
Test AT+CGEREP=?
Set AT+CGEREP=0

AT+CGMI

Description: MANUFACTURERS IDENTITY REQUEST
Returns manufacturer identification text. Identical to the command [AT+GMI](#).

Syntax: AT+CGMI

Parameters: NONE

Response: Manufacturer's ID

| Example: | Input | Output |
|----------|-----------|---------------------------|
| Query | AT+CGMI | Novatel Wireless, Inc. OK |
| Test | AT+CGMI=? | OK |

AT+CGMM

Description: MODEL IDENTITY REQUEST
Returns product model identification text. Identical to the command [AT+GMM](#).

Syntax: AT+CGMM

Parameters: None

Response: <model identity>

| Example: | Input | Output |
|----------|-----------|----------------------|
| Query | AT+CGMM | GPRS PC Card 1900 OK |
| Test | AT+CGMM=? | OK |

AT+CGMR

Description: REVISION IDENTITY REQUEST
Returns product software version identification text. Identical to the command [AT+GMR](#).

Syntax: AT+CGMR

Parameters: None

Response: <software revision text>

| Example: | Input | Output |
|----------|-----------|------------|
| Query | AT+CGMR | 1.0.0.0 OK |
| Test | AT+CGMR=? | OK |



| | | |
|-------|------------------|---|
| Query | AT+CGMR? | Software Version: PN160-0300 Date: May 23 2001, Time: 14:17:39. OK |
| Test | AT+CGMR=? | OK |

AT+CGOI

Description: GLOBAL IDENTITY REQUEST

Reports one or more lines of information text which permit the user to identify the device, based on the ISO system for registering unique object identifiers. Identical to the command [AT+GOI](#).

Syntax: **AT+CGOI**

Parameters: **None**

Response: **Identifier of device type.**

AT+CGPADDR

Description: SHOW PDP ADDRESS

This command dictates the behavior of PPP in the ME but not the behavior of any other GPRS-enabled foreground layer, e.g. browser.

Syntax: **AT+CGPADDR=[<cid>[,<cid>[,...]]]**

Parameters:

<cid> a numeric parameter which specifies a particular PDP context definition (see [+CGDCONT](#) command). If no <cid> is specified, the addresses for all defined contexts are returned.

<PDP_addr> a string that identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. For a static address, it will be the one set by the [+CGDCONT](#) command when the context was defined. For a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by <cid>. <PDP_address> is omitted if none is available.

Response: **+CGPADDR: <cid>,<PDP_addr>[<cr><LF>+CGPADDR: <cid>,<PDP_addr>**

AT+CGQMIN

Description: QUALITY OF SERVICE PROFILE (MINIMUM ACCEPTABLE)

Get current quality of service profile. This reports the minimum quality standard that will be used by the device / network.

Syntax: **AT+CGQMIN=[<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]**

<cid> a numeric parameter which specifies a particular PDP context definition (see +CGDCONT command). The following parameters are defined in GSM 03.60

<precedence> a numeric parameter which specifies the precedence class

<delay> a numeric parameter which specifies the delay class

<reliability> a numeric parameter which specifies the reliability class

<peak> a numeric parameter which specifies the peak throughput class

<mean> a numeric parameter which specifies the mean throughput class

Response: **AT+CGQMIN?+CGQMIN:**
<cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>[<cr><LF>
+CGQMIN: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>[...]]

| | | |
|-------|---------------|-----------------------------|
| Query | AT+CGQMIN? | Current selection OK |
| Test | AT+CGQMIN=? | List of possible selections |
| Set | AT+CGQMIN=<n> | OK |

AT+CGQREQ

Description: REQUEST QUALITY OF SERVICE PROFILE

Request quality of service from carrier.

Syntax: **AT+CGQREQ=[<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]]]**

Parameters:

<cid> a numeric parameter which specifies a particular PDP context definition (see +CGDCONT command). The following parameters are defined in GSM 03.60

-

<precedence> a numeric parameter which specifies the precedence class

<delay> a numeric parameter which specifies the delay class

<reliability> a numeric parameter which specifies the reliability class

<peak> a numeric parameter which specifies the peak throughput class



<mean> a numeric parameter which specifies the mean throughput class

Response: +CGQREQ:<cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>[<cr>]<LF>+CGQREQ:<cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>[...]]

AT+CGREG

Description: GPRS NETWORK REGISTRATION STATUS

This set command returns the status of an unsolicited result code.

Syntax: AT+CGREG=[<n>]

Parameters:

| | | |
|-----|---|---|
| <n> | 0 | disable network registration unsolicited result code |
| | 1 | enable network registration unsolicited result code +CGREG: <stat> |
| | 2 | enable network registration and location information unsolicited result code +CGREG: <stat>[,<lac>,<ci>] |

Response: (Read Response)

+CGREG: <n>,<stat>[,<lac>,<ci>]

+CME ERROR: <err>

| | | |
|--------|---|---|
| <n> | 0 | disable network registration unsolicited result code |
| | 1 | enable network registration unsolicited result code +CGREG: <stat> |
| | 2 | enable network registration and location information unsolicited result code +CGREG: <stat>[,<lac>,<ci>] |
| <stat> | 0 | device is not registered, ME is not currently searching a new operator to register to |
| | 1 | device is registered |

<lac> string type; two byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)

<ci> string type; two byte cell ID in hexadecimal format

| | | |
|-------|--------------|-----------------------------|
| Query | AT+CGREG? | Current selection OK |
| Test | AT+CGREG=? | List of possible selections |
| Set | AT+CGREG=<n> | OK |

AT+CGSMS

Description: SERVICE SELECTION FOR MO SMS MESSAGES

This set command is used to specify the service or service preference that the MT will use to send MO SMS messages.

Syntax: **AT+CGSMS=[<service>]**

Parameters:

| | |
|-----------|---|
| <service> | a numeric parameter which indicates the service or service preference to be used. The circuit switched service route is the default method. |
| 0 | GPRS |
| 1 | circuit switched |
| 2 | GPRS preferred (use CSD if GPRS not available) |
| 2 | CSD preferred (use GPRS if CSD not available) |

Response: **(Read Response)**

+CGSMS: [<service>]<cr> +CME ERROR: <err> <service> see above.

| | | |
|--------|---|---|
| <n> | 0 | disable network registration unsolicited result code |
| | 1 | enable network registration unsolicited result code +CGREG: <stat> |
| | 2 | enable network registration and location information unsolicited result code +CGREG: <stat>[,<lac>,<ci>] |
| <stat> | 0 | device is not registered, ME is not currently searching a new operator to register to |
| | 1 | device is registered |
| <lac> | | string type; two byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal) |
| <ci> | | string type; two byte cell ID in hexadecimal format |

AT+CGSN

Description: SERIAL NUMBER REQUEST

Reports the device serial number. Identical to the command AT+GSN.

Syntax: **AT+CGSN**

Parameters: **None**

| Example: | Input | Output |
|-----------------|------------------|---------------------------|
| Query | AT+CGSN | 01234567890123. OK |
| Test | AT+CGSN=? | OK |



AT+CHLD

Description: CALL HOLD

Controls the supplementary services Call Hold, MultiParty and Explicit Call Transfer. Calls can be put on hold, recovered, released, added to conversation, and transferred. This supplementary service is only applicable to teleservice 11 (Speech: Telephony).

Syntax: **AT+CHLD=[<n>]**

| | | |
|---|----|--|
| n | 0 | Terminate all held calls or UDUB (User Determined User Busy) for a waiting call |
| | 1 | Terminate all active calls (if any) and accept the other call (waiting call or held call) |
| | 1X | Terminate the active call number X (X= 1-7) |
| | 2 | Place all active calls on hold (if any) and accept the other call (waiting call or held call) as the active call |
| | 2X | Place all active calls except call X (X= 1-7) on hold |
| | 3 | Add the held call to the active calls |

| Example: | Input | Output |
|-----------------|------------------|--|
| Query | AT+CHLD? | 1 OK |
| SET | AT+CHLD=1 | OK |
| Test | AT+CHLD=? | List of supported <n>s OK |

AT+CIMI

Description: INTERNATIONAL MOBILE SUBSCRIBER IDENTITY REQUEST

Returns international mobile subscriber identity for identifying the individual SIM which is attached to the device.

Syntax: **AT+CIMI**

Parameters: **None**

Response: **International Mobile Subscriber Identity**

| Example: | Input | Output |
|-----------------|------------------|---|
| Query | AT+CIMI? | 1234567890123455566 OK |
| Test | AT+CIMI=? | OK |

AT+CLCC

Description: CURRENT CALL LIST

Returns a list of current calls.

Syntax: AT+CLCC

Parameters: None

[+CLCC:<id1>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>[,<alpha>]]

- <id1> integer type; call identification number as described in GSM 02.30[19] sub clause 4.5.5.1; this number can be used in +CHLD command operations.
- <dir> 0 mobile originated (MO) call
1 mobile terminated (MO) call
- <stat> state of call:
0 active
1 held
2 dialing (MO call)
3 alerting (MO call)
4 incoming (MT call)
5 waiting (MT call)
- <mode> bearer/tele service:
0 voice
1 data
2 fax
9 unknown
- <mpty> 0 call is not one of multiparty (conference) call parties
1 call is one of multiparty (conference) call parties
- <number> string type phone number in format specified by <type>
- <type> type of address octet in integer format; 145 when dialing string includes international access code character "+", otherwise 129
- <alpha> string type alphanumeric representation of <number> corresponding to the entry found in phone book

| Example: | Input | Output |
|-----------------|--------------|-------------------------------|
| Query | AT+CLCC | LIST FORMATTED AS ABOVE OK |
| Test | AT+CLCC=? | OK |



AT+CLCK

Description: FACILITY LOCK

This command is used to lock, unlock or interrogate an ME or a network facility. A password is normally needed to perform such actions. When querying the status of a network service (<mode>=2) the response line for 'not active' case (<status>=0) should be returned only if service is not active for any <class>.

Syntax: **AT+CLCK = <fac>, <mode>[,<passwd>[,<class>]]**

Parameters:

| | | |
|--------|------|---|
| <fac> | "PS" | PH-SIM (lock PHone to SIM card) (ME asks password when other than current SIM card inserted; ME may remember certain amount of previously used cards thus not requiring password when they are inserted). |
| | "SC" | SIM (lock SIM card) (SIM asks password in ME power-up and when this lock command issued). |
| | "AO" | BAOC (Barr All Outgoing Calls) (refer GSM02.88[6] clause 1) |
| | "O" | BOIC (Barr Outgoing International Calls) (refer GSM02.88[6] clause 1) |
| | "OX" | BOIC-exHC (Barr Outgoing International Calls except to Home Country) (refer GSM02.88[6] clause 1) |
| | "AI" | BAIC (Barr All Incoming Calls) (refer GSM02.88[6] clause 2) |
| | "IR" | BIC-Roam (Barr Incoming Calls when Roaming outside the home country) (refer GSM02.88 [6] clause 2) |
| | "AB" | All Barring services (refer GSM02.30[19]) (applicable only for <mode>=0) |
| | "AG" | All out Going barring services (refer GSM02.30[19]) (applicable only for <mode>=0) |
| | "AC" | All in Coming barring services (refer GSM02.30[19]) (applicable only for <mode>=0) |
| | "PN" | Network Personalization (refer GSM 02.22[33]) |
| | "PU" | network sUbset Personalization (refer GSM 02.22[33]) |
| | "PP" | service Provider Personalization (refer GSM 02.22[33]) |
| | "PC" | Corporate Personalization (refer GSM 02.22[33]) |
| <mode> | 0 | unlock |
| | 1 | lock |

| | | |
|----------|---|-----------------------|
| | 2 | query status |
| <passwd> | | password |
| <class> | 1 | voice |
| | 2 | data |
| | 4 | fax |
| | 7 | all classes (default) |
| <status> | 0 | off |
| | 1 | on |

Response: If <mode><>2 and command is successful

OK

If <mode>=2 and command is successful

+CLCK: <status>[,<class1>[<cr><LF>

+CLCK: <status>, class2....]] OK

If error is related to ME functionality:

+CME ERROR: <err>

| Example: | Input | Output |
|----------|-----------|-------------------------------|
| Query | AT+CLCK? | 129 OK |
| Test | AT+CLCK=? | LIST OF SUPPORTED (<fac>s) OK |

AT+CLDTMF

Description: GENERATE LOCAL DTMF TONE

Syntax: AT+CLDTMF=<n>,<dtmf-string>

Parameters:

<n> Duration of all DTMF tones in <dtmf-string> in 1/10 seconds.

<dtmf-string> As a max length of 20 characters of form <dtmf>, must be entered between double quotes (“ ”) and consists of combinations of the following separated by commas.

<dtmf> A single ASCII characters in the set 0-9,#,*,A-D. This is interpreted as a sequence of DTMF tones whose duration is set by <n>.

**Response: OK+CME ERROR**

<err> AT+CLDTMF, without any parameters will abort any DTMF tone currently being generated and any DTMF tone sequence

Query: AT+CLDTMF=? Current State OK

Set: AT+CLDTMF=<n> A list of possible selections

Test: AT+CLDTMF=

AT+CLIP

Description: CALLING LINE IDENTIFICATION PRESENTATION

TA enables or disables the presentation of the CLI at the TE. It has no effect on the execution of the supplementary service CLIP in the network. When the presentation of the CLI at the TE is enabled (and calling subscriber allows), an unsolicited result code is returned after every RING (or +CRING: <type>) at a mobile terminating call.

Syntax: AT+CLIP=<n>

Parameters:

<n> 0 suppress unsolicited result codes
1 display unsolicited result codes

Response: +CLIP: <number>, <type>

<number> string type phone number of calling address in format specified by <type>

<type> type of address octet in integer format; 145 when dialing string includes international access code character "+", otherwise 129

| Example: | Input | Output |
|-----------------|------------------|------------------------------|
| Query | AT+CLIP? | List of supported N's |
| Test | AT+CLIP=? | List of supported N's |

AT+CLIR

Description: CALLING LINE IDENTIFICATION RESTRICTION

TA restricts or enables the presentation of the CLI to the called party when originating a call. The command overrides the CLIR subscription (default is restricted or allowed) when temporary mode is provisioned as a default adjustment for all following outgoing calls. This adjustment can be revoked by using the opposite command.

Syntax: AT+CLIR=<n>

Parameters: <n> parameter sets the adjustment for outgoing calls

| | | |
|-----|---|--|
| <n> | 0 | presentation indicator is used according to the subscription of the CLIR service |
| | 1 | CLIR invocation |
| | 2 | CLIR suppression |
| <m> | parameter shows the subscriber CLIR service status in the network | |
| <m> | 0 | CLIR not provisioned |
| | 1 | CLIR provisioned in permanent mode |
| | 2 | unknown (e.g. no network, etc.) |
| | 3 | CLIR temporary mode presentation restricted |
| | 4 | CLIR temporary mode presentation allowed |

Response: +CLIR: <n>, <m> OK

| Example: | Input | Output |
|-----------------|--------------|-----------------------|
| Test | AT+CLIR=? | List of supported n's |

AT+CLTS

Description: GET LOCAL TIME STAMP
Query the master time source (local) for the current time.

Syntax: AT+CLTS

Parameters: None

Response:

| | |
|-------|---|
| <tds> | time-string format: "yy/MM/dd,hh:mm:ss±zz" where characters indicate year (last two digits), month, day, hours, minutes, seconds and time zone. |
|-------|---|

AT+CLVL

Description: LOUDSPEAKER VOLUME SETTING
Sets the local loudspeaker volume level. If no loudspeaker provisions exist, this command does nothing.

Syntax: AT+CLVL=<level>

Parameters:

| | |
|---------|--|
| <level> | integer type value with manufacturer specific range (smallest value represents the lowest sound level) |
|---------|--|

Response:

| | |
|-------|---------------------------------|
| Query | +CLVL: <level>+CME ERROR: <err> |
|-------|---------------------------------|



Test +CLVL: (list of supported <level>s)+CME ERROR: <err>

AT+CMEE

Description: REPORT MOBILE EQUIPMENT ERROR

Modem disables or enables the use of result code +CME ERROR: <err> as an indication of an error relating to the functionality of the mobile equipment.

Syntax: AT+CMEE=<n>

Parameters:

| | | |
|-----|---|---|
| <n> | 0 | disable result code |
| | 1 | enable result code and use numeric values |
| | 2 | enable result code and use verbose value |

Response: <n> OK

| Example: | Input | Output |
|----------|-----------|------------------------------|
| Query | AT+CMEE? | <n> OK |
| Test | AT+CMEE=? | List of supported <n>s OK |

AT+CMGD

Description: DELETE SMS MESSAGE

Deletes message from preferred message storage location.

Syntax: AT+CMGD=<index>

Parameters:

| | |
|---------|---|
| <index> | integer type; value in the range of location numbers supported by the associated memory |
|---------|---|

Response: OK

| Example: | Input | Output |
|----------|-----------|--------|
| Test | AT+CMGD=? | OK |

AT+CMGF

Description: SMS MESSAGE FORMAT

Sets parameter to dictate which input and output format of messages to use.

Syntax: AT+CMGF = [<mode>]

Parameters:

| | | |
|--------|---|-----------|
| <mode> | 0 | PDU mode |
| | 1 | text mode |

Response: OK**Example: Input****Output**Query **AT+CMGF?****+CMGF: <mode> OK**Test **AT+CMGF=?****+CMGF: list of supported <mode>s OK**

AT+CMGL

Description: LIST SMS MESSAGES

Returns messages with status value <stat> from message storage <mem1> to the TE. If status of the message is 'received unread', status in the storage changes to 'received read'.

Syntax: AT+CMGL [=<stat>]**Parameters:**

| | | |
|--------|-----------|--|
| <stat> | Text Mode | "REC UNREAD" Received unread message (default) |
| | | "REC READ" Received read messages. |
| | | "STO UNSENT" Stored unsent messages |
| | | "STO SENT" Stored sent messages |
| | | "ALL" All messages |
| | PDU Mode | 0 Received unread messages (default) |
| | | 1 Received read messages |
| | | 2 Stored unsent messages |
| | | 3 Stored sent messages |
| | | 4 All messages |

Response:

1. If text mode (+CMGF=1) and command successful: for SMS-SUBMITs and/or SMS-DELIVERs: **+CMGL: <index>,<stat>,<oa/da>,<alpha>,<scts>,<tooa/toda>,<length><cr><LF><data><cr><LF>+CMGL: <index>,<stat>,<da/oa>,<alpha>,<scts>,<tooa/toda>,<length><cr><LF><data>[...]] OK**
2. If PDU mode (+CMGF=0) and command successful: **+CMGL: <index>,<stat>,<alpha>,<length><cr><LF><pdu><cr><LF>+CMGL: <index>,<stat>,<alpha>,<length><cr><LF><pdu>[...]] OK**
3. If error is related to ME functionality: **+CMS ERROR: <err>**



| | |
|-----------------------------|--|
| <code><alpha></code> | string type alphanumeric representation of <code><da></code> or <code><oa></code> corresponding to the entry found in MT phone book; implementation of this feature is manufacturer specific |
| <code><da></code> | GSM 03.40 TP-Destination-Address, Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters; type of address given by <code><toda></code> |
| <code><data></code> | <p>In the case of SMS: GSM 03.40 TP-User-Data in text mode responses; format:</p> <p>if <code><dc></code> indicates that GSM 03.38 default alphabet is used and <code><fo></code> indicates that GSM 03.40 TP-User-Data-Header-Indication is not set: ME/TA converts GSM alphabet into current TE character set according to rules of Annex A</p> <p>if <code><dc></code> indicates that 8-bit or UCS2 data coding scheme is used, or <code><fo></code> indicates that GSM 03.40 TP-User-Data-Header-Indication is set: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65))</p> <p>In the case of CBS: GSM 03.41 CBM Content of Message in text mode responses; format:</p> <p>if <code><dc></code> indicates that GSM 03.38 default alphabet is used: ME/TA converts GSM alphabet into current TE character set according to rules of Annex A.</p> <p>if <code><dc></code> indicates that 8-bit or UCS2 data coding scheme is used: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number.</p> |
| <code><length></code> | integer type value indicating in the text mode (+CMGF=1) the length of the message body <code><data></code> (or <code><cdata></code>) in characters; or in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length) |
| <code><index></code> | integer type; value in the range of location numbers supported by the associated memory |
| <code><oa></code> | GSM 03.40 TP-Originating-Address, Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters; type of address given by <code><tooa></code> |
| <code><pdu></code> | In the case of SMS: GSM 04.11 SC address followed by GSM 03.40 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with |

| | |
|--------|--|
| | integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)). In the case of CBS: GSM 03.41 TPDU in hexadecimal format. |
| <scts> | GSM 03.40 TP-Service-Center-Time-Stamp in time-string format (refer <dt>) |
| <toda> | GSM 04.11 TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145, otherwise default is 129) |
| <tooa> | GSM 04.11 TP-Originating-Address Type-of-Address octet in integer format (default refer<toda>) |

| Example: | Input | Output |
|----------|------------------|---|
| Test | AT+CMGL=? | +CMGF: list of supported <stats>s OK |

AT+CMGR

Description: READ SMS MESSAGE

Returns SMS message with location value <index> from message storage <mem1> to the TE. If status of the message is 'received unread', status in the storage changes to 'received read'.

Syntax: **AT+CMGR=<index>**

Parameters:

<index> integer type; value in the range of location numbers supported by the associated memory.

Response:

- If text mode (+CMGF=1) and command successful: for SMS-DELIVER:
+CMGR: <stat>,<oa>,[<alpha>],<scts>
[,<tooa>,<fo>,<pid>,<dc>,<sca>,<tosca>,<length>]<cr><LF><data>for
SMS-SUBMIT:+CMGR: <stat>,<da>,[<alpha>]
[,<toda>,<fo>,<pid>,<dc>,[<vp>],<sca>,<tosca>,<length>]<cr><LF><data>
>
- If PDU mode (+CMGF=0) and command successful:
+CMGR: <stat>,[<alpha>],<length><cr><LF><pdu> OK



3. If error is related to ME functionality:

+CMS ERROR: <err>

| | |
|----------|---|
| <alpha> | The string type alphanumeric representation of <da> or <oa> corresponding to the entry found in MT phone book; implementation of this feature is manufacturer specific. |
| <da> | GSM 03.40 TP-Destination-Address, Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters; type of address given by <toda>. |
| <data> | <p>In the case of SMS: GSM 03.40 TP-User-Data in text mode responses; format:</p> <p>if <dc> indicates that GSM 03.38 default alphabet is used and <fo> indicates that GSM 03.40 TP-User-Data-Header-Indication is not set: ME/TA converts GSM alphabet into current TE character set according to rules of Annex A.</p> <p>If <dc> indicates that 8-bit or UCS2 data coding scheme is used, or <fo> indicates that GSM 03.40 TP-User-Data-Header-Indication is set: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65))</p> <p>In the case of CBS: GSM 03.41 CBM Content of Message in text mode responses; format:</p> <p>If <dc> indicates that GSM 03.38 default alphabet is used: ME/TA converts GSM alphabet into current TE character set according to rules of Annex A.</p> <p>If <dc> indicates that 8-bit or UCS2 data coding scheme is used: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number.</p> |
| <dc> | Depending on the command or result code: GSM 03.38 SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme in integer format. |
| <fo> | Depending on the command or result code: first octet of GSM 03.40 SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND (default 2) in integer format. |
| <length> | Integer type value indicating in the text mode (+CMGF=1) the length of the message body <data> (or <cdata>) in characters; or in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length). |
| <mid> | GSM 03.41 CBM Message Identifier in integer format. |

| | | | |
|---------|--|--------------|--------------------------|
| <oa> | GSM 03.40 TP-Originating-Address, Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters; type of address given by <tooa>. | | |
| <pdu> | In the case of SMS: GSM 04.11 SC address followed by GSM 03.40 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65). In the case of CBS: GSM 03.41 TPDU in hexadecimal format. | | |
| <sca> | GSM 04.11 RP SC address Address Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters; type of address given by <tosca>. | | |
| <stat> | 0 | “REC UNREAD” | Received unread messages |
| | 1 | “REC READ” | Received read messages |
| | 2 | “STO UNSENT” | Stored unsent messages |
| | 3 | “STO SENT” | Stored sent messages |
| | 4 | “ALL” | All messages |
| <toda> | GSM 04.11 TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145, otherwise default is 129) | | |
| <tooa> | GSM 04.11 TP-Originating-Address Type-of-Address octet in integer format (default refer <toda>). | | |
| <tosca> | GSM 04.11 RP SC address Type-of-Address octet in integer format (default refer <toda>). | | |
| <vp> | depending on SMS-SUBMIT <fo> setting: GSM 03.40 TP-Validity-Period either in integer format (default 167) or in time-string format (refer <dt>) | | |

| Example: | Input | Output |
|----------|------------------|---|
| Test | AT+CMGR=? | +CMGR: list of supported <index>s OK |

AT+CMGW

Description: WRITE SMS MESSAGE TO MEMORY

Transmits SMS message from terminal to memory storage. Memory location of the stored message is returned. By default message status will be set to 'stored unsent', but parameter allows other status values to be given.

Syntax:

TEXT MODE: **AT+CMGS=[<oa/da>[,<tooa/toda>]]<cr> MESSAGE TEXT <ctrlZ>**
 PDU MODE: **AT+CMGW==<length><cr> PDU IS GIVEN <ctrlZ>**
 SENDS MESSAGE <ctrlZ>



EXITS WITHOUT SENDING **<esc>**

Parameters:

| | |
|-----------------------|---|
| <oa> | GSM 03.40 TP-Originating-Address, Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters; type of address given by <tooa> |
| <da> | GSM 03.40 TP-Destination-Address, Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters; type of address given by <toda> |
| <tooa> | GSM 04.11 TP-Originating-Address Type-of-Address octet in integer format (default refer <toda>). |
| <toda> | GSM 04.11 TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145, otherwise default is 129) |
| <length> | Integer type value indicating in the text mode (+CMGF=1) the length of the message body <data> (or <cdata>) in characters; or in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length) |
| <pdu> | In the case of SMS: GSM 04.11 SC address followed by GSM 03.40 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)). In the case of CBS: GSM 03.41 TPDU in hexadecimal format. |
| <index> | Index of message in selected storage <mem2> |

Response: If writing is successful: **+CMGW: <index> OK**
 If error is related to ME functionality: **+CMS ERROR: <err>**

| | | |
|-----------------|------------------|---------------|
| Example: | Input | Output |
| Test | AT+CMGW=? | OK |

AT+CMSS

Description: SEND STORED SMS MESSAGE

Sends message with location value **<index>** from message storage **<mem2>** to the network (SMS-SUBMIT). If new recipient address **<da>** is given, it shall be used instead of the one stored with the message. Reference value **<mr>** is returned to the TE on successful message delivery. Values can be used to identify message upon unsolicited delivery status report result code.

Syntax: **AT+CMSS=<index>[,<da>[,<toda>]]**

Parameters:

| | |
|---------|--|
| <index> | integer type; value in the range of location numbers supported by the associated memory |
| <da> | GSM 03.40 TP-Destination-Address, Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters; type of address given by <tda> |
| <tda> | GSM 04.11 TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145, otherwise default is 129) |
| <mr> | GSM 03.40 TP-Message-Reference in integer format |

Response: If text mode(+CMGF=1) and sending successful: **+CMGS: <mr> OK**
 If PDU mode(+CMGF=0) and sending successful: **+CMGS: <mr> OK**
 If error is related to ME functionality: **+CMS ERROR: <err>**

| Example: | Input | Output |
|----------|------------------|-----------|
| Test | AT+CMSS=? | OK |

AT+CMUT

Description: This command is used to enable and disable the uplink voice muting during a voice call.

Syntax: **AT+CMUT=<n>**

Parameters:

| | | |
|-----|---|----------|
| <n> | 0 | mute off |
| | 1 | mute on |

Response:

| | |
|-------|--|
| Query | +CMUT: <n>+CME ERROR: <err> |
| Test | +CMUT: (list of supported <n>s) |

AT+CMUX

Description: This command is used to enable/disable the GSM 07.10 multiplexing protocol control channel.

Syntax: **AT+CMUX=<mode>**

Parameters:

| | | |
|--------|---|--|
| <mode> | 0 | Basic option (i.e. No multiplexer in operation) |
| | 1 | Advanced option (GSM 07.10 multiplexer) |
| | 2 | Proprietary option (manufacturer specific multiplexer) |

Response:



Query +CMUX: <mode>+CME ERROR: <err>
 Test +CMUX: (list of supported <mode>s)

AT+CNMI

Description: SMS MESSAGE ARRIVAL INDICATION

Selects the procedure for receiving of new messages from the network. Indicates to the TE when TE is active, e.g. DTR signal is ON. If TE is inactive (e.g. DTR signal is OFF), message receiving should be done as specified in GSM 03.38.

Syntax: AT+CNMI = [<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]

Parameters:

| | | |
|--------|---|--|
| <mode> | 0 | Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications. |
| | 1 | Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved (e.g. in on-line data mode). Otherwise forward them directly to the TE. |
| | 2 | Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in on-line data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE. |
| | 3 | Forward unsolicited result codes directly to the TE. TA-TE link specific in band technique used to embed result codes and data when TA is in on-line data mode. |
| <mt> | | The rules for storing received SMSs depend on its data coding scheme (refer GSM 03.38 [2], preferred memory storage (+CPMS) setting and this value: |
| | 0 | No SMS-DELIVER indications are routed to the TE. |
| | 1 | If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code: +CMTI: <mem>,<index> |
| | 2 | SMS-DELIVERs (except class 2) are routed directly to the TE using unsolicited result code: +CMT: [<alpha>],<length><cr><LF><pdu> (PDU mode enabled) or +CMT: <oa>, [<alpha>],<scts> [,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>] <cr><LF><data> (text mode enabled; about |

| | | |
|-------|---|---|
| | | parameters in italics, refer command Show Text Mode Parameters +CSDH). Class 2 messages result in indication as defined in <mt>=1. |
| | 3 | Class 3 SMS-DELIVERs are routed directly to TE using unsolicited result codes defined in <mt>=2. Messages of other classes result in indication as defined in <mt>=1. |
| <bm> | | The rules for storing received CBMs depend on its data coding scheme (refer GSM 03.38 [2]), the setting of Select CBM Types (+CSCB) and the following values: |
| | 0 | No CBM indications are routed to the TE. |
| | 2 | New CBMs are routed directly to the TE using unsolicited result code: +CBM: <length><cr><LF><pdu> (PDU mode enabled) or +CBM: <sn>,<mid>,<dc>,<page>,<pages><cr><LF><data> (text mode enabled). |
| <ds> | 0 | No SMS-STATUS-REPORTs are routed to the TE. |
| | 1 | SMS-STATUS-REPORTs are routed to the TE using unsolicited result code: +CDS: <length><cr><LF><pdu> (PDU mode enabled) or +CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> (text mode enabled) |
| <bfr> | 0 | TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1...3 is entered (OK response shall be given before flushing the codes). |
| | 1 | TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1...3 is entered. |

Response: OK

Unsolicited Response:

| | |
|-------------------------------------|---|
| +CMTI: <mem>,<index> | Indication that new message has been received |
| +CMT: ,<length><cr><LF><pdu> | Short message is output directly |
| +CBM: <length><cr><LF><pdu> | Cell broadcast message is output directly |

| | | |
|-----------------|--------------|---------------|
| Example: | Input | Output |
| Test | AT+CNMI=? | OK |

AT+CNUM

Description: SUBSCRIBER NUMBER



This is a query command is used to retrieve the current subscriber number and associated information.

Syntax:**AT+CNUM**

| | |
|-----------|---|
| <alphax> | optional alphanumeric string associated with |
| <numberx> | used character set should be the one selected with commandSelect TE Character Set +CSCS |
| <numberx> | string type phone number of format specified by <typex> |
| <typex> | type of address octet in integer format (refer GSM 04.08 [8] subclause 10.5.4.7) |
| <speed> | as defined by the +CBST command |
| <service> | service related to the phone number |
| | 0 asynchronous modem |
| | 1 synchronous modem |
| | 2 PAD Access (asynchronous) |
| | 3 Packet Access (synchronous) |
| | 4 Voice |
| | 5 Fax |
| <itc> | information transfer capability |
| | 0 3.1 kHz |

AT+COLP

Description: CONNECTED LINE IDENTIFICATION PRESENTATION

TA enables or disables the presentation of the COL(Connected Line) at the TE for a mobile originated call. It has no effect on the execution of the supplementary service COLR in the network. Intermediate result code is returned from TA to TE before any +CR or V.25ter responses.

Syntax:**AT+COLP=[<n>]**

Parameters:

| | | |
|-----|---|--------------------------|
| <n> | 0 | disable |
| | 1 | enable |
| <m> | 0 | COLP not provisioned |
| | 1 | COLP provisioned |
| | 2 | Unknown (e.i no network) |

Response: +COLP:,<NUMBER>,<TYPE>[,<SUBADDR>,<SATYPE>[,<ALPHA>]]

| | |
|-----------|--|
| <number> | string type phone number of format specified by <type> |
| <type> | type of address octet in integer format; 145 when dialing string includes international access code character "+", otherwise 1 |
| <subaddr> | string type sub address of format specified by <satype> |
| <satype> | type of sub address octet in integer format (refer GSM 04.08 [8] sub clause 10.5.4.8) |
| <alpha> | optional string type alphanumeric representation of <number> corresponding to the entry found in phone book |

| Example: | Input | Response |
|-----------------|------------------|--|
| Query | AT+COLP? | +COLP:<n>,<m> OK |
| Test | AT+COLP=? | +COLP:(List of supported <n>s) OK |

AT+COPN

Description: READ OPERATOR NAME

Execute command returns the list of operator names from the ME. Each operator code that has an alphanumeric equivalent in the ME memory shall be returned.

Syntax: AT+COPN

Parameters: <numericn>: string type;operator in numeric format
<alphan>: string type;operator in long alphanumeric format

Response: **+COPN: <numeric1>, <alpha>**
[<CR><LF>+COPN: <numeric2>, <alpha2>[...]]



AT+COPS

Description: OPERATOR SELECTION

SET forces an attempt to select and register the GSM network operator. If the selected operator is not available, no other operator shall be selected (except <mode>=4). The selected operator name format shall apply to further read commands (+COPS?).

QUERY returns a list of quadruplets, each representing an operator present in the network. The formats may be unavailable, in this case the field should be empty. The list of operators shall be in order: home network, networks referenced in SIM, and other networks.

Syntax: **AT+COPS = <mode>[, <format>[, <oper>]]**

Parameters:

| | | |
|----------|---|--|
| <oper> | | operator in format as per <mode> |
| <mode> | 0 | automatic mode; <oper> field is ignored |
| | 1 | manual operator selection; <oper> field shall be present |
| | 2 | manual de-register from network |
| | 3 | set only <format> (for read command +COPS?) – not shown in Read command response |
| | 4 | manual/automatic selected; if manual selection fails, automatic mode (<mode>=0) is entered |
| <format> | 0 | long format alphanumeric <oper>; can be up to 16 characters long |
| | 1 | short format alphanumeric <oper> |
| | 2 | numeric <oper>; GSM Location Area Identification number |

Response: **+COPS: (<stat>, <oper>, <oper>)s [,,(<mode>s),(<format>s)]**

| | | |
|--------|---|--|
| <stat> | 0 | unknown |
| | 1 | operator available |
| | 2 | operator current |
| | 3 | operator forbidden |
| <oper> | | operator in format as per <mode> |
| <mode> | 0 | automatic mode; <oper> field is ignored |
| | 1 | manual operator selection; <oper> field |
| | 2 | manual de-register from network |
| | 3 | set only <format> (for read command +COPS?) – not shown in Read command response |

| | | |
|----------|---|--|
| | 4 | manual/automatic selected; if manual selection fails, automatic mode (<mode>=0) is entered |
| <format> | 0 | long format alphanumeric <oper>;can be up to 16 characters long |
| | 1 | short format alphanumeric <oper> |
| | 2 | numeric <oper>; GSM Location Area Identification number |

| | | |
|-----------------|------------------|--|
| Example: | Input | Response |
| Query | AT+COPS? | List of supported <stat>, <oper>,<mode>,<format> OK |
| Test | AT+COPS=? | +COPS: <mode>[,<format>[,<oper>]] OK |

AT+CPAS

Description: MOBILE EQUIPMENT ACTIVITY STATUS
Returns the current equipment activity status.

Syntax: **AT+CPAS**

Parameters: **None**

Response: **+CPAS: <pas> OK**

| | |
|---|---|
| 0 | ready |
| 2 | unknown (ME is not guaranteed to respond to instructions) |
| 3 | incoming call (ringing) |
| 4 | call in progress or call hold |

| | | |
|-----------------|------------------|-----------------|
| Example: | Input | Response |
| Test | AT+CPAS=? | 4 OK |

AT+CPBF

Description: PHONE BOOK, FIND ENTRIES
Returns phone book entries (from the current phone book memory storage selected with +CPBS) containing alphanumeric string <findtext>.

Syntax: **AT+CPBF=<findtext>**

Parameters: **Findtex - An ASCII string which may or may not be contained in the phone book.**

Response: **[+CPBF: <index1>,<number>,<type>,<text>[...]<cr><LF>
+CBPF: <index2>,<number>,<type>,<text>] OK]<index1>**

<index1> integer type values in the range of location numbers of phone book memory



| | |
|------------|--|
| <index2> | integer type values in the range of location numbers of phone book memory |
| <number> | string type phone number of format <type> |
| <type> | type of address octet in integer format ; 145 when dialling string includes international access code character "+", otherwise 129 |
| <findtext> | string type field of maximum length <tlength> |
| <text> | string type field of maximum length <tlength> |
| <nlength> | integer type value indicating the maximum length of field <number> |
| <tlength> | integer type value indicating the maximum length of field <text> |

| Example: | Input | Response |
|----------|---|-----------|
| Query | AT+CPBF=? | OK |
| Test | +CPBF: [<nlength>],[<tlength>] | OK |

AT+CPBR

Description: PHONE BOOK READ

Returns phone book entries in location number range <index1>...<index2> from the current phone book memory storage selected with +CPBS. If <index2> is left out, only location <index1> is returned.

Syntax: **AT+CPBR = <index1>[, <index2>]**

Parameters:

| | |
|----------|---------------------------------|
| <index1> | read as of this location number |
| <index2> | read to this location number |
| <number> | phone number |
| <type> | type of number |
| <text> | text for phone number |

Response: **+CPBR: <index1>, <number>, <type>, <text>[<cr><LF>+CPBR:+CPBR: <index2>, <number>, <type>, <text>] OK**

| Example: | Input | Response |
|----------|------------------|---|
| Test | AT+CPBR=? | +CPBR: (<index>s), <nlength>, <tlength> OK |

AT+CPBS

Description: PHONE BOOK STORAGE SELECTIONS

Selects current phone book memory storage, which is used by other phone book commands.

Syntax: **AT+CPBS=<storage>**

Parameters:

| | | |
|-----------|----|--|
| <storage> | DC | Modem dialed calls list (+CPBW may not be applicable for this storage) |
| | FD | SIM fix dialing-phone book |
| | LD | SIM last-dialing-phone book |
| | ON | SIM (or ME) own numbers (MSISDNs) list |
| | SM | SIM phone book |

| Example: | Input | Response |
|-----------------|------------------|--|
| Query | AT+CPBS? | <storage> OK |
| Test | AT+CPBS=? | list of supported <storage>s OK |

AT+CPBW

Description: PHONE BOOK WRITE ENTRY

This command writes phone book entry in location number <index> in the current phone book memory storage selected with +CPBS. Entry fields written are phone number <number> (in the format <type>) and text <text> associated with the number. If those fields are omitted, phone book entry is deleted. If <index> is limited, but <number> is given, entry is written to the first free location in the phone book.

Syntax: **AT+CPBW = [<index>], [<number>, [<type>, [<text>]]]**

Parameters:

| | |
|-----------|--|
| <nlength> | max. length of phone number |
| <tlength> | max. length of text for number |
| <index> | location number |
| <number> | phone number |
| <type> | type of number; e.g. 145 when dialing string includes international access code character "+", otherwise 129 |
| <text> | text for phone number |

Response: **+CPBW: (<index>s),<nlength>,(<typ>s),<tlength> OK**



| Example: | Input | Response |
|----------|------------------|--|
| Test | AT+CPBW+? | (<index>s),<nlength>,(<typ>s),<tlength> OK |

The following characters in <text> must be entered via the escape sequence:

| GSM Char | Seq. | Seq.(hex) | Note |
|----------|------|-----------|--------------------|
| \ | \5C | 5C 35 43 | (backslash) |
| " | \22 | 5C 32 32 | (string delimiter) |
| BSP | \08 | 5C 30 38 | (backspace) |
| NULL | \00 | 5C 30 30 | (GSM null) |



'0' (GSM null) may cause problems for application layer software when reading string lengths.

AT+CPIN

Description: ENTER PIN

Stores a password which is necessary before it can be operated (SIM PIN, SIM PUK, PH?SIM PIN, etc.). If the PIN is to be entered twice, the TA shall automatically repeat the PIN. If no PIN request is pending, no action is taken and an error message, +CME ERROR, is returned to TE. If the PIN required is SIM PUK or SIM PUK2, the second pin is required. This second pin, <newpin>, is used to replace the old pin in the SIM.

Syntax: **AT+CPIN=<pin>[, <new pin>]**

Parameters:

| | |
|-----------|---|
| <pin> | string type; password |
| <new pin> | string type; If the PIN required is SIM PUK or SIM PUK2: new password |

Response: **+CPIN: <code> OK**

| | |
|------------|--|
| READY | no further entry needed |
| SIM PIN | ME is waiting for SIM PIN |
| SIM PUK | ME is waiting for SIM PUK |
| PH_SIM PIN | ME is waiting for phone to SIM card (antitheft) |
| PH_SIM PUK | ME is waiting for SIM PUK (antitheft) |
| SIM PIN2 | PIN2, e.g. for editing the FDN book possible only if preceding command was acknowledged with +CME ERROR:17 |

SIM PUK2 possible only if preceding command was acknowledged with error +CME ERROR:18.

| Example: | Input | Response |
|----------|-----------|-----------|
| Query | AT+CPIN? | <code> OK |
| Test | AT+CPIN=? | OK |

AT+CPMS

Description: PREFERRED SMS MESSAGE STORAGE

Selects memory storages <mem1>, <mem2> and <mem3> to be used for reading, writing.

Syntax: AT+CPMS = <mem1>[,<mem2>[,<mem3>]]

Parameters:

| | |
|----------|---|
| <mem1> | Messages to be read and deleted from this memory storage "SM" SIM message storage |
| <mem2> | Messages will be written and sent to this memory storage "SM" SIM message storage |
| <mem3> | Received messages will be placed in this memory storage if routing to PC is not set "+CNMI") "SM" SIM message storage |
| <usedx> | Number of messages currently in <memx> |
| <totalx> | Number of messages storable in <memx> |

Response: +CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3> OK

Example:

| | Input | Response |
|--------|-----------|--|
| Test: | AT+CPMS=? | list of supported <mem1>s OK list of supported <mem2>s OK list of supported <mem3>s OK |
| Query: | AT+CPMS=? | CPMS:<mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3>OK |

AT+CPOL

Description: PREFERRED OPERATOR LIST

This command is used to edit the SIM preferred list of networks. Execute command writes an entry in the SIM list of preferred operators. If <index> is given but <oper> is left out, entry is deleted. If <oper> is given but <index> is left out, <oper> is put in the next free location. If only <format> is given, the format of the <oper> in the read command is changed.



Syntax: AT+CPOL=[<index>][,<format>[,<oper>]]

Parameters:

<index> integer type: order number of operator in SIM preferred operator list

<format> 0 long format alphanumeric <oper>
1 short format alphanumeric <oper>
2 numeric <oper><oper>string type:

<format> indicates whether alphanumeric or numeric format used (see +COPS command)

Response:

Query AT+CPOL <index1>,<format>,<oper1>[<CR><LF>+CPOL: <index2>,<format>,<oper2>[...]]+CME ERROR: <err>

Test AT+CPOL? (list of supported <index>s),(list of supported <format>s)

AT+CPUC

Description: PRICE PER UNIT AND CURRENCY TABLE SETTING

This command sets the conversion from minutes of use to the local currency cost.

Syntax: AT+CPUC=<currency>,<ppu>[,<passwd>]

Parameters:

<currency> string type; three-character currency code (e.g. "GBP", "DEM"); character set as specified by command Select TE Character Set +CSCS

<currency> string type; price per unit; dot is used as a decimal separator (e.g. "2.66")

<passwd> string type; SIM PIN2

Response: OK

Query AT+CPUC <currency>,<ppu>+CME ERROR: <err>

Test AT+CPUC? <err>

AT+CPWD

Description: PASSWORD CHANGE

Sets a new password for the facility lock function.

Syntax: AT+CPWD = <fac>, [<oldpwd>], <newpwd>

Parameters:

<fac> SC SIM (lock SIM card) (SIM asks password in ME power-up and when this lock command issued)

| | |
|----|--|
| AO | BAOC (Barr All Outgoing Calls) (refer GSM02.88[6] clause 1) |
| OI | BOIC (Barr Outgoing International Calls) (refer GSM02.88[6] clause 1) |
| OX | BOIC-exHC (Barr Outgoing International Calls except to Home Country) (refer GSM02.88[6] clause 1) |
| AI | BAIC (Barr All Incoming Calls) (refer GSM02.88[6] clause 2) |
| IR | BIC-Roam (Barr Incoming Calls when Roaming outside the home country) (refer GSM02.88 [6] clause 2) |
| AB | All Barring services (refer GSM02.30[19]) (applicable only for <mode>=0) |
| AG | All outGoing barring services (refer GSM02.30[19]) (applicable only for <mode>=0) |
| AC | All inComing barring services (refer GSM02.30[19]) (applicable only for <mode>=0) |
| P2 | SIM PIN2<oldpwd> password specified for the facility from the user interface or with command. If an old password has not yet been set, <oldpwd> is not to enter. |

<newpwd> new password

<pwdlength> integer max. length of password

Response: +CPWD: (<fac>, <pwdlength>)s OK

Example: Input Response

Test **AT+CPWD=? list of supported <fac>s,<pwdlength>s OK**



AT+CR

Description: REPORTING CONTROL

Controls whether or not intermediate result code +CR: <serv> is returned from the TA to the TE at a call set up. If enabled, an intermediate result code is transmitted at the point during connect negotiation at which the TA has determined which speed and quality of service will be used, before any error control or data compression reports are transmitted, and before any final result code (e.g. CONNECT) is transmitted.

Syntax: AT+CR=<mode>

Parameters:

0 disable
1 enable

Response: +CR:<serv>

ASYNCR asynchronous transparent
SYNCR synchronous transparent
REL ASYNCR asynchronous non-transparent
REL SYNCR synchronous non-transparent

| Example: | Input | Response |
|-----------------|--------------|-----------------|
| Query | AT+CR? | <mode> OK |
| Test | AT+CR=? | +CR:(0-1) OK |

AT+CRC

Description: RESULT CODES, SET CELLULAR CODES FOR INCOMING CALL INDICATION

Controls whether or not the extended format of incoming call indication is used.

When enabled, an incoming call is indicated to the TE with unsolicited result code +CRING: <type> instead of the normal RING.

ASYNCR asynchronous transparent
SYNCR synchronous transparent
REL ASYNCR asynchronous non-transparent
REL SYNCR synchronous non-transparent
FAX facsimile
VOICE voice

Syntax: AT+CRC=<mode>

Parameters:

| | | |
|--------|---|-------------------------|
| <mode> | 0 | disable extended format |
| | 1 | enable extended format |

Response: OK

| Example: | Input | Response |
|----------|-----------------|-------------------|
| Query | AT+CRC? | 129 OK |
| Test | AT+CRC=? | 129,145 OK |

AT+CREG

Description: REGISTRATION INDICATION

Returns the status of result code presentation and an integer <stat> which shows whether the network has currently indicated the registration of the ME. Location information elements <lac> and <ci> are returned only when <n>=2 and ME is registered in the network.

Syntax: **AT+CREG=[<n>]****Parameters:**

| | | |
|--------|---|---|
| <n> | 0 | disable network registration unsolicited result code |
| | 1 | enable network registration unsolicited result code +CREG: <stat> |
| <stat> | 0 | not registered, ME is not currently searching a new operator to register to |
| | 1 | registered, home network |
| | 2 | not registered, but ME is currently searching a new operator to register to |
| | 3 | registration denied |
| | 4 | unknown |
| | 5 | registered, roaming |

Response: +CREG: <n>,<stat> OK

| Example: | Input | Response |
|----------|------------------|--|
| Query | AT+CREG? | <n>,<stat> OK |
| Test | AT+CREG=? | list of supported <n>s OK |

AT+CRES

Description: RESTORE MESSAGE SERVICE SETTINGS

This command restores SMS settings for +CMGF, +CNMI, +CSDH from non-volatile memory to active memory.



Syntax: AT+CRES[=<profile>]<CR>

Parameters:

<profile> manufacturer specific profile number where settings are to be stored

Response:

Test AT+CRESAS=?<CR> list of supported <profile>s OK

AT+CRLP

Description: RADIO LINK PROTOCOL SELECT

Sets radio link protocol (RLP) parameters used when non-transparent data calls are setup, returns values supported. RLP versions 0 and 1 share the same parameter set. TA returns only one line for this set (where <verx> is not present).

Syntax: AT+CRLP=[<iws>[,<mws>[,<T1>[,<N2>[,<ver>[,<T4>]]]]]]

Parameters:

| | | |
|--------|----------|---|
| <iws> | 0 6l 255 | Interworking window size (IWF to MS) |
| <mws> | 0 6l 255 | Mobile window cesiums to IWF) |
| <T1> | 0 48 255 | acknowledgment timer T1 in 10 ms units) |
| <N2> | 0 6 255 | retransmission attempts N2 |
| <verx> | 0-1 | RLP version number in integer format; when version indication is not present it shall equal 0. Versions 0 and 1 share the same parameter set. |
| <T4> | 0-3-255 | Re-sequencing period in integer format, in units of 10 ms. This is NOT used for RLP versions 0 and 1. |

Response: +CRLP: <iws>,<mws>,<T1>,<N2>,<ver1>,<T4>

Example: Input

Response

Query AT+CRLP?

returns current settings for RLP version. RLP versions 0 and 1 share the same parameter set. TA returns only one line for this set (where <verx> is not present)

Test AT+CRLP=?

list of possible settings. OK

AT+CRSL

Description: RINGER SOUND LEVEL

This command sets the ring volume for a phone or voice device.

Syntax: AT+CRSL=<level>

Parameters:

<level> integer type value with manufacturer specific range
(smallest value represents the lowest sound level)

Response:

Query +CRSL: <level>+CME ERROR: <err>

Test +CRSL: (list of supported <level>s)+CME ERROR: <err>

AT+CSAS

Description: RESTORE MESSAGE SERVICE SETTINGS

Restores SMS settings for +CMGF, +CNMI, +CSDH from non-volatile memory to active memory.

Syntax: AT+CSAS[=<profile>]

Parameters: <profile> manufacturer specific profile number where settings are to be stored

Response: OK

Example: Input

Response

Test AT+CSAS=?

list of supported <profile>s OK

AT+CSCA

Description: SMS SERVICE CENTER ADDRESS

Updates the SMSC address, through which mobile originated SMs are transmitted. In text mode, setting is used by send and write commands. In PDU mode, setting is used by the same commands, but only when the length of the SMSC address coded into <pdu> parameter equals zero.



This command writes the parameters in the NON-VOLATILE memory.

Syntax: AT+CSCA = <sca>[,<tosca>]

Parameters:

<sca> GSM 04.11 RP SC address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters; type of address given by <tosca>



<tosca> Service center address format GSM 04.11 RP SC address
Type-of-Address octet in integer format default refer
<toda>)

Response: OK

| Example: | Input | Response |
|----------|-----------|------------------------|
| Query | AT+CSCA? | +CSCA:<sca>,<tosca> OK |
| Test | AT+CSCA=? | OK |

AT+CSCB

Description: CELL BROADCAST MESSAGE SELECTION

Selects which types of cell broadcast messages that are to be received by the device.



The command writes the parameters in NON-VOLATILE memory.

Syntax: AT+CSCB=[<mode>[,<mids>[,<dcss>]]]

Parameters:

| | | |
|--------|---|--|
| <mode> | 0 | message types specified in <mids> and <dcss> are accepted |
| | 1 | message types specified in <mids> and <dcss> are not accepted |
| <mids> | | string type; all different possible combinations of CBM message identifiers (refer <mid>) (default is empty string); e.g. "0,1,5,320-478,922". |
| <dcss> | | string type; all different possible combinations of CBM data coding schemes (refer <dc>) (default is empty string); e.g. "0-3,5". |

Response: +CSCB: <mode>,<mids>,<dcss> OK

| Example: | Input | Response |
|----------|-----------|--------------------------------|
| Query | AT+CSCB? | +CSCB: <mode>,<mids>,<dcss> OK |
| Test | AT+CSCB=? | list of supported <mode>s OK |

AT+CSCS

Description: SELECT CHARACTER SET

Sets which character set <chset> is used by the TE. The TA can then convert character strings correctly between the TE and ME character sets.

Syntax: AT+CSCS=[<chset>]

Parameters: CHSETGSM

Response: OK

| Example: | Input | Response |
|----------|-----------|----------|
| Query | AT+CSCS? | GSM OK |
| Test | AT+CSCS=? | (GSM) OK |

AT+CSDH

Description: SHOW SMS TEXT MODE PARAMETERS

Determines whether detailed header information is shown in text mode result codes.

Syntax: AT+CSDH=<show>

Parameters:

| | | |
|--------|---|--|
| <show> | 0 | do not show header values defined in commands +CSCA and +CSMP (<sca>, <tosca>, <fo>, <vp>, <pid> and <dc>) nor <length>, <today> or <tooa> in +CMT, +CMGL, +CMGR result codes in text mode |
| | 1 | show the values in result codes |

Response: OK

| Example: | Input | Response |
|----------|-----------|------------------------------|
| Query | AT+CSDH? | +CSDH: <show> OK |
| Test | AT+CSDH=? | list of supported <show>s OK |

AT+CSIM

Description: GENERIC SIM ACCESS

This command used to send a command to the SIM card/module and return the appropriate response.

Syntax: AT+CSIM=<length>,<command>

Parameters:

| | |
|-----------|--|
| <length> | integer type: length of characters sent to the TE in <command> or <response> (i.e. twice the number of octets in the raw data) |
| <command> | hex format: GSM 11.11 SIM command sent from the ME to the SIM |

<vp> depending on SMS-SUBMIT <fo> setting: GSM 03.40 TP-Validity-Period either in integer format (default 167) or in time-string format (refer <dt>)

Response: OK

Example: Input

Response

Query **AT+CSMP?**

+CSMP: <fo>,<vp> OK

Test **AT+CSMP=?**

**+CSMP: list of supported <fo>s and <vp>s
OK**

AT+CSMS

Description: SELECT MESSAGE SERVICE

Select the type of SMS service.

Syntax: **AT+CSMS= <service>**

Parameters:

| | | |
|-----------|-----|---|
| <service> | 0 | GSM 03.40 and 03.41 (the syntax of SMS AT commands is compatible with GSM 07.05 Phase 2 version 4.7.0; Phase 2+ features which do not require new command syntax may be supported (e.g. correct routing of messages with new Phase 2+ data coding schemes)) |
| | 128 | SMS PDU mode - TPDU only used for sending/receiving SMSs. |

Response: **+CSMS: <mt>,<mo>,<bm> OK**

Mobile Terminated Messages:

| | | |
|------|---|--------------------|
| <mt> | 0 | Type not supported |
| | 1 | Type supported |

Mobile Originated Messages

| | | |
|------|---|--------------------|
| <mo> | 0 | Type not supported |
| | 1 | Type supported |

Broadcast Type Messages:

| | | |
|------|---|--------------------|
| <bm> | 0 | Type not supported |
| | 1 | Type supported |

Example: Input

Response

Query **AT+CSMS?**

As above

Test **AT+CSMS=?**

list of supported <services>s OK



AT+CSQ

Description: SIGNAL QUALITY REPORT

Execution command returns received signal strength indication and channel bit error rate from the modem. Test command returns values supported by the modem.

Syntax: AT+CSQ<cr>

Parameters: None

Response: +CSQ: <rssi>,<ber>

RSSI (in dBm) = (<rssi> X 2) -113 (FOR 0<= <rssi> <=31)

RSSI (in dBm) = -51 (FOR 31<= <rssi> <=98)

(FOR 99<= <rssi>) rssi is not known or not detectable

BER 0..7 as RXQUAL values in the table in GSM 05.08 [20] sub clause 8.2.4

BER 99 not known or not detectable

| Example: | Input | Response |
|-----------------|--------------|--------------------------|
| Test | AT+CSQ=? | list of RSSI and BLER OK |

AT+CSSN

Description: SUPPLEMENTARY SERVICE NOTIFICATION

AT+CSTA

Description: SELECT TYPE OF ADDRESS

Selects the type of number for further dialing commands (ATD) according to GSM specifications. The data services software only supports default settings.

Syntax: AT+CSTA=[<type>]

Parameters:

| | | |
|------|-----|--------------------|
| Type | 129 | Type Unknown |
| | 145 | Type International |

Response: OK

| Example: | Input | Response |
|-----------------|--------------|-----------------|
| Test | AT+CSTA? | 129 OK |
| Query | AT+CSTA=? | (129,145) OK |

AT+CUUSD

Description: UNSTRUCTURED SUPPLEMENTARY SERVICE DATA

This command sets the Unstructured response format as well as being used to query the device with regards to the current session status.

Syntax: **AT+CUUSD=[<n>[,<str>[,<dcs>]]]**

Parameters:

| | | |
|-------|---|---|
| <n> | 0 | disable result code presentation in the TA |
| | 1 | enable result code presentation in the TA |
| | 2 | cancel session<str>string type: USSD string (see GSM 07.07 for use) |
| <dcs> | | integer type: GSM 03.38 Cell Broadcast Data Coding Scheme |
| <m> | 0 | no further user action required |
| | 0 | further user action required |
| | 1 | USSD terminated by network |
| | 2 | other local client has responded |
| | 3 | operation not supportednetwork time out |

Response:

Query: **AT+CUUSD? <n>+CME ERROR: <err>**

Test: **AT+CUUSD=? (list of supported <n>s)**

AT+DR

Description: DATA COMPRESSION REPORTING CONTROL

This command defines whether or not the result codes for the V.42bis compression will be returned.

Syntax: **AT+DR=[<n>][?]**

Parameters: **=[0, 1, ?], [?]**

| | |
|---|--|
| 0 | disables the compression result code reporting |
| 1 | enables the compression result code reporting |
| ? | queries the command and returns its current setting or displays the valid values for the commands parameters |

Response: **AT+DR=[<n>], where value is 0 or 1, the command will return the string OK.**

AT+DR?, the command will return the strings:

+DR: <current command value, either 0 or 1>

OK



AT+DR=?, the command will return the strings:

+DR: (0-1)

OK

indicating the valid parameters for this command

If the result code reporting has been turned on, the following strings are returned when the modem establishes a connection:

+DR: NONE data compression is not in use

+DR: V42B Rec. V42bis is in use in both direction

+DR: V42B RD Rec. V42bis is in use in receive direction only

+DR: V42B TD Rec. V42bis is in use in transmit direction only

AT+DS

Description: V.42bis COMPRESSION CONTROL

This command determines if the modem will use V.42bis data compression and what the conditions of its use are after a call has been set up. This command only works for data calls. During GSM connections, data is transmitted transparently. The remote terminal adapter may or may not support this compression. This command must be used in conjunction with AT+CRLP command.

Syntax: **AT+DS=[<p0>,<n>,<p1>,<p2>]?] [?]**

Parameters:

| | |
|------|--|
| <p0> | defines the compression direction. |
| 0 | No compression |
| 1 | transmit only |
| 2 | receive only |
| 3 | both directions, but allow for negotiation. This is the default parameter. |
| <n> | defines the V.42bis negotiation parameters. |
| 0 | allows negotiation of for compression to take place, if allowed for in p0. This is the default parameter. |
| 1 | do not allow compression negotiation, even if allowed for in p0. Instead, disconnect if there is a difference. |
| <p1> | defines the size of the dictionary. The valid value range is 512 to 2048. The default value is 512. |
| <p2> | defines the maximum string size. The valid value range is 6 to 255. The default is 20. |

? queries the command and returns its current setting or displays the valid values for the commands parameters.

Response: **AT+DS?** is typed in, the modem will respond with a list of the commands current settings. For example: **+DS: 3,0,512,20 OK.**

AT+DS=? is typed in, the modem will respond with a list of the valid value ranges for each of the command parameters. For example: **+DS: (0-3),(0-1),(512-1024),(6-64) OK.**

AT+DS=<p0>,<n>,<p1>,<p2> is typed in, the modem will set each of the parameters to the value defined in each parameter place holder and the command will return the string **OK.**

Example: **AT+DS=1,0,640,50<cr>**

AT+DS=?<cr>

AT+DS?<cr>

AT+FCLASS

Description: FAX CLASS SET OR TEST

Sets a particular mode of operation (data, fax). This causes the TA to process information in a manner suitable for that specific type of device.

Syntax: **AT+FCLASS=<n>**

Parameters:

0 data
1 fax class 1 (TIA-578-A)

Response: **+FCLASS: <n> OK**

| Example: | Input | Response |
|----------|--------------------|-----------------|
| Test | AT+FCLASS=? | (0,1) OK |
| Query: | AT+FCLASS? | (0) OK |

AT+FMI

Description: FAX MANUFACTURER IDENTITY REQUEST

Reports one or more lines of information text permitting the user to identify the manufacturer.

Syntax: **AT+FMI**

Parameters: **None**

Response: **<manufacturer Id> OK**



| Example: | Input | Response |
|----------|-----------------|-----------------------------------|
| Test | AT+FMI=? | OK |
| Query | AT+FMI | <manufacturer Id> OK |

AT+FMM

Description: FAX MODEL IDENTITY REQUEST

Reports one or more lines of information text permitting the user to identify the specific model of device.

Syntax: **AT+FMM**

Parameters: **None**

Response: **<model Id> OK**

| Example: | Input | Response |
|----------|-----------------|----------------------------|
| Test | AT+FMM=? | OK |
| Query | AT+FMM | <model Id> OK |

AT+FMR

Description: FAX VERSION IDENTITY REQUEST

Reports one or more lines of information text which permit the user to identify the version, revision level or data or other information of the device.

Syntax: **AT+FMR**

Parameters: **None**

Response: **<Revision Id> OK**

| Example: | Input | Response |
|----------|-----------------|---------------------|
| Test | AT+FMR=? | OK |
| Query | AT+FMR | <Revision |

AT+GCAP

Description: REPORT ADDITIONAL CAPABILITIES

Modem reports a list of additional capabilities.

Syntax: **AT+GCAP: <name>s ,<cr>**

Parameters: **None**

Response: **Not Applicable**

Example: **AT+GCAP<cr>**

AT+GMI

Description: MANUFACTURER IDENTITY
Request for manufacturer identification.

Syntax: AT+GMI or AT12

Parameters: None

Response: <MANUFACTURERS NAME/ID> OK

AT+GMM

Description: MODEM IDENTITY
Request TA model identification. Unit reports one or more lines of information text which permits the user to identify the specific model of device.

Syntax: AT+GMM or AT13

Parameters: None

Response: <MODEL ID> OK

| Example: | Input | Response |
|-----------------|--------------|-----------------|
| Test | AT+GMM=? | OK |
| Query | AT+GMM | <modem Id> OK |

AT+GMR

Description: REVISION NUMBER / IDENTITY
This command reports the version, revision and date of the software or firmware used in the device. It is also used to identify the software version to facilitate easier tracking and code updates.

Syntax: AT+GMR or AT11

Parameters: None

Response: <REVISION ID> OK

| Example: | Input | Response |
|-----------------|--------------|---|
| Query | AT+GMR | Software Version OE071-XX OK Date: May 17, 2001, Time 10:58:12 OK |
| Test | AT+GMR=? | OK |



AT+GOI

Description: GLOBAL OBJECT IDENTITY

Reports one or more lines of information text which permits the user to identify the device, based on the ISO system for registering unique object identifiers.

Syntax: AT+GOI

Parameters: None

Response: NULL ID OK
<OBJECT ID> OK see X.208, 209 for the format

Example: AT+GOI=? <OBJECT ID> OK

AT+GSN

Description: SERIAL NUMBER IDENTITY

Reports the IMEI (international mobile equipment identifier) number in information text which permits the user to identify the individual ME device. The serial number (IMEI) is varied by individual ME device.

Syntax: AT+GSN

Parameters: None

Response: <SERIAL NUMBER> OK

| Example: | Input | Response |
|----------|----------|--------------------|
| Test | AT+GSN=? | OK |
| Query | AT+GSN | <serial number> OK |

AT+ICF

Description: INTERFACE CHARACTER FRAMING

This command setting determines the serial interface character framing format and parity received by TA from TE.

Syntax: AT+ICF=[<format>,[<parity>]]

Parameters:

| | | |
|----------|---|------------------------|
| <format> | 1 | 8 data 0 parity 2 stop |
| | 2 | 8 data 1 parity 1 stop |
| | 3 | 8 data 0 parity 1 stop |
| | 4 | 7 data 0 parity 2 stop |
| | 5 | 7 data 1 parity 1 stop |
| | 6 | 7 data 0 parity 1 stop |

| | | |
|----------|---|-----------|
| <parity> | 0 | odd |
| | 1 | even |
| | 2 | mark (1) |
| | 3 | space (0) |



The parity field is ignored if the format field specifies no parity.

Response: +ICF: <format>,<parity> OK

| | | |
|-----------------|--------------|----------------------------|
| Example: | Input | Response |
| Test | AT+ICF=? | +ICF: <format>,<parity> OK |
| Query | AT+ICF? | <3,3> OK |

AT+IFC

Description: LOCAL DATA FLOW CONTROL

This setting determines the data flow control on the serial interface for data mode.

Syntax: AT+IFC=[<dce_by_dte>[,<dte_by_dce>]]

Parameters:

| | |
|--------------|--|
| <dce_by_dte> | specifies the method will be used by TE at receive of data from TA |
| 0 | None |
| 1 | XON/XOFF, don't pass characters on to data stack |
| 2 | line 133: Ready for Receiving |
| 3 | XON/XOFF, pass characters on to data stack |
| <dte_by_dce> | specifies the method will be used by TA at receive of data from TE |
| 0 | None |
| 1 | XON/XOFF |
| 2 | line 106: Clear to send (CTS) |

Response: OK

| | | |
|-----------------|--------------|-----------------|
| Example: | Input | Response |
| Test | AT+IFC=? | OK |



AT+ILRR

Description: LOCAL RATE REPORTING

This AT setting determines whether or not an intermediate result code of local rate is reported at connection establishment. The rate is applied after the final result code of the connection is transmitted to TE.

Syntax: AT+ILRR=<value>

Parameters:

| | | |
|-------|---|---------------------------------------|
| Value | 0 | Disables reporting of local port rate |
| | 1 | Enables reporting of local port rate |

Response: <value> OK

| Example: | Input | Response |
|----------|----------|------------|
| Test | AT+ILRR? | <value> OK |

AT+IPR

Description: FIXED LOCAL RATE

This parameter setting determines the data rate of the TA on the serial interface. The rate of command takes effect following the issuance of any result code associated with the current command line.

Syntax: AT+IPR=<rate>

Parameters:

| | |
|--------|---|
| <rate> | port rate setting on call connection in Baud per second |
| | 300 |
| | 1200 |
| | 2400 |
| | 4800 |
| | 9600 |
| | 19200 |
| | 28800 |
| | 38400 |
| | 57600 |
| | 115200 |

Response: OK

Example: AT+IPR=2400<cr>

| | | |
|-------|----------|----------------|
| Test | AT+IPR=? | <rate list> OK |
| Query | AT+IPR? | <rate> OK |

AT+NWOPN

Description: READ OPERATOR NAMES

This command returns the list of operator names, stored in the SIM's ONS field, from the SIM Card.

Syntax: AT+NWOPN?

Parameters: None

Response: OK

Example: Operator Name: <Operator Name>

AT+NWRST

Description: RESET MODEM TO POWER-UP STATE

This command resets the modem to its power-up state. The modem will be unresponsive for up to 6 seconds during the reset sequence. Any characters sent to the modem during this time will be lost.

AT+NWSIM

Description: CHECK FOR SIM PRESENCE

AT+NWW

Description: WRAPPER STATUS

This command queries the status of the wrapper driver.

Syntax: AT+NWW<n>

Parameters:

| | | |
|------------|---|--|
| <status=n> | 0 | Turns wrapping off |
| | 1 | Turns wrapping on |
| | | Wrapper Protocol not supported by this build |

Response: AT+NWW<n> OK

| | Input | Response |
|-------|---------|------------|
| Query | AT+NWW? | +NWW<n> OK |

AT+VTD

Description: TONE DURATION (VOICE)



This command refers to an integer <n> that defines the length of tones emitted as a result of the **AT+VTS** command in voice mode. This does not affect the D command.

Syntax: **AT+VTD = <duration>**

Parameters:

| | | |
|------------|-------|--------------------------------------|
| <duration> | 0 | default setting (NO TONE) |
| | 1-255 | duration of the tone in 1/10 seconds |

Response: **+VTD: <n> OK**

Example: **Input**

Response

Query **AT+VTD?**

+VTD: <n> OK

Test **AT+VTD=?**

List of supported <n>s OK

AT+VTS

Description: DTMF AND TONE GENERATION (VOICE)

This command allows the transmission of DTMF tones and arbitrary tones in voice mode. These tones may be used when announcing the start of a recording period.

Syntax: **AT+VTS=<DTMF-string>**

Parameters:

| | |
|---------------|---|
| <dtmf-string> | which has a max length of 20 characters, must be entered between double quotes (" ") and consists of combinations of the following separated by commas: |
|---------------|---|

1. <dtmf> A single ASCII characters in the set 0-9,#,*,A-D. This is interpreted as a sequence of DTMF tones whose duration is set by the +VTD command.
2. {<dtmf>,<duration>} This is interpreted as a DTMF tone whose duration is determined by <duration>.

| | |
|------------|---|
| <duration> | duration of the tone in 1/10 seconds range: 1-255 |
|------------|---|

Response: **OK**

Example: **Input**

Response

Test **AT+VTS=?**

(List of supported parameters) OK

CME ERROR Codes for GSM 07.07 Commands

Final result code **+CME ERROR: <err>** indicates an error related to mobile equipment or network, and that the command and any following commands were not executed. As no commands were executed, no result should be expected.

Table 9: CME Error Codes below, lists and defines <err> values used by common messaging commands.

Table 9: CME Error Codes

| Code of <err> | Definition |
|---------------|-----------------------------------|
| 0 | phone failure |
| 1 | no connection to phone |
| 2 | phone-adapter link reserved |
| 3 | operation not allowed |
| 4 | operation not supported |
| 5 | PH-SIM PIN required |
| 6 | PH-FSIM PIN required |
| 7 | PH-FSIM PUK required |
| 10 | SIM not inserted |
| 11 | SIM PIN required |
| 12 | SIM PUK required |
| 13 | SIM failure |
| 14 | SIM busy |
| 15 | SIM wrong |
| 16 | incorrect password |
| 17 | SIM PIN2 required |
| 18 | SIM PUK2 required |
| 20 | memory full |
| 21 | invalid index |
| 22 | not found |
| 23 | memory failure |
| 24 | text string too long |
| 25 | invalid characters in text string |
| 26 | dial string too long |
| 27 | invalid characters in dial string |
| 30 | no network service |



| | |
|-----------|---|
| 31 | network time out |
| 32 | network not allowed - emergency calls only |
| 40 | network personalization PIN required |
| 41 | network personalization PUK required |
| 42 | network subset personalization PIN required |
| 43 | network subset personalization PUK required |
| 44 | service provider personalization PIN required |
| 45 | service provider personalization PUK required |
| 46 | corporate personalization PIN required |
| 47 | corporate personalization PUK required |
| 100 | Unknown |
| 101...255 | Reserved |

CMS Error Codes for GSM 07.05 Commands

Final result code **+CMS ERROR: <err>** indicates an error related to mobile equipment or network. The operation is similar to ERROR result code in that none of the commands in the same command line are executed. Neither **ERROR** nor **OK** result code shall be returned.

Table 10: CMS Error Codes below, lists and defines <err> values used by common messaging commands.

Table 10: CMS Error Codes

| Code of <err> | Definition |
|---------------|---|
| 0...127 | GSM 04.11 Annex E-2 values, see CME ERROR codes related GSM 07.07 |
| 128...255 | GSM 03.40 sub clause 9.2.3.22 values |
| 300 | ME failure |
| 301 | SMS service of ME reserved |
| 302 | operation not allowed |
| 303 | operation not supported |
| 304 | invalid PDU mode parameter |
| 305 | invalid text mode parameter |
| 310 | SIM not inserted |
| 311 | SIM PIN required |
| 312 | PH-SIM PIN required |
| 313 | SIM failure |

| | |
|--------|--|
| 314 | SIM busy SIM wrong |
| 315 | SIM wrong |
| 316 | SIM PUK required |
| 317 | SIM PIN2 required |
| 318 | SIM PUK2 required |
| 320 | memory failure |
| 321 | invalid memory index |
| 322 | memory full |
| 330 | SMSC address unknown |
| 331 | no network service |
| 332 | network time-out |
| 340 | no +CNMA acknowledgment expected |
| 500 | unknown error |
| ...511 | other values in range 256...511 are reserved |
| 512... | manufacturer specific |
| 513 | Unread SM on SIM |

Chapter 4: Firmware Setup and Upgrades

Firmware is installed in all modems prior leaving the manufacturing facility. Updates to firmware can be performed by downloading new code into the modem.

Updating Expedite Firmware

To update the Expedite firmware you will require the Expedite Development Kit Interface Board, shown below . The interface board will connect the Expedite module to the host computer.

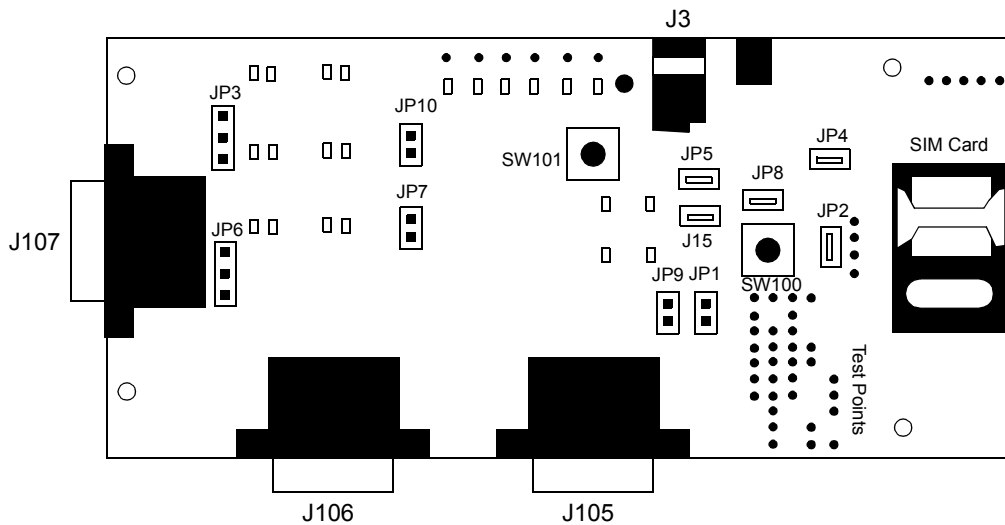


Figure 8: Expedite Development Kit Interface Board



These instructions may change for future product releases.

Topics Included in this Chapter

| | |
|----------------------------------|-----|
| Updating Expedite Firmware | 145 |
| Updating Merlin Firmware | 147 |
| Troubleshooting. | 151 |

To update Expedite firmware:

1. **Disconnect** the interface board from the power source.
2. **Connect** the serial cable to the Primary Serial Port (J106) on the Expedite interface board.
3. **Connect** the other end of the cable to a port (either 1 or 2, depending on your PC) in your computer.
4. **Start** the Flash.exe program.

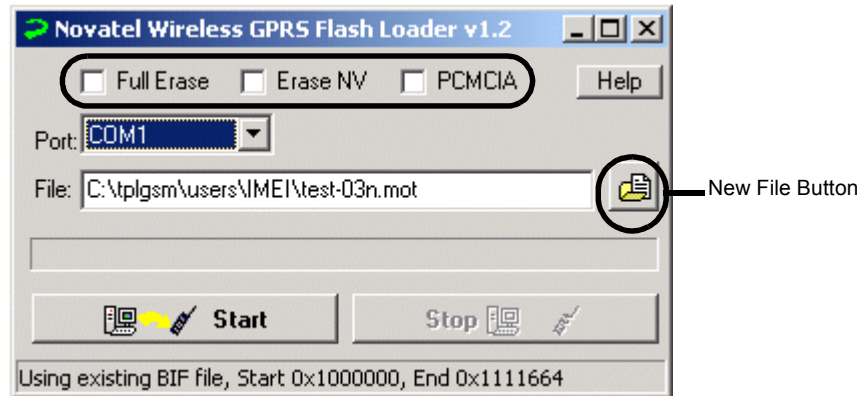


Figure 9: Flash Program

5. **Select** the appropriate Erase option. With no options chosen (recommended), the Flash Loader will do a partial erase.
6. **Navigate** to and **select** the binary Motorola™ (.mot) file to download by pressing the **New File** button.

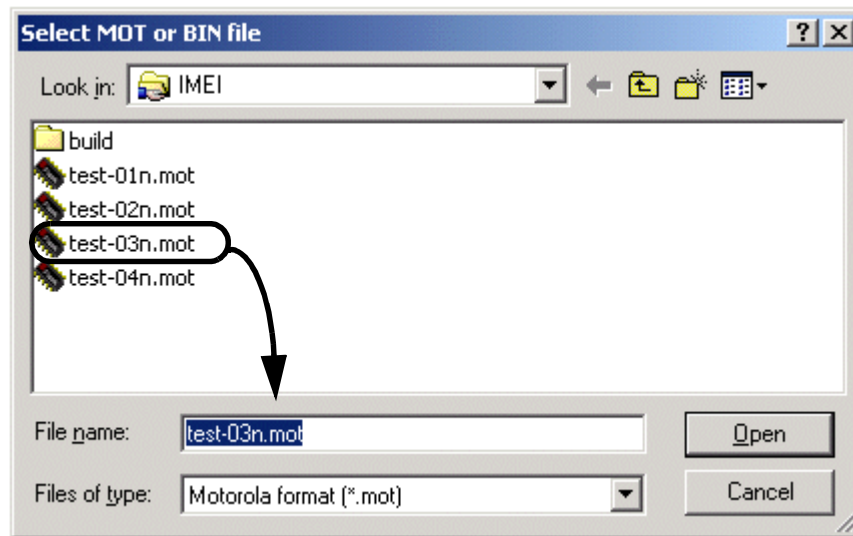


Figure 10: Selecting MOT file



- The default communications port is COM1; select the correct one if necessary.

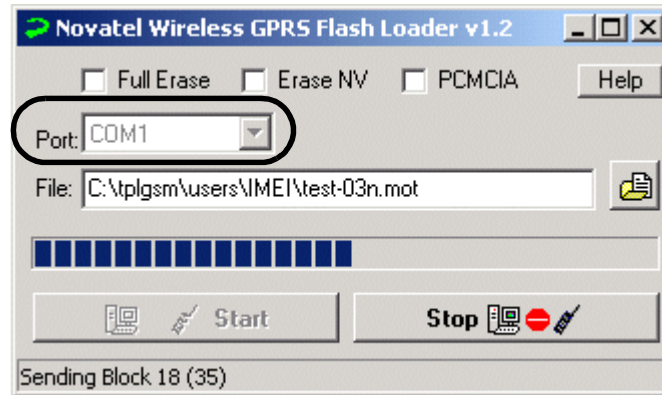


Figure 11: Flash Loader Settings

- Press **Start**. The message “Power On/Reset Target” will appear in the status bar.



Once you start downloading firmware, you cannot stop the process until the “Download Complete” message is shown on the status bar.

- Apply** power to the device. LED’s on interface board will light up.
- Disconnect** the power supply when the “Download Complete” message appears in the status bar.
- Reconnect** the power again for regular operation.

Updating Merlin Firmware

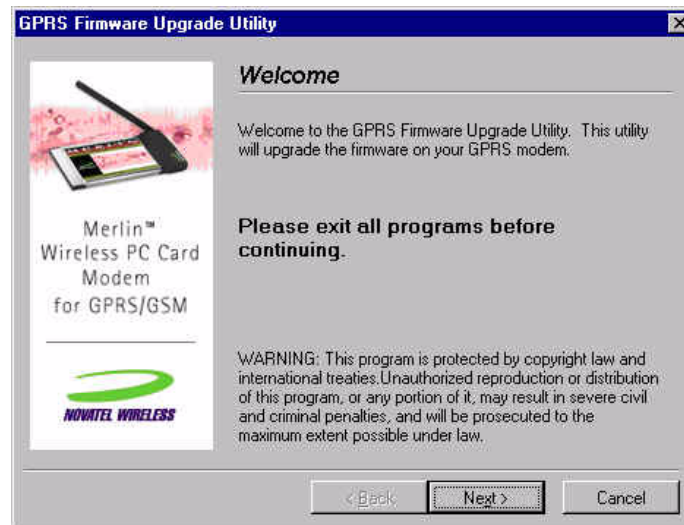
The **GPRS Firmware Upgrade Utility** is used to update Merlin firmware. The utility program and code is delivered as a self-extracting executable file.

To update Merlin firmware:

- Obtain the executable file from your service provider, ensuring that you have the appropriate single band or dual band version. (PN=Single band or North America; PE=Dual band or European).
- Ensure that you have at least 10 MB of free disk space on your system drive.
- Close all applications in order to avoid resource conflicts.
- Run the **Firmware Upgrade Utility** by double-clicking the Desktop icon:



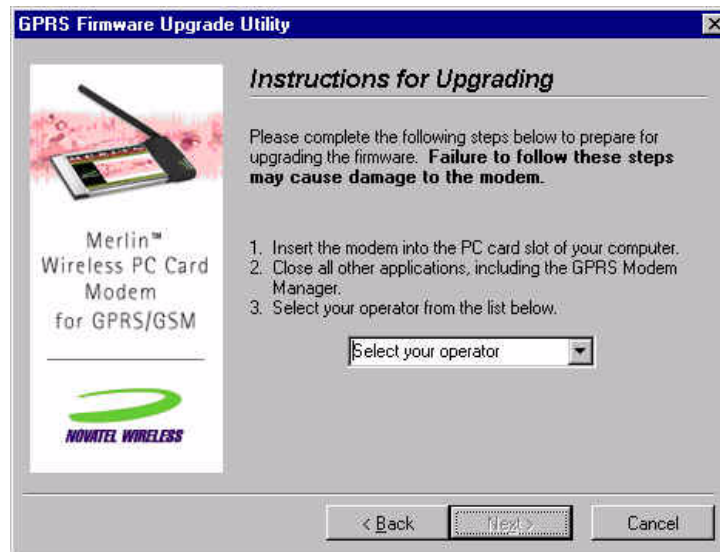
5. After the splash window, the **Welcome** window will be displayed.



6. Read the **Welcome** window and click **Next**. The License agreement will be displayed.

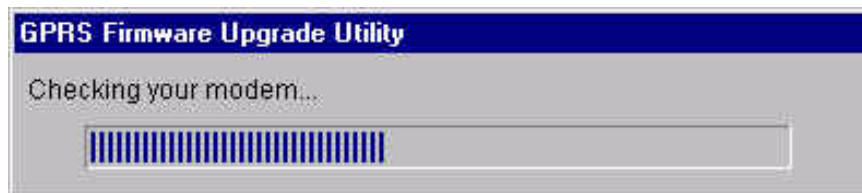


7. Read the **License Agreement**. To continue with the upgrade utility, you must indicate that you have accepted the terms of the agreement by selecting "**I have read and agree to the above items.**" Click **Next**. The **Instructions for Upgrading** window will appear.



- 7.1. Insert your modem into the PC Card slot.
- 7.2. Ensure all other applications are closed.
- 7.3. Select your operator from the drop down menu.
- 7.4. Click **Next**.

The utility will then locate your modem for the upgrade. The **Checking your modem** window will appear.



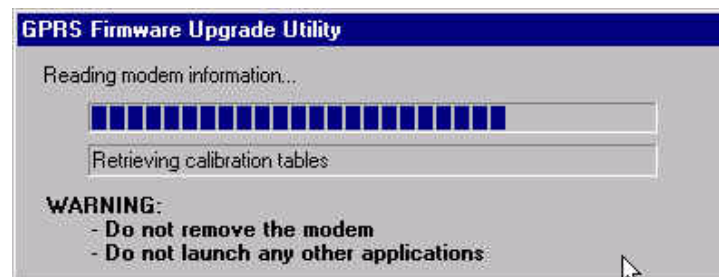
If your modem is located, the **Start Upgrade** window will be displayed.



8. Ensure all information on the window is correct, then select **I am ready to proceed with the upgrade.** and select **Next.**

An **Upgrade Status** window will appear, and the upgrade utility will retrieve your modem information.

NOTE: Do not remove any modem or launch any other applications during the upgrade.

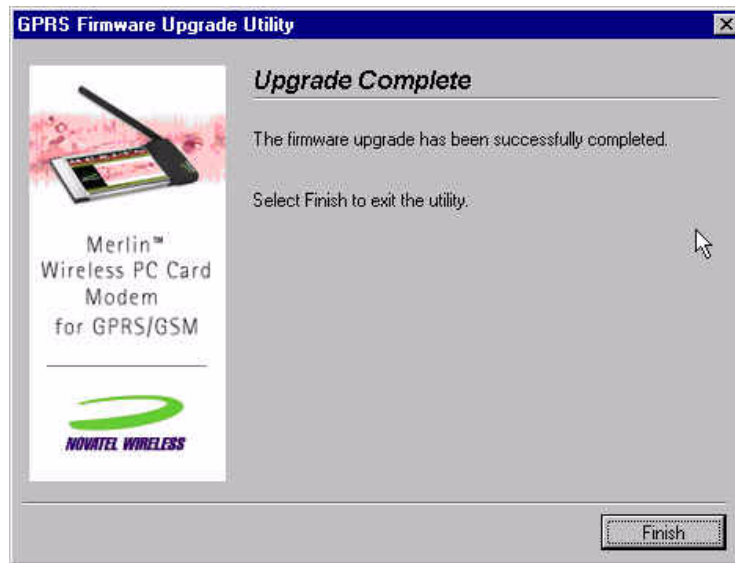


The upgrade consists of 3 phases:

- Phase 1: Reading modem information
- Phase 2: Upgrading firmware
- Phase 3: Writing Modem information

NOTE: The upgrade process may take up to 10 minutes for completion. Please wait for the process to complete even if it appears that the utility has stopped.

Once the upgrade is complete, the **Upgrade Complete** window will appear.



9. Select **Finish** to close the firmware upgrade utility.

NOTE: This utility creates a log file in your Windows temp directory called GPRSFUU.log. Customer support may request this log if there was a problem upgrading your modem's firmware.

Troubleshooting

If there is a problem with the firmware upgrade, a warning window will appear. Follow the steps below to solve the problem indicated by the warning window.

Incorrect Firmware Version

Dual Band Modem with Single Band Firmware

If the warning below appears, the wrong type of modem has been inserted into the PC slot of your computer.



You have inserted a dual band modem that requires a firmware type that starts with "PE." Please locate and install the correct firmware version.

Incorrect Firmware Version

Single Band Modem with Dual Band Firmware

If the warning below appears, the wrong type of modem has been inserted into the PC slot of your computer.



You have inserted a dual band modem that requires a firmware type that starts with "PN." Please locate and install the correct firmware version.

Firmware Utility Cannot Locate Modem

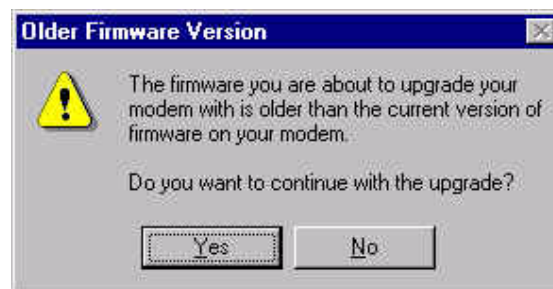
If the warning below appears, the Firmware Upgrade Utility cannot locate your modem.



Please ensure that the modem is firmly inserted into the PCMCIA slot. If the error message reappears, remove your modem and reinsert it into an adjacent slot.

Older Firmware Version

If the warning below appears, the firmware version that you are about to load is older than the current version of firmware on your modem.



If you have been instructed by your operator to perform the upgrade, click **Yes**. If you have **NOT** been instructed to perform the upgrade, select **No**. This will stop the upgrade process.

Chapter 5: Software Interface

Novatel Wireless™ has designed and developed a protocol which provides facilities to monitor modem status while a data session on the host is active. In a modem environment, modem status is typically accessed through AT commands over the serial port. However, after a data session is activated on the host through the modem, the serial port is deemed “in-use” and direct serial access of AT Commands is not permitted. All data is now encapsulated through the data session protocols.

The following items will be discussed within this chapter:

- wireline modem interface
- wrapper protocol
- pros and cons of the wrapper protocol

Topics Included in this Chapter

| | |
|---|-----|
| Point-to-Point Protocol Interface | 156 |
| Software Architecture | 157 |
| Wrapper Protocol Overview | 158 |

Point-to-Point Protocol Interface

A Point-to-Point (PPP) server implementation is supported within the GPRS module. Remote Access Service (RAS) communication over the serial port is supported using the AT commands to enter the PPP session and support PPP negotiation of IP and DNS elements.

PPP negotiation will NOT complete until registration on the network has been completed. In some cases, particularly where dynamic IP addressing is supported by the carrier, this will not occur as it would be impossible to report an IP address until the unit had performed the GPRS “attach request” on the network.

Status Interface

The Expedite and Merlin GPRS modem supports a method to retrieve modem status information using AT commands while the modem is in a data session. This is accomplished by using a unique driver called a Wrapper driver which exposes two serial ports, one for data and the other for status. The Wrapper driver multiplexes or “wraps” the information across the single serial or PCMCIA connection, and the data is then “unwrapped” and routed to the appropriate location in the modem or over the air. This allows status requests to occur in a separate stream to permit either the Novatel Wireless Modem Manager or another user application to communicate with the modem. It is anticipated that this approach will work for the majority of applications.

Software Architecture

Figure 12: Software Architecture below depicts the software interfaces for the Novatel GPRS modem software.

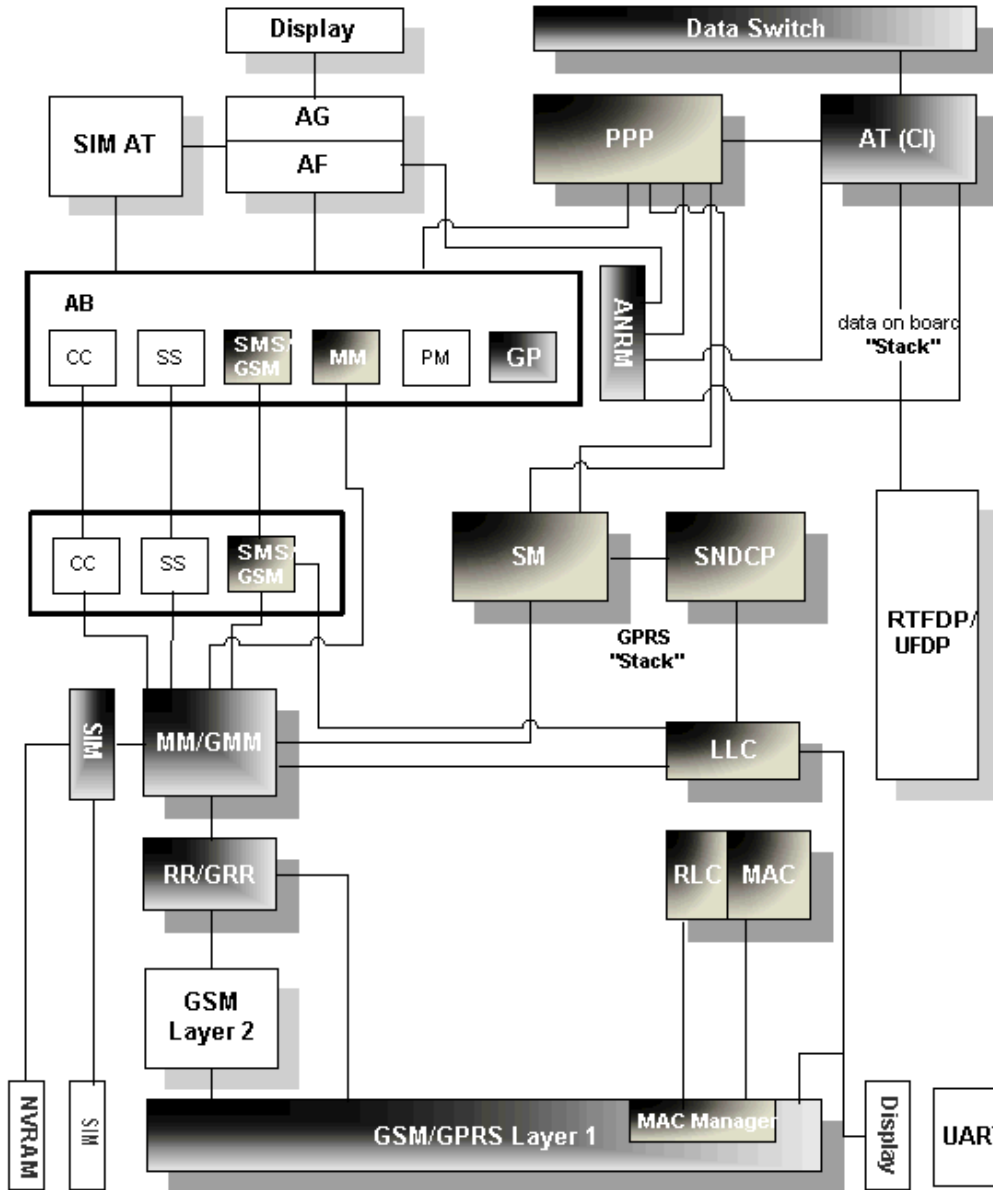


Figure 12: Software Architecture

Wireline Modem Interface

All of the current Merlin based products implement a communication model that emulates a wireline modem interface.

In a traditional modem model, users:

1. select the appropriate modem from the installation list
2. dial a number using that modem to contact their ISP
3. allow the host stack to establish a PPP session with another network entity.

Wrapper Protocol Overview

Novatel Wireless has created a protocol to provide facilities to monitor modem status while a data session on the host is active. In a modem environment, modem status is typically assessed through AT commands over the serial port. However, after a data session is activated on the host through the modem, the serial port is deemed “in-use” and direct serial access of AT commands is not permitted. All data is now encapsulated through the data session protocols. The modem is limited in its processing of the incoming data stream on the serial port to either passing the data along (as in a data session) or processing it internally (as in AT commands).

Appendix A - Expedite Connectors



Board to Board Connector

PB-5 Series 0.5mm Spacing



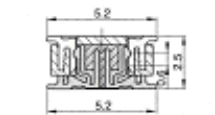
■ Features

1. A dual-lined board to board connector of a between terminal pitch of 0.5mm.
2. Variety of 7 between PWB dimensions from 2.5mm to 6.0mm available.
3. Use of supporting hardware ensures high degree solder strength.
4. With choices of 20p to 100p, most suitable for high density surface mounting.
5. Compact design yet a sufficient suction area provided.

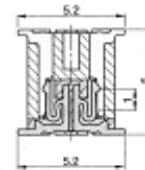
■ Specifications

1. Rating : 0.5A 50V AC/DC (up to 40Poles)
0.3A 50V AC/DC (up to 100Poles)
2. Contact Resistance : 30mΩ max.
3. Insulation Resistance : 100MΩ min.at 100V DC
4. Withstanding Voltage : 100V AC for one minute
5. Operating Temperature Range : -25°C to +70°C

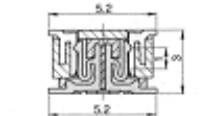
■ Connection Diagram



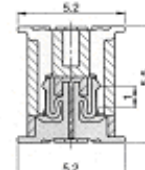
PLUG : CPB72□□-11□□
SOCKET : CPB71□□-01□□



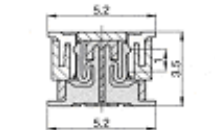
PLUG : CPB72□□-03□□
SOCKET : CPB71□□-02□□



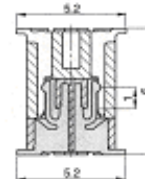
PLUG : CPB72□□-12□□
SOCKET : CPB71□□-02□□



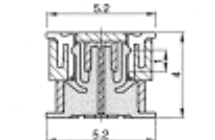
PLUG : CPB72□□-03□□
SOCKET : CPB71□□-04□□



PLUG : CPB72□□-12□□
SOCKET : CPB71□□-04□□

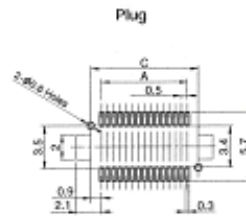
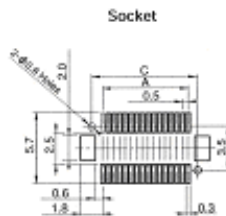


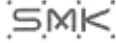
PLUG : CPB72□□-03□□
SOCKET : CPB71□□-03□□



PLUG : CPB72□□-12□□
SOCKET : CPB71□□-03□□

■ PC Board Diagram





Board to Board Connector

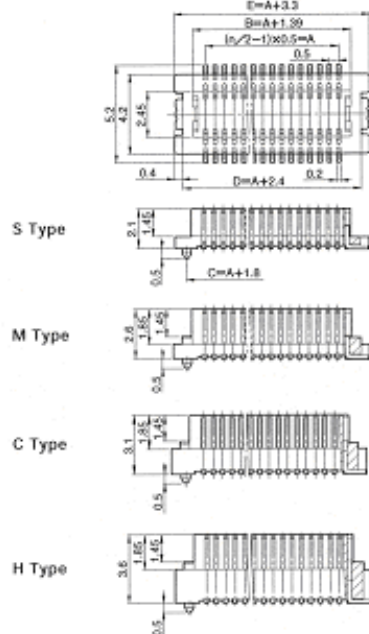
PB-5 Series

- Socket CPB 71□□-01□□ (S Type)
- CPB 71□□-02□□ (M Type)
- CPB 71□□-03□□ (H Type)
- CPB 71□□-04□□ (C Type)

| | | No. of Pins | | | | |
|-------------|----|-------------|-------|------|------|------|
| No. of Pins | □□ | A | B | C | D | E |
| 20 | 20 | 4.5 | 5.89 | 6.3 | 6.9 | 7.8 |
| 30 | 30 | 7.0 | 8.39 | 8.8 | 9.4 | 10.3 |
| 40 | 40 | 9.5 | 10.89 | 11.3 | 11.9 | 12.8 |
| 50 | 50 | 12.0 | 13.39 | 13.8 | 14.4 | 15.3 |
| 60 | 60 | 14.5 | 15.89 | 16.3 | 16.9 | 17.8 |
| 70 | 70 | 17.0 | 18.39 | 18.8 | 19.4 | 20.3 |
| 80 | 80 | 19.5 | 20.89 | 21.3 | 21.9 | 22.8 |
| 100 | 91 | 24.5 | 25.89 | 26.3 | 26.9 | 27.8 |

- Material and Plating
- Housing : Liquid Crystal Polymer (Natural Color) 94V-0
- Contact : Phosphor Bronze
Tin-lead Plating (20-60Poles)
Gold Plating (70-100Poles)
- Frame : Phosphor Bronze Tin-lead Plating

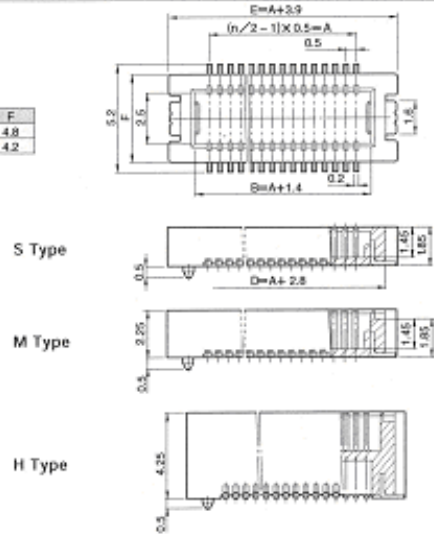
| □□ | Reinforce Metal | Boss |
|----|-----------------|---------|
| □□ | Without | Without |
| 01 | Without | With |
| 10 | With | Without |
| 11 | With | With |



- Plug CPB 72□□-11□□ (S Type)
- CPB 72□□-12□□ (M Type)
- CPB 72□□-03□□ (H Type)

| | | No. of Pins | | | | | Type | |
|-------------|----|-------------|------|------|------|------|------|-----|
| No. of Pins | □□ | A | B | C | D | E | Type | F |
| 20 | 20 | 4.5 | 5.9 | 6.3 | 7.3 | 8.4 | S, M | 4.8 |
| 30 | 30 | 7.0 | 8.4 | 8.8 | 9.8 | 10.9 | H | 4.2 |
| 40 | 40 | 9.5 | 10.9 | 11.3 | 12.3 | 13.4 | | |
| 50 | 50 | 12.0 | 13.4 | 13.8 | 14.8 | 15.9 | | |
| 60 | 60 | 14.5 | 15.9 | 16.3 | 17.3 | 18.4 | | |
| 70 | 70 | 17.0 | 18.4 | 18.8 | 19.8 | 20.9 | | |
| 80 | 80 | 19.5 | 20.9 | 21.3 | 22.3 | 23.4 | | |
| 100 | 91 | 24.5 | 25.9 | 26.3 | 27.3 | 28.4 | | |

- Material and Plating
- Housing : Polyamide (Natural Color) 94V-0
- Contact : Phosphor Bronze
Tin-lead Plating (20-60Poles)
Gold Plating (70-100Poles)
- Frame : Phosphor Bronze Tin-lead Plating



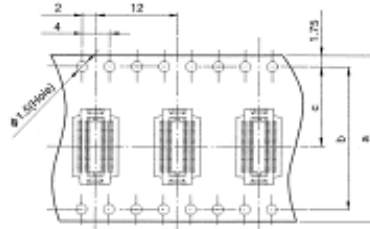


Board to Board Connector

PB-5 Series

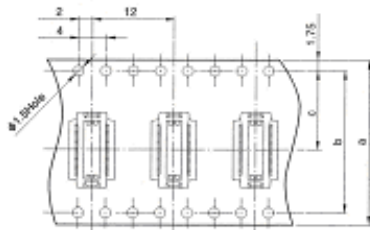
Dimensions of Reels and Tapes (JIS Standard)

● Socket



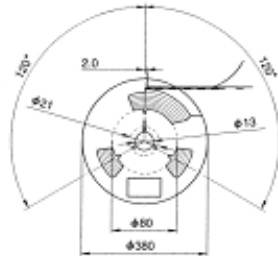
| No. of Pins | □□ | a | b | c |
|-------------|----|------|------|------|
| 20 | 20 | 16.0 | / | 7.5 |
| 30 | 30 | | | |
| 40 | 40 | 24.0 | / | 11.5 |
| 50 | 50 | | | |
| 60 | 60 | 32.0 | 28.4 | 14.2 |
| 70 | 70 | | | |
| 80 | 80 | 44.0 | 40.4 | 20.2 |
| 100 | 91 | | | |

● Plug

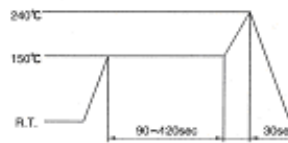


| No. of Pins | □□ | a | b | c |
|-------------|----|------|------|------|
| 20 | 20 | 16.0 | / | 7.5 |
| 30 | 30 | | | |
| 40 | 40 | 24.0 | / | 11.5 |
| 50 | 50 | | | |
| 60 | 60 | 32.0 | 28.4 | 14.2 |
| 70 | 70 | | | |
| 80 | 80 | 44.0 | 40.4 | 20.2 |
| 100 | 91 | | | |

■ Reel Dimensions
1000pcs/reel



■ Reflow Soldering Conditions



180°C min : 45sec max, 200°C min : 30sec max.
240°C : 5sec max.

MMCX - 50 Ohm Connectors



Specifications

ELECTRICAL RATINGS

Impedance: 50 ohms
 Frequency Range: Connectors 0-8 GHz
 Dummy loads 0-1 GHz

| VSWR: (f = GHz) | Straight Cabled Connectors | | Right Angle Cabled Connectors |
|--------------------------|----------------------------|-------------|-------------------------------|
| | 0.1 | 0.2 | 0.5 |
| .047 dia flexible | 1.20 | 1.14 ± .071 | 1.25 |
| RG 178, RG 316, RG 316DS | 1.20 | 1.15 | 1.15 |
| .086 semi-rigid | 1.15 | | |

Uncabled receptacles, dummy loads N/A
 Working Voltage: Connectors 170 Vrms at sea level
 Dummy loads N/A
 Dielectric Withstanding Voltage: Connectors 500 Vrms at sea level
 Dummy loads N/A
 Insulation Resistance: 1000 megohms min
 Contact Resistance: (milliohms maximum) Initial After Environmental

| | Initial | After Environmental |
|--|---------|---------------------|
| Center contact (straight cabled connectors and uncabled receptacles) | 5.0 | 8.0 |
| Center contact (right angle cabled connectors) | 5.0 | 15.0 |
| Outer contact (all connectors) | 1.0 | 1.5 |
| Braid to body | 1.5 | N/A |

Corona Level: Connectors 190 volts min at 70,000 feet
 Dummy loads N/A
 Insertion Loss: (dB max tested at 1 GHz)
 Straight cabled connectors 0.1
 Right angle cabled connectors 0.2
 Uncabled receptacles, dummy loads N/A
 RF Leakage: (dB minimum, tested at 2.5 GHz)
 Flexible cable connectors -60 dB
 .086 semi-rigid -70 dB
 Dummy loads N/A
 RF High Potential Withstanding Voltage: (400 Vrms at 4 and 7 MHz)
 Power Rating (Dummy Load): - 0.5 watt @ +25°C, derated to 0.25 watt @ +125°C

MECHANICAL RATINGS

Engagement Design: Series MMCX
 Engagement/Disengagement Force: 8 lbs. max engagement
 1.4 lbs. min disengagement
 Contact Retention: 2.0 lbs. minimum axial force
 Cable Retention: Axial Force* Torque (in-oz)

| | Axial Force* (pounds) | Torque (in-oz) |
|--------------------------------|-----------------------|----------------|
| Connectors for .047 flexible | 3.5 | N/A |
| Connectors for RG 178 | 7.0 | N/A |
| Connectors for RG 316 | 20.0 | N/A |
| Connectors for RG 316DS | 25.0 | N/A |
| Connectors for .086 semi-rigid | 30.0 | 18 |

*Or cable breaking strength whichever is less.
 Durability: 500 cycles minimum

ENVIRONMENTAL RATINGS (Meets or exceed the applicable paragraph of MIL-C-39012)

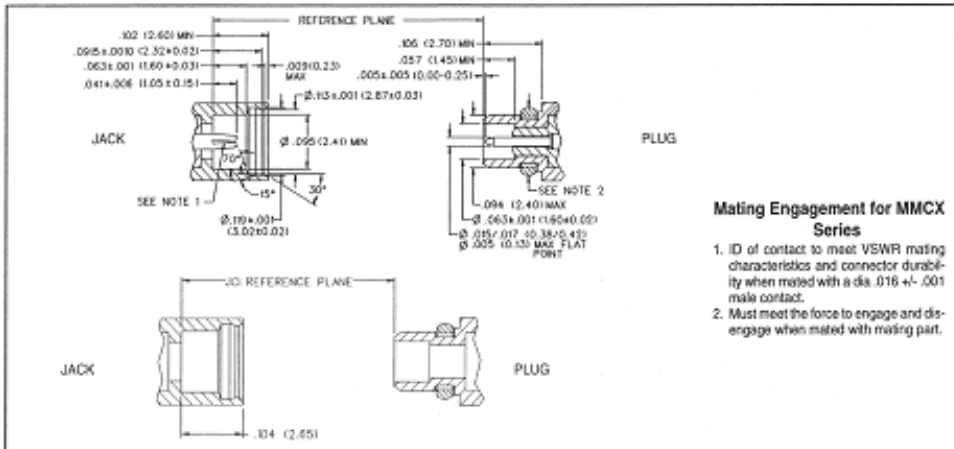
Operating Temperature: Connectors - 65°C to + 165°C
 Dummy loads - 65°C to + 125°C
 Thermal Shock: Connectors: MIL-STD-202, Method 107, Condition C, except -55°C to + 155°C (N/A dummy loads)
 Corrosion: MIL-STD-202, Method 101, Condition B (N/A dummy loads)
 Shock: MIL-STD-202, Method 213, Condition B (N/A dummy loads)
 Vibration: MIL-STD-202, Method 204, Condition D (N/A dummy loads)
 Moisture Resistance: MIL-STD-202, Method 106 (N/A dummy loads)

MATERIAL SPECIFICATIONS

- Bodies:** Brass per QQ-B-626, gold plated* per MIL-G-45204 .00001" min.
Contacts: Beryllium copper per QQ-C-530, gold plated* per MIL-G-45204 .00003" min.
Interface Spring: Beryllium copper per QQ-C-530, gold plated* per MIL-G-45204 .00003" min.
Insulators: PTFE fluorocarbon per ASTM D 1710 and ASTM D 1457
Crimp Sleeves: Copper per WW-T-799 or brass per QQ-B-626, gold plated per MIL-G-45204 .00001" min.
Mounting Hardware: Brass per QQ-B-626 or QQ-B-613, gold plated per MIL-G-45204 .00001" min.

*Avoid user injury due to misapplication. See safety advisory definitions on page 2.

*All gold plated parts include a .00005" min nickel barrier layer.

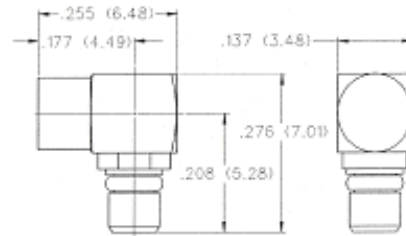




MMCX - 50 Ohm Connectors

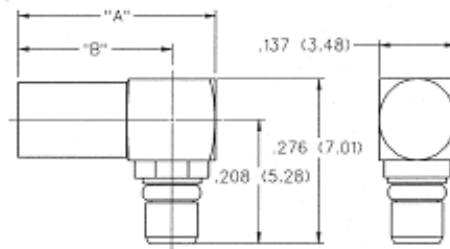
For Semi-Rigid and Flexible Cable

Right Angle Solder Type Plug - Captivated Contact



| CABLE TYPE | PART NUMBER |
|-----------------|--------------|
| .086 Semi-rigid | 135-3693-101 |

Right Angle Crimp Type Plug - Captivated Contact



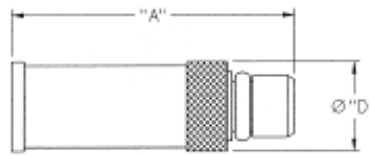
| CABLE TYPE | PART NUMBER | "A" | "B" | TERMINATION |
|--|--------------|--------------|-------------|--------------|
| .047" Diameter Flexible Huber K01152-07 Axon P512479A Astrolab 32018 DS | 135-3436-101 | .364 (8.99) | .276 (6.98) | Crimp Insert |
| RG 178U, 196 | 135-3402-101 | .364 (8.99) | .276 (6.98) | Crimp Insert |
| RG 316U, 188, 187 179, 161, 174 | 135-3403-101 | .412 (10.46) | .334 (8.48) | Crimp Sleeve |
| RG 316 DS, RG 188DS | 135-3404-101 | .412 (10.46) | .334 (8.48) | Crimp Sleeve |

MMCX - 50 Ohm Connectors

For Flexible Cable

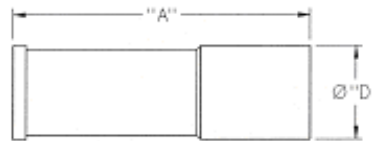


Straight Crimp Type Plug Solder or Crimp Captivated Contact



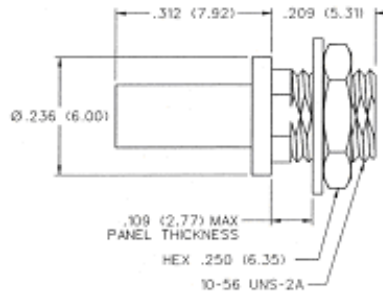
| CABLE TYPE | PART NUMBER | "A" | "D" | TERMINATION |
|--|--------------|--------------|-------------|--------------|
| .047" Diameter Flexible Huber K01152-07 Axon P512479A Astrolab 32018 DS | 135-3496-001 | .462 (11.73) | .137 (3.48) | Crimp Insert |
| RG 178/U, 196 | 135-3402-001 | .462 (11.73) | .137 (3.48) | Crimp Insert |
| RG 316/U, 188, 161, 174 | 135-3403-001 | .509 (12.93) | .173 (4.39) | Crimp Sleeve |
| RG 316 DS, 188 DS, 187 DS | 135-3404-001 | .509 (12.93) | .173 (4.39) | Crimp Sleeve |
| RG 179/U, 187 | 135-3433-001 | .509 (12.93) | .173 (4.39) | Crimp Sleeve |

Straight Crimp Type Jack Solder or Crimp Captivated Contact



| CABLE TYPE | PART NUMBER | "A" | "D" | TERMINATION |
|--|--------------|--------------|-------------|--------------|
| .047" Diameter Flexible Huber K01152-07 Axon P512479A Astrolab 32018 DS | 135-3336-001 | .462 (11.73) | .137 (3.48) | Crimp Insert |
| RG 178/U, 196 | 135-3302-001 | .462 (11.73) | .137 (3.48) | Crimp Insert |
| RG 316/U, 188, 161, 174 | 135-3303-001 | .545 (13.84) | .173 (4.39) | Crimp Sleeve |
| RG 316 DS, 188 DS, 187 DS | 135-3304-001 | .545 (13.84) | .173 (4.39) | Crimp Sleeve |
| RG 179/U, 187 | 135-3333-001 | .545 (13.84) | .173 (4.39) | Crimp Sleeve |

Straight Crimp Type Bulkhead Jack Solder or Crimp Captivated Contact



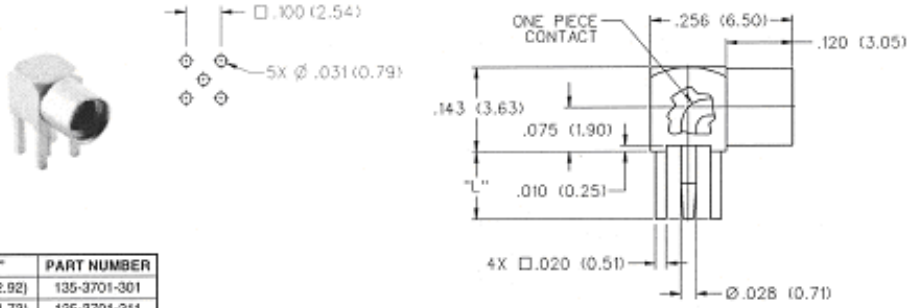
| CABLE TYPE | PART NUMBER | TERMINATION |
|--|--------------|--------------|
| .047" Diameter Flexible Huber K01152-07 Axon P512479A Astrolab 32018 DS | 135-3336-401 | Crimp Insert |
| RG 178/U, 196 | 135-3302-401 | Crimp Insert |



MMCX - 50 Ohm Connectors

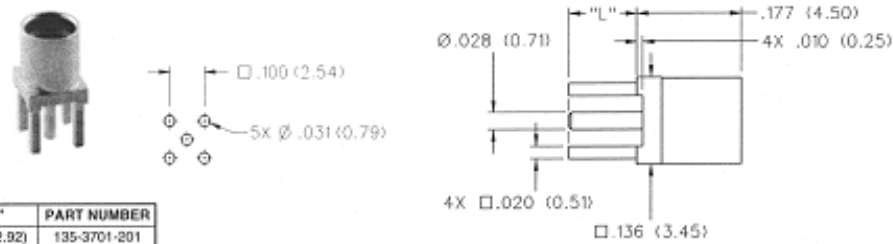
PC Mount

Right Angle Jack Receptacle



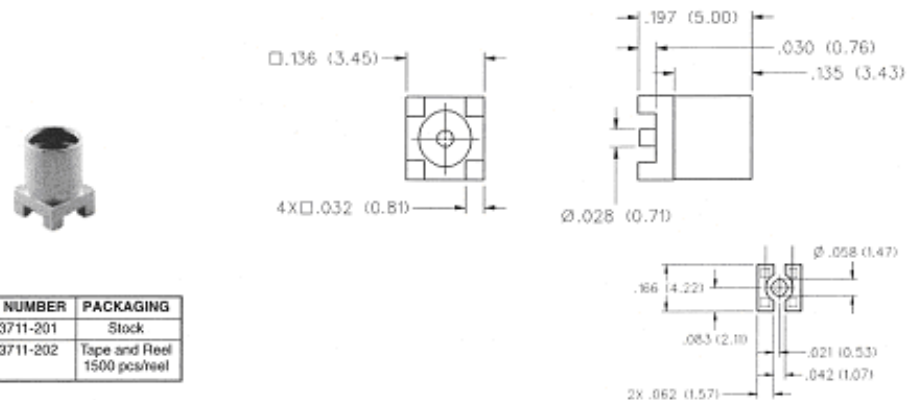
| "L" | PART NUMBER |
|-------------|--------------|
| .115 (2.92) | 135-3701-301 |
| .068 (1.73) | 135-3701-311 |

Straight Mount Jack Receptacle



| "L" | PART NUMBER |
|-------------|--------------|
| .115 (2.92) | 135-3701-201 |
| .068 (1.73) | 135-3701-211 |

Straight Jack Receptacle - Surface Mount



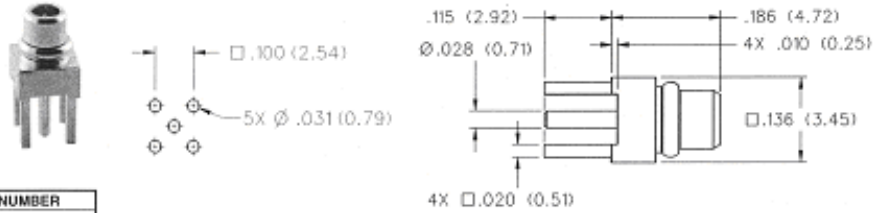
| PART NUMBER | PACKAGING |
|--------------|--------------------------------|
| 135-3711-201 | Stock |
| 135-3711-202 | Tape and Reel 1500 pcs/reel |

MMCX - 50 Ohm Connectors

PC Mount and Termination

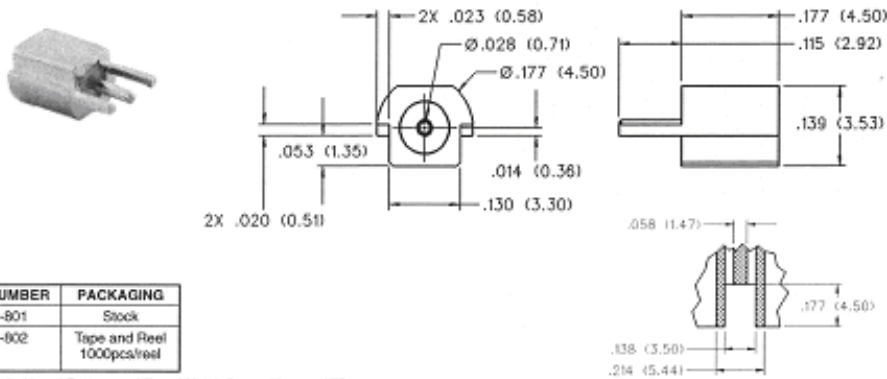


Straight Plug Receptacle



| PART NUMBER |
|--------------|
| 135-3801-201 |

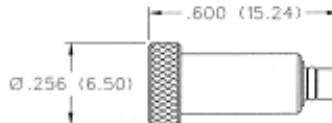
End Launch Jack Receptacle - Surface Mount



| PART NUMBER | PACKAGING |
|--------------|-------------------------------|
| 135-3711-801 | Stock |
| 135-3711-802 | Tape and Reel 1000pcs/reel |

Recommended Land Pattern and Board Notch figure 14 page 175.

Plug Dummy Load



| FREQ. RANGE | PART NUMBER | PLATING | RESISTANCE |
|-------------|--------------|---------|------------|
| 0-1 GHz | 135-3801-811 | Gold | 50 Ohms |

Appendix B - Merlin Connectors

Merlin G100 Connectors

Figure 13: G100 68 Pin Connector

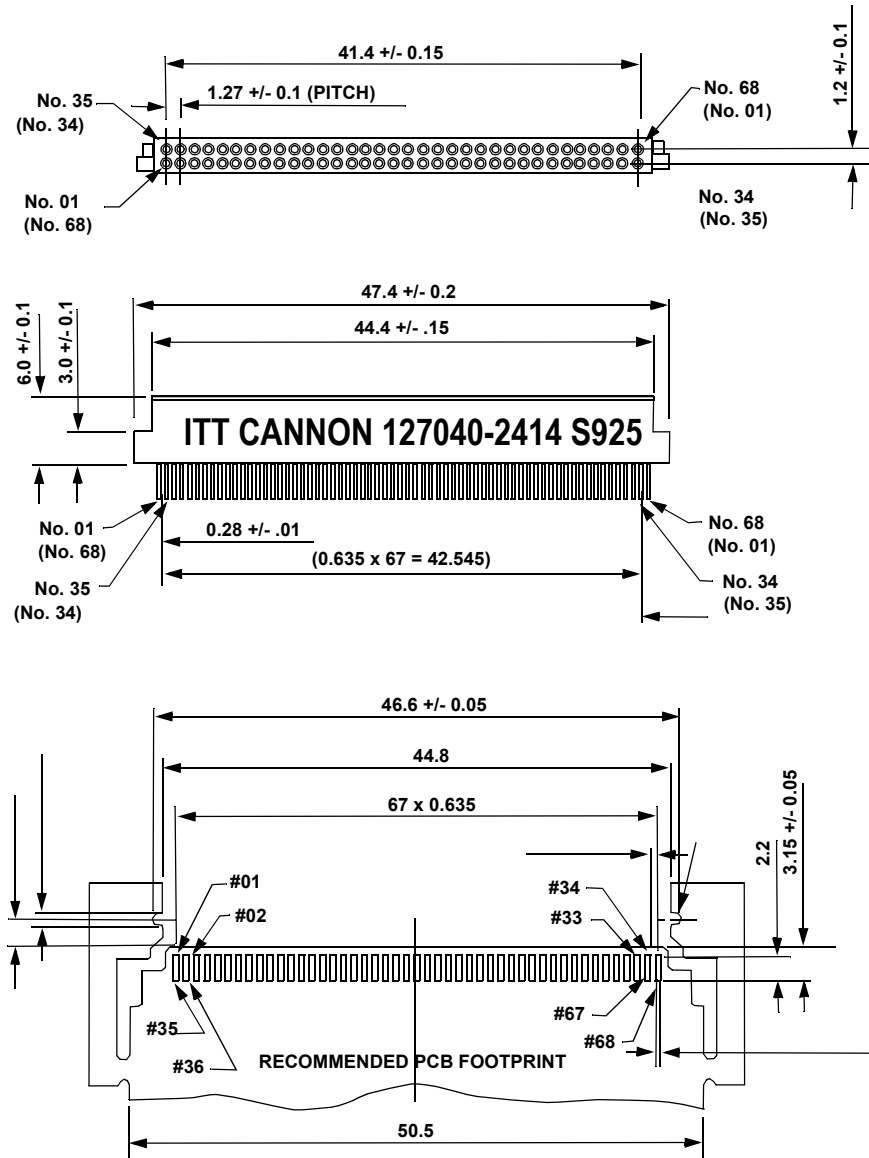
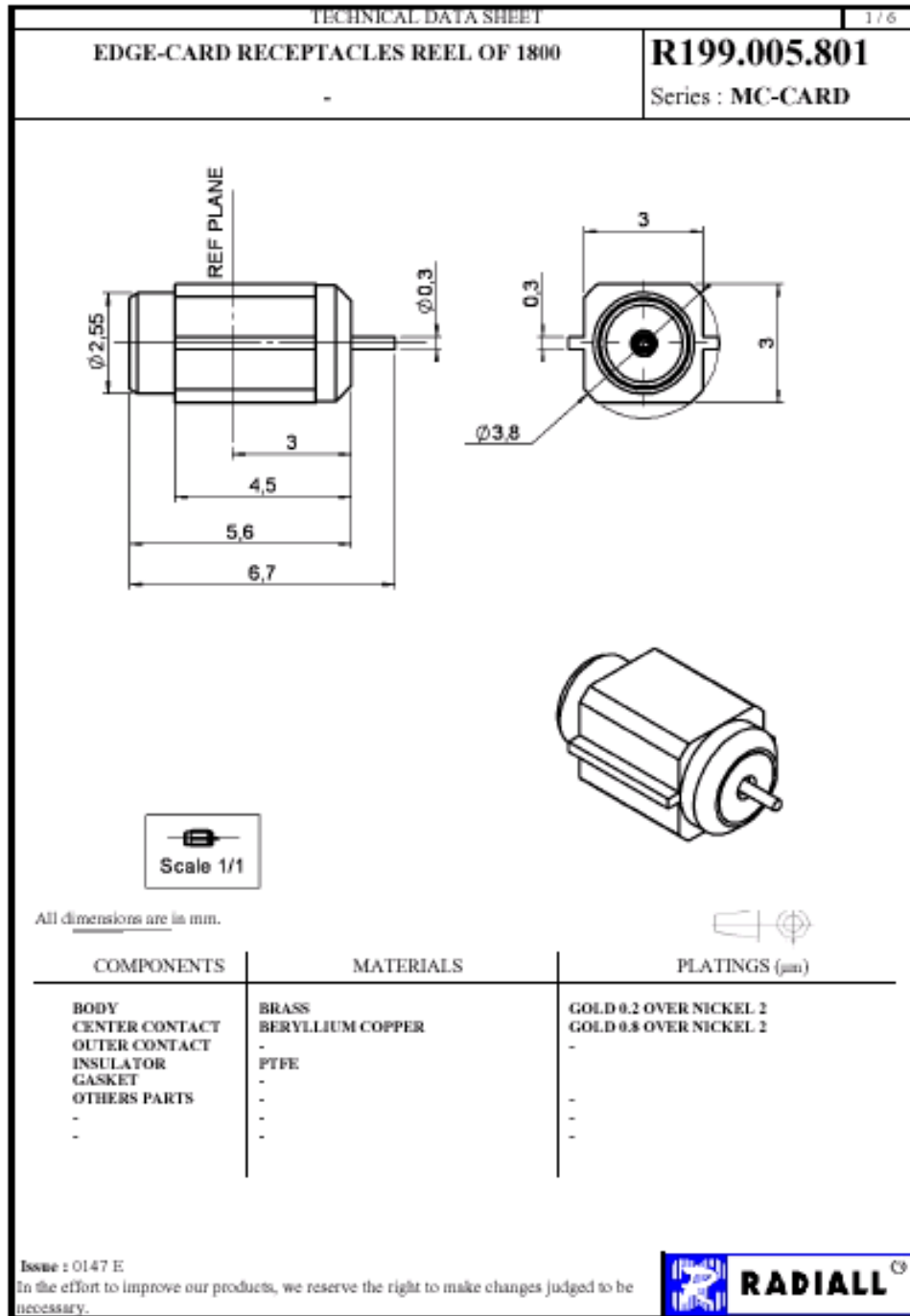


Figure 14: G100 Radial RF Connector






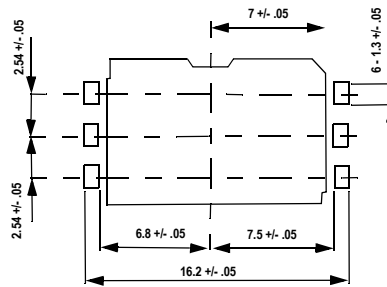
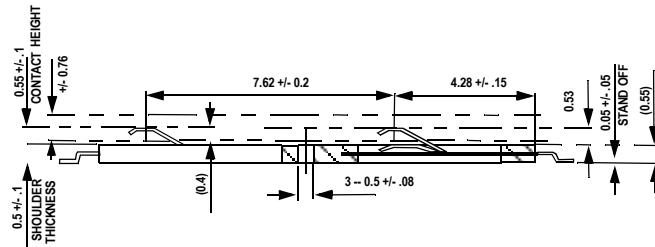
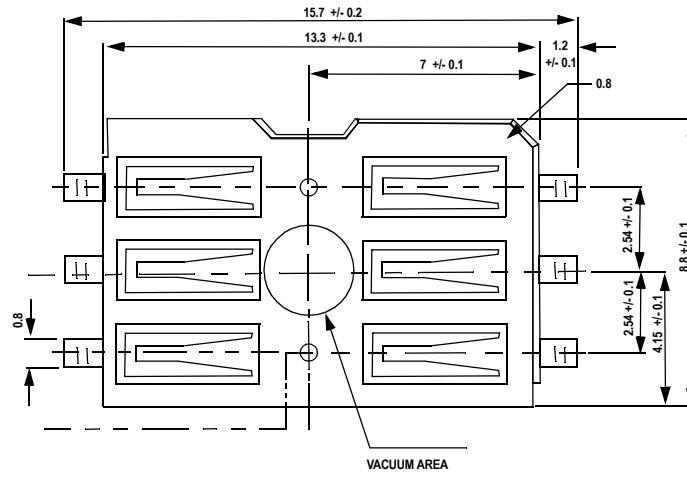
| TECHNICAL DATA SHEET | | 2 / 6 |
|---|------------------------------|---|
| EDGE-CARD RECEPTACLES REEL OF 1800 | | R199.005.801 |
| | | Series : MC-CARD |
| <u>PACKAGING</u> | | <u>SPECIFICATION</u> |
| Standard | Unit | Other |
| 1800 | 'W' option | Contact us |
| ELECTRICAL CHARACTERISTICS | | ENVIRONMENTAL |
| Impedance | 50 Ω | Operating temperature |
| Frequency | 0-8 GHz | -65/+165 ° C |
| VSWR | 1.15 + 0.015 x F(GHz) Maxi | Hermetic seal |
| Insertion loss | .07 \sqrt{F} (GHz) dB Maxi | NA Atm.cm ³ /s |
| RF leakage | -(- F(GHz)) dB Maxi | Panel leakage |
| Voltage rating | 170 Veff Maxi | NA |
| Dielectric withstanding voltage | 500 Veff mini | |
| Insulation resistance | 5000 M Ω mini | |
| MECHANICAL CHARACTERISTICS | | OTHERS CHARACTERISTICS |
| Center contact retention | | Assembly instruction |
| Axial force - Mating end | 10 N mini | Others : |
| Axial force - Opposite end | 10 N mini | - |
| Torque | NA N.cm mini | |
| Recommended torque | | |
| Mating | NA N.cm | |
| Panel nut | NA N.cm | |
| Mating life | 5000 Cycles mini | |
| Weight | 0.270 g | |
| Issue : 0147 E | | |
| In the effort to improve our products, we reserve the right to make changes judged to be necessary. | |  |

Figure 15: G100 SIM Connector



APPLICABLE P.C.B. DIMENSION (REF.)

Merlin G200 Connectors

Figure 16: G200 68 Pin Connector

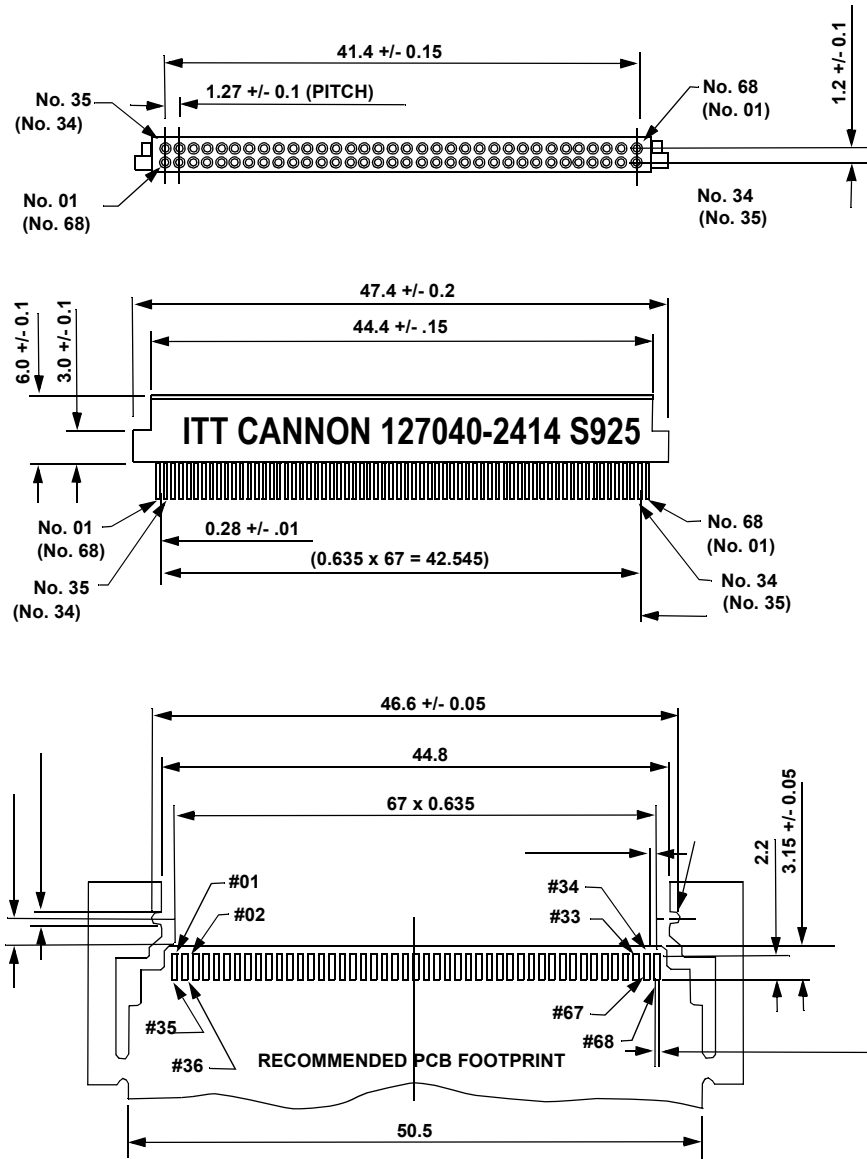


Figure 17: G200 Audio Jack

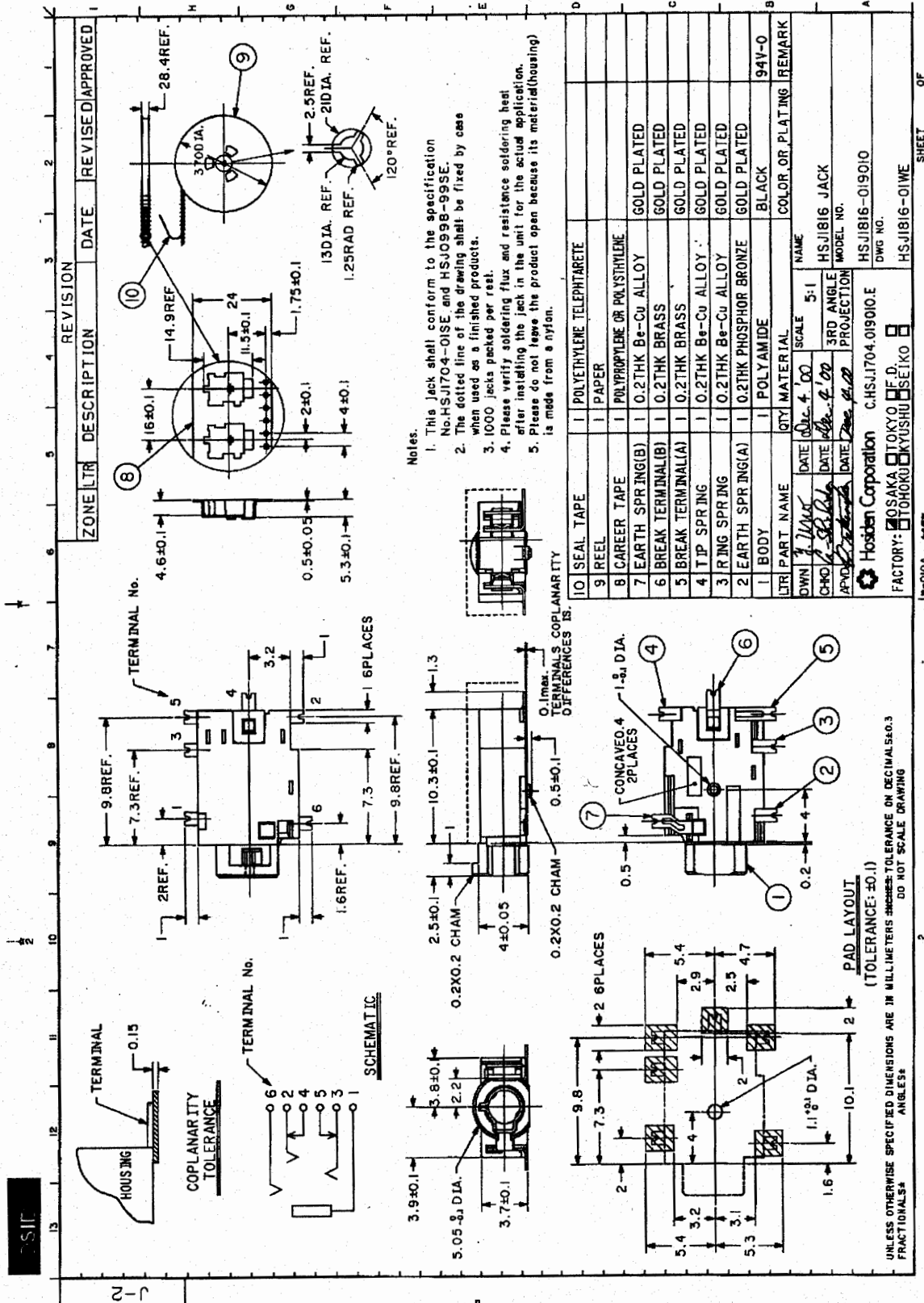




Figure 18: G200 RF Connector



SUHNER® COAXIAL CONNECTOR DATA SHEET

TYPE 82 MMCX-S50-0-2

Description

Straight PCB jack



General Information

Interface according to: SUHNER® MMCX
Weight: 0.7 g / 0.02 oz

Electrical Data

Impedance: 50 Ω
Frequency range for connector interface: DC ... 6.0 GHz

Material Data

Centre contact:
Outer contact:
Body:
Insulator:
Coupling nut:
Fastening nut:
Gasket:
Washer:

Material

Copper-Beryllium
Brass
Brass
PTFE / PFA
-
-
-
-

Surface Plating

Gold / nickel underplated
Gold / nickel underplated
Gold / nickel underplated

Packaging

Tape and Reel

Attachments

Outline drawing No.: 21471
Assembly instruction:

Notes

-

Order as 82 MMCX-S50-0-2/111 KG under Article No 22649679

WAIVER!

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Issued: 10.3.2000 15:49

Document No.: 22649679A.DOC



HUBER+SUHNER

HUBER+SUHNER AG
RF Interconnections
CH-9100 Herisau
Phone +41 (0)71 353 41 11
Fax +41 (0)71 353 45 90
<http://www.hubersuhner.com>

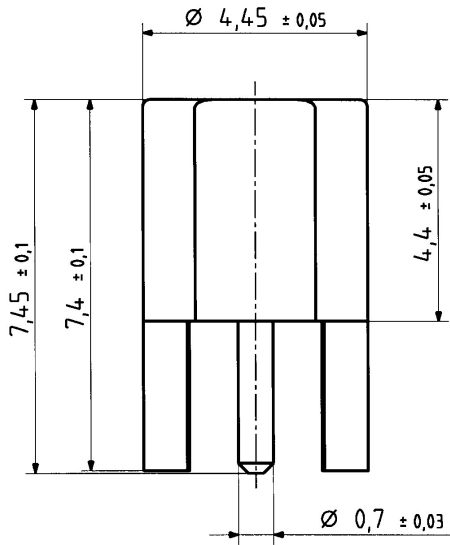
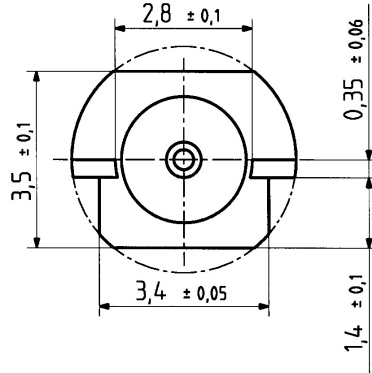
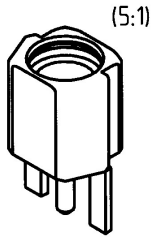
Uncontrolled copy

page 1 of 1

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82 MMCX S50 - 0 - 2

| | | |
|----------|----------|--------------|
| | Datum | Kurzz./Visum |
| Erstellt | 05.11.96 | 726/SMAFS |
| Geprüft | 5.11.96 | 726/Bam |
| Freigabe | 5.11.96 | 726/Bam |



Diese Zeichnung ist unser geistiges Eigentum und darf ohne unsere ausdrückliche Einwilligung weder kopiert, vervielfältigt, noch Dritten oder Konkurrenzfirmen zugänglich gemacht werden. (Art. 12 B.G.)

M. 10 : 1



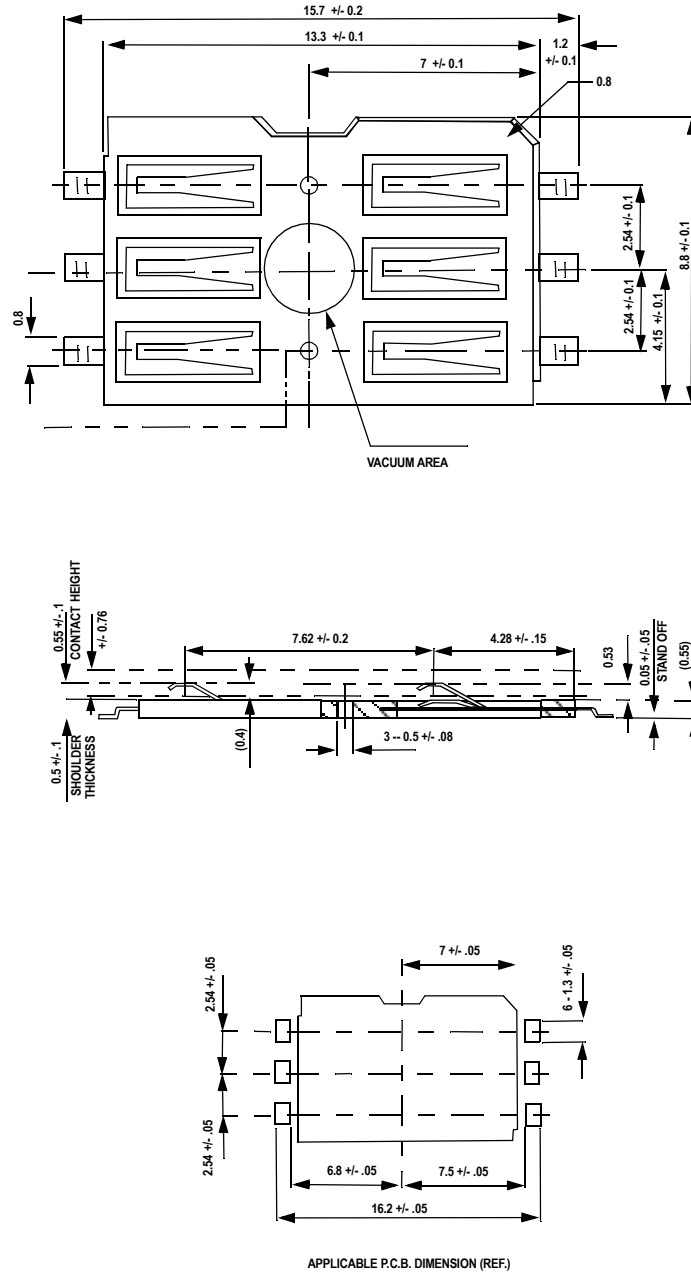
HUBER + SUHNER AG
9100 Herisau

4.13.21471

d

H+S 701 448.05

Figure 19: G200 SIM Connector



Appendix C – Expedite Development Kit Interface Board

The Expedite Development Kit is used to develop applications for embedding GPRS capability into OEM products and for upgrading firmware.

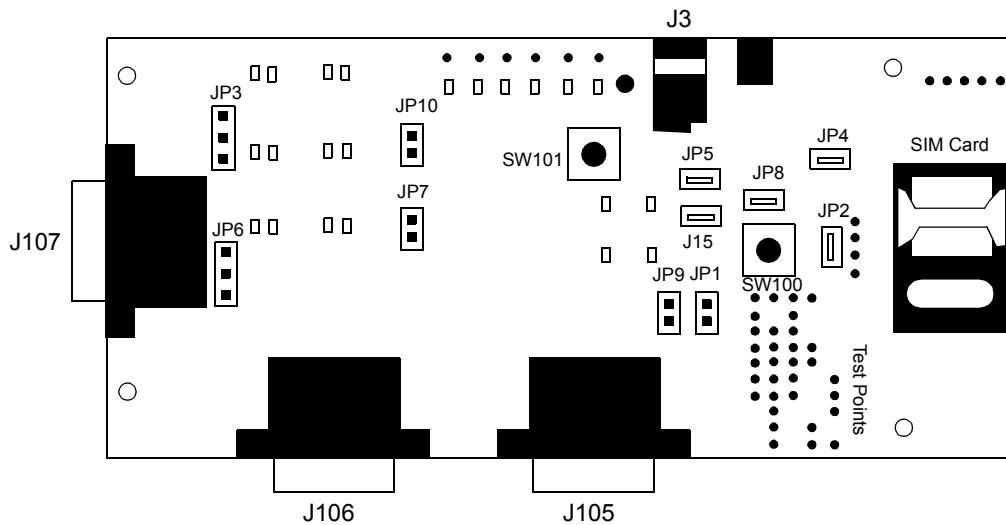



Figure 1: Expedite Development Kit Interface Board

Table 1: Interface Board Connector Assignment

| Point Name | Function |
|-----------------------|--|
| JP1 & JP9 | ADC Input pin – monitors ADC Battery Voltage |
| JP2 or SIM_IN | Activates switch on PC card |
| JP6 | Allows debugging to either J107 (jumper on pins 2 and 3) or not (jumper on pins 1 and 2). GPIO6 LED turns on during transmission regardless. |
| JP5 & JP15 | Always enable jumpers; used for current measurements. |
| JP7 & JP10 | Jumper must be placed on either JP10 (primary serial port) or JP7 (USC) to disable serial port (i.e.: jumper on JP7 disables USC). NOTE: printing error on interface card – should read DIS_PRM for JP10 and DIS_USC for JP7. |
| JP8 | Wake up hardware button |
| JP3 | Allows debugging to either J107 (jumper on pins 2 and 3) or to GPIO4 LED (jumper on pins 1 and 2) |
| JP108 | Voltage bench box supply |
| JP4 | Ground |
| J3 | 5 V power supply. |

| | |
|---|--|
| J104 | Place SIM card here |
| SW100 | Wakeup button (press for 750 ms to wake up device). Jumper on pins above SW100 enable software download without having to manually press button. |
| SW101 | Testing purposes. |
|  | <i>Power supply should vary between 3.8 – 4.5 Volts. DO NOT EXCEED 4.5 V.</i> |



Glossary

Access Point Name (APN)

The IP domain name (e.i. Novatel Wireless.com) of the network device that acts as a gateway by connecting a GPRS wireless radio network to a wired local or wide area network.

Active Network Session

An active network session allows you to send and receive data across the Internet using point-to-point protocol through your network connection.

Anonymous Access (AA)

Network does not know the real identity of the mobile. Opposite to non-anonymous.

AP Access Point

An entry point to an external network.

AT Commands

AT commands are a language type that enables PC communications software to give the modem directions. The term **AT** comes from the command terminology which always begins with **attention**, or AT.

Baud Rate

The actual bit rate, excluding compression and other Tx enhancements, on a communication line.

Border Gateway (BG)

Logical box that connects two (or more) operators together via an Inter-PLMN backbone. BG protects operator's intra-PLMN network against intruders.

Carrier

See **Service Provider** on page 183.

Circuit Switched Data

A wireless network connection established, using a single circuit that extends from you, directly through the network to your call's destination. Opposite to packet switched.

This connection type is also referred to as **GSM-Data**.

CLI

Command Line Interface.

CLIR

Call Line Identification Restriction.

Connection Oriented Network Service (CONS)

Same as X.25 protocol for packet network transmission and switching.

CSD

See "Circuit Switched Data" on page 179.

Connection Profile

See **Network Connection Profiles** on page 182.

dBm

dBm stands for decibels below 1 milliwatt. It is essentially a device's signal output power compared against a standard input signal strength of 1 (one) milliwatt. This number represents a ratio and is expressed as a negative number (e.i. -60dBm)

Default Network Connection Profile

The default network connection profile is the connection profile, chosen by the user, that the Modem Manager will use to connect to the network. The default network connection profile can be thought of as the **active** network connection profile.

Direct Memory Access (DMA)

A fast method of moving data from a storage device or LAN device interface card directly to RAM which speeds up processing. DMA by passes the CPU.

Domain Name

The name assigned to a computer or group of computers that constitute an IP network domain. In general, a domain name is comprised of its local host name and its top-level domain. The top-level domain can be made up of several names, each separated by a period (.).

An example of a domain name is **novatelwireless.com**.

Domain Name System (DNS)

This is a network server used on IP networks, such as the Internet, for translating network host names and Universal Resource Locators (URL's) into IP addresses.

Domain Name System (DNS) Address

The IP (internet protocol) address of the Domain Name System (DNS).

Firmware

Firmware is a program or set of programs that have been set permanently into a computer chip. The programs themselves usually are low-level programs that directly manipulate or interact with the hardware. An example of firmware is your desktop computer's BIOS.

Gateway GPRS Support Node (GGSN)

The SGSN communicates with what is called the Gateway GPRS Support Node (GGSN), a system that maintains connections with other networks such as the Internet, X.25 networks or private networks.

GPRS

GPRS stands for General Packet Radio Service. GPRS is a high-speed data transfer technique, used on GSM networks. It does not require that a continuous data stream be opened between the data source and destination. Instead, it uses packet to move data back and forth, making efficient use of the available radio spectrum.

GPRS Mobility Management and Session Management (GMM/SM)

Protocol stack between MS and SGSN that handles GPRS attach/detach and PDP context activation/deactivation.



GPRS Tunnelling Protocol (GTP)

Protocol between SGSN and GGSN to encapsulate user data and to carry GPRS signaling.

GSM

GSM stands for Global System for Mobiles. It is an open, non-proprietary system with international roaming capability providing seamless and same standardized same number contact ability in more than 170 countries. GSM satellite roaming has extended service access to areas where terrestrial coverage is not available.

GSM uses digital technology and time division multiple access transmission methods. Voice is digitally encoded via a unique encoder, which emulates the characteristics of human speech. This method of transmission permits a very efficient data rate/information content ratio.

GSM-Data

See “Circuit Switched Data” on page 179.

Home Public Land Mobile Network (HPLMN)

The home network.

IMEI

IMEI stands for International Mobile Station Equipment Identity.

Internet Protocol (IP)

Internet Protocol works in conjunction with Transmission Control Protocol (TCP). TCP/IP are part of a group of protocols that provide communication across interconnected networks. TCP/IP is the protocol used on the Internet. The TCP protocol first establishes a connection between the two systems in order to send and receive data, and then breaks and sequentially marks the message into small packets. The IP protocol routes and sends the packets based on the IP address.

Internet Control Message Protocol (ICMP)

IP network control protocol.

IP Addresses

As with personal computers that access the Internet, modems using GPRS technology also have a dedicated Internet Protocol (IP) address, which is used to identify the node or access point for the modem on the Internet. The service provider assigns this IP address.

The 32-bit host address is usually represented in dotted decimal notation, e.g. 128.121.4.5. The address can be split into a network number (or network address) and a host number unique to each host on the network and sometimes also a subnet address.

IP Network

A network of computer networks that employ Internet Protocol allowing a user to access the Internet, provided that the user has a modem; telephone line, cable line, or wireless data network (e.g. CDPD); and a service provider.

Local Area Network (LAN)

A computer network that spans a relatively small area (typically up to a 1 km radius), although most LANS are confined to a single building or group of buildings. This type of networking allows for easy interconnection of terminals, printers, and computers within a building or buildings.

Logical Link Control (LLC)

Protocol layer between MS and SGSN.

Medium Access Control (MAC)

Protocol in the radio level that is used to allocate the radio channel.

Megahertz (MHz)

One million hertz. Hertz is another word for cycles in a radio frequency.

Network Connection Profiles

A network connection profile is a group of connection settings that define a specific network connection to the Modem Manager. This includes such settings as network ID, network password, APN, DNS addresses and so on.

Mobile Station (MS)

The device being used to receive/transmit data and/or voice.

Original Equipment Manufacturer (OEM)

The original manufacturer of a pieces of equipment, typically complete boards, duplexers or enclosures etc.

Packet

A short block of data transmitted across a network.

Packet Control Unit (PCU)

Functional element in BSS that handles upper level GPRS control in the radio.

Packet Data Network (PDN)

Network that carries user data in packets. e.i Internet and X.25

Packet Size

The size of a packet expressed in bytes.

PC Card

A PC Card, similar in size to a credit card, is used for adding devices on to portable computing devices such as laptop, handheld, and palmtop computers. Some examples of these devices are modems, network cards, disk drive adapters, and extra memory. PC cards are often called PCMCIA cards.

PCMCIA Card Slots

The PCMCIA card slots are the sockets in the computing device, in which the PCMCIA card is inserted. It is the hardware interface between the computing device and the PCMCIA card.



Point to Multipoint (PTM)

Widely used protocol under IP to connect. i.e PC and ISP via modems.

Point to Point (PTP)

One sender on receiver.

Point-to-Point Protocol (PPP)

PPP is an interconnection protocol which allows a device, such as a wireless IP modem, to connect to a network or the Internet.

Primary Domain Name System

In order to get the translated IP addresses, the modem will try to connect to the server with the primary DNS address. If the modem cannot connect to this address, it will try to connect using the secondary DNS address.

Protocol Data Unit (PDU)

One data packet.

Quality of Service (QoS)

Definition of the service class of the connection between MS and the network.

Routing Area (RA)

A set of cells that belongs to one group. RA is always a subset of an LA (Location Area).

Registration

In order to send and receive data across a given network, a GPRS modem must first register to GSM/GPRS network. This involves the selection of an available channel and interaction with various systems on the GPRS network to set up a communication path.

Remote Access Service (RAS)

Software that enables distant PCs and workstations to get into a Remote Access Server to retrieve software and/or data on a corporate LAN. This service is provided through modems, analog telephone lines or digital ISDN lines.

Request to Send (RTS)

A control signal that has a dedicated wire in the RS-232 protocol. When the far device places a logic "one" or 5-V voltage on this wire, it enables the near modem to initiate a transmission.

Secondary Domain Name System

If the modem cannot connect to the DNS using the primary address, it will try to connect using the secondary DNS address.

Segment

Each IP network address consists of four numeric segments, which are divided by a period ("."). For example, 204.119.63.40.

Service Provider

A company that provides network connections to the Internet.

Short Message Service (SMS)

Short messages either in binary (160 characters) or text messages (140 bytes) format.

SIM

The term SIM stands for Subscriber Identity Module.

SIM Card

A SIM card is a type of *smart card* that contains all of your account information for your GSM and GPRS account. It also used to encrypt the data and voice that is sent across the network during a session.

SIM Card Contact Points

These are the small gold- or aluminum-colored.

Serving GPRS Support Node (SGSN)

The SGSN is the node within the GSM infrastructure that sends and receives data to and from the mobile stations. It also keeps track of the mobiles within its service area.

Transmission Control Protocol (TCP)

Protocol layer on top of conventional IP protocol.

Type II PCMCIA Card

A Type II PCMCIA card is identical to the Type I PCMCIA card in all ways except that it is thicker than the Type I card. The Type II PCMCIA card is in general use now.

User Datagram Protocol (UDP)

Another protocol on top of IP.

Wireless IP Network

A wireless network (e.g. GPRS) that uses Internet Protocol (IP).

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