CLAIM CHART FOR '071 PATENT AND SMITH

U.S. 7,584,071	Correspondence to Prior Art Reference (U.S. Pat. No. 5,043,646 to "Smith") (Ex. 1002)
1. A remote control system, comprising:	"A remote control transmitter/receiver system wherein…" Smith (Ex. 1002), Abstract.
a remote controller, comprising:	**Remote control transmitter 100** FIG. 3 is a schematic block diagram of a preferred remote control transmitter 100 according to the present invention. Smith (Ex. 1002), 3:61-63.
a motion detecting module, which detects the remote controller's motion and outputs a motion detecting signal; and	**Flux gate compass (10) and outputs sin θ and cos θ** "Referring still to FIG. 3, it can be seen that sine and cosine voltages 14, 12 are available as outputs from the flux gate compass 10. A suitable flux gate compass is the Micronta Automotive Electronic Compass sold by Radio Shack, Catalog No. 63-641. A detailed discussion of the operational details of the flux gate compass will be omitted because such devices are well known and their internal operation does not constitute a material portion of this invention except as herein explained." Smith (Ex. 1002), 4:17-26. "Suffice it to say that the magnitude of the voltages present on the sine and cosine outputs 14, 12 correspond to the sine and cosine of the earth's magnetic field, and that the data necessary to interpret the orientation of the flux gate compass and the remote control transmitter 100 is obtained by determining the ratio of the sine and cosine voltages. For this purpose, the sine and cosine voltages 14, 12 are provided to the microcontroller 24 via an 8-bit successive approximation A/D converter 13. As shown in FIG. 3, the A/D

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	converter 13 is comprised of two comparators 16, 18." Smith (Ex. 1002), 4:27-37.
a first communication module, which connects to the motion detecting module and receives the motion detecting signal, and transmits a target motion signal according to the motion detecting signal; and	**Microcontroller (24) and output (via line 34)** "The microcontroller determines the orientation of the flux compass by first dividing the absolute value of the sine voltage 14 by the absolute value of the cosine volt age 12 to obtain a tangent voltage, and by then using the tangent voltage as an index into an arctangent look-up table of 256 entries ranging from O to 90 degrees." Smith (Ex. 1002), 4:47-52. "The absolute direction ("absolute" meaning relative to magnetic North) corresponding to the selected direction is obtained by summing the orientation of the remote control transmitter 100 relative to magnetic north with the orientation of the shaft 26j relative to the remote control transmitter 100... A direction control signal containing information about the absolute direction relative to magnetic North can then be provided to an ordinary radio transmitter 36 via line 34 and then transmitted over antenna 38 to the car 200." Smith (Ex. 1002), 5:17-31.
a remote-controlled device, which is controlled by the remote controller, comprising:	**Remotely controlled car 200** "FIG. 4 is a schematic block diagram of a remote control receiving device according to the present invention; and" Smith (Ex. 1002), 3:4-6. "The radio receiver 136 receives digital command sequences transmitted by the remote control transmitter 100 via antenna 138." Smith (Ex. 1002), 5:62-64.

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a second communication module, which receives the target motion signal from the remote controller;	**Radio receiver 136** "The radio receiver 136 receives digital command sequences transmitted by the remote control transmitter 100 via antenna 138." Smith (Ex. 1002), 5:62-64.
a terrestrial magnetism sensing module, which detects the remote-controlled device's terrestrial magnetism and outputs a terrestrial magnetism sensing signal;	**Flux gate compass and outputs sine and cosine voltages 114, 112** Referring now to FIG. 4, the remote control receiver 200 is comprised of a microcontroller 124, a flux gate compass 110, a radio receiver 136, motor control circuitry 150, and steering control circuitry 140. The flux gate compass 110 is identical to the flux gate compass 10 used in the radio control transmitter 100. The flux gate compass 110 provides sine and cosine voltage outputs 114, 112 that vary based on the orientation of the compass 110 relative to magnetic North." Smith (Ex. 1002), 5:48-56.
a processing module, which has a first input connected to the terrestrial magnetism sensing module and receives the terrestrial magnetism sensing signal, and a second input connected to the second communication module and receives the target motion signal, and processes the terrestrial magnetism sensing signal and the target motion signal to output a	**Microcontroller 124 and outputs, left 142 and right 144** "The sine and cosine voltages 114, 112 [from flux gate compass 110] are provided to microcontroller 124 via A/D deconverter 113." Smith (Ex. 1002), 5:56-58; Figure 4. "The radio receiver 136 receives digital command sequences transmitted by the remote control transmitter 100 via antenna 138. Digital command sequences so received are provided by the radio receiver 136 to the microcontroller 124 on line 134. Once a command sequence has been received by microcontroller 124, and if the checksum test

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driving control signal; and	passes, then the digital command sequence is processed." Smith (Ex. 1002), 5:61-6:1. Regarding "to output a driving control signal": "The steering of the car is accomplished via a steering electromagnetic 146 that is controlled by the microcontroller 124 via left and right control lines 142, 144 and a steering control circuit 140. The steering control circuit 140 is interfaced to the steering electromagnet 146 via lines 145 and 147." 6:12-17." *See also*, Smith (Ex. 1002), Fig. 4.
a driving module, which connects to the processing module and receives the driving control signal, and adjusts the remote-controlled device's motion according to the driving control signal.	**Steering control circuitry 140** "The steering of the car is accomplished via a steering electromagnetic 146 that is controlled by the microcontroller 124 via left and right control lines 142, 144 and a steering control circuit 140. The steering control circuit 140 is interfaced to the steering electromagnet 146 via lines 145 and 147." Smith (Ex. 1002), 6:12-17." *See also*, Smith (Ex. 1002), Fig. 4. "The direction of the car 200 can be controlled based upon the orientation of the car 200 relative to magnetic North and the direction control signal contained in the digital control sequence (Byte 3, FIG. 5), because the car 200, like remote control transmitter 100, contains a flux gate compass 110 for measuring the orientation of the car 200 relative to magnetic North." Smith (Ex. 1002), 6:29-35.
2. The remote control system of claim 1, wherein the processing module processes the terrestrial	**Microcontroller 124 and outputs, left 142 and right 144** *See* claim 1.

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magnetism sensing signal and compares with the target motion signal, and uses the comparison result to generate the driving control signal.	"If a turn is required, microcontroller 124 will determine which of two possible directions will result in the smallest angle of rotation. While the turn is in progress, microcontroller 124 will periodically read the flux gate compass 110 to determine when the car 200 has converged to the commanded angle (direction control signal) contained in byte 3." Smith (Ex. 1002), 6:5-11.
3. The remote control system of claim 1, wherein the terrestrial magnetism sensing module comprises a magnetic sensor, the magnetic sensor detects the remote-controlled device's terrestrial magnetism to output the terrestrial magnetism sensing signal.	**Microcontroller 124 and outputs, left 142 and right 144** *See* claim 1. "Referring still to FIG. 3, it can be seen that sine and cosine voltages 14, 12 are available as outputs from the flux gate compass 10. A suitable flux gate compass is the Micronta Automotive Electronic Compass sold by Radio Shack, Catalog No. 63-641." Smith (Ex. 1002), 4:17-22.
4. The remote control system of claim 1, wherein the processing module uses the terrestrial magnetism sensing signal to calculate the current motion of the remote-controlled device, and uses the calculated result to compare with the target motion signal to get the difference of motion between the remote-controlled device and the remote controller, and according to the difference	**Microcontroller 124 and outputs, left 142 and right 144** *See* claim 1. "If a turn is required, microcontroller 124 will determine which of two possible directions will result in the smallest angle of rotation. While the turn is in progress, microcontroller 124 will periodically read the flux gate compass 110 to determine when the car 200 has converged to the commanded angle (direction control signal) contained in byte 3." Smith (Ex. 1002), 6:5-11. **Smith in view of Fouche** "Pitch attitude error 314 is the difference between a

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