NCP81599 GUI Software & Eval Board User Guide

1. Plug I²C interface board (J1 needs shorted) into your computers USB port, via a USB-A to Mini-B cable. It should install drivers automatically. Once completed, the PWR LED1 should turn on.



- 2. Run dgSCOM Setup (dgSCOM_1.5.12_setup32.msi). Follow the instructions to finish the installation.
- 3. When dgSCOM has been installed, run it.
- 4. Load the NCP81599 register map excel file "NCV81599ac_REG_MAP_TABLE_07_10_19.xlsx" from the files provided, by clicking the **File** -> **Open Register Definitions** or the quick access tool button in the top left of the window. See the screenshot below.

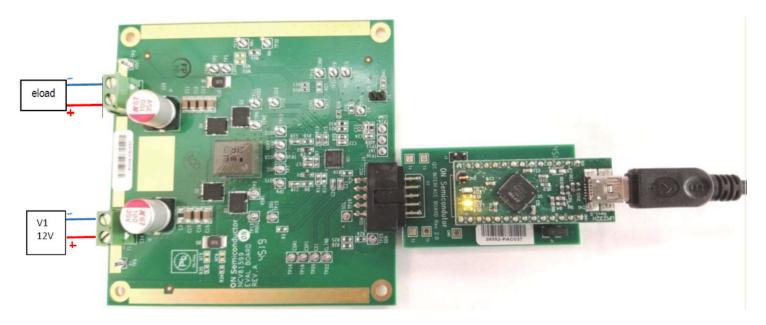
🙀 DGScom Test I	erface	- - X
File Tools He		
Mark 1	UM232H Refresh Connect Unknown Reset I/O's HEX	
Register I/O		
Filter	😋 💭 🕫 🦀 🕨 Computer 🔸 FD 8Gb (F:) 🔸 NCP81599 🔸 GUI Software 💿 🗸 🍫 Search GUI Software 🔎	
		Slave Address
Name	Secent Places A Name Date modified Type Size	0 🌻
	CV81599ac_REG_MAP_TABLE_07_10_19 10/18/2019 4:38 PM Microsoft Office E 4 KB	Bus Rate (KHz)
	Cill Libraries	500 🗸
	Documents 0 ℃	Write
	E Pictures	Read
	Videos S S S Add	Write to Seq
		Read to Seq
	🚣 Local Disk (C:)	
	FD 8Gb (F:)	
	CD Drive (G:)	
	File name: NCV81599ac_REG_MAP_TABLE_07_10_19 Register Definitions File (*.xls)	
Function / De-	Open Cancel 9 9 9	
Function / De	00000000	
	Definitions	
	• ON Semiconductor®	

 Ones the register map loaded, click "connect" to establish communication with the I²C dongle. "Unknown" field will turn from red to green with "FT_OK" see below.

DGSCom : NCP81238 Te ile Tools Help	st Interface								□ ×
2	UM232	°H ▼ Re	fresh	Disconr	iect	FT_O	(Reset I/O's	
legister I/O Sequencer	FTDI Settings								
Filter	Clear	Map NCP81238	-	Write All	Read All	Clear All Save A		L/O	Address
				S	<u> </u>				74 🗘
Name			Reg	# Bits	LSB Loc			12C Bus R	ate (KHz)
en_mask			00	1	2	00		Destavel	
en_int			00	1	3		8		100 🗘
dac_target			01	8	0	00			
slew_rate			02	2	0	00		Reg 0 🗘 Data 🛛 🗘	
pwm_frequency			03		1724			Write	
dac_target_lsb				1	4	00		Low Byte	
vlovp_lat			03	1	5	00		Read	<u> </u>
pfet			04	1	0	00		6 영 명 명 명 명 명 명 Add Write t	o Seq
dis_ocp_l			04	1	1	00			-
cs1_dchrg			04	1	2000	00		Add Read t	o Sed
cs2_dchrg				1	5	00			
ocp_clim_pos			05		-	00			
ocp_clim_neg			05	2	4	00		Unloc	k
cs1_clim_pos			06	2	2	00		#High Byte	Mode
cs2_clim_pos			06	2	4	00			
sel_ov2th			06	2	4	00		10 17 17 17 17 17 18 18 Blow Fu	ses
Function / Description			Test M	ux Descriptic	2015				
Function / Description	Additional Info		Name		Definition				
								Definitions	
								D'ANNOIS	
								•	
		7							
			1 4				-		

6. Click the "**HEX**" button if you want to convert values from Hex to Decimal format. This is important for users to set the proper readable register values (e.g. output voltage).

- 7. Connecting NCP81599 evaluation board.
 - a. Plug I²C board to I²C header J3 on the evaluation board.
 - b. Connect 12V (typical) input supply to T1 as shown below.
 - c. Connect electronic load to T2 as shown below.



Note: The reason for the two pin header connected to the bottom of the board, rather than on the C7 pads is due to the fact that the C7 pad is before the output pi filter, which is used to suppress high frequency noise on the output, the two pin header can be used with a differential prob. You can also use a passive probe to observe the output by probing the test point on the Q6 drain pad.

- 8. Once the NCP81599 evaluation board is connected, turn on the Vin power supply. Now you should see 5V at the output.
- 9. To change the output voltage:

Under the "Register I/O" tab find the "dac_target" register. Click to select that row and press the **Read** button. If you have properly converted to decimal format and are properly connected, you should see a 50 in the "Data" box.

UM232H + R	sh Disconnect FT_OK Reset I/O's HEX	
gister I/O Sequencer FTDI Settings Filter Map Clear NCP81238	Auto Update Write All Read All Clear All Save All Reg # Bits LSB Loc Data	Slave Addr 74
nome en_mask en_int dac_target	0 1 2 0 4 0 1 3 0 # 1 8 0 50 #	12C Bus Rate (* • 100
sel_ev2th Function / Description	2 0 0 3 3 0 0 3 1 4 0 3 1 5 0 4 1 0 0 4 1 0 0 4 1 5 0 4 1 5 0 5 2 0 0 5 2 4 0 6 2 0 0 6 2 0 0 6 2 0 1 7 9 9 9 9 9 9 9 9 9 9 9 1 1 0 0 1 1 0 0 0 0 0 1 1 0	Write Read Add Write to Sec Add Read to Sec Unlock Exit Test Mode Blow Fuses
Function / Description Additional Info	Name Definition dmux0 (NT)	

Note: The "dac_target" register (01H) is to set the internal reference voltage, which is 0.5 V with a resolution of 10 mV by default. The reference voltage can be adjusted with 10 mV steps from 0.1 V to 2.55 V through this dac_target register, which makes the continuous output voltage profile possible. For example, by default, if there's a 10:1 ratio resistor divider from the converter output to the FB, the output voltage profile will be set to 5V by default and be able to vary from 1 V to 25.5 V with 100 mV steps.

Moreover, the LSB of the 9-bit DAC is not actually the LSB of the 8-bit "dac_target" register. There's a 1-bit "dac_target_lsb" register (03h) by using which one can set a finer resolution of DAC output to 5 mV.

WARNING: YOU MUST INCREASE CURRENT LIMIT TO PULL A 5A LOAD. THE DEFAULT CURRENT LIMIT IS SET TO 7.6A (peak detect), YOU WILL NEED TO INCREASE THIS TO 14A VIA THE DEFINITIONS DROP DOWN MENU IN REGISTER "ocp_clim_pos", THEN PRESS WRITE. SEE THE SCREEN SHOT BELLOW.

DGSCom : NCP81238 Test Interface						X			
File Tools Help									
UM232H • Ret	resh	Disconn	ect	FT_OK	Reset I/O's				
Register I/O Sequencer FTDI Settings									
Filter Map Clear NCP81238	• W	Irite All	Read All	Auto Update	-₩0 ocp_clim_pos	Slave Address			
Name	Reg	# Bits	LSB Loc	Data	ocp_cnm_pos	All and a second			
en_mask	0	1	2	0 -		I2C Bus Rate (KHz)			
en_int	0	1	3	0 =	Protocol I2C •	100 🗘			
dac_target	1	8	0	50					
slew_rate	2	2	0	0	Reg 5 🗘 Data 3 🌲				
_pwm_frequency	3	3	0	0		Write			
dac_target_lsb	3	1	4	0	Low Byte	write			
vlovp_lat	3	1	5	0		Read			
pfet	4	1	0	0	d d d d d d d d d d d d d d	Add Write to Seg			
_dis_ocp_l	4	1	1	0					
_cs1_dchrg	4	1	4	0	A A L	Add Read to Seq			
cs2_dchrg	4	1	5	0					
ocp_clim_pos	5	2	0	3					
_ocp_clim_neg	5	2	4	0		Unlock			
cs1_clim_pos	6	2	0	0	High Byte	Exit Test Mode			
_cs2_clim_pos	6	2	2	0	10 7 m N H O	Exit Test Mode			
sel_ov2th	6	2	4	0 *	d15 d13 d13 d10 d5 d8 d8	Blow Fuses			
Function / Description Test Mux Descriptions									
Function / Description Additional Info	Name Definition								
register to set the internal positive current limit	dmux0 (INT) dmux1 (CLIND) tmux0 (CS1) tmux1								
					Definitions				
					CLIM value = 2.2V, Current at RSENSE(5mΩ)=14 A →				
	(CS2)								
	1					40			

10. As you can see, there are many read/writeable registers. They can all be changed to accomplish different things. In the data package is a complete register map (NCP81599_register_map_rev3.pdf) with register definitions. Use that as a guide to change any register values.

NOTE: This part does not have memory and will revert to all default register values when power (or enable) is cycled.

Operating Conditions:

Vin: 4.5V – 28V Vout: 1V – 20V Imax: 5A (Limitation of passive components, not NCP81239) Fsw: 600 kHz (Default, can be changed in GUI via **pwn_frequency** register)