Although snap circuits includes several parts that are called integrated circuits, they are actually modules containing a number of parts. The modules contain specialized sound-generation and amplifier ICs and other supporting components (resistors, capacitors, and transistors) that are always needed with them. This was done to simplify the connections you need to make to use them.

Introducing New Parts

The **music IC** module contains sound-generation ICs and supporting components. It can play several musical tunes that are recorded in it. Its actual schematic is complex and looks like this:
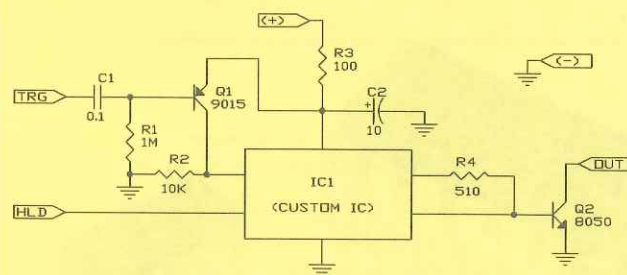
Its snap circuits connections are like this:
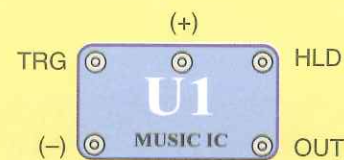
Music IC:

(+) - power from batteries   HLD - hold control input
(–) - power return to batteries   TRG - trigger control input
OUT - output connection

Music for ~20 sec on power-up, then hold HLD to (+) power or touch TRG to (+) power to resume music.
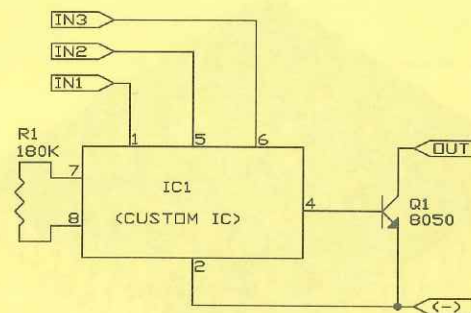
This module has two different control inputs. The OUT connection pulls current into the module (not out of it), usually from a speaker. This current is adjusted to make the music. Snap circuits projects 15 and 16 show how to connect this part and what it can do.

Quick Quiz

1. Select an electronic product in your home and guess how many ICs are inside it. Then (with the power disconnected from it) open it and look to see how many there are.

Introducing New Parts

The **alarm IC** module contains a sound-generation IC and supporting components. It can make several siren sounds. Its actual schematic looks like this:

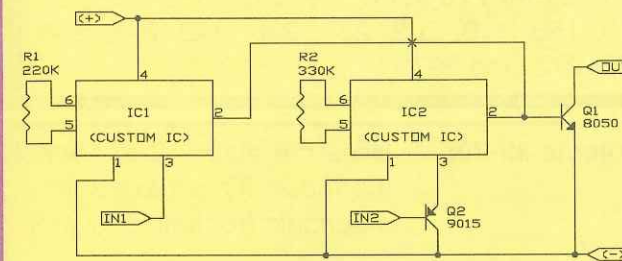Its snap circuits connections are like this:

Alarm IC:

IN1, IN2, IN3 - control inputs
(–) - power return to batteries
OUT - output connection

Connect control inputs to (+) power to make five alarm sounds.

This module has three control inputs, and can make five siren sounds. The OUT connection pulls current into the module (not out of it), usually from a speaker. This current is adjusted to make the siren sounds. Snap circuits project 17 shows a simple way to connect this part, and projects 113-117 show the connections needed to make the five possible sounds.

Introducing New Parts

The **space war IC** module contains sound-generation ICs and supporting components. It can make several siren sounds. Its actual schematic looks like this:

Its snap circuits connections are like this:
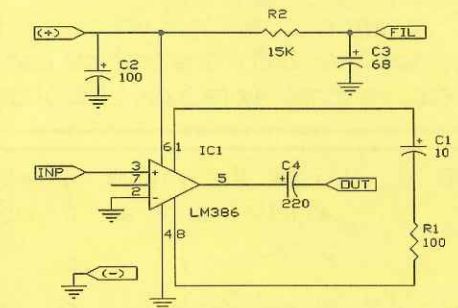

Space War IC:

(+) - power from batteries   OUT - output connection
(–) - power return to batteries   IN1, IN2 - control inputs

Connect each control input to (–) power to sequence through 8 sounds.

This module has two control inputs that can be stepped through 8 sounds. The OUT connection pulls current into the module (not out of it), usually from a speaker. This current is adjusted to make the space war sounds. Snap circuits project 19 shows how to connect this part and what it can do.

Introducing New Parts

The **high frequency IC** is an TA7642 (or other equivalent) AM radio IC. It is a specialized amplifier used only in high frequency radio circuits. The circuitry inside it looks like this:

Introducing New Parts

The **power amplifier IC** module contains an LM386 audio amplifier IC and supporting components. Its actual schematic looks like this:

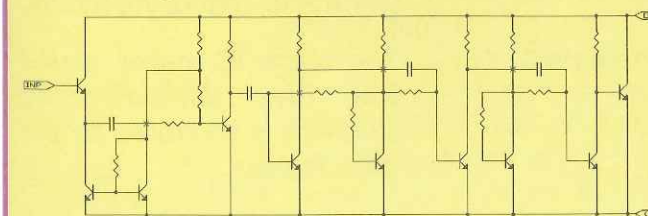

Its snap circuits connections are like this:

Power Amplifier IC:

(+) - power from batteries   INP - input connection
(–) - power return to batteries   OUT - output connection
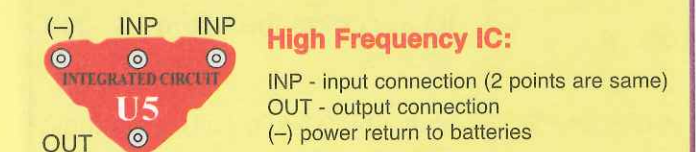FIL - filtered power from batteries

This module amplifies a signal from its input. The OUT connection will usually be directly to a speaker. Amplifiers like this let a small amount of electricity control a much larger amount, such as using a tiny signal from a radio antenna to control a speaker playing music. Snap circuits projects 242 and 293 show how to connect this part and what it can do.

High Frequency IC:

INP - input connection (2 points are same)
OUT - output connection
(–) power return to batteries

This module converts an AM radio signal at its input into an audio signal at its output. Snap circuits project 242 shows how to connect this part and what it can do.

7-2 Integrated Circuit Projects

Integrated circuits are used in most electronic products; there are probably more than a thousand throughout your home. The range and uses of ICs available is hard to imagine.

Although snap circuits contains only five IC modules, more than half of the projects use at least one. There are many more examples of using the parts described in the preceding chapters, such as the microphone and photoresistor. Here is a short description of each, the project manuals explain them in more detail:

Suggested Projects: 38, 51, 58, 61, 81, 83, 119, 158, 178, 202, 237, 238, 242, 245, 250, 255, 272, and 297.

Project 3:	Uses the music IC with the whistle chip as a vibration sensor.
Project 4:	Uses the music IC with the whistle chip as a vibration sensor.
Project 10:	Combines the sound effects of the music and space war ICs.
Project 15:	Uses the music IC as a doorbell.
Project 16:	Uses the music IC as an alarm.
Project 17:	Makes one of the alarm IC siren sounds.
Project 18:	Makes one of the alarm IC siren sounds.
Project 19:	This is the standard circuit using the space war IC.
Projects 20-21:	This uses the photoresistor with the space war IC.
Projects 22-26:	Uses the photoresistor and music IC to control the alarm IC siren sounds.
Projects 27-31:	Uses the whistle chip and music IC to control the alarm IC siren sounds.
Projects 32-33:	Uses the whistle chip and music IC to control the space war IC.
Projects 34-35:	Uses the motor and music IC to control the space war IC.
Projects 36-37:	Uses the motor and alarm IC to control the space war IC.

Projects 38-39:	Uses the alarm IC to control the music IC. An example of a periodic (repeating) signal.
Projects 40-44:	Uses the motor and music IC to control the alarm IC siren sounds.
Project 45:	Uses the photoresistor, music IC, and alarm IC to control an LED.
Project 46:	Makes one of the alarm IC siren sounds.
Project 51:	The alarm IC uses the photoresistor to sense reflections from a lamp.
Project 52:	The alarm IC uses the photoresistor to sense reflections from a lamp.
Project 53:	Sound and light controlled by the alarm IC.
Project 54:	Uses the alarm IC to control the space war IC.
Project 58:	Uses the music IC to control the alarm IC, with additional control from the whistle chip and photoresistor. Also shows how some parts can be used as wires.
Project 60:	Uses the alarm and space war ICs to control the motor.
Projects 61-65:	The alarm IC makes sound with the whistle chip; loudness is controlled by the photoresistor.
Project 66:	Uses the space war IC in a mind-reading game.

Project 67:	Uses the space war IC in a mind-reading game.
Project 68:	Combines the sound effects of the music and space war ICs.
Project 69:	Combines the sound effects of the alarm and space war ICs.
Project 70:	Uses the alarm IC as a water detector.
Projects 71-76:	Use either the photoresistor, whistle chip, or motor to control a light using the music IC.
Project 77:	Uses the alarm and space war ICs to control a light.
Project 78:	Makes an AND gate with the music IC.
Project 79:	Combines effects from the music and alarm ICs.
Projects 81-82:	Allows you to DRAW an activator for the alarm IC.
Project 83:	Effects from the music and alarm ICs are combined in several different ways.
Projects 84-85:	Sound effects from the music and alarm ICs are combined with the motor (in most manuals).
Project 86:	Effects from the music and alarm ICs are combined in several different ways.
Project 87:	Makes a fun sound with the space war IC.
Project 88:	Makes fun sounds by controlling the space war IC with the motor.
Projects 89-91:	The photoresistor and whistle chip are used to control the space war IC.
Projects 92-97:	Uses water to control the space war IC in various ways.

Projects 98-101:	Uses the alarm IC to make a water alarm in several ways.
Project 104:	Uses the space war IC to spin a fan.
Project 106:	Uses the photoresistor and NPN transistor with the alarm IC.
Projects 113-117:	The alarm IC makes sounds with the whistle chip.
Project 119:	Uses the motor as a generator. As you spin the motor, the power amplifier IC makes sounds like a typewriter.
Projects 120-121:	Use a transistor to amplify sounds from the space war IC.
Project 122:	Makes an AM radio transmitter using the space war IC. See chapter 8 for information about radio circuits.
Projects 139-144:	The microphone, photo-resistor, and motor are used to control music and lights with the music IC.
Projects 145-150:	Makes an AM radio transmitter using the music IC, with several variations. See chapter 8 for information about radio circuits.
Project 151:	Uses the microphone and transistors to control the space war IC.
Projects 154-163:	The music, alarm, and space war ICs are used to control the speaker and lamp at the same time, sometimes with the fan running.
Projects 176-179:	Use the microphone and transistors to control the music IC.
Project 202:	Water and a transistor are used to control the alarm IC.