HBS-Compatible Driver and Receiver Monolithic IC MM1192

Outline

This IC conforms to the HBS (Home Bus) specification (Electronic Industries Association of Japan), and has functions for the reception and transmission of data. AMI is adopted for the waveforms of signals handled by the transmission and reception units, designed for connection to twisted-pair lines.

The IC can be driven by a single 5V power supply, and incorporates an output transistor to reduce the number of external components required.

Telephone equipment, security devices, audio or video equipment, air-conditioning equipment, and a wide range of other devices can be connected to a bus line to enable mutual communications.

Features

- 1. Compact design
- 2. High reliability
- 3. Replaces pulse transformers
- 4. Can be driven by a single 5V power supply
- 5. Low cost
- 6. Easy circuit design
- 7. Few external components

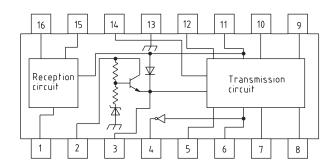
Applications

- 1. Telephony equipment
- 2. Security equipment
- 3. Audio and video devices
- 4. Air-conditioning equipment
- 5. Wide range of other equipment and devices

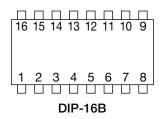
Package

DIP-16B (MM1192XD)

Block Diagram



Pin Assignment



1	Reception DATA OUT	9	OUT (A)
2	$ m V_{IN}$	10	OUT (B)
3	Boost capacitor pin	11	Vcc
4	Boost capacitor pin	12	COLLECTOR (b)
5	RESET	13	GND
6	DATA IN	14	COLLECTOR (a)
7	out (b)	15	IN (2)
8	out (a)	16	IN (1)

Absolute Maximum Ratings (Ta=25℃)

Item	Symbol	Ratings	Units	
Storage tempereture	Tstg	-40~+125	$^{\circ}$ C	
Operating tempereture	Topr	-20~+70	°C	
Power supply voltage	Vcc max.	-0.3~+7	V	
Operating power supply voltage	Vccop	4.5~5.5	V	
Allowable loss	Pd	450	mW	
Recommended power supply voltage range	Vccop2	4.75~5.25	V	
Bias voltage range (V _{IN})	VINOP	8.0~40	V	

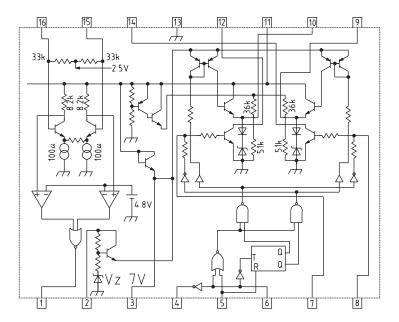
Electrical Characteristics (Except where noted therwise, Ta=25°C, Vcc=5V, Ftransmit=10kHz (DUTY=50%) RL=36Ω)

Item		Symbol	Measurement conditions	Min.	Тур.	Max.	Units
	Power supply current 1	ICCO	No signal (5PIN="H")		8	13	mA
	Power supply current 2	ICCON	In transmission FL=10kHz, R _L =36Ω		75	90	mA
	Transmission output voltage	VTO	Both pins 9 and 10		4.2	4.6	V _{P-P}
	Transmission waveform	VTR	V _T 01/V _T 02	0.75	1.0	1.25	
	symmetry	VIK		0.73	1.0	1.23	
	Reception sensitivity	Vrs			0.75	0.85	V _{P-P}
	Noise resistance	V_{RN}	Level at which no errors are output				V _{P-P}
Transmission	Input impedance	Rin	Both pins 15 and 16		36	46	kΩ
Circuits	Transmission delay time 1	Td1	cf. transmit/receive waveform diagrams		0.4		μS
	Transmission delay time 2	Td2	cf. transmit/receive waveform diagrams		0.5		μS
	Transmission delay time 3	Td3	cf. transmit/receive waveform diagrams		1.0		μS
	Transmission delay time 4	Td4	cf. transmit/receive waveform diagrams		1.2		μS
	Reception output H voltage	V _{ROH}		4.5			V
	Reception output L voltage	Vrol				0.5	V
	Transmission waveform LOSS 1	VTLS1	V _T =5V applied, power on	4.5			V
	Transmission waveform LOSS 2	VTLS2	V _T =5V applied, power off	4.5			V
	H level input voltage	VLIH		2.4			V
	L level input voltage	VLIL				0.6	V
	H level input current	Ilih	VDATA IN=2.4V			10	μA
	L level input current	Ilil	VDATA IN=0.4V			-300	μA
	Bootstrap output H voltage	V_{BR}		7.5	8.0		V

When a negative voltage is applied to pins 7, 8, 9 and 10, there should be no abnormal operation of internal circuits between 0 and 6V. However, if a negative voltage exceeding -6V is applied, thyristor operation may result, so it is recommended that an external clamping diode be added.

In addition, no measures have been taken for a negative voltage at pins 12 and 14. Hence if a negative voltage is applied to pins 12 and 14, the internal transistor should not be used.

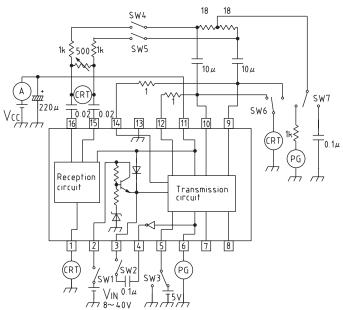
Circuit Diagram



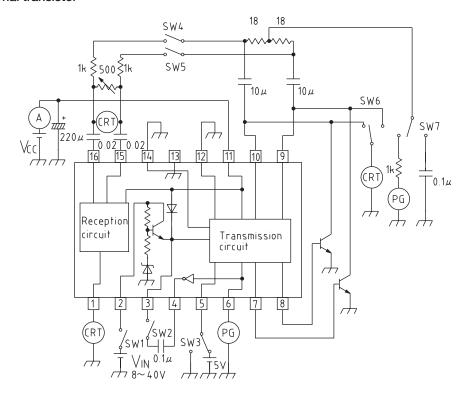
- Note 1: The peripheral components in the block diagram are the constants for Ftransmit=10kHz. If the frequency is low, larger values should be chosen for the coupling capacitors between the receive and transmit pins and the bus line and for the capacitor connecting pins 3 and 4.
- Note 2: A block diagram is shown for an example application in which an external transistor is used; but depending on system conditions the internal transistor may be used, and no external transistor is needed. In such cases pins 7 and 8 are left open, a 1Ω resistance is inserted between pins 10 and 12, and a 1Ω resistance is inserted between pins 9 and 14. When the load resistance (36Ω) is to be varied during use, these resistances (1Ω) should be changed according to the load resistance. If these resistances are omitted, oscillation may occur at low volume levels.

Measuring Circuit

1. No external transistor



2. With external transistor



Timing Chart

