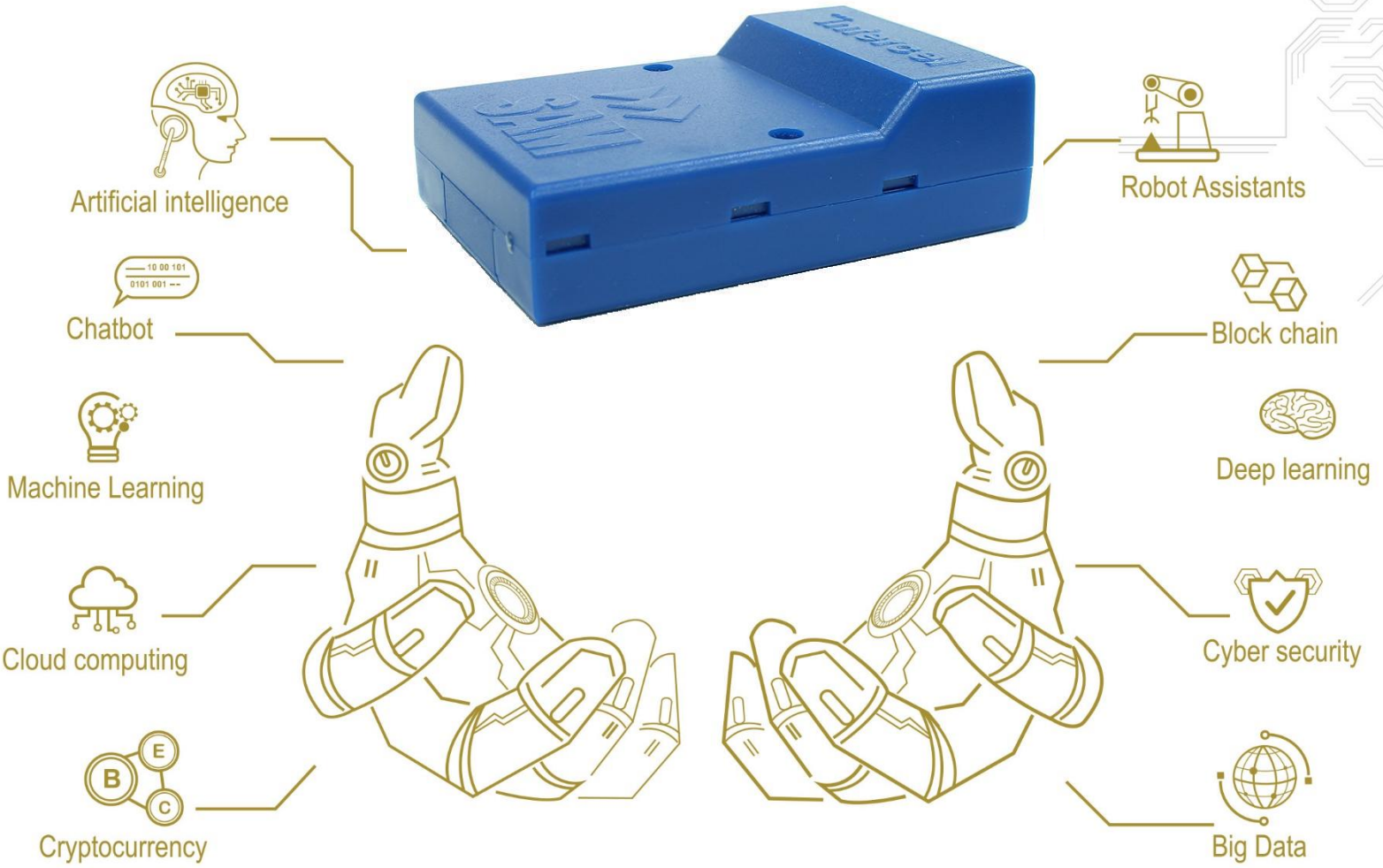
intercel

SAM4Q User Guide



Revision History

Version	Modified By	Date	Description
1.0		03/04/2017	Document created
1.1	Sang Vu	27/04/2017	Updated power supply statement
1.2	Van Pham	28/08/2017	Updated LED display sequence
1.3	Moe Chaudhry	09/05/2018	Updated formatting, minor corrections
2.0	Matt Salsbury	26/02/2021	Document relaunched

Contents

1 Introduction

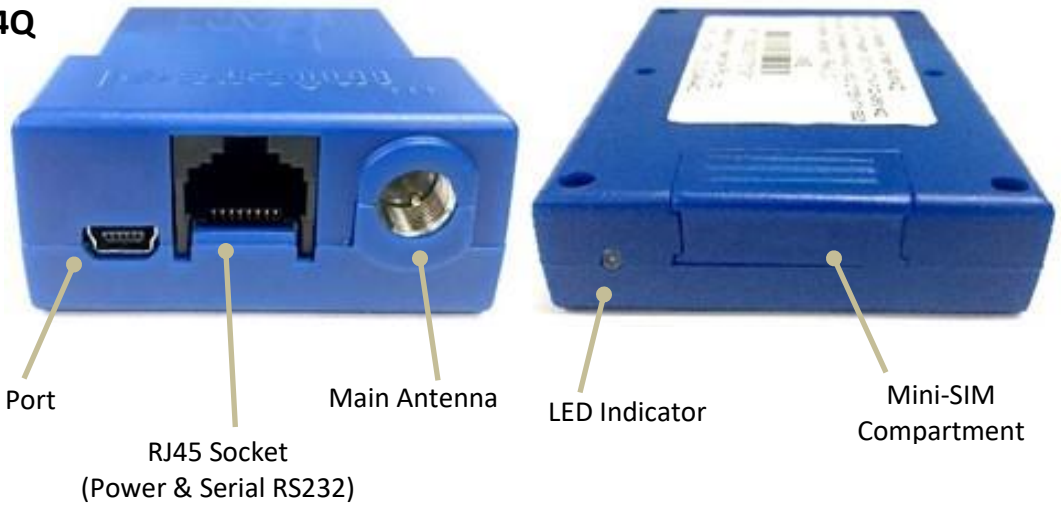
The SAM4Q is a compact, lightweight 3G and LTE based modem. It provides CAT1 connectivity with speeds of 5Mbps uplink and 10Mbps downlink. The SAM4Q modem is available in 2 variants.

The **SAM4Q** is designed for both mobile and fixed M2M applications. It has an RJ45 socket for input voltage and the serial RS232 signals, a Mini USB port, **one** FME-male for main antenna connection, a SIM holder, and an LED indicator.

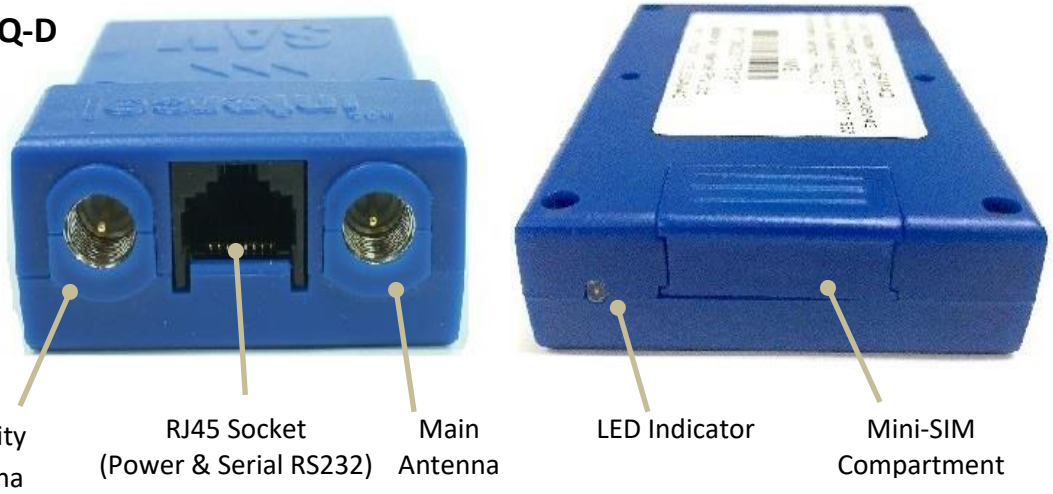
The **SAM4Q-D** is designed for both mobile and fixed M2M applications. It has an RJ45 socket for input voltage and the serial RS232 signals, **two** FME-male for main and diversity antenna connections, a SIM holder, and an LED indicator.

The SAM4Q is capable of sending and receiving SMS, Circuit Switched Data (CSD) and Packet Switched Data (PSD). It is controlled by a set of AT commands which can be found in Section 8 of this user guide.

SAM4Q



SAM4Q-D



2 Safety Precautions

The following safety precautions must be observed whenever the SAM4Q modem is in operation or in service. Failure to comply with these precautions violates the safety standards of the design, manufacture and intended use of the product

Switch off the SAM4Q modem:

- In hospitals or places where medical equipment may be in use
- In an aircraft
- Refueling points
- Explosive areas

Restricted use of the SAM4Q modem:

- Near any chemical plant
- Near any fuel depot
- Areas with mobile phone warning signs

Respect national regulations on the use of cellular devices.

The SAM4Q modem receives and transmits radio frequency energy while switched on, therefore interference can occur if the SAM4Q is near TVs, radios, PCs, or any inadequately shielded equipment.

3 Radio Frequency Exposure – SAR

The SAM4Q modem is a low-power transceiver, similar to a typical handheld 3G/LTE mobile phone. When it is turned on, it will emit low-level radio frequency energy.

There are different guidelines and standards around the world that govern the permitted levels of radio frequency exposure for general population. The levels include a safety margin to a human body.

The Specific Absorption rate (SAR) is a measure of the rate at which radio frequency energy is absorbed by the body when exposed to radio frequency electromagnetic field. The SAR value is determined at the highest certified power level in the laboratory conditions, but the actual SAR level of the transceiver while operating can be well below this value. This is because the transceiver is designed to use minimum power to connect to the network.

The SAM4Q modem is approved to use in applications where the ***antenna is placed more than 21cm from the body.***

For other applications, the integrator is responsible for the local SAR requirements.

4 WEEE Directive 2002/96/EC: Disposal of Old Electronic Equipment

This symbol on the product indicates that this product shall not be treated as household waste. It must be placed at an appropriate collection point for the recycling of electrical and electronic equipment.

By ensuring the correct disposal of this equipment, it will help the environment and human health. Recycling will also help to conserve natural resources.

The SAM4Q modem is RoHS compliant

5 Packaging Contents

5.1 Content

The SAM4Q package consists of:

- SAM4Q Modem
- Data Cable (optional)
- Programming Cable (optional)

5.2 Packaging

Modem dimensions:	120mm x 95mm x 60mm
Programming cable length:	2m long
Label dimensions:	50mm x 33mm

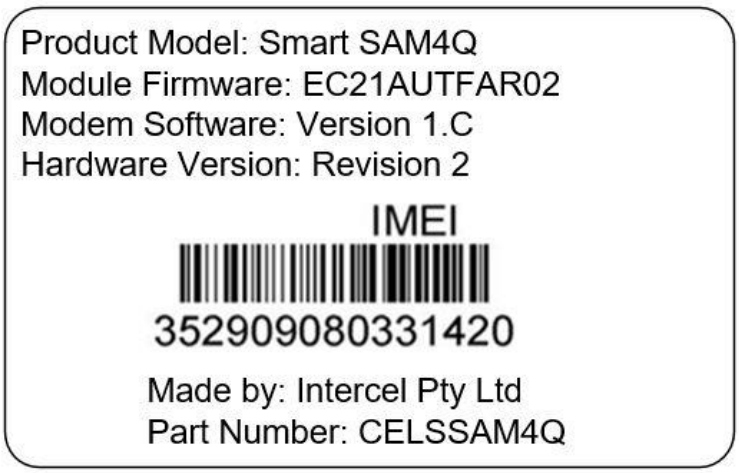
A suitable power supply is available on request. The SAM4Q must be powered using a limited power source of 12V/1A power supply according to the clause 2.5 of AS/NZS 60950.1.

A suitable antenna is also available on request. Please make sure the correct antenna is used to get optimized performance from the SAM4Q.

5.3 Production Label

The production part number is located at the back of the SAM4Q, which includes:

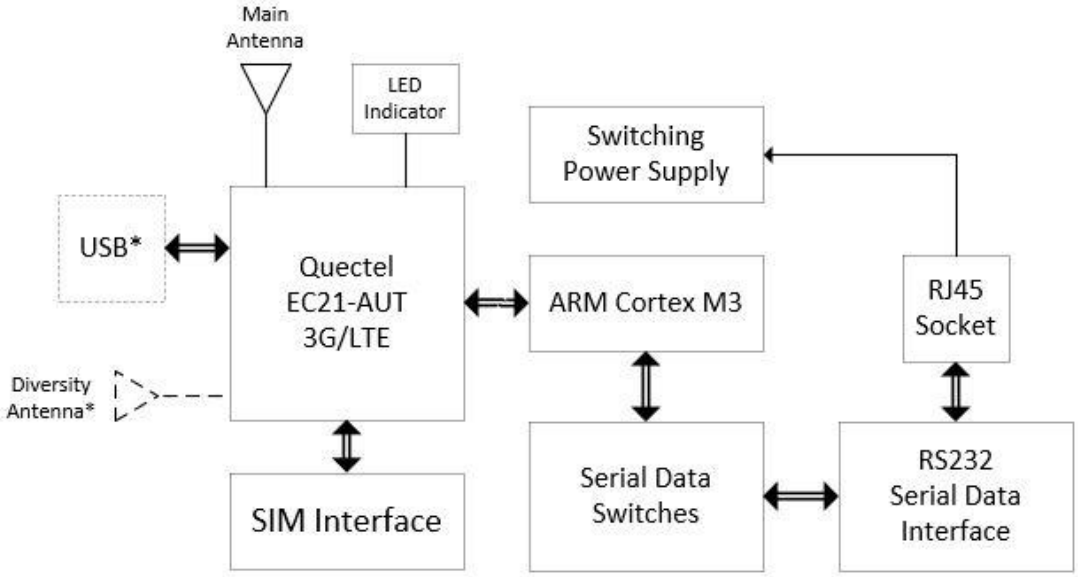
- Product Model
- Software Version
- Hardware Version
- IMEI Number
- Manufacturer
- Part Number



6 Functionality

6.1 General

The SAM4Q modem consists of an RJ45 socket for serial communication and input power, a Mini USB port, a SIM holder and an FME male connector for main antenna. The LED indicator, located next to the SIM holder, indicates the SAM4Q operating status.



**USB port only available on SAM4Q. Diversity Antenna only available on SAM4Q-D*

6.2 RJ45 Socket Layout

Pin	Signal	Description
1	VIN	Input voltage 5Vdc – 32 Vdc
2	DCD	Data Carrier Detect
3	DTR/RI	Data Terminal Ready / Ring Indicator
4	GND	Common Ground
5	RXD	Serial Data OUT of SAM4Q
6	TXD	Serial Data IN to SAM4Q
7	CTS	Clear To Send
8	RTS	Ready To Send

6.3 FME-Male 50Ω Antenna Connectors

The FME male antenna connector is a 50Ω impedance antenna connector. The antenna used for the SAM4Q must have 50Ω impedance.

6.4 SIM Holder

The SIM holder is designed to accommodate a mini-SIM card. The SIM card can either be 3V or 1V8 SIM. Voltage levels over this SIM interface comply with 3GPP standards.

To insert the SIM card, remove the door by sliding it back towards the end. Make sure the SIM card faces the right way as indicated on the product.

6.5 LED Status

The LED indicator status changes depending on the configured SAMMODE:

SAMMODE=0

Modem power on, not registered:	Always ON
Mode operating on 3G band:	Orange LED on permanently
Mode operating on 4G band:	Green LED 100ms on 300ms off

SAMMODE=1

Modem power on until SIM ready:	Red LED On
Modem initializing on 3G:	Red LED 1s On/Off
Modem initializing on 4G:	Red LED 500ms On/Off
Remote socket connection on 3G:	Orange LED 500ms On/Off
Remote socket connection on 4G:	Green LED 500ms On/Off
Modem failed to connect to IP:	Red LED 100ms On/Off
Modem connected to IP:	Green LED flashing on 4G, Orange LED flashing on 3G LED timing patterns are explained below.

3G RSCP Signal Strength

> -70 dBm	4 pulses of Orange LED (100ms On 300ms Off) then 3s Off
-70 dBm to -85 dBm	3 pulses of Orange LED (100ms On 300ms Off) then 3s Off
-86 dBm to -100 dBm	2 pulses of Orange LED (100ms On 300ms Off) then 3s Off
<-100 dBm	1 pulse of Orange LED (100ms On 300ms Off) then 3s Off

4G RSRP Signal Strength

> -90 dBm	4 pulses of Green LED (100ms On 300ms Off) then 3s Off
-90 dBm to -105 dBm	3 pulses of Green LED (100ms On 300ms Off) then 3s Off
-106 dBm to -120 dBm	2 pulses of Green LED (100ms On 300ms Off) then 3s Off
<-120 dBm	1 pulse of Green LED (100ms On 300ms Off) then 3s Off

If the modem is IP connected in idle state but is searching for network or is of limited service: Red LED flashing, LED timing patterns are explained below.

3G RSCP Signal Strength

> -70 dBm	4 pulses of Red LED (100ms On 300ms Off) then 3s Off
-70 dBm to -85 dBm	3 pulses of Red LED (100ms On 300ms Off) then 3s Off
-86 dBm to -100 dBm	2 pulses of Red LED (100ms On 300ms Off) then 3s Off
<-100 dBm	1 pulse of Red LED (100ms On 300ms Off) then 3s Off

4G RSRP Signal Strength

> -90 dBm	4 pulses of Red LED (100ms On 300ms Off) then 3s Off
-90 dBm to -105 dBm	3 pulses of Red LED (100ms On 300ms Off) then 3s Off
-106 dBm to -120 dBm	2 pulses of Red LED (100ms On 300ms Off) then 3s Off
<-120 dBm	1 pulse of Red LED (100ms On 300ms Off) then 3s Off

For FOTA (M1/NB1 module Firmware Over-the-Air upgrade) or DOTA (Modem software Download Over-the-Air upgrade), the following flash sequence applies:

Process run on 3G:	Orange LED 100ms On/Off
Process run on 4G:	Green LED 100ms On/Off

SAMMODE=2 (CSD)

Note:	CSD Mode will only work when modem is set to 3G bands only
Modem power-on until SIM ready:	Red LED ON
Modem initializing on 3G:	Red LED 1s On/Off
Modem in data call mode:	Orange LED 500ms On/Off

3G RSCP Signal Strength – Modem in CSD Mode ready to receive incoming CSD call

> -70 dBm	4 pulses of Orange LED (100ms On 300ms Off) then 3s Off
-70 dBm to -85 dBm	3 pulses of Orange LED (100ms On 300ms Off) then 3s Off
-86 dBm to -100 dBm	2 pulses of Orange LED (100ms On 300ms Off) then 3s Off
<-100 dBm	1 pulse of Orange LED (100ms On 300ms Off) then 3s Off

3G RSCP Signal Strength – CSD idle state, network searching or limited service

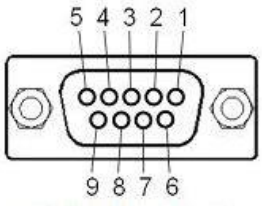
> -70 dBm	4 pulses of Red LED (100ms On 300ms Off) then 3s Off
-70 dBm to -85 dBm	3 pulses of Red LED (100ms On 300ms Off) then 3s Off
-86 dBm to -100 dBm	2 pulses of Red LED (100ms On 300ms Off) then 3s Off
<-100 dBm	1 pulse of Red LED (100ms On 300ms Off) then 3s Off

6.6 Programming & Data Cable

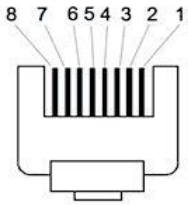
The programming cable is 2m long. It consists of an RJ45 plug, a DB9-female connector and a 4 pin micro-fit termination.

The following table describes the pin configuration from DB9 to RJ45.

DB9 Pin	<-Signal->	RJ45 Pin	Description
1	DCD	2	Data Carrier Detect
2	RXD	5	Serial Data OUT of SAM4Q
3	TXD	6	Serial Data IN to SAM4Q
4	DTR	3	Not Used
5	GND	4	Common Ground
6	DSR		Not Used
7	RTS	8	Ready To Send
8	CTS	7	Clear To Send
9	RI		Not Used
		1	**Red** Wire: Input Voltage range 5 Vdc to 32 Vdc
		4	**Black** Wire: Power Ground



DB9



RJ45

7 Electrical Characteristics

7.1 Power Consumption

Idle Mode:	30mA @ 12V (0.36W)
Average In-Use Mode:	140mA @ 12V (1.68W)
Full Tx Power	230mA @ 12V (2.76W)
Peak Current Requirement:	0.3A @ 12V (3.6W)

7.2 Receive Sensitivity

Mode/Band	Primary without Diversity	Diversity
3G Band 1	-110 dBm	N/A
3G Band 5	-100.5 dBm	N/A
LTE-FDD Band 1 (10M)	-98.5 dBm	-98.0 dBm
LTE-FDD Band 3 (10M)	-98.0 dBm	-96.0 dBm
LTE-FDD Band 5 (10M)	-98.0 dBm	-99.0 dBm
LTE-FDD Band 7 (10M)	-97.0 dBm	-95.0 dBm
LTE-FDD Band 28 (10M)	-97.0 dBm	-99.0 dBm

7.3 Conducted Transmit Power

Parameter	Min	Max
3G Bands	-50 dBm	-24 dBm
LTE	-44 dBm	-43 dBm

7.4 Antenna Specifications

Max Cable Loss:	0.5 dBm
Impedance:	50 Ω
VSWR Recommended:	2:1
VSWR Absolute Maximum:	10:1

7.5 Environmental Characteristics

Operating Temperature:	-30°C to +85°C
Storage Temperature:	-40°C to +95°C
Humidity:	90% relative humidity (non-condensing)

8 SAM4Q TCP/IP Operation & AT Commands

The SAM4Q has a MCU (Microcontroller) to control the LTE module EC21. The SAM4Q can be operated in three different modes, defined by the parameter SAMMODE:

SAMMODE=0 The modem is in standard mode. When powered on, the MCU turns on the LTE module, checks its baud rate, turns on the LED and releases control of the LTE module to the connecting device. AT commands can be sent from the serial port here after, the MCU will keep monitoring the LTE module, checks time in the RESETPERIOD parameter to reset itself and the LTE module.

SAMMODE=1 The modem is in PSD (Packet Switch Data) smart mode. The MCU is in total control of the LTE module. When powered on the software reads all parameters from flash and activates a PSD connection, it then creates a UDP and a TCP socket to listen for data transfer connection, opens a UDP and a TCP socket to listen for remote AT commands connection. If programmed as a TCP client it will try to connect to a remote TCP server, the modem then stays in PSD online idle state waiting for SMS, UDP or TCP connection. The software maintains PSD connectivity by means of PING using POLLPERIOD parameter stored in flash.

SAMMODE=2 The modem is in CSD (Circuit Switch Data) smart mode. This mode is used if the SIM card is not setup for PSD. The MCU is in total control of the LTE module, the modem is always waiting for a CSD call or SMS.

Note: SAMMODE=2 for CSD is only possible if the modem is programmed to work in 3G mode.

8.1 Communication Sockets

TCP Data:
The socket connection allows transparent data (excluded IP header) to pass through from the remote host to the modem serial port and vice versa. In TCP server mode, the socket will be disconnected after 5 minutes of no data transfer.

UDP Data:
The socket connection allows transparent data to pass through from the remote host to the modem serial port and vice versa. A block of data received from a remote UDP server will open a 2-minute window for data to be transferred from the serial port.

TCP AT Command:
The socket connection allows a user from the host computer to send AT commands to the modem and receive its responses. The socket will be disconnected after 5 minutes of no activity. The socket can also be used for remote firmware update.

UDP AT Command:
The socket connection allows a user from the host computer to send AT commands to the modem and receive its responses. The socket can also be used for remote firmware update.

8.2 TCP/IP AT$ Commands

Communications parameters are stored in Flash using AT$PARAMETERS.

Parameters are defined as:

APN=	Access Point Name
USERNAME=	Username that may be required with GPRS login
PASSWORD=	Password that may be required with GPRS login
LTCPPORT=	Local TCP listening port
RTCPIP=	Remote TCP server IP
RTCPPORT=	Remote TCP server port
TCPMODE=	0 or 1 (0 to disable the modem TCP client, 1 to enable the modem TCP client)
LUDPPORT=	Local binding UDP port (modem listens for UDP data on this port)
RUDPIP=	Remote binding UDP IP (modem only accepts data from this IP)
RUDPPORT=	Remote binding UDP port (modem sends UDP data to this port)
PINGIP=	If set, the modem will send PING packet to this IP to check for PSD connectivity.
POLLPERIOD=	Modem uses this time to send TRACE or PING packet to check for PSD connectivity.
RESETPERIOD=	Set time to reset modem periodically.
SBREAKTIME=	Serial port break time, modem will wait for this break in serial port transmission before it packetizes the data and sends.
MBREAKTIME=	Modem or GSM module serial break time, use to adjust the way the modem rebuilds long IP packets from fragments of CMUX frames.
BAUDRATE=	Serial port baud rate.
DATALEN=	Serial port support 8 bits only
PARITY=	NONE for no parity only
SAMMODE=0	for standard modem, 1 for PSD mode.
SERIALLOCK=	When modem access is safeguarded by username and password, 0=serial port access is not lock, 1=serial port access is locked
LOGINTIMEOUT=	Timeout (in seconds) after repeated failed login attempts (set at 5 failed attempts).
SESSIONIDLETIME=	Set the time interval (in seconds) the login session could stay idle before it is closed
PPPAUTH=	PAP or CHAP for PPP authentication, PAP is the default value.

All parameters can be programmed all at once, for example:

```
AT$PARAMETERS=APN=telstra.extranet,USERNAME=intercel,PASSWORD=mach,LTCPPOR
T=10000,RTCPIP=203.45.1.236,RTCPPORT=10000,TCPMODE=,LUDPPORT=20000,RUDPIP
=203.45.1.236,RUDPPORT=20000,POLLPERIOD=60,SBREAKTIME=100,MBREAKTIME=5,B
AUDRATE=115200,DATALEN=8,PARITY=NONE,SAMMODE=0,SERIALLOCK=0,LOGINTIME
OUT=300,SESSIONIDLETIME=120,PPPAUTH=PAP,EXTRASETTINGS=AT+CMGF=1, TCPMAXSIZE=500

Saved parameters to flash...
OK
```

Alternatively, the user can program only those parameters they wish to change, for example:

```
AT$PARAMETERS=APN=telstra.extranet,USERNAME=intercel,PASSWORD=mach
Saved parameters to flash...
OK

AT$PARAMETERS=LTCPPORT=10000,RTCPIP=203.45.1.236,RTCPPORT=10000,TCPMOD
E=,LUDPPORT=20000,RUDPIP=203.45.1.236,RUDPPORT=20000
Saved parameters to flash...
OK

AT$PARAMETERS=POLLPERIOD=60,SBREAKTIME=100,MBREAKTIME=5,BAUDRATE=115
200,DATALEN=8,PARITY=NONE
Saved parameters to flash...
OK
```

To query the current parameter settings, use **AT$PARAMETERS?** Example response shown below:

```
AT$PARAMETERS?
$PARAMETERS:
APN: telstra.extranet
USERNAME: intercel
PASSWORD: mach
LTCPPORT: 10000
RTCPIP: 203.45.1.236
RTCPPORT: 10000
TCPMODE: 0
LUDPPORT: 20000
RUDPIP: 203.45.1.236
RUDPPORT: 20000
BAUDRATE: 115200
DATALEN: 8
PARITY: NONE
POLLPERIOD: 60
RESETPERIOD: 1440
SBREAKTIME: 100
MBREAKTIME: 5
SERIALLOCK: 0
LOGINTIMEOUT: 300
SESSIONIDLETIME: 120
PPPAUTH: CHAP
EXTRASETTINGS: AT+CMGF=1;+CPMS="SM" "SM" ”SM";+CSCS="IRA";+CTZU=1
TCPMAXSIZE: 500
SAMMODE: 0

OK
```

AT$UDPCONNECT

If the modem is already allocated an IP address, this command will put the modem in UDP data mode, the modem DCD pin goes high, data from serial will be packetized into UDP packets and sent to remote UDP server (UDP settings must be set prior), modem will return to AT Command mode if it receives no UDP data in 30 seconds.

If the modem has no IP address (CSD or SAMMODE=2), the modem will connect to PSD and go into UDP data mode, the modem DCD pin goes high, data from serial will be packetize into UDP packets and sent to a remote UDP server (UDP settings must be configured prior), modem will reset and return to CSD mode if it received no UDP data in 30 seconds.

AT$TCPCONNECT

If the modem is already allocated an IP address, this command will make a TCP client connection to the remote TCP server, the modem will return to AT Command mode if it receives no TCP ACK in 30 seconds.

If the modem has no IP address (CSD mode or SAMMODE=2), the modem will connect to PSD and make a TCP client connection to the remote TCP server, the modem will reset and return to CSD mode if it receives no TCP ACK in 30 seconds.

AT$DDNS

This function is used to setup parameters required for Dynamic DNS updating.
Parameters are defined as:

DDNSENABLE=	0 or 1 (0 disable, 1 enable)
DDNSHOST=	Host name
DDNSUSERNAME=	DNNS account name
DDNSPASSWORD=	DDNS account password
DDNSSERVER=	DDNS server
DDNSSTRING=	Only need to change from default in some circumstances with Intercel support
DDNSAUTH=	Only need to change from default in some circumstances with Intercel support
DDNSAGENT=	Only need to change from default in some circumstances with Intercel support
PDNSIP=	Primary DNS, leave blank if not using your own DNS server, not a requirement for DDNS.
SDNSIP=	Secondary DNS, leave blank if not using your own DNS server, not a requirement for DDNS
DNSTTL=	DNS Time To Live in minutes before updating of DNS entries, not a requirement for DDNS.

```
AT$DDNS=PDNSIP=8.8.8.8,SDNSIP=8.8.4.4,DNSTTL=240,DDNSENABLE=0,DDNSHOST=int
ercelau.ddns.net,DDNSUSERNAME=intercelau,DDNSPASSWORD=123456789,DDNSSERVE
R=dynupdate.noip.com,DDNSSTRING=GET/nic/update?hostname=%s&myip=%sHTTP/1.0,DD
NSAUTH=Authorization: Basic%s,DDNSAGENT=User-Agent:SAM4Q/1.0
intercel@intercel.com.au

Saved parameters to flash...
OK
```

```
AT$DDNS?
$DDNS:
DDNSENABLE: 0
DDNSHOST: intercelau.ddns.net
DDNSUSERNAME: van.phamus@yahoo.com
DDNSPASSWORD: 123456789
DDNSSERVER: dynupdate.no-ip.com
DDNSSTRING: GET /nic/update?hostname=%s&myip=%s HTTP/1.0
DDNSAUTH: Authorization: Basic %s
DDNSAGENT: User-Agent: SAM4Q/1.0 intercel@intercel.com.au
PDNSIP: 8.8.8.8
SDNSIP: 8.8.4.4
DNSTTL: 240
OK
```

AT$DDNSTEST

Used to force a manual updating of IP to the DDNS server, all required parameters must be set beforehand.

```
AT$DDNSTEST
$DDNSTEST: Starting....
$DDNSTEST: Resolving dynupdate.no-ip.com....
Connecting to DDNS dynupdate.no-ip.com ....
Connected to DDNS dynupdate.no-ip.com
HTTP/1.1 200 OK
Date: Tue, 02 Feb 2020 00:33:32 GMT
Server: Apache/2
Content-Location: update.php
Vary: negotiate
TCN: choice
Content-Length: 19
Connection: close
Content-Type: text/plain; charset=UTF-8
good 123.209.169.62
DDNS host intercelau.ddns.net updated with 123.209.169.62
OK
```

AT$LGSMS

Used to program parameters for last gasp SMS. Parameters are defined as:

LGSMSMSG=	SMS message text, default is "SAM4Q low power detected..."
LGSMSDELAY=	Time delay to make sure supply power is down for this long before sending last gasp SMS
LGSMSNO=	SMS phone number

```
AT$LGSMS= LGSMSMSG= SAM4Q power supply is low....,60,LGSMSNO=+61418505361
Saved parameters to flash...
OK
AT$LGSMS?
$LGSMS:
LGSMSMSG: SAM4Q power supply is low....
LGSMSDELAY: 60
LGSMSNO: +61418505361
OK
```

AT$ACCESS

Used to setup parameters required for remote access. Parameters are defined as:

IPBLOCK=	0 or 1 (0 disable, 1 enable remote IP access from REMOTEIP1-REMOTEIP4)
REMOTEIP1=	nnn.nnn.nnn.nnn
REMOTEIP2=	nnn.nnn.nnn.nnn
REMOTEIP3=	nnn.nnn.nnn.nnn
REMOTEIP4=	nnn.nnn.nnn.nnn
SMSBLOCK=	0 or 1 (0 disable, 1 enable remote SMS access from REMOTESMS1-4)
REMOTESMS1=	ccnnnnnnnnn cc for country code
REMOTESMS2=	ccnnnnnnnnn
REMOTESMS3=	ccnnnnnnnnn
REMOTESMS4=	ccnnnnnnnnn
DIALBLOCK=	0 or 1 (0 disable, 1 to enable remote dialing access from REMOTEDIAL1-4)
REMOTEDIAL1=	acnnnnnnnnn ac for area code
REMOTEDIAL2=	acnnnnnnnnn
REMOTEDIAL3=	acnnnnnnnnn
REMOTEDIAL4=	acnnnnnnnnn

```
AT$ACCESS=IPBLOCK=1,REMOTEIP1=10.64.24.2,REMOTEIP2=,REMOTEIP3=,REMOTEIP4=,SMSBLO
CK=1,REMOTESMS1=0413586218,REMOTESMS2=,REMOTESMS3=,REMOTESMS4=,DIALBLOCK=1,REMOT
EDIAL1=0395612959,REMOTEDIAL2=,REMOTEDIAL3=,REMOTEDIAL4=
Saved parameters to flash...
OK

AT$ACCESS?
$ACCESS:
IPBLOCK: 1
REMOTEIP1: 10.64.24.2
REMOTEIP2:
REMOTEIP3:
REMOTEIP4:
SMSBLOCK: 1
REMOTESMS1: 0413586218
REMOTESMS2:
REMOTESMS3:
REMOTESMS4:
DIALBLOCK: 1
REMOTEDIAL1: 0395612959
REMOTEDIAL2:
REMOTEDIAL3:
REMOTEDIAL4:

OK
```

AT$LOGIN

Use this parameter to setup login details for remote sending of AT commands, parameters and software updating; password is encrypted so remote login required PC software SAM4Q Terminal.

AT$LOGOFF

Used to log off remote access instantly.

AT$IP

Used to return the allocated IP addresses of the current GPRS connection

```
AT$IP
$IP: 120.157.107.60
$DNS Primary: 10.4.182.20
$DNS Secondary: 10.4.81.103
OK
```

AT$VERSION

This command returns the TCP/IP software version.

```
AT$VERSION
SAM4Q V1.632 29/03/17 13:49
OK
```

AT$RESET

Use to remotely reset the modem, normally after sending of new parameters

```
AT$RESET
SAM Reset...
OK
```

AT$SMSTOSERIALON

This command allows the connecting device to receive SMS notification for 300s: e.g. “+CMTI: "SM",1”, the connecting device must send AT+CMGR to read SMS and AT+CMGD to delete it, during this 300s period, the modem will not be able to decode AT$ commands sending to it over SMS.

AT$FOTA

Use to start FOTA (LTE Module Firmware Over The Air).

AT$FOTA=FTP_Server,FTP_Username,FTP_Password,FTP_Path,FTP_Filename

FTP_Server=	FTP server in dot format nnn.nnn.nnn.nnn
FTP_Username=	Maximum length 100
FTP_Password=	Maximum length 100
FTP_Path=	Maximum length 50
FTP_Filename=	Maximum length 50

```
AT$FOTA=120.157.48.51,vp,test,.,deltafota_LE910A4_V_25.00.001.4_EU_to_V_25.00.00
2.3_EU_LE910C1_AP_CUST_031_test.upd

OK
```

AT$DOTA

Use to start DOTA (Modem Software Download Over The Air).

AT$DOTA=FTP_Server,FTP_Username,FTP_Password,FTP_Path,FTP_Filename
FTP_Server= FTP server in dot format nnn.nnn.nnn.nnn
FTP_Username= Maximum length 100
FTP_Password= Maximum length 100
FTP_Path= Maximum length 50
FTP_Filename= Maximum length 50

```
AT$DOTA=120.157.48.51,vp,test,.,SAM4Q V1631 100818 1637.bin
OK
```

AT$GETLOG

Use this function to check read logged events from flash.

Read all logged events:

AT$GETLOG

```
$GETLOG:
1     2020/03/23 13:08:25+40 257 Software start
2     2020/03/23 13:08:30+40 259 BG96_OFF
3     2020/03/23 13:08:36+40 258 BG96_ON
4     2020/03/23 13:08:42+40 288 NW registered…..
249   2020/03/24 10:52:19+40 320 $version.
250   2020/03/24 11:17:10+40 320 $getlog.
OK
```

To read the last 5 events: AT$GETLOG=5 $GETLOG:

```
246   2020/03/24 10:26:15+40 288 NW registered
247   2020/03/24 10:26:16+40 262 /04/09,10:26:16
248   2020/03/24 10:52:19+40 320 $version.
249   2020/03/24 11:17:10+40 320 $getlog.
250   2020/03/24 11:21:13+40 320 $getlog=5.
OK
```

AT$CLEARLOG

Use to clear logged events from flash.

```
AT$CLEARLOG
OK
```

AT$MODEMLOG

Use to enable and disable events logging,

AT$MODEMLOG=1 enable logging
AT$MODEMLOG=0 disable logging

```
AT$MODEMLOG?
$MODEMLOG: 1
OK
```

AT$DEFAULT

Use to restore modem's parameters to default settings.

```
AT$DEFAULT
OK
```

8.3 CSD Call Escape Sequence

During a CSD call to the SAM4Q modem, send three consecutive Esca (EscEscEsc) or hex number sequence 0x1B 0x1B 0x1B to switch the modem between data modem and remote AT Command mode.

9 Firmware Upgrade

9.1 The LTE Module Firmware

The module firmware can be upgraded via the modem's USB port, or can be upgraded over-the-air (FOTA) by instructing it to download from an FTP server.

9.2 The Modem's Controller Software

The modem's software can be upgraded over the JTAG port using the SAM-BA software tool from Atmel.

The modem software and parameters can be upgraded over the serial port, PSD, or SMS (parameters only) using SAM Terminal program running on PC.

For mass upgrade of modem's software, the new software can be loaded onto a FTP server and the modem instructed to download the new software from this FTP server.

10 Operating Notes

In SAMMODE=0 After power on the MCU turns on the LTE module, checks its baud rate, turns on LED before releasing control of the LTE module to the connecting device. All this takes between 15 to 20 seconds, so the modem is only ready for AT commands here after.

In SAMMODE=1 The modem takes 30 to 60 seconds to connect to PSD, the modem only responds to AT commands from serial port once it is connected to PSD or after it has failed. If it failed to connect it will reset after 120 seconds.

In SAMMODE=2 The MCU takes about 30 seconds to set up the LTE module, the modem only responds to AT commands from the serial port after setting up is finished.

In SAMMODE= 2 The modem can be reset remotely by calling the voice number.

In SAMMODE 1 and 2 If the SAM4Q modem is powered up without a SIM card it will go into AT command mode after 20 seconds.

ABOUT INTERCEL

Intercel is an Australian designer and manufacturer of modems and mobile equipment for use with GSM, 3G and 4G telecommunication networks. Our products provide remote connectivity for Serial and Ethernet devices in critical industrial applications. We are located in Melbourne, Australia and our head office is in Mulgrave.

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