



IC8205A

UNIVERSAL LEARNING REMOTE CONTROL INTEGRATED CIRCUIT

FEATURES

- Combines Innotech's extensive remote control Infrared code library with a powerful IR learning capability.
- Single chip solution provided in die form for lowest cost.
- Available in OTP form for prototyping.
- 6 device slots
- Simple clocked serial host interface.
- Total learning capacity 112 buttons dynamically distributed over the 6 device slots.
- Broad coverage of all popular entertainment models.
- Two battery operation.
- Low operating power and Sleep Mode for long battery life.
- Flexible learner. Understands codes with toggle bits.
- Upload and Download extra IR codes.
- Retains learned codes even with battery removed via external EEPROM.

DESCRIPTION

The IC8205A Universal Learning Remote Integrated Circuit is a fully integrated solution for any system that requires IR transmission and learning capability. The chip can be configured for keypad or serial control. The IC8205A includes a comprehensive IR library of entertainment remote control codes. The IC8205A is provided in die form for the lowest manufacturing costs using chip-on-board assembly and is also available in a One-Time-Programmable daughterboard for prototyping.

The IC8205A is a complete "six-in-one" remote control IC capable of controlling any combination of TV, VCR, CBL, DSS, DVD, Audio and Aux.

Based on the advanced Innotech IR learning technology, the IC8205A can "capture" remote control codes for the vast majority of home entertainment and automation equipment including TV, VCR, Cable Box, Satellite (DSS) Receiver, Audio equipment and DVD players.

**DESCRIPTION OF PIN FUNCTIONS**

Die Pad #	COB/OTP Pin# daughterboard	Symbol	I/O	Description
2, 37	35, 28	IR_INP2 IR_INP3	Input	Learner Inputs
42	33	HOST_CLK_IN	Input	Clock from Host
40	31	HOST_SYNC_DATA	I/O	Host Synchronous Serial Data
34	25	HOST_CLK_OUT	Output	Clock to Host
38	29	~IRLED	Output	IR LED for transmitting IR codes
32	12	LED	Output	Visible LED indicator for visual feedback to user.
21	15	~Reset	Input	Power On Reset
30	10	SCL	Output	Clock output to I ² C serial EEPROM used for non-volatile storage of learned codes
29	9	SDA	I/O	Data signal to I ² C serial EEPROM used for non-volatile storage of learned codes
24	18	GND	Ground	Ground
1	34	IR_INP1	Input	Learner IR input 1
31	11	ENABLE	Output	Enables the IR detector during learning
25, 26	19, 20	FXI, FXO	I/O	4 MHz ceramic resonator connection
22, 23	16, 17	SX1, SXO	I/O	Control resistor for internal secondary clock.
20	24	TSTPT	Input	Test point input. Should be tied low.
27, 28	21, 22	Vcc	Power	Positive battery connection
35, 36	26, 27	CFG1, CFG2	Input	Configuration Straps = 0,0 for Sync mode
12-19	45-48, 1 5-7	X7-X0	Input	Keypad sense lines (not used in serial configuration)
41	32	SLEEP	Input	Force power down
39	30	WAKE	Input	Keypad wakeup signal



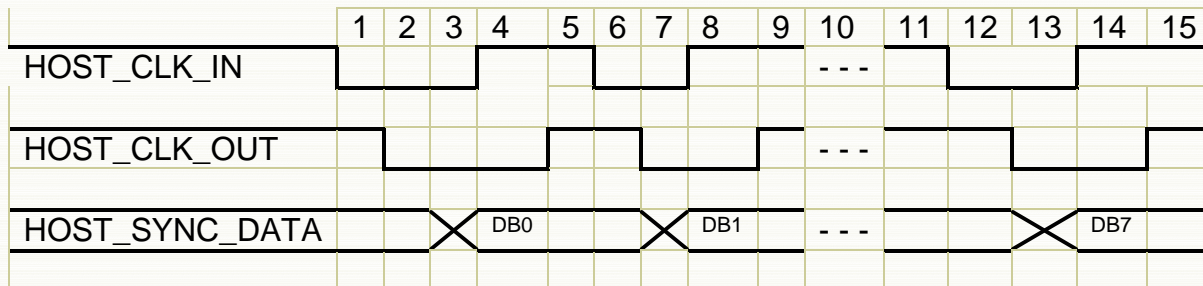
HOST INTERFACE

Data communications between the IC8205 and the host processor is accomplished through the use of a simple clocked bit-serial interface. This interface allows host processors of any speed to exchange data with the IC8205 at the fastest possible speed.

The host processor initiates all functions by sending the IC8205A commands which consist of *virtual button presses*. This is equivalent to pressing the buttons on a traditional remote control. Depending on the function being performed, these command sequence may consist of from one to several bytes going into the IC8205A.

With few exceptions every “button press” sent by the host processor will elicit a status byte returned from the IC8205A. This lock-step approach is the flow control mechanism for controlling the chip.

SEND COMMAND BYTE



The host initiates all transactions.

A transaction consists of exchanges of commands and responses between the host and the IC8205.

A command may be from 1 byte to 3 bytes.

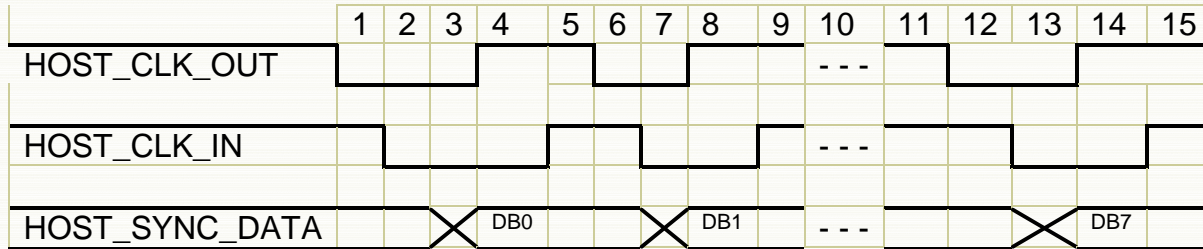
- 1) A command is initiated when the host drops its HOST_CLK line. If the IC8205 was in power down mode, this action will awaken it.
- 2) The IC8205 will acknowledge that it is ready to accept a bit of information by lowering the LR_CLK line.
- 3) The host can then place its first data bit (DB0) on the SERIAL DATA line.
- 4) The host then raises its clock line to say there is data available.
- 5) When the IC8205 reads the data-bit it will raise its clock line.
- 6 – 15) This handshake process repeats 8 times.

Status messages returned from the IC8205 to the host processor convey information about such things as the progress of a learning function, the completion of a transmission of learned data, and the return of version information. Status data is sent from the IC8205 to the host using the same serial clocked handshake as the command data sent to the IC8205.

- 1) The host monitors the LR_CLK line from the IC8205 waiting for it to go low.
- 2) The host lowers the HOST_CLK line indicating that it is ready to receive a bit of status data.
- 3) The IC8205 place its first status data bit (DB0) on the SERIAL DATA line.
- 4) The IC8205 raises its clock line (LR_CLK) to say there is data available.
- 5) After the host reads the data-bit it will raise its clock line.
- 6) 6 – 15) This handshake process repeats 8 times.



RECEIVE STATUS BYTE



REMOTE CONTROL OPERATION

General

The IC8205A implements a fully functional 6-in-1 universal remote control. It supports 64 traditional remote control buttons, in addition to extended buttons used for control purposes. The IC8205A contains an IR learner to augment the built-in library. All user preferences, programmed codes, learned codes, and downloadable IR codes are stored in an external serial EEPROM.

The following tables show the button codes that are sent to the IC8205A and the status codes that are returned to the host.

NOTE: To maintain backwards compatibility with a legacy product, the MSB must always be set to 1 for all button codes. This was the “button down” bit in the earlier product.



VIRTUAL BUTTON MAPPING

Buttons that Transmit IR

Function	CODE	Class
		Page 8
0	00h	channel
1	01h	channel
2	02h	channel
3	03h	channel
4	04h	channel
5	05h	channel
6	06h	channel
7	07h	channel
8	08h	channel
9	09h	channel
Enter	0Ah	channel
Mute	0Bh	volume
Volume up	0Ch	volume
Volume down	0Dh	volume
Channel up	0Eh	channel
Channel down	0Fh	channel
Rewind	10h	transport
Play	11h	transport
Fast Forward	12h	transport
Record	13h	transport
Stop	14h	transport
Pause	15h	transport
Power	16h	power
Previous	17h	channel
Input	18h	PIP
Display	19h	setup
Menu	1Ah	setup
Select	1Bh	Setup
Navigate up	1Ch	Setup
Navigate down	1Dh	Setup
Navigate left	1Eh	setup
Navigate Right	1Fh	setup
Exit	20h	setup
Guide	21h	setup
10+	22h	channel
TITLE	23h	
Sleep	24h	power
Yellow Square	25h	channel
Blue Circle	26h	channel
Red Triangle	27h	Channel
PIP	28h	PIP
PIP Ch+	29h	PIP
PIP CH-	2Ah	PIP
PIP move	2Bh	PIP
PIP swap	2Ch	PIP

Function	CODE	Class
		Page 8
Page up	2Dh	channel
Page down	2Eh	channel
Power off	2Fh	power
XIR48	30h	none
XIR49	31h	none
XIR50	32h	none
XIR51	33h	none
XIR52	34h	none
XIR53	35h	none
XIR54	36h	none
XIR55	37h	none
XIR56	38h	none
XIR57	39h	none
XIR58	3Ah	none
XIR59	3Bh	none
XIR60	3Ch	none
XIR61	3Dh	none
XIR62	3Eh	none
XIR63	3Fh	none

Control Buttons

Function	Code	Type
Program	40h	Setup
AUX	41h	Slot
TV	42h	Slot
VCR	43h	Slot
DVD	44h	Slot
Audio	45h	Slot
CBL/SAT	46h	Slot
Search	47h	Setup
Learn	48h	Setup
F1	49h	Macro
F2	4Ah	Macro
F3	4Bh	Macro
F4	4Ch	Macro
Smart ON	4Dh	Setup
Smart Off	4Eh	Setup
Smart Source	4Fh	Setup
IR repeat 0	50h	Setup
IR repeat 1	51h	Setup
IR repeat 2	52h	Setup
IR repeat 3	53h	Setup
IR repeat 4	54h	Setup
IR repeat 5	55h	Setup
IR repeat 6	56h	Setup
Function	Code	Type



IR repeat 7	57h	Setup
Erase Learned button	58h	Setup
Write EEPROM	59h	Setup
Read EEPROM	5Ah	Setup
Clear EEPROM	5Bh	Setup
Revision number	5Ch	Setup
Device number	5Dh	Setup
Number of learned buttons	5Eh	Setup
Erase Selected Device	5Fh	Setup
Enable Punch-Thru	60h	Setup
Disable Punch-Thru	61h	Setup
Size EEPROM	62h	Setup
Start Learn	63h	Setup

Response byte	Code
Invalid Scan Code	31h
Invalid Device Code	32h
Search Exhausted	33h
Slot Empty	34h
Program Abort	35h
IR Xmit complete	36h
Invalid IR type	37h
Power-On-Reset	38h
Auto Search	39h
No Learn button specified	3Ah
No Learn IR detected	3Bh
Learn Started	3Ch
Brand Search	3Bh
Non-Learnable button	3Ch
Learn analysis Error	3Dh
Send Start Address Lo	11h
Send Start Address Hi	12h
Send End Address Lo	13h
Send End Address Hi	14h
Read Complete	15h
Write Complete	16h
Start Write	17h
Read/Write Error	18h
Memory Full	19h
EEPROM NG	1Ah
EEPROM SIZE 128	1Bh
EEPROM SIZE 64	1Ch
Erase Complete	1Dh
Indicator Flash 0	20h
Indicator Flash 1	21h
Indicator Flash 2	22h
Indicator Flash 3	23h
Indicator Flash 4	24h
Indicator Flash 5	25h
Indicator Flash 6	26h
Indicator Flash 7	27h
Indicator Flash 8	28h
Indicator Flash 9	29h
IR Xmit Start	40h
Abort Learn	41h

Status Byte from IC8205A to Host

7	6	5	4	3	2	1	0
Button press	Tx IR	MOD1	MOD0	DAT3	DAT2	DAT1	DAT0

- DB7 Button pressed.
 DB6 Transmitting IR
 DB5-4 Mod bits determine the interpretation of the DAT bits
- 0 1 Type 1 Status message
 - 1 0 Visible LED flash count
 - 1 1 Type 3 Status message

NOTE: To maintain backwards compatibility with an earlier product, the Button press bit (MSB) will always be set to 1.



REMOTE CONTROL OPERATION

Programming the IC8205A

Many of the IC8205A parameters can be setup using the following model..

Host sends one of the 6 slot commands to the IC8205A (TV, DVD CBL/SAT, AUDIO, VCR, AUX)

Receive 1 LED flash status. This marks the slot as active until changed.

Host sends the PROGRAM command

Receive 2 LED flashes status response

Host sends 1 numeric digit to set some user preference.

-or- send 2 digits to prepare to do a brand auto-search.

-or- send 3 digits to program a device from the internal library.

-or- send 4 digits to program a device from the extended (downloadable) library

Receive 1 LED flash for each digit

Host sends PROGRAM (or SEARCH) to complete to operation.

Response varies depending on the operation.

Slots

Before the IC8205A can transmit an IR signal, one or more devices must be programmed from the library database or one or more buttons must be learned. The IC8205A is a 6-in-1 remote control meaning that 6 independent slots can be setup. These 6 slots can be programmed for any combination of device category. The 6 default categories are AUX, TV, VCR, DVD, AUD, and CBL/SAT, however there is no restriction on what device category gets programmed into what slot. For example all 6 slots can be programmed to be a different TV.

Programming a slot from the library

Slots are programmed either by directly entering a 3 or 4 digit device code for a selected slot or by using one of the auto-search modes. 3 digit device codes are built into the IC8205A. 4 digit device codes are for extra devices that can be uploaded into the extended non-volatile memory.

Direct Device Code Programming

Like any universal remote control, the IC8205A can be programmed by directly entering a 3 (or 4) digit device code from the device list. The button sequence to program a slot from the device list is as follows....

Button	Host sends	Status returned	IC8205A sends
Send one of the six slot buttons	41h – 46h	1 indicator LED flash	21h
Send PROGRAM	40h	2 LED flashes	22h
Send #0 - #9 hundreds digit of device code	00h – 09h	1 LED flash	21h
Send #0 - #9 tens digit of device code	00h – 09h	1 LED flash	21h
Send #0 - #9 tens digit of device code	00h – 09h	1 LED flash	21h
Send PROGRAM	40h	3 LED flashes. If code exists	23h

Customized IR libraries are available to fit any application.

Transmitting IR codes from the library

Once a slot is programmed, the appropriate IR code is transmitted by “pressing” any virtual button that is implemented for the device that was programmed. The IR code will be transmitted a minimum of 3 times. This default repeat count can be adjusted by sending an IR_REPEAT_N command (50h – 57h). The IR code will also repeat as long as the “button” is held unless the code is designated as a non-repeat type. IR



Transmissions are extended by asserting the Continuous Tx pin. This signal can be tied to Request-To-Send (RTS) on a typical serial communications port. The IR signal will continue to repeat until the line is de-asserted, or until it is transmitted 256 times.

Punch-Through

Library devices generally implement some subset of all the possible buttons that exist. For example it is unlikely that a TV in the library will implement the PLAY button (unless it's a combo). If a button is not implemented, the IC8205A will check the other slots for programmed devices that have the requested button implemented in a logical order depending on the class of button. Punch-Through can be handy for most remote control operation however there may be applications where punch-through is not desired. Punch-Through mode can be turned on or off by sending the PunchOn or PunchOff commands.

Function	Scancode	Status response
Enable Punch Through	60h	2 indicator LED flashes
Disable Punch Through	61h	1 indicator LED flash

Smart Source (patented)

The IC8205A can be programmed to pre-select specific slots when certain *classes* of buttons are transmitted. Button classes are defined in the following table.

Class	Buttons
POWER	POWER, PWR_OFF, SLEEP
VOLUME	VOL+, VOL-, MUTE
CHANNEL	0-9, Enter, CH+, CH-, PREVIOUS
TRANSPORT	PLAY, STOP, FF, REW, PAUSE, RECORD
SETUP	UP, DOWN, LEFT, RIGHT, MENU, EXIT, GUIDE, DISPLAY
PIP	INPUT, PIP, PIP swap PIP Ch+ PIP Ch- PIP move

To program *smart source* send the following button sequence for each class that you want to setup.

Button	Host sends	Status returned	IC8205A sends
Send one of the six slot buttons TV, DVD, etc)	41h – 46h	1 indicator LED flash	21h
Send PROGRAM	40h	2 LED flashes	22h
Send any button from the desired class	00h – 3Fh	3 LED flashes	23h

NOTE: To program the channel class you cannot use the numbers (0-9) because they are used for device setup. Instead use another button from the channel class such as CH+. Programming a class automatically enables smart-source mode. Smart source can be temporarily disabled by sending the SMART button.

An example best explains the utility of *Smart-Source*.

- If you want the TV to turn on and off when the POWER button is sent independent of what slot was selected previously you send; TV PROG POWER. (Note for simplicity, the status bytes returned for each button sent are assumed)
- In addition you want to select the TV whenever you adjust the volume. Send TV PROG VOL+
- You also want to select your cable box whenever you change the channel. Send CBL PROG CH+
- Finally to automatically select the VCR slot whenever you send a transport button, Send VCR PROG PLAY.



Once *smart source* is setup, you may never need to send a slot button. However there are times when you may need to circumvent the automatic slot selection that *smart source* provides. For example, if you have a VCR that you need to tune to a specific channel to record a program while watching another channel. Normally *smart-source* will automatically set the slot to your cable or satellite box but in this situation, you need to set the channel on the VCR. When *smart source* is turned off, you can use the slot buttons to determine what device the numbers control. Once the VCR is set to the proper channel, you can turn *smart source* back on and resume the automatic slot selection you programmed.

Function	Scancode	Status response
Enable Smart Source	4Dh	2 indicator LED flashes
Disable Smart Source	4Eh	1 indicator LED flash

Auto-Search

Auto-Search mode causes the IC8205A to transmit a button from each device in the library, wait 3 seconds, and then move to the next device until told to stop. There are two auto-search modes in the IC8205A.

Category auto-search will search through an entire category (TV, DVD, VCR, etc) of device from the database. The category of the search is determined by the currently active slot. For example, selecting the TV slot will only search for TVs. Selecting the AUX slot will search through the entire library without regard to category. The button sequence to start a category auto-search is...

Function	Host Sends	Status returned	IC8205A sends
Send a Slot button	41h – 46h	1 indicator LED flash	21h
Send PROGRAM	40h	2 LED flashes	22h
Send SEARCH	47h	AutoSearch	39h

The IC8205A will start its search from the currently programmed device code in the currently active slot. It will transmit the POWER button, and then pause 3 seconds to give the user time to respond. Before each IR message is sent, the IC8205A returns an IR Xmit Start status byte (40h). When the IR transmission is done, it sends a IR Xmit Complete status byte (36h),

The IC8205A will stop searching when one of the following happens:

Function	Host Sends	Status returned	IC8205A sends
Send PROGRAM code Code is saved in the currently active slot	40h	3 indicator LED flash	23h
Send one of the 6 slot codes Code is saved in the selected slot	41h- 46h	3 LED flashes	23h
Send any other button Search is aborted. No code saved	00h - 3Fh		

Search will stop automatically when all of the pertinent codes have been sent.

Brand Auto-Search

The IC8205A can filter its auto-search by category and brand. For example, it can be told to search only for Sony TVs. This reduces the time it takes to find the desired code. To start a brand search the following button sequence is sent...

Function	Host Sends	Status returned	IC8205A sends
Send a Slot button	41h – 46h	1 indicator LED flash	21h
Send PROGRAM	40h	2 LED flashes	22h
Send brand code tens digit	00h – 09h	1 LED flash	21h



Send brand code ones digit	00h – 09h	1 LED flash	21h
Send SEARCH	47h	AutoSearch	39h

See the brand code list. Customized IR libraries are available to fit any application.

Brand auto-search is stopped the same was as the category auto-search. Send the PROGRAM button or one of the 6 slot buttons.

Learning from another remote

The IC8205A can learn IR codes from other remote controls. These learned codes can be programmed on top of library codes or they can be learned onto unused buttons. If a learned code is programmed on top of an existing library code, the learned code has precedence. Up to 112 learned codes can be programmed into the IC8205A distributed in any way amongst the 6 source slots. Note that re-programming a device from the library will erase all the learned codes for that device slot. The button sequence to learn an IR code is..

Function	Host Sends	Status returned	IC8205A sends
Send a Slot button	41h – 46h	1 indicator LED flash	21h
Send LEARN	48h	Learn Started	3Ch
Send any learnable button code (see page 4)	00h - 3Fh	Not a learnable button	3Eh
		Memory Full	19h
		No button specified	3Ah
		Learn Started 1 flash	21h
While holding the two remotes nose to nose, press the button that you want to learn on the teaching remote for about 2 seconds or one of the following status messages is received.		No IR detected	3Bh
		No IR detected	3Bh
		Learn analysis error	3Fh
		Memory Full	19h
		Learn Complete	22h (2 flashes)

You can only learn IR codes onto the 64 buttons that send IR. You cannot learn IR codes onto the following buttons that are used for device programming purposes.

- The 6 slot buttons. (TV, DVD CBL/SAT, AUDIO, VCR, AUX)
- PROGRAM
- LEARN
- F1 – F4 (macro buttons)
- SMART-SOURCE
- SEARCH



Programming a macro

There are 4 macro buttons in the IC8205A (F1 – F4). These buttons can be programmed to transmit a series of up to 25 button codes each. The macro buttons can be setup to send a series of favorite channels or to turn all your equipment on or off. To program a macro Send the following buttons...

Function	Host Sends	Status returned	IC8205A sends
Send the Learn command	48h	2 indicator LED flash	22h
Send F1 – F4	49h - 4Ch	2 LED flashes	22h
Send button sequence	00h - 3Fh	<u>IR Xmit Start</u> then <u>IR Xmit complete</u> for each button sent	40h 36h
End of String (Learn)	48h	2 Flashes	22h
End of Macro (Program)	40h	3 Flashes	23h

Multi String Macros.

You can program a macro button to send out a sequence of buttons that is different each time the macro button is sent. For example, if you want to program macro 1 to go to each of your favorite sports channels.

- Send CBL (1 flash)
- Send LEARN (2 flashes)
- Send the F1 (2 flashes)
- Send #1
- Send #9
- Send LEARN (end of 1st macro string for channel 19) (2 flashes)
- Send #2
- Send #8
- Send LEARN (end of 2nd macro string for channel 28) (2 flashes)
- Send #4
- Send #5
- Send PROGRAM (end of 3rd macro string for channel 45 and end of the macro) (3 flashes)

The first time you Send F1 the TV will go to channel 19, the 2nd Send will show channel 28 and the 3rd will go to channel 45. After that the sequence begins at channel 19 again. Another macro button can be programmed to go to you favorite movie channels.



Reading back the programmed device code

To read back the 3 or 4 digit library device codes enter the following button sequence...

Button	Host sends	Status returned	IC8205A sends
Send the slot code that you want to read	41h – 46h	1 indicator LED flash	21h
Send PROGRAM	40h	2 LED flashes	22h
Send #1	01h	1 LED flash	21h
Send PROGRAM	40h	Flash hundreds digit	20h – 29h
Send the slot code that you want to read	41h – 46h	1 indicator LED flash	21h
Send PROGRAM	40h	2 LED flashes	22h
Send #2	01h	1 LED flash	21h
Send PROGRAM	40h	Flash tens digit	20h – 29h
Send the slot code that you want to read	41h – 46h	1 indicator LED flash	21h
Send PROGRAM	40h	2 LED flashes	22h
Send #3	01h	1 LED flash	21h
Send PROGRAM	40h	Flash ones digit	20h – 29h
Send the slot code that you want to read	41h – 46h	1 indicator LED flash	21h
Send PROGRAM	40h	2 LED flashes	22h
Send #4	01h	1 LED flash	21h
Send PROGRAM	40h	Flash thousands digit	20h – 29h

To read out the firmware revision levels...

Button	Host sends	Status returned	IC8205A sends
To read firmware major send AUX	41h or	1 indicator LED flash	21h
To read firmware minor send TV	42h or		
To read library major send VCR	43h or		
To read library minor send DVD	44h		
Send PROGRAM	40h	2 LED flashes	22h
Send #0	00h	1 LED flash	21h
Send PROGRAM	40h	Flash digit	20h – 29h

Resetting the IC8205A to factory default settings.

This sequence will erase all user device codes, learned buttons, preference settings, smart-source programming, and macros.

Button	Host sends	Status returned	IC8205A sends
Send one of the six slot buttons	41h – 46h	1 indicator LED flash	21h
Send PROGRAM	40h	2 LED flashes	22h
Send #9	01h	1 LED flash	21h
Send PROGRAM	40h	After a delay of several seconds, Erase Complete	1Dh

ABSOLUTE GUARANTEED RATINGS*

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Operating Temperature Range 0°C to 70°C
 Storage Temperature Range -20°C to + 100°C
 Voltage from any pin to V_{SS} -0.3 to V_{CC} + 0.3
 Voltage from V_{CC} to V_{SS}..... -0.5 to +3.9

*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° to 70°C, V_{CC} = 2.2 to 3.6 V)

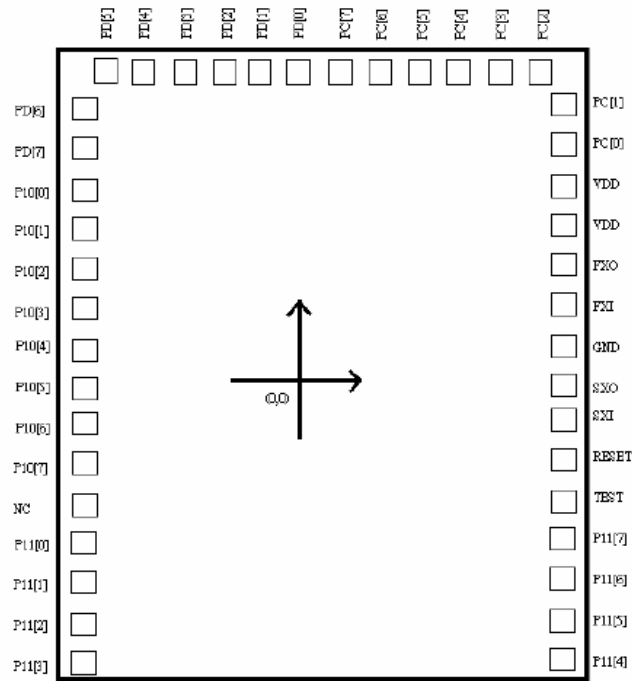
SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT	COMMENT
V _{IL}	Input Voltage Low			0.2V _{CC}	V	
V _{IH}	Input Voltage High	0.8V _{CC}			V	Except XTAL
V _{HYS}	Reset Input Voltage Low			1/3V _{CC}	V	
V _{IHR}	Reset Input Voltage High	.67 V _{CC}			V	
I _{IL}	Logic 0 Sink Current	.8	1		mA	V _{OL} = .4 V _{CC}
I _{IL}	Logic 1 Source Current	-40	-50	-60	μA	V _{OH} = .9 V _{CC}
V _{OL}	Output Voltage Low			.45	V	I _{OL} = 1.0mA
V _{OH}	Output Voltage High	2.4			V	I _{OH} = -50μA
I _{CC}	Power Supply Current		0.75	2	mA	Active
I _{CC}	Power Supply Current			1	μA	Sleep

AC ELECTRICAL CHARACTERISTICS (T_A = 0° to 70°C, V_{CC} = +2.2 to 3.6 V)

SYMBOL	PARAMETER	MIN	MAX	UNIT	COMMENT
f _{in}	Clock frequency	3.98	4.02	MHz	
T _{IR}	Infrared Output Resolution		±500	ns	
T _{RD}	Reset Pulse Width	2		μs	
f _{cap}	IR Capture (Learn) Frequency	10	70	kHz	



Pad Diagram



Chip Size : 1640um X 2160um
 IC 's substrate is connected to GND

Pad Coordination

Pin Number	Pin Name	X Coordinate	Y Coordinate	Pin Number	Pin Name	X Coordinate	Y Coordinate
1	PD.6	-747.400	485.250	22	SXI	747.400	-368.800
2	PD.7	-747.400	380.250	23	SXO	747.400	-263.800
3	P10.0	-747.400	275.250	24	GND	747.400	-158.800
4	P10.1	-747.400	170.250	25	FXI	747.400	-53.800
5	P10.2	-747.400	65.250	26	FXO	747.400	51.200
6	P10.3	-747.400	-39.750	27	VDD	747.400	156.800
7	P10.4	-747.400	-144.750	28	VDD	747.400	262.400
8	P10.5	-747.400	-249.750	29	PC.0	747.400	367.400
9	P10.6	-747.400	-354.750	30	PC.1	747.400	472.400
10	P10.7	-747.400	-459.750	31	PC.2	598.700	1006.300
11	NC	-747.400	-572.650	32	PC.3	493.700	1006.300
12	P11.0	-747.400	-682.400	33	PC.4	388.700	1006.300
13	P11.1	-747.400	-787.400	34	PC.5	283.700	1006.300
14	P11.2	-747.400	-892.400	35	PC.6	178.700	1006.300
15	P11.3	-747.400	-997.400	36	PC.7	73.700	1006.300
16	P11.4	747.400	-998.800	37	PD.0	-31.300	1006.300
17	P11.5	747.400	-893.800	38	PD.1	-136.300	1006.300
18	P11.6	747.400	-788.800	39	PD.2	-241.300	1006.300
19	P11.7	747.400	-683.800	40	PD.3	-346.300	1006.300
20	TEST	747.400	-578.800	41	PD.4	-451.300	1006.300
21	RESET	747.400	-473.800	42	PD.5	-556.300	1006.300

