A wireless communications, monitoring, or control device that picks up and automatically responds to an incoming signal. The term is a contraction of the words transmitter and responder. Transponders can be either passive or active. A passive transponder allows a computer or robot to identify an object. Magnetic labels, such as those on credit cards and store items, are common examples. A passive transponder must be used with an active sensor that decodes and transcribes the data the transponder contains. The transponder unit can be physically tiny, and its information can be sensed up to several feet away. Simple active transponders are employed in location, identification, and navigation systems for commercial and private aircraft. An example is an RFID (radio-frequency identification) device that transmits a coded signal when it receives a request from a monitoring or control point. The transponder output signal is tracked, so the position of the transponder can be constantly monitored. The input (receiver) and output (transmitter) frequencies are preassigned. Transponders of this type can operate over distances of thousands of miles. Sophisticated active transponders are used in communications satellites and on board space vehicles. They receive incoming signals over a range, or band, of frequencies, and retransmit the signals on a different band at the same time. The device is similar to a repeater of the sort used in land-based cellular telephone networks. The incoming signal, usually originating from a point on the earth's surface, is called the uplink. The outgoing signal, usually sent to a point or region on the surface, is the downlink. These transponders sometimes operate on an interplanetary scale.

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