

Cellular Engine
Siemens A20

Technische Beschreibung

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1 Übersicht

Gegenstand dieses Dokuments ist die Beschreibung der Bedienfunktionen, der Spannungsversorgung und der Schnittstellen der Cellular Engine Siemens A20, sowie die Anforderungen an das Basisgerät für den Betrieb der Cellular Engine Siemens A20. Die Auflistung der auf der seriellen Schnittstelle implementierten AT - Befehle, die Möglichkeiten zur externen Diagnose und die Sicherheitshinweise für den Benutzer der Cellular Engine Siemens A20, sowie die technischen Daten der Cellular Engine Siemens A20 sind ebenfalls Gegenstand dieses Dokuments.

Achtung: Der Benutzer der Cellular Engine Siemens A20 wird ausdrücklich gebeten, die Sicherheitshinweise im Kapitel 2 als Erstes zu lesen.

2 Sicherheitshinweise für den Benutzer

Bei der Cellular Engine Siemens A20 handelt es sich um kein sicherheitsrelevantes Produkt (wie z.B. Airbag).

2.1 Elektrische Sicherheit

Dieser Hinweis gilt für bestimmte Klassen von Mobilstationen mit Anschluß an Stromzufuhreinheiten oder Batterieladegeräte unter Verwendung von Spannungen über 50 V (effektiver Mittelwert) Wechselstrom oder 75 Volt Gleichstrom und trifft daher bei der Cellular Engine Siemens A20 nicht zu (siehe Kap. 7).

2.2 Flugzeugsicherheit

Die Cellular Engine Siemens A20 darf nicht an Bord eines Flugzeuges betrieben werden. Die Benutzung eines Funktelefons in einem Flugzeug kann für das Führen des Flugzeugs gefährlich sein, stört das zellulare Netz und ist illegal. Nicht-Beachtung dieser Anweisung kann zur zeitweiligen Einstellung oder zur vollständigen Aussetzung der Funktelefondienste für und/oder zu rechtlichen Schritten gegen denjenigen führen, der gegen diese Regelung verstoßen hat.

2.3 Umgebung mit explosiven Stoffen

- a) Es wird dem Benutzer empfohlen, die Geräte nicht an Tankstellen zu verwenden,
- b) Benutzer werden an die Notwendigkeit erinnert, die eingeschränkte Nutzung von Funkgeräten in Benzinedeps, chemischen Fabriken oder an Orten, an denen Sprengungen durchgeführt werden, zu beachten.

2.4 Sicherheit auf Straßen

- a) Beim Empfang eines Rufes auf öffentlichen Straßen dürfen Mobilstationen keine „Warn“-Vorrichtung verwenden, die ein Ertönen der Hupe des Fahrzeugs ermöglicht oder dessen Kennleuchten aufleuchten lassen.
- b) Es wird empfohlen, daß das Handmikrofon oder der Telefon-Handapparat- außer in einer Notsituation - nicht vom Fahrer benutzt werden sollte, während das Fahrzeug in Bewegung ist. Sprechen Sie nur unter Verwendung der Freisprecheinrichtung, wenn dadurch Ihre Aufmerksamkeit nicht vom Verkehr abgelenkt wird.

2.5 Nicht ionisierende Strahlungen

Wie bei anderen mobilen Funksendegeräten, werden die Benutzer darauf hingewiesen, daß zwecks zufriedenstellendem Gebrauch der Geräte und zur Sicherheit des Bedienungspersonals empfohlen wird, daß das Gerät lediglich in normaler Betriebsposition zu benutzen ist.

2.6 Elektronik von medizinischen Geräten

Der Betrieb von Funksendegeräten, einschließlich Funktelefonen, kann zu Störungen der Funktionsfähigkeit von unzureichend geschützten medizinischen Geräten führen. Bitte wenden Sie sich an einen Arzt oder an den Hersteller des medizinischen Gerätes, wenn Sie Fragen haben sollten.

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2.7 Wärmeentwicklung

Die Cellular Engine Siemens A20 kann im Betrieb eine Maximaltemperatur von ca 80° C erreichen. Daher sollte die Cellular Engine Siemens A20 nach Betrieb nicht ungeschützt berührt werden.

2.8 Antenne

Da es sich bei der Cellular Engine Siemens A20 um ein Gerät mit 8W Sendeleistung handelt wird dem Benutzer empfohlen die Antenne während des Sendebetriebs nicht zu berühren bzw. einen Sicherheitsabstand von 20 cm einzuhalten. Außerdem ist darauf zu achten, daß die Antenne nicht in den Fahrzeuginnenraum abstrahlt.

2.9 Vorkehrungen bei Verlust/Diebstahl der Cellular Engine Siemens A20 und SIM-Karte

Ist Ihr Siemens A20, Ihre SIM-Karte oder beides abhanden gekommen, rufen Sie bitte unverzüglich Ihren Netzbetreiber an, um einen Mißbrauch zu verhindern.

3 Produktbeschreibung

Bei dem A20 handelt es sich um eine kompakte Baugruppe mit zum Teil geschirmter Elektronik. Die Elektronik gliedert sich in die Komponenten Funkteil inklusive 8W HF-Endstufe, Stromversorgungsteil und Logik-/Analogteil. Zusätzlich enthält die Baugruppe Schnittstellen für Spannungsversorgung, SIM - Kartenleser, externe Antenne, Audiosignale (analog / digital), Daten, I/O-Ports, sowie für die Fernsteuerung der Engine durch das Basisgerät (z.B. Autoradio oder IDIS).

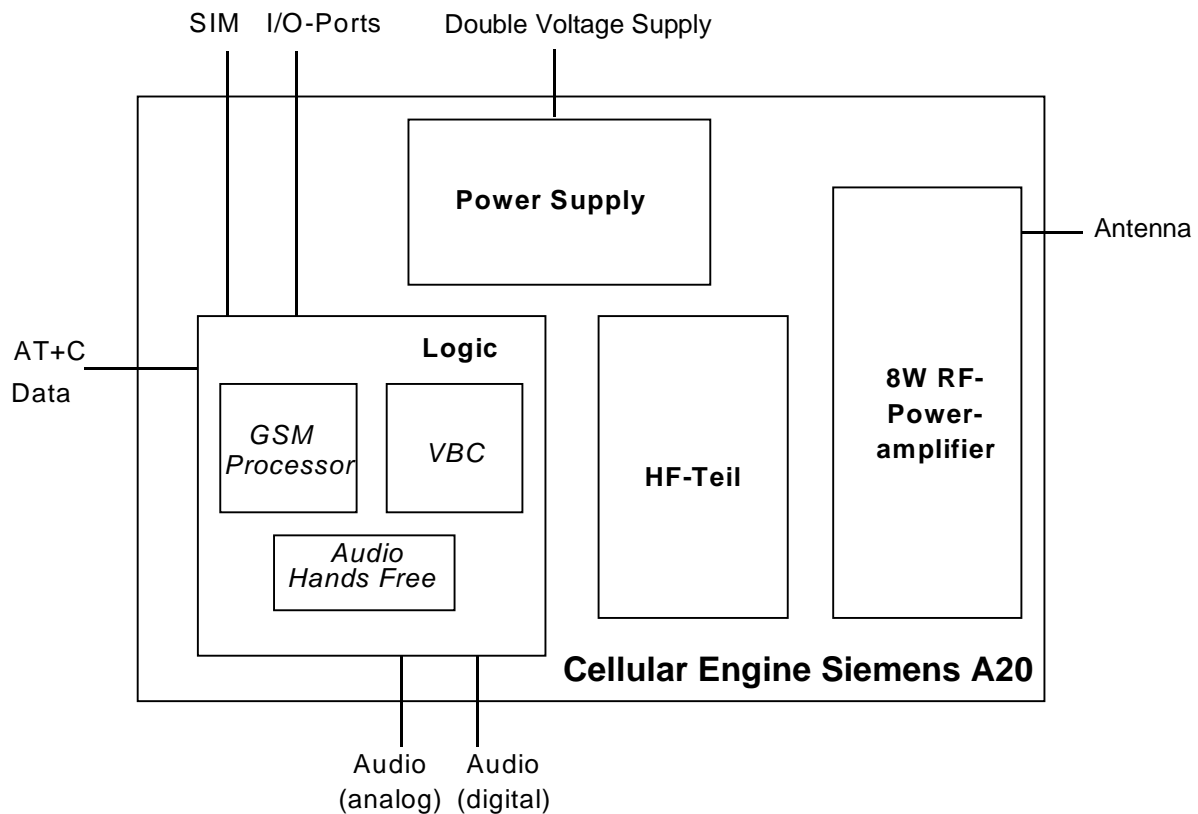


Abbildung 3-1: Blockschaltbild Cellular Engine Siemens A20

4 Leistungsmerkmale

- GSM 900 Phase II/II+
- Übertragung von Sprache mit full-rate (FR), enhanced full-rate (EFR)
- 8W Sendeleistung (class 2)
- Datendienste:
 - transparent mode (Fehlerkorrektur erfolgt im Endgerät)
 - non-transparent mode, RLP (Fehlerkorrektur erfolgt im Netz)
 - unterstützte Modemtypen: V.21, V.22, V.22bis, V.26ter, V.32, V.23, auto.
 - Fax: Class 1 Group 3
 - Datenkompression: V42.bis
 - Bearer Services BS 24/25/26
- Empfangen und Senden von SMS:
 - MO (Mobile Originated),
 - MT (Mobile Terminated),
 - CB (Cell Broadcast).
- SMS parallel zu Sprache bzw. Daten
- USS (Unstructured Supplementary Services)
- normal MS (Mobile Station) Anforderungen
- Eingangsempfindlichkeit -106dBm (-108dBm typisch)

5 HW-Interface

5.1 Schnittstelle für externen 3V SIM-Kartenleser

Hinweis: Es dürfen nur SIM-Kartenleser verwendet werden bei denen der Kontakt des Auswurfknopfes vor dem Lösen der anderen Kontakte getätigt wird.

Hinweis: Die Länge der Zuleitungen ist Zulassungsrelevant. Siehe Kapitel 13 (Standardkonfiguration)

CCIN_	Inp.	- low: $-0,3V < U_{pin} < +0,8V$ (CC gesteckt) - open: (CC entfernt)	Erkennungssignal für Chipkarte gesteckt (int. Pull-Up 3,3 kΩ nach Vcc = 2,8V)
CC2V8	Outp.	$+2,7V < U_{pin} < +2,9V$	Versorgung der CC, (int. Kondensator 100uF); 2x100nF Kondensator müssen unbedingt nahe an den CC-Pins (Kontakte) auf dem CC-Leser liegen und dienen als Blockkondensatoren für die Versorgung der CC.
CCRES_	Outp.	low: $0V < U_{low} < +0,4V$ high: $+2,4V < U_{high} < +2,8V$	Reset für CC
CCIO_	Inp./ Outp.	low out: $0V < U_{low} < +0,4V$ high out: $+2,4V < U_{high} < +2,8V$ low in: $-0,3V < U_{pin} < +0,8V$ high in: $+2,0V < U_{pin} < +3,1V$	Daten für CC mit 5,6 kΩ Pull-Up an CC2V8.
CCCLK_	Outp.	low: $0V < U_{low} < +0,4V$ high: $+2,4V < U_{high} < +2,8V$	Takt für CC

Tabelle 5-1: Schnittstelle für externen 3V SIM-Kartenleser

Hinweis: Die Verwendung von reinen 5V SIM-Karten ist nicht vorgesehen und führt zu einem Fehlerbild, welches von einer defekten SIM-Karte nicht unterschieden werden kann (-> Fehlermeldung wie bei defekter SIM-Karte).

5.2 digitale Audioschnittstelle

- 13 bit linear PCM (bei 8 kHz Frame Rate -> 104 kHz Serial Clock)
- defaultmäßig inaktiv. Analoge Audioschnittstelle aktiviert. (Umschalten mittels AT^SNFR)

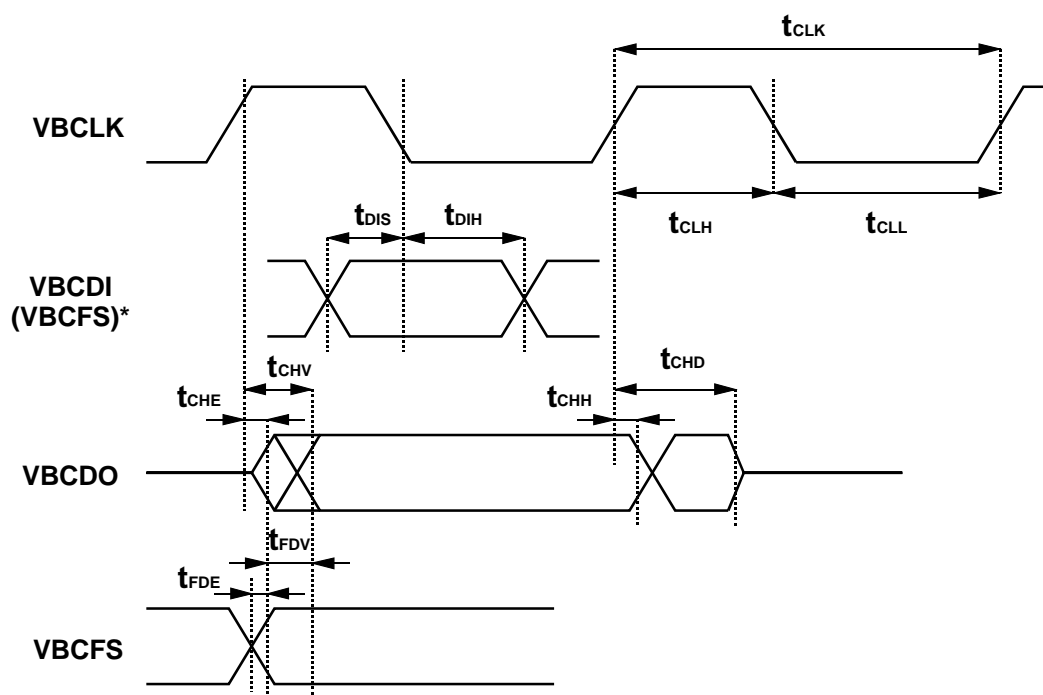
VBCFS	Inp.	low: $-0,3V < U_{pin} < +0,8V$ high: $+2,0V < U_{pin} < +3,1V$	frame synchronisation
VBCLK	Inp.	low: $-0,3V < U_{pin} < +0,8V$ high: $+2,0V < U_{pin} < +3,1V$	serial voice clock (104 kBit/s)
VBCDI	Inp.	low: $-0,3V < U_{pin} < +0,8V$ high: $+2,0V < U_{pin} < +3,1V$	serial voice data in
VBCDO	Outp.	low: $0V < U_{low} < +0,4V$ high: $+2,4V < U_{high} < +2,8V$	serial voice data out

Tabelle 5-2: digitale Audioschnittstelle (frame synch. und voice clock werden von extern vorgegeben)

5.2.1 Timing der digitalen Audioschnittstelle:

Parameter		Min	Typ	Max	Einheit
t_{CLK}	Clockperiod	76,9			ns
t_{CLH}	Clock high	25			ns
t_{CLL}	Clock low	25			ns
t_{DIS}	Data in setup time	5			ns
t_{DIH}	Data in hold time	10			ns
t_{CHE}	Clock high to data enable	0			ns
t_{CHV}	Clock high to data valid			20	ns
t_{CHH}	Clock high data hold	0			ns
t_{CHD}	Clock high data disable			20	ns
t_{FDE}	Frame to data enable	0			ns
t_{FDV}	Frame to data valid			20	ns

Tabelle 5-3: Timing der digitalen Audioschnittstelle



* short frame

Abbildung 5-1: Timing der digitalen Audioschnittstelle

5.3 analoge Audioschnittstelle

defaultmäßig aktiv. (Umschalten auf digitale Audioschnittstelle mittels AT^SNFR)

Hinweis: Auch wenn die analoge Audioschnittstelle aktiv ist, liegen Signale an der digitalen Audioschnittstelle an.

ANAOUTP	Outp.	$U_{max} = 3,1V_{SS}$ symmetrisch mit Pin ANAOUTN. Ausgangsimpedanz: 10 Ω	NF-Ausgang, Last mind. 32 Ω , bei unsym. Betrieb mind. 320 Ω (nicht
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		(typ.) Toleranzen: tbd.	unsym. Betrieb mind. 320Ω (nicht benutzter Pin unbeschaltet).
ANAOUTN	Outp.	$U_{max} = 3,1V_{ss}$ symmetrisch mit Pin ANAOUTP. Ausgangsimpedanz: 10 Ω (typ.) Toleranzen: tbd.	NF-Ausgang, Last mind. 32Ω, bei unsym. Betrieb mind. 320Ω.
MICP	Inp.	$U_{max} = 1,55V_{ss}$ sym. mit Pin MICN, Impedanz: mind. 200kΩ Toleranzen: tbd.	NF-Eingang, bei unsym. Betrieb nicht benutzter Pin auf Masse
MICN	Inp.	$U_{max} = 1,55V_{ss}$ sym. mit Pin MICP, Impedanz: mind. 200kΩ Toleranzen: tbd.	NF-Eingang

Tabelle 5-4: analoge Audioschnittstelle

5.4 I/O Ports

SW_AKTIV	Outp.	nicht aktiv: $0V < U_{out} < 0,4V$ aktiv: $2,4V < U_{out} < 2,8V$ Anstiegszeit: max 200 ns Abfallzeit: max 200 ns Last 100pF: typ. 80 ns	Signalisiert, daß das A20 eingeschaltet und zur Kommunikation über die serielle Schnittstelle für AT-Befehle bereit ist (int. Pull-Down 100KΩ). Kann auch als Erkennungssignal zur Ansteuerung einer Automatikantenne dienen. Für genauere Informationen siehe Kapitel 5.6
BSTMODIN	Outp.	nicht aktiv: $0V < U_{out} < 0,4V$ aktiv: $2,4V < U_{out} < 2,8V$ Anstiegszeit: $< 1 \mu s$ Abfallzeit: $< 1 \mu s$ Last 100pF: typ. 300 ns	Burstmodeindikation, wird ca. 28us μs vor dem Burst gesetzt und 40 μs nach dem Burst rückgesetzt (int Pull-Down 100KΩ).
RM	Outp.	nicht aktiv: $0V < U_{out} < 0,4V$ aktiv: $2,4V < U_{out} < 2,8V$ Anstiegszeit: $< 1 \mu s$ Abfallzeit: $< 1 \mu s$ Last 100pF: typ. 300 ns	Erkennungssignal zur Stummschaltung des Radios (int. Pull-Down 100KΩ). Port aktiv, wenn Radio stummgeschaltet werden soll. RM geht auf „high“, beim MTC, wenn das Kommando „call-indication“ empfangen wird (also knapp vorm ersten Läuten) und beim MOC, wenn das Läuten beim gerufenen Teilnehmer (Kommando „ringing-indication“) gemeldet wird. RM geht auf „low“, wenn das Gespräch beendet wurde (Kommando „disconnected“).
DATADIR	Outp.	nicht aktiv: $0V < U_{out} < 0,4V$ aktiv: $2,4V < U_{out} < 2,8V$ Anstiegszeit: $< 1 \mu s$ Abfallzeit: $< 1 \mu s$	Signal zur Anzeige der Datenrichtung von/zur SIM (int. Pull-Down 100KΩ). Nur für internen Gebrauch. Bleibt unbeschaltet.

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		Last 100pF: typ. 300 ns	
IGNITION	Inp.	nicht aktiv: $U_{pin} < 0,4V$ aktiv: $2,6V < U_{pin} < 5,5V$ Anstiegszeit: $< 500\mu s$ Abfallzeit: $< 5 ms$ Hinweis: Die Ignitionleitung ist nicht für den direkten Anschluß an die Autobatterie ausgelegt und darf nicht über 6V angesteuert werden	Schaltsignal des Siemens A20. (int. Pull-Down 100k Ω) <u>Einschalten:</u> Durch Setzen der IGNITION-Leitung auf „aktiv“ wird das A20 eingeschalten. <u>Ausschalten:</u> Wird die IGNITION-Leitung auf „nicht aktiv“ gesetzt, bucht das A20 aus und schaltet ab. Siehe Kapitel 5.6.1 „Ignition“

Tabelle 5-5: I/O-Ports

5.5 serielle Schnittstelle

RX/TX 57,6 kbit/s im GSM-Betrieb. Kann mit oder ohne HW-Handshake genutzt werden. Ca. 100 kbit/s bei SW-Reload.

Die 2. Serielle Schnittstelle (RX1/TX1) ist nur für Entwicklung/Fertigung verfügbar

RX	Inp.	low: $-0,3V < U_{pin} < +0,8V$ high: $+2,0V < U_{pin} < +3,1V$ Anstiegszeit: $< 200 ns$ Abfallzeit: $< 200 ns$	Serielle Schnittstelle zur Datenübertragung und Steuerung des Siemens A20 (int. Pull-Up 100k Ω nach $V_{cc} = 2,8V$)
TX	Outp.	low: $0V < U_{low} < +0,4V$ high: $+2,4V < U_{high} < +2,8V$ Anstiegszeit: max 200 ns Abfallzeit: max 200 ns Last 100pF: typ. 80 ns	Serielle Schnittstelle zur Datenübertragung und Steuerung des Siemens A20 (int. Pull-Up 100k Ω nach $V_{cc} = 2,8V$)
CTS	Inp.	low: $-0,3V < U_{pin} < +0,8V$ high: $+2,0V < U_{pin} < +3,1V$ (default) Anstiegszeit: $< 200 ns$ Abfallzeit: $< 200 ns$	Clear to send. Kann unbeschaltet bleiben (int. Pull-Up 100k Ω nach $V_{cc} = 2,8V$)
RTS	Outp.	low: $0V < U_{low} < +0,4V$ high: $+2,4V < U_{high} < +2,8V$ Anstiegszeit: max 200 ns Abfallzeit: max 200 ns Last 100pF: typ. 80 ns	Ready to send (int. Pull-Up 100k Ω nach $V_{cc} = 2,8V$)
RX1	Inp.	low: $-0,3V < U_{pin} < +0,8V$ high: $+2,0V < U_{pin} < +3,1V$ Anstiegszeit: $< 200 ns$ Abfallzeit: $< 200 ns$	Serielle Schnittstelle für interne Service-Funktionen
TX1	Outp.	low: $0V < U_{low} < +0,4V$ high: $+2,4V < U_{high} < +2,8V$ Anstiegszeit: max 200 ns Abfallzeit: max 200 ns	Serielle Schnittstelle für interne Service-Funktionen

BOOTCODE	Inp.	Last 100pF: typ. 80 ns	Notwendig zum Starten der Prozessorinternen Laderoutine. Port muß bereits bei Power-Up auf High-Pegel befinden und während des SW-Downloads auf High-Pegel gehalten werden. Siehe Abbildung 5-2. (int. Pull-Down 100kΩ)
		low: $-0,3V < U_{pin} < +0,8V$ high: $+2,0V < U_{pin} < +3,1V$	
		Anstiegszeit: unkritisch Abfallzeit: unkritisch	

Tabelle 5-6: serielle Schnittstelle

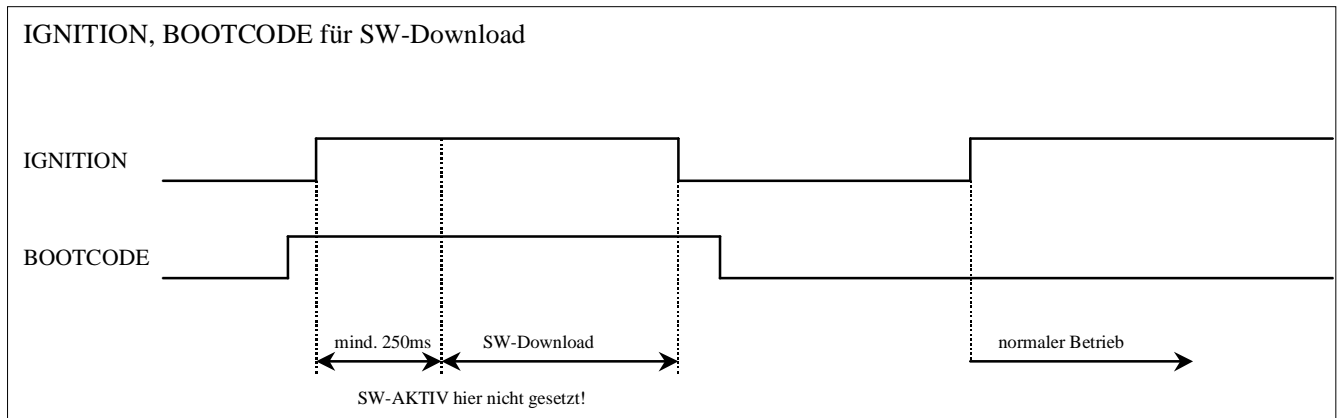


Abbildung 5-2: Timingdiagramm – SW-Download mit BOOTCODE

5.6 Ein-/Ausschaltverhalten

Folgende Ursachen bedingen ein Ein- bzw. Ausschalten des A20

5.6.1 Ignition

Einschalten: Durch Setzen der IGNITION-Leitung auf „high“ wird das A20 eingeschalten.

Ablauf: Zuerst erfolgt ein Reset, anschließend wird die SW hochgefahren und initialisiert. Wenn die SW an der seriellen Schnittstelle (RX/TX) für AT-Befehle bereit ist, signalisiert das A20 mittels „high“-Pegel am I/O-Port SW_AKTIV die Betriebsbereitschaft. Siehe Abbildung 5-3.

Ausschalten: Wird die IGNITION-Leitung auf „low“ gesetzt, bucht das A20 aus und schaltet ab. I/O-Port SW_AKTIV geht mit dem Abschalten auf „low“. Siehe Abbildung 5-3.

Hinweis: Bei jedem Übergang der Ignitionleitung von „low“ auf „high“ wird ein Reset ausgeführt (flankengesteuert). **Dies bedingt eine Neueingabe der PIN.**

Hinweis: Wird die Ignitionleitung während des Ausbuchens wieder auf „high“ gesetzt, wird der Ausbuchprozeß abgebrochen (wegen Reset) und die SW A20 läuft wieder hoch (siehe Einschalten).

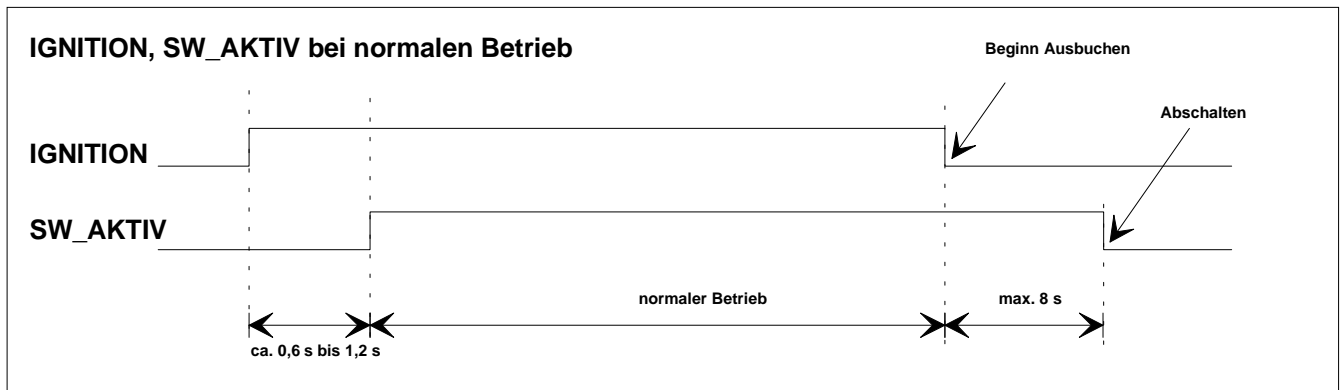


Abbildung 5-3: Timingdiagramm Ein- / Ausschalten mit Ignition

5.6.2 SW-Befehl AT^SMSO

Ausschalten: Wird das A20 mittels AT-Befehl (AT^SMSO siehe Kapitel 16) abgeschaltet, so bucht das Gerät aus, schaltet nichtbenötigte Einheiten ab und antwortet mit OK. Die SW läuft jedoch weiter. Es werden alle, nicht netzbezogenen, AT-Befehle bearbeitet und alle Meldungen, entsprechend der Konfiguration des A20, ausgegeben.

Hinweis: SW_AKTIV bleibt auf „high“ Pegel.

Einschalten: Mittels AT-Befehl (AT^SMSO siehe Kapitel 16) kann das A20 wieder eingeschalten werden (nur wenn Ignition „high“) und signalisiert mittels OK die Betriebsbereitschaft.

- **Hinweis: PIN bleibt erhalten.**

Weitere Hinweise:

- Wenn versucht wird das Gerät nach erfolgter SW-mäßiger Abschaltung wieder einzuschalten und Zustände eingetreten sind wie Unterspannung oder Übertemperatur, dann wird dies mit einem CME-ERROR (operation not allowed) signalisiert.
- Wird versucht zweimal hintereinander aus- bzw. einzuschalten, so wird dies durch ERROR signalisiert (Überprüfung des aktuellen Zustandes mit AT^SMSO).
- Benötigte Ausschaltzeit: max. 8 Sekunden
- Benötigte Einschaltzeit (bis Modul eingebucht ist): 20 Sekunden

Ausnahme: Liegen zwischen der Aus- und Einschaltaktion weniger als 30 Sekunden, so kann sich die Einschaltzeit (bis Modul eingebucht ist) auf 50 Sekunden erhöhen.

Voraussetzung: Normale Netzumgebung (Auslastung, Feldstärke)

Bemerkung: Bei den Einschaltzeiten können sich noch Änderungen ergeben.

5.6.3 Unterspannung an 12 V Versorgung

Ausschalten: Bei Spannungen unter 8,5 V (Erkennungszeit 0 bis 2 Sekunden) meldet das A20 mittels AT-Befehl (AT^SCVM siehe Kapitel 16) Unterspannung und schaltet die 12V Versorgung ab. Die Empfängerschaltung bleibt aktiv und bei kurzzeitigen Spannungsunterschreitungen bleiben Verbindungen erhalten.

- **Hinweis:** SW_AKTIV bleibt auf „high“ Pegel.

Einschalten: Bei Spannungen über 9 V (Erkennungszeit 0 bis 2 Sekunden) meldet das A20 mittels AT-Befehl (AT^SCVM siehe Kapitel 16) das Ende der Unterspannung und schaltet die 12V Versorgung wieder ein und versucht gegebenenfalls einzubuchen.

5.6.4 Unterspannung an 6 V Versorgung

Ausschalten: Bei Spannungen unter 5,4 V (für mehr als 2 bis 4 Sekunden) meldet das A20 mittels AT-Befehl (AT^SCVM siehe Kapitel 16) Unterspannung. Verhalten wie bei Unterspannung an der 12V Versorgung.

- **Hinweis:** Unterschreitet die Versorgungsspannung die 4V Grenze (Erkennungszeit 0 bis 2 Sekunden), dann wird ein Reset ausgelöst und die PIN muß neu eingegeben werden.
- **Hinweis:** SW_AKTIV bleibt auf high Pegel.

Einschalten: Bei Spannungen über 5,5 V (Erkennungszeit 0 bis 2 Sekunden) meldet das A20 mittels AT-Befehl (AT^SCVM siehe Kapitel 16) das Ende der Unterspannung, schaltet die 12V Versorgung wieder ein und versucht gegebenenfalls einzubuchen.

5.6.5 Übertemperatur

Temperaturwarnung: Bei > 80°C Geräteinnentemperatur meldet das A20 mittels AT-Befehl (AT^SCTM siehe Kapitel 16) Übertemperatur.

Temperaturentwarnung: Bei < 80°C Geräteinnentemperatur meldet das A20 mittels AT-Befehl (AT^SCTM siehe Kapitel 16) Übertemperaturentwarnung.

Rückregeln der Leistung: Bei > 82°C Geräteinnentemperatur regelt das A20 die Sendeleistung um 5 dBm/°C zurück.

Ausschalten: Bei > 85°C Geräteinnentemperatur meldet das A20 mittels AT-Befehl (AT^SCTM siehe Kapitel 16) das nachfolgende Abschalten bucht aus und schaltet die 12V Versorgung, wie auch nicht benötigte Einheiten ab. Die SW bleibt aktiv.

- **Hinweis:** SW_AKTIV bleibt auf high Pegel.
- **Wichtig:** bei überschreiten von 85°C Umgebungstemperatur kann das A20 zerstört bzw. die Lebensdauer verringert werden. Daher muß das A20 mittels Ignition abgeschaltet werden.

Einschalten: Bei < 80°C Geräteinnentemperatur meldet das A20 mittels AT-Befehl (AT^SCTM siehe Kapitel 16) das Ende der Abschaltung durch Übertemperatur, schaltet die 12V Versorgung wieder ein und beginnt mit dem Einbuchen.

5.7 Stecker

Hinweis: Das A20 ist nicht für Board-to-Board-Steckverbindungen vorgesehen!

Antenne:	Leiterplattenbuchse der Fa. IMS (Bestellnummer 1733.13.2510.000)	Identisch mit Antennenbuche vom Siemens A1. Es wird ein Antennenkabel mit guter Schirmdämpfung (20 dB) empfohlen.
	Steckzyklen:	< 50
Interface:	30-polige MINI-FIX SMT-Steckleiste bzw. Stiffeldverbinder der Fa. ODU	für Flachbandkabel mit 0,635 mm Litzenabstand. Gegenstück: Stiffeldverbinder der Fa. ODU; Art.Nr.: 525.060.035.030.000 Verriegelungsbügel der Fa. ODU; Art.Nr.: 515.568.730.700.000
	Steckzyklen:	< 50
Power Supply:	PICOFLEX HEADER / 10-polig / SMT 90814-0010 der Fa. Molex	
	Steckzyklen:	< 30

Tabelle 5-7: im A20 eingesetzte Stecker

5.7.1 Detaillierte Beschreibung der Steckerbelegungen

5.7.1.1 Interfacestecker

Hinweis: Alle Leitungen des Interfacesteckers sind nicht gegen Überspannungen geschützt und dürfen nicht über 6 V Belastet werden.

PIN	Signal	IN/OUT	Pegel	Funktion
Masse digital + On/Off-Schalter				
1, 13, 18, 25, 30	SHEELD			Schirmung (empfohlen). Können allerdings auch als Masseleitungen ausgeführt werden.
23	IGNITION	Inp.	low: $U_{Pin} < 0,4V$ high: $3,0V < U_{Pin} < 5,5V$ Hinweis: Die Ignitionleitung ist nicht für den direkten Anschluß an die Autobatterie ausgelegt und darf nicht über 6V angesteuert werden	Schaltsignal des Siemens A20. (int. Pull-Down 100kΩ) Siehe Tabelle 5-5.
serielle Schnittstellen + Bootcodeenable. Siehe Tabelle 5-6				
9	RX	Inp.	low: $-0,3V < U_{pin} < +0,8V$ high: $+2,0V < U_{pin} < +3,1V$	Empfangsleitung der seriellen Schnittstelle (int. Pull-Up 100kΩ nach $V_{cc} = 2,8V$)
10	TX	Outp.	low: $0V < U_{low} < +0,4V$ high: $+2,4V < U_{high} < +2,8V$	Sendeleitung der seriellen Schnittstelle (int. Pull-Up 100kΩ nach $V_{cc} = 2,8V$)
12	CTS	Inp.	low: $-0,3V < U_{pin} < +0,8V$ high: $+2,0V < U_{pin} < +3,1V$	Clear to send. Kann unbeschaltet bleiben (int. Pull-Up 100kΩ nach $V_{cc} = 2,8V$)
11	RTS	Outp.	low: $0V < U_{low} < +0,4V$ high: $+2,4V < U_{high} < +2,8V$	Ready to send (int. Pull-Up 100kΩ nach $V_{cc} = 2,8V$)
8	TX1	Outp.	low: $0V < U_{low} < +0,4V$ high: $+2,4V < U_{high} < +2,8V$	Serielle Schnittstelle für interne Service-Funktionen
7	RX1	Inp.	low: $-0,3V < U_{pin} < +0,8V$ high: $+2,0V < U_{pin} < +3,1V$	Serielle Schnittstelle für interne Service-Funktionen
24	BOOTCODE	Inp.	low: $-0,3V < U_{pin} < +0,8V$ high: $+2,0V < U_{pin} < +3,1V$	Port zum Signalisierung für SW-Download. (int. Pull-Down 100kΩ)
Indikationspins. Siehe Tabelle 5-5				
22	SW_AKTIV	Outp.	nicht aktiv: $0V < U_{out} < 0,4V$ aktiv: $2,4V < U_{out} < 2,8V$	Signalisiert, daß das A20 eingeschaltet und zur Kommunikation über die ser. Schnittstelle bereit ist (int. Pull-Down 100kΩ)
21	BSTMODIN	Outp.	nicht aktiv: $0V < U_{out} < 0,4V$ aktiv: $2,4V < U_{out} < 2,8V$	Burstmodeindikation (int Pull-Down 100kΩ).
20	RM	Outp.	nicht aktiv: $0V < U_{out} < 0,4V$ aktiv: $2,4V < U_{out} < 2,8V$	Erkennungssignal zur Stummschaltung des Radios (int. Pull-Down 100kΩ)
19	DATADIR	Outp.	nicht aktiv: $0V < U_{out} < 0,4V$ aktiv: $2,4V < U_{out} < 2,8V$	Signal zur Anzeige der Datenrichtung von/zur SIM (int. Pull-Down 100kΩ).

PIN	Signal	IN/OUT	Pegel	Funktion
analoge Audioschnittstelle. Siehe Tabelle 5-4				
29	ANAOUTP	Outp.	$U_{\max} = 3,1V_{SS}$ symmetrisch mit Pin ANAOUTN. Ausgangsimpedanz: $10\ \Omega$ (typ.)	NF-Ausgang, Last mind. $32\ \Omega$, bei unsym. Betrieb mind. $320\ \Omega$. Siehe auch Abbildung 5-4
28	ANAOUTN	Outp.	$U_{\max} = 3,1V_{SS}$ symmetrisch mit Pin ANAOUTP. Ausgangsimpedanz: $10\ \Omega$ (typ.)	NF-Ausgang, Last mind. $32\ \Omega$, bei unsym. Betrieb mind. $320\ \Omega$. Siehe auch Abbildung 5-4
27	MICP	Inp.	$U_{\max} = 1,55V_{SS}$ sym. mit Pin MICN, Impedanz: mind. $200k\ \Omega$	NF-Eingang Siehe auch Abbildung 5-4
26	MICN	Inp.	$U_{\max} = 1,55V_{SS}$ sym. mit Pin MICP, Impedanz: mind. $200k\ \Omega$	NF-Eingang Siehe auch Abbildung 5-4
digitale Audioschnittstelle. Siehe Tabelle 5-2				
17	VBCFS	Inp.	low: $-0,3V < U_{pin} < +0,8V$ high: $+2,0V < U_{pin} < +3,1V$	Rahmensynchronisation
14	VBCLK	Inp.	low: $-0,3V < U_{pin} < +0,8V$ high: $+2,0V < U_{pin} < +3,1V$	serielle Voice Clock
15	VBCDI	Inp.	low: $-0,3V < U_{pin} < +0,8V$ high: $+2,0V < U_{pin} < +3,1V$	serielle Voice Daten in
16	VBCDO	Outp.	low: $0V < U_{low} < +0,4V$ high: $+2,4V < U_{high} < +2,8V$	serielle Voice Daten out
SIM-Schnittstelle. Siehe Tabelle 5-1				
6	CCIN_	Inp.	- low: $-0,3V < U_{pin} < +0,8V$ (CC gesteckt) - open: (CC entfernt)	Erkennungssignal für Chipkarte gesteckt (int. Pull-Up $3,3\ k\ \Omega$ nach $V_{CC} = 2,8V$)
5	CC2V8	Outp.	$2,7V < U_{pin} < 2,9V$	Versorgung der CC, (int. Kondensator $100\ \mu F$); $2 \times 100nF$ Kondensator müssen unbedingt nahe an den CC-Pins (Kontakte) auf dem CC-Leser liegen und dienen als Blockkondensatoren für die Versorgung der CC.
4	CCRES_	Outp.	low: $0V < U_{low} < +0,4V$ high: $+2,4V < U_{high} < +2,8V$	Reset für CC
2	CCIO_	Inp./ Outp.	low out: $0V < U_{low} < +0,4V$ high out: $+2,4V < U_{high} < +2,8V$ low in: $-0,3V < U_{pin} < +0,8V$ high in: $+2,0V < U_{pin} < +3,1V$	Daten für CC mit $5,6\ k\ \Omega$ Pull-Up an CC2V8.
3	CCCLK_	Outp.	low: $0V < U_{low} < +0,4V$ high: $+2,4V < U_{high} < +2,8V$	Takt für CC

Tabelle 5-8: Steckerbelegung IF-Stecker. Pinnummerierung siehe Abbildung 5-6.

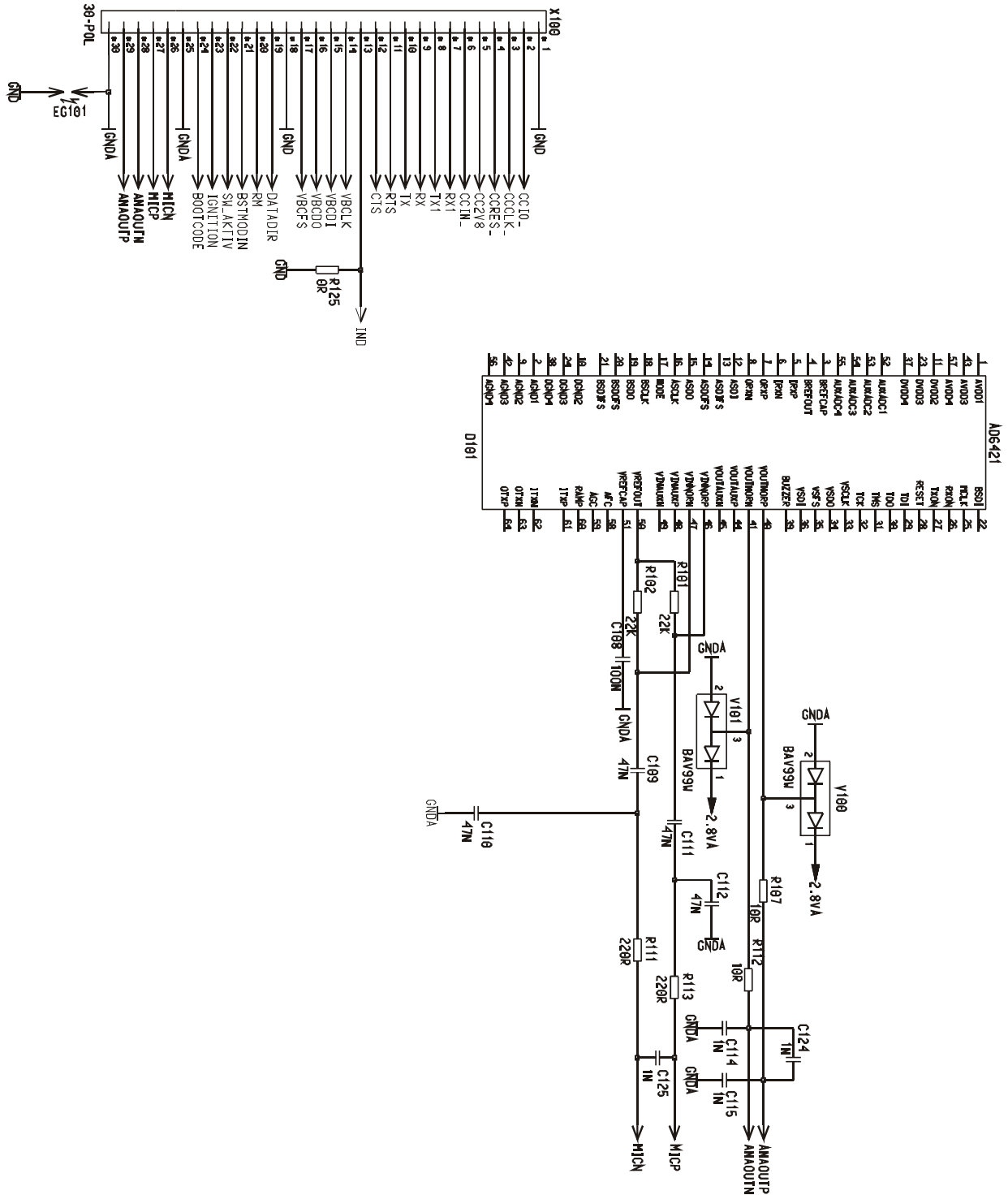


Abbildung 5-4: A20-interne Beschaltung der Audioleitungen.

5.7.1.2 Versorgungsstecker

PIN	Signal	IN/OUT	Pegel	Funktion
3,4,7,9	GND			Gerätemasse
1,2	IN_6V	Inp.	$U_{\text{nominal}}: 6V$ Siehe Kapitel 8.2 „6 V Versorgung“	Versorgung von Logik, HF-Elektronik und der SIM
5,6,8,10	IN_12V	Inp.	(Batteriespannung) $U_{\text{nominal}}: 13,2V$ Siehe Kapitel 8.1 „12 V Versorgung“	Versorgung der Leistungs- endstufe Siehe auch Abbildung 5-5

Tabelle 5-9: Steckerbelegung Stromversorgungsstecker. Pinnummerierung siehe Abbildung 5-6.

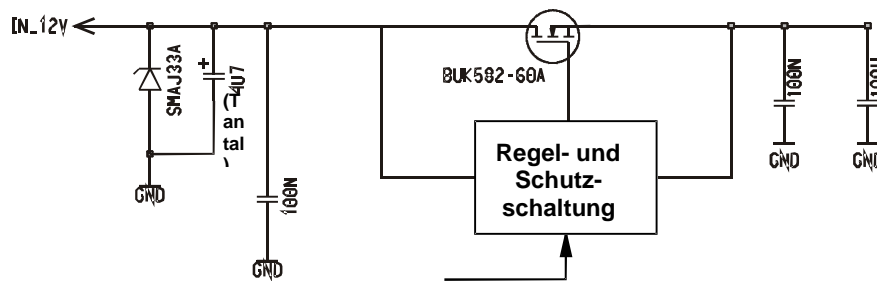


Abbildung 5-5: A20-interne Beschaltung der 12V Versorgungsspannung

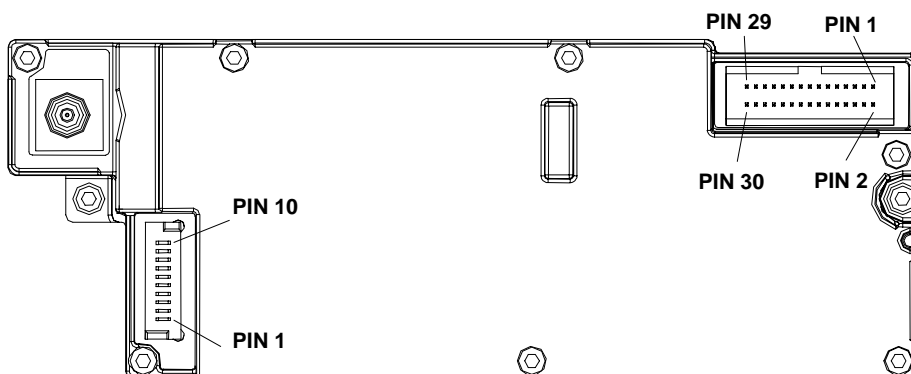


Abbildung 5-6: Pinnummerierung Stromversorgungsstecker und IF-Stecker

6 SW-Interface

6.1 Allgemeines

- Error Correction Protocol -> RLP (non-transparent mode)
- Datenkompression V42.bis
- Service-Ton für Incoming SMS
- Missed Calls und Call-Back Telefonbücher
 - Speicher für je 5 Nummern mit 32 Digits (im EEPROM)
- Fehlersuche-, Diagnoseschnittstelle
 - Indikationspin für SW aktiv (Outp.-Port: SW_AKTIV)
 - Feldstärkeindikation (AT+CSQ)
 - Auslösegrund des letzten Gespräches abfragen (AT+CEER)
 - Erweiterte Fehlermeldung nach GSM 07.07
- 3 Audiokonfigurationen
 - 1 für Standardhörer
 - 1 für Kundenspezifischen Hörer
 - 1 für Freisprechen

6.2 SMS

- MO, MT, CB
- PDU-Mode
- Text-Mode
- verkettete SMS (3 Stück)

6.3 Freisprechen

- kompensierbare max. Echolaufzeit: > 40ms
- echo return loss: bis zu 50dB (konfigurationsabhängig)
- noise reduction: > 10dB
- full duplex
- Noise Reduction parallel zu Echo Cancellation

6.4 AT-Befehle

Die Bedienfunktionen des A20 sind in der Basiseinheit, in dem das A20 eingebaut ist, implementiert. Die entsprechenden Funktionen sind gemäß V.25ter, GSM 07.07 und GSM 07.05 umgesetzt. AT-+C-Befehle nach GSM 07.07 und GSM 07.05 sowie eine Reihe herstellerspezifischer AT-Befehle sind über die serielle Schnittstelle des Siemens A20 zur Implementierung der jeweiligen Funktionen verfügbar. Auf diese Befehle wird im Kapitel „14 ff.“ noch näher eingegangen.

Die Befehlseingabe erfolgt über die Bedienfunktionen der Basiseinheit. Die Basiseinheit setzt die Bedienfunktionen in AT-Befehle um, und das Siemens A20 führt dann die gewünschte Aktion aus.

Beachten Sie folgendes:

Die Modem-Richtlinie V.25ter gilt für die zeitliche Aufeinanderfolge von Schnittstellenbefehlen. Gemäß dieser Richtlinie beginnen Befehle mit der Zeichenkette "**AT**" und enden auf "**<CR>**" (= **0x0D**).

Befehle werden entweder mit "OK" oder mit "ERROR" quittiert. Ein Befehl, der sich gerade in Bearbeitung befindet, wird durch jedes darauffolgend empfangene Zeichen unterbrochen. Folglich muß mit dem nächsten Befehl gewartet werden, bis eine Quittierung erfolgt ist, da es sonst zum Abbruch des aktuell bearbeiteten Befehls kommt.

Hinweis1: Fehlt ein Parameter eines Basis-Befehls, so ist gemäß ITU-T V.25 dafür der Wert "0" anzunehmen.

Hinweis2: Fehlt ein Parameter eines erweiterten Befehls, so ist gemäß ITU-T V.25 dafür der Wert "default" anzunehmen.

Hinweis3: Liegt der Wert eines Parameters eines Befehls außerhalb des zulässigen Wertebereichs, so wird der Befehl nicht ausgeführt, und die entsprechende Quittung lautet "ERROR".

7 Audio

7.1 Konfiguration

Das A20 verfügt über drei eigenständige Audiomodi (1, 2, 3).

7.1.1 AT^SNFS:

Mittels Kommando AT^SNFS wird ein Audiomodus gewählt. Beim Audiomodus 1 wird immer auf die Defaultwerte von Siemens zurückgegriffen. Bei den Audiomodi 2 und 3 werden die vom Kunden abgespeicherten Werte im EEPROM verwendet. Gibt es noch keinen Audiomodus im EEPROM, werden die Defaultwerte von Siemens verwendet. Der gewählte Audiomodus wird nach dem Kommando automatisch in EEPROM abgespeichert und steht somit nach einem Reset weiterhin zur Verfügung.

7.1.2 AT^SNF_x:

Bei den Audiomodi 2 oder 3 können die aktiven Werte mittels der Kommandogruppe AT^SNF_x komplett überladen bzw. abgeändert werden. Diese Kommandos sind: ^SNFA, ^SNFE, ^SNFI, ^SNFO, ^SNFR, +VGR, +VGT. Diese Kommandos können bei der Audiomodus 1 die Audiowerte nicht setzen sondern nur abfragen. Das Kommando ^SNFW kann nur bei den Audiomodi 2 oder 3 verwendet werden.

7.1.3 AT^SNFW:

Die mittels AT^SNF_x geänderten Werte können mittels dem Kommando AT^SNFW im EEPROM abgelegt werden und stehen somit nach einem Reset weiterhin zur Verfügung. Dieses Kommando steht nur bei Audiomodus 2 oder 3 zur Verfügung.

7.1.4 AT^SNFD:

Die veränderten aktiven Werte können bei Bedarf mittels AT^SNFD auf die Defaultwerte von Siemens zurück verändert werden.

Siemens Default Werte für Audiomodus 1, 2 und 3:

- Audiomodus 1 ist für das Siemens-Standard-Handset zu verwenden,
- Audiomodus 2 ist für Freisprecheinrichtung
- Audiomodus 3 ist für Handset vorgesehen.

Demnach ist der Handsfreeprozessor im Audiomodus 1 und 3 immer auf "transparent" geschaltet und im Audiomodus 2 immer auf "aktiv" geschaltet ist.

7.2 Umschaltung analog/digital

7.2.1 AT^SNFR:

Bei Audiomodus 1 ist immer die analoge Audioschnittstelle aktiv.

Bei Audiomodus 2 und 3 kann die Schnittstelle mittels Kommando AT^SNFR von analog auf digital bzw. umgekehrt umgeschaltet werden. Diese Einstellung wird mit den anderen Audio-Konfigurationsdaten im EEPROM je Audiomodus (für Audiomodus 2 und 3) abgelegt. Wenn ein Audiomodus aktiviert wird, wird damit auch automatisch auf die digitale bzw. analoge Schnittstelle geschaltet.

7.3 Diagnose

7.3.1 Eigendiagnose

Für die Audiomode Tabellen in EEPROM werden Checksummen gebildet und mitgespeichert. Wenn während des Lesens, bei Initialisierung oder beim Befehl AT^SNFS die Checksumme nicht stimmt, wird automatisch die Siemens Default Tabelle geladen. Wenn während des Schreibens, beim Befehl AT^SNFW das Schreiben fehlerhaft ist, wird ein ERROR ausgegeben.

8 Power Supply

Hinweis: Es wird empfohlen das Gehäuse der Cellular Engine A20 mit der Masse des Basisgerätes zu verbinden/verschrauben. (siehe auch Kapitel 10)

8.1 12 V Versorgung

Hinweis: Der Stromversorgungsstecker darf nur im spannungslosen Zustand an- und abgesteckt werden!!!

Spannungsversorgung für 8W HF-Endstufe (Autobatteriespannung nicht stabilisiert)	Nominalspannung:	13,2 V
	Toleranz:	Datenhaltig von 10,8V bis 15,6V. Funktionsfähig von 9V bis 16V
	Ripple: (Bei DC 12,5V bis 14,6V)	siehe Abbildung 8-1 und Abbildung 8-2 Hinweis: Die Einhaltung der in Abbildung 8-1 angeführten maximalen Spannungsdifferenz zwischen Mittelwert der Spannung vor dem Burst und tiefster Spannung während des Bursts ist zulassungsrelevant !
	Obere Abschalteschwelle:	> 16V
	Untere Abschalteschwelle:	< 9V
	Einschaltflankensteilheit:	< 100 V/ms
	Stromaufnahme:	$A_{Average} < 462 \text{ mA}$, $A_{peak} < 3,7 \text{ A}$ (GSM-typisch)
Verpolschutz:	- 0,5V	

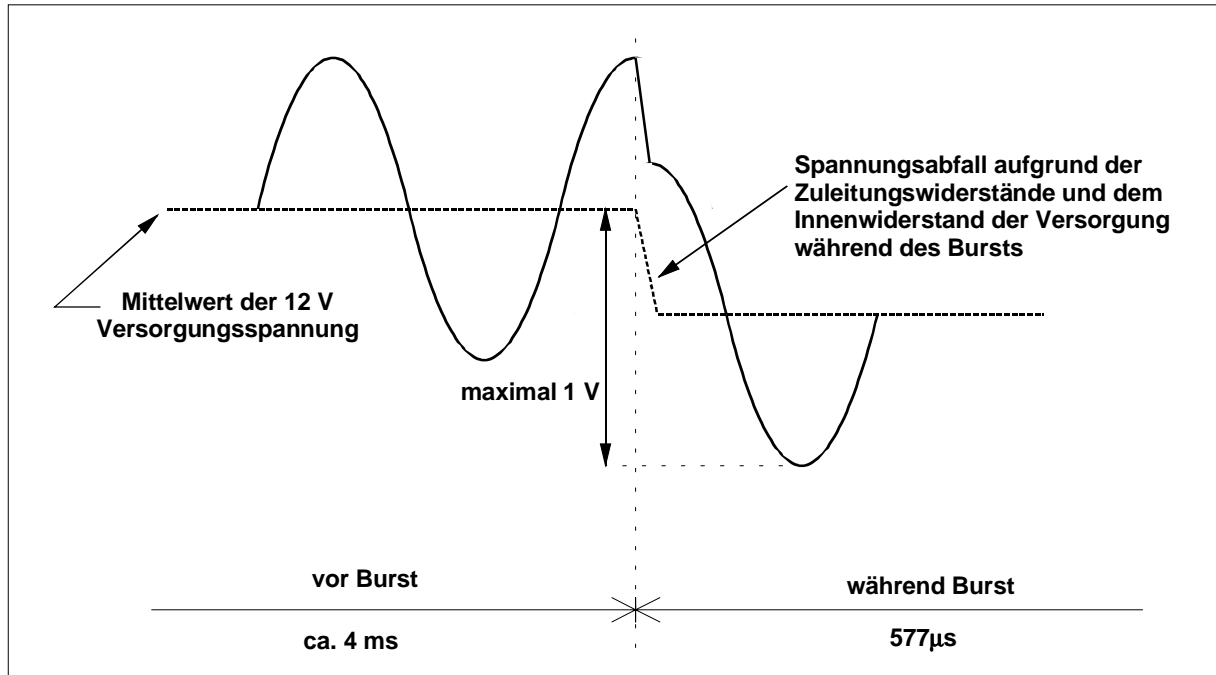


Abbildung 8-1: Maximal zulässige Spannungsdifferenz (direkt am 12 V Eingang des A20) zwischen Mittelwert der Spannungsversorgung vor dem Burst und tiefster Spannung während des Bursts.

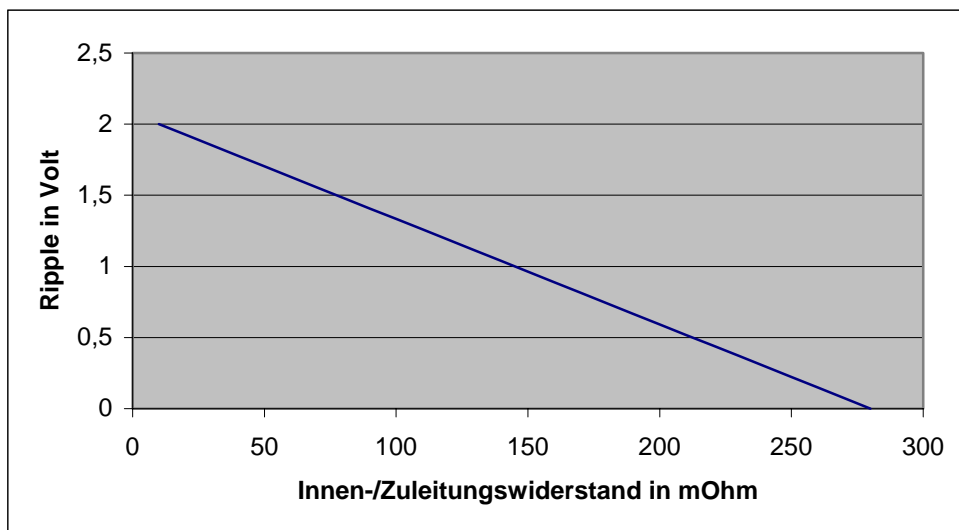


Abbildung 8-2: Maximaler Innen-/Zuleitungswiderstand in Abhängigkeit vom Ripple (an der 12 V Versorgung).

Hinweis: Dieses Diagramm ist nur eine Konsequenz aus Abbildung 8-1 und zwar für den Fall, daß keine Verpolschutzdiode verwendet wird, da ansonsten der Mittelwert der Versorgungsspannung höher liegt.

8.2 6 V Versorgung

Spannungsversorgung Logik und HF ohne 8W Endstufe (stabilisiert)	Nominalspannung:	6,0 V
	U_{max} :	6,2 V
	U_{min} :	5,6 V
	Ripple: (peak-to-peak)	< 200 mV
	Obere Abschalteschwelle:	> 6,2 V
	Untere Abschalteschwelle:	< 5,6 V
	Einschaltflankensteilheit:	< 7 V/ms
	Stromaufnahme:	$A_{average} < 100 \text{ mA}$, $A_{peak} < 250 \text{ mA}$ (GSM-typisch)
Verpolschutz:	Kein Verpolschutz	
Hinweis: SIM-Kartenversorgung aktiv für Spannungen $\geq 4 \text{ V}$ (-> keine PIN-Eingabe notwendig)		

- Stromverbrauch

Gesprächsmodus (dedicated mode)	$A_{peak} < 3,95 \text{ A}$ (Impuls) $A_{Average} < 562 \text{ mA}$ (Durchschnitt)
Idle-Lock (eingebucht, nicht dedicated mode, d.h. keine Netzsuche oder Gespräch)	$A_{Average} < 50 \text{ mA}$
Ausgeschalteter Zustand (an 6V Versorgung) (mittels Ignition)	< 230 μA 110 μA (typisch)
Ausgeschalteter Zustand (an 12V Versorgung) (mittels Ignition)	< 200 μA 130 μA (typisch)

- Überspannungsschutz (12 V Versorgung)

DC	bis +30 V
AC (gültig im Bereich 17V bis 35V)	Siehe Abbildung 8-3

- Überspannungsschutz (6 V Versorgung)

Hinweis: Die 6 V Versorgung besitzt keinen Überspannungsschutz und wird bei Spannungen > 8 V zerstört !	
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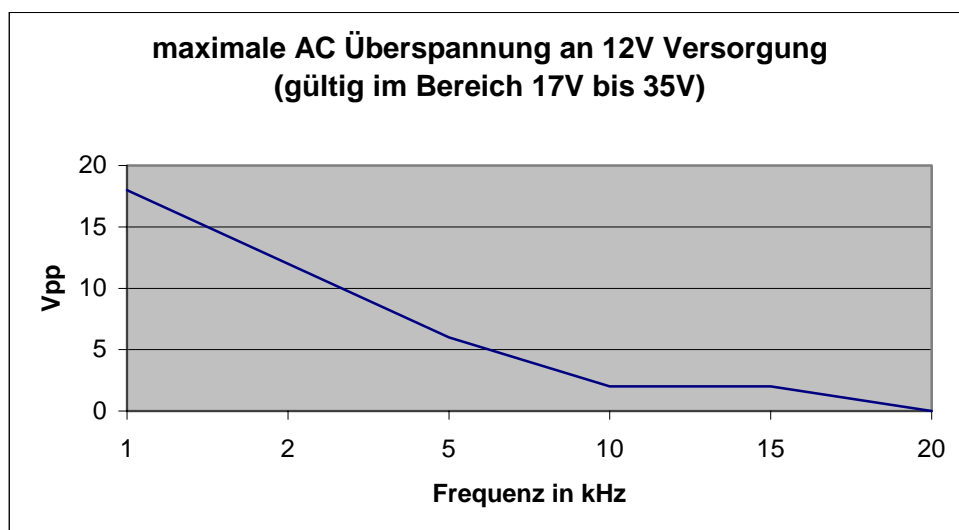


Abbildung 8-3: AC Überspannungsschutz

- ESD: 8kV Kontaktentladung / 12kV Luftentladung im funktionsbereiten Zustand (-> eingebaut), Human Body Model
Hinweis: Handling des Gerätes nur mit ESD-relevanten Maßnahmen (geerdet, ESD-Kette, geschultes Personal)

9 Gehäuse

- Abmessungen (nominal): 128,0 x 48,0 x 15,0 mm
- Schraubanbindung ähnlich dem Siemens A1
- Material: Zinkdruckguß vernickelt

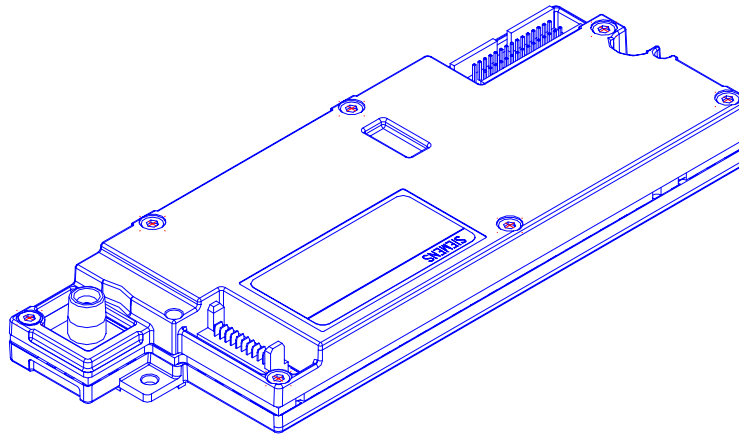
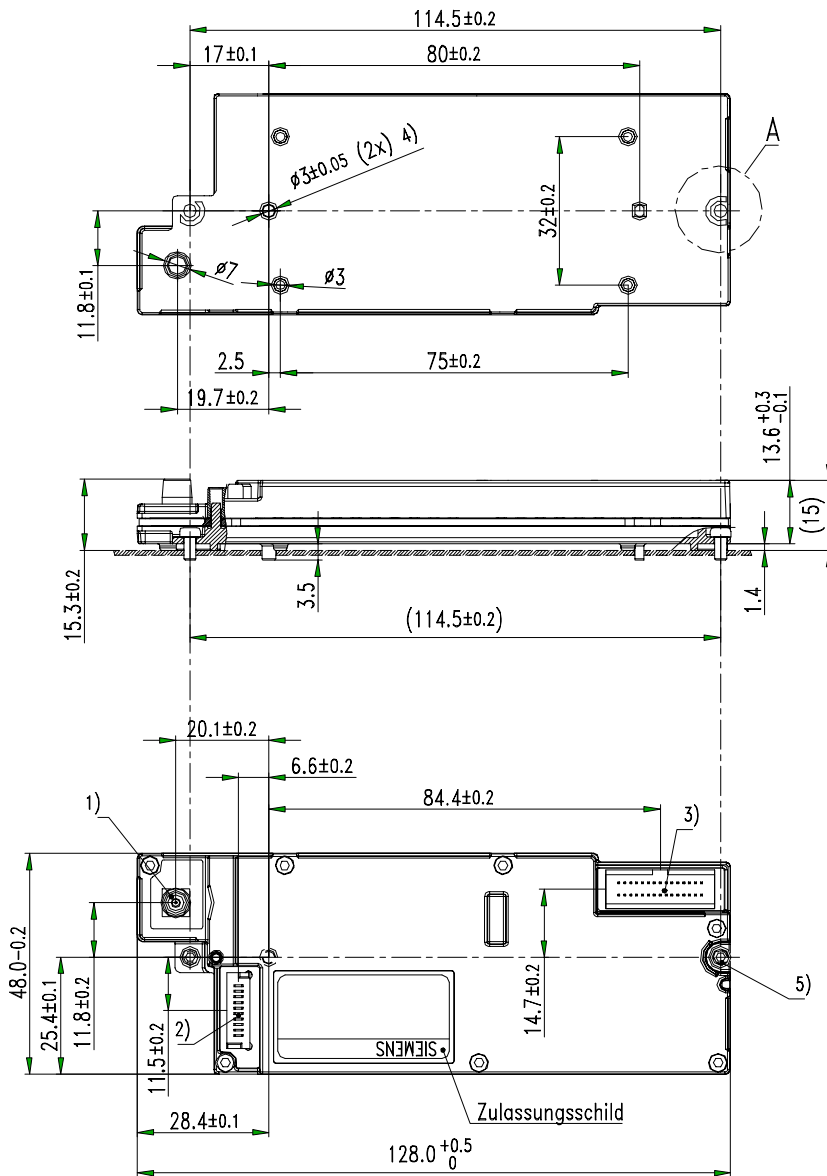
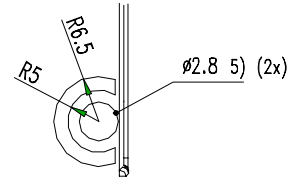


Abbildung 9-1: Cellular Engine Siemens A20 Gehäuse



A (3:1)



- 5) Befestigungsbohrung ($\varnothing 2.8\text{mm}$) für Schraube M2.5
- 4) Zentrierbohrung ($\varnothing 3\pm 0.05\text{mm}$) zum fixieren des Moduls auf dem Basisgerät
- 3) Digitalstecker (30-polig)
- 2) SV-Stecker (10-polig)
- 1) HF-Buchse

Abbildung 9-2: Cellular Engine Siemens A20 Maßzeichnung

A20
Cellular Engine

Version 62
Technische Beschreibung
vorläufig

EZE PNK1
Schell
Siemens confidential © 22.03.99
429.90C

10 Anforderungen bezüglich EMV und ESD

Im Hinblick auf EMV- und ESD-Anforderungen gilt für das A20 die Norm **ETS 300 342-1**.

Zusätzliche Anforderungen bezüglich EMV/ESD:

- Dem A20 muß über die Basiseinheit eine EMV-gefilterte Stromversorgung (6 V) zur Verfügung gestellt werden. Wird das A20 in Fahrzeugen verwendet, so müssen die in der Norm **ETS 300 342-1 (6/97)**, Abschnitt **9.6** definierten Anforderungen hinsichtlich der Stromversorgung erfüllt sein.
- Die Länge der Verbindungskabel zur 30-poligen Schnittstelle muß weniger als **2m** betragen, andernfalls müssen Messungen gemäß der Norm **ETS 300 342-1 (6/97)**, Abschnitt **9.5** erfolgen.
- Das Verbindungskabel zwischen dem Chipkarten-Lesegerät und dem Stecker am Siemens A20 muß laut EMV-Anforderungen abgeschirmt sein.
- Bei Verwendung des Cellular Engine A20 mit individuellen Freisprecheinrichtungen sind eventuelle Probleme bezüglich Störfestigkeit nicht auszuschließen.
- Die Cellular Engine A20 muß mit der Masse des Basisgerätes direkt verbunden/verschraubt werden.

Hinweis: Handling des Gerätes nur mit ESD-relevanten Maßnahmen (geerdet, ESD-Kette, geschultes Personal)

11 Umwelterprobung

Die angewandten Normen bezüglich der Umweltbedingungen für die Cellular Engine A20 entsprechen IEC68.

- Schutzklasse: IP50
- Klimawechselprüfung (Betaungstest) nach IEC68-2-38
- Temperaturbereich

Lagertemperatur:	-30°C bis +85°C	
Betrieb mit Spannungsversorgung	-20°C bis +65°C Klimaschrank: Vötsch VT 4002	Voll funktionsfähig und datenhaltig
Betrieb mit <u>nominaler</u> Spannungsversorgung und <u>2W</u> Sendeleistung	-20°C bis +75°C (typisch) Klimaschrank: Vötsch VT 4002	Voll funktionsfähig und datenhaltig (ausgenommen Sendeleistung)

12 CE-Konformität

Das A20 trägt das CE-Kennzeichen. Dieses Zeichen entspricht einer Erklärung des Herstellers, daß das A20 aufgrund seines Design und seiner Implementierung den aktuell gültigen Versionen der folgenden EU-Richtlinien entspricht.

89/336/EWG	(EMV-Richtlinie)
73/23/EWG	(Niederspannungsrichtlinie)
91/263/EG	(Telekommunikationsgeräterichtlinie)

Normen:

EMV:	ETS 300 342-1
Sicherheit:	EN 60950
GSM-Netz:	TBR 19 TBR 20

13 Standardkonfiguration

Das A20 wurde für folgende Standardkonfiguration zugelassen:

1. Cellular Engine Siemens A20
2. A20 Entwicklungsbox
3. SIM-Kartenleser: Framatome Connectors (FC) für Full-Size- SIM (große SIM-Karte), Kabellänge ca. 20 cm
4. Telefonhörer: Nokia HSU-1
5. MMI, in unserem Fall der PC mit den AT+C-Befehlen

14 Standard AT Hayes commands for controlling the A20

14.1 List of commands

Command	Function
A/	Repeat previous command line
+++AT	Switch from data mode to command mode
ATA	Answer a call
ATD	Mobile originated call to dial a number
ATD<mem><n>	Originate call to phone number <n> in memory <mem>
ATD=<n>;	Originate call to phone number <n> in current memory
ATD<str>	Originate call to phone number in memory with corresponding alphanumeric. Field
ATDL	Redial last telephone number used
ATE	Enable command echo
ATH	Disconnect existing connection
ATI	Display product identification information
ATO	Switch from command mode to data mode
ATQ	Set result code presentation mode
ATV	Set result code format mode
ATX	Set CONNECT result code format and call monitoring
AT&F	Set all current parameters to manufacturer defaults
AT&V	Display current configuration
AT+DR	V.42bis data compression reporting control
AT+DS	V.42bis data compression control
AT+GCAP	Request complete TA capabilities list
AT+GMI	Request manufacturer identification
AT+GMM	Request TA model identification
AT+GMR	Request TA revision identification
AT+ICF	Set TE-TA control character framing
AT+IFC	Set TE-TA local data flow control
AT+ILRR	Set TE-TA local rate reporting mode
AT+IPR	Set fixed local rate

Tabelle 14-1: Standard Hayes AT commands

**) Note:* it is not necessary to subsequently download a stored configuration (see commands AT&Y and AT&W) since the stored configuration is automatically downloaded each time the system is started up.

14.2 Detailed description

A/	Repeat previous command line
Execute command	Response

A/	Repeat previous command line <u>Note:</u> it does not have to end with terminating character. Parameter
Reference V.25ter	Note

+++AT Switch from data mode to command mode	
Execute command +++ <waiting more as 0.5 sec> <CR>	Response If TA receives the characters +++ followed by <CR> after 0.5 s, TA interrupts the data flow on the AT interface, switches to command mode and all characters received during waiting for <CR> are interpreted as commands. Note: the command is only available in data mode. OK Parameter
Reference Hayes	Note

ATA Answer a call	
Execute command ATA	Response TA causes remote station to go off-hook (i.e. answer call). <u>Note1:</u> any additional commands on the same command line are ignored. <u>Note2:</u> this command may be aborted generally by receiving a character during execution. This command cannot be aborted in some connection setup states, such as handshaking. If successfully connected CONNECT<text> <u>Note:</u> <text> only if parameter setting X>0 TA switches to data mode. When TA returns to command mode after call release OK If no connection NO CARRIER Parameter
Reference V.25ter	Note

ATD Mobile originated call to dial a number	
Execute command ATD[<n>][<mgs m][;]	Response TA attempts to set up an outgoing call. <u>Note:</u> this command may be aborted generally by receiving a character during execution. This command cannot be aborted in some connection setup states, such as handshaking.

	<p>If no dialtone and (parameter setting X=2 or X=4) NO DIALTONE</p> <p>If busy and (parameter setting X=3 or X=4) BUSY</p> <p>If a connection cannot be set up NO CARRIER</p> <p>If successfully connected and non-voice call CONNECT<text> <i>Note:</i> <text> only if parameter setting X>0 TA switches to data state. When TA returns to command mode after call release</p> <p>OK</p> <p>If successfully connected and voice call OK</p> <p>Parameter <n>string of dialling digits and optionally V.25ter modifiers (dialling digits): 0-9, * , #, +, A, B, C V.25ter modifiers: these are ignored: ,(comma), T, P, !, W, @ <mgsn>string of GSM modifiers: ICLIR invocation iCLIR suppression G, gCUG info, uses set with command +CCUG Default value of <n>: last dialled number <;>voice call , return to command state</p>
	<p>Parameter <n>string of dialling digits and optionally V.25ter modifiers (dialling digits): 0-9, * , #, +, A, B, C V.25ter modifiers: these are ignored: ,(comma), T, P, !, W, @ <mgsn>string of GSM modifiers: ICLIR invocation iCLIR suppression G, gCUG info, uses set with command +CCUG Default value of <n>: last dialled number <;>voice call , return to command state</p>
<p>Reference V.25ter/ GSM 07.07</p>	<p>Note</p>

ATD<mem><n> Originate call to phone number <n> in memory <mem>	
Execute command	Response
ATD<mem> <n>[<I>][<G>][;]	<p>TA attempts to set up an outgoing call to stored number.</p> <p><u>Note: This command may be aborted generally by receiving a character during execution. The aborting is not possible during some states of connection establishment such as handshaking.</u></p> <p>If error is related to ME functionality +CME ERROR: <err></p> <p>If no dialtone and (parameter setting X=2 or X=4) NO DIALTONE</p> <p>If busy and (parameter setting X=3 or X=4) BUSY</p> <p>If a connection cannot be set up NO CARRIER</p> <p>If successfully connected and non-voice call CONNECT<text> <u>Note: <text> only if parameter setting X>0</u></p> <p>TA switches to data state.</p> <p>When TA returns to command mode after call release OK</p> <p>If successfully connected and voice call OK</p>
	<p>Parameter</p> <p><mem>"SM"phonebook: "FD"SIM fixdialling-phonebook "LD"SIM last-dialling-phonebook "MC"ME missed (unanswered received) calls list "RC"SIM received calls list "OW"SIM (or ME) own numbers (MSISDNs) list</p>
	<p><n>integer type memory location should be in the range of locations available in the memory used</p> <p><I>ICLIR invocation iCLIR suppression</p> <p><G>G, gCUG info, uses set with command +CCUG</p> <p><;>voice call , return to command state</p>
Reference V.25ter/GSM 07.07	<p>Note</p> <p>There is no <mem> for emergency call ("EN").</p>

ATD<n>	Originate call to phone number in current memory
Execute command ATD<n>[<I>] [<G>][;]	Response TA attempts to set up an outgoing call to stored number. The used memory is already selected with command +CPBS. <u>Note: this command may be aborted generally by receiving a character during execution. This command cannot be aborted in some connection setup states, such as handshaking.</u> If error is related to ME functionality +CME ERROR: <err> If no dialtone and (parameter setting X=2 or X=4) NO DIALTONE If busy and (parameter setting X=3 or X=4) BUSY If a connection cannot be set up NO CARRIER If successfully connected and non-voice call CONNECT<text> <u>Note:</u> <text> only if parameter setting X>0 TA switches to data state. When TA returns to command mode after call release OK If successfully connected and voice call OK Parameter <n>integer type memory location should be in the range of locations available in the memory used <I>ICLIR invocation iCLIR suppression <G>G, gCUG info, uses set with command +CCUG <;>voice call , return to command state
	Emergency call: no SIM needed <n> 112 worldwide number
Reference V.25ter/GSM 07.07	Note

ATD<str> Originate call to phone number in memory with corresponding alphanum. field	
Execute command ATD<str>[I] [G][;]	<p>Response</p> <p>TA attempts to set up an outgoing call to stored number. All available memories are searched for the entry <str>. <u>Note: this command may be aborted generally by receiving a character during execution. This command cannot be aborted in some connection setup states, such as handshaking.</u></p> <p>If error is related to ME functionality +CME ERROR: <err></p> <p>If no dialtone and (parameter setting X=2 or X=4) NO DIALTONE</p> <p>If busy and (parameter setting X=3 or X=4) BUSY</p> <p>If a connection cannot be set up NO CARRIER</p> <p>If successfully connected and non-voice call CONNECT<text> <u>Note: <text></u> only if parameter setting X>0 TA switches to data state. When TA returns to command mode after call release OK</p> <p>If successfully connected and voice call OK</p> <p>Parameter <str>string type value ("x"), which should equal an alphanumeric field in at least one phonebook entry in the searched memories <I>ICLIR activation iCLIR suppression <G>G, gCUG info, uses set with command +CCUG <;>voice call, return to command state</p>
Reference V.25ter/GSM 07.07	Note

ATDL Redial last telephone number used	
Execute command ATDL[;]	<p>Response</p> <p>TA attempts to set up an outgoing call to stored number.</p> <p><u>Note:</u> this command may be aborted generally by receiving a character during execution. This command cannot be aborted in some connection setup states, such as handshaking.</p> <p>If there is no last number or number is not valid: +CME ERROR or: If no dialtone and (parameter setting X=2 or X=4) NO DIALTONE If busy and (parameter setting X=3 or X=4) BUSY If a connection cannot be set up NO CARRIER If successfully connected and non-voice call CONNECT<text> <u>Note:</u> <text> only if parameter setting X>0 TA switches to data state. When TA returns to command mode after call release OK If successfully connected and voice call OK Parameter <;>voice call</p>
Reference	Note

ATE Enable command echo	
Set command ATE[<value>]	<p>Response</p> <p>This setting determines whether or not the TA echoes characters received from TE during command state.</p> <p>OK Parameter <value>0Echo mode off 1Echo mode on</p>
Reference V.25ter	Note

ATH Disconnect existing connection	
Execute command ATH[n]	<p>Response</p> <p>Disconnect existing call by local TE from command line and terminate call</p> <p>OK</p> <p><u>Note:</u> OK is issued after circuit 109 (DCD) is turned off (if it was</p>

	<p>previously on).</p> <p>Parameter</p> <p><n>0disconnect from line and terminate call</p>
Reference V.25ter	Note

ATI Display product identification information	
Execute command ATI	Response ME issues product information text SIEMENS A20 Revision: x.yy, DD.MM.YY HH:MM OK Explanation of "Revision" parameter: Version (x) and variant (y) of software release. Date and time of software production DD: day, MM: month, YY: year, HH: hours, MM: minutes Parameter
Reference V.25ter	Note

ATO Switch from command mode to data mode	
Execute command ATO[n]	Response TA resumes the connection and switches back from command mode to data mode. If connection is not successfully resumed NO CARRIER or TA returns to data mode from command mode CONNECT <text> <i>Note:</i> <text> only if parameter setting X>0 Parameter <n>0switch from command mode to data mode
Reference V.25ter	Note

ATQ Set result code presentation mode	
Set command ATQ[<n>]	Response This parameter setting determines whether or not the TA transmits any result code to the TE. Information text transmitted in response is not affected by this setting. If <n>=0: OK If <n>=1: (none) Parameter <n>0DCE transmits result code 1Result codes are suppressed and not transmitted
Reference V.25ter	Note

ATV Set result code format mode	
Set command ATV[<value>]	Response This parameter setting determines the contents of the header and trailer transmitted with result codes and information responses. When <value> =0 0 When <value> =1 OK Parameter <value>0 Information response: <CR><LF> <text><CR><LF> Short result code format: <CR><LF><numeric code><CR> 1 Information response: <CR><LF><text><CR><LF> Long result code format: <CR><LF><verbose code><CR><LF>
Reference V.25ter	Note

ATX Set CONNECT result code format and call monitoring	
Set command ATX[<value>]	Response This parameter setting determines whether or not the TA detected the presence of dial tone and busy signal and whether or not TA transmits particular result codes OK Parameter <value>0 CONNECT result code only returned, dial tone and busy detection are both disabled 1 CONNECT<text> result code only returned, dial tone and busy detection are both disabled 2 CONNECT<text> result code returned, dial tone detection is enabled, busy detection is disabled 3 CONNECT<text> result code returned, dial tone detection is disabled, busy detection is enabled 4 CONNECT<text> result code returned, dial tone and busy detection are both enabled
Reference V.25ter	Note

AT&F Set all current parameters to manufacturer defaults	
Execute command AT&F[<value>]	Response TA sets all current parameters to the manufacturer defined profile. Any existing connections will be terminated. <i>Note:</i> any additional commands on the same command line are ignored. OK Parameter

	<value>0set all TA parameters to manufacturer defaults
Reference V.25ter	Note

AT&V Display current configuration	
Execute command AT&V[<n>]	Response TA returns the current parameter setting. ACTIVE PROFILE: E1 L0 M0 Q0 V1 X4 & C1 & D0 S0:= S2:43 S3:13 S4:10 S5:8 S6:2 S7:60 S8:2 S10:15 S12:10 S13:60 S1:0 +CBST: 7,0,1 +CIWF: 0 +CRLP: 61,61,48,6 +CRC:0 +CR: 0 +FCLASS: 0 +HFC: 2,2 +IMODE: 0 *ICF: 3,3 +DR: 0 +CMGF: 1 +CSDH: 0 +CNMI: 2,1,0,0,0 +IPR: 6 +DS: 3,0,6,2,0 +ILRR: 0 +IPR: 19200 +DS: 3,0,512,6 +CSCA: ”+436640501” +CSMP: 17,11 OK Parameter <n>0profile number
Reference V.25ter	Note

AT+DR V.42bis data compression reporting control	
Test command AT+DR=?	Response +DR: (list of supported <value>s) OK Parameter see set command
Read command AT+DR?	Response +DR: <value> OK Parameter see set command
Set command AT+DR=<value>	Response This parameter setting determines whether or not the intermediate result code of the current data compression is reported by TA to TE after a connection setup. OK Parameter <value>0reporting disabled 1reporting enabled
	Intermediate result code +DR: <type> <u>Note: reported at call setup</u> Parameter <type>NONEdata compression is not in use V42BRec. V42bis is in use in both directions B42B RDRc. V42bis is in use in receive direction only B42B TDRc. V42bis is in use in transmit direction only
Reference V.25ter	Note

AT+DS V.42bis data compression control	
Test command AT+DS=?	Response +DS: (list of supported <p0>s), (list of supported <n>s), (list of supported <p1>s), (list of supported <p2>s) OK Parameter see set command
Read command AT+DS?	Response +DR: <p0>,<n>,<p1>,<p2> OK Parameter see set command
Set command AT+DS=[<p0>, [<n>],[<p1>, [<p2>]]]]	Response This parameter setting determines the possible data compression mode by TA at the compression negotiation with the remote TA after call setup. <u>Note1:</u> only for data call <u>Note2:</u> GSM transmits the data transparent. The remote TA may support this compression. OK Parameter <u>Note:</u> see also ITU V.42bis <p0>0NONE 1transmit only 2receive only 3both directions, but allow negotiation <n>0allow negotiation of p0 down 1do not allow negotiation of p0 disconnect on difference <p1>512-1024dictionary size <u>Note:</u> default determined by manufacturer <p2>6-64maximum string size
Reference V.25ter	Note

AT+GCAP Request complete TA capabilities list	
Test command AT+GCAP=?	Response OK Parameter
Execute command AT+GCAP	Response TA reports a list of additional capabilities. +GCAP: <name> OK Parameter <name>e.g.: +CGSM, +FCLASS, +DS
Reference V.25ter	Note

AT+GMI Request manufacturer identification	
Test command AT+GMI=?	Response OK Parameter
Execute command AT+GMI	Response TA reports one or more lines of information text which permit the user to identify the manufacturer. +GMI: SIEMENS OK Parameter
Reference V.25ter	Note <i>See also "AT+CGMI Request manufacturer identification".</i>

AT+GMM Request TA model identification	
Test command AT+GMM=?	Response OK Parameter
Execute command AT+GMM	Response TA reports one or more lines of information text which permit the user to identify the specific model of device. +GMM: A20 OK Parameter
Reference V.25ter	Note <i>See also "AT+CGMM Request model identification".</i>

AT+GMR Request TA revision identification of software status	
Test command AT+GMR=?	Response OK
Execute command AT+GMR	Response TA reports one or more lines of information text which permit the user to identify the version, revision level or data or other device information. +GMR: Revision x.yy OK Parameter
Reference V.25ter	Note <i>See also "AT+CGMR Request revision identification of software status".</i>

AT+ICF Set TE-TA control character framing	
Test command AT+ICF=?	Response +ICF: (list of supported <format>s), (list of supported <parity>s) OK Parameter see set command
Read command AT+ICF?	Response +ICF: <format>,<parity> OK <u>Note:</u> framing is applied for command state Parameter see set command
Set command AT+ICF= [<format>, [<parity>]]	Response This parameter setting determines the serial interface character framing format and parity received by TA from TE. <u>Note:</u> +IPR=0 forces +ICF=0 OK Parameter <u>Note:</u> the parity field is ignored if the format field specifies no parity. <format>18 data 0 parity 2 stop 28 data 1 parity 1 stop 38 data 0 parity 1 stop 47 data 0 parity 2 stop 57 data 1 parity 1 stop 67 data 0 parity 1 stop <parity>0odd 1even 2mark (1) 3space (0)
Reference V.25ter	Note

AT+IFC Set TE-TA local data flow control	
Test command AT+IFC=?	Response +IFC: (list of supported <dce_by_dte>s), (list of supported <dte_by_dce>s) OK Parameter see set command
Read command AT+IFC?	Response +IFC: <dce_by_dte>,<dte_by_dce> OK <i>Note:</i> This flow control is applied for data mode Parameter see set command
Set command AT+IFC=[<dce_by_dte>[,<dte_by_dce>]]	Response This parameter setting determines the data flow control on the serial interface for data mode. OK Parameter <dce_by_dte> specifies the method which will be used by TE when data is received from TA 0None 1XON/XOFF, don't pass characters on to data stack 2line 133: ready for receiving 3XON/XOFF, pass characters on to data stack <dte_by_dce> specifies the method which will be used by TA when data is received from TE 0None 1XON/XOFF 2line 106: clear to send (CTS)
Reference V.25ter	Note There are no pins for line 133 at AD6426. TTP applies line 105 (RTS) for this method.

AT+ILRR Set TE-TA local rate reporting mode	
Test command AT+ILRR=?	Response +ILRR: (list of supported <value>s) OK Parameter see set command
Read command AT+ILRR?	Response +ILRR: <value> OK Parameter see set command
Set command AT+ILRR= <value>	Response This parameter setting determines whether or not an intermediate result code of local rate is reported at connection setup. The rate is applied after the final result code of the connection is transmitted to TE. OK Parameter <value>0 Disables reporting of local port rate 1 Enables reporting of local port rate
	Intermediate result +ILRR:<rate> <u>Note: It indicates port rate settings on connection.</u> Parameter <rate>port rate setting on call connection in bauds per second 300 1200 2400 4800 9600 19200 28800 38400 57600
Reference V.25ter	Note

AT+IPR Set fixed local rate	
Test command AT+IPR=?	Response +IPR: (list of supported auto-detectable <rate>s), (list of supported fixed-only <rate>s) OK Parameter see set command
Read command AT+IPR?	Response +IPR: <rate> OK Parameter see set command
Set command AT+IPR=<rate>	Response This parameter setting determines the data rate of the TA on the serial interface. TA must also accept the following minimum rates from TE in command mode only: 1200 bit/s and 9600 bit/s. The rate of command takes effect following the issue of any result code associated with the current command line. OK Parameter <rate> baud rate per second 300 1200 2400 4800 9600 <u>19200</u> 28800 38400 57600
Reference V.25ter	Note

15 AT commands and responses to GSM 07.07 and GSM 07.05

Test command	AT+CXXX=?	The mobile equipment returns the list of parameters and value ranges set with the corresponding set command or by internal processes.
Read command	AT+CXXX?	This command returns the currently set value of the parameter or parameters
Set command	AT+CXXX=<...>	This command sets user-definable parameter values.
Execution command	AT+CXXX	The execution command reads non-variable parameters affected by internal processes in the telephone.

15.1 AT Cellular commands to GSM 07.07

15.1.1 List of commands

Commands according to GSM 07.07	Function
AT+CACM	Accumulated call meter (ACM) reset or query
AT+CAMM	Accumulated call meter maximum (ACMmax) set or query
AT+CAOC	Advice of Charge information
AT+CBST	Select bearer service type
AT+CCFC	Call forwarding number and conditions control
AT+CCUG	Closed user group control
AT+CCWA	Call waiting control
AT+CEER	Extended error report
AT+CGMI	Request manufacturer identification
AT+CGMM	Request model identification
AT+CGMR	Request revision identification of software status
AT+CGSN	Request product serial number identification (IMEI)
AT+CHLD	Call hold and multiparty
AT+CHUP	Hang up call
AT+CIMI	Request international mobile subscriber identity
AT+CIND	Indicator control
AT+CLCK	Facility lock
AT+CLIP	Calling line identification presentation
AT+CLIR	Calling line identification restriction
AT+CMEE	Report mobile equipment error
AT+CMER	Mobile Equipment event reporting
AT+CNUM	Subscriber number
AT+COLP	Connected line identification presentation
AT+COPS	Operator selection
AT+CPAS	Mobile equipment activity status
AT+CPBR	Read current phonebook entries
AT+CPBS	Select phonebook memory storage
AT+CPBW	Write phonebook entry

AT+CPIN	Enter PIN
AT+CPWD	Change password
AT+CR	Service reporting control
AT+CRC	Set cellular result codes for incoming call indication
AT+CREG	Network registration
AT+CRLP	Select radio link protocol param. for orig. non-transp. data call
AT+CSCS	Parameter command syntax
AT+CSQ	Signal quality
AT+CSSN	Supplementary service notifications
AT+CUSD	Unstructured supplementary service data
AT+FCLASS	FAX: select, read or test service class
AT+FMI?	FAX: report manufactured ID
AT+FMM?	FAX: report model ID
AT+FMR?	FAX: report revision ID
AT+VTD	Tone duration
AT+VTS	DTMF and tone generation

Tabelle 15-1: AT commands according to GSM 07.07

15.1.2 Detailed description

AT+CACM Accumulated call meter (ACM) reset or query	
Test command AT+CACM=?	Response OK Parameter
Read command AT+CACM?	Response TA returns the current ACM value. +CACM: <acm> OK If error is related to ME functionality: +CME ERROR: <err> Parameter <acm>string type; three bytes of the current ACM value in hexadecimal format (e.g. "00001E" indicates decimal value 30) 000000FFFFFF
Set command AT+CACM= [<passwd>]	Parameter <passwd>string type: SIM PIN2 Response TA resets the Advice of Charge related to the accumulated call meter (ACM) value in SIM file EF(ACM). ACM contains the total number of home units for both the current and pre ceding calls. OK If error is related to ME functionality: +CME ERROR: <err>
Reference GSM 07.07	Note

AT+CAMM Accumulated call meter maximum (ACMmax) set or query	
Test command AT+CAMM=?	Response OK Parameter
Read command AT+CAMM?	Response TA returns the current ACMmax value. +CAMM: <acmmax> OK If error is related to ME functionality: +CME ERROR: <err> Parameter see set command
Set command AT+CAMM=[<acmmax>[,<passwd>]]	Response TA sets the Advice of Charge related to the accumulated call meter maximum value in SIM file EF (ACMmax). ACMmax contains the maximum number of home units allowed to be consumed by the subscriber. OK If error is related to ME functionality: +CME ERROR: <err> Parameter <acmmax>string type; three bytes of the max. ACM value in hexadecimal format (e.g. "00001E" indicates decimal value 30) 000000 disable ACMmax feature 000001-FFFFFF <passwd>string type SIM PIN2
Reference GSM 07.07	Note

AT+CAOC Advice of Charge information	
Test command AT+CAOC=?	Response +CAOC: (list of supported <mode>s) OK Parameter see execute command
Read command AT+CAOC?	Response +CAOC: <mode> OK Parameter see execute command
Execute command AT+CAOC= <mode>	Response TA sets the Advice of Charge supplementary service function mode. If error is related to ME functionality: +CME ERROR: <err> If <mode>=0 , TA returns the current call meter value +CAOC: <ccm> OK If <mode>=1 , TA deactivates the unsolicited reporting of CCM value OK If <mode>=2 . TA activates the unsolicited reporting of CCM value OK Parameter <mode> 0query CCM value 1deactivate the unsolicited reporting of CCM value 2activate the unsolicited reporting of CCM value <ccm> string type; three bytes of the current CCM value in hexadecimal format (e.g. "00001E" indicates decimal value 30); bytes are similarly coded as ACMmax value in the SIM 000000-FFFFFF
Action command AT+CAOC	Response TA returns the current call meter value (same as AT+CAOC=0)
	Unsolicited result code When activated, an unsolicited result code is sent when the CCM value changes, but not more that every 10 seconds +CCCM: <ccm> Parameter see execute command
Reference GSM 07.07	Note

AT+CBST Select bearer service type	
Test command AT+CBST=?	Response +CBST: (list of supported <speed>s) ,(list of supported <name>s) ,(list of supported <ce>s) OK Parameter see set command
Read command AT+CBST?	Response +CBST: <speed>,<name>,<ce> OK Parameter see set command
Set command AT+CBST= [<speed> [,<na me>[,<ce>]]]	Response TA selects the bearer service <name> with data rate <speed>, and the connection element <ce> to be used when data calls are originated. Values may also be used during mobile terminated data call setup, especially in case of single numbering scheme calls (refer +CSNS). OK Parameter <speed>1300 bps(V.21) 21200 bps(V.22) 31200/75 bps(V.23) 42400 bps(V.22bis) 52400 bps(V.26ter) 64800 bps(V.32) 79600 bps(V.32) <name>0asynchronous modem <ce>0transparent 1non-transparent
Reference GSM 07.07	Note GSM 02.02[1]: list of valid combinations of <speed>, <Name> and <ce> values.

AT+CCFC Call forwarding number and conditions control	
Test command AT+CCFC=?	Response +CCFC: (list of supported <reas>s) OK Parameter see execute command
Execute command AT+CCFC = <reas>, <mode> [, <number> [, <type> [,<class> [, <subaddr> [,<satype> [,<time>]]]]]]	Response TA controls the call forwarding supplementary service. Registration, erasure, activation, deactivation, and status query are supported. When querying the status of a network service (<mode>=2) the response line for 'not active' (<status>=0) should be returned only if service is not active for any <class>. If <mode><>2 and command successful OK If <mode>=2 and command successful (only in connection with <reas> 03) +CCFC: <status>, <class1>[, <number>, <type> [, <time>]] [<CR><LF>+CCFC:] OK If error is related to ME functionality: +CME ERROR: <err> Parameter <reas>0unconditional 1mobile busy 2no reply 3not reachable 4all call forwarding (0-3) 5all conditional call forwarding (1-3) <mode>0disable 1enable 2query status 3registration 4erasure <number>string type phone number of forwarding address in format specified by <type> <type>type of address in integer format; default 145 when dialling string includes international access code character "+", otherwise 129 <subaddr>string type subaddress of format specified by <satype> <satype>type of subaddress in integer; default 128 <class>1voice 2data 4fax 7all classes <time>time, rounded to a multiple of 5 sec. 1...20..30 <status>0not active 1active
Reference GSM 07.07	Note

AT+CCUG Closed user group control	
Test command AT+CCUG=?	Response OK Parameter
Read command AT+CCUG?	Response +CCUG: <n>,<index>,<info> OK If error is related to ME functionality: +CME ERROR: <err> Parameter see set command
Set command AT+CCUG=[<n> [,<index>[,<i n fo>]]]	Response TA sets the closed user group supplementary service parameters as a default adjustment for all following calls. OK If error is related to ME functionality: +CME ERROR: <err> Parameter <n>0disable CUG 1enable CUG <index>0...9CUG index 10no index (preferred CUG taken from subscriber data) <info>0no information 1suppress OA (Outgoing Access) 2suppress preferential CUG 3suppress OA and preferential CUG
Reference GSM 07.07	Note

AT+CCWA	Call waiting control
Test command AT+CCWA=?	Response +CCWA: (list of supported <n>s) OK Parameter see set command
Read command AT_CCWA?	Response +CCWA: <n> OK Parameter see set command
Execute command AT+CC WA=[<n> [,<mo de>[,<class>]]]	Response TA controls the call waiting supplementary service. Activation, deactivation and status query are supported. It should be possible to abort the command when network is interrogated. If <mode><2 and command successful OK If <mode>=2 and command successful +CCWA:<status>,<class1>[<CR><LF>+CCWA:<status>,<class2>[...]] OK <i>Note:</i> <status>=0 should be returned only if service is not active for any <class>. If error is related to ME functionality: +CME ERROR: <err> Parameter <n>0disable presentation of unsolicited result code 1enable presentation of unsolicited result code <mode>when <mode> parameter not given, network is not interrogated 0disable 1enable 2query status <class>is a sum of integers each representing a class of information 1voice (telephony) 2data (usually refers to all bearer services, if<mode>=2, this may refer only to some bearer services) 4fax 7default (equals all classes) <status>0not active 1enable
	Unsolicited result code An unsolicited result code is returned when "Call Waiting at the TA" (and Call Waiting) are enabled and the system attempts to terminate call setup during an established call: +CCWA: <number>,<type>,<class>[,<alpha>] Parameter <number>string type phone number of calling address in format specified by <type> <type>type of address octet in integer format; 145 when dialling string includes international access code character "+", otherwise 129

	<alpha>optional string type alphanumeric representation of <number> corresponding to the entry found in phonebook
Reference GSM 07.07	Note

AT+CEER Extended error report	
Test command AT+CEER=?	Response OK
Execute command AT+CEER	Response TA returns an extended report of the reason for the last call release. +CEER: <report> OK Parameter <report> Reason for last call release as number code
Reference GSM 07.07	Note

AT+CGMI Request manufacturer identification	
Test command AT+CGMI=?	Response OK
Execute command AT+CGMI	Response TA returns manufacturer identification text. +CGMI: SIEMENS Parameter <manufacturer>
Reference GSM 07.07	Note <i>See also "AT+GMI Request manufacturer identification".</i>

AT+CGMM Request model identification	
Test command AT+CGMM=?	Response OK
Execute command AT+CGMM	Response TA returns product model identification text. +CGMM: A20 OK Parameter <model>
Reference GSM 07.07	Note <i>See also "AT+GMM Request TA model identification".</i>

AT+CGMR Request revision identification of software status	
Test command AT+CGMR=?	Response OK
Execute command AT+CGMR	Response TA returns product software version identification text. +CGMR: <revision> x.yy OK Parameter Revision x: version, yy: variant of software
Reference	Note

GSM 07.07

See also ''AT+GMR Request TA revision identification of software status''.

AT+CGSN Request product serial number identification (IMEI) identical to GSN	
Test command AT+CGSN=?	Response OK
Execute command AT+CGSN	Response TA returns identification text for determination of the individual ME. +CGSN: <sn> OK Parameter <sn> IMEI of the telephone (International Mobile station Equipment Identity)
Reference GSM 07.07	Note <i>See also "AT+GSN Request TA serial number identification".</i>

AT+CHLD Call hold and multiparty	
Test command AT+CHLD=?	Response +CHLD: (list of supported <n>s) OK
Execute command AT+CHLD=[<n>]	Response TA controls the supplementary services Call Hold, MultiParty and Explicit Call Transfer. Calls can be put on hold, recovered, released, added to conversation, and transferred. <u>Note: the supplementary services are only applicable to teleservice 11 (Speech telephony).</u> OK If error is related to ME functionality: +CME ERROR: <err> Parameter <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 <u>Note: Where both are held and a waiting call exists, the above procedures shall apply to the waiting call (i.e. not to the held call) in conflicting situation.</u>
Reference GSM 07.07	Note

AT+CHUP Hang up call	
Test command	Response

AT+CHUP=?	OK
Execute command AT+CHUP	Response OK/ERROR All active calls and held calls are cleared down.
Reference GSM 07.07	Note

AT+CIMI Request international mobile subscriber identity	
Test command AT+CIMI=?	Response OK
Execute command AT+CIMI	Response TA returns <IMSI> for identifying the individual SIM which is attached to ME. +CIMI: <IMSI> OK If error is related to ME functionality: +CME ERROR: <err> Parameter <IMSI> International Mobile Subscriber Identity (string without double quotes)
Reference GSM 07.07	Note

AT+CIND Indicator control	
Test command AT+CIND=?	Response +CIND: (<descr>, (list of supported <ind>s)) [, (<descr>, (list of supported <ind>s)) [, ...]] +CME ERROR: <err>
	Parameter see below
Read command AT+CIND?	Response +CIND: <ind>[,<ind>[,...]] +CME ERROR: <err>
	Parameter see below
Execute command AT+CIND= [<ind>[,<ind> [,...]]]	Response OK +CME ERROR: <err>
	Parameter <ind> integer type value, which shall be in range of corresponding <descr> <descr> values reserved by this ETS and their <ind> ranges: "battchg" battery charge level (0-5) "signal" signal quality (0-5) "service" service availability (0-1) "sounder" sounder activity (0-1) "message" message received (0-1) "call" call in progress (0-1) "vox" transmit activated by voice activity (0-1) "roam" roaming indicator (0-1) "smsfull" a short message memory storage in the MT has become full (1), or memory locations are available (0); i.e. the range is (0-1)
Reference GSM 07.07	Note

AT+CLCK	Facility lock
Test command AT+CLCK=?	Response +CLCK: (list of supported <fac>s) OK Parameter see execute command
Execute command AT+CLCK = <fac>, <mode> [, <passwd> [, <class>]]	Response This command is used to lock, unlock or interrogate a ME or a network facility <fac>. Password is normally needed for 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>. It should be possible to abort the command when network facilities are set or interrogated. 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> Parameter <fac> "PS" PH-SIM (lock PHone to SIM card) (ME requests password when other than current SIM card inserted; ME may remember certain number of previously used cards thus not requiring password when they are inserted) "SC" SIM (lock SIM cards) (SIM requests password at ME power-up and when this lock command issued) "FD" SIM fixed dialling memory feature (if PIN2 authentication has not been performed during the current session, PIN2 is required as <passwd>) "AO" BAOC (Bar All Outgoing Calls) "OI" BOIC (Bar Outgoing International Calls) "OX" BOIC-exHC (Bar Outgoing International Calls except to Home Country) "AI" BAIC (Bar All Incoming Calls) "IR" BIC-Roam (Bar Incoming Calls when Roaming outside the home country) "AB" All Barring services (applicable only for <mode>=0) "AG" All outGOing barring services (applicable only for <mode>=0) "AC" All inCOming barring services (applicable only for <mode>=0) "PN" Network Personalisation (refer GSM 02.22[33]) "PU" network sUBset Personalisation (refer GSM 02.22[33]) "PP" service Provider Personalisation (refer GSM 02.22[33]) "PC" Corporate Personalisation (refer GSM 02.22[33]) <mode> 0 unlock 1 lock 2 query status

	<pre><passwd> password <class> 1 voice 2 data 4 fax 7 all classes (default) <status> 0 off 1 on</pre>
Reference GSM 07.07	Note

AT+CLIP Calling line identification presentation	
Test command AT+CLIP=?	Response +CLIP: (list of supported <n>s) OK Parameter see set command
Read command AT+CLIP?	Response +CLIP: <n>, <m> OK If error is related to ME functionality: +CME ERROR: <err> Parameter see set command
Set command AT+CLIP=<n>	Response 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. OK If error is related to ME functionality: +CME ERROR: <err> Parameter <n> 0 suppress unsolicited result codes 1 display unsolicited result codes <m> 0 CLIP not provisioned 1 CLIP provisioned 2 unknown
	Unsolicited result code When CLIP is enabled at the TE (and is permitted by the calling subscriber), an unsolicited result code is returned after every RING (or +CRING: <type>) at a mobile terminating call. +CLIP: <number>, <type> Parameter <number> string type phone number of calling address in format specified by <type> <type> type of address octet in integer format; 145 when dialling string includes international access code character "+", otherwise 129.
Reference GSM 07.07	Note

AT+CLIR Calling line identification restriction	
Test command AT+CLIR=?	Response +CLIR: (list of supported <n>s) OK Parameter see set command
Read command AT+CLIR?	Response +CLIR: <n>, <m> OK If error is related to ME functionality: +CME ERROR: <err> Parameter see set command
Set command AT+CLIR=<n>	Response 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. OK If error is related to ME functionality: +CME ERROR: <err> Parameter <n> (parameter sets the adjustment for outgoing calls): 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): 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
Reference GSM 07.07	Note

AT+CMEE Report mobile equipment error	
Test command AT+CMEE=?	Response +CMEE: (list of supported <n>s) OK Parameter see set command
Read command AT+CMEE?	Response +CMEE: <n> OK Parameter see set command
Set command AT+CMEE=<n>	Response TA disables or enables the use of result code +CME ERROR: <err> as an indication of an error relating to ME functionality. OK Parameter <n> 0 disable result code 1 enable result code and use numeric values 2 enable result code and use verbose values
Reference GSM 07.07	Note The possible error result codes are listed in annex.

AT+CMER Mobile Equipment event reporting	
Test command AT+CMER=?	Response +CMER: (list of supported <mode>s),(list of supported <keyp>s),(list of supported <disp>s),(list of supported <ind>s),(list of supported <bfr>s)
	Parameter see below
Read command AT+CMER?	Response +CMER: <mode>,<keyp>,<disp>,<ind>,<bfr>
	Parameter see below
Execute command AT+CMER= [<mode> [<keyp> [,<disp> [<ind> [,<bfr>]]]]]	Response OK +CME ERROR: <err>
	Parameter <mode>: 0buffer unsolicited result codes in the TA; if TA result code buffer is full, codes can be buffered in some other place or the oldest ones can be discarded 1discard unsolicited result codes when TA-TE link is reserved (e.g. in on-line data mode); otherwise forward them directly to the TE 2buffer 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 3forward unsolicited result codes directly to the TE; TA-TE link specific inband technique used to embed result codes and data when TA is in on-line data mode <keyp>: 0no keypad event reporting <disp>: 0no display event reporting <ind>: 0no indicator event reporting 1indicator event reporting using result code +CIEV: <ind>,<value>. <ind> indicates the indicator order number (as specified for +CIND) and <value> is the new value of indicator. Only those indicator events, which are not caused by +CIND shall be indicated by the TA to the TE 2indicator event reporting using result code +CIEV: <ind>,<value>. All indicator events shall be directed from TA to TE <bfr> : 0TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1...3 is entered 1TA 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)
Reference GSM 07.07	Note

AT+CNUM Subscriber number	
Test command	Response
AT+CNUM=?	OK
	Parameter
Execute command	Response
AT+CNUM	+CNUM: [<alpha1>,<number1>,<type1>[,<speed>,<service>[,<itc>]] [<CR><LF>+CNUM: [<alpha2>,<number2>,<type2>[,<speed>,<service>[,<itc>]] [...]] +CME ERROR: <err>
	Parameter
	<p><alpha x>: optional alphanumeric string associated with <number x>; used character set should be the one selected with command Select TE Character Set +CSCS</p> <p><number x>: string type phone number of format specified by <type x></p> <p><type x>: type of address octet in integer format (refer GSM 04.08 [8] subclause 10.5.4.7)</p> <p><speed>: see AT+CBST</p> <p><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 also all other values below 128 are reserved by this ETS</p> <p><itc> (information transfer capability): 0 3.1 kHz 1 UDI</p>
Reference	Note
GSM 07.07	

AT+COLP	Connected line identification presentation
Test command AT+COLP=?	Response +COLP: (list of supported <n>s) OK Parameter see set command
Read command AT+COLP?	Response +COLP: <n>,<m> OK If error is related to ME functionality: +CME ERROR: <err> Parameter see set command
Set command AT+COLP=[<n>]	TA enables or disables the presentation of the COL (connected line) at the TE at a mobile originating 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 [5] responses. It is manufacturer-specific if this response is used when normal voice call is set up. OK Parameter <n> (parameter sets/shows the result code presentation status in the TA): 0 disable 1 enable <m> (parameter shows the subscriber COLP service status in the network): 0 COLP not provisioned 1 COLP provisioned 2 unknown (e.g. no network, etc.)
	Intermediate result code When enabled (and called subscriber allows), an intermediate result code is returned before any +CR or V.25ter responses: +COLP:<number>,<type>[,<subaddr>,<satype> [,<alpha>]]
	Parameters <number>string type phone number of format specified by <type> <type>type of address octet in integer format; 145 when dialling string includes international access code character "+", otherwise 129 <subaddr>string type subaddress of format specified by <satype> <satype>type of subaddress octet in integer format (refer GSM 04.08 [8] subclause 10.5.4.8) <alpha>optional string type alphanumeric representation of <number> corresponding to the entry found in phonebook
Reference GSM 07.07	Note

AT+COPS	Operator selection
Test command AT+COPS=?	Response TA returns a list of quadruplets, each representing an operator present in the network. Any of the formats may be unavailable and should then be an empty field. The list of operators shall be in the following order: home network, networks referenced in SIM, and other networks. +COPS: (list of supported (<stat>), long alphanumeric <oper>, short alphanumeric <oper>, numeric <oper>)] [,,(list of supported <mode>s), (list of supported <format>s)] OK If error is related to ME functionality: +CME ERROR: <err> Parameter see set command
Read command AT+COPS?	Response TA returns the current mode and the currently selected operator. If no operator is selected, <format> and <oper> are omitted. +COPS: <mode>[, <format>[, <oper>]] OK If error is related to ME functionality: +CME ERROR: <err> Parameter see set command
Set command AT+COPS = <mode> [, <format>[, <oper>]]	Response TA 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?) also. <u>Note: it should be possible to abort this command when registration/deregistration attempt is made.</u> OK If error is related to ME functionality: +CME ERROR: <err> Parameter <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 shall be present (<format> can only be = 2) 2 manual deregister from network 3 set only <format> (for read command +COPS?) 4 automatic, manual selected; if manual selection fails, automatic mode (<mode>=0) is entered <format> 0 long format alphanumeric <oper>; can be up

	to 16 character long 2 numeric <oper>; GSM Location Area Identification number
Reference GSM 07.07	Note

AT+CPAS Mobile equipment activity status	
Test command AT+CPAS=?	Response +CPAS: (list of supported <pas>s) OK Parameter see execute command
Execute command AT+CPAS	Response TA returns the activity status of ME. +CPAS: <pas> OK If error is related to ME functionality: +CME ERROR: <err> Parameter <pas> 0 ready 2 unknown (ME is not guaranteed to respond to instructions) 3 incoming call (ringing) 4 call in progress or call hold
Reference GSM 07.07	Note

AT+CPBR Read current phonebook entries	
Test command AT+CPBR=?	Response TA returns location range supported by the current storage as a compound value and the maximum lengths of <number> and <text> fields. <u>Note:</u> the lengths are not available in case of SIM storage. +CPBR: (list of supported <index>s), <nlength>, <tlength> OK If error is related to ME functionality: +CME ERROR: <err> Parameter <index> location number <nlength> max. length of phone number <tlength> max. length of text for number
Execute command AT+CPBR = <index1> [, <index2>]	Response TA returns phonebook entries in location number range <index1>... <index2> from the current phonebook memory storage selected with +CPBS. If <index2> is left out, only location <index1> is returned. [+CPBR: <index1>, <number>, <type>, <text>[<CR><LF>]+CPBR:+CPBR: <index2>, <number>, <type>, <text>]] OK If error is related to ME functionality: +CME ERROR Parameter <index1> read from this location number <index2> read to this location number <number> phone number <type> type of number <text> text for phone number
Reference GSM 07.07	Note

AT+CPBW	Write phonebook entry																																				
<p>Test command</p> <p>AT+CPBW=?</p>	<p>Response</p> <p>TA returns location range supported by the current storage, the maximum length of <number> field, supported number formats of the storage, and the maximum length of <text> field.</p> <p><u>Note: the lengths may not be available in case of SIM storage. If storage does not offer format information, the format list should be empty parenthesis.</u></p> <p>+CPBW: (list of supported <index>s), <nlength>, (list of supported <typ>s), <tlength> OK</p> <p>If error is related to ME functionality:</p> <p>+CME ERROR: <err></p> <p>Parameter</p> <p>see execute command</p>																																				
<p>Execute command</p> <p>AT+CPBW = [<index>, [<number> [,<type> [,<text>]]]</p>	<p>Response</p> <p>TA writes phonebook entry in location number <index> in the current phonebook memory storage selected with +CPBS. Entry fields written are phone number <number> (in the format <type>) and text <text> associated with the number. If these fields are omitted, phonebook entry is deleted. If <index> is left out, but <number> is given, entry is written to the first free location in the phonebook.</p> <p>OK</p> <p>If error is related to ME functionality:</p> <p>+CME ERROR: <err></p> <p>Parameter</p> <p><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 dialling string includes international access code character "+", otherwise 129 <text> text for phone number</p> <p><u>Note:</u> the following characters in <text> must be entered via the escape sequence:</p> <table border="1"> <thead> <tr> <th>GSM char.</th> <th>Seq.</th> <th>Seq.(hex)</th> <th>Note</th> </tr> </thead> <tbody> <tr> <td>\</td> <td>\5C</td> <td>5C 35 43</td> <td></td> </tr> <tr> <td>"</td> <td>\22</td> <td>5C 32 32</td> <td></td> </tr> <tr> <td></td> <td></td> <td>(string delimiter)</td> <td></td> </tr> <tr> <td>BSP</td> <td>\08</td> <td>5C 30 38</td> <td></td> </tr> <tr> <td></td> <td></td> <td>(backspace)</td> <td></td> </tr> <tr> <td>NULL</td> <td>\00</td> <td>5C 30 30</td> <td></td> </tr> <tr> <td></td> <td></td> <td>(GSM null)</td> <td></td> </tr> <tr> <td></td> <td></td> <td>'0' (GSM null) may cause problems on application level</td> <td></td> </tr> </tbody> </table>	GSM char.	Seq.	Seq.(hex)	Note	\	\5C	5C 35 43		"	\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 on application level	
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	when using the function (strlen) and should thus be represented by an escape sequence when necessary
Reference GSM 07.07	Note

AT+CPIN	Enter PIN
Test command AT+CPIN=?	Response OK
Read command AT+CPIN?	Response TA returns an alphanumeric string indicating whether some password is required or not. +CPIN: <code> OK If error is related to ME functionality: +CME ERROR: <err> Parameter <code> 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 acknowledged with if preceding command was +CME ERROR:17 SIM PUK2 possible only if preceding command was acknowledged with error +CME ERROR:18 .
Set command AT+CPIN=<pin> [, <new pin>]	Response TA 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. OK If error is related to ME functionality: +CME ERROR: <err> Parameter <pin> password (string type) must be entered in double quotes. E.g.: AT+CPIN=""9515"" <new pin> if the PIN required is SIM PUK or SIM PUK2: new password
Reference GSM 07.07	Note 1. <pin> and <new pin> must be entered with double quotes (i.e. "1234") 2. Wait 10 sec after PIN input before using SMS related commands.

AT+CPWD	Change password
<p>Test command</p> <p>AT+CPWD=?</p>	<p>Response</p> <p>TA returns a list of pairs which present the available facilities and the maximum length of their password.</p> <p>+CPWD: (list of supported (<fac>,<pwdlength>)s) OK</p> <p>If error is related to ME functionality:</p> <p>+CME ERROR: <err></p> <p>Parameter</p> <p><fac></p> <p>otherwise see execute command, without "FD"</p> <p><pwdlength> integer max. length of password</p>
<p>Execute command</p> <p>AT+CPWD = <fac>, [<oldpwd>], <newpwd></p>	<p>Response</p> <p>TA sets a new password for the facility lock function.</p> <p>OK</p> <p>If error is related to ME functionality:</p> <p>+CME ERROR: <err></p> <p>Parameter</p> <p><fac> "SC" SIM (lock SIM card) (SIM asks password in ME power-up and when this lock command issued)</p> <p>"AO" BAOC (Bar All Outgoing Calls)</p> <p>"OI" BOIC (Bar Outgoing International Calls)</p> <p>"OX" BOIC-exHC (Bar Outgoing International Calls except to Home Country)</p> <p>"AI" BAIC (Bar All Incoming Calls)</p> <p>"IR" BIC-Roam (Bar Incoming Calls when Roaming outside the home country)</p> <p>"AB" All Barring services (applicable only for <mode>=0)</p> <p>"AG" All outGoing barring services (applicable only for <mode>=0)</p> <p>"AC" All inComing barring services (applicable only for <mode>=0)</p> <p>"P2" SIM PIN2</p> <p><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 be entered.</p> <p><i>Note:</i> a password may already be set, depending on the provider. Please check with your provider.</p> <p><newpwd> new password</p>
<p>Reference</p> <p>GSM 07.07</p>	<p>Note</p>

AT+CR Service reporting control	
Test command AT+CR=?	Response +CR: (list of supported <mode>s) OK Parameter see set command
Read command AT+CR?	Response +CR: <mode> OK Parameter see set command
Set command AT+CR=<mode>	Response TA controls whether or not intermediate result code +CR: <serv> is returned from the TA to the TE at call setup. OK Parameter <mode> 0 disable 1 enable
	Intermediate result code When enabled, an intermediate result code is transmitted at the point during connect negotiation when the TA has determined the 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. +CR:<serv> Parameter <serv> ASYNC asynchronous transparent SYNC synchronous transparent REL ASYNC asynchronous non-transparent REL SYNC synchronous non-transparent
Reference GSM 07.07	Note

AT+CRC Set Cellular Result Codes for incoming call indication	
Test command AT+CRC=?	Response +CRC: (list of supported <mode>s) OK Parameter see set command
Read command AT+CRC?	Response +CRC: <mode> OK Parameter see set command
Set command AT+CRC=[<mode>]	Response TA controls whether or not the extended format of incoming call indication is used. OK ParameterS <mode> 0 disable extended format 1 enable extended format
	Unsolicited result code When enabled, an incoming call is indicated to the TE with unsolicited result code +CRING: <type> instead of the normal RING. Parameter <type> ASYNC asynchronous transparent SYNC synchronous transparent REL ASYNC asynchronous non-transparent REL SYNC synchronous non-transparent FAX facsimile VOICE voice
Reference GSM 07.07	Note

AT+CREG	Network registration
Test command AT+CREG=?	Response +CREG: (list of supported <n>s) OK Parameter see set command
Read command AT+CREG?	Response TA 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. +CREG: <n>,<stat>[,<lac>,<ci>] OK If error is related to ME functionality: +CME ERROR: <err> Parameter see set command
Set command AT+CREG=[<n>]	Response TA controls the presentation of an unsolicited result code +CREG: <stat> when <n>=1 and there is a change in the ME network registration status, or code +CREG: <stat>[,<lac>,<ci>] when <n>=2 and there is a change of the network cell. OK Parameter <n> 0 disable network registration unsolicited result code 1 enable network registration unsolicited result code +CREG: <stat> 2 enable network registration and location information unsolicited result code +CREG: <stat>[,<lac>,<ci>] <stat>>0 not registered, ME is not currently searching for a new operator at which to register 1 registered, home network 2 not registered, but ME is currently searching for a new operator at which to register 3 registration denied 4 unknown 5 registered, roaming <lac> string type; two byte location area code in hexadecimal format (e.g. "00C3" equals 193 in decimal) <ci> string type; two byte cell ID in hexadecimal format
	Unsolicited result code When <n>=1 and there is a change in the ME network registration status: +CREG: <stat> When <n>=2 and there is a change of the network cell: +CREG: <stat>[,<lac>,<ci>] Parameter see set command
Reference GSM 07.07	Note

AT+CRLP Select radio link protocol param. for orig. non-transparent data call	
<p>Test command</p> <p>AT+CRLP=?</p>	<p>Response</p> <p>TA returns values supported by the TA as a compound value. If ME/TA supports several RLP versions <verx>, the RLP parameter value ranges for each <verx> are returned in a separate line.</p> <p>Note: versions 0 and 1 share the same parameter set. TA returns only one line for this set (where <verx> is not present).</p> <p>+CRLP: (list of supported <iws>s), (list of supported <mws>s), (list of supported <T1>s), (list of supported <N2>s), (list of supported <ver1>s), (list of supported <T4>s)</p> <p>+CRLP: (list of supported <iws>s), (list of supported <mws>s), (list of supported <T1>s), (list of supported <N2>s), (list of supported <ver2>s), (list of supported <T4>s)</p> <p>...</p> <p>OK</p> <p>Parameter see set command</p>
<p>Read command</p> <p>AT+CRLP?</p>	<p>Response</p> <p>TA returns current settings for each supported RLP version <verx>. Only RLP parameters applicable to the corresponding <verx> are returned.</p> <p>Note: versions 0 and 1 share the same parameter set. TA returns only one line for this set (where <verx> is not present).</p> <p>+CRLP: <iws>,<mws>,<T1>,<N2>[,<ver1>[,<T4>]]</p> <p>+CRLP: <iws>,<mws>,<T1>,<N2>[,<ver2>[,<T4>]]</p> <p>...</p> <p>OK</p> <p>Parameter see set command</p>
<p>Set command</p> <p>AT+CR- LP=[<iws>[,<mws>[,<T1>[,<N2>[,<ver>[,<T4>]]]]]]]</p>	<p>Response</p> <p>TA sets radio link protocol (RLP) parameters used when non-transparent data calls are originated.</p> <p>Note: available command subparameters depend on the RLP versions implemented by the device (e.g. <ver> may not be available if device supports only versions 0 and 1).</p> <p>OK</p> <p>Parameter</p> <p><iws> 0-61 _____ Interworking window size (IWF to MS)</p> <p><mws> 0-61 _____ Mobile window size (MS to IWF)</p> <p><T1> 39-255 _____ Acknowledgment timer T1 in 10 ms units)</p> <p><N2> 1-6-255 _____ Re-transmission attempts N2</p> <p><verx> 0-2 _____ RLP version number in integer format; when version indication is not present it shall equal 0.</p> <p>Note: versions 0 and 1 share the same parameter set.</p> <p><T4> 0-5-255re-sequencing period in integer format, in units of 10 ms</p> <p>Note: default values and value ranges depend on RLP</p>

	<code>version; refer to GSM 04.22 [18]</code>
Reference GSM 07.07	Note

AT+CSCS		Parameter command syntax
Test command +CSCS=?	Response	+CSCS: (list of supported <chset>s)
Set command +CSCS?	Response	CSCS: <chset>
+CSCS=[<chset>] >]	Response	Set command informs TA which character set <chset> is used by the TE. TA is then able to convert character strings correctly between TE and ME character sets.
	Parameters	<p><chset>:</p> <p>"IRA" international reference alphabet (ITU-T T.50 [13])</p> <p>"GSM" GSM default alphabet (GSM 03.38 subclause 6.2.1); this setting causes easily software flow control (XON/XOFF) problems</p> <p>"PCCP850" PC character set Code Page 850</p> <p>"PCCP852" PC character set Code Page 852</p> <p>"8859-1" ISO 8859 Latin 1 character set</p> <p>"8859-2" ISO 8859 Latin 2 character set</p>

AT+CSQ		Signal quality
Test command AT+CSQ=?	Response	+CSQ: (list of supported <rssis>), (list of supported <ber>) OK
	Parameter	see execute command
Execute command AT+CSQ	Response	TA returns received signal strength indication <rssis> and channel bit error rate <ber> from the ME.
	Parameter	<p>+CSQ: <rssis>, <ber> OK</p> <p><rssis> Receive level:</p> <p>0 -113 dBm or less</p> <p>1 -111 dBm</p> <p>2...30 -109... -53 dBm</p> <p>31 -51 dBm or greater</p> <p>99 not known</p> <p><ber> Bit error rate:</p> <p>0...7 as RXQUAL values in the table in GSM 05.08 section 8.2.4</p> <p>99 not known</p>
Reference GSM 07.07	Note	

AT+CSSN Supplementary service notifications	
Test command AT+CSSN=?	Response +CSSN: (list of supported <n>s),(list of supported <m>s)
	Parameter see below
Read command AT+CSSN?	Response +CSSN: <n>,<m>
	Parameter <n> (parameter sets/shows the +CSSI result code presentation status in the TA): 0 disable 1 enable <m> (parameter sets/shows the +CSSU result code presentation status in the TA): 0 disable 1 enable
Execute command AT+CSSN=[<n>[,<m>]]	Response OK
	Parameter
Unsolicited result code +CSSI: <code1>[,<index>]	Description When <n>=1 and a supplementary service notification is received after a mobile originated call setup, intermediate result code +CSSI is sent to TE before any other MO call setup result codes.
	Parameter <code1> (it is manufacturer specific, which of these codes are supported): 0 unconditional call forwarding is active 1 some of the conditional call forwardings are active 2 call has been forwarded 3 call is waiting 4 this is a CUG call (also <index> present) 5 outgoing calls are barred 6 incoming calls are barred 7 CLIR suppression rejected 8 call has been deflected <index>: refer "Closed user group +CCUG"
Unsolicited result code +CSSU: <code2>[,<index>[,<number>,<type>[,<subaddr>,<satype>]]]	Description When <m>=1 and a supplementary service notification is received during a mobile terminated call setup or during a call, or when a forward check supplementary service notification is received, unsolicited result code +CSSU is sent to TE.
	Parameter <code2> (it is manufacturer specific, which of these codes are supported): 0 this is a forwarded call (MT call setup) 1 this is a CUG call (also <index> present) (MT call setup) 2 call has been put on hold (during a voice call) 3 call has been retrieved (during a voice call) 4 multiparty call entered (during a voice call) 5 call on hold has been released (this is not a SS notification) (during a voice call) 6 forward check SS message received (can be received whenever)

	<p>7 call is being connected (alerting) with the remote party in alerting state in explicit call transfer operation (during a voice call)</p> <p>8 call has been connected with the other remote party in explicit call transfer operation (also number and subaddress parameters may be present) (during a voice call or MT call setup)</p> <p>9 this is a deflected call (MT call setup)</p> <p><number>:string type phone number of format specified by <type></p> <p><type>:type of address octet in integer format (refer GSM 04.08 [8] subclause 10.5.4.7)</p> <p><subaddr>:string type subaddress of format specified by <satype></p> <p><satype>:type of subaddress octet in integer format (refer GSM 04.08 [8] subclause 10.5.4.8)</p>
Reference GSM 07.07	Note

AT+CUSD Unstructured supplementary service data																			
<p>Test command AT+CUSD=?</p>	<p>Response +CUSD: (list of supported <n>s) OK</p> <p>Parameters see set command</p>																		
<p>Read command AT+CUSD?</p>	<p>Response TA returns the parameter unsolicited result code presentation mode. +CUSD: <n> OK</p> <p>Parameters see set command</p>																		
<p>Set command AT+CUSD=[<n>[,<str>[,<dc>]]]</p>	<p>Response TA controls the Unstructured Supplementary Service Data(USSD). Both network and mobile initiated operations are supported. Parameter <n> is used to disable/enable the presentation of an unsolicited result code. The value <n>=2 is used only to cancel an ongoing USSD session. When <str> is given, a mobile initiated USSD-string or a response USSD-string to a network initiated operation is sent to the network. OK If error is related to ME functionality: +CME ERROR: <err> Note: The set command should be abortable when network is interrogated.</p> <p>Parameters</p> <table> <tr> <td><n></td> <td>0</td> <td>disable unsolicited result code presentation</td> </tr> <tr> <td></td> <td>1</td> <td>enable unsolicited result code presentation</td> </tr> <tr> <td></td> <td>2</td> <td>cancel ongoing USSD session,</td> </tr> </table> <p><str> string type USSD-string if <dc> indicates that GSM03.38[25] default alphabet is used: ME/TA converts GSM alphabet into current TE character set (refer command Select TE Character Set +CSCS) according to rules of GSM07.05[24] AnnexA</p> <p><dc>: GSM03.38[25] Cell Broadcast Data Coding Scheme in integer format</p> <table> <tr> <td></td> <td>0</td> <td>GSM default alphabet is used in <str> in ME</td> </tr> <tr> <td><m></td> <td>0</td> <td>no further user action required (network initiated USSD-Notify, or no further information needed after mobile initiated operation)</td> </tr> <tr> <td></td> <td>1</td> <td>further user action required (network initiated USSD-Request, or further information needed after</td> </tr> </table>	<n>	0	disable unsolicited result code presentation		1	enable unsolicited result code presentation		2	cancel ongoing USSD session,		0	GSM default alphabet is used in <str> in ME	<m>	0	no further user action required (network initiated USSD-Notify, or no further information needed after mobile initiated operation)		1	further user action required (network initiated USSD-Request, or further information needed after
<n>	0	disable unsolicited result code presentation																	
	1	enable unsolicited result code presentation																	
	2	cancel ongoing USSD session,																	
	0	GSM default alphabet is used in <str> in ME																	
<m>	0	no further user action required (network initiated USSD-Notify, or no further information needed after mobile initiated operation)																	
	1	further user action required (network initiated USSD-Request, or further information needed after																	

	<p>mobile initiated operation)</p> <p>2 USSD terminated by network</p> <p>3 Other local client has responded</p> <p>4 Operation not supported</p> <p>5 network time out</p> <p>Note: m=3 is not relevant at A20 because there is not other client but AT</p> <p>Unsolicited result code</p> <p>When the presentation of an unsolicited result code is enabled, TA send USSD response from the network or network initiated operation to the TE:</p> <p>+CUSD: <m>[,<str>,<dc>]</p> <p>Parameters</p> <p>See set command</p>
Reference GSM 07.07/V580	Note

AT+FCLASS Fax: select, read or test service class	
Test command AT+FCLASS=?	Response +FCLASS: (list of supported <n>s) OK Parameter see set command
Read command AT+FCLASS?	Response +FCLASS: <n> OK Parameter see set command
Set command AT+FCLASS= <n>	Response TA sets a particular mode of operation (data, fax). This causes the TA to process information in a manner suitable for that type of information. OK Parameter <n> 0 data 1 fax class 1 (TIA-578-A)
Reference GSM 07.07	Note

AT+FMI? Fax: report manufactured ID	
Read command AT+FMI?	Response TA reports one or more lines of information text which permit the user to identify the manufacturer. <manufacturer Id> + FMI: SIEMENS
AT+FMI?	Response OK Parameter
Reference GSM 07.07	Note

AT+FMM? Fax: report model ID	
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Read command AT+FMM?	Response TA reports one or more lines of information text which permit the user to identify the specific model of device. <model Id> A20 Parameter <model Id> A20
Reference GSM 07.07	Note

AT+FMR? Fax: report revision ID	
Read command AT+FMR?	Response TA 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. <Revision Id> OK Parameter
Reference GSM 07.07	Note

AT+VTD=<n> Tone duration	
Test command AT+VTD=?	Response +VTD: (list of supported <n>s) OK Parameter see set command
Read command AT+VTD?	Response +VTD: <n> OK Parameter see set command
Set command AT+VTD = <duration>	Response This command refers to an integer <n> that defines the length of tones emitted as a result of the +VTS command. This does not affect the D command. <u>Note: In GSM the value of tone duration is preset and cannot be altered.</u> OK Parameter <n> 0 manufacturer-specific 1-255 duration of the tone in 1/10 seconds
Reference GSM 07.07	Note

AT+VTS	DTMF and tone generation (<Tone> in {0-9, *, #, A, B, C, D})
Test command AT+VTS=?	Response +VTS: (list of supported <dtmf>s)[, (list of supported <duration>s)] OK Parameter see set command
Set command 1) AT+VTS=<dtmf-string> 2) AT+VTS=[<tone1>,<tone2>,<duration>] 3) AT+VTS=<dtmf>,<duration>	Response This command allows the transmission of DTMF tones and arbitrary tones in voice mode. These tones may be used (for example) when announcing the start of a recording period. <i>Note:</i> D is used only for dialling. 1) This is interpreted as a sequence of DTMF tones whose duration is set by the +VTD command. 2) This has no function at GSM. 3) This is interpreted as a DTMF tone whose duration is determined by <duration>. OK If error is related to ME functionality: +CME ERROR: <err> <i>Note:</i> the command is write only. Parameter <dtmf> String of ASCII characters in the set 0-9,#,*,. Maximal length of the string is 29. The string must be entered between double-quote characters (''). <duration> duration of the tone in 1/10 seconds 1-255
Reference GSM 07.07	Note This command only works during active voice call

15.2 AT commands to GSM 07.05 for SMS

15.2.1 List of commands

Commands according to GSM 07.05	Function
AT+CMGD	Delete SMS message
AT+CMGF	Select SMS message format
AT+CMGL	List SMS messages from preferred store
AT+CMGR	Read SMS message
AT+CMGS	Send SMS message
AT+CMGW	Write SMS message to memory
AT+CMSS	Send SMS message from storage
AT+CNMA	New SMS message acknowledge to ME/TE, only phase 2+
AT+CNMI	New SMS message indications

AT+CPMS	Preferred SMS message storage
AT+CSCA	SMS service centre address
AT+CSCB	Select cell broadcast SMS messages
AT+CSDH	Show SMS text mode parameters
AT+CSMP	Set SMS text mode parameters
AT+CSMS	Select message service

Tabelle 15-2: AT commands according to GSM 07.05

15.2.2 Detailed description

AT+CMGD Delete SMS message	
Test command AT+CMGD=?	Response OK Parameter
Execute command AT+CMGD= <index>	Response TA deletes message from preferred message storage <mem1> location <index>. OK If error is related to ME functionality: +CMS ERROR <err> Parameter <index> integer type; value in the range of location numbers supported by the associated memory
Reference GSM 07.05	Note

AT+CMGF Select SMS message format	
Test command AT+CMGF=?	Response +CMGF: (list of supported <mode>s) OK Parameter see set command
Read command AT+CMGF?	Response +CMGF: <mode> OK Parameter see set command
Set command AT+CMGF = [<mode>]	Response TA sets parameter which specifies the input and output format of messages to be used. OK Parameter <mode> 0 PDU mode 1 text mode
Reference GSM 07.05	Note

AT+CMGL List SMS messages from preferred store	
Test command AT+CMGL=?	Response +CMGL: (list of supported <stat>s) OK Parameter See execute command
Execute command AT+CMGL [=<stat>]	Parameter 1) If text mode: <stat> "REC UNREAD" Received unread messages (default) "REC READ" Received read messages "STO UNSENT" Stored unsent messages "STO SENT" Stored sent messages "ALL" All messages 2) If PDU mode: <stat> 0 Received unread messages (default) 1 Received read messages 2 Stored unsent messages 3 Stored sent messages 4 All messages Response TA 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'. <u>Note:</u> if the selected <mem1> can contain different types of SMS (e.g. SMS-DELIVERS, SMS-SUBMITs, SMS-STATUS-REPORTs and SMS-COMMANDs), the response may be a mix of the responses of different SM types. TE application can recognize the response format by examining the third response parameter. (continued next page)
	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 for SMS-STATUS-REPORTs: +CMGL: <index>,<stat>,<fo>,<mr>,<ra>,<tora>,<scts>,<dt>,<st><CR><LF> +CMGL: <index>,<stat>,<fo>,<mr>,<ra>,<tora>,<scts>,<dt>,<st>[...]] OK for SMS-COMMANDs: +CMGL: <index>,<stat>,<fo>,<ct><CR><LF> +CMGL: <index>,<stat>,<fo>,<ct>[...]] OK for CBM storage: +CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages><CR><LF><data><CR><LF> +CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages>

	<p><CR><LF><data>[...]]OK</p> <p>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</p> <p>3) If error is related to ME functionality: +CMS ERROR: <err></p>
	<p>Parameter</p> <p><alpha> string type alphanumeric representation of <da> or <oa> corresponding to the entry found in MT phonebook; implementation of this feature is manufacturer- specific</p> <p><ct> GSM 03.40 TP-Command-Type in integer format (default 0)</p> <p><da> GSM 03.40 TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted into characters; type of address given by < toda></p> <p><data> In the case of SMS: GSM 03.40 TP-User-Data in text mode responses; format:</p> <ul style="list-style-type: none"> -if < dcs> 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 -if < dcs> 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 hexadecimal numbers containing two IRA characters (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)) <p>In the case of CBS: GSM 03.41 CBM Content of Message in text mode responses; format:</p> <ul style="list-style-type: none"> - if < dcs> 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 -if < dcs> indicates that 8-bit or UCS2 data coding scheme is used: ME/TA converts each 8-bit octet into hexadecimal numbers containing two IRA characters <p>(continued next page)</p>
	<p>Parameter</p> <p><dt> GSM 03.40 TP-Discharge-Time in time-string format: "yy/MM/dd,hh:mm:ss±zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. For example, 6th of May 1994, 22:10:00 GMT+2 hours equals "94/05/06,22:10:00+08"</p> <p><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</p> <p><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)</p> <p><index> integer type; value in the range of location numbers supported by the associated memory</p> <p><mid>GSM 03.41 CBM Message Identifier in integer format</p>

	<p><mr> GSM 03.40 TP-Message-Reference in integer format</p> <p><oa> GSM 03.40 TP-Originating-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted into characters; type of address given by <tooa></p> <p><pages> GSM 03.41 CBM Page Parameter bits 0-3 in integer format</p> <p><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 hexadecimal numbers containing two IRA characters (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.</p> <p><page> GSM 03.41 CBM Page Parameter bits 4-7 in integer format</p> <p><ra> GSM 03.40 TP-Recipient-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted into characters; type of address given by <tora></p> <p><scts>GSM 03.40 TP-Service-Centre-Time-Stamp in time-string format (refer <dt>)</p> <p><sn> GSM 03.41 CBM Serial Number in integer format</p> <p><st> GSM 03.40 TP-Status in integer format</p> <p><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)</p> <p><tooa> GSM 04.11 TP-Originating-Address Type-of-Address octet in integer format (default refer<toda>)</p> <p><tora> GSM 04.11 TP-Recipient-Address Type-of-Address octet in integer format (default refer<toda>)</p>
Reference GSM 07.05	Note

AT+CMGR	Read SMS message
Test command AT+CMGR=?	Response OK Parameter
Execute command AT+CMGR= <index>	<p>Parameter</p> <p><index> integer type; value in the range of location numbers supported by the associated memory</p> <p>Response</p> <p>TA 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'.</p> <p>1) If text mode (+CMGF=1) and command successful: for SMS-DELIVER: +CMGR: <stat>,<oa>,[<alpha>],<scts> [,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data> for SMS-SUBMIT: +CMGR: <stat>,<da>,[<alpha>] [,<toda>,<fo>,<pid>,<dcs>],[<vp>],<sca>,<tosca>,<length>]<CR><LF><data> for SMS-STATUS-REPORT: +CMGR: <stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> for SMS-COMMAND: +CMGR: <stat>,<fo>,<ct> [,<pid>],[<mn>],[<da>],[<toda>],<length>]<CR><LF><cdata>] for CBM storage: +CMGR: <stat>,<sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data></p> <p>2) If PDU mode (+CMGF=0) and command successful: +CMGR: <stat>,[<alpha>],<length><CR><LF><pdu> OK</p> <p>3) If error is related to ME functionality: +CMS ERROR: <err></p> <p>Parameter</p> <p><alpha> string type alphanumeric representation of <da> or <oa> corresponding to the entry found in MT phonebook; implementation of this feature is manufacturer-specific</p> <p><ct> GSM 03.40 TP-Command-Type in integer format (default 0)</p> <p><da> GSM 03.40 TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted into characters; type of address given by <toda></p> <p><data> In the case of SMS: GSM 03.40 TP-User-Data in text mode responses; format: -if <dcs> 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 covered in Annex A -if <dcs> 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 hexadecimal numbers containing two IRA characters (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 CBM Content of Message in text mode responses; format: (continued next page)</p>

	<p>Parameter</p> <ul style="list-style-type: none"> - if <dc> indicates that GSM 03.38 default alphabet is used: ME/TA converts GSM alphabet into current TE character set according to rules covered in Annex A -if <dc> indicates that 8-bit or UCS2 data coding scheme is used: ME/TA converts each 8-bit octet into hexadecimal numbers containing two IRA characters <dt> GSM 03.40 TP-Discharge-Time in time-string format: "yy/MM/ dd, hh:mm:ss±zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. For example, 6th of May 1994, 22:10:00 GMT+2 hours equals "94/05/06,22:10:00+08" <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 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) <index> integer type; value in the range of location numbers supported by the associated memory <mid> GSM 03.41 CBM Message Identifier in integer format <mr> GSM 03.40 TP-Message-Reference 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 into characters; type of address given by <toa> <page> GSM 03.41 CBM Page Parameter bits 4-7 in integer format <pages> GSM 03.41 CBM Page Parameter bits 0-3 in integer format <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 hexadecimal numbers containing two IRA characters (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)). In the case of CBS: <ra> GSM 03.40 TP-Recipient-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted into characters; type of address given by <tora> <scts> GSM 03.40 TP-Service-Centre-Time-Stamp in time-string format (refer <dt>) <sn> GSM 03.41 CBM Serial Number in integer format <st> GSM 03.40 TP-Status in integer format <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) <toa> GSM 04.11 TP-Originating-Address Type-of-Address octet in integer format (default refer <toda>) <tora> GSM 04.11 TP-Recipient-Address Type-of-Address octet in integer format (default refer <toda>)
Reference GSM 07.05	Note

AT+CMGS	Send SMS message
Test command AT+CMGS=?	Response OK Parameter
Execute command 1) If text mode (+CMGF=1): +CMGS=<da>[, <toda>]<CR> text is entered <ctrl-Z/ESC> 2) If PDU mode (+CMGF=0): +CMGS=<length><CR> PDU is given <ctrl-Z/ESC> ESC aborts message	Parameter <da> GSM 03.40 TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted into characters; type of address given by <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) Response TA transmits SMS message from a TE to the network (SMS-SUBMIT). Message reference value <mr> is returned to the TE on successful message delivery. Value can be used to identify message upon unsolicited delivery status report result code. 1) If text mode (+CMGF=1) and sending successful: +CMGS: <mr>[,<scts>] OK 2) If PDU mode (+CMGF=0) and sending successful: +CMGS: <mr>[,<ackpdu>] OK 3) If error is related to ME functionality: +CMS ERROR: <err> Parameter <mr> GSM 03.40 TP-Message-Reference in integer format <scts> GSM 03.40 TP-Service-Centre-Time-Stamp in time-string format (refer <dt>) <dt> GSM 03.40 TP-Discharge-Time in time-string format: "yy/MM/dd,hh:mm:ss±zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. For example, 6th of May 1994, 22:10:00 GMT+2 hours equals "94/05/06,22:10:00+08" <ackpdu> GSM 03.40 RP-User-Data element of RP-ACK PDU; format is same as for <pdu> in case of SMS, but without GSM 04.11 SC address field and parameter shall be enclosed in double quote characters like a normal string type parameter <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 hexadecimal numbers containing two IRA characters (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.
Reference GSM 07.05	Note <u>Note: use CTRL-Z at the end of input to send the message and return OK. Use ESC at the end of message input to abort message send operation. NO message is sent although display returns OK!</u>

AT+CMGW	Write SMS message to memory
Test command AT+CMGW=?	Response OK Parameter
Execute command 1) If text mode (+CMGF=1): +CMGW[=<oa/da>[,<tooa/tooda>[,<stat>]]] <CR> text is entered ctrl-Z/ESC<> <ESC> quits without sending 2) If PDU mode (+CMGF=0): +CMGW=<length>[,<stat>]<CR> PDU is given <ctrl-Z/ESC>	Response TA transmits SMS message (either SMS-DELIVER or SMS-SUBMIT) from TE to memory storage <mem2>. Memory location <index> of the stored message is returned. Message status will be set to 'stored unsent'. Note: SMS-COMMANDs and SMS-STATUS-REPORTs can not be stored in text mode. If writing is successful: +CMGW: <index> OK If error is related to ME functionality: +CMS ERROR: <err> Parameter <oa> GSM 03.40 TP-Originating-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted into 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 into 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) <stat> 0 "REC UNREAD" Received unread messages (default) 1 "REC READ" Received read messages 2 "STO UNSENT" Stored unsent messages 3 "STO SENT" Stored sent messages 4 "ALL" All messages <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 hexadecimal numbers containing two IRA characters (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> Note: ctrl-Z sends/writes message, Returns Ok ESC aborts input, message NOT sent/written. Returns Ok
Reference GSM 07.05	Note

AT+CMSS Send SMS message from storage	
Test command AT+CMSS=?	Response OK Parameter
Execute command +CMSS= <index>[,<da> [,<toda>]]	Response TA sends message with location value <index> from message storage <mem2> to the network (SMS-SUBMIT or SMS-COMMAND). If new recipient address <da> is given for SMS-SUBMIT, 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. This command should be abortable. 1) If text mode (+CMGF=1) and send successful: +CMSS: <mr>[,<scts>] OK 2) If PDU mode (+CMGF=0) and send successful: +CMSS: <mr>[,<ackpdu>] OK 3) If error is related to ME functionality: +CMS ERROR: <err> Parameter <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 into characters; type of address given by <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) <mr> GSM 03.40 TP-Message-Reference in integer format
Reference GSM 07.05	Note

AT+CNMA New SMS message acknowledge to ME/TE, only phase 2+	
Test command AT+CNMA=?	Response 1) If text mode (+CMGF=1): OK 2) If PDU mode (+CMGF=0): +CNMA: (list of supported <n>s) OK Parameters see execute command
Execute command 1) If text mode: AT+CNMA 2) If PDU mode: AT+CNMA[=<n>[,<length>[<CR>PDU is given<ctrl-Z/ESC>]]]	Response TA confirms successful receipt of a new message (SMS-DELIVER or SMS-STATUS-REPORT) which is routed directly to the TE. TA shall not send another +CMT or +CDS result code to TE until previous one is acknowledged. If ME does not receive acknowledgment within required time (network timeout), ME should send RP-ERROR to the network. TA shall automatically disable routing to TE by setting both <mt> and <ds> values of +CNMI to zero. <u>Note: the command shall only be used when +CSMS parameter <service> equals 1 (= phase 2+).</u> 1) If text mode: OK 2) If PDU mode: OK 3) If error is related to ME functionality: +CMS ERROR: <err> Parameters <n> 0 command operates similarly as defined for the text mode 1 send RP-ACK (or buffered result code received correctly) 2 send RP-ERROR (if PDU is not given, ME/TA shall send SMS-DELIVER-REPORT with GSM 03.40 TP-FCS value set to 'FF' (unspecified error cause)) <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)
Reference GSM 07.05	Note

AT+CNMI	New SMS message indications
Test command AT+CNMI=?	Response +CNMI: (list of supported <mode>s), (list of supported <mt>s), (list of supported <bm>s), (list of supported <ds>s), (list of supported <bfr>s) OK Parameter see set command
Read command AT+CNMI?	Response +CNMI: <mode>,<mt>,<bm>,<ds>,<bfr> OK Parameter see set command
Set command AT+CNMI = [<mode> [, <mt> [, <bm> [, <ds> [, <bfr>]]]]]	Response TA selects the procedure, how the receipt of new SMS messages from the network is indicated 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. <u>Note1:</u> when DTR signal is not available or the state of the signal is ignored (V.25ter command &D0), reliable message transfer can be assured by using +CNMA acknowledgment procedure. <u>Note2:</u> the rules <mt>=2 and <mt>=3 for storing received SM are possible <u>only if phase 2+</u> compatibility is activated with +CSMS=1 OK If error is related to ME functionality: +CMS ERROR: <err> Parameter <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 inband technique used to embed result codes and data when TA is in on-line data mode. <mt> (the rules for storing received SMS depend on the relevant data coding method (refer to GSM 03.38 [2]), preferred memory storage (+CPMS) setting and this value <u>Note:</u> if AT command interface is acting as the only display device, the ME must support storage of class 0 messages and messages in the message waiting indication group (discard message) 0 No SMS-DELIVER indications are routed to the TE. 1 If SMS-DELIVER is stored in ME/TA, indication of the memory location is routed to the TE using unsolicited result code: +CMTI: <mem>,<index> (continued next page)
	<u>Note:</u> 2 SMS-DELIVERS routed directly to TE are NOT supported 3 Class 3 SMS-DELIVERS routed directly to TE are NOT supported. <bm> (the rules for storing received CBMs depend on the relevant data coding method (refer to GSM 03.38 [2]), the setting of Select CBM Types (+CSCB) and this value:

	<p>0 No CBM indications are routed to the TE.</p> <p>1 If CBM is stored in ME/TA, indication of the memory location is routed to the TE using unsolicited result code: +CBMI: <mem>,<index></p> <p>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>,<dcs>,<page>,<pages><CR><LF><data> (text mode enabled) If ME supports data coding groups which define special routing also for messages other than class 3 (e.g. SIM specific messages), ME may choose not to route messages of such data coding schemes into TE (indication of a stored CBM may be given as defined in <bm>=1).</p> <p>3 Class 3 CBMs are routed directly to TE using unsolicited result codes defined in <bm>=2. If CBM storage is supported, messages of other classes result in indication as defined in <bm>=1.</p> <p><ds> 0 No SMS-STATUS-REPORTs are routed to the TE. Note: 1 SMS-STATUS-REPORTs routed to TE not supported. 2 indication of memory location routed to TE not supported.</p> <p><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.</p>
	<p>Unsolicited result code</p> <p>+CMTI: <mem>,<index> Indication that new message has been received</p> <p>+CMT: ,<length><CR><LF><pdu> Short message is output directly</p> <p>+CBM: <length><CR><LF><pdu> Cell broadcast message is output directly</p>
Reference GSM 07.05	Note

AT+CPMS	Preferred SMS message storage
Test command AT+CPMS=?	<p>Response</p> <p>+CPMS: (list of supported <mem1>s), (list of supported <mem2>s) ,(list of supported <mem3>s)</p> <p>Parameter see set command</p>
Read command AT+CPMS?	<p>Response</p> <p>+CPMS: <mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3> OK</p> <p>If error is related to ME functionality: +CMS ERROR</p> <p>Parameter see set command</p>
Set command AT+CPMS = <mem1> [,<mem2> [,<mem3>]]	<p>Response</p> <p>TA selects memory storages <mem1>, <mem2> and <mem3> to be used for reading, writing, etc.</p> <p>+CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3> OK</p> <p>If error is related to ME functionality: +CMS ERROR:<err></p>

	<p>Parameter</p> <p><mem1> Messages to be read and deleted from this memory storage "SM" SIM message storage</p> <p><mem2> Messages will be written and sent to this memory storage "SM" SIM message storage</p> <p><mem3> Received messages will be placed in this memory storage if routing to PC is not set ("+CNMI") "SM" SIM message storage</p> <p><usedx> Number of messages currently in <memx></p> <p><totalx> Number of messages storable in <memx></p>
<p>Reference GSM 07.05</p>	<p>Note</p>

AT+CSCA SMS service centre address	
Test command AT+CSCA=?	Response OK
Read command AT+CSCA?	Response +CSCA: <sca>,<tosca> OK Parameter see set command
Set command AT+CSCA = <sca>[,<tosca> >]	Response TA 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. <u>Note: this command writes the service centre address to non-volatile memory.</u> OK Parameter <sca> GSM 04.11 RP SC address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted into characters; type of address given by <tosca> <tosca> Service centre address format GSM 04.11 RP SC address Type-of-Address octet in integer format (default refer <toda>)
Reference GSM 07.05	Note

AT+CSCB Select cell broadcast SMS messages	
Test command AT+CSCB=?	Response +CSCB: (list of supported <mode>s) OK Parameter see set command
Read command AT+CSCB?	Response +CSCB: <mode>,<mids>,<dcss> OK Parameter see set command
Set command AT+CSCB= [<mode>[,<mids> > [,<dcss>]]]	Response TA selects which types of CBMs are to be received by the ME. OK Parameter <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". A maximum of 8 <mids> can be accepted. The maximum <mids> value is 999. Parameters are always sorted by value in output. <dcss> string type; all different possible combinations of

	CBM data coding schemes (refer <dc>) (default is empty string); e.g. "0-3,5". A maximum of 5 <dc> can be accepted. The maximum <dc> value is 15. In set commands with <mode> =0, the <dc> s must be written in order of priority (highest priority language first). The new <dc> will have higher priority than any existing <dc> . In read commands with <mode> =0, the <dc> s are written in order of priority.
Reference GSM 07.05	Note The A20 supports text mode only in Cell Broadcast Messages.

AT+CSDH Show SMS text mode parameters	
Test command AT+CSDH=?	Response +CSDH: (list of supported <show>s) OK Parameter see set command
Read command AT+CSDH?	Response +CSDH:<show> OK Parameter see set command
Set command AT+CSDH= <show>	Response TA sets whether or not detailed header information is shown in text mode result codes. OK Parameter <show> 0 do not show header values defined in commands +CSCA and +CSMP (<sca>, <tosca>, <fo>, <vp>, <pid> and <dcs>) nor <length>, <toda> or <tooa> in +CMT, +CMGL, +CMGR result codes for SMS-DELIVERs and SMS-SUBMITs in text mode; for SMS-COMMANDs in +CMGR result code, do not show <pid>, <mn>, <da>, <toda>, <length> or <cdata> 1 show the values in result codes
Reference GSM 07.05	Note

AT+CSMP Set SMS text mode parameters	
Test command AT+CSMP=?	Response +CSMP: (list of supported <fo>s), (list of supported <vp>s) OK Parameter see set command
Read command AT+CSMP?	Response +CSMP:<fo>,<vp> OK Parameter see set command
Set command AT+CSMP= [<fo>[<vp>[,p id [,<dcs>]]]]	Response TA selects values for additional parameters needed when SM is sent to the network or placed in a storage when text format message mode is selected. It is possible to set the validity period starting from when the SM is received by the SMSC (<vp> is in range 0... 255) or define the absolute time of the validity period termination (<vp> is a string). Parameter <fo> depending on the command or result code: first octet of GSM 03.40 SMS- DELIVER, SMS-SUBMIT (default 17), , or SMS-COMMAND (default 2) in integer format <vp> depending on SMS-SUBMIT <fo> setting: GSM 03.40 TP-Validity-Period either in integer format (default 167)
Reference GSM 07.05	Note The command writes the parameters in NON-VOLATILE memory.

AT+CSMS Select Message Service	
Test command AT+CSMS=?	Response +CSMS: (list of supported <service>s) OK Parameter see set command
Read command AT+CSMS?	Response +CSMS: <service>,<mt>,<mo>,<bm> OK Parameter see set command
Set command AT+CSMS= <service>	Response +CSMS: <mt>,<mo>,<bm> OK If error is related to ME functionality: +CMS ERROR: <err> Parameter <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)) 1 GSM 03.40 and 03.41 (the syntax of SMS AT commands is compatible with GSM 07.05 Phase 2+ version; the requirement of <service> setting 1 is mentioned under corresponding command descriptions) Currently not available with the M20. <mt> Mobile Terminated Messages: 0 Type not supported 1 Type supported <mo> Mobile Originated Messages: 0 Type not supported 1 Type supported <bm> Broadcast Type Messages: 0 Type not supported 1 Type supported
Reference GSM 07.05	Note

16 Siemens-defined AT commands for enhanced functions

Self-defined commands do not have to be implemented in accordance with the official syntax. The "+C" string can therefore be replaced by "^S" ("^" = 0x5E). If a self-defined command with the same syntax is to be included in future in the GSM recommendations, the command can be addressed with both strings.

16.1 List of commands

List of Siemens-defined commands	Function
AT^SACM	Advice of Charge and query of ACM and ACMmax
AT^SCID	Display SIM card identification number
AT^SCKS	Set SIM conn. presentation. mode and query SIM conn. status
AT^SCNI	List call number information
AT^SCTM	Set critical operating temp. present. mode or query temp. status
AT^SCVM	Set critical operating volt. present. mode or query volt. status
AT^SLCK	Facility lock (including Siemens-defined locks)
AT^SMGL	List SMS mess. from pref. store without changing status to read
AT^SMGO	Set or query SMS overflow present. mode or query SMS overflow
AT^SMSO	Switch off/on mobile station
AT^SNFA	Set or query of microphone attenuation
AT^SNFD	Set audio parameters to manufacturer default values
AT^SNFE	Set or query echo suppression parameters
AT^SNFI	Set microphone path parameters
AT^SNFM	Mute microphone
AT^SNFO	Set or query audio output (= loudspeaker path) parameters
AT^SNFR	Switch audio interface digital/analog
AT^SNFS	Select audio hardware set
AT^SNFV	Set or query loudspeaker volume
AT^SNFW	Write audio setting in non-volatile store
AT^SNUM	Write Subscriber number
AT^SPIC	Display PIN counter
AT^SPLM	Read the PLMN list
AT^SPLR	Read entry from the preferred operator list
AT^SPLW	Write an entry to the preferred operator list
AT^SPWD	Change password for a lock (including Siemens-defined locks)
AT^SRTC	Select, query or test ringing tone
AT^SRTE	Connection rate
AT^SSTA	Display temperature and voltage status

AT^SWHO	Display working hours
AT^MONI	Monitor mode in Idle mode
AT^MONP	Monitor neighbour cells
AT+CXXCID	Display card ID (identical to AT^SCID)

Tabelle 16-1: Siemens-defined AT commands

16.2 Detailed description

AT^SACM Advice of charge and query of ACM and ACMmax	
Test command AT^SACM=?	Response ^SACM: (list of supported <n>s) OK Parameter see set command
Read command AT^SACM	Response TA returns the Advice of Charge supplementary service function mode and the SIM values for accumulated call meter (ACM) and accumulated call meter maximum (ACMmax). ^SACM: <n>,<acm>,<acm_max> OK If error is related to ME functionality: +CME ERROR: <err> Parameter see set command
Set command AT^SACM=<n>	Response TA sets the Advice of Charge supplementary service function mode. OK If error is related to ME functionality: +CME ERROR: <err> Parameter <n> 0 suppress unsolicited result code 1 display unsolicited result code <acm> ACM, string type; three bytes of the current ACM value in hexadecimal format (e.g. "00001E" indicates decimal value 30) 000000-FFFFFF <acm_max> ACMmax, string type; three bytes of the max. ACM value in hexadecimal format (e.g. "00001E" indicates decimal value 30) 000000 disable ACMmax feature 000001-FFFFFF <ccm> string type; three bytes of the current CCM value in hexadecimal format (e.g. "00001E" indicates decimal value 30); bytes are coded in the same way as ACMmax value in the SIM 000000-FFFFFF
	Unsolicited result code When activated, an unsolicited result code is sent when the CCM value changes, but not more that every 10 seconds +CCCM: <ccm> Parameter see set command
Reference GSM07.07:	Note

AT+CACM,
AT+CAMM,
AT+CAOC

AT^SCID Display SIM card identification number	
Test command AT^SCID=?	Response OK If error is related to ME functionality: +CME ERROR: <err> Parameter
Execute command AT^SCID	Response TA returns the card identification number in SIM (SIM file EF ICCID, see GSM 11.11 Chapter 10.1.1). ^SCID: <cid> OK If error is related to ME functionality: +CME ERROR: <err> Parameter <cid> string type: card identification number in SIM
Reference	Note

AT^SCKS Set SIM connection presentation mode and query SIM connection status	
Test command AT^SCKS=?	Response ^SCKS: (list of supported <n>s) OK Parameter see set command
Read command AT^SCKS?	Response TA returns SIM connected presentation mode and SIM connected status. ^SCKS: <n>, <m> OK Parameter see set command
Set command AT^SCKS=<n>	Response TA sets SIM connected presentation mode whether or not an unsolicited result code is to be sent to TE when SIM is not connected. OK Parameter <n> 0 Suppress unsolicited result codes 1 Output unsolicited result codes <m> 0 No card 1 Card in card reader
	Unsolicited result code When the status SIM connected has changed, an unsolicited result code is sent to TE ^SCKS: <m> Parameter see set command
Reference	Note

AT^SCNI List Call Number Information	
Test command AT^SCNI=?	Response OK
Execute command AT^SCNI	<p>Response</p> <p>TA returns a list of current calls of ME.</p> <pre>[^SCNI: <id1>[,<cs>[,<number>,<type>]]] [^SCNI: <id2>[,<cs>[,<number>,<type>]]] [...] OK</pre> <p>If error is related to ME functionality: +CME ERROR: <err></p> <p>Parameter</p> <p><idx> integer type; call identification number as described in GSM 02.30[19] subclause 4.5.5.1; this number can be used in +CHLD command operations</p> <p>1-7</p> <p><cs> Call status of respective call number (first parameter)</p> <p>0 call hold</p> <p>1 call in progress</p> <p>2 Waiting call</p> <p><number> string type phone number in format specified by <type></p> <p><type> type of address octet in integer format; 145 when dialling string includes international access code character "+", otherwise 129</p>
Reference Siemens, GSM 07.07: AT+CLCC	Note

AT^SCTM Set critical operating temperature presentation mode or query temperature																
Test command AT^SCTM=?	Response ^SCTM: (list of supported <n>s) OK Parameter see set command															
Read command AT^SCTM?	Response TA returns critical operating temperature presentation mode setting and temperature data ^SCTM: <n>, <m> OK Parameter see set command															
Set command AT^SCTM=<n>	Response TA sets critical operating temperature presentation mode OK Parameters <table border="0"> <tr> <td><n></td> <td>0</td> <td>Suppress unsolicited result codes</td> </tr> <tr> <td></td> <td>1</td> <td>Output unsolicited result codes</td> </tr> <tr> <td><m></td> <td>0</td> <td>Below critical temperature</td> </tr> <tr> <td></td> <td>1</td> <td>Above critical temperature (message issued when temperature of the A20-PCB is > 80°C)</td> </tr> <tr> <td></td> <td>2</td> <td>Device switched off (message issued when temperature of the A20-PCB is > 85°C), device immediately deregisters.</td> </tr> </table>	<n>	0	Suppress unsolicited result codes		1	Output unsolicited result codes	<m>	0	Below critical temperature		1	Above critical temperature (message issued when temperature of the A20-PCB is > 80°C)		2	Device switched off (message issued when temperature of the A20-PCB is > 85°C), device immediately deregisters.
<n>	0	Suppress unsolicited result codes														
	1	Output unsolicited result codes														
<m>	0	Below critical temperature														
	1	Above critical temperature (message issued when temperature of the A20-PCB is > 80°C)														
	2	Device switched off (message issued when temperature of the A20-PCB is > 85°C), device immediately deregisters.														
	Unsolicited result code When the temperature data has changed, an unsolicited result code is sent to TE ^SCTM: <m> Parameter see set command															
Reference GSM Engine A1	Note Important: The device switches off (like smso) even if <n> is 0 and user is not informed.															

AT^SCVM Set critical operating voltage presentation mode or query voltage status											
Test command AT^SCVM=?	Response ^SCVM: (list of supported <n>s) OK Parameter see set command										
Read command AT^SCVM?	Response TA returns critical operating voltage status presentation mode setting and voltage data ^SCVM: <n>, <m> OK Parameter see set command										
Set command AT^SCVM=<n>	Response TA sets critical operating temperature presentation mode OK Parameters <table border="0"> <tr> <td><n> 0</td> <td>Suppress unsolicited result codes</td> </tr> <tr> <td>1</td> <td>Output unsolicited result codes</td> </tr> <tr> <td><m> 0</td> <td>Above critical voltage</td> </tr> <tr> <td>1</td> <td>Below critical voltage (power voltage ≤8V or logic voltage ≤5,4V, switch off transmitter)</td> </tr> <tr> <td>2</td> <td>Logic voltage <4V (software reboot)</td> </tr> </table>	<n> 0	Suppress unsolicited result codes	1	Output unsolicited result codes	<m> 0	Above critical voltage	1	Below critical voltage (power voltage ≤8V or logic voltage ≤5,4V, switch off transmitter)	2	Logic voltage <4V (software reboot)
<n> 0	Suppress unsolicited result codes										
1	Output unsolicited result codes										
<m> 0	Above critical voltage										
1	Below critical voltage (power voltage ≤8V or logic voltage ≤5,4V, switch off transmitter)										
2	Logic voltage <4V (software reboot)										
	Unsolicited result code When the voltage status data has changed, an unsolicited result code is sent to TE ^SCVM: <m> Parameter see set command										
Reference	Note Important: The device switches off (like smso) even if <n> is 0 and user is not informed.										

AT^SLCK Facility lock (including self-defined locks)	
Test command AT^SLCK=?	Response ^SLCK: (list of supported <fac>s) OK Parameter see execute command
Execute command AT^SLCK = <fac>, <mode> [, <passwd> [, <class>]]	Response This command is used to lock, unlock or interrogate a ME or a network facility <fac>. Password is normally needed for 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>. It should be possible to abort the command when network facilities are set or interrogated. If <mode><>2 and command is successful OK If <mode>=2 and command successful ^SLCK: <status>[, <class1>[<CR><LF> ^SLCK: <status>, class2....]] OK If error is related to ME functionality: +CME ERROR: <err> Parameter <fac> "PS" Phone locked to SIM (phone code) "SC" SIM card (PIN) "FD" FDN lock "AO" BAOC (Bar All Outgoing Calls) "OI" BOIC (Bar Outgoing International Calls) "OX" BOIC-exHC (Bar Outgoing International Calls except to Home Country) "AI" BAIC (Bar All Incoming Calls) "IR" BIC-Roam (Bar Incoming Calls when Roaming outside the home country) "AB" All Barring services "AG" All Outgoing barring services "AC" All inComing barring services "PN" Network Personalization (GSM 02.22) "PC" Corporate Personalization (GSM 02.22) "PU" Network Subset Personalization (GSM 02.22) "PP" Service Provider Personalization (GSM 02.22) "PF" Phone locked to very first inserted SIM <mode> 0 disable lock 1 enable lock 2 query lock status <passwd> password <class> 1 voice 2 data 4 fax 7 all classes (default)

	<status> 0 off 1 on
Reference GSM 07.07: AT+CLCK	Note

AT^SMGL		List SMS messages from preferred storage without changing status to read
Test command AT^SMGL=?	Response	see set command + CMGL Parameters see command +CMGL
Execute command AT^SMGL [=<stat>]	Response	TA returns messages with status value <stat> from message storage <mem1> to the TE. The status of the messages is u n c h a n g e d (unread remains unread). Otherwise: see command +CMGL Parameters see command +CMGL
Reference GSM Engine A1, GSM 07.05: +CMGL	Note	

AT^SMGO		Set or query SMS overflow presentation mode or query SMS overflow
Test command AT^SMGO=?	Response	^SMGO: (list of supported <n>s) OK Parameter see set command
Read command AT^SMGO?	Response	TA returns overflow presentation mode and SMS overflow status ^SMGO: <n>,<mode> OK If error is related to ME functionality: +CME ERROR: <err> Parameter see set command
Set command AT^SMGO=<n>	Response	TA sets overflow presentation mode OK Parameter <n> SMS overflow presentation mode 0 disable (default) 1 enable <mode> SMS overflow status 0 space available 1 SMS buffer full (chip card) 2 Buffer full and new message waiting in SC for delivery to phone
	Unsolicited result code	When the status SIM overflow changes, an unsolicited result code is sent to TE ^SMGO: <mode> Parameter

	see set command
Reference Siemens	Note

AT^SMSO Switch off/on mobile station	
Test command AT^SMSO=?	Response ^SMSO: (list of supported <n>s) OK Parameter see execute command
Read command AT^SMSO?	Response ^SMSO: <n> OK Parameter see execute command
Execute command AT^SMSO=<n>	Response ^SMSO: OK Parameters <n> (parameter to switch off/on or to read the actual condition) 0 switch off / switched off 1 switch on / switched on If error is related to ME functionality: +CME ERROR: <err> If no parameter is written, the result is the same as n=0 (switch off like A1)
AT^SMSO	Response ^SMSO: MS OFF OK
Reference	Note

AT^SNFA Set or query of microphone attenuation	
Test command AT^SNFA=?	Response ^SNFA: (list of supported <inCalibrate>s) OK Parameter see set command
Read command AT^SNFA?	Response TA returns the value of attenuation. <i>Note:</i> if microphone is muted, TA returns value 0. ^SNFA: <inCalibrate> OK Parameter see test command
Set command AT^SNFA= <inCalibrate>	Response TA controls the large-scale attenuation on the microphone path. OK Parameter <inCalibrate> attenuation/dB = 20*log (<inCalibrate> / 32768) 0 (0x0) – 65535 (0xFFFF)
Reference GSM Engine A1	Note Set command works only in audio mode 2 or 3. When microphone is muted, set command is disabled.

	Commands read and execute are related to the active audio mode. The value <inCalibrate> can be changed by the commands AT^SNFI and AT+VGT,too.
--	--

AT^SNFD Set audio parameters to manufacturer default values	
Test command AT^SNFD=?	Response OK
	Parameter
Read command AT^SNFD	Response TA sets the active audio parameters to manufacturer defined default values. OK
	Parameter
Reference	Note

AT^SNFE	Set or query echo parameters
Test command AT^SNFE=?	Response ^SNFE: (list of supported < voxGain >s), (list of supported < minMicEnergy >s), (list of supported < samplesSilencePeriod >s), (list of supported < continueSuppressPeriod >s) OK Parameter see set command
Read command AT^SNFE?	Response ^SNFE: <voxGain>, <minMicEnergy>, <samplesSilencePeriod>, <continueSupressPeriod> OK Parameter see set command
Set command AT^SNFE=<voxGain>,<minMicEnergy>,<sampleSilencePeriod>,<continueSuppressPeriod>	Response TA sets echo parameters. If ear piece energy scaled by <voxGain> microphone energy, and microphone energy <minMicEnergy> echo suppression will take place. If there is silence, <sampleSilencePeriod> of frames will be transmitted before saving a silence frame. If the conditions of echo suppression has not met more echo suppression will be continued during<continueSuppressPeriod> frames. OK
	Parameter <voxGain> Scaling factor for ear piece signal in echo suppression. Scaling factor=20*log(voxGain/32768) Value range: 0(0x0)-32767(0x7FFF) <minMicEnergy> Minimum energy at the microphone before echo suppression can take place (usually set to 0) Value range: 0(0x0)-32767(0x7FFF) <sampleSilencePeriod> Number of 20-ms speech frames after the speech transcoder says there is silence before saving a 'silence' frame. Used to allow speech to decay to the background (silence) level. Value range: 0(0x0)-32767(0x7FFF) <continueSuppressPeriod> Number of extra 20-ms speech frames over which echo suppression will continued after the echo suppression condition cases value range: 0(0x0)-32767(0x7FFF)
Reference	Note Set command works only in audio mode 2 or 3. Commands read and execute are related are related to the active audio mode.

AT^SNFI Set microphone path parameters	
Test command AT^SNFI=?	Response ^SNFI: (list of supported <inBbcGain>s), (list of supported <inCalibrate>s) OK Parameters see set command
Read command AT^SNFI?	Response +SNFI: < inBbcGain >, <inCalibrate> OK Parameters see set command
Set command AT^SNFI=<inBbcGain>,<inCalibrate>	Response TA sets microphone path amplifying. OK AT+VGT
	Parameters <inBbcGain>Setting for ADC gain Amplifier (0=0 dB, 13=39 dB, 14 steps of 3 dB) 0(0x0)-13(0xD) <inCalibrate>Multiplication factor for input samples Attenuation=20*log (inCalibrate/32768) 0(0x0)-65535 (0xFFFF)
Reference Siemens	Note Set command works only in audio mode 2 or 3. Commands read and execute are related to the active audio mode. The value <inCalibrate> can be changed by the commands AT^SNFA and AT+VGT, too.

AT^SNFM Mute microphone	
Test command AT^SNFM=?	Response ^SNFM: (list of supported <mute>s) OK Parameter see set command
Read command AT^SNFM?	Response +SNFM: <mute> OK Parameter see set command
Set command AT^SNFM=<mute>	Response TA switches on/off the microphone OK Parameter <mute> 0 Mute microphone 1 Microphone on
Reference GSM Engine A1	Note Select audio hardware set sets ^SNFM<mute><mute> =1 automatically

AT^SNFO Set or query of Audio Output (= loudspeaker path) Parameters	
Test command AT^SNFO=?	Response ^SNFO:(list of supported <outBbcGain>),(list of supported <outCalibrate>s),(list of supported<outStep>),(list of supported <sideTone>s) OK Parameter see set command
Read command AT^SNFO	Response +SNFO: <outBbcGain>, <outCalibrate> , <outStep>, <sideTone> OK Parameter see set command
Set command AT^SNFO=<outBbcGain> <outCalibrate[0]> .. <outCalibrate[7]> <outStep> <sideTone>	Response TA sets loudspeaker path parameters: <outBbcGain> <outCalibrate>(outStep)> <sideTone> The value <outCalibrate> are by this command new defines. OK. Parameters <outBbcGain> Setting for DAC gain Amplifier attenuation (0 6 dB, 7 15 dB, 8 steps of 3 dB) 0(0x0)-7(0x7) <outCalibrate[0]> ... <outCalibrate[7]> Multiplication factor for output samples Attenuation = 20 * log (outCalibrate[n] / 32768) (0(0x0)- 65535(0xFFFF)) <outStep> Setting of actual volume; 0(0x0)-7(0x7) <sideTone> Multiplication factor determining how much of the original microphone signal is added to the earpiece signal. Side Tone Gain/dB = 20 * log (sideTone/32768) 0(00x0)-65535(0xFFFF)
Reference	Note Set command works only in audio mode 2 or 3. Commands red and set are related to the active audio mode. The values <outCalibrate> can be changed by the commands AT^SNFV and AT+VGR, too.

AT^SNFR Switch audio interface digital/analog	
Test command AT^SNFR=?	Response ^SNFR: (list of supported <audIfcMode>s) OK
	Parameter
Read command AT^SNFR?	Response ^SNFR: <audIfcMode> OK
	Parameter See below
Executive command AT^SNFR= <audIfcMode>	Response TA switched off/on the intern microphone and loudspeaker path of BBC on the digital audio bus. In off state the digital audio bus can be driven by extern device. OK
	Parameter <audIfcMode>: 0 digital audio interface active 1 analog audio interface active
Reference	Note Set command works only in audio mode 2 or 3. Commands read and execute are related to the active audio mode. Manufacturer defined default values: audio mode 1:1 Audio mode 2 and 3:0

AT^SNFS	Select audio hardware set
Test command AT^SNFS=?	Response ^SNFS: (list of supported <audMode>s) OK Parameter see set command
Read command AT^SNFS?	Response ^SNFS: <audMode> OK Parameter see set command
Set command AT^SNFS= <audMode>	Response TA activates the selected audio set. TA reads the audio set for audio mode 1 from manufacturer defined table, for audio mode 2 or 3 from user defined in EEPROM. In case of the selected user defined table in EEPROM is not valid, the manufacturer defined table will be read. TA stores value <audMode> in EEPROM. OK If error is related to ME functionality: + CME ERROR: <error> <error> memory failure EEPROM read error or EEPROM write error Parameters <audMode> 1(0x1) Audio mode 1: standard mode approved for handset, Nokia HSU-1, switched always through analog interface 2(0x2) Audio mode 2: customer specific mode with Handfree; all audio parameters can be adjusted by AT-Commands; switched through digital or analog interface 3(0x3) Audio mode 3: customer specific mode for handset; all audio parameters can be adjusted by AT-Commands; switched through digital or analog interface
	Unsolicited result code When TA can not initialise audio mode and audio parameter by EEPROM read because of EEPROM error after Reset, TA select audio mode 1, reads the audio set for audio mode 1 from manufacturer defined table and sends an unsolicited result code to TE. ^SNFS: <n> <n> 3 EEPROM read error

Reference	Note
GSM 07.07	<p>When the user defined table for audio mode 2 or 3 in EEPROM is empty, TA reads from manufacturer defined table</p> <p>The following set commands can be used only in mode2 or in mode3:</p> <p>^SNFA=<inCalibrate></p> <p>^SNFE=<voxGain>,<minMicEnergy>,<sampleSilencePeriod>,<continueSuppressPeriod></p> <p>^SNFI=<inBbcGain>,<inCalibrate></p> <p>^SNFO=<outBbcGain>,<outCalibrate[0]><outCalibrate[7]>,<outStep>,<sideTone></p> <p>^SNFR=<audIfcMode></p> <p>^SNFW</p> <p>+VGR=<outCalHighByte></p> <p>+VGT=<inCalHighByte></p>

AT^SNUM Write Subscriber number	
Test command AT^SNUM=?	<p>Response</p> <p>TA returns locations range supported by the MSISDN storage, the maximum length of <alpha1> string, the maximum length of <number1> field, supported number formats for <type1> and supported formats for <speed>, <service> and <itc> .</p> <p>^SNUM: (list of supported <index>s), <alength>, <nlength>, (list of supported <typ>s), (list of supported <speed>s), (list of supported <service>s), (list of supported <itc>s)</p> <p>OK</p> <p>If error is related to ME functionality: +CME ERROR: <err></p>
	<p>Parameter</p> <p>See execute command</p>
Execute command AT^SNUM=[<index>], [<alpha1>], <number1>, <type1> [,<speed>, <service> [,<itc>]]	<p>Response</p> <p>TA writes MSISDN phonebook entry in location <index>. Entry fields written are alpha string <alpha1>, phone number <number1> (in the format <type1>) and values for <speed>, <service> and <itc>. If <index> is left out, but <number1> is given. Entry is written to first free location in the MSISDN phonebook.</p> <p>OK</p> <p>If error is related to ME functionality: +CME ERROR: <err></p> <p>Parameter</p> <p><alength> max. length of alpha string <nlength> max. length of phone number</p> <p><index> location number <alpha1> alpha string <number1> phone number <type1> type of number, e.g. 145 when dialling string includes international access code character "+", otherwise 129 <speed> as defined in GSM 07.07 subclause 6.7 <service> (service related to the phone number) 0 asynchronous modem 1 synchronous modem 2 PAD Access 4 Packet Access 5 voice 6 fax</p> <p>also all other values below 128 are reserved by ETS</p> <p><itc> (information transfer capability) 1 3.1 kHz 1 UDI</p>
Reference	Note

AT^SPLR Read entry from the preferred operator list	
Test command AT^SPLR=?	Response TA returns the whole index range supported by the SIM. ^SPLR: (list of supported <index>s) OK If error is related to ME functionality: +CME ERROR: <err> Parameter see execute command
Execute command AT^SPLR= <index1>[, <index2>]	Response TA returns used entries from the SIM list of preferred operators with <index> between <index1> and <index2>. If <index2> is not given, only entry with <index1> is returned. ^SPLR: <index1>, numeric <oper> ^SPLR: ^SPLR: <index2>, numeric <oper> OK If error is related to ME functionality: +CME ERROR: <err> Parameter <index1> location number to read from <index2> location number to read to default: <index1> <oper> string type; operator in numeric form; GSM location area identification number <index> location number
Reference GSM 07.07: AT+CPOL	Note

AT^SPWD Change password for a lock (including Siemens-defined locks)	
Test command AT^SPWD=?	Response ^SPWD: (list of supported (<fac>, <pwdlength>)s) OK If error is related to ME functionality: +CME ERROR: <err> Parameter <fac> "P2" PIN2 otherwise see execute command without "FD" <pwdlength> integer max. length of password
Execute command AT^SPWD = <fac>, <oldp- wd>, <newpwd>	Parameter <fac> "SC" SIM card (PIN) "AO" BAOC (Bar All Outgoing Calls) "OI" BOIC (Bar Outgoing International Calls) "OX" BOIC-exHC (Bar Outgoing International Calls except to Home Country) "AI" BAIC (Bar All Incoming Calls) "IR" BIC-Roam (Bar Incoming Calls when Roaming outside the home country) "AB" All Barring services "AG" All outGoing barring services "AC" All inComing barring services "P2" PIN 2 <oldpwd> <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
	Response All facility locks: AO, OI, OX, AI, IR, AB, AG, AC, have the the SAME <password> to lock and unlock. The <password> depends on the network provider. TA sets a new password for the facility lock function. OK If error is related to ME functionality: +CME ERROR: <err>
Reference GSM 07.07: AT+CPWD	Note

AT^SPLW Write an entry to the preferred operator list	
Test command AT^SPLW=?	Response TA returns the whole index range supported by the SIM. ^SPLW: (list of supported <index>s) OK If error is related to ME functionality: +CME ERROR: <err> Parameter see execute command
Execute command AT^SPLW = <index> [, <oper>]	Parameter TA writes an entry to the SIM list of preferred operators (EFPLMNscl) at location number <index>. If <index> is given but <oper> is left out, the entry is deleted. If <oper> is given but <index> is left out, <oper> is inserted in the next free location. <index> location number <oper> string type; operator in numeric form; GSM location area identification number <u>Note: <oper> is a 5 digit number. 3 digits country code and 2 digits for the Network provider</u> Response OK If error is related to ME functionality: +CME ERROR: <err>
Reference GSM 07.07: AT+CPOL	Note

AT^SRTC Select, query or test ringing tone													
Test command AT^SRTC=?	Response ^SRTC: (list of supported <type>s), (list of supported <vol>s) OK Parameter see set command												
Read command AT^SRTC?	Response ^SRTC: <type>, <vol> OK Parameter see set command												
Set command AT^SRTC= [<type>][,<vol> l>]	Response TA sets the ringing parameters <type> and <vol>. OK Parameter <table border="0"> <tr> <td><type></td> <td>type of ringing tone</td> </tr> <tr> <td>1</td> <td>Sequence 1: 4 second cycle, 3 tone rise and fall <900>,<1> <0>,<3></td> </tr> <tr> <td>2</td> <td>Sequence 2: 4 second cycle, single burst bitone <1425, 1625>,<1> <0>,<3></td> </tr> <tr> <td>3</td> <td>Sequence 3: 4 second cycle, single burst tritone <1425, 1625, 1825>,<1> <0>,<3></td> </tr> <tr> <td>4</td> <td>Sequence 4: 3.3 second cycle, double burst ('BT' style) <1700>,<0.3> <0>,<0.3> <1700>,<0.3> <0>,<2.2></td> </tr> <tr> <td>5</td> <td>Sequence 5: 3.1 second cycle, rising tone on musical scale <2400>,<0.1> <2700>,<0.1> <3000>,<0.1> <3200>,<0.1> <0>,<2.7></td> </tr> </table>	<type>	type of ringing tone	1	Sequence 1: 4 second cycle, 3 tone rise and fall <900>,<1> <0>,<3>	2	Sequence 2: 4 second cycle, single burst bitone <1425, 1625>,<1> <0>,<3>	3	Sequence 3: 4 second cycle, single burst tritone <1425, 1625, 1825>,<1> <0>,<3>	4	Sequence 4: 3.3 second cycle, double burst ('BT' style) <1700>,<0.3> <0>,<0.3> <1700>,<0.3> <0>,<2.2>	5	Sequence 5: 3.1 second cycle, rising tone on musical scale <2400>,<0.1> <2700>,<0.1> <3000>,<0.1> <3200>,<0.1> <0>,<2.7>
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5	Sequence 5: 3.1 second cycle, rising tone on musical scale <2400>,<0.1> <2700>,<0.1> <3000>,<0.1> <3200>,<0.1> <0>,<2.7>												
	6 Sequence 6: 4 second cycle, 'Star Trek' alert <2400>,<0.4> <2500>,<0.24> <3000>,<0.8> <0>,<2.560> <vol>volume of ringing tone 0 mute 1-7 volume varies from low to high												
Execute command AT^SRTC	Response Ringing tone sounds at AF device currently selected with "AT^SNFS" "", until AT^SRTC is called again. OK <u>Note1</u> : the test ringing signal cannot be activated while an MTC is ringing (ERROR) <u>Note2</u> : if an MTC arrives while the test ringing tone is active, the test ringing will be deactivated and "normal" ringing reactivated (RING).												



Reference	Note

AT^SRTE Connection rate	
Test command	Response
AT^SRTE=?	OK
	Parameter
Execute command	Response
AT^SRTE	^SRTE: <mode> OK
	Parameter
	<mode>: 0 no voice call in progress 1 voice call using Full Rate speech coding in progress 2 voice call using Enhanced Full Rate speech coding in progress
Reference	Note

AT^SSTA Display temperature and voltage status	
Test command	Response
AT ^ SSTA=?	^SSTA: (list of supported <n>s) OK
	Parameter
	see set command
Read command	Response
AT ^ SSTA?	^SSTA?: <n>
	Parameter
	see set command
Set command	Response
AT ^ SSTA=[<n>]	Sets the kind of presentation. OK Parameters <n> (parameter sets/shows the result code presentation status) 0 disable full presentation 1 enable full presentation
Execute command	Response
AT ^ SSTA	If <n>=0 then ^SSTA: <Lo_V>,<Po_V>,<T>,<ADC0>,<ADC1>,<ADC2> If <n>=1 then ^SSTA: Lo_V [mV] Po_V [mV] T [°C] ADC0 [Hex] ADC1 [Hex] ADC2 [Hex] <Lo_V> <Po_V> <T> <ADC0> <ADC1> <ADC2>
	Parameter
	<Lo_V>logic voltage [mV] <Po_V>power voltage [mV] <T>temperature [°C] <ADC0>ADC0 logic voltage (hexadecimal) <ADC1>ADC1 power voltage(hexadecimal) <ADC2>ADC2 temperature (hexadecimal)
Reference	Note

AT^SWHO		Display working hours
Test command	Response	
AT ^ SWHO=?	Response	^SWHO: (list of supported <n>s) OK
	Parameter	see set command
Read command	Response	
AT ^ SWHO?	Response	^SWHO?: <n>
	Parameter	see set command
Set command	Response	
AT ^ SWHO=[<n >]	Response	Sets the kind of presentation. OK Parameters <n> (parameter sets/shows the result code presentation status) 0 disable full presentation 1 enable full presentation
Execute command	Response	
AT ^ SWHO	Response	If <n>=0 then ^SWHO: <d1>,<h1>,<m1>,<d2>,<h2>,<m2>,<count> If <n>=1 then ^SWHO: Power_On: d h m Booked_In: d h m Count_Off_On <d1><h1><m1> <d2><h2><m2> <count>
	Parameter	<d1>days power on <h1>hours power on <m1>minutes power on <d2>days booked in <h2>hours booked in <m2>minutes booked in <count>count power on/off
Reference	Note	

AT^MONI Monitor idle mode and dedicated mode	
Test command AT^MONI[=<period>]	Response See execute command Command is broken by any character sent to serial port Parameter <period>Display period in seconds
Execute command AT^MONI	Response <pre> Serving cell chann rs dBm PLMN LAI cell PWR RXlev C1 I chann TS timAdv PWR dBm Q 41 44 -66 023102 0001 796A 5 -100 34 I 39 5 1 10 -62 0 OK </pre> Parameters Serving cell: chann Channel number rs RSSI value (0–63) dBm Receiving level in dBm PLMN PLMN ID code LAI Location area ID cell Cell ID NCC PLMN colour code BCC BS colour code PWR Maximal power level used on RACH channel RXlev Minimal receiving level (in dBm) to allow registration C1 C1 coefficient for base station selection Dedicated channel: chann Channel number TS Time slot timAdv Timing advice in bits PWR Current power level dBm Receiving level in dBm Q Receiving quality (0–7)
Reference	Note

AT^MONP Monitor neighbour cells	
Test command AT^MONP[=<period>]	Response See execute command Command is broken by any character sent to serial port Parameter <period>Display period in seconds
Execute command AT^MONP	Response chann rs dBm PLMN LAI C1 C2 41 46 -64 023102 0001 36 36 81 16 -94 023102 0001 6 6 48 15 -95 023102 0001 5 5 32 9 -101 023102 0001 -1 -1 44 9 -101 023102 0001 -1 -1 84 3 -107 023102 0001 -9 -9 37 1 -109 023102 0001 -5 -5 41 0 -110 023102 0001 -10 -10 OK Parameter: chann Channel number rs RSSI value (063) dBm Receiving level in dBm PLMN PLMN ID code LAI Location area ID NCC PLMN clour code BCC BS clour code C1 C1 coefficient for base station selection C2 C2 coefficient for base station selection
Reference	Note

AT+CXXCID Display card ID (identical to AT^SCID)	
Test command AT+CXXCID=?	Response OK If error is related to ME functionality: +CME ERROR: <err> Parameter
Execute command AT+CXXCID	Response TA returns the card identification number in SIM (SIM file EF ICCID, see GSM 11.11 Chap.10.1.1) as string type. see ^SCID Parameter see ^SCID
Reference GSM Engine A1: ^SCID	Note

17 Summary of CMS ERRORS

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

<err> values used by common messaging commands:

17.1 Summary of CMS ERRORS related to V.25ter commands

Code of <err>	Meaning
0...127	GSM 04.11 Annex E-2 values, see CMS ERROR codes related GSM 07.07
128...255	GSM 03.40 subclause 9.2.3.22 values
512...	see CMS ERROR codes related to Siemens-defined commands (Chapter)

17.2 Summary of CMS ERRORS related to GSM 07.07

Code of <err>	Meaning
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 timeout
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

Note: all other values below 256 are reserved.

Tabelle 17-1: Summary of CMS ERRORS

0.1.9 Summary of CMS ERRORS related to GSM 07.05

Code of <err>	Meaning
0...127	GSM 04.11 Annex E-2 values, see CMS ERROR codes related to GSM 07.07
128...255	GSM 03.40 subclause 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
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 timeout
340	no +CNMA acknowledgment expected
500	unknown error
511	all other values in range 256...511 are reserved
512...	manufacturer-specific

0.1.9 Summary of CMS ERRORS related to Siemens-defined commands

:

Code of <err>	Meaning
0...127	GSM 04.11 Annex E-2 values, see CMS ERROR codes related to GSM 07.07
128...255	GSM 03.40 subclause 9.2.3.22 values
300...511	see CMS ERROR codes related to GSM 07.05
512	CALL BARRED BY BLACKLIST
513	PHONE LINK RESERVED
514	INVALID DIAL STRING
515	PHONE BUSY
550	PH-SIM PUK required
551	ntf-SIM PIN REQUIRED
552	ntf-SIM PUK REQUIRED
553	PH-NET PIN REQUIRED
554	PH-NET PUK REQUIRED
555	PH-SP PIN REQUIRED
556	PH-SP PUK REQUIRED