

MCETool V2 User Manual

iMOTION™ programming, debugging and tuning tool

Quality requirement category: Industry

Features

- Programming of RAM, Flash and OTP memory for IRMCKxxx and IRMCFxxx devices
- Debugging via standard JTAG interface
- Tuning of motor parameters via virtual UART
- All interfaces are galvanically isolated
- 3.3 VDC output voltage to target
- Internal generation of OTP programming voltage
- USB interface to PC for power and data
- Ships with all required cables

Supported Devices

- iMOTION[™] IRMCK099
- iMOTION[™] IRMCx100 series
- iMOTION[™] IRMCx300 series
- iMOTION[™] 2.0 Devices (virtual UART only)

Description

MCETOOLV2 (formerly 'IR Cable V2') is designed to program and debug IRMCK099/ IRMCx100/ IRMCx300 series iMOTION[™] motor control ICs on the user's target board (final application board) or on IRMCx evaluation boards.

The MCETOOLV2 can also be used for motor and inverter board parameter tuning via the UART to USB interface.

Infineon provides the respective PC tools (MCEProgrammer & MCEDesigner) for download on the <u>http://www.infineon.com/imotion-software</u> web page. Tools are delivered as a part of Installer package (e.g. "99 Series Installer" and "100 Series Installer")



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1 Introduction

MCETOOLV2 (in some older documents named 'IR Cable V2') is designed to program IRMCK099/ IRMCx100/ IRMCx300 series digital motor control ICs on the user's target board (final application board) or on corresponding Evaluation Kits, to enable engineers to design the application code during development.

MCETOOLV2 contains the following basic configuration and functions:

- Power: 5V DC power supply (Powered through USB Mini B type interface)
- PC interface: USB to virtual communication port with baud rate of up to 256Kbps
- Isolated 3.3V DC Output for target
- Isolated output interface:
 - o 8 Pin JTAG
 - o 4 Pin UART



Figure 1 Picture of MCETOOLV2

Function description

- 1. Isolated UART port
- 2. Isolated JTAG port
- 3. Green LED1: Indicates when Vpp is enabled during programming the target
- 4. Yellow LED: When blinking indicates that MCETOOLV2 is powered and MCU is working.
- 5. Switch SW1: Provides 3.3V to target board, and provides program voltage Vpp when programming OTP.
- 6. PC USB cable port for UART operation
- 7. PC USB cable port for JTAG operation
- 8. Red LED6: Indicates presence of 5V USB power supply. When MCETOOLV2 connects to PC, this LED shows that the MCETOOLV2 has been powered from 5V USB power.

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Introduction

To use as an isolated USB to UART converter, PC USB cable plugs in to "USB-UART", and the UART output port is used. The pinout for UART connector (J2) is as shown in figure below



Figure 2 **UART Connector pinout**

To use as an isolated USB to JTAG converter, PC USB cable plugs in to "USB-JTAG", and the JTAG output port is used. The pinout for JTAG connector (J3) is as shown in figure below



Figure 3 **JTAG Connector pinout**

Switch SW1 is used to power target from isolated DC-DC converted on MCETOOLV2. If switch is in upward position, target is powered from MCETOOLV2 and if it's in downward position, target is powered from external source.

The MCETOOLV2 is supported by following software tools:

- MCE Programmer (v3.0.1.9 and above) •
- MCE Designer (v1.2.0.0 and above) •



2 Software installation for MCETOOLV2

MCETOOLV2 is supported by MCE Programmer as well as by MCE Designer and needs CP210x virtual com port drivers to communicate with PC. The installation procedure for MCE Programmer, MCE Designer and CP210x virtual com port drivers is as follows.

2.1 MCE Programmer, MCE Designer and CP210x driver installation

MCE Programmer, MCE Designer and CP210x drivers are available for download from the Infineon website and are also part of the software package Infineon-99series-kit-mce-installer-SW-v02_02-EN.exe (or higher version) in "99 Series Installer" or Infineon-100serieskitmceinstaller-SW-v03_05-EN.exe (or higher version) in "100 Series Installer" which contains the following support items for MCETOOLV2:

- Pre-Requisite software
- MCE Programmer software
- MCE Designer software
- CP2102 driver.

Note: The following description is based on the use of the all-in-one installation package "Infineon-99series-kit-mce-installer-SW-v02_02-EN". The installation procedure might differ slightly if individual installation files are used for the software tools above.



2.2 Software installation step by step

Step 1: Double click the "Infineon-99series-kit-mce-installer-SW-v02_02-EN.exe" file. Installation process will check if the PC already has the software: "Microsoft Visual C ++ Runtime 11.0" and "Microsoft .NET Framework 3.5" or above version. If there is no such software, the installation will install them, otherwise it will go to the next step.

🖏 IRMCK099 Series iMotion Design Kit Support - InstallA 🗕 🗆 🗙
Application Requirements The following requirements must be processed before starting setup.
Your system needs following pre-requisites to be configured to install IRMCK099 Series Motion Design Kit Support:
Microsoft .NET Framework 2.0 Service Pack 1 Microsoft .NET Framework 3.0 Microsoft .NET Framework 3.0 Service Pack 1 Microsoft .NET Framework 3.5
Click Next to configure the required pre-requisites. Setup will resume once the required pre-requisites have been configured successfully.
Infineon Technologies < Back Next > Cancel

Figure 4 **Pre-Requisites software installation**

Step 2: After the pre-requisite software installs, it will install MCE Designer, MCE Programmer and other packaged application software.

otion Design Kit Support - InstallA 🗕 🗆 🗙	🐉 IRMCK099 Series iMotion Design Kit Support - InstallA 🗕 🗆 🗙
Welcome to the Install Wizard for IRMCK099 Series iMotion Design Kit Support Version 1.0	Destination Folder Select folder where setup will install files.
	Setup will install IRMCK099 Series Motion Design Kit Support in the following folder:
This Wizard will install IRMCK099 Series Motion Design Kit Support on your computer.	Cil/Program Files/Motion Change
It is strongly recommended that you exit all Windows programs before running this Setup Program.	
WARNING: This program is protected by copyright law and international treaties.	Destination Folder Required Dick Space: 72,682 KB Remaining Dick Space: 51,497 MB
To continue, click Next.	An 'Motion' folder will also be created in 'My Documents'
< Back Next > Cancel	Infineon Technologies < Back Next > Cancel
	btion Design Kit Support - InstallA X Welcome to the Install Wizard for IRMCK099 Series infotion Design Kit Support Version 1.0 This Wizard will install IRMCX099 Series iMotion Design Kit Support on your computer. It is strongly recommended that you exit all Windows programs before running this Setup Program. WARNING: This program is protected by copyright law and international treates. To continue, click Next. 8ack Next > Cancel

Figure 5 MCE Designer, MCE Programmer and other software installation

Press "Next" to select the install path, the default path is C:\Program Files\iMotion. This will overwrite previously installed files. The user can select a different path to preserve an earlier version of Infineon-99serieskit-mce-installer-SW-v02_02-EN. Then press "Next" and start the Infineon-99series-kit-mce-installer-SW-v02_02-EN software installation.

MCETool V2 User Manual iMOTION[™] programming, debugging and tuning tool Software installation for MCETOOLV2



Step 3: The driver installation dialog will launch during Infineon-99series-kit-mce-installer-SW-v02_02-EN installation. If the PC has installed the CP210x chip driver before, press "Cancel" to cancel the operation, otherwise follow the prompt to finish unpacking and installing the driver.

IRMCK099 Series iMotion Design Kit Support - Installa – X Installing IRM The program	Silicon Laboratories CP210x VCP Drivers for Windows XP/2003 Server ×
SILICON LABS	Welcome to the InstallShield Wizard for Silicon Laboratories CP210x VCP Drivers for Windows XP/2003 Server/Vista/7 V6.4 The InstallShield Wizard will copy Silicon Laboratories CP210x VCP Drivers for Windows XP/2003 Server/Vista/7 v6.4 onto your computer. To continue, click Next.
CP210x Virtual COM Port Drivers Windows XP/2K3 Server Windows Vista/7	
www.silabs.com	< Back Next> Cancel
⅔ Silicon Laboratories CP210x USB to UART Bridge Driver In	Silicon Success
Silicon Laboratories Silicon Laboratories CP210x USB to UART Bridge Driver Version 6.4	Si Si Installation completed successfully n 6.4
Install Cancel	OK

Figure 6 C210x chip driver installations

Step 4: After CP210x chip driver installation the following dialog "IRMCK099 Series iMotion Design Kit Support" successfully installed will appear. Check/Uncheck boxes to visit iMotion support site and view release notes and press "Finish" to exit the installation wizard.

😸 IRMCK099 Series iMo	tion Design Kit Support - InstallA – 🗆 🗙
₫.	IRMCK099 Series iMotion Design Kit Support
	IRMCK099 Series iMotion Design Kit Support has been successfully installed.
	Visit iMotion Support Site
	☑ View Release notes (requires Adobe Acrobat Reader)
	To dose this wizard, dick Finish.
Infineon Technologies	< Back Finish Cancel

Figure 7 Installation completed dialog



3 Getting Started

3.1 Using MCETOOLV2 with MCE Programmer

3.1.1 PC port configuration

When MCETOOLV2 is used for the first time or the COM port number has changed, configure the connection port and the baud rate. If there is no connection or the configuration has problem, MCE Programmer will prompt warning information.

Launch MCE Programmer and select "Tools—>IR Cable V2 Serial Port Setup". Choose the right serial port and set the baud rate to "57600 bps (IRCable V2 default)".

International Rectifier - MCEProgrammer 3.0.1.0
Product: IRMCK099 Operation: V2 IRCable: Program SRAM Options MCE Bin FIle Serial Port Setup State Serial Port Setup State Setup State Setup State Setup State Setup Setup State Setup Setup State Setup
Documents/iMotion/IRM Documents/iMotion/IRM Action List Load & Parse MCE .bin Baud rate: \$7600 bps (IRCable V2 default) • Ocument to IRCable via Program and verify SR
Reset Download SRAM

Figure 8 Configuring the connection port

Note: If there is no MCETOOLV2 connection to the PC or the configuration is mismatched, the following error messages will appear. Please reconfigure the port settings.

Product: IRMCK099 - Operation: IRCable: Program SRAM -	Product: IRMCK099 - Operation: V2 IRCable: Program SRAM
Options	Options
MCE Bin FIle	MCE Bin FIle
Documents/iMotion/IRMCP0199-1-D/IRMCK099FirmwareV14_20160218.bin Select Motor Bin File	Documents/iMotion/IRMCP0199-1-D/IRMCK099FirmwareV14_20160218.bin Select Motor Bin File
Action List Load & Parse MCE .bin file Build SRAM Image Connect to IRCable via R5232 serial port (COM13) Program and verify SRAM memory	Action List Load & Parse MCE. bin file Build SRAM Image Connect to IRCable via RS Program and verify SRAM memory

Figure 9 Open COM port failed / Port configured incorrectly



Getting Started

Target device programming 3.1.2

Select desired operation for MCETOOLV2 from drop-down list, select .bin file and click "Download" or "Program + Verify" button (depending upon desired operation)

Product: IRMCK099 - Operation:	V2 IRCable: Program SRAM	Product: IRMCK099 - Operation:	V2 IRCable: Program Firmware & Parameters OTP -
Options	IRCable: Program SRAM V2 IRCable: Program SRAM	Options	IRCable: Program SRAM V2 IRCable: Program SRAM IRCable: Program Firmware OTP V2 IRCable: Program Firmware OTP
MCE Bin File	IRCable: Program Firmware OTP	K099 Parameters File	
Socumencey motion/ prince-0199-1-0/16	IRCable: Program Parameters OTP	abcillex	IRCable: Program Parameters OTP
	V2 IRCable: Program Parameters OTP	MCE Bin File	V2 IRCable: Program Parameters OTP
	V2 IBCable: Program Firmware & Parameters OTP	abc.bin	IRCable: Program Firmware & Parameters OTP
	V2 IRCable: Upload OTP V2 IRCable: Upload OTP		IRCable: Upload OTP V2 IRCable: Upload OTP
Action List Load & Parse MCE .bin file Ruild SRAM Image	Generate Parameters OTP ROM .bin Image Generate OTP ROM .bin Image	Action List Load & Parse MCE .bin file	Generate Parameters OTP ROM .bin Image Generate OTP ROM .bin Image
Build SRAM Image Connect to RRcable via R5232 serial port (COM13) Program and verify SRAM memory		Build OT PROM Image Connect to IRCable via RS232 serial p Program and verify OTP memory	ort (COM3)

Figure 10 Select desired programming option

And wait for desired operation to finish.

File loois Help	File Tools Help
Product: IRMCK099 Operation: V2 IRCable: Program SRAM Options MCE Bin File Documents/IMotion/IRMCP0199-1-D/IRMCK099FirmwareV14_20160218.bin Select Motor Bin File	Product: JRMCK099 Operation: V2 IRCable: Program SRAM Options MCE Bin File Documents/iMotion/IRMCP0199-1-0/IRMCK099FirmwareV14_20160218.bin Select Motor Bin File
Action List Load & Parse MCE .b Build SRAM Image Connect to IRCable VI. Program and verify SRAM memory	Action List Load & Parse MCE. bit Build SRAM Image Connect to RicSable via Program and verify SR
Reset Download SRAM	Reset Download SRA

Figure 11 Programming complete

Switch SW1 is used to power target from isolated DC-DC converted on MCETOOLV2. If switch is in upward position, target is powered from MCETOOLV2 and if it's in downward position, target is powered from external source.

When Programmming OTP, switch in upward position is required.



3.2 Using MCETOOLV2 with MCE Designer

3.2.1 PC port configuration

Launch MCE Designer, open desired configuration file (with extension .irc)

Doen		
→ Libraries → Documents → iMotion → IRMCP0199-1-D →	Search IRMCP0199-1-D	
Organize 🔻 New folder	≡ ▼ 🔲 😧	
Documents library	Arrange by: Folder 🔻	
Name	Date modified Type Size	
Datasheets	2/24/2016 2:29 PM File folder	
Hardware	2/24/2016 2:29 PM File folder	
8 8 9 9 9 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
File name: JRMCP0199-1-D.irc	Configuration Files (*,irc) Open Cancel	

Figure 12 Configuration file selection

Highlight or click child window with title "System – XXX.irc" and select "Preferences —> Connection". Select proper com port from drop down list and press "OK" button.

System - IRMCP0199-1-D.irc - International Rectifier - MCEDesigner	(tm)	
File View Preferences Tools Window Help		
Meterd a IBMC00199.1.D irr		
\\infineoninfineoninfineoninfineon		
Argister Structure Definitions If Function Definitions Subfunction Library Definition If Subfunction Library Definition If System - IRMCP0199-1-D.inc		
Winfneoninfineoninfineon Second Sec	Connection Connect using CDM4 Statu: Connected Register access allowed HCEDesigner Register Map ID: IRMCx171 Register Map ID: IRMCx171 REC Program Version: 1.579 B051 Version: 1.579 B051 Version: 1.571 D0/2004Hz OK Cancel	
For Help, press F1 JRMCF171 COM4 Up	Trig Idle 🔹 MotorI Fault	

Figure 13 Com port selection



3.2.2 Programming target device

Highlight or click child window with title "System – XXX.irc" and select "Tools —> Load Target". Select desired firmware file (with .bin extension) using "Browse.." button, press "Open" button in file selection dialog and then "OK" button in "Load Target" dialog.

Motor1 - IRMCP0199-1-D.irc	
Vulfineen infineenneen infineenne Vulfineen infineenneen infineenne Subfunction Library Definition Subfunction Library Definition Subfunction Library Definition Subfunction Library Definition Output Subfunction Library Definition Subfunction Library Subfu	Open Organize New folder Documents library Arrange by: Folder * ISMCP0199-1-D Arrange by: Folder * Name Datasheets Handware ISMCK00000FirmwareV14_20160218.bin File name: ISMCK00000FirmwareV14_20160218. * MCE Executable Files (*bint,*ex * Open Cancel

Figure 14 Firmware file selection

Wait for programming to finish.

System - IRMCP0199-1-D.irc - International Rectifier - MCEDesig	iper(tm)
File View Preferences Tools Window Help	
Motor1 - IRMCP0199-1-D.irc	
\home001.rdu.infineon.com\gup	
E Function Definitions	
Subfunction Library Definition	
System - IRMCP0199-1-D.irc	
🔜 \\home001.rdu.infineon.com\gup	
Monitor Definitions	PROGRAMMING RAM PROGRESS
	Programming RAM
	Prograss
For Help, press F1 IRMCF171 • COM4 Up	Trig Idle Motor1 Fault

Figure 15 Programming in progress

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Getting Started

File View Preferences Tools Window Help Image: Second Seco	
System - IRMCP0199-1-D.ic Wontor Definitions MCEDesigner Cocount of the second s	
For Help, press F1 IRMCF171 • COM4 Up Trig Idle • Motor1 Fault	

Figure 16 Programming complete

When configuration file is loaded or MCETOOLV2 is used for the first time or the COM port number has changed, configure the connection port. If there is no connection or the configuration has problem, MCE Designer will prompt warning information.

In this case, highlight or click child window with title "System – XXX.irc" and select "Preferences —> Connection". Select proper com port from drop down list and press "OK".



Revision history

Major changes since the last revision

Version number	Revision date	Revision description
1.3	2017-03-01	First Release
1.4	2017-07-27	1. Box figure updated
		2. Document title updated
		3. Software download link updated
		4. Interface illustration updated

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