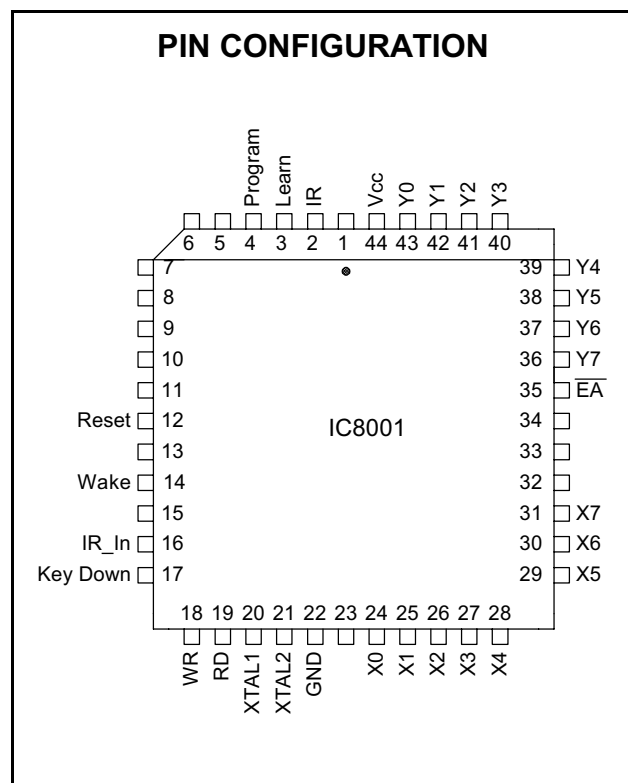


IC8001 UNIVERSAL "LEARNING" REMOTE CONTROL INTEGRATED CIRCUIT

FEATURES

- Combines Innotech's acclaimed remote control code library with powerful IR learning capability
- Stores learned codes even with battery removed
- "Sleep Mode" for long battery life
- Learns all common IR protocols
- Up to Six Sources
- Easy to program
- Choice of
 - Manual Programming
 - Manual Search Mode
 - Automatic Search Mode
- Controls any combination of TV/VCR/ Cable/Satellite and DVD
- Broad Coverage of All Popular Entertainment Models
- Up to 64 keys
- Punch-Through Operation



DESCRIPTION

The IC8001 Universal Remote Integrated Circuit is a fully integrated solution for a complete six-in-one "learning" universal remote control. The IC8001 includes the comprehensive Innotech library of entertainment remote control codes for the highest possible coverage of consumer products, in addition to learning new codes so that remote controls incorporating the IC8001 are never out-dated. The learned buttons can be used to add buttons to an entertainment device already in the library, or to add new devices. The IC8001 may be used to control up to six different entertainment devices, typically a TV, VCR, Satellite, and cable box. The IC8001 may be customized to include OEM-specific remote control codes. The choice of programming methods ensures the easiest-possible customer operation.



DESCRIPTION OF PIN FUNCTIONS

Pin Number		Symbol	Function	Description
DIP	PLCC			
1	2	IR	Output	IR LED output
2	3	Learn	Output	Tri-Color Visible LED for user feedback during learning
3	4	Program	Output	Tri-Color Visible LED for program set up
9	10	Reset	Input	Power On Reset
12	14	Wake	Input	Wakes IC8001 from power-saving sleep mode
14	16	IR_In	Input	IR from remote control being learned
15	17	Key Down	Input	Active when any key is depressed
16	18	WR	Input	Input from serial EEPROM used for non-volatile storage of learned codes
17	19	RD	Output	Output to serial EEPROM used for non-volatile storage of learned codes
18	20	XTAL1	Output	12 MHz Crystal Connection.
19	21	XTAL2	Input	12 MHz Crystal Connection.
20	22	GND	Ground	Ground
21-28	24-31	X0-X8	Keypad	Keypad Row Connections
31	35	EA/VP	Input	Connect to +5 Volts
32-39	36-43	Y7-Y0	Keypad	Keypad Column Connections
40	44	VCC	Power	+5 Volts Power Supply

BUTTON DESCRIPTION

Device Buttons: . These buttons are used to select the device to control. For example, the button switches the remote to cable or satellite mode and the remote control functions control the cable box. Pressing switches the remote to TV mode. Some controls may function even when their normal device is not selected (Punch Through). For example, when in cable box mode, the volume controls may still work with the television, and the VCR controls may still control the

VCR. The availability of this feature depends on the type of TV, VCR, cable box, etc.

This button is used to turn the TV, VCR, cable box etc. on or off.

Channel Up / Channel Down

Raise or lower the volume.



VCR Play, Fast Forward, Rewind, Pause, Stop. These operate as conventional VCR controls, but **REC** must be pressed twice to start recording.

TV/VCR Toggles between TV and VCR functions.

MUTE This button turns muting on and off.

Numeric Pad: The numbers on this pad control channel settings on TVs, VCRs, and cable boxes.

ENTER Some TVs require **ENTER** be pressed when changing channels with the numeric pad.

PREV Returns to the previous channel selected on TV's that support this function.

Learn Used for learning IR signals from other remote controls. See "Learning."

The **PROG** **AUTO** Program and auto search buttons used for programming the remote to work with your specific TV, VCR, and cable box. Programming the remote is described later in this manual.

PROGRAMMING GUIDE

QUICK PROGRAMMING GUIDE

Press the device button for the device you wish to program (1 flash)	TV VCR C/SAT AMP CD DVD ⚙
Press the PROG button (2 flashes)	PROG ⚙⚙
Input the corresponding code from the code list. (Flashes once for each digit pressed)	1 ⚙ 2 ⚙ 3 ⚙

When you have entered the correct code, press PROG . (3 flashes)	PROG ⚙⚙⚙
Repeat steps 1-4 for each device (TV, VCR, or cable box.)	

DETAILED PROGRAMMING GUIDE

To program A Device:

1. Select the device you wish to program with a device key (TV, VCR, Cable). For instance to program the VCR, press the VCR device button. The light on the remote will flash once.

2. Press the **PROG** button. The light will flash twice.

3. Find the correct code from the code list that follows. If a brand has more than one code, the first codes are the latest models.



4. Enter the correct code on the number pad. The light will flash once for each key pressed.

5. Press the **PROG** button again to lock in the code. The light should flash 3 times, and programming is finished. For example, to program a Sony TV:

First, find the Sony codes in the code list.

Then, try the first (latest model) code. Press:

TV **PROG** **0** **3** **8** **PROG**

When finished, try to operate the TV with the remote. If the remote works with the TV, the programming for the TV is finished. If the remote does not work, try the next code: 141, and so-on, until the correct code is found. If you cannot find the correct code, refer to the Auto Search feature.

LEARNING CODES FROM EXISTING REMOTE CONTROLS

LEARNING CODES

1. Press the device button, which you wish to store the learned code. (1 flash)

TV or **VCR** or **C/SAT**

2. Press the LEARN button. The LED will now illuminate orange.

LEARN

3. Now press the button that you wish to store the learned data on. The LED will now change to red.

4. Next how hold the old remote up to the IR sensor. (See note). When the learn is complete, the LED will go out. If two flashes occur, that means there was an error and the process needs to be repeated.

Repeat steps 2-4 to learn addition buttons for the current source.

Note: Some OEM remote controls have multiple IR LEDs. It is important to have a direct line between the IR LED on the OEM remote and the IR sensor on the IC8001-based remote control.

ERASING LEARNED BUTTONS

Learned functions are associated with the selected source (TV, VCR etc.) not the device number. To erase learned functions for a specific device TV, VCR etc.),

1. Select the device you wish to reprogram with a device key (TV, VCR, Cable). For instance to erase the learned buttons associated with the VCR, press the VCR device button. The light on the remote will flash once.

2. Press the **PROG** button. The light will flash twice.

3. Select a device code from the code list and enter the code on the number pad. The light will flash once for each key pressed.

4. Press the **PROG** button again to lock in the code. The light should flash 3 times. The VCR function will now operate per the selected device code without any learned buttons. Individual buttons cannot be erased.



SPECIAL FEATURES

The IC8001 Universal Remote Control Integrated Circuit has a number of special features:

Punch Through

Punch Through allows TVS, VCRs, and cable box controls to work at the same time. For example, after you press the **C/SAT** or **VCR** buttons, the volume controls would still work with the television. Other functions may also work this way. *Availability of this feature varies depending on the type of TV, VCR, and cable box used.*

Read Back Programmed Code

The IC8001 allows the remote control to read back the codes selected for TV, VCR, and cable box so users can write them down and use for future reference. To do this:

1. Press the device key that you want the code read back for. For example, if you want to get the code for your TV, press the **TV** key.
2. Press **PROG**. The light should flash twice.
3. Press **1** and then **PROG**. The light will flash the number of the first digit of the code. For instance, if the TV's code is 567, the light will flash five times. If a digit of code is zero, the light will not flash.
4. Repeat the last two steps to get the second and third digits of the TV code, by pressing **2** and **PROG** for the second digit (light flashes six times) and **3** and **PROG** for the third digit (light flashes seven times). This procedure can then be repeated for the VCR and cable box.

Substitute Devices

Users can substitute devices with universal remote controls based on the IC8001. All of the three device buttons (TV, VCR, and C/SAT) can be programmed as a TV, VCR, or cable box etc. To program a TV on the VCR device button:


1. Press **VCR** and then **PROG**. The light will flash twice.
2. Instead of entering a VCR code, enter the TV code for the desired TV. The light will flash once for each digit.
3. Press **PROG**, and the light will flash 3 times. Now the VCR button will act as a second TV. This works with all three devices, so it is possible to program up to three TV's, VCR's, and cable boxes. For example, to program a Sony TV in the cable boxes place, press:

C/SAT **PROG** **0** **3** **8** **PROG**

Now the C/SAT button will act as a Sony TV.

Auto Search For Correct Code

If users have trouble programming the remote, or can't find the correct code in the manual, the remote can cycle through available codes rapidly to help locate a usable code. It is recommended that this feature be used only when all other methods have failed, as users may have to cycle through many codes before finding a usable one.

1. Manually turn on the device to control.
2. **TV** or **VCR** or **C/SAT**  Press the device key for the device code being searched for. For example, to search for a TV code, press **TV** once. (1 Flash)



3. **PROG** ⚙ ⚙
Press the **PROG** button once. (2 Flashes)

4. **AUTO** Press the Auto button. ⚙

The remote control will now search through the library for the target device code in 3 second intervals. Every 3 seconds the user will be prompted by the light flashing and the remote will attempt to turn the power off.

When the device turns off, the user should immediately press the **PROG** key to save the code. Check the other buttons to ensure they all work with the target device. If they do not, repeat the preceding auto search steps.

To stop Auto Search, press any key except **AUTO**.

Manual Search For Correct Code

The user can manually toggle through the device codes to find the correct code for a TV, VCR or Cable/Satellite.

1. Manually turn on the device.

2. **TV** or **VCR** or **C/SAT** ⚙
Press the device key for the device code you want to search for. For example, to search for a TV code, press **TV** once. (1 Flash)

3. **PROG** ⚙ ⚙
Press the **PROG** button once. (2 Flashes)

4. **0** ⚙ **0** ⚙ **0** ⚙

Press **0** **0** **0** (Flashes once for each digit pressed)

5. **PROG** ⚙ ⚙ ⚙
Press the **PROG** to change to the next device code. Every time **PROG** is pressed, the device code will increment..

6. **TV** or **VCR** or **C/SAT** ⚙

Press the device key again to lock in the code.

NOTE: Some devices, such as cable boxes, may not support power buttons on the remote. In this case, you can substitute **CH+** or any other supported button to test the code.

DEVICE CODES

For a code list of supported devices and associated ISI codes, please contact Innotech Systems for the document "Index of Device Codes - IC8001."



OPERATIONAL DESCRIPTION

MAXIMUM GUARANTEED RATINGS*

Operating Temperature Range	0°C - 70°C
Storage Temperature Range	-55°C to + 150°C
Voltage from any pin to V_{SS}	-0.5 to $V_{CC} + 0.5$
Voltage from V_{CC} to V_{SS}	-0.5 to +6.5

*Stresses above those listed could cause permanent damage to the device. This is a stress rating only and functional operation of the device at any other condition above those indicated in the operation sections of this specification is not implied.

DC ELECTRICAL CHARACTERISTICS ($T_A = 0^\circ\text{C} - 70^\circ\text{C}$, $V_{CC} = +5.0\text{ V} \pm 10\%$)

SYMBOL	PARAMETER	MIN	MAX	UNIT	COMMENT
V_{IL}	Input Voltage Low		$0.2V_{CC}-0.1$	V	
V_{IH}	Input Voltage High	$0.2V_{CC}+0.9$		V	Except XTAL
V_{OL}	Output Voltage Low		.45	V	$I_{OL}=1.6\text{mA}$
V_{OH}	Output Voltage High	2.4		V	$I_{OH}=-60\mu\text{A}$
I_{CC}	Power Supply Current		22	mA	12 MHz Clock



TYPICAL APPLICATION SIX FUNCTION LEARNING REMOTE CONTROL

