Neon - User Guide

Scope

This document, User Guide provides detailed information and testability of Neon Board.

This user guide can be used and rereferred by the user/operator with efficiency.

Block Diagram

The system level block diagram and detailed architecture is depicted below



Figure - 1 Neon - Block Diagram

System Interface

The system interface of **Neon** board is classified into two types.

- a) Hardware Interface
- b) Software Interface

Hardware Interface

This section provides detailed description of Neon's Hardware interface.



Figure - 2 Neon Hardware

Configuration / selection switch

We have a few configuration/selection switches on the Neon board.

As shown in the below table, following are the major configuration/selection switches color coded to recognize their respective locations on the Neon board.

	Connector / Key	Description
1	J16	OBD -II Connector (J16) This is a 16-pin connector, from External world PWR, Data and any analog /digital signals fed to our module through this connector. We are energizing the Neon module through pin-16 on this connector, pin 4 or pin 5 can be used as Ground(GND) Refer Figure - 3
2	J4	Battery Connector (J4) This is a 2-pin connector, we can connect battery module for charging and for powering on Neon module. PIN 1 Vcc and PIN 2 GND Refer Figure - 3
3	J8	Module debug USB connector (J8) From PC/LAPTOP user can interface with our module via Micro-USB interface. Refer Figure - 3
4	J3	SIM Connector (J3) We have a SIM slot on Neon module. It supports 4G LTE carrier network on this slot Refer Figure - 3
5	J6	Bluetooth Antenna Connector (J6) For effectively working with Bluetooth functionality we will attach a suitable antenna @J6 Refer Figure - 4
6	J9	LTE Antenna Connector (J9) For acquiring 4G LTE signal we need to connect a suitable antenna @J9 Refer Figure - 4
7	J11	GPS Antenna Connector (J11) For acquiring a proper GPS signal we need to connect a suitable antenna @J11 Refer Figure - 4
8	J1	Mono Audio Output Connector (J1) We need to connect a speaker @J1 to listen the audio output Refer Figure - 3
9	SW1	Module RESET Button (SW1) At any stage of operations when we need to reset the module, this button needs to be pressed. Refer Figure - 4
10	SW2	Module PWR ON Button (SW2) After programming the board, and energizing it, we need press & hold this key for 10 seconds, such that the Soft Module gets powered. Refer Figure - 4
11	U10	SIMCOM Module (U10) A7672s module is the key component of the Neon module which will initiate and ensure all the critical functionality.
12	LED7	STATUS LED (LED7) Will glow in GREEN indicating that the SIMCOM Module is Active.
13	LED5	NETLIGHT LED (LED5) Indicates network status, glows continuously in GREEN indicating network status activity.



FIGURE - 3 Neon Key Components

As highlighted BLACK in the above figure, J16 is the OBD-II connector. Currently we are using it for power source only.



FIGURE - 4 Neon Key Components

Hardware Test Equipment / Tools

Following Hardware Test Equipment is required for testing the unit / modules

- Fully assembled Neon board
- 12v Power source
- Battery module for power back up and reuse.
- Micro USB cable for Debug port
- Antennas
- Digital Multi-meter
- Digital Oscilloscope

Software Interface

Tools Required

For flashing the image on Neon board and working with Neon board, we need the following installation on the PC/LAPTOP

- A76XX_A79XX_MADL V1.07 Only for Update.exe is known as MADL from SIMCom.
- Terminal Emulator SIMCom Serial Port Tool i.e SIMComSPT_V3.5 mandatory or any (like Tera Term, XShell or any) for debug purpose and running commands

Note: Officially Flashing tool i.e MADL and Terminal emulator i.e SIMComSPT_V3.5 are available ONLY for Windows OS. So PC/LAPTOP must be having Windows OS for above purpose.

EUT Operation

EUT operations are highlighted as below

Board level visual inspection and Impedance Measurement

This preliminary check ensure that the Board can be powered ON.

Flashing Guide for the Neon board

For programming the Neon board, we need a Windows 10 PC/Laptop with A76XX_A79XX_MADL V1.07 Only for Update.exe is known as MADL from SIMCom and configured with the compatible USB driver configuration.

- Power OFF the Neon Module
- On Windows PC / LAPTOP preferably Windows 10, launch the flash tool

A76XX_A79XX_MADL V1.07 Only f	Manage			
File Home Share View	Application Tools			
- 1				
\leftarrow \rightarrow \checkmark \uparrow 📜 « Flash tool »	A76XX_A79XX_MAD	DL V1.07 Only for Update > A76XX_A79XX_MADL V1.07 Only for Update	~	U
A76XX_A: ^ N	ame	Date modified Type	Size	
A1601D	A1601Driver	25-11-2020 14:57 File folder		
A1802D	A1802Driver	25-11-2020 14:57 File folder		
AbsBlfTe	AbsBlfTemp	14-12-2022 14:27 File folder		
📜 extra Ter 🔋	extra Temp	07-12-2022 14:41 File folder		
📜 temp	temp	14-12-2022 14:27 File folder		
image_camera	7z.dll	29-11-2019 06:51 Application extension	8	93 KB
IPEG	🛙 7z	29-11-2019 06:51 Application	1	60 KB
KE 202211241	A76XX_A79XX_MAD	DL Only for Update_UserGuide 17-07-2020 10:58 Microsoft Edge PDF	1,5	91 KB
KE-202211241	A76XX_A79XX_MAD	DL V1.07 Only for Update 26-11-2020 13:33 Application	13,8	80 KB
MaxAudioPrc	aboot.dll	10-09-2020 13:13 Application extension	4,8	87 KB
MobaXterm_Ir	IFL_SWD.dll	19-03-2019 16:16 Application extension	5,2	35 KB
📕 msvcr100	MPMDownloader	07-12-2022 14:42 Configuration settings		2 KB
ORCA_SNAPS	MPMDownloader	07-12-2022 14:42 Text Document	6	07 KB
PDF 🛛	ResultStatistic	07-12-2022 14:42 Microsoft Excel Com		3 KB
PICkit3 Progra	SWD	08-12-2020 08:23 Text Document		2 KB
OPST 2 7 496	UsbReg	28-10-2020 11:47 Registration Entries		2 KB
Qualcomm_US	WtptpDownLoad.dll	I 19-03-2019 16:14 Application extension	2,9	57 KB

FIGURE - 5 Launch Flash Tool



FIGURE - 6 Select .ZIP file

- After selecting the .zip file click on GO (Download button)
- Power ON the Neon module, wake up the module by pressing SW1
- Make sure download automatically starts and shows the progress on the flash tool

🕞 A76XX_A	79XX_MADL V1.07 Only for	r Update	Build: N	lov 26 2020	16:03:06 This is upgrade mode.			- 6	y ×
File View	Help								
S - 0 🖕									
Infomation User Station		^ ^	Pla C	form Type BLF file Zip file	C:USersiDELLiDownloadsiA011B05V00	2A7672M7_F_220602_A7672S-FASE_V101210811_A	T_CMDs\A011B05A7672	47_F_220602_A76	
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	1		cligo	Device 1	Port_#0001.Hub_#0001			Idle	
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			-						
		~	-						
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Output									- a ×
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2022/12/14 16	15:42:806 - Device: 2, Targel 15:42:822 - Device: 2, Targel 15:42:822 - Device: 2, Targel	t Debug t Debug	Message Message	{ description	n" : "Arom Usb Boot Port", "displayName" : "USB Serial Devic n" : "Arom Usb Boot Port", "displayName" : "USB Serial Devic IN	e (COM9)", "enabled" : true, "event" : 6, "locationInfo" e (COM9)", "enabled" : true, "event" : 6, "locationInfo"	"Port_#0002.Hub_#000 "Port_#0002.Hub_#000	1", "order": 1, "path": "COM9", " 1", "order": 1, "path": "COM9", "	"productid" "productid"
Ready								G	AP NUM SCRL

FIGURE -7 Download Success on Flashtool

· Wait till download success message

Once the download is successful, close the flash tool properly

Power OFF and Power ON the Neon device

Open Device Manager PC/LAPTOP

Make sure Neon device's USB ports are advertised in the Device Manager



FIGURE - 8 Neon USB ports' enumeration on PC

Each port has its dedicated task and functionality (read/write commands) and further processing. Connect Micro-USB cable from PC/LAPTOP to **Neon** module @J8

From PC / LAPTOP, Launch Debug Terminal i.e SIMComSPT_V3.5 on AT port

Here we can run all the supported AT commands and get the response from Neon board.

AT Commands

As explained above, AT commands be run on the designated AT port



RTS DTR	Signal BaudRate: 115200 V Parity: NONE V Data Bits: 8 V Stop	Bits: 1 V
Hex Display	Show Time AtLog Save Log File Path	
Hex Send	Clear Send AT+CPSI?	Send

FIGURE - 9 Neon AT Port

As shown in the above figure, launch the SIMComSPT_V3.5 terminal emulator on the windows PC

Select appropriate PortNum which is have AT port 9011, Click on Open Port

Now we are ready to send the AT commands and see the response above.

For each command OK response should come then only we can confirm that execution is successful

	AT Command	Description	Output
1	ATI	Firmware information of the SIMCOM module	Manufacturer: INCORPORATED Model: A7672S-FASE Revision: A7672M7_V1.11.1 IMEI: 864180050240626 +GCAP: +CGSM,+FCLASS,+DS OK
2	AT+CSPN?	Service provider name	+CSPN: "airtel",0 OK
3	AT+CSQ	Query the Signal quality	+CSQ: 30,99 OK
4	AT+CPSI?	Inquiring System information	+CPSI: LTE,Online,404-45,0x2152,46117386,108,EUTRAN-BAND3,1301,5,0,22,55,54,10 OK
5	AT+CFUN?	Check the Phone functionality	+CFUN: 1 OK

AT commands for Call Control (Phone number calling and control)

Now let us see few commands for Call Control

	AT Command	Description	Output
1	ATD+919886740211;	Mobile originated call to dial a number (9886740211) from Neon	+CGEV: NW ACT 8,10 +CLCC: 1,0,2,0,0,"+919886740211",145,"" +CLCC: 1,0,3,0,0,"+919886740211",145,"" OK
2	ΑΤΑ	Answer incoming call	VOICE CALL: BEGIN +CLCC: 1,1,0,0,0,"+919886740211",145,"" OK
3	ATS0=4	Automatically answer incoming call after 2 rings	ats0=4 OK ats0? 004 OK
4	AT+CHUP	Hang-up / disconnect the incoming or outgoing call	+CGEV: NW DEACT 8,10 NO CARRIER +CLCC: 1,0,6,0,0,"+919886740211",145,"" VOICE CALL: END: 000226 OK

Ę	SIMComSPT_V3.5	-		\times
	2023-01-03 16:32:35:003[Send->]ATD+919886740211; 2023-01-03 16:32:35:003[Recv<-] OK			^
	2023-01-03 16:32:36:301[Recv<-] +CGEV: NW ACT 8,10			
	+CLCC: 1,0,2,0,0,"+919886740211",145,"			
	+CLCC: 1,0,3,0,0,"+919886740211",145,""			
	2023-01-03 16:32:45:127[Recv<-] VOICE CALL: BEGIN			
	+CLCC: 1,0,0,0,0,"+919886740211",145,""			
	+COLP: "+919886740211",145			
	2023-01-03 16:35:11:156[Send->]AT+CHUP 2023-01-03 16:35:11:158[Recv<-] +CGEV: NW DEACT 8,10			
	NO CARRIER			
	2023-01-03 16:35:11:352[Recv<-] +CLCC: 1,0,6,0,0,"+919886740211",145,""			
	VOICE CALL: END: 000226			
	ок			
				~
	Close Port PortNum: (COM10) SimTech HS-USB AT Port 9011	~ (lear Data	>>
C	RTS DTR ☑ Signal BaudRate: 115200 ∨ Parity: NONE ∨ Data Bits: 8	✓ Sto	p Bits: 1	\sim
	Hex Display Show Time AtLog Save Log File Path			
C	Hex Send Clear Send AT+CHUP) s	end

FIGURE - 10 CALL Control using AT Commands

As shown in the above figure, we are able to dial a number from Neon module and disconnect the call also

AT commands for Messaging and Control (SMS read/write/list and delete)

Now let us see few commands for Messaging and Control

	AT Command	Description	Output
1	AT+CMGW="+919886740211"	Initiate message writing to a number 9886740211	Wait for message input and after messaging done press CTRL+Z to save the message Hello How are you? 2023-01-04 16:32:30:252[Recv<-] 2023-01-04 16:32:36:721[Recv<-] +CMGW: 6 OK
2	AT+CMSS=6	Send the above message SMS to the number 9886740211 with cmss 6	AT+CMSS=6 2023-01-04 16:32:50:961[Recv<-] 2023-01-04 16:32:51:703[Recv<-] +CMSS: 37 OK
3	AT+CMGR=1	Read the first message(SMS)	+CMGR: "STO SENT","+917095804070","" Hello Guys!!! Welcome to Neon #10 OK
4	AT+CMGR=2	Read the second message(SMS)	+CMGR: "REC READ","+917095804070","","23/01/04,15:39:37+20" Thank you so much

			ОК
5	AT+CMGD=5	Delete the 5th message in SMS store (with CMGR=5)	AT+CMGD=5 OK
6	AT+CMGL="ALL"	List all messages (SMS) on the device.	at+cmgl="all" +CMGL: 1,"STO SENT","+917095804070","" Hello Guys!!! Welcome to Neon #10 +CMGL: 2,"REC READ","+917095804070","","23/01/04,15:39:37+20" Thank you so much +CMGL: 3,"REC READ","+917095804070","","23/01/04,15:19:57+20" Cool +CMGL: 4,"STO UNSENT","+919886740211","" Hello Again from Neon #10 +CMGL: 6,"STO SENT","+919886740211","" Hello How are you? +CMGL: 7,"REC READ","+919886740211","" Hello How are you?

Ę	SIMComSPT_V3.5 —
	2023-01-04 15:51:03:911[Send-: AT+CMGL="ALL" 2023-01-04 15:51:03:915[Recv< +CMGL: 1,"STO SENT","+917095804070","" Hello Guys!!! Welcome to 4g-cat1 #10
	+CMGL: 2,"REC READ","+917095804070","","23/01/04,15:39:37+20" Thank you so much
	+CMGL: 3,"REC READ","+917095804070","","23/01/04,15:19:57+20" Cool
	+CMGL: 4,"STO UNSENT","+919886740211","" Hello Again from 4g-cat #10
	ок
	2023-01-04 15:51:27:862[Send-]AT+CMGR=1 2023-01-04 15:51:27:867[Recv<-] +CMGR: "STO SENT","+917095804070","" Hello Guys!!! Welcome to 4g-cat1 #10
	ок
	2023-01-04 15:51:53:435[Send:)]AT+CMGR=2 2023-01-04 15:51:53:440[Recv.] +CMGR: "REC READ","+917095804070","","23/01/04,15:39:37+20" Thank you so much
	ок

FIGURE - 11 SMS control using AT Command