

56K Data/Fax/Voice/Speaker Phone Modem Chip

Features

- Data mode capabilities:
 - ITU-T V.90, 56Kbps
 - ITU-T V.34, 33600 to 2400 bit/s
 - ITU-T V.32bis, V.32
 - ITU-T V.22bis, V.22
 - ITU-T V.23, V.21
 - Bell 212
 - Bell 103
- FAX mode capabilities:
 - ITU-T V.17, V.29, V.27ter, and V.21 Ch 2
 - TIA/EIA 578 class 1 FAX
- Enhanced voice features:
 - Telephone answering machine (TAM)
 - Real Audio, 8 bits PCM
 - Speakerphone (Option)
- Caller identification (caller ID)
- V.42 error correction (LAPM and MNP)
- V.42bis and MNP class 5 data compression
- World wide call progress tone detection
- ITU V.24, RS-232C serial interface
- Operating system support: DOS, Windows 95, Windows 98, and Windows NT
- IS-101 AT+V commands with extensions
- TIA/EIA 602 standard for AT command set
- DTE speed up to 115200
- I/O port for homologation and specific application
- Support power down mode
- Fully software upgradeable

General Description

The Modem Chip TP560x is a highly integrated, low-cost, high performance, low-power, a full-function modem

System Block Diagram

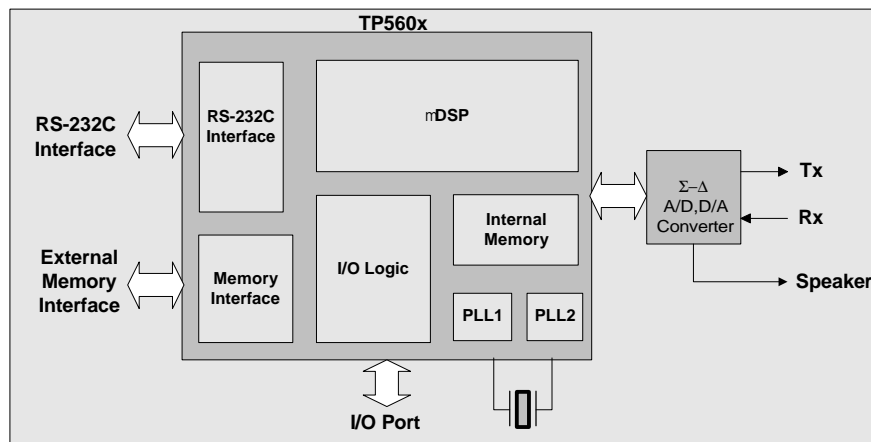


Figure 1. Block Diagram

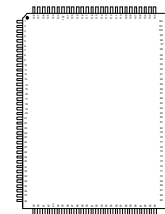
solution. TP560x implements V.90 to achieve Internet connection rates up to 56Kbps, supporting existing V.34 data mode, video-ready interface, Class 1 FAX, TAM (Telephone Answer Machine) and Speakerphone functions. TP560x's I/O pins allow designer to easily control DAA or design modem for special application. TP560x is a μ DSP-based chip designed specifically for modem application, and it performs high MIPS operations such as V.90, V.34 and V.32 modulation. TP560x provides a serial interface for connecting to codec. TP560x uses high quality design to optimize modem configuration for line condition and provide reliable connection with connection rate ranging from 300bps up to 56Kbps. TP560x is the best choice for designing a modem.

Application

- Standalone Modem
- Embedded Modem Module
- Network Computer
- Set-top Box
- Video Phone

Order Information

- TP560x: 56K Modem with RS-232c serial interface



TP560x 128Pin QFP

PIN Assignments

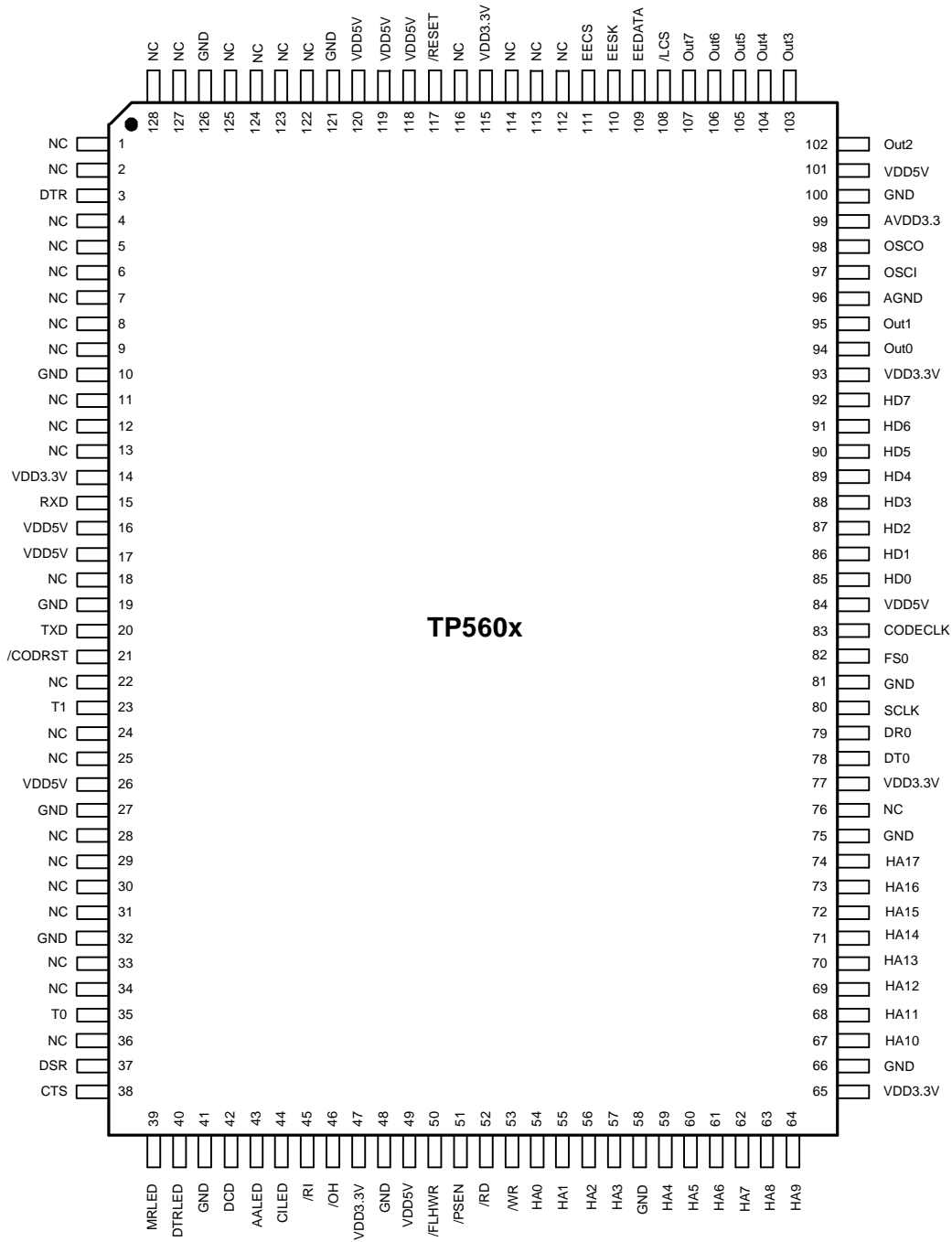


Figure 2. TP560x Pin Assignments

PIN Description

Pin No.	Symbol	I/O	Description
3	DTR	I	RS232 DTR signal
15	RXD	I	RS232 data input and TD LED
20	TXD	O	Data output to RS232 and RD LED
21	/CODRST	O	Codec Reset
23	T1	I	Connect with pin 15
35	T0	I	RS232 RTS signal
37	DSR	O	RS232 DSR signal
38	CTS	O	RS232 CTS signal
39	MRLED	O	MR LED pin
40	DTRLED	O	DTR LED pin
42	DCD	O	DCD
43	AALED	O	AA LED pin
44	CILED	O	CI LED pin
45	/RI	I	RS232 Ring input (P1.0)
46	/OH	O	Hook relay control (P1.2)
50	/FLHWR	O	TP560x flash memory write enable If program memory is not flash memory, this pin is an NC pin.
51	/PSEN	I	TP560x program strobe enable
52	/RD	O	Read enable
53	/WR	O	Write enable
54-57, 59-64,67-74	HA0-HA17	O	Host Address bus of TP560x
78	DT0	O	SP1 Transmit Data Output pin
79	DR0	I	SP1 Receive Data Input pin
82	FS0	I/O	SP1 Frame signal
80	SCLK	I	Reference Clock for SP1 and SP2
83	CODECLK	O	Codec Clock
85-92	HD0-HD7	I/O	Host Data bus of TP560x
94-95,102-107	Out[7:0]	O	Output port 0 – 7
97	OSCI	I	Oscillator input. It accepts either a crystal or an external TTL driver.
98	OSCO	O	Oscillator output
108	/LCS	I	Line loop current detection Input port (address:bit0 of F400H)
109	EEDATA	O	NVRAM serial data port
110	EESK	O	NVRAM clock input
111	E ECS	O	NVRAM chip select
117	/RESET	I	Reset pin
96	AGND	P	For PLL and oscillator
99	AVDD3.3	P	For PLL and oscillator (3V)
14,47,65,77,93,115	VDD3.3V	P	+3.3V power supply

PIN Description

Pin No.	Symbol	I/O	Description
16,17,26,49,84,101, 118,119,120	VDD5V	P	+5V power supply
10,19,27,32,41,48,58 ,66,75,81,100, 121,126	GND	P	Digital Ground
1, 2,4-9, 11-13, 18,22, 24, 25, 28-31,33,34,36,76, 112,113,114,116, 122-125,127,128	NC		These pins are for testing and must be floated in application.

Table 1. TP560x Pin Description

System Configuration

a. Power Down Mode

Host can instruct modem system to enter power down mode by "AT*P" command. There are two ways to wake μ DSP.

- (1) Power off then power on modem
- (2) Negative pulse is occurred at input pins "RI" of TP560x

b. Re-flash Program Memory (Download New code)

By setting C0H.0 (reset state: 0), system can switch program and data memory. If system uses FLASH memory as program memory, we can use this function to replace program code by loading download program to data memory then swapping external data memory and external program memory.

For example,

```
SETB C0H,0
LJMP 0000H
```

In this modem system, modem provides a AT command for download function. When users get new code and want to upgrade current program code, the following procedure can be used:

```
ATxxxx      (Issue Download command)
Ready       (Modem response "Ready")
Send ASCII File (Choose send ASCII file in
              communication software & send
              new code to modem)
              (download program)
Wait moment
.           (Waiting)
.
.
OK          (When download procedure is
              complete, modem will response
              OK.)
```

Note: When modem is in download mode, don't turn off power.

c. DAA (Data Access Arrangement) & NCU (network Control Unit)

The modem chip provides standard serial interface for Codec. TP560x can support traditional code plus transformer-based NCU circuit and advance silicon DAA. For further information, please contact technical supporting engineer.

d. AT command

TP560x modem supports Data, Fax and Voice function. All functions are controlled by AT command.

Topic will provide source code of AT command part for customer modification. Please refer to the document "User's Manual & AT command set".

Electrical Characteristic

Absolute Maximum Rating

Power supply voltage	-0.5V to 7.0V
Operating temperature under bias	0°C J to 70°C J
Storage temperature	-65°C J to 150°C J
Applied voltage on any pin	-0.5V 0V VDD +0.5V

Table 2. Absolute Maximum Rating

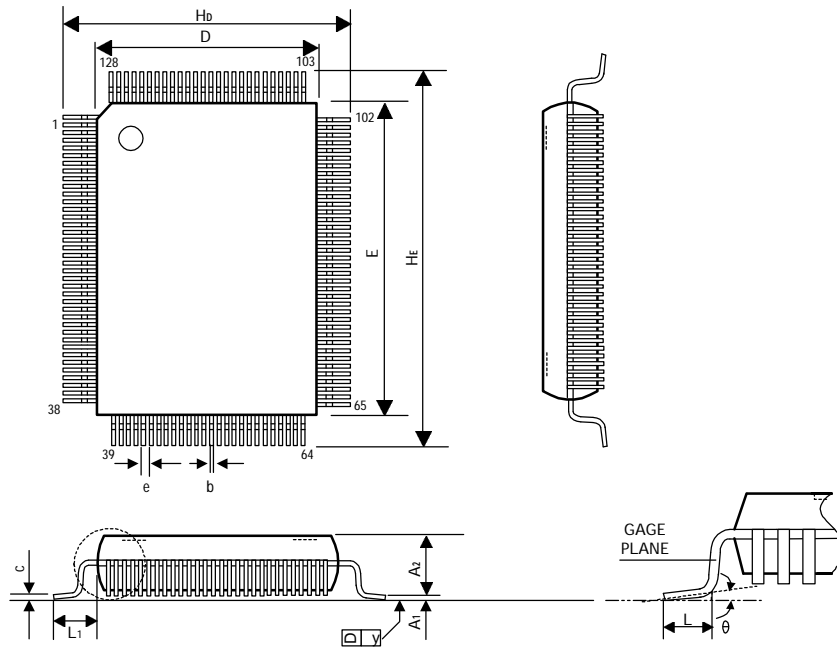
DC Electrical Characteristics (VDD=5V, GND=0V, TA=0°C to 70°C)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Conditions
VDD5V	Operation Voltage	4.75	5.0	5.25	V	
VDD3.3V	Operation Voltage		3.3		V	
AVDD3.3V	Operation Voltage		3.3		V	
IDD	Operation Current		TBD		mA	
VIH	Input High Voltage	2.0			V	
VIL	Input Low Voltage			+0.8	V	
ILI	Input Leakage	-10		10	uA	VIN =0, 5.25V
VOH	Output High Voltage	2.4			V	IOH=-0.5mA
VOL	Output Low Voltage			+0.4	V	IOL=1.5mA
CIN	Input Capacitance		10.0		pF	
VILRESET	Reset Schmitt VIL			0.8	V	
VIHRESET	Reset Schmitt VIH	2.8			V	

Table 3. DC electrical characteristics

Package Detail
(QFP 128L Outline Dimensions)

Unit: Inches/mm



Symbol	Dimensions In Inches			Dimensions In mm		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A ₁	0.010	0.014	0.018	0.25	0.35	0.45
A ₂	0.107	0.112	0.117	2.73	2.85	2.97
b	0.007	0.009	0.011	0.17	0.22	0.27
c	0.004	0.006	0.008	0.09	0.15	0.20
H _b	0.669	0.677	0.685	17.00	17.20	17.40
D	0.547	0.551	0.555	13.90	14.00	14.10
H _E	0.906	0.913	0.921	23.00	23.20	23.40
E	0.783	0.787	0.791	19.90	20.00	20.10
e	-	0.020	-	-	0.50	-
L	0.025	0.035	0.041	0.65	0.88	1.03
L ₁	-	0.063	-	-	1.60	-
y	-	-	0.004	-	-	0.10
θ	0°	-	12°	0°	-	12°

Note:

1. Dimension D & E do not include mold protrusion.
2. Dimension B does not include dambar protrusion.
Total in excess of the B dimension at maximum material condition.
Dambar cannot be located on the lower radius of the foot.

System Schematic (For Reference Only)