VFIR 16 Mb/Sec Controller and Transciever

How Fast Do You Want to Go?

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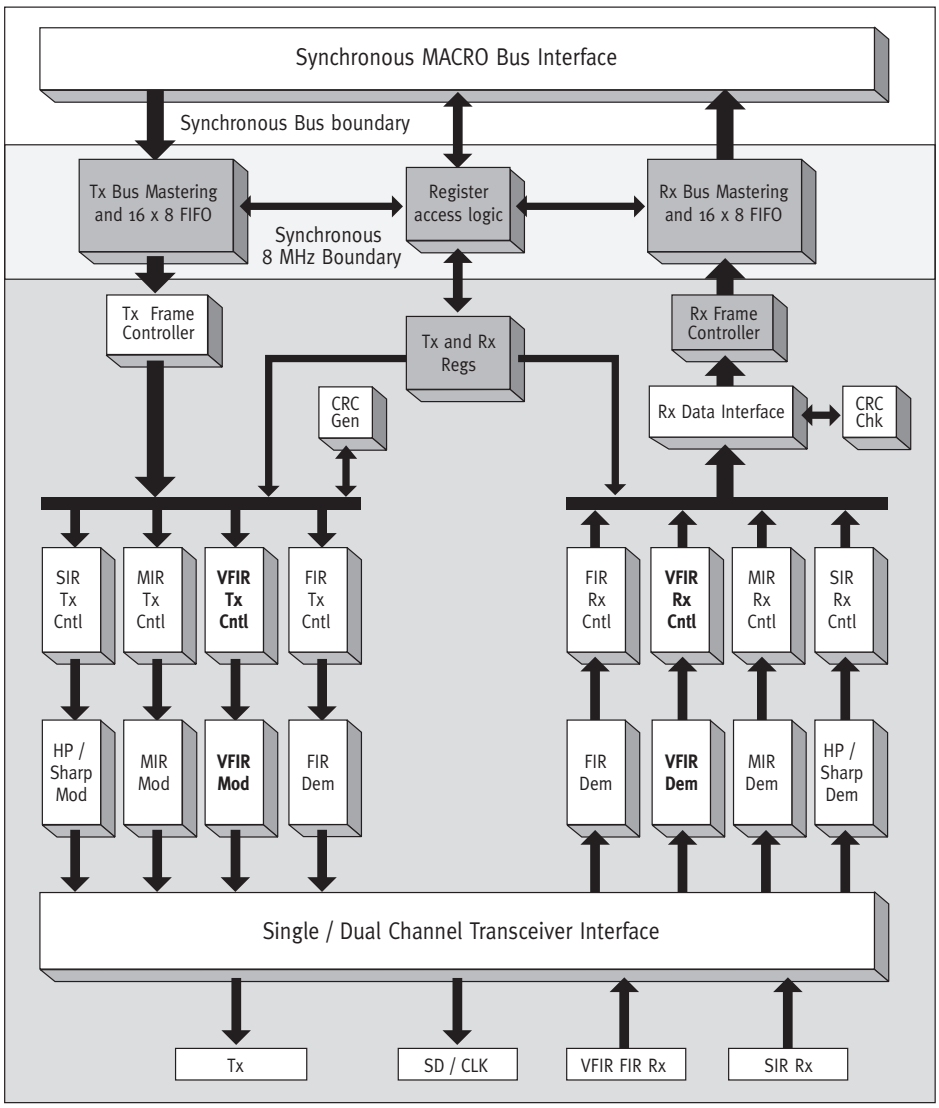
IRC 1802
IrDA Communications Controller for SIR, MIR, FIR and VFIR



IRC 1802 BLOCK DIAGRAM

Features

- IrDA 1.x, HP-SIR, and Sharp ASK compliant
- Supports all IrDA data rates up to Very Fast IR (VFIR), 16 Mb/s
- High performance hardware based IrDA SIR Link Access Protocol (IrLAP)
- Host Direct Memory Access (DMA) and Shared Memory modes
- Burst packet transmission and reception for all data rates
- Hardware transceiver Serial Interface (SIF) programming
- Direct interface connection to all vendors Infrared Transceiver modules
- Support for dual channel transceivers
- General purpose I/O pins for external device control
- ISA Plug and Play (PnP) and PCMCIA bus interface
- Single 48 or 96 MHz external clock input
- 3.3 V supply voltage
- Small 100-pin Thin Quad Flat Pack (TQFP) package

The IRC1802 is a low-cost, highly integrated SIR, MIR, FIR and Very Fast Infrared (VFIR) communications controller capable of supporting IrDA 1.x infrared modulation schemes including HP-SIR and Sharp ASK. The IrDA 1.x low and high-speed communication modes support all speeds up to 16 Mb/s (VFIR). All speeds can use Direct Memory Access. The same drivers are used for all speeds for receiving and transmitting, simplifying driver programming and speed upgrades.

Typical applications include data transfer in notebook computers, desktops computers, printers, access-points, digital cameras and peer-peer or client-server network environments.

Architecture

The IRC1802 Infrared Communications Controller consists of an Infrared Core module and a Host Interface module (see IRC 1802 Block Diagram).

The Infrared Core module controls all infrared communication functions. It is divided into four subsystems: SIR, MIR, FIR and Very Fast Infrared (VFIR). Each subsystem consists of a controller and a modem.

The SIR subsystem improves on the popular 16550 UART scheme by combining a high performance DMA asynchronous receiver-transmitter with the hardware Link Access Protocol (IrLAP) for a complete hardware SIR packet transfer.

The Host Interface module connects to an ISA bus or PCMCIA bus. It contains the bus interface logic, system configuration registers, power management circuitry, and local DMA control functions. The IRC1802 supports two modes of block data transfer: Host DMA and Shared Memory Buffer. In Host DMA mode, data is transferred using the host system's DMA controller. In Shared Memory mode, data is first buffered in local RAM, then read by the host during receive-mode or shifted out to the infrared link during transmit-mode.

- **Shared Memory and Host DMA modes** Shared Memory mode is a Local DMA mode with 32 Kbytes SRAM locally.

  In this mode, both the controller and host have access to a shared block of memory to which data can be read or written. During packet transmitting or receiving there is no data transfer on the system bus.

  For packet sending, the host copies the packet to the Tx buffer of shared memory, initializes the Transmit Request and waits for the End of Transmit, EOTR, condition to generate an interrupt.

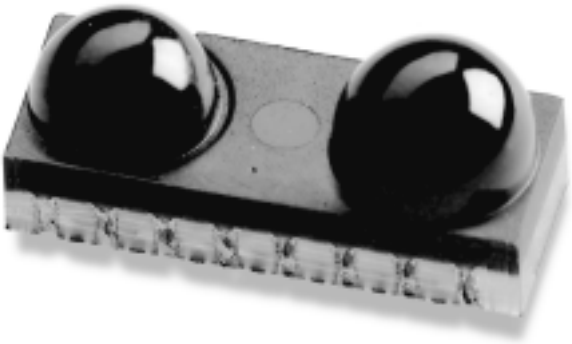
  For packet receiving, the host waits for the End of Receive, EOR, interrupt condition and copies packets received from the Rx buffer of shared memory. The programming is simple and the operation is fast.

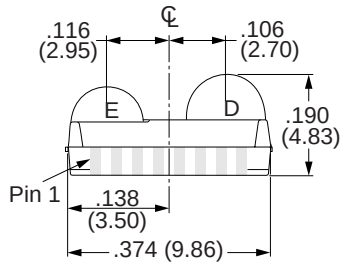
- **Burst packet transmission and reception support for all data rates** Burst data transfer consisting of multiple IrDA frames are accomplished by adding control headers to the desired outgoing data frames and arranging them sequentially in the transmit buffer of the host's or local shared memory.

  The Tx and Rx Frame Control Modules control transmit and receive functions. The 32 Kbytes shared memory can keep seven IrDA frames with size of 2048 bytes.

- **Direct Interface to both Legacy and Digital Serial Interface (SIF) Transceivers** The Serial Interface (SIF) module allows the controller to interface directly to Infineon's IRM1600 transceiver.

  This transceiver supports new features like speed mode select (VFIR), programmable modulation setting, LED power control, receiver sensitivity and power management.





E=Emitter
D=Detector

Dimensions in inches (mm)

IRMS1600 SIDE VIEW

Preliminary Product Description

16Mb/s Infrared Data Transceiver

Infineon Technologies transceiver for VFIR 16 Mb/sec is pin compatible with our Slimline series of IrDT transceivers. Available in side view only, it is part of the only complete VFIR solution available on the market. The device combines an LED, photodiode, and VFIR ASIC. The ASIC has been designed to support VFIR, FIR, MIR, SIR, and ASK modes. It is ideal for Notebook, Desktop, Printer and Digital Video applications.

IRMS1600 Pin Functions

PIN #	FUNCTION	PIN #	FUNCTION
1	LED Anode	5	SD/SCLK
2	LED Cathode	6	V_{CC}
3	TxD	7	*Do Not Connect
4	RxD	8	GND

*Pin 7 internally grounded

Features

- Compliant with IrDA Specification
- Data Rates 9.6Kb/s to 16Mb/s
- Supply Voltage 2.5V to 5.5V
- Standby Current 3.0mA(max)
- Shut Down Current 50nA(max)
- Slimline Package
  H 4.0mm x D 4.8mm x L 9.8mm
- Digital Serial Interface

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	MIN	TYPICAL	MAX	UNIT	CONDITIONS
V_{CC}	Supply Voltage	-0.5		5.5	V	
PD	Power Dissipation Average			550	mW	
T_S	Storage Temperature	-40		100	°C	
I_{LED}	LED Current (Peak)			450	mA	
TxD	Transmission Input Voltage	-0.5		V_{CC}+0.3	V	

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	MIN	TYPICAL	MAX	UNIT	CONDITIONS
V_{CC}	Supply Voltage	3.0	3.3	3.6	V	
T_A	Ambient Operating Temperature	-25		75	°C	

DC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	MIN	TYPICAL	MAX	UNIT	CONDITIONS
I_{CC}	Supply Current; Standby			3.0	mA	Standby VFIR receive
I_{CC}	Supply Current; Receiving	3	7	25	mA	Interface and optical input power dependent
I_{SD}	Supply Current, Shutdown			50	nA	
I_{LED}	LED Current			100	mA	

RECEIVER PARAMETER

SYMBOL	PARAMETER	MIN	TYPICAL	MAX	UNIT	CONDITIONS
E_{MIN}	Detection Irradiance SIR	3	-	-	µW/cm²	
E_{MIN}	Detection Irradiance MIR	3	-	-	µW/cm²	
E_{MIN}	Detection Irradiance FIR	4	-	-	µW/cm²	
E_{MIN}	Detection Irradiance VFIR	5	-	-	µW/cm²	
tr,tf	Receiver Rise/Fall Time			20	ns	VFIR Mode
tr,tf	Receiver Rise/Fall Time			50	ns	SIR, MIR, FIR Mode

TRANSMITTER PARAMETER

SYMBOL	PARAMETER	MIN	TYPICAL	MAX	UNIT	CONDITIONS
λ_P	Input Capacitance	850	870	900	nm	
α	Radiant Angle at Half Intensity	-15	+15	°		
Ie	Output Radiant Intensity	85	170	275	MW/sr	TxD=High, SD=Low, V_{CC}=3.0V, α= 0° and 15°, TA=25 C, 25% duty

For samples, www.infineon.com/irdt

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