

### Ques. WHAT IS IrDA? PLEASE EXPLAIN IrDA PROTOCOLS.

**Pamarthi Kanakaraja**

**Ans.** Infrared Data Association, or IrDA in short, is a group of device manufacturers that developed a standard for transmitting data via infrared (IR) light waves. It provides specifications for the complete set of protocols for wireless IR communication.

IR communication is an inexpensive and widely adopted short-range (1-3m) wireless technology. It is widely used in consumer electronics, automobiles, computers, medical devices, household appliances, commercial services, etc.

IrDA-enabled devices can communicate and are bi-directional. IrDA is inexpensive, secure and fast (supporting speeds of up to 100Mbps and even more).

The Open Systems Interconnection (OSI) model of IrDA protocol stack is shown in Fig. 1. Some of the specifications based on the OSI model are given below:

#### **Infrared physical layer (IrPHY).**

This specification is intended to facilitate point-to-point communication between electronic devices. It specifies the optical media interfaces for Serial Infrared (SIR) data transmission and is part of the first layer of the OSI model.

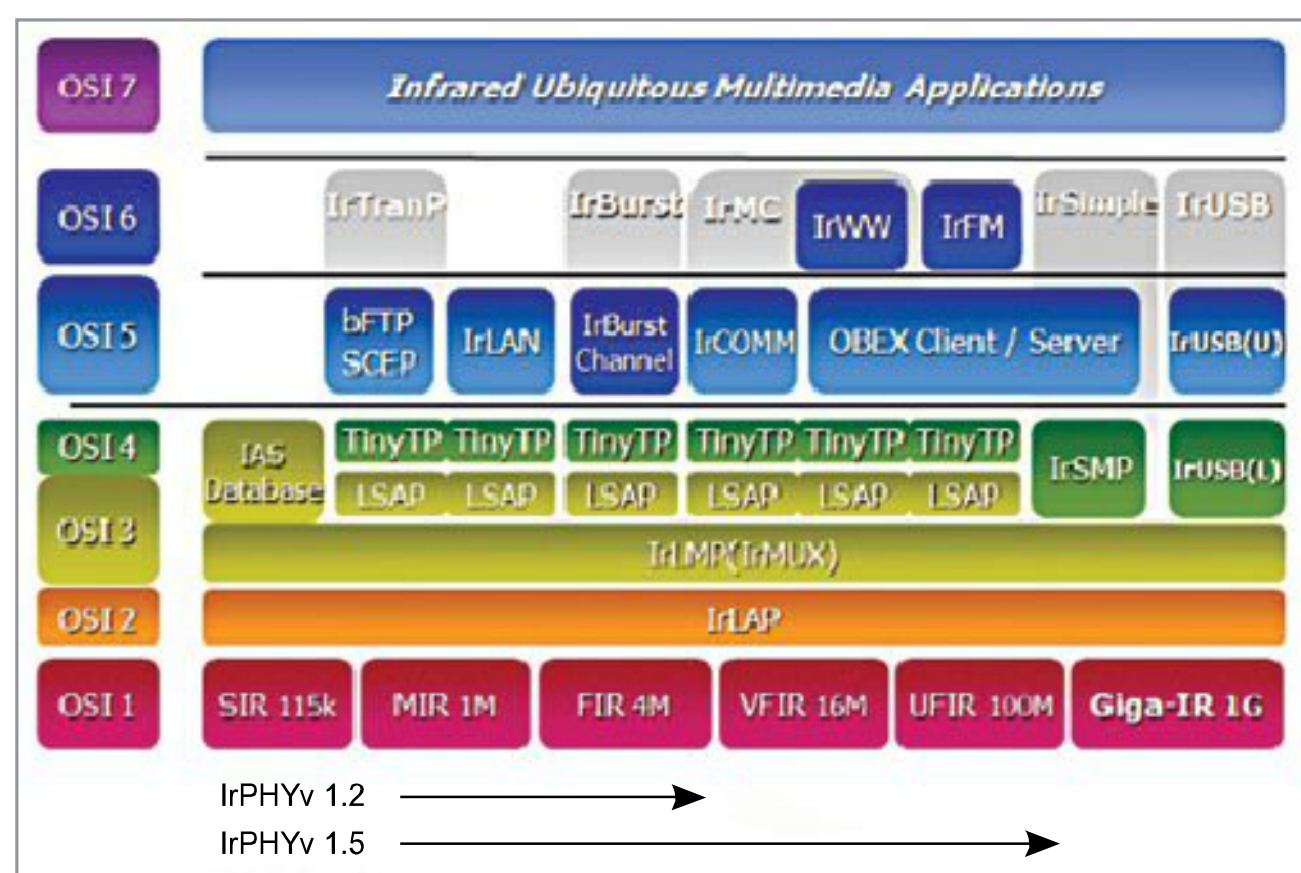


Fig. 1: IrDA protocol stacks

**Infrared link access protocol (IrLAP).** This specification is part of the second layer of IrDA specifications. It lies on top of the IrPHY layer and below the IrLMP layer. It represents the data link layer.

**Infrared link management protocol (IrLMP).** It is the third layer of IrDA specifications. It defines link management multiplexer and link management information access service.

**Transport protocol (TinyTP).** This optional protocol specified in the fourth layer lies on top of the IrLMP layer.

**Infrared communication protocol (IrCOMM).** The IrCOMM protocol specified in the fifth layer lets the infrared device act like either a serial or parallel port.

**Infrared Financial Messaging (IrFM).** This protocol specified in the sixth layer is a wireless payment standard developed by the Infrared Data Association.

### Q2. WHAT IS MCPCB? WHAT ETCHING SOLUTION IS USED IN MCPCB?

**Suresh Nath Sharma**

**A2. MCPCB.** Short for metal-core printed circuit board, the MCPCB is a type of PCB with metal as its base material. That is, unlike common

PCBs whose core materials are either composite epoxy materials (CEM-1 through CEM-5) or flame-retardant composite materials (FR-1 through FR-4), MCPCBs have metals—either aluminium, copper or steel alloy. Fig. 2 shows an MCPCB with aluminium base plate.

The MCPCB efficiently removes heat from integrated circuits (ICs). The metal base and thermally conductive dielectric layer act as bridges between ICs and heat-sinks. Aluminium is a popular base material. Metal cores in PCB base plates are typically 0.762 to 3.175mm thick.

**Etching solution.** Etching is the process of using a solution/etchant to remove unwanted parts of a metal surface to create a design in the metal. Ferric chloride ( $\text{FeCl}_3$ ) etchant is commonly used for normal copper-clad PCBs. Aluminium reacts more violently with  $\text{FeCl}_3$  than copper. That is, hydrogen gas starts forming and aluminium heats up very quickly, which is a bit risky.

Depending on the base material of the MCPCB, the etchant can be different. In theory,  $\text{FeCl}_3$  should work

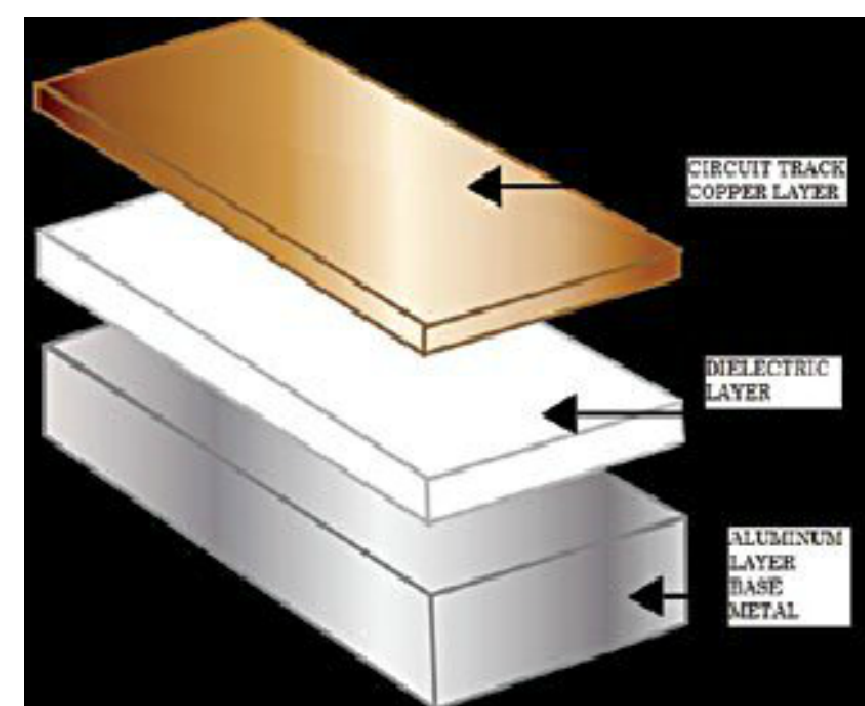


Fig. 2: An MCPCB

with aluminium MCPCB as the back side of the base metal (aluminium) is normally covered with a protective sheet for the purpose of etching. But, in practical, the sodium persulfate ( $\text{Na}_2\text{S}_2\text{O}_8$ ) etchant is found to work better. The complete homebrew etching process is available on <http://www.rollitup.org/t/diy-making-your-own-metal-core-printed-circuit-boards-for-led-applications.646086/>

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