

HD81900

Single Chip Modem for Group III, Group II and Low-speed Facsimile

The Hitachi HD81900 is a single chip modem for Group III, Group II and Low-speed facsimile, operating over either dedicated unconditioned lines or over the general switched telephone network.

This modem satisfies telecommunication requirements specified in CCITT Recommendations V.29, V.27ter, and Recommendation T.4, T.3 and T.30. It includes a modulator, a demodulator, sending and receiving filters and a V.24 serial interface. Using this LSI device, a modem system for Group III facsimile may be easily created.

Features

- CCITT V.29, V.27ter, T.4, T.3, T.30, V.21 channel 2
- Half-Duplex (2-wire)
- V.21 Flag Detection Function (concurrent receive of V.29/V.27ter and V.21)
- TX/RX Filters
- Tone Generation/Detection
Arbitrary frequency can be concurrently

detected from eight wave signals.

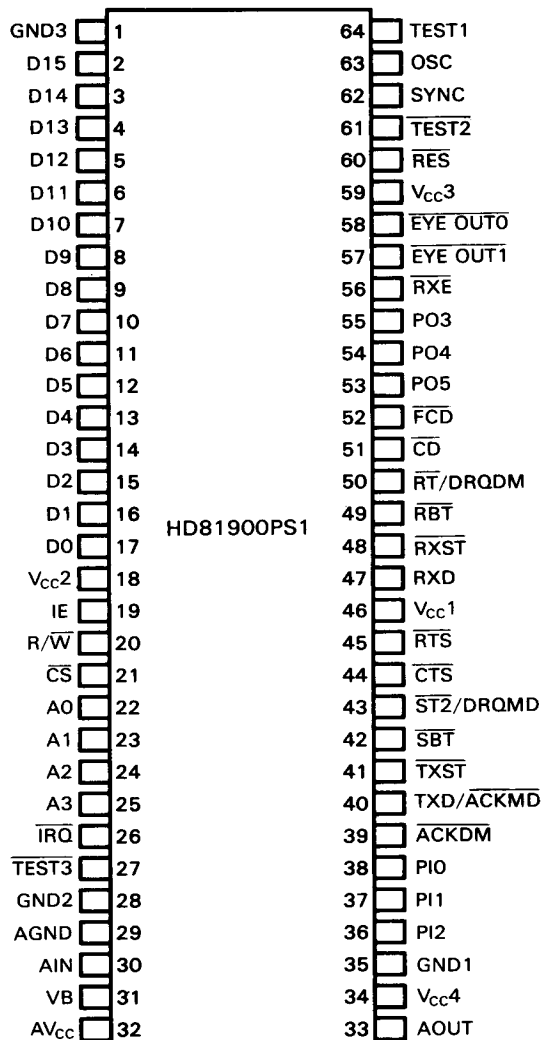
- DTMF Generation
The level difference between the high group frequency and low group frequency can be specified.
- Transmit Output Level (0 dBm to 31 dBm)
- Selectable Receive Sensitivity (FCD ON level: -21 to -51 dBm)
- Equalization:
—Automatic Adaptive
—Compromise Cable (Selectable)
- DTE Interface
—Parallel (8 bits)
—Serial (CCITT V.24)
- I/O Ports for NCU Control (3 inputs, 3 outputs)
- Diagnostic Capability
- TTL and CMOS Compatible
- Low Power Consumption (350 mW, Typical)
- Signal +5 Volt Power Supply
- Wide Operating Temperature Range (-20 to +75°C)
- Package
80-pin plastic QFP
64-pin plastic shrink DIP
68-pin PLCC

Product Series

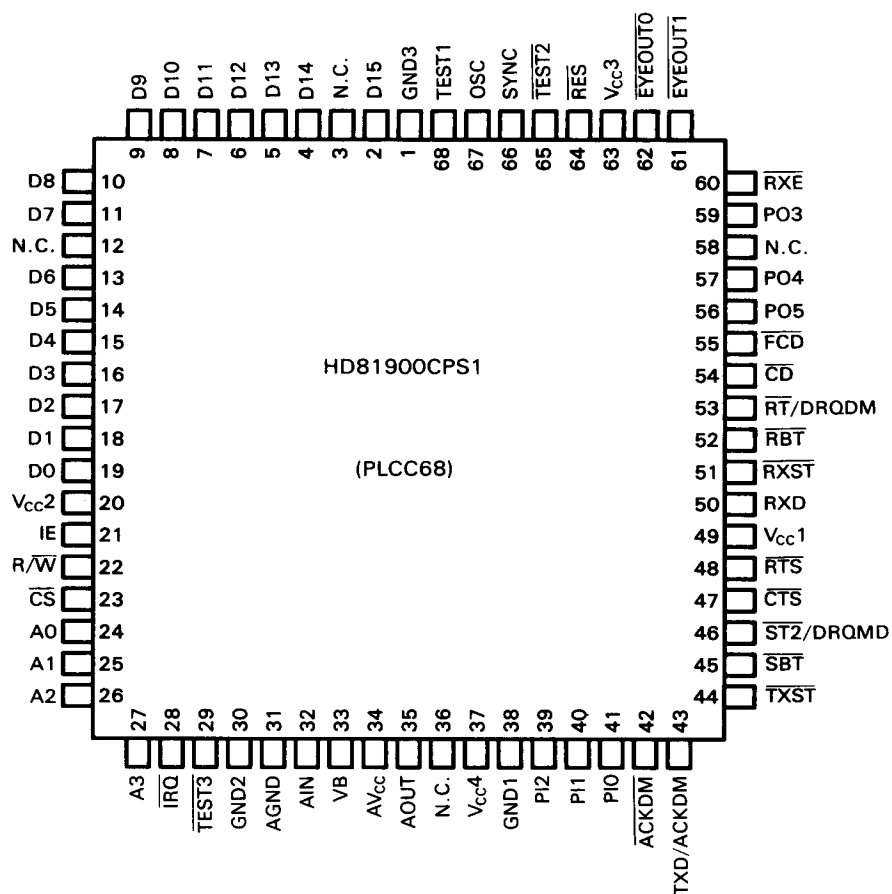
Type	Package
HD81900PS1	64-pin plastic shrink DIP
HD81900CPS1	68-pin PLCC
HD81900FS1	80-pin plastic QFP

HD81900

Pin Assignment

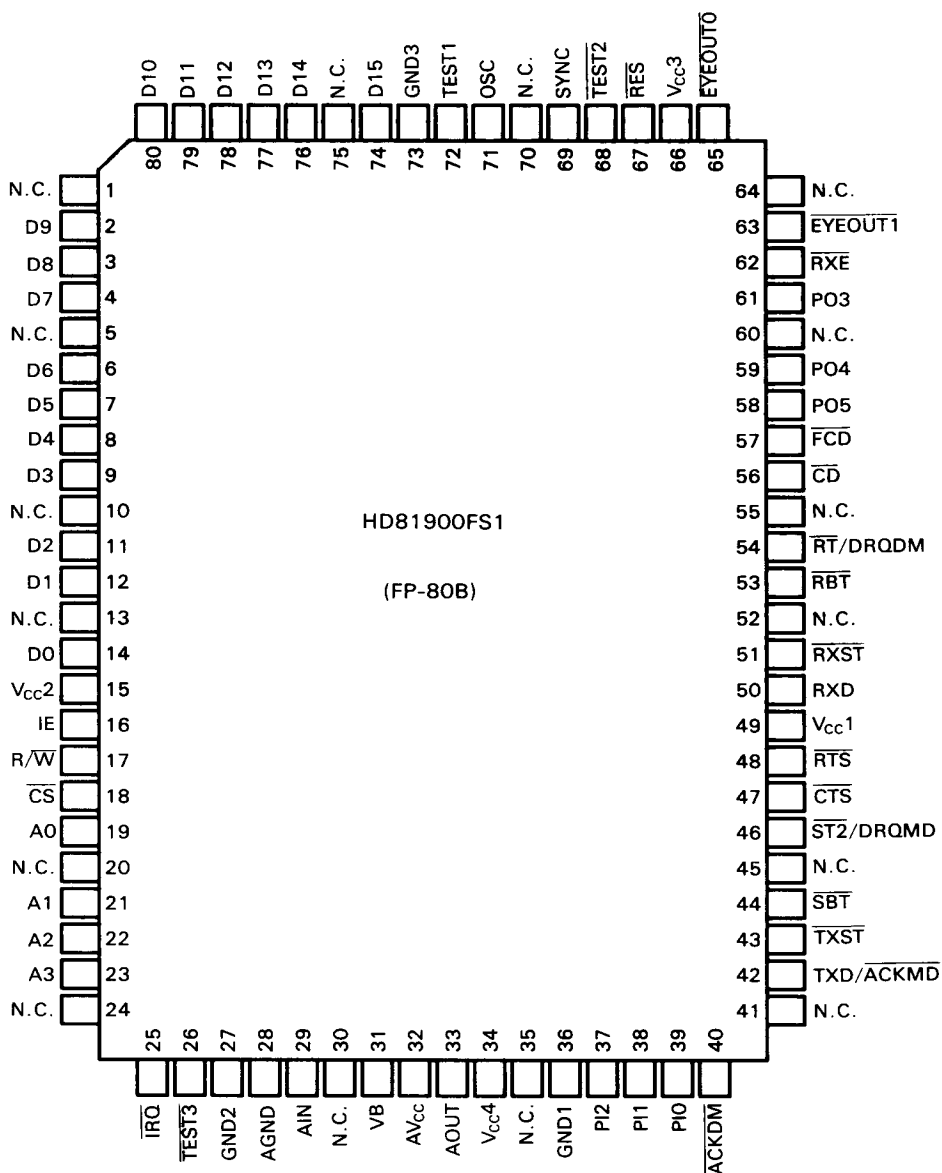


(Top view)



(Top view)

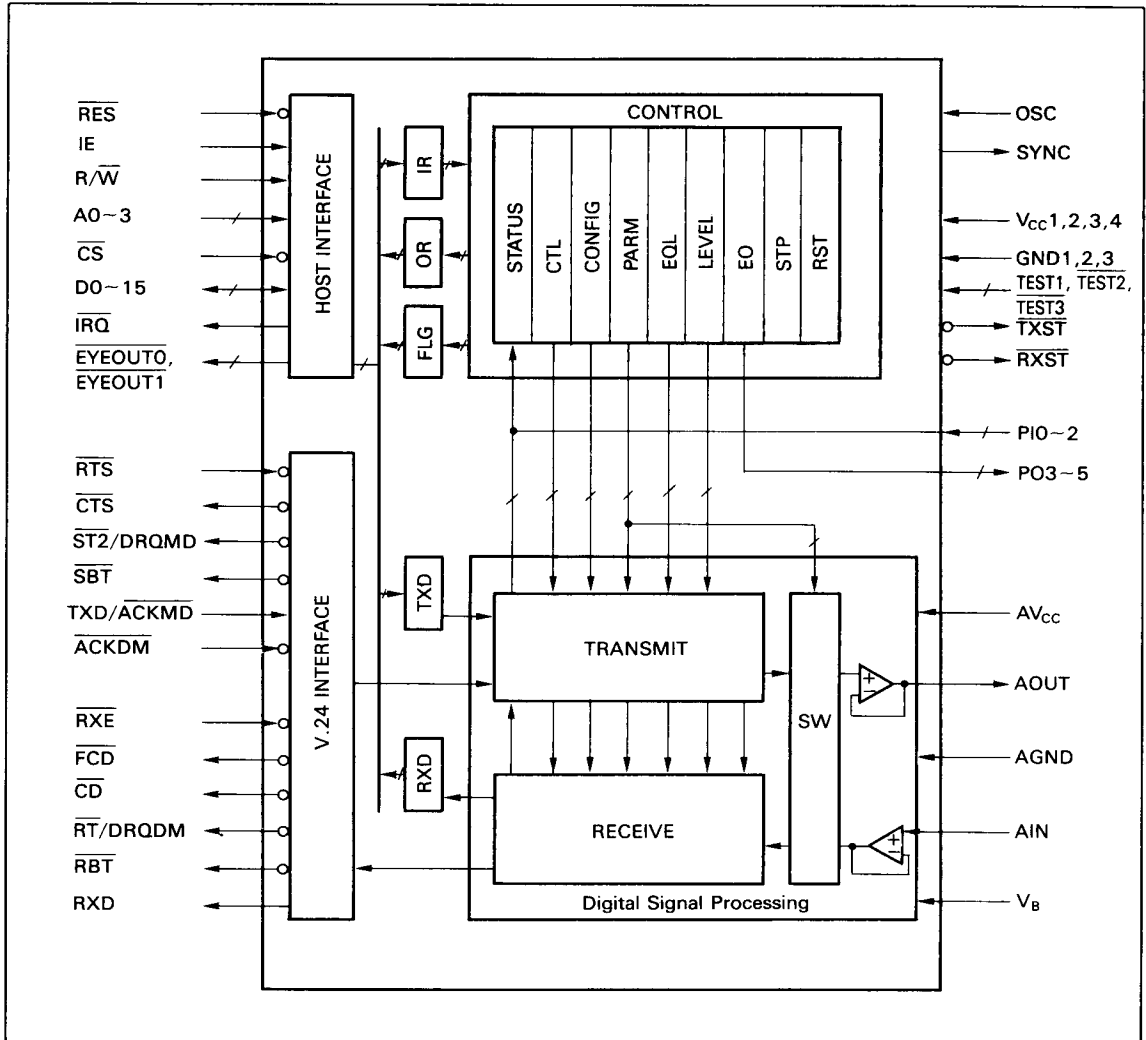
N.C. : Not connected to
internal chip



(Top view)

N. C. : Not connected to internal chip

Block Diagram



HD81900

Electrical Characteristics of the HD81900

1. Absolute Maximum Ratings

No.	Item	Symbol	Specification	Unit	Note
1	Power Supply	V_{CC}	−0.3 to +7.0	V	1
2	Analog Power Supply	AV_{CC}	−0.3 to +7.0	V	
3	Digital Input Voltage	V_{inD}	−0.3 to $V_{CC} + 0.3$	V	
4	Analog Input Voltage	V_{inA}	−0.3 to $V_{CC} + 0.3$	V	
5	Operation Temperature	T_{opr}	−20 to +75	°C	
6	Storage Temperature	T_{stg}	−55 to +125	°C	
7	Storage Temperature with Bias	T_{bias}	−10 to +85	°C	

Note 1: V_{CC1} − V_{CC2} − V_{CC3} − V_{CC4} − $V_{CC'}$, GND1−GND2−GND3− GND−0 volt

2. DC Characteristics ($V_{CC}=AV_{CC}=5.0V \pm 5\%$, $GND=AGND=0V$, $T_a=-20\sim+75^\circ C$)

No.	Item	Symbol	Test Condition	Specification			Unit	Pin
				Min	Typ	Max		
1	Digital Input Voltage High 1	V_{IH1}		2.4		$V_{CC}+0.3$	V	OSC
2	Digital Input Voltage High 2	V_{IH2}		2.4		$V_{CC}+0.3$	V	*1
3	Digital Input Voltage High 3	V_{IH3}		$V_{CC}\times 0.7$		$V_{CC}+0.3$	V	RES
4	Digital Input Voltage Low 1	V_{IL1}		-0.3		0.6	V	OSC
5	Digital Input Voltage Low 2	V_{IL2}		-0.3		0.6	V	*1
6	Digital Input Voltage Low 3	V_{IL3}		-0.3		0.6	V	RES
7	Digital Input Leakage	$ I_{in} $	$V_{inD}=-0.4\sim 2.4$ V			10	μA	*1
8	Tri-state Leakage	$ I_{ist} $	$V_{inD}=-0.4\sim 2.4$ V			10	μA	*2
9	Digital Output Voltage High	V_{OH}	$-I_{OH}=-400$ μA	2.4			V	*3
10	Digital Output Voltage Low	V_{OL}	$I_{OL}=1.6$ mA			0.4	V	*3
11	Pull-up Current	I_{pull}	$V_{inD}=0$ V			400	μA	*4
12	Analog Input Leakage	$ I_{ia} $	$V_{inA}=0$ V			10	μA	AIN
13	Analog Input Leakage	$ I_{ia} $	$V_{inA}=AV_{CC}-5$ V			10	μA	AIN
14	Analog Input Resistance	R_{iA}	$f=1$ kHz	1			m Ω	AIN
15	Analog Output Resistance	R_{oA}				100	Ω	AOUT
16	Total Current	I_{CC}			70		mA	
17	Analog Ref. Voltage	V_B		2.3	2.4	2.55	V	V_B
18	Analog Ref. Current	I_B	$V_B=2.55$ V			10	μA	V_B
19	Digital Input Capacitance	C_{in}	$V_{inD}=0$ V, $f=1$ MHz $T_a=25^\circ C$			12.5	pF	*5
20	Analog Input Capacitance	C_{ia}	$f=1$ MHz, $V_B=2.4$ V			40	pF	AIN
21	Analog Output Off-set	V_{off}		-220		220	mV	AOUT

*1: TXD, ACKDM, RTS, RXE, PIO-2, D0-15, A0-3, R/W, CS, IE

*2: D0-15

*3: RXD, ST2, SBT, RT, CTS, CD, FCD, IRQ, EYEOUT0-1, PO3-5, SYNC, TXST, RXST, D0-15

*4: IRQ, ACKDM, RTS, PIO-2, RXE, RES, TEST2, TEST3

*5: All input pins except AIN.

3. AC Characteristics ($V_{CC}=AV_{CC}=5V \pm 5\%$, $GND=AGND=0V$, $T_a=-20\sim+75^{\circ}C$)

No.	Item	Symbol	Specification			Unit	Pin
			Min	Typ	Max		
1	OSC Cycle Time	ϕ_{cyc}		33.9		ns	OSC*1
2	OSC Pulse Width	$\phi_{WH/L}$	10			ns	OSC
3	OSC Rise/Fall Time	$\phi_{r/f}$			5	ns	OSC
4	IE Cycle Time	t_{cyc}	0.5			μs	IE
5	IE Pulse Width High Level	t_{WH}	210			ns	IE
6	IE Pulse Width Low Level	t_{WL}	210			ns	IE
7	IE Rise Time	t_r			25	ns	IE
8	IE Fall Time	t_f			25	ns	IE
9	CS Setup Time	t_{CS}	45			ns	CS
10	CS Hold Time	t_{CH}	10			ns	CS
11	Input Data Setup Time	t_{DSW}	60			ns	IE, D0-15
12	Input Data Hold Time	t_{DHW}	10			ns	IE, D0-15
13	Output Data Delay Time	t_{DDR}			150	ns	IE, D0-15
14	Output Data Hold Time	t_{DHR}	20			ns	IE, D0-15
15	Reset Pulse Width	t_{RST}	0.5			μs	RES
16	TXD Setup Time	t_{TXS}	200			ns	TXD
17	TXD Hold Time	t_{TXH}	200			ns	TXD
18	RXD Delay Time	t_{RXD}			250	ns	RXD
19	ACKMD, ACKDM Setup Time	t_{AS}	70			ns	ACKMD, ACKDM
20	ACKMD, ACKDM Hold Time	t_{AH}	10			ns	ACKMD, ACKDM
21	DRQMD, DRQDM Delay Time	t_{RQ}			300	ns	DRQMD, DRQDM

*1 OSC=29.4912 MHz (Deviation less than 5ppm)