



Mixed-Signal Explorer CLI Quick Reference Guide

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Preface

NOTICE TO CUSTOMERS

All documentation becomes dated, and this manual is no exception. Microchip tools and documentation are constantly evolving to meet customer needs, so some actual dialogs and/or tool descriptions may differ from those in this document. Please refer to our website (microchip.com) to obtain the latest documentation available.

Documents are identified with a “DS” number. This number is located on the bottom of each page, in front of the page number. The numbering convention for the DS number is “DSXXXXXXXXA”, where “XXXXXXXX” is the document number and “A” is the revision level of the document.

For the most up-to-date information on development tools, see the MPLAB® IDE online help. Select the Help menu, and then Topics, to open a list of available online help files.

INTRODUCTION

This chapter contains general information that is useful to know before using the Mixed-Signal Explorer CLI. Items discussed in this chapter include:

- [Document Layout](#)
- [Conventions Used in this Guide](#)
- [Recommended Reading](#)
- [The Microchip Website](#)
- [Product Change Notification Service](#)
- [Customer Support](#)
- [Document Revision History](#)
- [Index](#)

DOCUMENT LAYOUT

This document provides a quick reference to the command set supported by Mixed-Signal Explorer CLI. The manual layout is as follows:

- **Chapter 1. “Usage workflow”** – Includes instructions on how to use the Mixed-Signal Explorer CLI.
- **Chapter 2. “Command Line Interface”** – Includes detailed description for all commands supported by the Mixed-Signal Explorer CLI.
- **Chapter 3. “Usecases”** – Includes description of Mixed-Signal Explorer CLI basic usecases.

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CONVENTIONS USED IN THIS GUIDE

This manual uses the following documentation conventions:

DOCUMENTATION CONVENTIONS

Description	Represents	Examples
Arial font:		
Italic characters	Referenced books	<i>MPLAB® IDE User's Guide</i>
	Emphasized text	...is the <i>only</i> compiler...
Initial caps	A window	the Output window
	A dialog	the Settings dialog
	A menu selection	select Enable Programmer
Quotes	A field name in a window or dialog	"Save project before build"
Underlined, italic text with right angle bracket	A menu path	<u><i>File > Save</i></u>
Bold characters	A dialog button	Click OK
	A tab	Click the Power tab
N'Rnnnn	A number in verilog format, where N is the total number of digits, R is the radix and n is a digit.	4'b0010, 2'hF1
Text in angle brackets < >	A key on the keyboard	Press <Enter>, <F1>
Courier New font:		
Plain Courier New	Sample source code	#define START
	Sample command line	mse> connect
	Filenames	autoexec.bat
	File paths	c:\mcc18\h
	Keywords	_asm, _endasm, static
	Command-line options	-Opa+, -Opa-
	Bit values	0, 1
	Constants	0xFF, 'A'

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Italic Courier New	A variable argument	<i>file.o</i> , where <i>file</i> can be any valid filename
Square brackets []	Optional arguments	mcc18 [options] <i>file</i> [options]
Curly brackets and pipe character: { }	Choice of mutually exclusive arguments; an OR selection	errorlevel {0 1}
Ellipses...	Replaces repeated text	var_name [, var_name...]
	Represents code -supplied by user	void main (void) { ... }

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RECOMMENDED READING

This Quick Reference Guide provides a quick reference to the command set supported by Mixed-Signal Explorer CLI. Other useful documents are listed below. The following Microchip document is available and recommended as a supplemental reference resource:

- Mixed-Signal-Explorer-User-Guide.pdf
- Mixed-Signal-Explorer-Release-Notes.pdf
- Mixed-Signal-Explorer-CLI-User-Guide.pdf

THE MICROCHIP WEBSITE

Microchip provides online support via our website at microchip.com where files and information are easily available to customers. The website contains the following:

- **Product Support** – Data sheets and errata, application notes and sample programs, design resources, user's guides and hardware support documents, latest software releases and archived software
- **General Technical Support** – Frequently Asked Questions (FAQs), technical support requests, online discussion groups, Microchip consultant program member listing
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- Field Application Engineer (FAE)
- Technical Support

Customers should contact their distributor, representative or field application engineer (FAE) for support. Local sales offices are also available to help customers. A listing of sales offices and locations is included in the back of this document, under **Worldwide Sales and Service**.

Technical support is available at: microchip.com/support.

DOCUMENT REVISION HISTORY

Revision C (September 2025)

- Update for Generic-I2C support
- Update CLI commands to accommodate other types of mixed-signal devices: DAC, DigiPOT

Revision B (February 2025)

- Update for Delta-Sigma support.

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Revision A (November 2024)

- Initial Release of this document.

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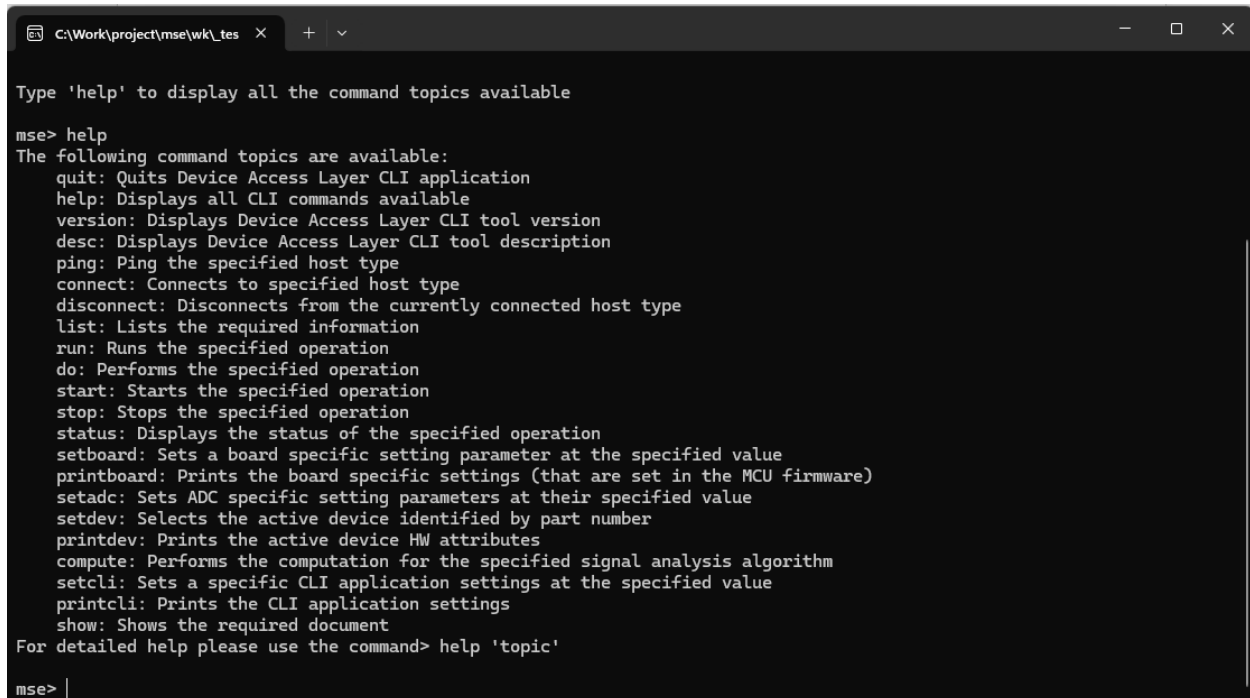
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Chapter 1. USAGE WORKFLOW

This chapter describes how the evaluation tool works and provides instructions for performing the basic operations.

The main purpose of this tool is to help users conduct a comprehensive evaluation of Mixed-Signal devices focusing on their functionality, quality, precision and performance.



```
C:\Work\project\mse\wk_tes x + -
Type 'help' to display all the command topics available

mse> help
The following command topics are available:
quit: Quits Device Access Layer CLI application
help: Displays all CLI commands available
version: Displays Device Access Layer CLI tool version
desc: Displays Device Access Layer CLI tool description
ping: Ping the specified host type
connect: Connects to specified host type
disconnect: Disconnects from the currently connected host type
list: Lists the required information
run: Runs the specified operation
do: Performs the specified operation
start: Starts the specified operation
stop: Stops the specified operation
status: Displays the status of the specified operation
setboard: Sets a board specific setting parameter at the specified value
printboard: Prints the board specific settings (that are set in the MCU firmware)
setadc: Sets ADC specific setting parameters at their specified value
setdev: Selects the active device identified by part number
printdev: Prints the active device HW attributes
compute: Performs the computation for the specified signal analysis algorithm
setcli: Sets a specific CLI application settings at the specified value
printcli: Prints the CLI application settings
show: Shows the required document
For detailed help please use the command> help 'topic'

mse> |
```

Mixed-Signal Explorer CLI application

Mixed-Signal Explorer CLI usage workflow:

- Type 'help' to display all available commands
 - For detailed help about a specific topic, use the command> help 'topic'
- Starting the system
 - Connect to USB Bridge Service
 - Use any of the provided connection options: Local host or Remote host
 - Connect to board
 - First list all boards that are physically attached to host
 - Then connect to desired board by using its Board ID
- Select the desired target device:
 - Use cli command 'setdev' to select a device from the supported ones
- Set the desired board configuration:
 - Display the current board configuration and modify it if needed

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- set the MCU operation mode: *MCU Simulated data*, *Firmware acquisition via SPI*, *Generic-SPI*, *Generic-I2C*
 - set the desired mikroBus slot
 - set the sample rate specified in ksp/s (only for ADC devices)
- <Optional>: Run the speed benchmark test (if the selected device is ADC):
 - Check the benchmark speed achieved. This test is useful to make sure that the device truly operates at the desired sample rate that was set at the previous step
- Perform single-shot acquisition:
 - Perform single-shot acquisition over a specified number of samples
 - If it is not specified, then the number of samples to be acquired is set by default to 500ks for high-speed modes and 1000 samples for low-speed modes
 - Save acquired data in a specified file with the specified file format:
 - CSV format of the acquisition file: CSV text format, integer, 1 channel
 - Binary format of the acquisition file: Binary 16-bit raw data, LE, 1 channel
 - If no option is specified, then CSV format is used by default
- Run continuous acquisition:
 - Start continuous acquisition mode for a predetermined time duration
 - If it is not specified, the continuous acquisition time duration is set by default to 5 seconds
 - Save acquired data in a specified file with the specified file format:
 - CSV format of the acquisition file: CSV text format, integers, 1 channel
 - Binary format of the acquisition file: Binary 16-bit raw data, LE, 1 channel
 - If no option is specified, then CSV format is used by default
 - Finally stop continuous acquisition manually or wait for the predetermined time duration to expire and continuous acquisition is automatically stopped
- Closing the system down:
 - The following options are available:
 - Gracefully closing the system (by carefully checking all open connections and closing them manually)
 - Hard closing the system (by simply force closing the CLI and all open connections are automatically shut down)

2.1 Starting CLI Application

Windows users:

Starting Mixed-Signal Explorer CLI application on **Windows 64-bit OS**:

- Use the Search Bar to type the following:
 - To start the CLI app: MSECLI
 - To start the GUI app: MSEGUI
 - To open the documentation folder: MSEDPCS

Linux users:

Starting Mixed-Signal Explorer CLI application on **Linux OS**:

- *Not supported by this release.*

2.2 CLI Commands Description

The following CLI commands are available:

- **help**
`help [<topic>]`
 - Displays all commands available.
 - `<topic>` - Displays detailed usage description for the requested command topic. This parameter is optional.
- **version**
`version`
 - Displays the current version of the Mixed-Signal Explorer CLI application and DAL module.
- **desc**
`desc`
 - Displays description of the Mixed-Signal Explorer CLI application and DAL module
- **quit**
`quit`
 - Exits the Mixed-Signal Explorer CLI application.
- **status**
`status`
 - Displays the current system status:
 - Connection to Host
 - Connection to Device
 - Continuous acquisition status

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- **list**

list <info>

- List information: this command is used to list desired information according to the first command parameter.
 - *<info>* - parameter 'info' is an alphanumeric symbol corresponding to the information type desired to be displayed: [boards, devices, settings, api, tests]

>list boards

Lists all the boards attached to the host.

>list devices

Lists the supported devices organized by families.

>list settings

Lists all CLI application specific settings.

>list api

Lists DAL module API.

>list tests

Lists all available tests.

- **ping**

ping <target>

- Pings the specified target.
 - *<target>* - parameter 'target' is an alphanumeric symbol corresponding to the target type desired to ping: [host]

>ping host <addr>

Ping the Host of USB devices

<addr> - parameter 'addr' identifies the Host IP address desired to ping.

- **connect**

connect <target>

- Connects to specified target.
 - *<target>* - parameter 'target' is an alphanumeric symbol corresponding to the target type desired to connect: [host, board]

>connect host <addr>

Connects to Host of USB devices

<addr> - parameter 'addr' identifies the Host IP address desired to connect.

>connect board <brdid>

Connects to specified board attached to USB

<brdid> - parameter 'brdid' is the board id that identifies the USB board desired to connect.

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>connect http <port>

Connects to specified HTTP port

<port> - parameter 'port' is the HTTP port desired to connect.

- **disconnect**

disconnect <target>

- Disconnects from the currently connected target.
 - **<target>** - parameter 'target' is an alphanumeric symbol corresponding to the target type desired to disconnect: [host, board]

>disconnect host

Disconnects from the currently connected Host

>disconnect board

Disconnects from the currently connected USB board

>disconnect http

Disconnects from the currently connected HTTP port

- **run**

run <op>

- Runs the specified operation.
 - **<op>** - parameter 'op' identifies the desired operation to be run: [test]

>run test <testname>

Runs the specified test

<testname> - parameter 'testname' identifies the desired test to be run.

- **do**

do <op>

- Performs the specified operation.
 - **<op>** - parameter 'op' identifies the desired operation to be performed: [saq]

>do saq <filename> [-csv] [-bin] [-s <size>]

Performs single-shot acquisition operation

<filename> - parameter 'filename' identifies the file name where to save the acquired data.

-csv - specifies the CSV format of the acquisition file (CSV text format, integer, 1 channel)

-bin - specifies the Binary format of the acquisition file (Binary 16-bit raw data, LE, 1 channel)

-s <size> - parameter 'size' specifies the size of the acquisition. In can be entered as samples, kilo-samples or mega-samples.

- **start**

start <op>

- Starts the specified operation.
 - *<op>* - parameter 'op' identifies the desired operation to be started: [caq]

>start caq <filename> [-csv] [-bin] [-t <duration>]

Starts the continuous acquisition operation

<filename> - parameter 'filename' identifies the file name where to save the acquired data.

-csv - specifies the CSV format of the acquisition file (CSV text format, integer, 1 channel)

-bin - specifies the Binary format of the acquisition file (Binary 16-bit raw data, LE, 1 channel)

-t <duration> - parameter 'duration' specifies the time duration (in seconds) of the acquisition process

- **stop**

stop <op>

- Stops the specified operation.
 - *<op>* - parameter 'op' identifies the desired operation to be stopped: [caq]

>stop caq

Stops continuous acquisition operation

- **printboard**

printboard

- Prints the board specific configuration settings:
 - Operation mode
 - Active mikroBUS slot
 - Sample rate (for ADC devices)

- **setboard**

setboard <param>

- Sets the specified board specific configuration parameter.
 - *<param>* - parameter 'param' identifies the desired device specific parameter to be set: [slot, opmode]

>setboard slot <val>

Sets the active mikroBUS slot

<val> - parameter 'val' identifies the desired mikroBUS slot

>setboard opmode <val> [-w <waveform>]

Sets the MCU operation mode

<val> - parameter 'val' identifies the desired operation mode:

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- *mcu-sim*: MCU simulation mode
- *fw-spi*: Firmware acquisition via SPI
- *gen-spi*: Generic-SPI acquisition
- *gen-i2c*: Generic-I2C acquisition

-w <waveform> - optional parameter 'waveform' specifies the desired MCU simulated waveform

- **printdev**

printdev

- Prints the active device name and HW attributes:
 - Bit resolution
 - Input mode
 - Encoding scheme
 - Top sample rate (for ADC devices)

- **setdev**

setdev <partNo>

- Selects the active device identified by part number.
 - **<partNo>** - parameter 'partNo' identifies the desired device to be used. The list of all supported devices is displayed in case a wrong part number was provided.

- **setadc**

setadc <param>

Sets the specified ADC specific configuration parameter.

- **<param>** - parameter 'param' identifies the desired ADC specific parameter to be set: [sr]

>setadc sr <val>

Sets the ADC sample rate

<val> - parameter 'val' identifies the desired sample rate value in ksp/s

- **compute**

compute <alg>

- Performs the computation for the specified signal processing algorithm.
 - **<alg>** - The parameter 'alg' identifies the desired signal processing algorithm to be performed: [fft, hist, inldnl]

>compute fft <smp1> [-w <window>] [<filename>]

Performs the FFT analysis

<smp1> - The parameter 'smp1' identifies the desired number of samples used to perform the FFT analysis. It can be entered into samples, kilo-samples or mega-samples.

-w <window> - The optional parameter 'window' specifies the FFT window used for FFT calculation. The following window options are supported: rect, blackman, hamming, hann, kaiser.

In case this option is not specified then the default window used is 'blackman'.

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<filename> - The parameter 'filename' identifies the file required to save the FFT results.

```
>compute hist <smp1> [<filename>]
```

Computes the Histogram

<smp1> - The parameter 'smp1' identifies the desired number of samples used to perform the Histogram analysis. It can be entered in samples, kilo-samples or mega-samples. Only a certain range of values is allowed.

<filename> - The parameter 'filename' identifies the file required to save the Histogram.

```
>compute inldnl <smp1> [<filename>]
```

Performs the INL/DNL analysis

<smp1> - The parameter 'smp1' identifies the desired number of samples used to perform the INL/DNL analysis. It can be entered as samples, kilo-samples or mega-samples. Only a certain range of values is allowed.

<filename> - The parameter 'filename' identifies the file required to save the INL/DNL results.

- **setcli**

```
setcli <var> <val>
```

- Sets a specific CLI application setting at the specified value.
 - **<var>** - The parameter 'var' is an alphanumeric symbol corresponding to the application settings variable.
The following application settings variables are supported: loglevel, wkdir
 - **<val>** - The parameter 'val' is an alphanumeric symbol corresponding to the desired value of the application settings.

- **printcli**

```
printcli [<var>]
```

- Prints the CLI application settings.
 - **<var>** - The parameter 'var' is an alphanumeric symbol corresponding to the application settings variable.
This parameter is optional. If it is not provided, then all application settings variables are displayed.

- **show**

```
show <doc>
```

- Shows the required document.
 - **<doc>** - The parameter 'doc' identifies the desired document to be shown.
The following documentation IDs are available:
 - ug: User Guide
 - qrg: Quick Reference Guide
 - docs: User documentation location
 - dcb: Data Capture Board online documentation

Chapter 3. USECASES

3.1 Connection Modes

The connection mode refers only to the connection between CLI application and USB Bridge service. Once this connection is established, all operations provided by the CLI application work the same from user perspective (even if the connection is local or remote, this has no impact at user level).

Also, the target devices are accessible in the same manner via USB connections by USB Bridge service.

- **Local host connection mode:**

In local host connection mode, the PIC32MZ Mixed Signal Data Capture Board (EV64F02A) and the Evaluation Board are physically attached to the same machine running the CLI application, machine referred to as local host. The USB Bridge Service must also run on this local host to facilitate CLI application connection to USB connected devices.

- **Remote host connection mode:**

In remote host connection mode, the PIC32MZ Mixed Signal Data Capture Board (EV64F02A) and the Evaluation Board are physically attached to a remote host accessible over the local network. The USB Bridge Service must run on this remote host as well and be able to serve several client connections over TCP/IP at the same time.

3.2 Data Acquisition Modes

- **Single-shot acquisition mode:**

In single-shot acquisition mode, only one single-shot of samples of specified length is acquired from target device at user request. The user has the option to acquire another set of samples as many times desires.

- **Continuous acquisition mode:**

In continuous acquisition mode, the samples are continuously acquired from target device and saved in data acquisition file. The user has the option to start the continuous acquisition mode for a predetermined time duration, but also to manually stop continuous acquisition mode at any time or to wait until the predetermined time duration expires and continuous acquisition mode is automatically stopped.

INDEX

Alphabetical order	Meaning
ADC	Analog-to-digital converter
BE	Big Endian
CLI	Command Line Interface
CSV	Comma Separated Values
DAL	Device Access Layer
dB	Decibel
dBFS	Decibels relative to Full Scale
DNL	Differential Nonlinearity
FFT	Fast Fourier Transform
FW	Firmware
GUI	Graphical User Interface
HW	Hardware
INL	Integral Nonlinearity
INSTALLDIR	Installation Directory
IP	Internet Protocol
ksps	kilo-samples per second
LE	Little Endian
MCHP	Microchip
MCU	Microcontroller Unit
PC	Personal Computer
Rev	Revision
S/N	Serial Number
SPI	Serial Peripheral Interface
SW	Software
TCP	Transmission Control Protocol
USB	Universal Serial Bus