Parrot CK5050NEW

All in one multimedia module
Bluetooth 2.0+EDR compliant
Bluetooth 2.1+EDR available in 09Q3

Version 2.00
March 2009

FEATURES

Bluetooth 2.0 + EDR qualified module
Piconet and scatternet support
Standard single 3V3 supply
CAN, UART, I²C
2*USB 2.0 full speed Host
GPIO
Ipod chip management
Digital audio input and output
Analog audio input and output

Small size module (34,5 x 41,35 mm)
Automotive qualified

Application:

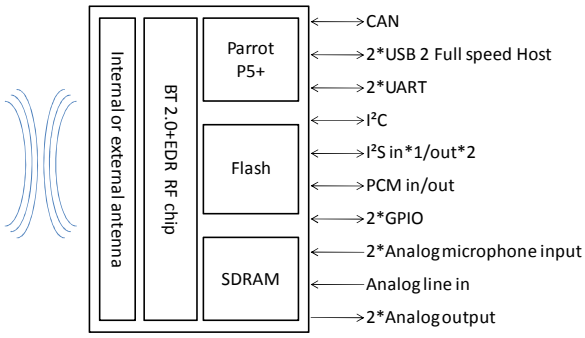
- Telephony
- Audio streaming
- USB
- Ipod management
- Internet access (through DUN)

The CK5050New integrates the latest version of the Parrot Bluetooth stack (Blues). Blues gives to the customer a very high level of compatibility with most of the phones available on the market and provide phonebook and list synchronization.

The CK5050New can also integrate a version of the Parrot USB management library (Disco). Disco manages the USB devices, build database with metadata, browses the compressed audio files by artist/gender/title and play them. Disco also supports the IPod chip through the I²C interface.

Description:

Parrot CK5050New is a low cost solution for Bluetooth connectivity. It integrates a large variety of interfaces for an easy integration in most of the applications



	Memory (Flash/SDRAM)	Vertical	Horizontal
Internal antenna	32Mbits/64Mbbits	PF240023AA	PF240024AA
	64Mbits/128Mbbits	PF240033AA	PF240034AA
External antenna	32Mbits/64Mbbits	PF240036AA	PF240037AA
	64Mbits/128Mbbits	PF240038AA	PF240039AA

Parrot

Table of contents

1 PRODUCT OVERVIEW 4

2 SOFTWARE SPECIFICATIONS 6

2.1 BLUETOOTH STACK 6
2.2 BLUETOOTH PROFILE SUPPORTED 6
2.3 SOFTWARE INTERFACE 7
2.4 MEMORY CONFIGURATIONS 7

3 ELECTRICAL SPECIFICATIONS 8

3.1 HARDWARE ARCHITECTURE 8
3.2 PINOUT 8
3.2.1 40 pins diagram 8
3.2.2 Pinout table 9
3.2.3 Unconnected pins advice 10
3.3 MAXIMUM RATINGS 11
3.4 POWER CONSUMPTION (T°=-40°C TO +85°C) 11
3.5 ELECTRICAL SPECIFICATIONS 11
3.5.1 Power pins 11
3.5.2 Reset pin 11
3.5.3 IO pins 12
3.5.4 CAN 12
3.5.5 I²C 13
3.5.6 USB 14
3.5.7 UART0/UART1 14
3.5.8 PCM 15
3.5.9 I²S 16
3.5.10 Analog out 17
3.5.11 Line in 17
3.5.12 Microphone input 17
3.5.13 Bluetooth radio link 18
3.6 RESET AND SUPPLY SEQUENCE DIAGRAM 19
3.6.1 Switching ON 19
3.6.2 Switching OFF 19
3.6.3 Diagram 19
3.7 INTERNAL COMPONENTS SCHEMATICS 20
3.7.1 Audio I/O 20
3.7.2 Boot/reset and Power supply 20
3.7.3 Serial Link 20
3.8 INTEGRATION RECOMMENDATIONS 21
3.8.1 Analog out 21
3.8.2 Analog in 21
3.8.3 Microphone input 22
3.8.4 I2S 22
3.8.5 USB 23

4 MECHANICAL SPECIFICATIONS 24

4.1 HORIZONTAL MODULE WITH INTERNAL ANTENNA 24
4.2 HORIZONTAL MODULE WITH EXTERNAL ANTENNA 25
4.3 VERTICAL MODULE WITH INTERNAL ANTENNA 26
4.4 VERTICAL MODULE WITH EXTERNAL ANTENNA 27
4.5 CONNECTOR OF HORIZONTAL VERSION 28
4.6 CONNECTOR OF VERTICAL VERSION 29
4.7 PCB FOOTPRINT FOR HORIZONTAL MODULE 30
4.8 PCB FOOTPRINT FOR VERTICAL MODULE 30

4.9 CONNECTORS SPECIFICATIONS 30

5 AVAILABLE TOOLS 31

5.1 WORKBENCH 31
5.1.1 Diagram 31
5.1.2 Schematics 32
5.2 WXSERIAL 32

6 APPROVAL / CERTIFICATIONS 33

6.1 CE DECLARATION 33
6.2 FCC AND IC REQUIREMENTS FOR MODULE APPLICATION 34
6.3 ROHS DECLARATION 34

ANNEXE 35

A. BLUETOOTH HFP & A2DP/AVRCP USE CASES OVERVIEW: 35
a. Head Unit paired with Mobile phone 35
b. Head Unit connected to Mobile phone and headset device 37
c. Head Unit paired with two Mobile phones 38
d. Audio Streaming and Handsfree working together 39
e. Head Unit paired with Mobile phone and Music Player with Bluetooth dongle: 41
f. Head Unit paired with a stereo Headphone 42
g. Head Unit paired with two stereo Headphones 42
h. Head Unit paired with Mobile phone: Data transfer 44
B. USB/IPOD USE CASES 45
a. Head Unit with a iPod connected through the USB 45
b. iPod & iPhones Use Cases 46
c. Head Unit paired with a connected USB Mass storage device 47
C. HEAD UNIT BT/USB SOFTWARE UPDATE 48

1 Product overview

The CK5050New is a feature-rich Bluetooth/USB platform dedicated for the integration of Bluetooth and multimedia applications in car audios, car telematic systems or any systems requiring a complete embedded multimedia solution. CK5050New can integrate USB and Ipod management.

CK5050New features are:

- **Bluetooth connectivity**
  - Bluetooth Power Class 2 Radio
  - Embedded Bluetooth v1.1, v1.2 & v2.0+EDR compliant (v2.1+EDR 09Q3)
  - Embedded profiles
  - Compatible with most of Bluetooth phones
  - Pairing and connection with all Bluetooth Devices: Phones, Smartphones, PDA …
  - Multiple user support: Up to 10 paired phones
  - Multiple connection (up to 3 device connected at the same time)
  - Multiple profile

- **Phone**
  - Pick-up, Hang-up, Redial
  - Automatic answer (from host via pickup command)
  - Send DTMF during calls
  - Private Mode
  - 3-way calling

- **Phone Book**
  - Automatic Phone book synchronization over Bluetooth (up to 5000 contacts)
  - Call history (dialed number, received calls, missed calls)
  - All Synchronization Methods
  - Full Unicode for compatibility with numerous characters sets (European, Russian, Chinese, Japanese…)

- **Digital Signal Processing and Acoustics**
  - Acoustic Echo cancellation for Full Duplex operation
  - Noise reduction
  - Beam forming with 2 microphones inputs
  - Volume control
  - Speaker dependant voice recognition (trained names and keyword)

- **Audio Streaming**
  - Embedded SBC decoder
  - Embedded MP3 decoder from Thomson Licensing (optional)
  - Stereo audio output

- **Miscellaneous**
  - Provide Phone Battery Level and Network Level, Carrier Name (depends on phones)

- **Software Update**
  - Full standard Software available (free upgrade from Parrot homepage)
  - Software update available through Bluetooth, USB, UART or DUN
  - Very large compatibility with Phones, Smartphones, PDAs, Music players

- **External Bluetooth Antenna diagnostic**

- **USB**
  - Parrot CK5050New embeds USB 2.0 HOST Full speed transceivers
  - Compliant with USB devices supporting Mass Storage Class
  - Able to build a musical database from a Mass Storage Device conform to VFAT specifications (including FAT 12/16/32)
  - Using a dedicated library called DISCO, the feature supported by Parrot is to be able to retrieve the list of files and the metadata contained in the different files.

- **CAN bus connection**

2 Software specifications

2.1 Bluetooth stack

- HCI (Host Controller interface),
- L2CAP (Logical Link Control and Adaptation Protocol),
- RFCOMM
- SDP (Service Discovery Protocol),
- OBEX (IrDA Object Exchange).

2.2 Bluetooth profile supported

- Generic Access Profile
- Phone Management
  - HFP 0.96 - 1.0 - 1.5
  - HSP 1.0
  - SAP (SIM Access Profile)
- Message Management
  - MAP 1.0
- Phone Book
  - PBAP 1.0
  - SYNC 1.1 (IrMC SYNC over BT)
  - SYNCML
  - OPP 1.0 Server/Client (Vcard 2.1)
  - GSM 07.07 AT Commands
  - Nokia synchronization protocol
- Multimedia
  - A2DP (Audio)
  - SBC decoding
  - (optional MP3 decoding)
  - AVDTP
  - AVRCP1.2 / AVRCP1.3 / AVRCP1.4
- Others
  - SPP 1.1
  - BNEP, PAN
  - FTP 1.0
  - Image transfer over OPP
  - DUNP 1.1
  - Software update over SPP or DUN
  - Secure Simple Pairing 09Q3

2.3 Software interface

The software interface provides a high level command set, hiding the complexity of the Bluetooth.

This software is based on the well-known AT commands. Some of these commands are directly derived from the GSM 07.07 recommendations and the appropriate Bluetooth profiles.

Some supplementary commands are used to manage Bluetooth related functions like device pairing and connection management as well as the acoustic and speech recognition functions.

AT Command List and Bluetooth AT Command Software Specification are available on demand.

BLUES supports Unicode, which allows the management of accents and phonebook in any language. The format of the exchange with the HOST is UTF8

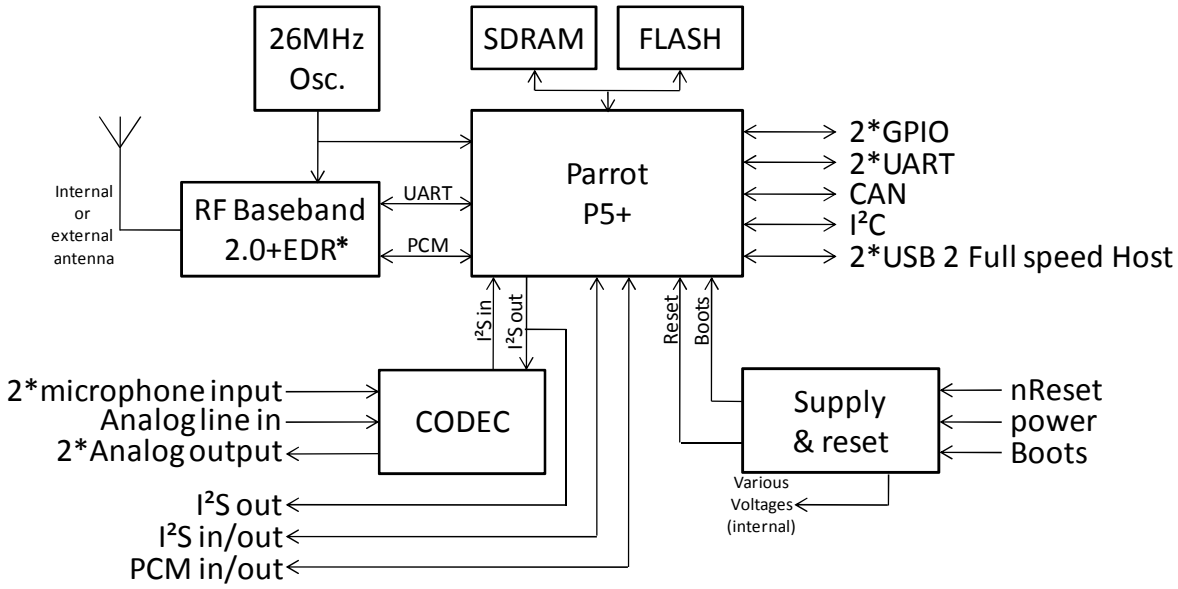
2.4 Memory configurations

Flash/SDRAM (Mbits)	Paired phones	Max. contacts	Disco(4)	Supported codecs(1)	Ipod(2)
32/64	Up to 10	1000	No	SBC	No
64/128	Up to 10	5000	Yes(3)	SBC, MP3, WMA, WAV, AAC	Yes

(1) Some codecs need specific fee to be paid directly to the right organization
(2) An IPod chip must be externally connected to the module (I²C interface)
(3) Database up to 10000 songs
(4) Parrot USB management library

3 Electrical specifications

3.1 Hardware architecture

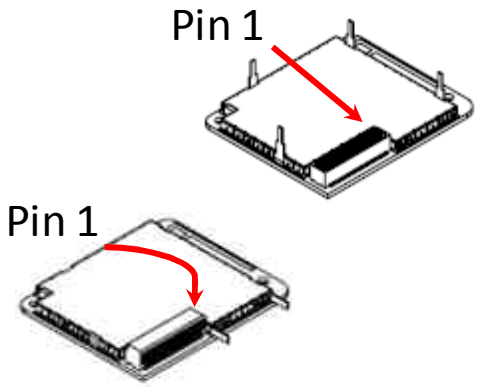


*** : BT2.1 + EDR will be available in 09Q3**

3.2 Pinout

3.2.1 40 pins diagram

CAN_Tx	1	2	I2C_CLK
CAN_Rx	3	4	I2C_DA
I/O1	5	6	I/O2
USB0_D-	7	8	USB1_D-
USB0_D+	9	10	USB1_D+
Boots	11	12	NRESET
Vcc	13	14	VSS
PCM_OUT	15	16	U1_OUT
PCM_IN	17	18	U1_IN
PCM_SYNC	19	20	U0_OUT
PCM_CLK	21	22	U0_IN
I2S_OUT1	23	24	I2S_OUT2
I2S_SYNC	25	26	I2S_IN
I2S_MCLK	27	28	I2S_CLK
Vss	29	30	Vcc
SPK2P	31	32	SPK1P
MIC_PWR	33	34	HP_COM
MIC1P	35	36	MIC2P
MiC2N	37	38	MIC2N
Lin	39	40	Rin



3.2.2 Pinout table

Pin	Function	Type	Description
01	CAN_TX	O	CAN interface
02	I2C_CLK	O	I²C clock
03	CAN_RX	I	CAN interface
04	I2C_DA	I/O	I²C data
05	I/O_1	I/O	General purpose IO
06	I/O_2	I/O	General purpose IO
07	USB0_D-	I/O	USB interface data -
08	USB1_D-	I/O	USB interface data -
09	USB0_D+	I/O	USB interface data +
10	USB1_D+	I/O	USB interface data +
11	Boots	I	Command for software update
12	Nreset	I	Reset
13	Vcc	Power	Power
14	Vss	Power	Ground
15	PCM_OUT	O	PCM data out
16	U1_OUT	O	UART out (debug)
17	PCM_IN	I	PCM data in
18	U1_IN	I	UART in (debug)
19	PCM_SYNC	I/O	PCM synchronization
20	U0_OUT	O	UART out
21	PCM_CLK	I/O	PCM clock
22	U0_IN	I	UART in
23	I2S_OUT1	O	I²S data out
24	I2S_OUT2	O	I²S data out
25	I2S_SYNC	I/O	I²S synchronization
26	I2S_IN	I	I²S data in
27	I2S_MCLK	I/O	I²S master clock
28	I2S_CLK	I/O	I²S clock
29	Vss	Power	Ground
30	Vcc	Power	Power
31	SPK2P	O	Analog audio output (left)
32	SPK1P	O	Analog audio output (right)
33	MIC_PWR	O	Microphone power supply
34	HP_COM	I	Headphone ground common feedback input
35	MIC1P	I	Analog microphone differential input +
36	MIC2P	I	Analog microphone differential input +
37	MIC1N	I	Analog microphone differential input -
38	MIC2N	I	Analog microphone differential input -
39	Lin	I	Analog audio line in (left)
40	Rin	I	Analog audio line in (right)

3.2.3 Unconnected pins advice

Pin	Function	Type	Comment
01	CAN_TX	O	
02	I2C_CLK	O	Left open
03	CAN_RX	I	
04	I2C_DA	I/O	Left open
05	I/O_1	I/O	To be configured as input and connected to Vss
06	I/O_2	I/O	To be configured as input and connected to Vss
07	USB0_D-	I/O	Left open
08	USB1_D-	I/O	Left open
09	USB0_D+	I/O	Left open
10	*USB1_D+*	*I/O*	*Left open*
11	BOOTS	I	Left open
15	PCM_OUT	O	
16	U1_OUT	O	Left open
17	PCM_IN	I	
18	U1_IN	I	Pull Up 22KOmhs
19	PCM_SYNC	I/O	
20	U0_OUT	O	Left open
21	PCM_CLK	I/O	
22	U0_IN	I	Left open
23	I2S_OUT1	O	Left open
24	I2S_OUT2	O	Left open
25	I2S_SYNC	I/O	Left open
26	I2S_IN	I	Pull Down 47KOmhs
27	I2S_MCLK	I/O	Left open
28	I2S_CLK	I/O	Left open
31	SPK2P	O	
32	SPK1P	O	
33	MIC_PWR	O	Left open
34	HP_COM	I	
35	MIC1P	I	Connect directly to ground
36	MIC2P	I	Connect directly to ground
37	MIC1N	I	Connect directly to ground
38	MIC2N	I	Connect directly to ground
39	Lin	I	Connect to ground through a capacitor (1nF)
40	Rin	I	Connect to ground through a capacitor (1nF)

3.3 Maximum ratings

Operating temperature range .....-40℃ to +85℃
Storage temperature range .....-40℃ to +125℃
Voltage on Vcc with respect to Vss.....-0.3V to +3.7V
ESD sensitivity according ES-XW7T-1A278-AC .....±4kV

3.4 Power consumption (T°=-40℃ to +85℃)

Stop mode..... <20µA
Idle mode (waiting for commands)..... <150mA
Hands free and audio streaming mode..... <300mA

3.5 Electrical specifications

3.5.1 Power pins

Conditions unless noted, otherwise : Tamb.=25℃					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Normal supply		3.2	-	3.6	V

3.5.2 Reset pin

Conditions unless noted, otherwise : T=-40℃ to +85 ℃; Vcc=3V2 to 3V6					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Reset time		50	-	-	µs
Active reset voltage level		-	-	0.4	V
Non active reset voltage level		2.5	-	-	V

3.5.3 IO pins

Electrical parameters of the GPIO pins (5 and 6)

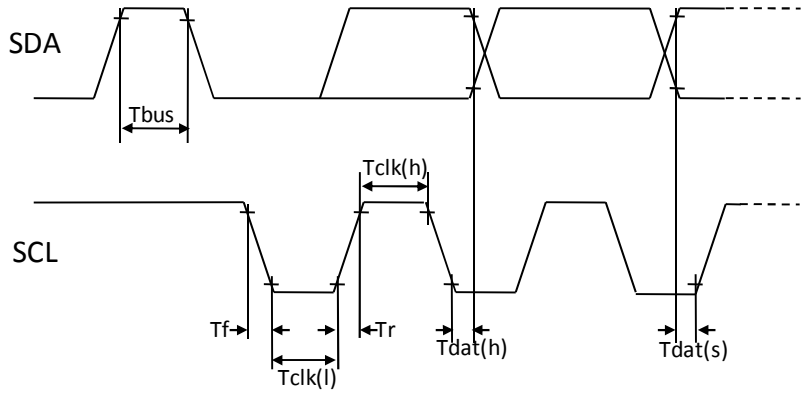
Conditions unless noted, otherwise : T=-40℃ to +85 ℃; Vcc=3V2 to 3V6					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Input voltage		0	-	Vcc	V
Output voltage		0	-	Vcc	V
High level input voltage (Vih min)		0.7*Vcc	-	-	V
Low level input voltage (Vil max)		-	-	0.2*Vcc	V
Low level input current	Vi=0V; pull up	-	-	100	µA
High level input current	Vi=Vcc; pull down	-	-	92	µA
Hysteresis voltage		0.5		0.62	V
High level output voltage (Voh min)	Iout= n mA	Vcc-0.4	3.3	-	V
Low level output voltage (Vol max)	Iout= n mA	-	-	0.4	V
Level output current	Vout= n V	-	-	2	mA

3.5.4 CAN

Conditions unless noted, otherwise : Tamb.=25℃; Vc c=3V3					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Input high level voltage (Vih min)		0.7*Vcc	-	Vcc	V
Input low level voltage (Vil max)		-	-	0.2*Vcc	V
Output high level voltage (Voh min)		Vcc-0.4	-	-	V
Output low level voltage (Vol max)		-	-	0.4	V

3.5.5 I²C

Timing parameters of the I²C bus (pins 2 and 4)



Conditions unless noted, otherwise : Tamb.=25°C; Vc c=3V3						
Parameter	**Conditions**	I²C 100kHz		I²C 400kHz		**Unit**
		Min.	**Max.**	**Min.**	**Max.**	
SCL clock frequency		0	100	0	400	kHz
Bus free between start and stop (Tbus)		6	-	1.5	-	µs
Low period of SCL (Tclk(l))		6	-	1.5	-	µs
High period of SCL (Tclk(h))		4.0	-	0.6	-	µs
Data hold time (Tdat(h))		50		50		ns
Data setup time (Tdat(s))		50	-	50	-	ns
Rise time of both SDA & SCL (Tr)		-	50	-	50	ns
Fall time of both SDA & SCL (Tf)		-	50	-	50	ns
Max. capacity load for each bus line		-	400	-	400	pF
Input high level voltage (Vih min)		0.7*Vcc	-	0.7*Vcc	-	V
Input low level voltage (Vil max)		-	0.2*Vcc	-	0.66	V
Output high level voltage (Voh min)		Vcc-0.4	-	Vcc-0.4	-	V
Output low level voltage (Vol max)		-	0.4	-	0.4	V

(1)

3.5.6 USB

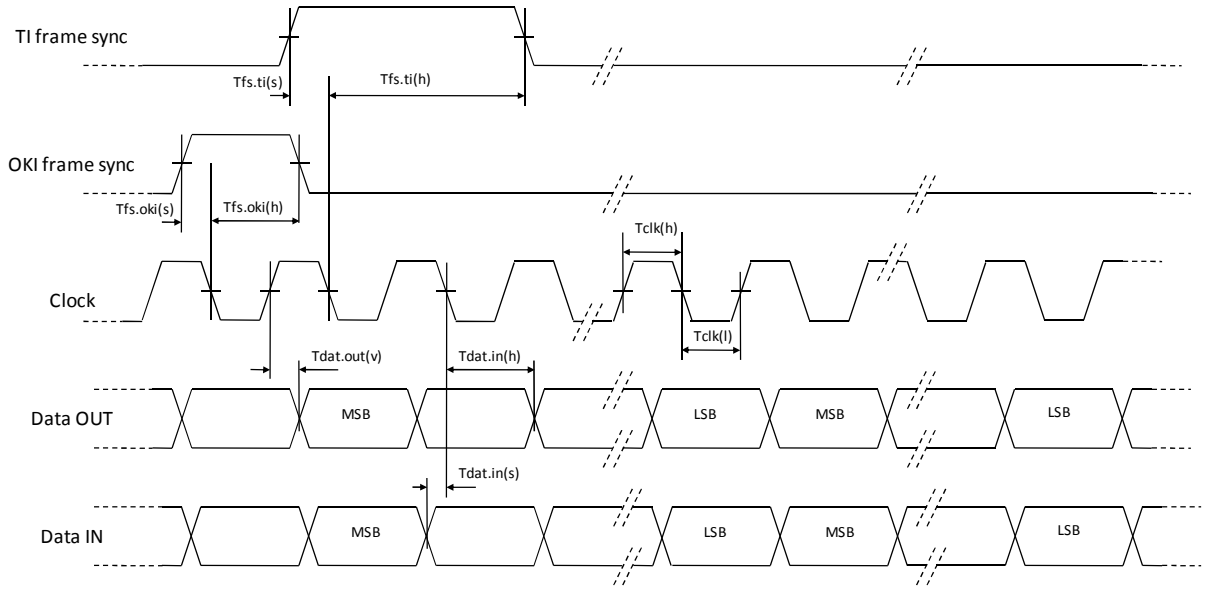
Conditions unless noted, otherwise : Tamb.=25℃; Vc c=3V3; Cload=50pF					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Differential input sensitivity	|(D+)-(D-)|	TBD	-	-	V
Differential common mode voltage range	Include differential input sensitivity	TBD	-	TBD	V
Single ended receiver switching threshold voltage		TBD	-	TBD	V
Low level output voltage for low and full speed	Rload=1.5kΩ to 3V3	-	-	TBD	V
High level output voltage for low and full speed	Rload=1.5kΩ to Vss	TBD	-	TBD	V
Transceiver capacitance	Pin to Vss	-	-	TBD	pF
Rise time	10% to 90%	4	-	20	ns
Fall time	10% to 90%	4	-	20	ns
Output signal crossover voltage		1.3	-	2	V
Input high level voltage (Vih min)		TBD	-	-	V
Input low level voltage (Vil max)		-	-	TBD	V
Output high level voltage (Voh min)		TBD	-	-	V
Output low level voltage (Vol max)		-	-	TBD	V

3.5.7 UART0/UART1

Conditions unless noted, otherwise : Tamb.=25℃; Vc c=3V3					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Input high level voltage (Vih min)		0.7*Vcc	-	-	V
Input low level voltage (Vil max)		-	-	0.2*Vcc	V
Output high level voltage (Voh min)		0.4*Vcc	-	-	V
Output low level voltage (Vol max)		-	-	0.4	V
Rise time	Cload=10pf	-	-	170	ns
Fall time	Cload=10pf	-	-	160	ns
Baud rate		-	-	650	kbps
Emission Baud rate precision		-	0.25	-	%
Reception Baud rate tolerance		-	4	-	%

3.5.8 PCM

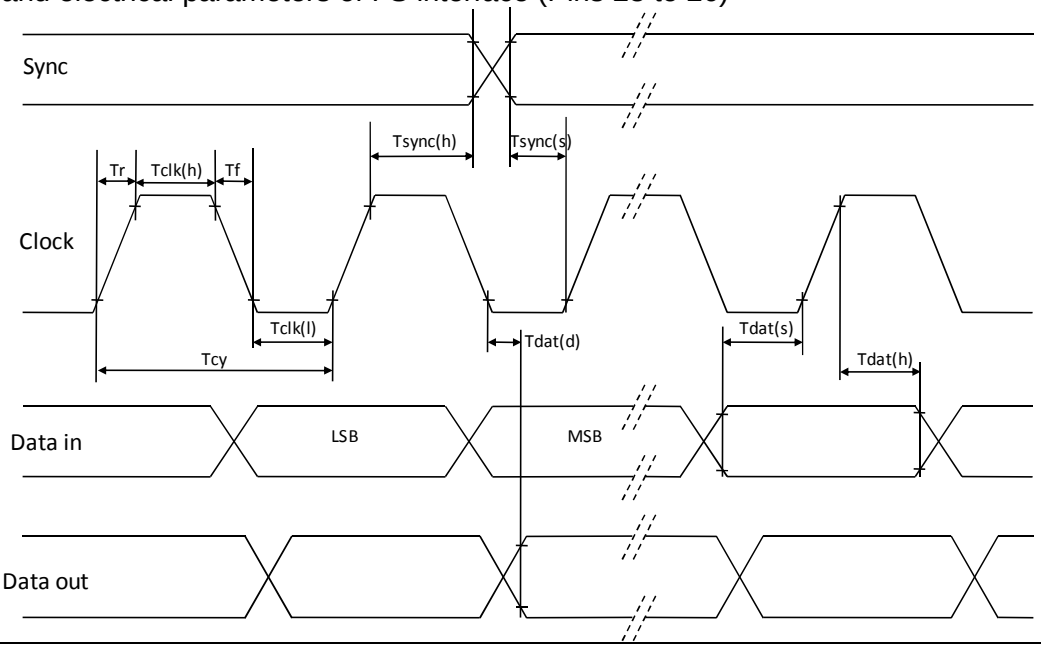
Timing parameters of PCM interface (pins 15, 17, 19 & 21)



Conditions unless noted, otherwise : Tamb.=25℃; Vc c=3V3					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Frame sync TI to clock falling setup time (Tfs.ti(s))		10	-	-	ns
Frame sync TI to clock falling hold time (Tfs.ti(h))		10	-	-	ns
Frame sync Oki to clock falling setup time (Tfs.oki(s))		10	-	-	ns
Frame sync Oki to clock falling hold time (Tfs.oki(h))		10	-	-	ns
PCM clock high time (Tclk(h))		100	-	-	ns
PCM clock low time (Tclk(l))		100	-	-	ns
PCM data in hold time (Tdat.in(h))		10	-	-	ns
PCM data in setup time (Tdat.in(s))		10	-	-	ns
PCM data out volid time (Tdat.out(v))		-	-	25	ns
Input high level voltage (Vih min)		0.7*Vcc	-	-	V
Input low level voltage (Vil max)		-	-	0.2*Vcc	V
Output high level voltage (Voh min)		0.4*Vcc	-	-	V
Output low level voltage (Vol max)		-	-	0.4	V

3.5.9 I²S

Timing and electrical parameters of I²S interface (Pins 23 to 26)



Conditions unless noted, otherwise : Tamb.=25°C; Vc c=3V3					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Bitclock cycle time (Tcy)		325 (48kHz)	-	354 (44.1kHz)	ns
Bitclock Rise time (Tr)		-	-	10	ns
Bitclock Fall time (Tf)		-	-	10	ns
Bitclock time high (Tckl(h))		150	-	-	ns
Bitclock time low (Tckl(l))		150	-	-	ns
Data setup time (Tdat(s))		10	-	-	ns
Data hold time (Tdat(h))		10	-	-	ns
Data delay time (Tdat(d))		-	-	100	ns
Sync setup time (Tsync(s))		10	-	-	ns
Sync hold time (Tsync(h))		10	-	-	ns
High level input voltage (Vih min)		0.7*Vcc	-	-	V
Low level input voltage (Vil max)		-	-	0.2*Vcc	V
High level output voltage (Voh min)		0.4*Vcc	-	-	V
Low level output voltage (Vol max)		-	-	0.4	V
Drive load capability			-	2	mA

3.5.10 Analog out

Electrical parameters of SPK1P and SPK2P pins (29 and 30).

Conditions unless noted, otherwise : Tamb.=25℃; Vc c=3V3					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Average DC output voltage		-	1.5	-	V
Bandwidth	-3dB	3.8	-	21.1K	Hz
Load resistor		16	-	-	Ω
Full scale output	Rload=10K, Gain=0dB		0,9		V_{rms}
THD+N	Rload AC=20kΩ, f=1kHz, OdB	-	-	80	dB
SNR	@1kHz, A-Weighted	-	65	-	dBA

3.5.11 Line in

Electrical parameters of the line-in pins (39 and 40).

Conditions unless noted, otherwise : Tamb.=25℃; Vc c=3V3					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Full scale input voltage	THD<0.5%	-		0.7	V_{rms}
Input resistance	Gain=0dB		46		kΩ
THD+N	1kHz, 1.3Vrms, BW=20kHz	-		85	dB
SNR	1kHz, Bw=20kHz, 0dBref.=1.3Vrms, A-weighted		75	-	dBA
Audio input frequency response	-3dB roll off	12	-	21k	Hz

3.5.12 Microphone input

Conditions unless noted, otherwise : Tamb.=25℃; Vc c=3V3					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Maximum input impedance data		-	-	TBD	Ω
DC input voltage (Pin MIC_PWR)		-	TBD	-	V
Max. AC input voltage	@ THD = 0.05%	TBD	TBD	TBD	mV_{rms}
SNR	@1kHz, A-weighted, G=0dB, Vin=800mVrms	-	80	-	dBA
THD+N	@1kHz, Vin=300mVrms	-	90	-	dB
Bandwidth	-3dB, G=0dB, Vin=800mVrms	7	-	21k	Hz

3.5.13 Bluetooth radio link

Conditions unless noted, otherwise : Tamb.=25°C; Vc c=3V3					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Antenna impedance	Module with connector only	-	50	-	Ω

3.6 Reset and supply sequence diagram

3.6.1 Switching ON

- The signal “NRESET” on the host interface is forced to a logical zero value by host until the supply voltage reached its nominal value.

During this phase no component on the module is supplied.

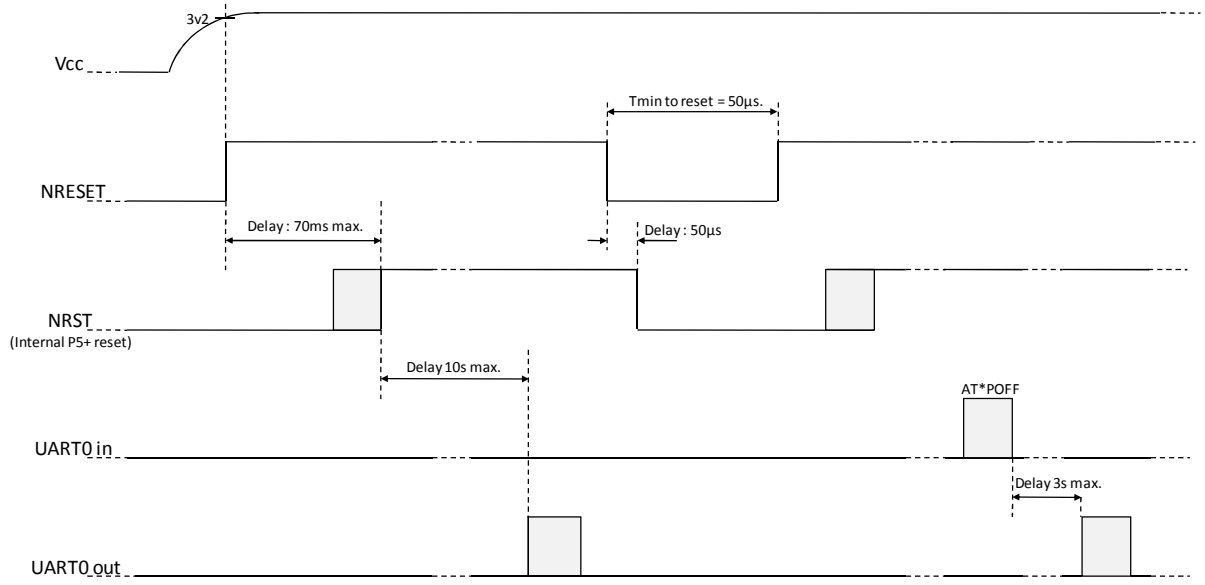
- The host switches its signal “NRESET” to a logical one value allowing the module to turn on its supply.
- After 70 ms, the supply gets stabilized and then triggers the start of the ASIC
- 100ms is necessary for the ASIC to start and give execution to the embedded software that will turn the module into a permanent “active mode”

3.6.2 Switching OFF

- The host sends the "sleep” AT command
- The ASIC disconnects any BT link
- The ASIC sends the "sleep acknowledge" AT command allowing the host to switch the reset to a zero logical value.
- If the host activate the “NRESET” to zero for at least 5 us but no more than 4ms the module will be reset.
- The signal “NRESET” on the host interface is forced to a logical zero value by host until the supply voltage reached its nominal value.

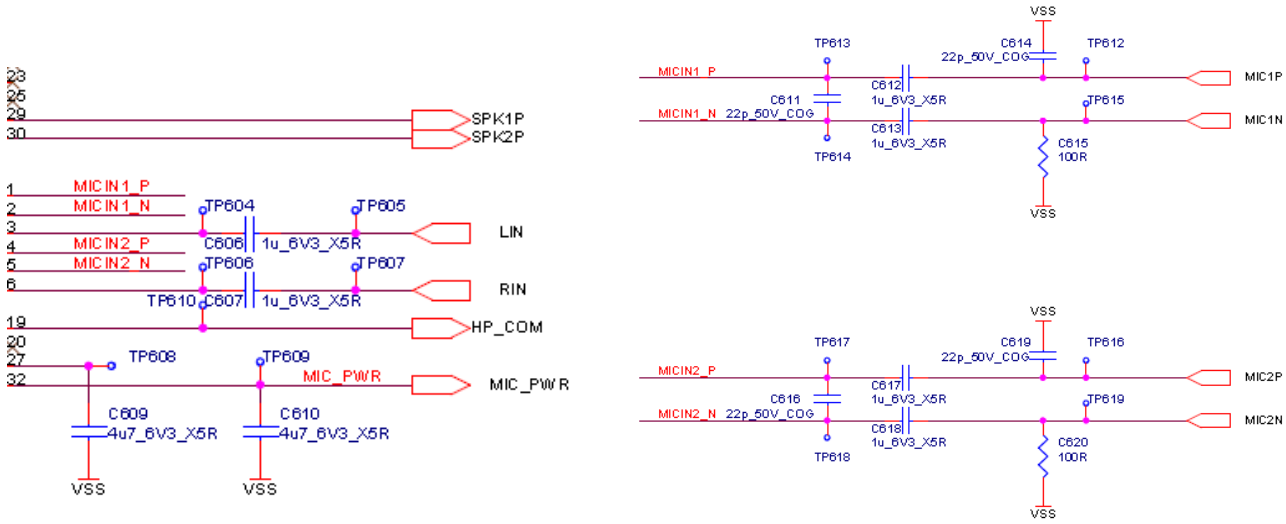
Note: Switching off is also possible during “active mode” by turning reset to “zero” during 500ms. This unexpected reset is not recommended because some BT devices may abnormally behave if the BT link is not properly disconnected.

3.6.3 Diagram

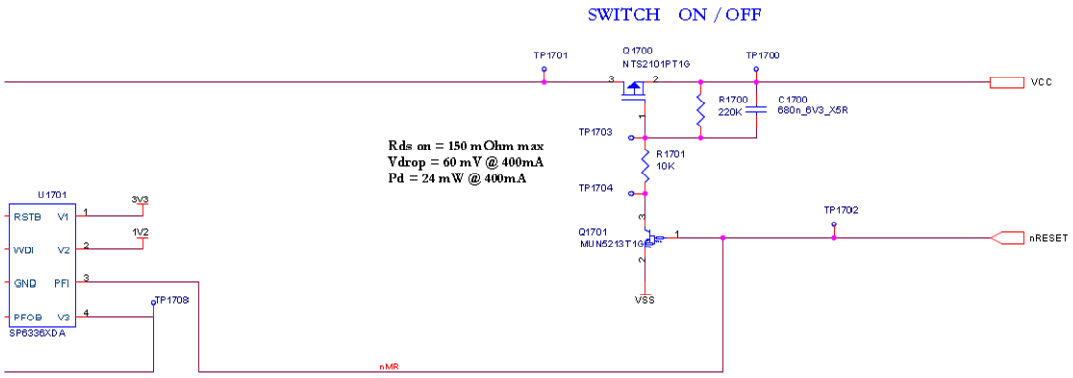


3.7 Internal Components schematics

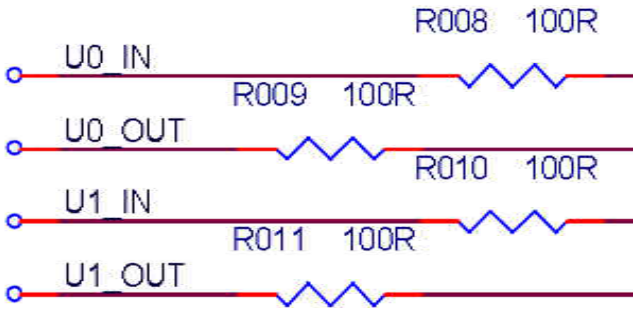
3.7.1 Audio I/O



3.7.2 Boot/reset and Power supply

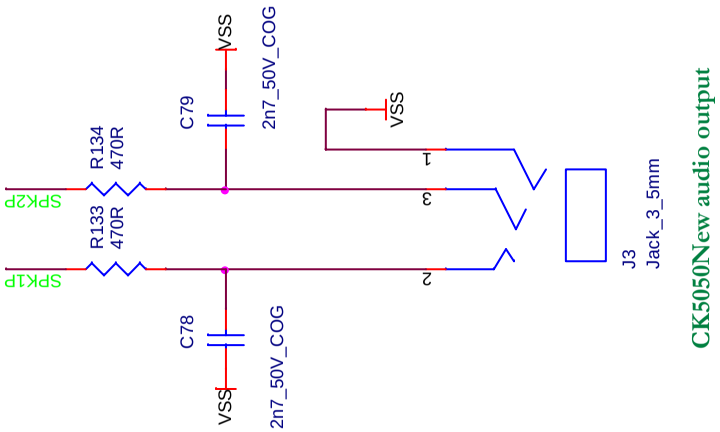


3.7.3 Serial Link

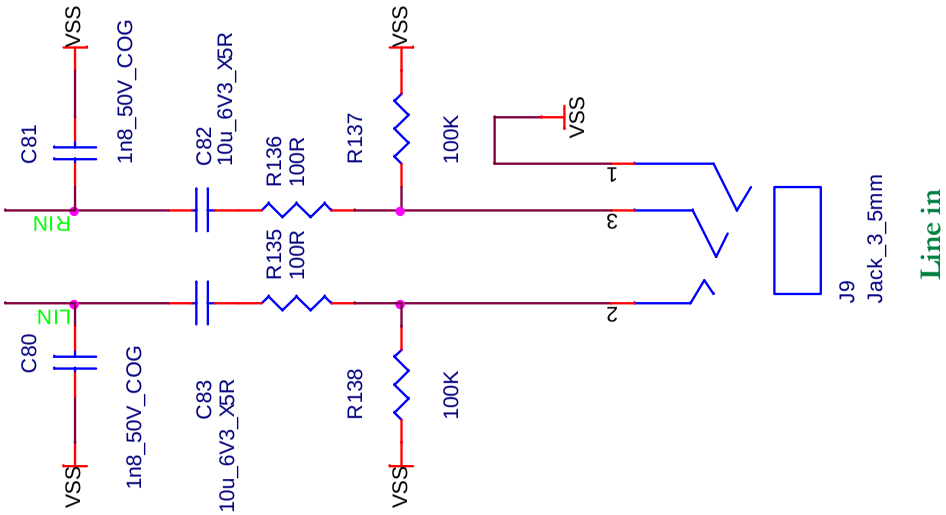


3.8 Integration recommendations

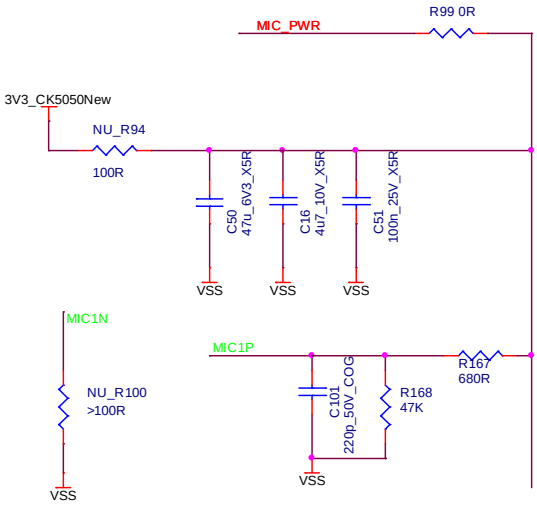
3.8.1 Analog out



3.8.2 Analog in



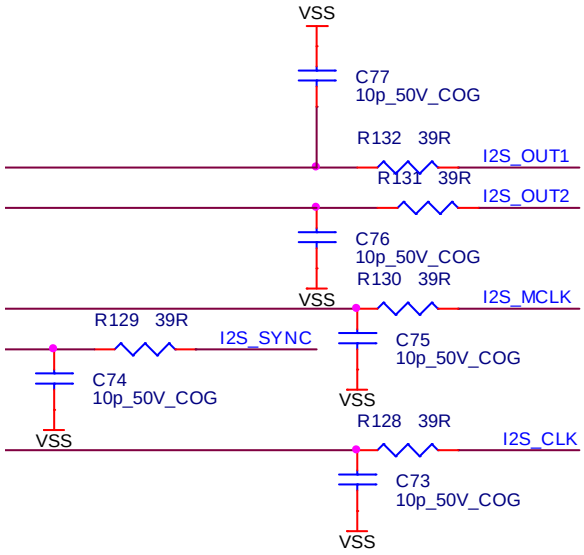
3.8.3 Microphone input



Note: Microphone input routing.

- *The microphone can use internal or external power supply. Take care to have the same ground reference between your supply and the pull down resistor on MICxN.*
- *For an external power supply, you have to put a resistor more than 100R. If you use the internal power supply, you needn't to use an external resistor.*

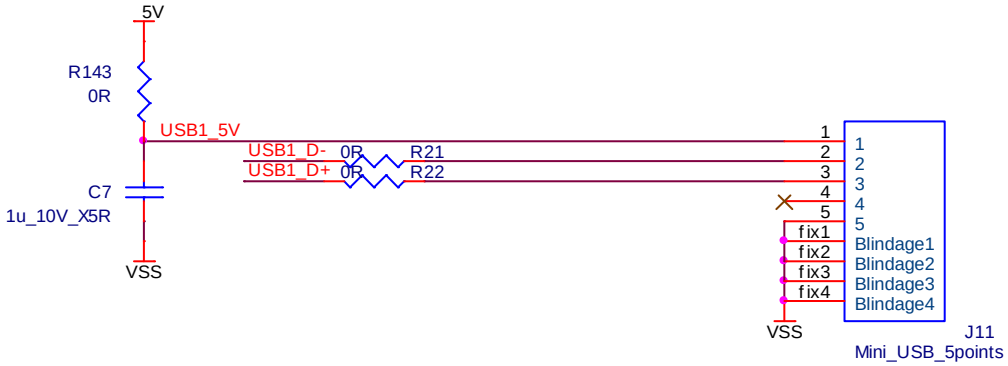
3.8.4 I2S



Note: I2S routing

- *Parrot advises to route I2S_MCLK in internal layout with ground around.*
- *The filters have to be put near of Parrot connector.*

3.8.5 USB

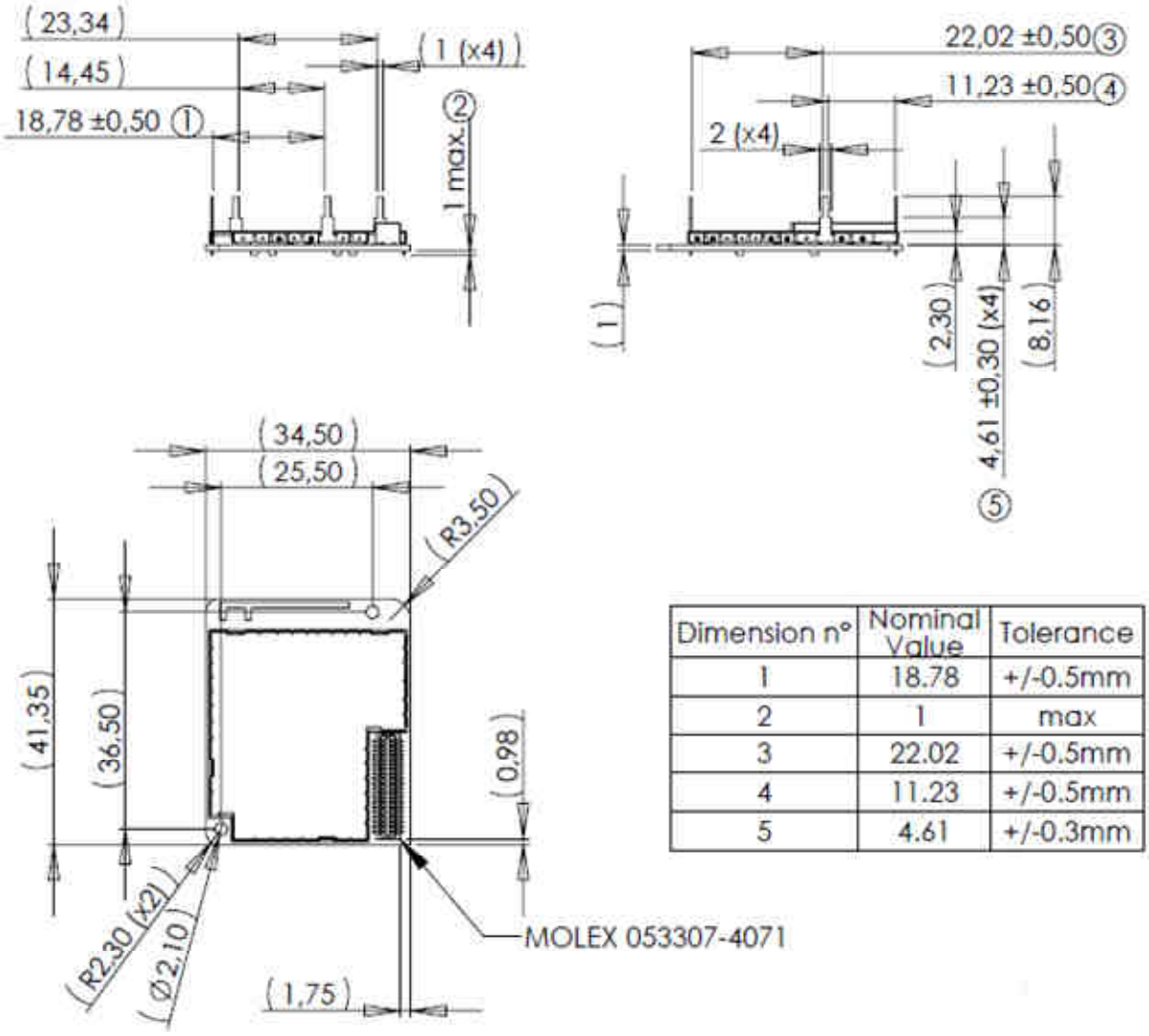


Note: USB Routing:

- *Maintain parallelism between USB differential signals with the trace spacing needed to achieve 90 ohms differential impedance i.e the separation between the two traces; D+, D-, shall be larger than their distances towards the USB signal reference plane: 90 Ohms differential = 2 times 45 Ohms to ground in series.*
- *Avoid 90° turns , use two 45° turns or an arc instead.*
- *Do not route USB traces under crystals, oscillators.*
- *Route high-speed USB signals using a minimum number of vias and corners (avoid changing layers with high-speed traces as much as practical.)*
- *Stubs on high speed USB signals e.g.towards the pull-down resistors, should be avoided*
- *Verify with an impedance calculator or TDR that the trace spacing and the trace width used on the specific board stack up to 90 ohms differential impedance. With low or minimal coupling between the two traces; D+, D-, the characteristic impedance towards the USB signal reference is dominant and shall be equal to 45 Ohm single ended.*
- *HIGH SPEED USB signal pair traces should be trace length matched. The maximum trace length mismatch between HS USB signal pairs should be no greater than 200 mils.*
- *Ensure D+ and D- traces have grounded solid guard traces aside and a solid USB signal reference plane underneath them from the USB connector up to the USB transceiver device.*

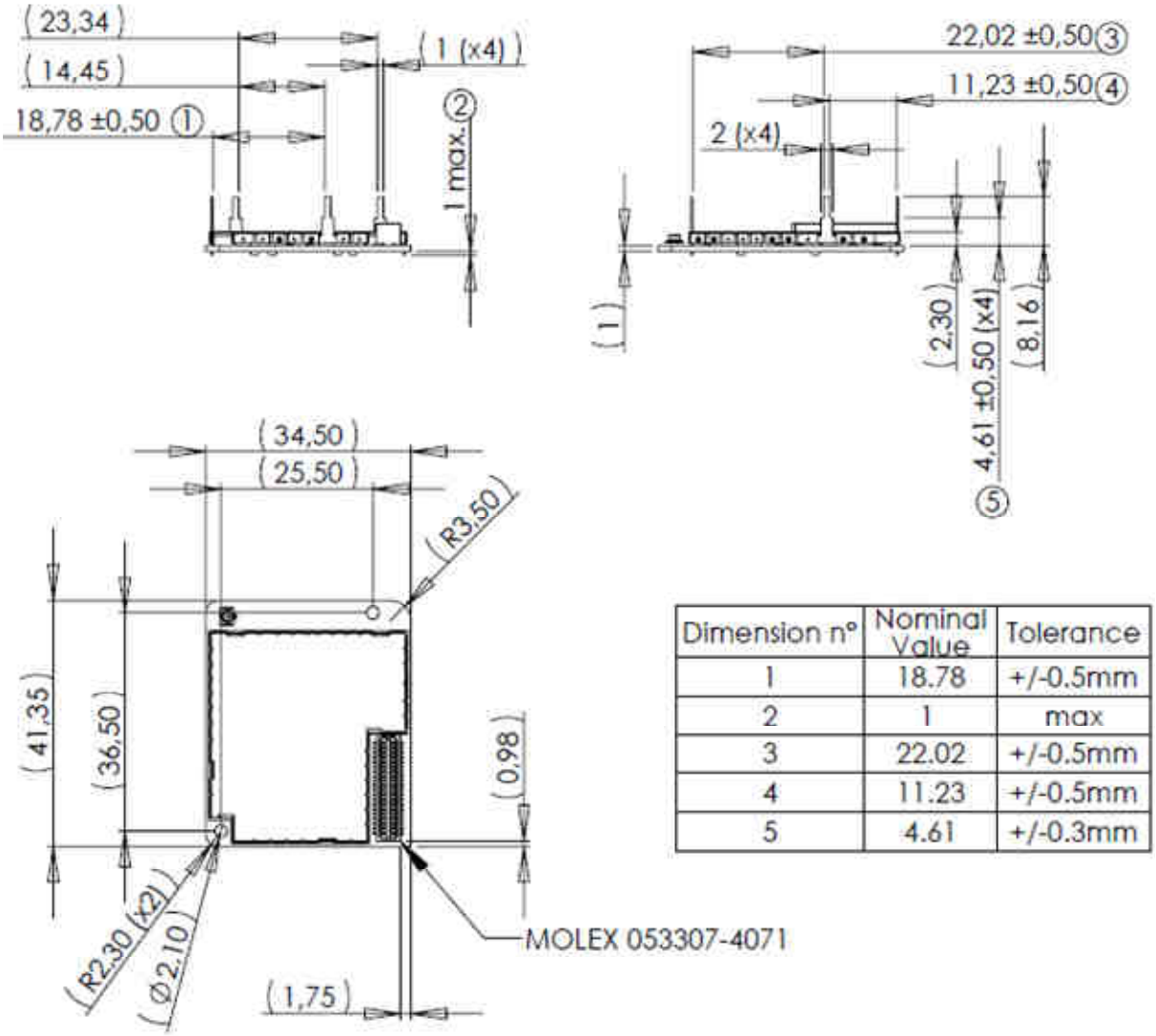
4 Mechanical specifications

4.1 Horizontal module with internal antenna



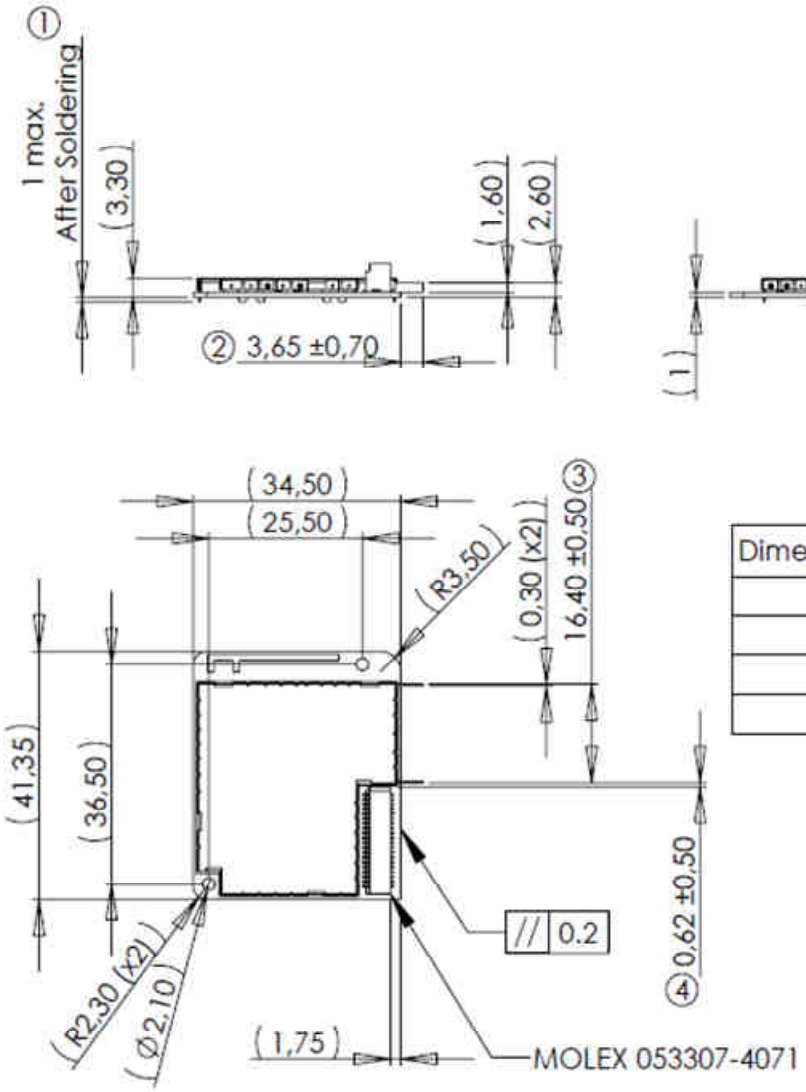
Dimension n°	Nominal Value	Tolerance
1	18.78	+/-0.5mm
2	1	max
3	22.02	+/-0.5mm
4	11.23	+/-0.5mm
5	4.61	+/-0.3mm

4.2 Horizontal module with external antenna



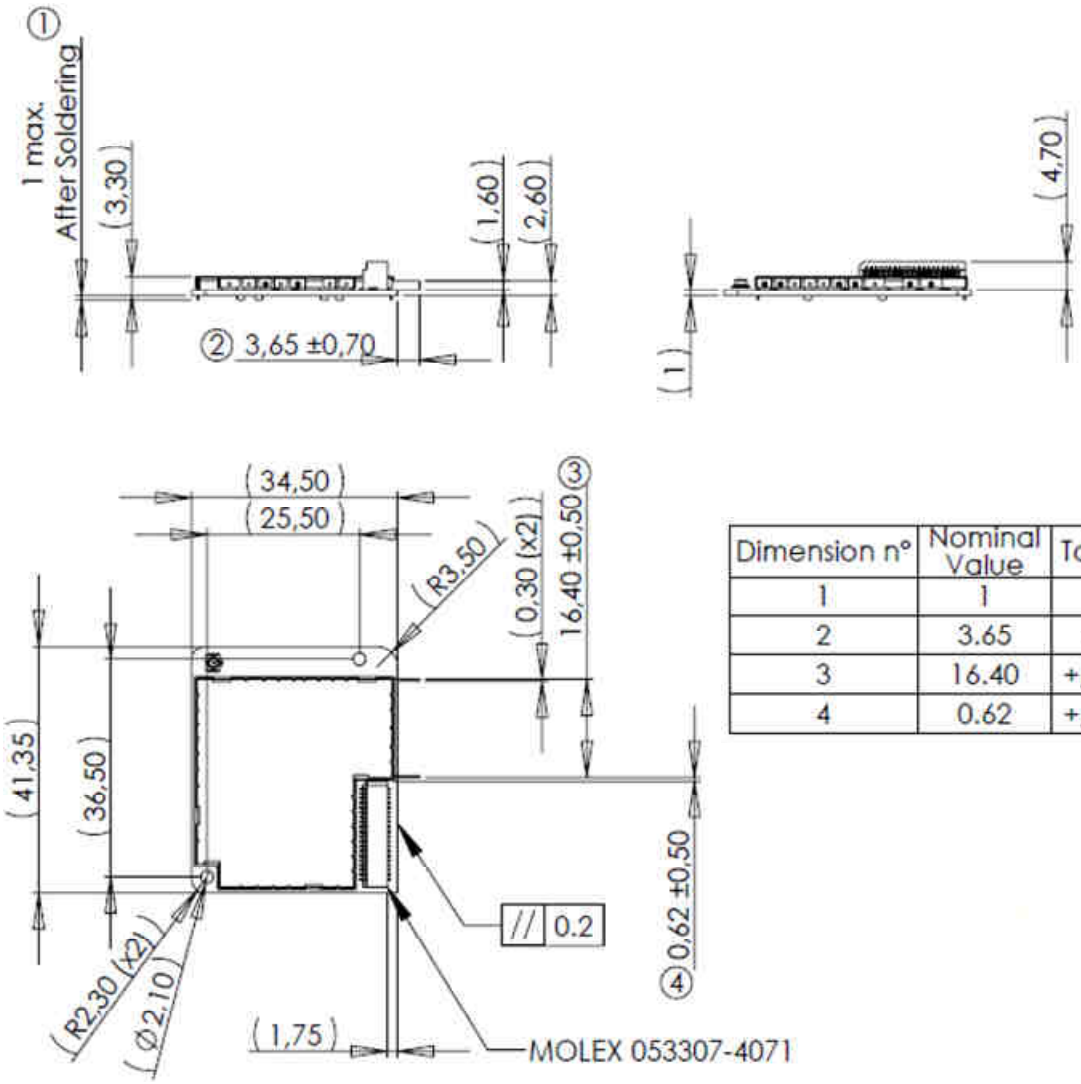
Dimension n°	Nominal Value	Tolerance
1	18.78	+/-0.5mm
2	1	max
3	22.02	+/-0.5mm
4	11.23	+/-0.5mm
5	4.61	+/-0.3mm

4.3 Vertical module with internal antenna



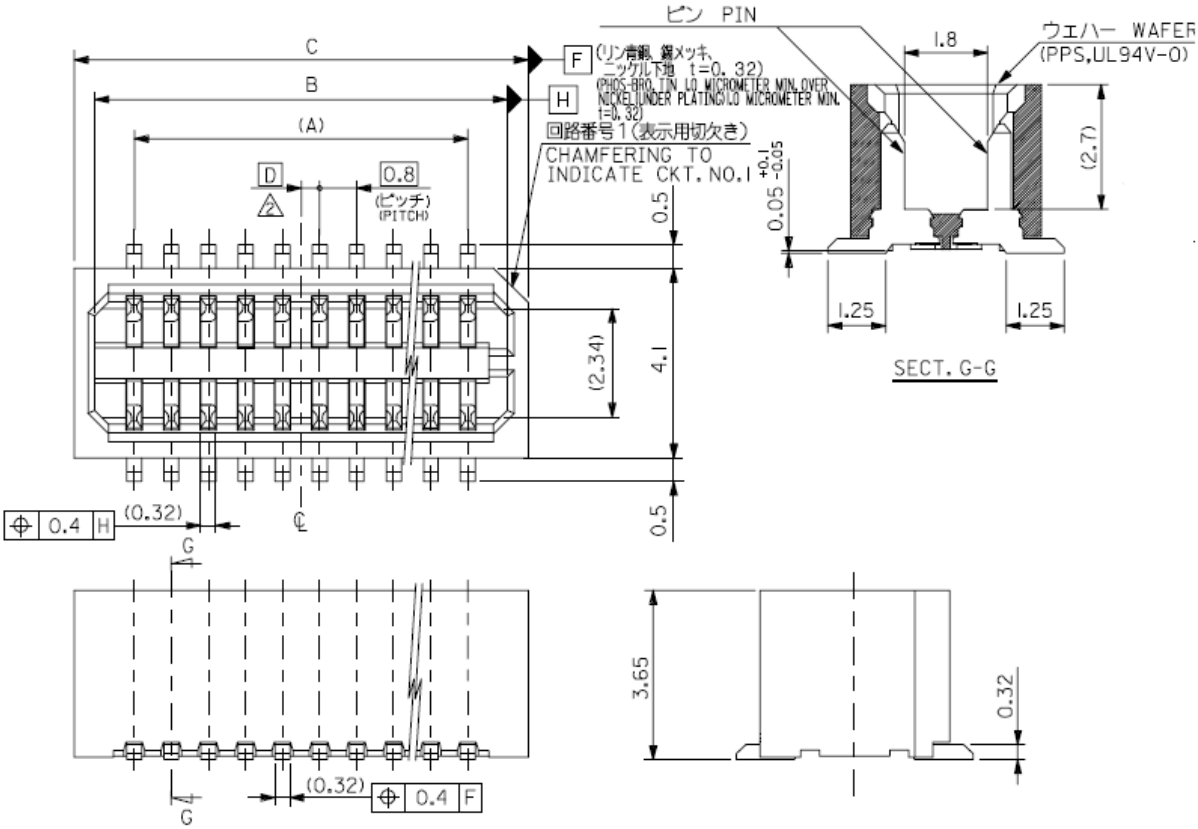
Dimension n°	Nominal Value	Tolerance
1	1	max
2	3.65	+/-0.7
3	16.40	+/-0.5mm
4	0.62	+/-0.5mm

4.4 Vertical module with external antenna



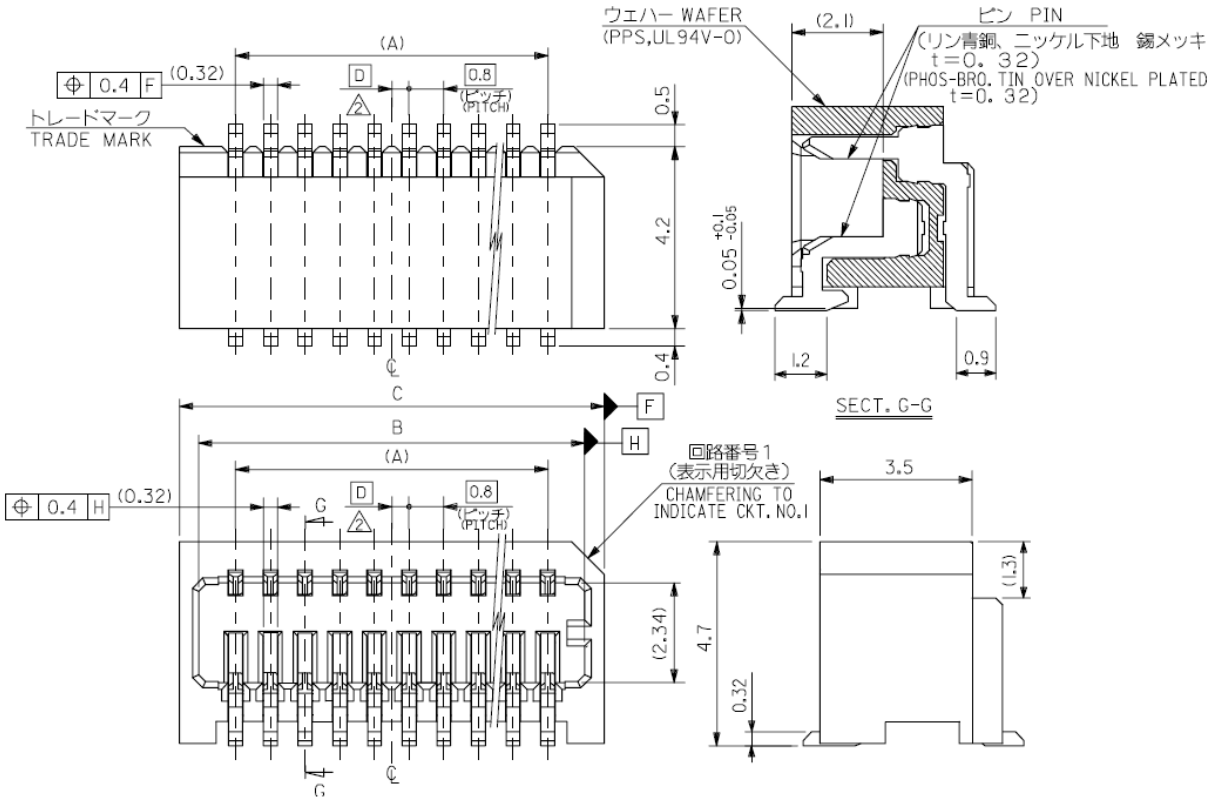
Dimension n°	Nominal Value	Tolerance
1	1	max
2	3.65	+/-0.7
3	16.40	+/-0.5mm
4	0.62	+/-0.5mm

4.5 Connector of horizontal version



		0.4	17.8	16.9	15.2	53307-4028	40
		0.8	13.8	12.9	11.2	53307-3028	30
53307-**28	MODEL NO.	D	C	B	A	MATERIAL. NO.	極数 CKT.

4.6 Connector of vertical version

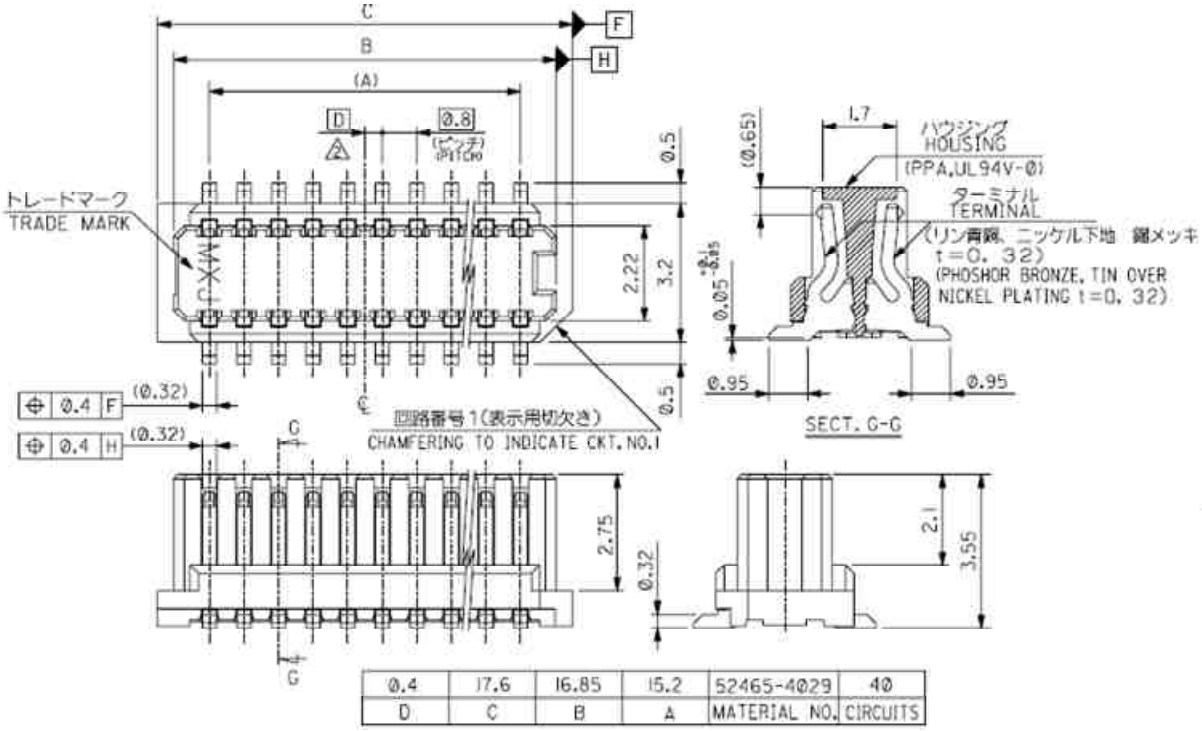


	0.4	17.8	16.9	15.2	53309-4029	40
53309-**29	0.8	13.8	12.9	11.2	53309=3029	30
MODEL NO.	D	C	B	A	MATERIAL NO.	極数CKT.

4.7 PCB footprint for horizontal module

4.8 PCB footprint for vertical module

4.9 Connectors specifications

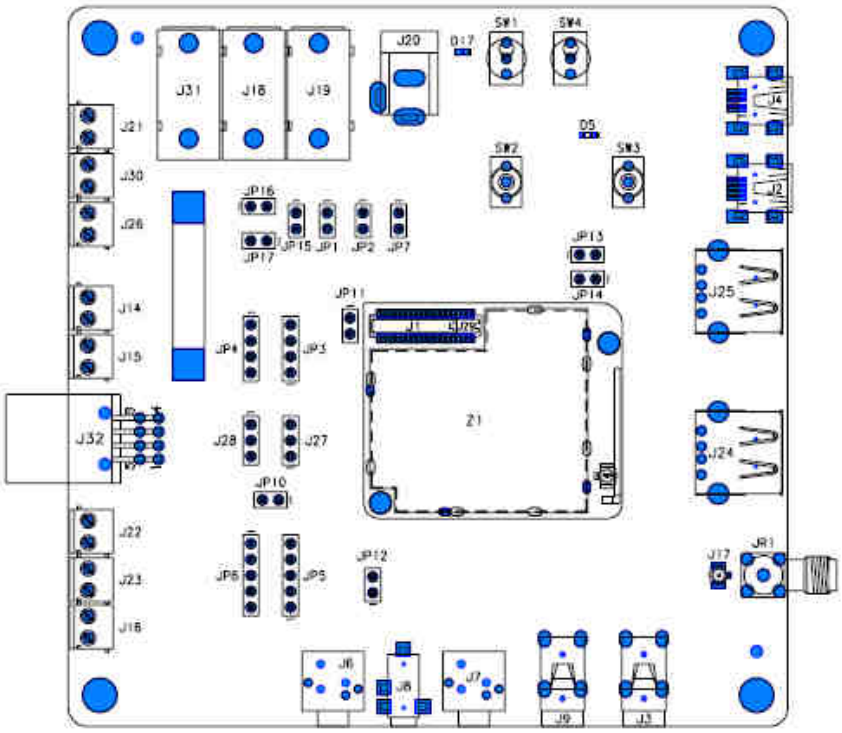


Ø.4	17.6	16.85	15.2	52465-4029	40
D	C	B	A	MATERIAL NO.	CIRCUITS

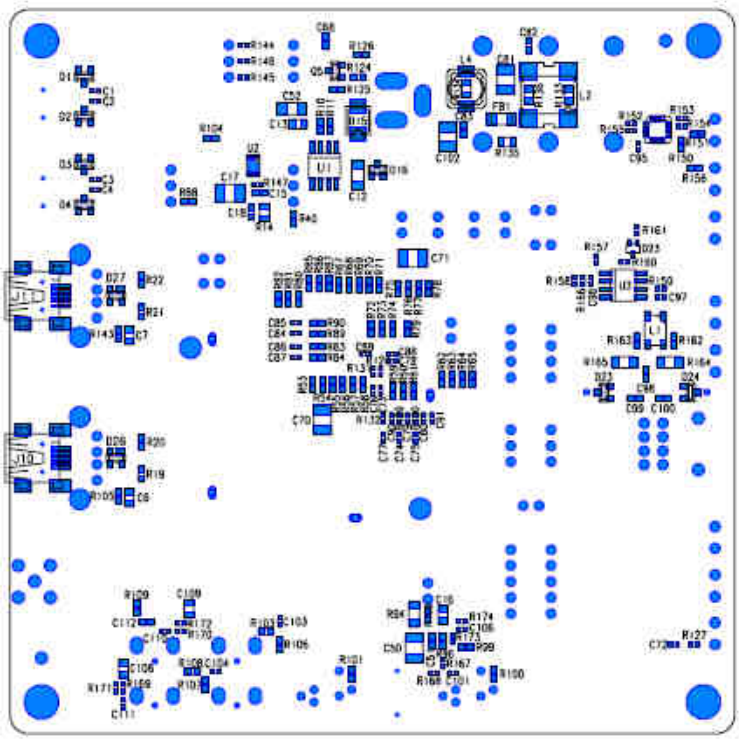
5 Available tools

5.1 Workbench

5.1.1 Diagram



TOP view



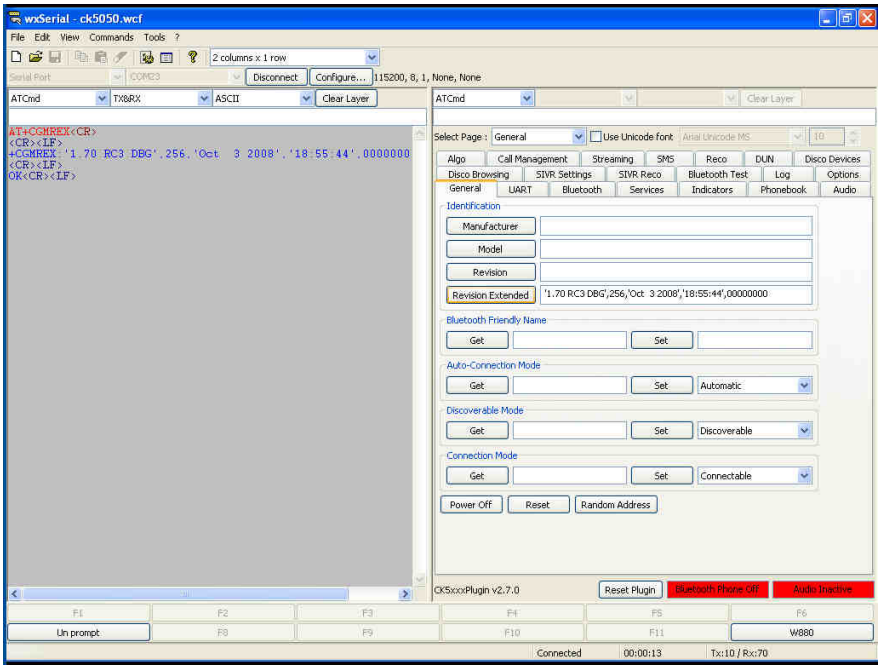
Bottom view

5.1.2 Schematics

The work bench schematic will be provided on demand

5.2 Wxserial

Wxserial is a windows based software that gives the possibility to send and read the AT commands used by the CK5050New.



6 Approval / Certifications

6.1 CE Declaration

We, Parrot SA 174 quai de Jemmapes 75010 Paris France, declare under our responsibility that our product (Parrot CK5050NEW) is in conformity with the Radio and Telecommunication Equipment directive 1999/5/EC R&TTE according to the essentials requirements and respect the standard listed below :

3.1-a) Electrical Safety	EN60950-1:2001/A11:2004
EMF	EN50371 (06/2002)
3.1-b) EMC	EN301 489-1 V1.6.1
3.2 Radio	EN300 328 V1.7.1

Paris, July 30th , 2009

Qualification Manager

Arezki Guerrab

6.2 FCC and IC requirements for module application

FCC ID: RKXCK5050NEW
IC : 5119A-CK5050NEW
In accordance with FCC Part 15, the CK5050+ is listed as a Modular Transmitter device.

USA – User information
This intends to inform how to specify the FCC ID of our module " CK5050NEW " on the product.
Based on the Public Notice from FCC, the host device should have a label which indicates that it contains our module. The label should use wording such as: "Contains FCC ID: RKXCK5050NEW"
Any similar wording that expresses the same meaning may be used.
The label of the host device should also include the below FCC Statement. When it is not possible, this information should be included in the User Manual of the host device.
"This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions.
(1) This device may not cause harmful interference
(2) this device must accept any interference received, including interference that may cause undesired operation.
Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Canada – User information
This intends to inform how to specify the IC ID of our module " CK5050NEW " on the product.
According to Canadian standards "RSS 210" and "RSS Gen" , the host device should have a label which indicates that it contains our module. The label should use wording such as: "Contains IC ID: 519A-CK5050NEW
Any similar wording that expresses the same meaning may be used.
The label of the host device should also include the below IC Statement.
When it is not possible, this information should be included in the User Manual of the host device.
"Operation is subject to the following two conditions:
(1) this device may not cause interference,and
(2) this device must accept any interference, including interference that may cause undesired operation of the device."

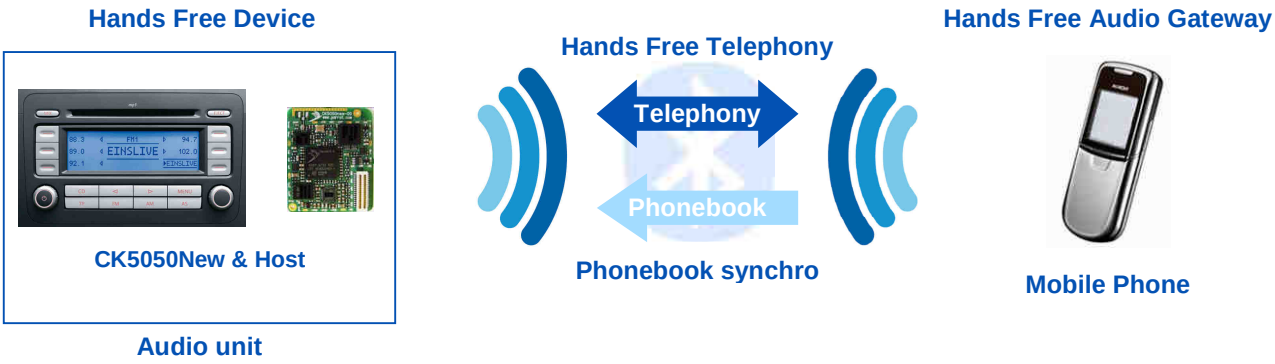
6.3 RoHS declaration

ANNEXE

A. Bluetooth HFP & A2DP/AVRCP use cases overview:

a. Head Unit paired with Mobile phone

Handsfree telephony & Phonebook Synchronization



Connections Strategy

If the Host does not store the last synchronized phonebook, it is always available for the Host at Module start up. Right after HFP connection (which is initiated to the last connected device), it is possible to place an outgoing call if requested. Once HFP initialization has finished (end of SLC/Extended SLC), the Module starts the best phonebook synchronization method available on the phone. The Module alerts the Host that the updated phonebook with new entries is available, and ready to be displayed on the HMI.

If an incoming/outgoing call occurs during the phonebook synchronization process, depending on the method of phonebook synchronization which is used, the process is paused. Once the call is finished, the phonebook synchronization restarts from where it has been stopped, and the call history is updated. This is transparent for the end user.

Calls Management

For incoming calls, the Caller ID (received from phone via CLIP or CLCC) is sent to the Host to be displayed on the HMI.

HFP indicators such as signal level, battery level and network provider are forwarded to the Host to be displayed on the HMI. CIND/CIEV indicators or GSM AT Commands are used for this purpose.

Service Continuity

This feature handles the audio management of a call when the module is powered on/off:

- When the module is powered on, the module automatically connects HFP to the phone and establishes the communication ((e)SCO connection) through the speakers during the SLC.
- When the module is powered off, the module transfers the audio to the phone ((e)SCO disconnection) and disconnects the Bluetooth link.

This process ensures the Host to be immediately ready to start Handsfree usage.

Three way calling / multiple calls management

Once a call is established, if a second incoming call occurs, here is how the Host should handle the HMI:

- Green button: takes the second incoming call as active, and put the first one on hold. Press green button again to switch between the two calls.
- Red button: hangs up the active call and takes the second one as active.

Full 3-way calling management (and multiparty calls) is optimized with phones supporting HFP1.5. Parrot supports up to 7 calls at the same time for conference calls purpose.

With phones supporting HFP1.0 only, there are gaps in the specification such as:

- When the user manages the calls from the phone interface, the phone does not always notify the Module.
- When the distant party who is on hold hangs up from its side.

b. Head Unit connected to Mobile phone and headset device

SCO forwarding feature (2 SCO)

The module is connected to a Headset and a phone at the same time. When requested by the user, the Module is able to forward audio from the phone to the Headset. Therefore, the communication is switched for privacy purpose. Two SCO channels are opened from the Module.

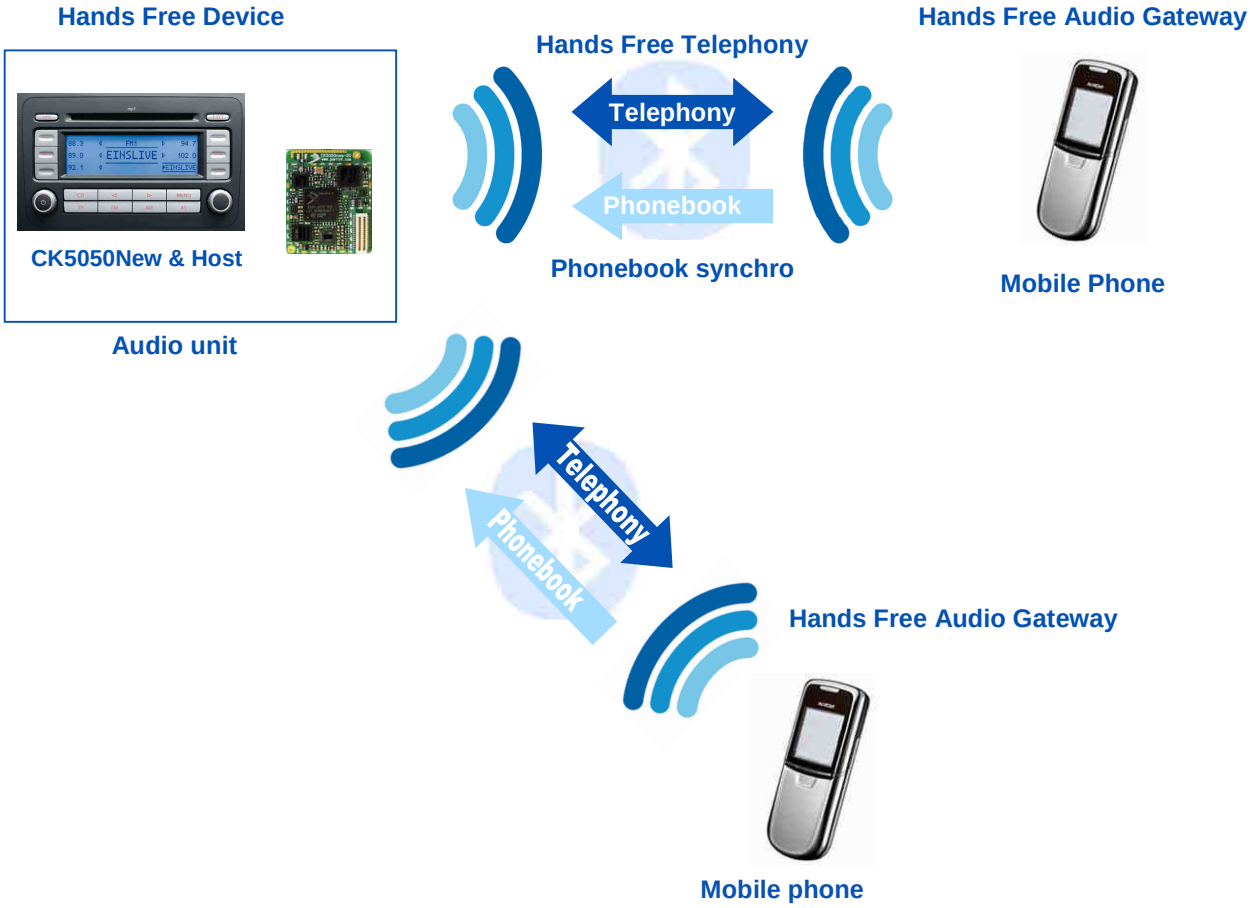
Description of the behavior:

- *Incoming call:*
  - Pick up from the HMI will pick up the call and establish one (e)SCO with the phone and one with the Headset.
  - Hang up from the HMI will hang up the call and release the 2nd SCO.
- *Outgoing call:*
  - Dialing from the HMI will place the call on the phone, and once the remote party has picked up, one (e)SCO is established with the phone and one with the Headset.
  - Hang up from the HMI will hang up the call and release the 2nd SCO.

A command is proposed on Parrot Module to handle the establishment of dual SCO, depending on user need.

c. Head Unit paired with two Mobile phones

Establish and receiving call possible on two different mobile phones



Multi HFP Feature

Parrot has developed the “Multi - HFP”, which enables the Module to handle two Handsfree connections at the same time. This use case is useful for people having two mobile phones, or when two users are in the car.

The Module is running phonebook synchronization on both phones, and each phone has its own phonebook available for the Host (phonebooks are not merged).

HFP indicators are available for each phone.

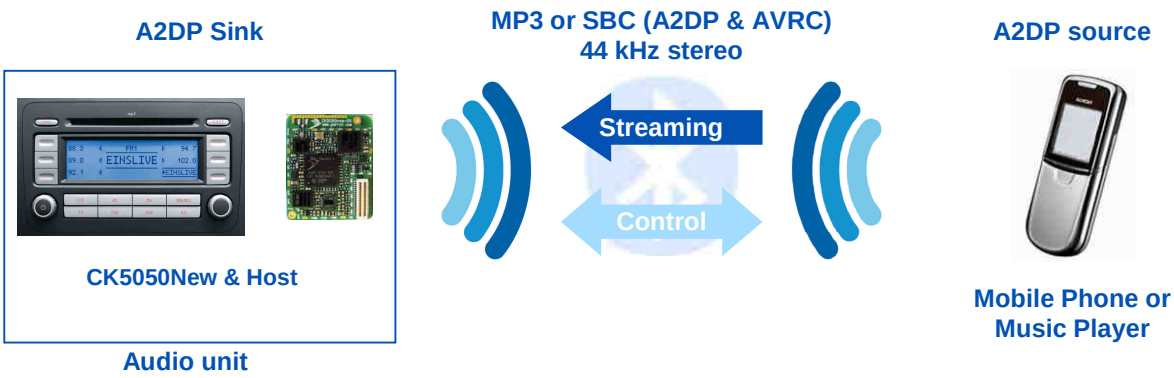
Description of the behaviour:

- *First example:* two phones (P1 and P2) are connected to HFP service. The host can start dialing on P1, hang up call then start outgoing call on P2.
- *Second example:* the phone receives incoming call P1 on Module. After the end of the first call from P1 the phone P2 can receive incoming call.

The multi HFP does not manage the calls of two phones at the same time.

d. Audio Streaming and Handsfree working together

Audio Streaming from phone to Module (remotely controlled by the Module)



AVHFP Feature

Most phones now support both HFP and A2DP Source/AVRCP TG. The most difficult case is to correctly handle the AVHFP Feature (dual use of A2DP/AVRCP and HFP).

As there is no specification release by the Bluetooth SIG explaining how this multi-profile use case should operate, a whitepaper has been issued by the A/V Working Group ("*Simultaneous Use of HFP, A2DP, And AVRCP Profiles*").

Basically, the Whitepaper states that the phone should handle the streaming restart management once the call is finished (this is the main concern today):

- *Incoming call:* the AG should handle the streaming management:
  - Pause the streaming on incoming call.
  - Send to the HF the indicators (CIEV Call setup)
  - Then the HF picks up the call with ATA, communication/SCO is established
  - Once finished (from AG or HF), the AG should restart streaming from where it has been paused.
- *Outgoing call from HF (ATD):* the AG should also handle this in the same manner.

Nevertheless, most phones do not correctly implement the Whitepaper, and the streaming does not always restart after the call. Parrot has developed a strategy that automatically relaunches streaming in this case.

Song information availability

According to the AVRCP version supported by the music player (can be a phone or a Bluetooth Music player), the Host is updated with the following information in order to update its HMI.

AVRCP TG 1.0 (Category 1 – Music Players):

- *Mandatory commands:*
  - Play and stop.
- *Optional Features:*
  - Enhanced control: Next, Previous, Pause, FF, FW (most of the phones/Players supporting AVRCP1.0 support those commands).

- There are a lot of other features, but the phone/Bluetooth Music Players do not implement these extended commands.

AVRCP CT 1.0 (Category 1 – Parrot Module):

- At least one command of the specification should be supported.
- Parrot has decided to implement the full Player Control (events send to the phone):
  - Play, Pause, Stop, Next, Previous, Pause, FF, FW

AVRCP TG 1.3 (Category 1 – Music Players):

- *Mandatory commands:*
  - Same perimeter as AVRCP TG 1.0.
- *Optional Features:*
  - If the phone supports the Bluetooth SIG Vendor Unique Feature, only Title of the Media is mandatory for Metadata. And Playback status and change of current track shall be supported in this case.
  - Other important features for Metadata support are Name of the Artist, Name of the Album, Genre...

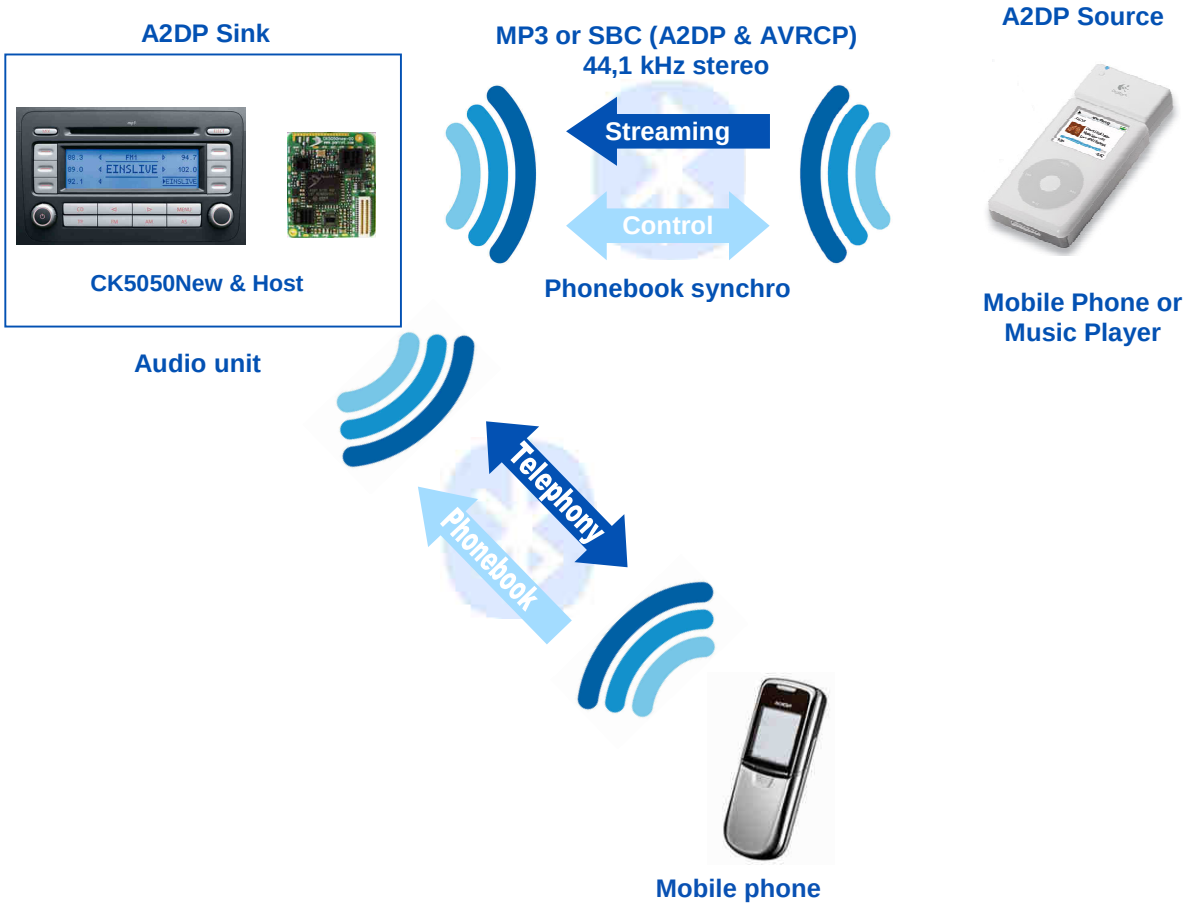
AVRCP CT 1.3 (Category 2 – Parrot Module):

- *Mandatory commands:*
  - Same perimeter as AVRCP CT 1.0.
- *Parrot optional features implemented:*
  - Referring to the specification, all “List of Media Attributes” are supported to be displayed on the car radio HMI.

According to the AVRCP version supported by the phone, the HMI should be implemented with information provided by the Module: Player status / Metadata for the current played song.

As member of AV Working Group, Parrot is involved with the development of those specifications.

e. Head Unit paired with Mobile phone and Music Player with Bluetooth dongle:



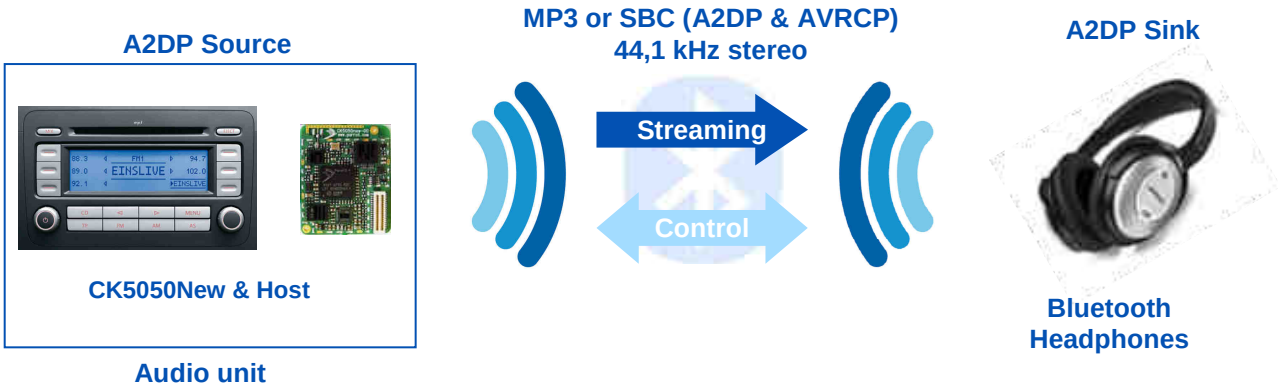
Connection Management

Parrot Module is able to maintain two Bluetooth connections: one HFP to a phone (where the phonebook synchronization is running after connection) and the other one with an A2DP SRC Music Player. From the Module point of view, there are two users connected.

As stated with the Whitepaper, in this use case, the Module handles the AVHFP because the A2DP SRC is not the connected phone. If the Bluetooth Music Player supports AVRCP TG, Parrot alerts the HMI with Playback status and Metadata.

f. Head Unit paired with a stereo Headphone

Audio Streaming from Module to a stereo headphone



Parrot Module also embeds the A2DP SRC role, and then is able to play local music files to a Sink device. Music file can be stored on a USB Stick, or can be routed from an iPod/iPhone to the A2DP SNK.

g. Head Unit paired with two stereo Headphones

Audio streaming from Module to two Stereo Headphones simultaneously

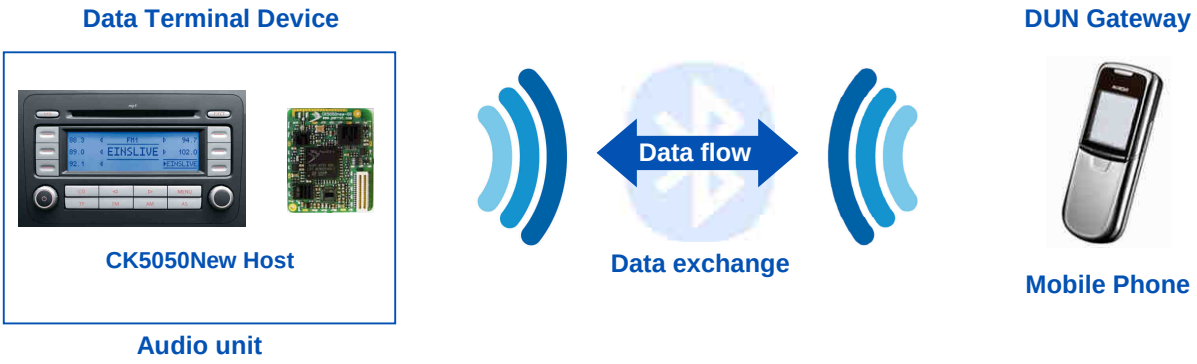
(In this configuration, DISCO library is needed)

The Module manages the A2DP SRC role, and establishes two A2DP connections with two A2DP Sinks. The audio file is streamed at the same time to the two headsets.

This use case is dedicated to Music streaming rear seat entertainment.

h. Head Unit paired with Mobile phone: Data transfer

Dial Up Networking: The Head Unit acts as data terminal with a connected gateway device, typically a mobile phone.



Multi Profile Use

Parrot handles multiple Bluetooth connections. On the same device, it is possible to set up both an HFP and a DUN connection.

According to the various Bluetooth implementations on phones, here is the description of what is possible (given no phone limitations):

- DUN only:
  - In this case, the phone acts as a Gateway and the Module forwards the data to the Host (Data Terminal).
- HFP and DUN:
  - If an incoming call occurs during the data transfer, there are three behaviors:
    - The call is established and data transfer continues without bandwidth diminution.
    - The call is established and data transfer is stopped (AG gives priority to HFP feature).
    - The distant caller reaches the voice mail of the connected phone (phone limitation).
  - If an outgoing call is requested by the user, the behaviors above also apply.

Those behaviors are described, phone by phone in the Parrot Bluetooth Compatibility Matrix with all tested phones.

B. USB/iPod Use Cases

Parrot **DISCO** Library handles the USB/iPod/iPhone connectivity, and gives to the Host the ability to manage the music player.

When it is allowed by the protocol, DISCO is able to build a database from the music files available on the device.

- USB mass storage, SDCards, local file system: a database can be created, called the BSM Database ("Base de Synchronization Musicale": in French for historical reason).
- MTP (Media Transfer Protocol) devices: a similar database can be created.
- iPods/iPhone: if the device is seen as a USB mass storage device, a database can be created, otherwise we use the iAP (iPod Accessory Protocol) protocol and no database is created.

a. Head Unit with a iPod connected through the USB

iPod/iPhone Management

In this case, the Module directly accesses the iPod/iPhone database via iAP. Here are the browsing modes offers by the Module:

- Artist (For all devices, including USB Mass Storage)
- Album
- Genre
- Playlist
- Title
- Podcast (only for iPod/iPhone)
- Composer

- StartList (For USB)
- File System (For USB)
- Flat File System (For USB)

As for the phonebook, UTF8 is used to communicate this database to the Host (independently if this is a USB or iPod database).

List of Compatible iPods

iPod Classic (3G), iPod Classic Photo (4G), iPod Classic Video (5G), iPod Classic (6G), iPod Mini (1G), iPod Nano (1G), iPod Nano (2G), iPod Nano (3G), iPod Nano (4G), iPod Touch (1G), iPod Touch (2G), iPhone, iPhone (3G).

b. iPod & iPhones Use Cases

The iPhone/iPhone3G can be used as a Bluetooth AG and Music content at the same time. In this case,

- First the user has to pair/connect its iPhone via Bluetooth to get the HFP features.
- Once HFP connection has been established, he can connect its iPhone to the dedicated iPod connector, and the Module handles the browsing.

The user will have the Bluetooth HFP capacity and at the same time the possibility to browse the iPod's content.

Parrot releases more information about supported features in the Parrot Compatibility Matrix.

c. Head Unit paired with a connected USB Mass storage device

Parrot music Management

Once the USB stick is plugged in for the first time, the Module reads the USB stick content, parses music files, and gives the Host the access to the file system. Once this first parsing is finished, the Module reparses music files, one by one, and builds the database using the Metadata included in each file. The database is built according to this new parsing.

The Parrot Module provides the same set of commands for USB or iPods devices. The implementation on the Host side is generic.

HFP and USB use at the same time

If a USB stick is plugged in while an HFP connection is already established with a phone, this case is handled in two separate processes. Handsfree features are available while DISCO is building the database in the background, without altering the Bluetooth link.

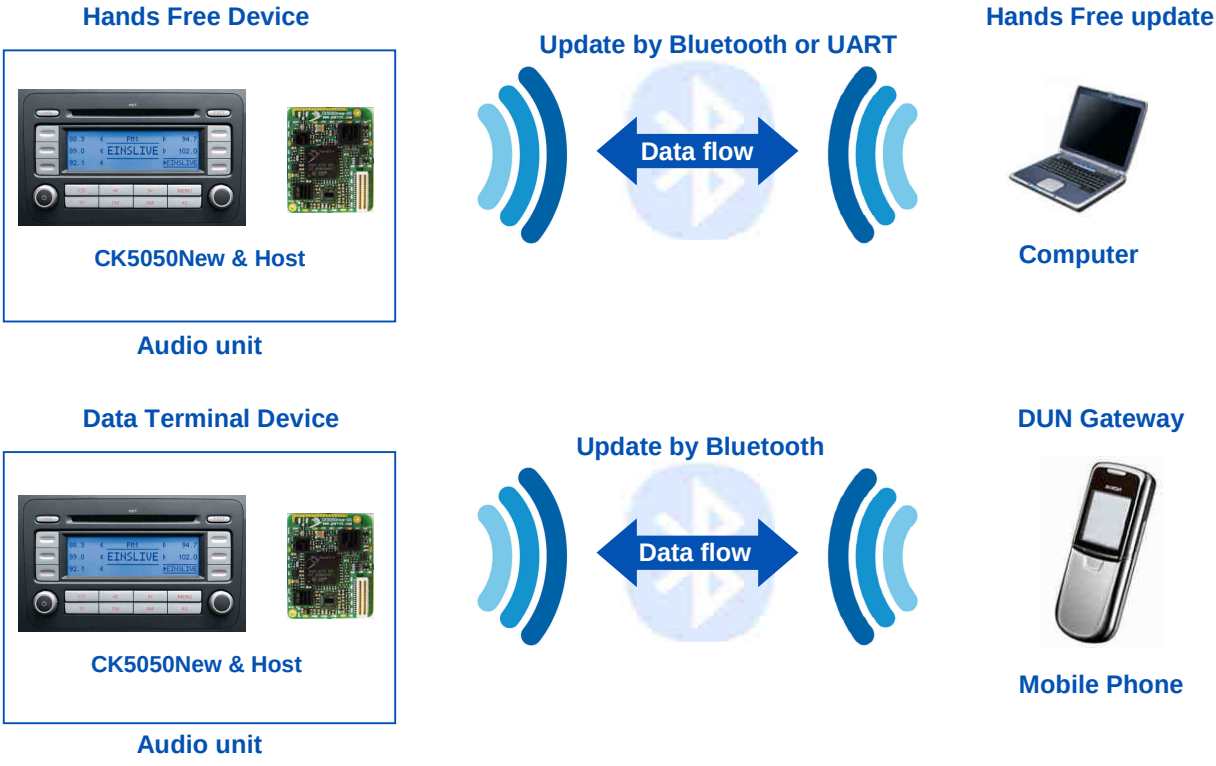
C. Head unit BT/USB software update

The firmware of Parrot modules can be updated in four different ways: by Bluetooth when paired with a Bluetooth-enabled laptop, by DUN, USB or UART.

This is a very important feature of the Parrot Module. This ensures better Bluetooth Compatibility with new phones coming on the Market. Some of these new phones need to have a specific work-a-round when the Bluetooth specifications are not correctly implemented on the phone (i.e. non-generic Bluetooth management).

Moreover, a major software update can include a new feature/profile (such as AVRCP1.4 for instance) to give more compatibility or functionality to a car radio. This software update can immediately be flashed (by Bluetooth, USB...) into your product already out in the market.

After the update, user settings (paired devices, phonebooks...) are not erased. This process is transparent for the user.



Methods available

- Bluetooth
  - Via SPP
  - Via FTP
  - Via DUN (through a mobile phone connected to a server where is stored the new software)
- Via USB with a standard USB Stick.
- Via UART with a host CPU that send the data

Secured update mechanism

The new software is copied into the flash Module's memory but the previous software is not affected by this copy. During this process, if an error occurs before the end of file transfer (Bluetooth disconnection, data transfer stopped, USB Stick removed…), the Module will restart with the previous software version.

The checksum of the new software is included into this new software. If the new file is correctly written into the flash, when Module will reboots, the new checksum internally calculated is compared the checksum of this new software. If checksum are equals, the new file will overwrite the previous one. During this process, if power supply is turned off, the remaining data will be continuing to be written where it has been stopped at the next boot.