G24 and G24-L

CHANGES DOCUMENT

History Revision

Version	Date	Author	Changes
0.1	07/05/2007	Nimrod Zarmi	Initial Draft
0.2	07/05/2007	Benzi Grossman	Added SW differences section
0.3	10/07/2007	Nimrod Zarmi	Updated
0.5	28/05/2008	Ravid Hod	Added “receiver”& “at” section.

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Scope

The purpose of this document is to provide G24 customers with a general overview of the electrical and programming interface differences between G24 and G24L, and provide a means to integrate the G24L product on a G24 compatible platform.
This document may be used as a reference which outlines the electrical, software and mechanical integration required for transforming a G24 platform to operate with G24L.

For further information and detailed specifications please refer to the Developer Manuals of each product.

Electrical Interface

In general, G24-L is designed with maximum electrical, mechanical and functional compatibility to G24.

Operating Bands & Power Classes

The G24L is a Quad band GSM transceiver (GSM850/GSM900/DCS1800/PCS1900).
GSM850/GSM900, Power Class4, 33 dBm (2W) nominal.
DCS1800/PCS1900, Power Class1, 30 dBm (1W) nominal.
GPRS Multi slot class 10

Power Supply

The G24L power supply specifications are Similar to G24.
The module operates from 3.3V to 4.2V, with a peak transmission current of 2.1A, and maximum transmission RMS current of 0.6A.

The G24L current consumption parameters may be different than G24. Final values will be available in the product developer manual.

Serial Interfaces

The G24L incorporates 2 serial interfaces, UART and USB.
The UART interface includes 8 active-low CMOS level signals, and supports auto baud rate.
The G24L USB interface supports USB revision 1.1 device specifications.

G24L doesn't include a secondary UART interface, as in G24.
G24L doesn't support simultaneous USB and UART operation.
G24L does not include a data-logging port through the SPI bus, as in G24. G24L data-logging is only performed through the Serial port.

SIM Card

The G24L SIM card interface is similar in to G24. G24L also supports 1.8V SIM cards.

Audio

The audio programming interface is identical in G24 and G24L.
Both interfaces support handset, headset and digital audio modes, which are configurable through the AT command interface.

Differences in the audio output and input gain settings between G24 and G24L may be noticed. Different gain levels for each path might need to be set through AT commands, depending on the application.

The G24L PCM Clock frequency is 520 kHz.

ON/OFF

Both G24 and G24L may be powered on and off using the ON_N and IGN signals. These signal's functionality and operation is identical in both modules.

It is important to note that the ON_N signal voltage level is different between the modules. In G24 the ON_N signal is referenced to the 2.75V logic level. In G24L the ON_N signal is referenced to the supply level VCC (3.3V – 4.2V).

This difference may affect customers using this signal if their design does not follow the recommendation in the Developer Manuals:
"The ON_N input signal is set high by an internal pull-up resistor whenever a power supply is applied to the module. Therefore, it is recommended to operate this signal using an open collector/drain circuit connection."

Operating this signal by a device that forces a specific level when in the "high" state may pose a problem.

ON/OFF Timing

The G24L power-on timing sequence may be different than G24. This may be noticed in the interface signals waveforms during the power up process. The signals logic state will operate as expected after the power up process is complete and the module is fully operational (usually after the UART is enabled).

The G24L does not power-on automatically, for a short period, when an external power supply is connected, unlike G24. The G24L will only power up if the ON_N or IGN signals are activated.

Receiver

Upon powering on, the G24L returns a value of “31” in respond to the “AT+CSQ?” command regardless of the signal strength received.
After a few seconds, the correct value is returned (proportional to the signal strength).
The customer may need to wait a few seconds after powering on, before issuing this command.

G24L vs. G24 Interface Connector Signals

The following table describes the differences between the G24 and G24-L interface connector signals.

Connector Pin #	G24-L	G24
1	GND	GND
2	GND	GND
3	GND	GND
4	GND	GND
5	VCC	VCC
6	VCC	VCC
7	VCC	VCC
8	VCC	VCC
9	RTS_N	RTS_N
10	USB_VBUS	USB_VBUS
11	RXD_N	RXD_N
12	USB_DP	USB_DP
13	DSR_N	DSR_N
14	USB_DN	USB_DN
15	CTS_N	CTS_N
16	WKUPI_N	WKUPI_N
17	DCD_N	DCD_N
18	PCM_DIN	PCM_DIN
19	DTR_N	DTR_N
20	PCM_DOUT	PCM_DOUT
21	TXD_N	TXD_N
22	PCM_CLK	PCM_CLK
23	RI_N	RI_N
24	PCM_FS	PCM_FS
25	RESET_N	RESET_N
26	WKUPO_N	WKUPO_N
27	VREF	VREF
28	GPIO1	GPIO1
29		RXD2_N
30	GPIO2	GPIO2
31		TXD2_N
32	GPIO3	GPIO3
33		RTS2_N
34	GPIO4	GPIO4
35		CTS2_N
36	GPIO5	GPIO5
37	ADC1	ADC1
38	GPIO6	GPIO6
39	TXEN_N	TXEN_N
40	GPIO7	GPIO7
41	ANT_DET	ANT_DET
42	GPIO8	GPIO8
43	ADC2	ADC2
44	SIM_RST_N	SIM_RST_N

Connector Pin #	G24-L	G24
45		UID
46	SIM_CLK	SIM_CLK
47	ADC3 *	ADC3
48	SIM_VCC	SIM_VCC
49	GPRS	GPRS
50	SIM_PD_N	SIMPD_N
51	IGN	IGN
52	SIM_DIO	SIM_DIO
53	ON_OFF_N	ON_N
54		LCD_CS
55	HDST_INT_N	HDST_INT_N
56		LCD_SD
57	HDST_MIC	HDST_MIC
58		LCD_CLK
59	AGND	AGND
60		LCD_RS
61	MIC	MIC
62		SPI_IRQ_N
63	ALRT_N	ALRT_N
64		SPI_DIN
65	ALRT_P	ALRT_P
66		SPI_CLK
67	SPKR_N	SPKR_N
68		SPI_DOUT
69	SPKR_P	SPKR_P
70		SPI_CS

(*) The ACD3 signal is allocated to the battery temperature measurement in the G24-LC module (with battery charger support).

Mechanical Interface

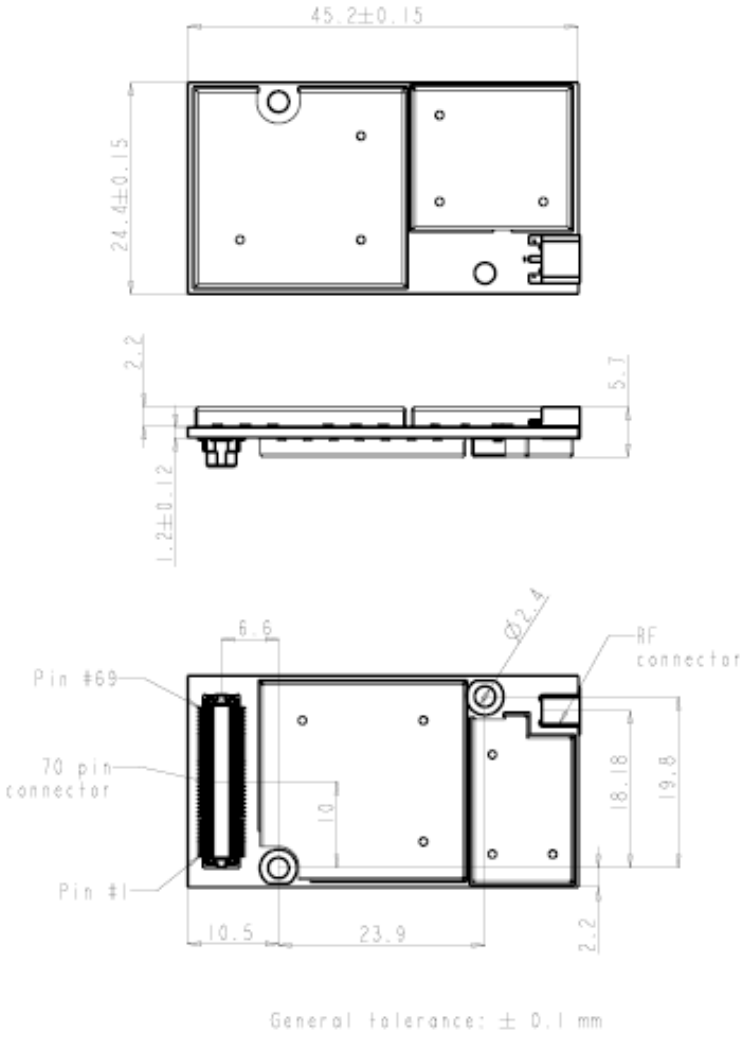
The mechanical design is similar in G24 and G24L. Slight differences in the module height may be observed.

Connectors

Both modules use a standard MMCX connector for the radio RF interface.

The application interface connector is a single 70-pin, 0.5mm pitch, 2 rows, board-to-board interconnect type.

Dimensions



G24-L and G24 between differences SW

Feature	Status in G24-L	Values
Features		
MUX	MUX feature Removed	
UART	Only UART1 is supported.	
Keypad & Display	Not supported	
TCP/IP Feature	Not supported	
ODM Feature	Not supported	
Fax Feature	Not supported	
Flashing Protocol	The flashing protocol was changed	
Commands - Removed		
EGPRS	EGPRS commands removed (CGEQREQ,CGEQMIN,CGEQNEG,CEG)	
+MEGA	Email Gateway Address Removed	
+GCAP	Request Overall Capabilities Removed	
+CVIB	Vibrator alert, Removed	
+MPDPM	PB dynamic Percentage Mem. Removed	
+TCLCC	List of current call Removed	
+MKPD	Keypad control Removed	
+TSMSRET	SMS Sending Retry Removed	
+TWUS	Wakeup Reason Set Removed	
+TWUR	Wakeup Reason Request Removed	
+TASW	Antenna Switch	
+TADIAG	Query antenna ADC value Removed	
+MVREF	Motorola Voltage Reference Removed	
+MCELL	Cell Description Removed	
+MNTFY	Notify Indication Removed	
+MPSU	Second UART Removed	
+CKPD	Keypad Control – Not supported	
+CKEV	Keypress Echo – Not supported	
+CDEV	Display Indication – Not supported	
+MREFALSH	Re-Flash Command – Not supported	
Commands - Updated		
ATIn command	Values are added and changed	1- Added 2- Changed to 'Motorola GSM Module' 3- Changed to N5
AGC (Auto. Gain Control)	AGC was added to +MAFEAT command	8
+MBC command	Motorola Battery Charger added (Charger Model)	
+CGMI,+GMI,+FMI – Manufacture ID	Support only Execute Mode and not Read Mode	
+CGMM,+GMM,+FMM – Model ID	Support only Execute Mode and not Read Mode	
+CGMR,+GMR,+FMR – Request Revision	Support only Execute Mode and not Read Mode	
+MMAD	Not support converters numbers 4,5	

+MMAD	Converters Value = 0-266	
+CFSN	Return Manufacture Serial Number	
+CRTT	18 Ring Tones instead of 41	
Sleep Mode	Wake up duration is 10 ms	
+CMER	<keyp>,<disp> parameters reserved for future implementation	
+CRLP	Radio Link Protocol, < Retransmission attempts> range is:(006-015) instead of (006-010)	
+CUSD	Support only USSD strings	
AT&K=?	G24-L return: &K: (0, 3-6) instead of &K: (0,3,4,5,6)	
AT+VTS=?	G24-L return: +VTS: (0,1,2,3,4,5,6,7,8,9,A,B,C,D,#,*),(0-600) instead of +VTS: (0-9,*,#,A-D),(0-600)	
AT&Y	G24-L must have a profile value AT&Y<n> instead of AT&Y[<n>]	

AT command response

The G24L will not respond until “AT” is typed, in the G24, typing just the “A” will yield a response.