IOVDD pin is not internally connected. Please contact the factory for instructions to supply an external IOVDD to the Pocket TDM Bridge.

The I/O Header on the Pocket TDM Bridge accepts the JST PHDR-24VS Socket Housing. Click here for the full data sheet for the JST PHD connector series.

Fabricating Pocket TDM Bridge Cables

I/O Connector part numbers

Item	Mfg.	Mfg. P/N	Dist.	Dist. P/N
JST Socket Housing	JST	JST PHDR-24VS	DigiKey	455-1177-ND
JST Terminal	JST	SPHD-001T-P0.5	DigiKey	455-1325-1-ND
JST Crimp Tool	JST	WC-240	DigiKey	455-1128-ND
Alternate Crimp Tool	Engineer	PA-09	Amazon	PA-09

The Pocket TDM Bridge ships with a harness kit to assist initial hookup. Assemble the harness as necessary for the application.

This chapter provides technical specifications for the Pocket TDM Bridge.

Environmental

Pocket TDM Bridge
DC Characteristics Target Power: USB +5V, 350 mA max GPIO Signal: 3.3V, 10 mA **Dimensions (W x D x L)** 68 x 43 x 25 mm (2.7" x 1.8 x 1") **Weight** 64 g (0.14 lbs) **Operating Temperature** 0° C to 70° C (32° C to 158° F)

Ordering Information

Pocket TDM Bridge
Part Number: AKT-2000   **Country of Origin**: USA **HTS:** 8473.30.1180 **ECCN**: EAR99

System log

The TDM Bridge has an internal system log that contains useful system information. Review the system log using the `'syslog'` command. Technical support may also ask for the system log when diagnosing problems.

Safe-Boot

An incorrect `sf:cfg.ini` or `sf:shell.cmd` boot script may cause the system to not boot properly and require a Safe-Boot Recovery to fix. The Safe-Boot Recovery bypasses all custom configurations and boots the unit in its default factory state.

A Safe-Boot Firmware Update skips the application boot phase and directly launches the Bootloader for firmware updates.

On the Pocket TDM Bridge, the Safe-Boot button is located behind the small hole on the underside of the unit.

Safe-Boot Recovery

To initiate a Safe-Boot Recovery, press and hold the Safe Boot Button during the "Two Blink" boot phase.

On the Pocket TDM Bridge, this is when the Status LED blinks Yellow twice following power up. Do not press the Safe-Boot button prior to power up otherwise a Safe-Boot Firmware Update will be initiated.

Safe-Boot Recovery can be confirmed by viewing the syslog. This line will be present at the top of the syslog following a Safe-Boot Recovery.

```
[     0.000]   Safe boot mode
```

Following the Safe-Boot, correct whatever caused the boot failure and reset the device to resume normal operation.

Safe-Boot Firmware Updates

A Safe-Boot Firmware Update requires the AKT Flasher utility. To enter Safe-Boot Firmware Update mode, press and hold the Safe-Boot button during power up.

On the Pocket TDM Bridge, the Status LED will slow blink yellow indicating bootloader mode.

At this point, use the AKT Flasher to update the firmware and power cycle the unit to complete the update.

If Safe-Boot Firmware Update mode was entered accidentally, and no firmware update is needed, simply power cycle the unit to return to normal operation.

Common Issues

Issue	Possible Cause	Solution
No USB Audio input in Windows	Windows Audio Enhancement is On for the TDM Bridge	Open Windows Sound Settings, Select the TDM Bridge audio device and confirm Audio Enhancements is Off.
No USB Audio in Windows	Modified USB audio settings in cfg.ini	Windows requires removing and reinstalling the device in the device manager when the audio settings are changed.
Status LED Flashing Red	The device has an invalid or missing feature license key	Check to see if you have a copy of the license file and re-install it on the internal sf: filesystem. If not, contact support at flextechakt.com
TDM Bridge not showing up as an audio device	Windows versions prior to Windows 10, release 1703 do not support the UAC2 USB audio protocol	Use a newer release of Windows
USB Audio playback dropouts	There is a rate-feedback bug in early versions of Windows 10 that can result in audio dropouts during playback.	The latest version of Windows 10 or 11 is required for proper operation. The `'usb'` command can be used to troubleshoot USB audio problems.