



IC4201/IC6201 UNIVERSAL REMOTE CONTROL INTEGRATED CIRCUITS

FEATURES

- Incorporates Innotech's acclaimed remote control code library
 - IC4201 Four-in-one
 - IC6201 Home Theater
- Single chip solution provided in die form for lowest cost
- IC4201 controls any combination of TV/VCR/Cable/DSS/DVD/Aux
- IC6201 controls any combination of TV/VCR/Cable/DSS/DVD/CD/Audio/Tape/Aux
- Up to Four Sources (IC4201) or eight sources (IC6201)
- Easy to program
- Choice of
 - Manual Programming
 - Manual Search Mode
 - Automatic Search Mode
- Broad Coverage of All Popular Entertainment Models
- Up to 64 keys
- Punch-Through Operation
- Macros optional
- Two battery operation
- Low operating power and "Sleep Mode" for long battery life

DESCRIPTION

The IC4201 and IC6201 Universal Remote Integrated Circuits are fully integrated single-chip solutions for handheld universal remote controls. The IC4201 and IC6201 include the comprehensive Innotech library of entertainment remote control codes for the highest possible coverage of consumer products. Both IC's are provided in die form for the lowest cost remote control manufacture using chip-on-board assembly.

The IC4201 is a complete "four-in-one" remote control IC capable of controlling any combination of TV/VCR/Cable Box/DSS/DVD and Aux ("six-in-one" optional). The IC6201 is a complete "Home Theater" remote control IC capable of controlling all popular home theater devices including TV/VCR/Cable Box/DSS/DVD/CD/ Audio/Tape and Aux. Both products allow users to program multiple TV's, VCR's etc.

Based on the comprehensive Innotech IR code library, the IC4201 controls virtually every TV, VCR, Cable Box, DSS Receiver, and DVD player available today. The IC6201 expands this to cover all popular home theater and audio system components. North American and European versions of both parts are available.



DESCRIPTION OF PIN FUNCTIONS

Pad Number	Symbol	Function	Description
	IR	Output	IR LED output
	Program	Output	Visible LED for program set up
	Reset	Input	Power On Reset
	SCL	Input	Input from optional serial EEPROM used for non-volatile storage of programmed codes
	SDA	Output	Output to optional serial EEPROM used for non-volatile storage of programmed codes
	XTAL1	Output	Crystal Connection.
	XTAL2	Input	Crystal Connection.
	GND	Ground	Ground
	X0-X8	Keypad	Keypad Row Connections
	Y7-Y0	Keypad	Keypad Column Connections
	Vcc	Power	Positive battery connection (2.4 – 5.5 volts)

BUTTON DESCRIPTION

Device Buttons: , (IC4201), (IC6201). (Note: other button combinations available). These buttons are used to select the device to control. For example, the button switches the remote to cable/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 what type of TV, VCR, and cable box.

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

Channel Up / Channel Down

Raise or lower the volume.

Play, Fast Forward, Rewind, Pause, Stop. These operate as conventional VCR/DVD/Tape transport controls, but must be pressed twice to start recording.

Toggles between TV and VCR functions.

This button turns muting on and off.

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

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



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

The **PROG** **AUTO** Program and auto search buttons used for programming the remote to work with your specific TV, VCR, and cable box. Program-

ming the remote is described later in this manual.

Note: additional buttons including **SCAN**, **Learn/M**, **F1** - **F4**, **CD**, **SAT** **Audio/Aux**, **DVD** and other are optional and may be defined.

PROGRAMMING GUIDE

QUICK PROGRAMMING GUIDE

Press the device button for the device you wish to program (1 flash)	TV or VCR or C/SAT ☼
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.



SPECIAL FEATURES

The IC4201/IC6201 Universal Remote Control Integrated Circuits have 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.*

Priority Press™ (optional)

Priority Press™ is a unique feature that makes remote controls using Innotek remote control IC's simpler to use than other remote controls by eliminating the traditional need to push the **TV**, **CBL**, **VCR**, or other device buttons every time users wish to change what they are doing. With Priority Press, users decide which entertainment device they wish to use for common functions — which they perform with just one button press. Priority Press reduces the number of button presses required to perform a function.

*Once users have programmed Priority Press, they may never need to press the **TV/CD**, **CBL**, **VCR/DVD**, or **Audio/Aux** buttons again!*

Read Back Programmed Code

The IC4201/IC6201 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 IC4201/IC6201. 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.

Macros (optional)

The IC4201/IC6201 can store up to four Macros. (Additional macros are an additional option). The four macro buttons are the **[F1]** - **[F4]** buttons.

Setting Up a Macro

1. Press the **[Learn/M]** (Learn Macro) button.
2. The LED will flash once.
3. Select one of the four macros by pressing your choice of **[F1]** - **[F4]**. The LED will flash twice.
4. Press the button sequence that you want to program. NOTE: The remote will transmit IR commands while you do this so you can see the effect. The LED will light as it normally does



when you press buttons.

5. End the macro by pressing the Learn/M key.

DEVICE CODES

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

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°C - 70°C, V_{CC} = 2.4V – 5.5 V)

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} =1.6mA
V _{OH}	Output Voltage High	2.4		V	IOH=-60µA
I _{CC}	Power Supply Current		1	mA	Active
I _{CC}	Power Supply Current		1	µA	Sleep

