■ SYSTEM CONTROL

1. General

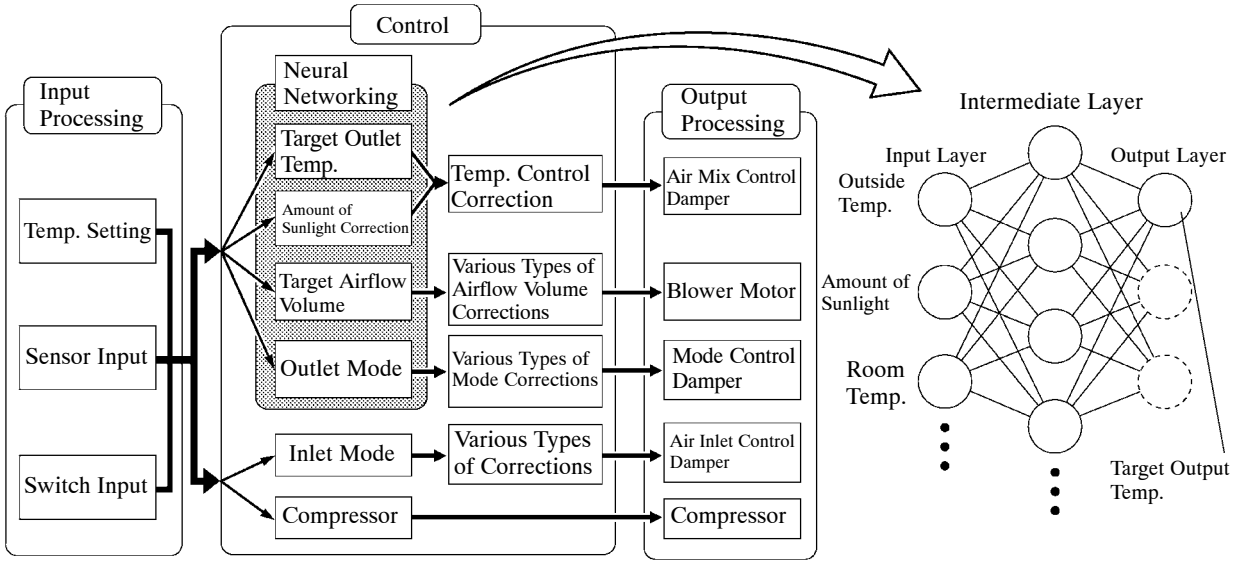
The air conditioning system has the following controls:

Control		Outline
Neural Network Control [See page BE-63]		This control is capable of effecting complex control by artificially simulating the information processing method of the nervous system of living organisms in order to establish a complex input/output relationship that is similar to a human brain.
Outlet Air Temp. Control		Based on the temperature set at the temperature control dial, the neural network control calculates the outlet air temperature based on the input signals from various sensors.
	Right/Left Independent Control	The temperature setting for the driver and front passenger is controlled independently in order to provide a separate vehicle interior temperature for the right and left side of the vehicle. Thus, air conditioning that accommodates the occupants' preferences has been achieved.
	Up/Down Independent Control	Adjusts the temperature of the air blown over the upper body and lower body separately based on signals from the solar sensor.
Blower Control		Controls the blower motor in accordance with the airflow volume that has been calculated by the neural network control based on the input signals from various sensors.
Air Outlet Control		Automatically switches the air outlets in accordance with the outlet mode that has been calculated by the neural network control based on the input signals from various sensors.
		In accordance with the engine coolant temperature, outside air temperature, amount of sunlight, required blower, outlet temperature, and vehicle speed conditions, this control automatically switches the blower outlet to the FOOT/DEF mode to prevent the windows from becoming fogged when the outside air temperature is low.
Air Inlet Control		Automatically controls the air inlet control damper to help achieve the calculated outlet air temperature that is required.
		Drives the servomotor (for air inlet) according to the operation of the air inlet control switch and moves the dampers to the FRESH or RECIRC position.
Compressor Control		This control turns off the magnetic clutch of the A/C compressor when the blower motor is turned off in case that the engine coolant temperature is below a predetermined value, an abnormal refrigerant pressure has been detected, or the discharge temperature of the evaporator is below a predetermined value (evaporator too cold).
		The air conditioning amplifier turns the compressor off if the engine coolant temperature becomes abnormally hot (120°C or above) when driving under a high load.
Rear Window Defogger & Mirror Heater Control*		Switches the rear window defogger and outside rear view mirror heaters on for 15 minutes when the rear window defogger button is pressed. Switches them off if the button is pressed again while they are operating.
Outside Temperature Indication Control		Based on the signal from the ambient temperature sensor, this control calculates the outside temperature, and this value is then corrected in the air conditioning amplifier, and shown on the accessory meter.
Self-diagnosis [See page BE-63]		A Diagnostic Trouble Code (DTC) is stored in the memory when the air conditioning amplifier detects a problem with the air conditioning system.

*: Standard equipment for the Limited and Platinum grades.

2. Neural Network Control

- Previously, in automatic air conditioning systems without neural network control, the air conditioning amplifier determined the required outlet air temperature and blower air volume in accordance with the calculation formula that has been obtained based on information received from the sensors.
  However, because the senses of a person are rather complex, a given temperature is sensed differently, depending on the environment in which the person is situated. For example, a given amount of solar radiation can feel comfortably warm in a cold climate, or extremely uncomfortable in a hot climate. Therefore, as a technique for effecting a higher level of control, a neural network is used in the automatic air conditioning system. With this technique, the data that has been collected under varying environmental conditions is stored in the air conditioning amplifier. The air conditioning amplifier can then effect control to provide enhanced air conditioning comfort.
- The neural network control consists of neurons in the input layer, intermediate layer, and output layer. The input layer neurons process the input data of the outside temperature, the amount of sunlight, and the room temperature based on the outputs of the switches and sensors, and output them to the intermediate layer neurons. Based on this data, the intermediate layer neurons adjust the strength of the links among the neurons. The sum of these is then calculated by the output layer neurons in the form of the required outlet temperature, solar correction, target airflow volume, and outlet mode control volume. Accordingly, the air conditioning amplifier controls the servomotors and blower motor in accordance with the control volumes that have been calculated by the neural network control.



3. Self-diagnosis

The air conditioning amplifier has a self-diagnosis function. It stores a record of any air conditioning system failures in memory in the form of Diagnostic Trouble Codes (DTCs).

- There are 2 methods for reading DTCs. One is to use the intelligent tester II, and the other is to read the DTCs using the heater control panel display.

For details, refer to the SEQUOIA Repair Manual (Pub. No. RM11Y0E).