



TUTORIAL Commander: Getting Started

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Introduction

Commander is a versatile environment which enables developers to create a full projects on BBM display modules that can be controlled by simple serial commands. You can quickly create a project from a selection of predesigned pages or custom pages designed using the other three Mates Studio environments.

After adding pages to the project and uploading to the BBM module, each page can be tested fully by using a built-in host simulator. This simulator provides a simple user interface to navigate across pages and control the widgets to give a visualization of what the host controller can do with the project. All this can be achieved without entering a single piece of code for the BBM module and in many cases, with the vast library of predesigned pages, no need for any design work to quickly bring projects to life ready to accept simple serial commands from the chosen host microcontroller.

Project Development

Start a new Commander project for the target module. For this tutorial, TIMI-96 in it's default orientation will be used.

	SELECT PRODUCT	CLOSE
	TIMI-96 160x80 A 0.96-inch TIMI powered by 4D Labs' Pixxi28 graphics proce	Click Image to Rotate
TED	TIMI-Click 80x160 A 0.96-inch TIMI for Click interface powered by 4D Labs' Pixxi	=
MIHA	TIMI-130 240x240 A 1.30-inch TIMI powered by 4D Labs' Pixxi28 graphics proce	\geq
REPTOR	TED-96 160x80 A 0.96-inch TED powered by 4D Labs' Pixxi28 graphics proces	CONFIRM
Browse Recent Projec	sts	Browse Computer

After selecting the product, you need to select the environment.

SELECT ENVIRONMENT BACK The Commander environment enables The Architect environment enables the the user to create projects by selecting user to design projects with custom page layouts from a selection of pages and widgets. This gives more predesigned user interfaces from designing capabilities than the Breadboard Mates team and Commander environment. community. The Genius environment enables the The Builder environment enables the user to design projects with custom user to design projects with custom pages and widgets and write code. pages and widgets and build the This removes the need for an external process flow using graphical/block host to control with the display. programming. This removes the need for an external host to control with the display. Browse Recent Projects Browse Computer

Click on the Commander Environment button to open with the Commander Environment blank project window.

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Project Control 🔿 🖺 🏝 🕹 🛪 i	TIMI-96 on COM16 LANDSCAPE	Сом16	Connect Reset
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Adding Pages

A project can consist of one or more pages and you can select each page individually. In this tutorial we will be creating a two-page project selecting ready-made pages from the many categories available.

As this is a new project, the panel on the left has a single rectangular button with a '+' symbol that matches the chosen orientation of the TIMI module.

Move your mouse pointer over the button and click on BROWSE LIBRARY to open the SELECT PAGE(S) FROM LIBRARY window.

	SELECT PAGE(S) FROM LIBRARY	CLOSE
Audio	5 Gauge EQ	
Date and Time	A page layout designed to be used in Audio applications	
Distance	Bar Meter LedDigits Image: A page layout designed to be used in Audio applications	
Electrical	Graphic Equalizer	
Environmental	A page layout designed to be used in Audio applications	
Graphs	LCD Bar Meter A page layout designed to be used in Audio applications	
Miscellaneous	Media Spectrum L to R	
Motion	A page layout designed to be used in Audio applications	
Multimedia	A page layout designed to be used in Audio applications	
Navigation	Metal Bar Meter Single	
Notifications	Metal Bar Meter	
User	A page layout designed to be used in Audio applications	
	Sound Level Meter	
	A page layout designed to be used in Audio applications	
	dB Meter - Left and Right Blue	
	A page layout designed to be used in Audio applications	
Browse Computer		

Click on the Environmental tab and select from the list, the Temperature Humidity with Text areas page. Click on CONFIRM.

The selected page, *page 0*, has now been added to the project. The right-hand panel has now been populated with full details of the widgets used on the page along with suggested MCU library commands to control the pages via the MCU host. This information is extremely useful in the preparation of your own code if needed.

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Page0	Page0 A page layout design for activate Page0, r mates.setPage0 Here's a list of multi	ned to be used in Environ	etPage (Page etPage (Page etate Page e0 and their	lications lice0)): o respective wid	dget type,	index and ID
	LedDigits0	LED DIGITS	0x00	0x0500	0	999
	LedDigits1	LED_DIGITS	0x01	0x0501	0	99
	MediaGaugeC0	MEDIA_GAUGE_C	0x00	0x4800	0	100
	MediaGaugeC1	MEDIA_GAUGE_C	0x01	0x4801	0	100
	TextArea0	TEXT_AREA	0x00			
	TextArea1	TEXT_AREA	0x01			
	MediaGaugeC0	uraco rup tha library fur	nation ((14.1) 0	

To add another page, click on the **'+'** (BROWSE LIBRARY) rectangular button.

Click on the Audio tab, then Media Spectrum L to R followed by CONFIRM.

	SELECT PAGE(S) FROM LIBRARY	CLOSE
Audio	5 Gauge EQ	
Date and Time	A page layout designed to be used in Audio applications	
Distance	Bar Meter LedDigits A page layout designed to be used in Audio applications	
Electrical	Graphic Equalizer	
Environmental	A page layout designed to be used in Audio applications	
Graphs	LCD Bar Meter A page layout designed to be used in Audio applications	
Miscellaneous	Media Spectrum L to R	
Motion	A page layout designed to be used in Audio applications	
Multimedia	Media Spectrum A page layout designed to be used in Audio applications	
Navigation	Metal Bar Meter Single A page layout designed to be used in Audio applications	
Notifications	Metal Bar Meter	CONFIRM
User	A page layout designed to be used in Audio applications	
	Sound Level Meter	
	A page layout designed to be used in Audio applications	
	dB Meter - Left and Right Blue	
	A page layout designed to be used in Audio applications	
Browse Computer		

The 2nd page, *page 1*, has now been added to the project. The full details of the widget used in page 1 are populating the right-hand panel. The project is now complete and ready for uploading to the display.

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Project Control → 🖹 土 🗴 i	TIMI-96 on COM12 LANDSCAPE	•	COM12		Connec	t R	eset
Page0	Page1 A page layout designe U U U U U U U U U U U U U U U U U U U	d to be used in Audio appl	ications): pective widget	t type, inde	ex and ID)
	Name MediaSpectrum0	Type MEDIA SPECTBUM	Index 0x00	ID 0x4C00	Min	Max 100	
	MediaSpectrum0 To update MediaSpec setSpectrumValue number and value is th // Update Medi. mates.setSpect:	trum0, run the library funct (MediaSpectrum0, inc he new target value for the aSpectrum0 rumValue (MediaSpect	tion dex, value e spectrum c trum0, in	 a), where ind solumn. a) b) c) <lic)< li=""> c) c) <lic)< li=""> <lic)< li=""> <lic)< li<="" td=""><td>ex is the c</td><td>olumn</td><td></td></lic)<></lic)<></lic)<></lic)<>	ex is the c	olumn	

Deploying the Project

In order to control the individual widgets and change page using the Commander environment, the project needs to be uploaded to the BBM TIMI-96 Module.

Start the process by ensuring the correct com port is selected, then click on the Upload Project button.



You will be prompted to save the project. Enter a project name and then click on Save to continue the Upload.

Save Mates Studio Pro	ect	×
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Organise 🔻 Ne	v folder	:== ▼ ?
 This PC 3D Objects Desktop Documents Downloads Music Dictures 	Name Status Name Status It Tyre Pressure Monitoring Left It It UDP Monitor It It Volt Meter Portrait It It Volt Meter It It VoltMeterAutorange It	Date modified ^ 14/06/2021 9:42 PM 14/06/2021 9:42 PM 14/06/2021 9:41 PM 17/03/2021 3:26 PM 13/05/2021 3:26 PM 13/05/2021 5:55 PM 19/05/2021 2:27 PM 3/02/2021 9:06 PM
File name: Save as type:	FirstCommanderProject.mates Mates Studio Projects	~ ~
 Hide Folders 		Save Cancel

Click on Proceed

RistCommanderProject Mates Studio - Commander C:\Users\paulc\OneDrive\Document	s\Mates Studio Projects\FirstCommanderProject.mates			_	
FirstCommanderProject Control → 🖹 土 土 🛪 i	TIMI-96 on COM12 LANDSCAPE	•	COM12	Connect	Reset
Pagel	Page1 A page layout designs Compilation Results Program: 11% (3406 out of 32750 bytes) Memory: 5% (657 out of 14400 bytes) Resources: 1% (3 out of 16384 kbytes) @ (progred	ed to be used in Audio appli	ications lage (Page1)): e Page1 nd their respective wi	idget type, index	and ID
	Name MediaSpectrum0 MediaSpectrum0 To update MediaSpect SetSpectrumValue number and value is t // Update Medi mates.setSpect	Type MEDIA_SPECTRUM trum0, run the library funct (MediaSpectrum0, ind he new target value for the aSpectrum0 rumValue (MediaSpect	Index ID 0x00 0x4C0 tion spectrum column. trum0, index, v	Min 10 0 20 0 20 0 21 0	Max 100
FirstCommanderProject Mates Studio - Commander C:\Users\paulc\OneDrive\Document	Mates Studio Projects\FirstCommanderProject.mates		COM12	Connect	K Reset



When the Upload procedure has finished the display will be showing page 0 with all widgets at their default state.

Testing the Project

Now that the project is running on the display, you can change the Commander environments mode to Control mode by clicking on the *Control* tab.



The Commander screen will then change to the control layout.

The control layout shows the page selection panel on the left, the current page and respective widget value controls in the middle, and followed by the Serial communications panel on the right which will be empty as the display is not presently connected.

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FirstCommander	rProject Control	→ 🖬 ± ±	.× i		TIMI-96 on COM12 LANDSCAPE	COM12	Connect	
Page0 Page1	Temp		8					
	MediaGaugeC0		LedDigits0					
	GET 🕨	SET	GET	SET				
	MediaGaugeC1		LedDigits1					
	GET ►	SET	GET	SET				
	TextArea0	1	TextArea1					
		SET		SET				

Click on Connect.



The Led to the left will illuminate and the Commander environment will start communicating with the display.

COM12	Disconnect

Immediately, you will notice that the display carried out a reset procedure and *page 0* returns shortly after. The serial communications panel will start displaying serial communications. If device connected successfully, you will receive a *Device is ready* message followed by the value *0*6.

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FirstCommander	Project Control) → 🗎 ±	±×i		TIMI-96 on COM12 LANDSCAPE	Сом12	Disconnect Reset
FirstCommanderf	Control Contro		LedDigits1	0 SET 0 SET	LANDSCAPE	dy]	Disconnect Heset

Note

The value of 06 is an important acknowledgement from the display which indicates that the display is ready to receive commands.

Now that the display is ready to accept your serial commands, you can enter the values directly into the widget value controls. The display will show all the changes you make.

Enter a value of 50 in MediaGauge0 and click on SET.



You will notice the gauge will change to a midway position based on the minimum and maximum values, as shown in the table below.

Name	Туре	Index	ID	Min	Max
LedDigits0	LED_DIGITS	0x00	0x0500	0	999
LedDigits1	LED_DIGITS	0x01	0x0501	0	99
MediaGaugeC0	MEDIA_GAUGE_C	0x00	0x4800	0	100
MediaGaugeC1	MEDIA_GAUGE_C	0x01	0x4801	P	100
TextArea0	TEXT_AREA	0x00			
TextArea1	TEXT_AREA	0x01	🥖		

If you click the *Play* button on the widget value controls, it will cycle through all values from minimum to maximum showing the gauge sweeping through its range.

MediaGaugeC0			
	0		
GET		SET	

You can change the text in the text areas by typing in the new text and clicking SET.

TextArea0	
TempC	
	SIT

You will notice that the communication panel has recorded all serial messages back and forth.

```
[ Device is ready ]
< 06
[ SetWidgetValue: Set MediaGaugeC0 (0x4800) value to 1 ]
> 24 00 02 48 00 00 01
[ ACK ]
< 06
[ SetWidgetValue: Set MediaGaugeC0 (0x4800) value to 2 ]
> 24 00 02 48 00 00 02
[ ACK ]
< 06
[ SetWidgetValue: Set MediaGaugeC0 (0x4800) value to 3 ]
> 24 00 02 48 00 00 03
[ ACK ]
< 06
[ SetWidgetValue: Set MediaGaugeC0 (0x4800) value to 4 ]
> 24 00 02 48 00 00 04
[ ACK ]
< 06
[ SetWidgetValue: Set MediaGaugeC0 (0x4800) value to 5 ]
> 24 00 02 48 00 00 05
[ ACK ]
< 06
[ SetWidgetValue: Set MediaGaugeC0 (0x4800) value to 6 ]
> 24 00 02 48 00 00 06
[ ACK ]
< 06
[ SetWidgetValue: Set MediaGaugeC0 (0x4800) value to 7 ]
> 24 00 02 48 00 00 07
[ ACK ]
< 06
```

To change page from Page 0 to Page 1, click on the Page 1 button in the left-hand panel.



The page will display Page 1 with its widget input controls.

FirstCommanderProject	Mates Studio - Commander C:\Users\paulc\OneDrive\Documents\Mates Studio F	Projects\FirstCommanderProject.mates		- 🗆 ×
FirstCommanderProjec	et Control 🔿 🖺 🕹 🔽 🛪 i	TIMI-96 on COM12 LANDSCAPE	Сом12	Disconnect Reset
Page0 Page1	ediaSpectrumO O SET	<pre>[Device is ready] < 06 [SetWidgetValue: Set MediaGauge > 24 00 02 48 00 00 01 [ACK] < 06 [SetWidgetValue: Set MediaGauge > 24 00 02 48 00 00 02 [ACK] < 06 [SetWidgetValue: Set MediaGauge > 24 00 02 48 00 00 03 [ACK] < 06 [SetWidgetValue: Set MediaGauge > 24 00 02 48 00 00 04 [ACK] < 06 [SetWidgetValue: Set MediaGauge > 24 00 02 48 00 00 05 [ACK] < 06 [SetWidgetValue: Set MediaGauge > 24 00 02 48 00 00 05 [ACK] < 06 [SetWidgetValue: Set MediaGauge > 24 00 02 48 00 00 05 [ACK] < 06 [SetWidgetValue: Set MediaGauge > 24 00 02 48 00 00 05 [ACK] < 06 [SetWidgetValue: Set MediaGauge > 24 00 02 48 00 00 07 [ACK] < 06 [SetWidgetValue: Set MediaGauge > 24 00 02 48 00 00 07 [ACK] < 06 [SetPage: Activate Page1 (0x000 > 24 00 00 01 [ACK] < 06 </pre>	<pre>:C0 (0x4800) value to 1] :C0 (0x4800) value to 2] :C0 (0x4800) value to 2] :C0 (0x4800) value to 3] :C0 (0x4800) value to 4] :C0 (0x4800) value to 5] :C0 (0x4800) value to 6] :C0 (0x4800) value to 7] :C0 (0x4800)</pre>	

All spectrums, regardless of the amount of bars will only have a single widget input control but contain a 2nd value to set the required bar with a value.

In this page, bar 3 will be the 4th from the top. Setting the 1st value to 3 and the 2nd value 100 will set the bar to full sacale on the display.

MediaSpectrum0			
3	100 🗘		
	ST		

Click on the Play button to create a random effect on the spectrum.

MediaSpectrum0		
4	55	
	SET	