

*Universal Infrared Remote Control  
From any PC!*

**"SpitFIRE"**  
*Serial Port Interface IR Engine*



**SpitFIRE I 4-in-1 Remote Control**

**SpitFIRE II 6-in-1" Learning"  
Remote Control**

# **"SpitFIRE"**

## *Serial Port Interface IR Engine*

### **FEATURES**

- Infrared remote control from a PC
- Available in two versions:
  - SpitFIRE I 4-in-1 Remote Control. Uses internal Infrared Code Library to support all common TV, VCR, Cable, Satellite, and DVD Players
  - SpitFIRE II 6-in-1 Remote Control. Combines internal Infrared Code Library with "learning"
- Ideal for
  - Home Automation
  - Home Theater
  - Industrial Control
- Includes front panel infrared emitting diodes and rear panel jack for remote IR emitter
- Connects Directly to PC's Serial Port
- SpitFIRE II Learns all common IR protocols
- Visible LEDs and status word outputs for easy user interface

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# INTRODUCTION

Congratulations on purchasing your Spit*FIRE*<sup>™</sup> Serial Port Infrared Remote Control.

The Innotech Systems' Spit*FIRE*<sup>™</sup> turns an ordinary PC into a powerful state-of-the-art home entertainment control system!

The Spit*FIRE* controls all popular entertainment devices directly from a PC. The Spit*FIRE* converts data words from your computer's serial port into infrared remote control signals.

The built-in infrared remote control database in the Spit*FIRE* I enables you to control TVs, VCRs, satellites, cable boxes, and DVD players without the need to "learn" your existing remote controls. In addition to the internal infrared remote control database, the Spit*FIRE* II adds the ability for you to control additional audio and home theater devices (or add additional buttons to existing devices) by "learning" the codes from your existing remote controls.

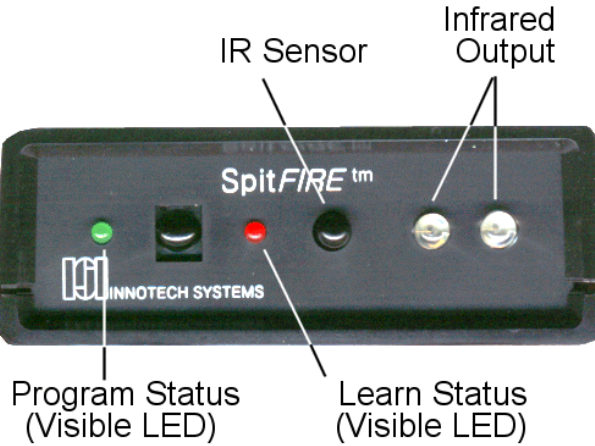
The Spit*FIRE* includes two convenient front panel mounted infrared diodes. A mini-phone plug located in the rear permits the use of mini stick-on IR emitters or IR blasters for maximum flexibility.

The small (3¼" x 5¼") Spit*FIRE* may be situated behind or near the PC, and is connected via a conventional serial cable to the PC. The Spit*FIRE* is controlled via a standard serial interface. The host PC controls the Spit*FIRE* by simply sending simulated button presses. The Spit*FIRE* will respond by returning status information for every command.

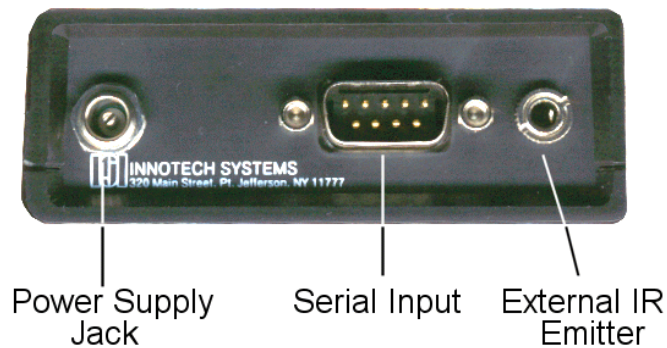
The Spit*FIRE* includes sample Visual Basic application software. The software displays a "virtual" remote control on screen and responds to "virtual button presses" to illustrate the operation of the device and for you to use as the basis for your own software applications.

## FRONT AND REAR PANELS

### SpitFIRE — FRONT PANEL



### SpitFIRE — REAR PANEL



The SpitFIRE provides dual infrared-emitting diodes on the front panel. These provide the control signals for the desired consumer systems. In addition, a rear panel connection permits the use of remote IR emitters that may be mounted

against the desired consumer systems.

Front panel status lights simplify programming the SpitFIRE. The status signals are also sent back to the PC via the serial connection.

## OPERATING YOUR SPITFIRE

Your SpitFIRE should be connected to a PC COM port using a modem cable or a NULL modem cable with a NULL modem adapter. If you use the software included with the SpitFIRE software you must select a COM port before it will communicate.

To insure that the SpitFIRE is communicating to the PC, click one of the source buttons (CBL, TV, VCR or AUX). You should see the green LED indicator on the SpitFIRE and on the PC remote

flash once. If it does not flash, try a different COM port and check your cable.

### Programming Overview

Before operating an entertainment product, the SpitFIRE must first be set up to send the correct codes. To program the SpitFIRE through the PC for a specific TV, VCR, Cable box, satellite, or DVD code from the included infrared remote control "library," the procedure is:

SEND CODE	RESPONSE
SOURCE (TV, VCR, CBL, AUX)	1 FLASH
PROG	2 FLASHES
3 DIGIT DEVICE CODE	1 FLASH FOR EACH DIGIT
PROG	3 FLASHES

If you don't see 3 flashes when the final PROG key is pressed, the SpitFIRE has not accepted your 3 digit ISI code. A table of ISI device codes is provided at the back of this manual.

For example to set up the SpitFIRE to control a Sony TV (ISI# 038):

SEND CODE	RESPONSE
SOURCE (TV, VCR, CBL, AUX)	1 FLASH
PROG	2 FLASHES
0	1 FLASH
3	1 FLASH
8	1 FLASH
PROG	3 FLASHES

You can control up to six simultaneous sources in any combination of TV VCR Cable box, DSS

Devices not already in the SpitFIRE infrared remote control database may be “learned” from existing remote controls. You may “learn” complete devices or use the learning capability to add additional buttons to existing devices. Once learned, the codes are stored in non-volatile

receiver, DVD player etc.

memory and retained even with power removed.

For details on learning new remote control codes, see “Learning Codes from Existing Remote Controls.

## LEARNING CODES FROM EXISTING REMOTE CONTROLS (SpitFIRE II only)

### Learning Codes

To “learn” the codes to add a new device, or to add a button to an existing device:

1. Send the source code for which you wish to store the learned code. (1 flash). (Note: You may learn IR codes only to sources 1-4. Sources 5 and 6 are for library database codes only.)

2. Send LEARN (Scancode 47h).

You will receive a status message 1100. Both the Program and Learn LEDs (red and green LEDs) will now light. (As the learning process is essentially manual, use of the visible LEDs for user feedback is recommended.)

3. Send the button code for the “virtual button” for which you wish to store the learned data. The Green program LED will turn off. (If no button code is received, the learn sequence will time out and you will receive status message 1010.

4. Hold the original OEM remote control up to the IR sensor located on the front panel. (See SpitFIRE Front Panel drawing on page 5.)

*Note: Some OEM remote controls have multiple infrared (IR) LEDs. It is important to have a direct line between the IR LED on the OEM remote and the IR sensor. Please note: you may need to hold the remote control right up against the IR sensor.*

When the code is learned the red Learn LED will go out and you will receive a 21h return flash (green Program LED will flash).

If the IR code is invalid or the IR code cannot be learned you will receive a status message 1110. If no IR is detected you will receive status message 1011.

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

## LEARNING IR CODES

SEND CODE	RESPONSE
SOURCE 1-4	1 GREEN FLASH
LEARN	RED AND GREEN LED <sub>s</sub> WILL LIGHT
SEND DESIRED BUTTON CODE. (IF USING SUPPLIED SOFTWARE, CLICK ON DESIRED BUTTON )	GREEN LED WILL GO OUT
HOLD ORIGINAL REMOTE CLOSE TO SPITFIRE II WHILE AIMING IR LED ON REMOTE AT IR SENSOR ON SPITFIRE. PRESS DESIRED BUTTON ON ORIGINAL REMOTE	RED LED WILL GO OUT, GREEN LED WILL FLASH

### Erasing Learned Codes

Learned functions are associated with the selected source (TV, VCR etc.). To erase learned functions for a specific device (TV, VCR etc.), you overwrite the learned code with a code from the code library. You can erase the complete device; individual buttons cannot be erased.

1. Select the device you wish to reprogram by sending the appropriate Source Code (TV, VCR, Cable etc.). For instance to erase the learned buttons associated with the VCR, send the Source Code you have associated with the VCR.

The Program LED will flash once.

2. Send the scancode for Program (40h).

The Program LED will flash twice.

3. Select a 3-digit ISI device code number from the code list and send the 3-digit code. The Program LED will flash once for each key pressed.

4. Send the scancode for Program (40h) again to lock in the code. The Program LED should flash 3 times. The VCR function will now operate per the selected device code without any learned buttons.

# PROGRAMMING INTERFACE DESCRIPTION

The *SpitFIRE* is controlled via a full-duplex bi-directional asynchronous serial interface operating at 2400 baud, 8 data bits, with no parity. A host CPU can manipulate the *SpitFIRE* by writing commands in the form of simulated button presses to it. The *SpitFIRE* will respond by returning status information for every command.

To maintain flow control, the *SpitFIRE* will not return a status response byte until it has processed the previous command.

The command byte consists of 7 scancode bits and one button-pressed bit.

## Command Byte to *SpitFIRE*

D7	D6	D5	D4	D3	D2	D1	D0
Button pressed	Scan Code						

This gives a maximum capacity of 128 buttons. D7, the *button pressed bit*, has several purposes.

- ◆ It provides a way to hold down a button for an arbitrarily long period of time.
- ◆ It provides a flow control mechanism between the two asynchronous processors. Some commands are executed very quickly (10s of microseconds) and some are quite slow (100s of milliseconds).
- ◆ It provides a way to distinguish two consecutive identical button presses.

When D7 is set, the *SpitFIRE* recognizes that a button is pressed. D7 is cleared when a button is released. When a command is given as described below, the *SpitFIRE* will respond with the same press/release state via the status byte. (See Status Byte Format).

Commands are sent to the *SpitFIRE* in the form of keypad scancodes (or “virtual key presses”). The 7 LSBs of the command are the scancode. This gives the system 128 virtual buttons that can be “pressed.” Of these 128 buttons the *SpitFIRE* uses a subset to represent the buttons on a typical remote control.

After the *SpitFIRE* has received and acted on a command it will return a status byte. The status byte tells the host processor how the previous scancode was dealt with. It also tells the system that it can send another command. The details of the status byte are covered later in this document.

The *SpitFIRE* can be configured to transmit IR messages indefinitely, or it can be instructed to transmit an IR message a fixed number of times and then stop. When sending an indefinite length IR message, a ‘*transmitting IR now*’ status message is returned at the start of a transmission.

Subsequently, when a button release command is sent, the *SpitFIRE* completes the current transmission and then it returns the appropriate status.

Special scancodes are available to tell the *SpitFIRE* to transmit IR message until told to stop, or to send messages a fixed number of times. The auto-repeat range is from 1 to 8 messages. A setting of 0 tells the *SpitFIRE* to send the message continuously until the button is released.

When the transmit N times feature is used, the *SpitFIRE* will not return a status byte until the IR transmission is completely sent (N times) so that the system knows that the transmission is complete.

The following is a list of scancodes that a system can send to the *SpitFIRE*. Codes are in hexadecimal and do **not** include the button-pressed bit.

Code	Code	Function	Notes
0	00h	#0	
1	01h	#1	
2	02h	#2	
3	03h	#3	
4	04h	#4	
5	05h	#5	
6	06h	#6	
7	07h	#7	
8	08h	#8	
9	09h	#9	
10	0Ah	ENTER	
11	0Bh	MUTE	
12	0Ch	VOL+	
13	0Dh	VOL-	
14	0Eh	CH+	
15	0Fh	CH-	
16	10h	REWIND	
17	11h	PLAY	
18	12h	FF	
19	13h	RECORD	
20	14h	STOP	
21	15h	PAUSE	
22	16h	POWER	
23	17h	RECALL	
24	18h	TV/VCR	
25	19h	DISPLAY	

Code	Code	Function	Notes
26	1Ah	REPEAT	
27	1Bh	RANDOM	
28	1Ch	MODE	
29	1Dh	DISC	
30	1Eh	SEL1	
31	1Fh	SEL2	
32	20h	SEL3	
33	21h	SEL4	
34	22h	SEL5	
35	23h	SEL6	
36	24h	SEL7	
37	25h	SEL8	
38	26h	SEL9	
39	27h	SEL10	
40	28h	UP	
41	29h	DOWN	
42	2Ah	LEFT	
43	2Bh	RIGHT	
44	2Ch	TRACK UP	
45	2Dh	TRACK DOWN	
46	2Eh	SKIP UP	
47	2Fh	SKIP DOWN	
48	30h	INDEX UP	
49	31h	INDEX DOWN	
50	32h	TRACK	
51	33h	GROUP	

Code	Code	Function	Notes
52	34h	PROGRAM	
53	35h	CONTINUE	
54	36h	SNOOZE	
55	37h	TEN PLUS	
56	38h	PWR ON	
57	39h	PWR OFF	
58	3Ah	MENU	
59	3Bh	TITLE	
60	3Ch	CLEAR	
64	40h	PROGRAM	Returns 2, 3 flashes or error code
65	41h	SOURCE 1	Returns 1 flash
66	42h	SOURCE 2	Returns 1 flash
67	43h	SOURCE 3	Returns 1 flash
68	44h	SOURCE 4	Returns 1 flash
69	45h	SOURCE5 (SpitFIRE II)	Returns 1 flash
70	46h	SOURCE6 (SpitFIRE II)	Returns 1 flash
71	47h	LEARN (SpitFIRE II)	return status msg 1100
80	50h	Transmit IR continuously until told to stop	(Return 0 flashes)

SOURCE is used to identify the device being controlled (TV, VCR, Cable etc). SOURCE 1- SOURCE 4 may be used with either library or learned codes. SOURCE 5 and SOURCE 6 are for library codes only. All sources can be associated with any type of device.

Code	Code	Function	Notes
81	51h	Transmit IR once	(Return 1 flash)
82	52h	Transmit IR twice	(Return 2 flashes)
83	53h	Transmit IR three times	(Return 3 flashes)
84	54h	Transmit IR four times	(Return 4 flashes)
85	55h	Transmit IR five times	(Return 5 flashes)
86	56h	Transmit IR six times	(Return 6 flashes)
87	57h	Transmit IR seven times	(Return 7 flashes)
88	58h	Transmit IR eight times	(Return 8 flashes)
89	59h	SEARCH (Auto Search)	
90	5Ah	Toggle Punch-through	(Return 1 flash [on], or 0 flash [off])
96	60h	Return firmware major	(Returns 1 flash)
97	61h	Return firmware minor	(Returns 1 flash)
98	62h	Return database revision major	(Returns 1 flash)
99	63h	Return database revision minor	(Returns 1 flash)

Before any IR messages can be sent, the SpitFIRE must be programmed for the device code of the appliance is being controlled. If you learn a new code, the code will overwrite the library code for the source selected. If you intend to learn a code for a specific source, it is not necessary to program a source code.

The programming sequence for selecting a device code from the IR code library is as follows:

- ◆ SOURCE
- ◆ PROGRAM
- ◆ 3-digit-ISI-number
- ◆ PROGRAM

The green Program LED flashes to indicate the progress of the programming sequence. The visible LED flash information is also returned as a status byte to help the host track its progress through the programming sequence.

The red Learn LED is used to provide user feedback during the learning process.

The ISI number is a three digit code that indicates which type of device is being controlled. Innotech provides a list of ISI-to-manufacturer/model types. Leading zeros must be included in the programming sequence. For example, to set up the VCR whose ISI number is 045, the “virtual key” sequence is:

Button	LED Flashes
SOURCE 1	1
PROGRAM	2
#0	1
#4	1
#5	1
PROGRAM	3

For hand held remote controls this button sequence is inherently a button press followed by a button release. For the SpitFIRE, the system must send a command with the button-press bit set. When the status byte is returned, it too will have its button-press bit set. The system must then send a button release command and wait for the button-release status byte acknowledge. This is the *flow control handshake*. The 7 LSBs of the button-release command can contain any code. In fact, if the button-press bit is set to 0, the scan code portion of the command is ignored. The programming sequence to set source #1 to ISI number 045 is:

Button function	Scancode	Status returned
SOURCE1 press	C1 (41 with MSB set)	1 flash
SOURCE1 release	41 (or 0)	button release
PROGRAM press	C0	2 flashes
PROGRAM release	0	button release
#0 press	80	1 flash
key release	0	button release
#4 press	84	1 flash
key release	0	button release
#5 press	85	1 flash
key release	0	button release
PROGRAM press	C0	3 flashes
Key release	0	button release

It is not strictly necessary to issue a Key Release command during the programming sequence. The *SpitFIRE* will respond to any scancode changes

in the command. The *SpitFIRE* will operate properly if you issue:

Button function	Scancode	Status returned
SOURCE1 press	C1	1 flash
PROGRAM press	C0	2 flashes
#0 press	80	1 flash
#4 press	84	1 flash
#5 press	85	1 flash
PROGRAM press	C0	3 flashes

However, in the absence of a Key Release command, the *SpitFIRE* cannot distinguish two identical consecutive scancodes. For example, if the ISI number were 113, the first two “ones” could not be distinguished without a button release between them.

The *SpitFIRE* will respond to programming codes rapidly. At the end of the programming sequence it will provide a status byte that indicates if the engine accepted the ISI number. (3 flashes)

Once programmed, the *SpitFIRE* will remember the ISI numbers of all the programmed sources until the engine is reset or until it is reprogrammed. You may have up to six different devices programmed and quickly scan between them by issuing a Source # scancode.

While infrared is actually being transmitted, the status response to the next button may take significantly longer. If an undefined scancode is issued, the device will respond with an error scancode. In addition, if a button is pressed that is defined, but is not implemented for the particular device programmed, the device will respond with a different error response.

### Status Byte From *SpitFIRE*

You will get one and only one status change per command that you send to the *SpitFIRE* .

#### Status Byte from *SpitFIRE*

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

- DB7 ScanKey Up/Down feedback bit
- DB6 Transmitting IR message bit (if continuous)
- DB5-4 MOD bits determine the interpretation of the DAT bits.
  - 0 X Software revision level (5 bits DAT0-3 and MOD0)

1 0 Visible LED flash count  
 1 1 Status message  
 DAT3-0 Status messages (MOD=11)  
 0000 NOP  
 0001 This scancode is not currently used  
 0010 The selected device number is not in the database  
 0011 This button is not implemented on the selected device.  
 0100 No source programmed  
 0101 Programming sequence aborted  
 0110 IR transmission complete  
 0111 Database error  
 1000 Spit*FIRE* has been reset  
 1001 Auto search mode  
 1010 No learn location specified  
 1011 No IR detected in learn mode  
 1100 Press button to specify learn location  
 1110 Invalid code  
 1111 Could not learn button  
 DAT3-0 LED flashes in BCD (0-9)  
 DAT3-0 Software revision code (0-31) Uses MOD0 as a 5th bit.

For example, assume that a VCR was previously programmed as Source 1. To select the source and press the POWER button:

System sends	C1h	Select VCR (source #1)
System gets	21h	Return 1 flash
System sends	D2h	Transmit IR 2 times mode
System gets	21h	Return 1 flash
System sends	96h	Press the POWER button
System gets	36h	IR Transmission complete (after a delay)

The source selection and transmission instructions stay in effect until they are changed.

## SPECIAL FEATURES

The Spit*FIRE* has a number of special features:

### Auto Search For Correct Code

#### Overview

If you can not find the correct code in the manual, the Spit*FIRE* 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 you may have to cycle through many codes before finding a usable one.

1. Manually turn on the device to control.
2. Send the desired SOURCE code.
3. Send PROGRAM.
4. Send SEARCH.
5. When the device turns off, immediately issue PROGRAM

#### AutoSearch Detail

The SOURCE commands provides four alternative search capabilities, permitting the user to save time when performing an AutoSearch:

SOURCE 1 (41h) searches cable boxes and DSS receivers

SOURCE 2 (42h) searches VCRs and DVD players

SOURCE 3 (43h) searches TVs

SOURCE 4 (44h) searches all devices.

When the sequence SOURCE-PROGRAM-SEARCH is entered, the Spit*FIRE* will begin transmitting IR codes for all devices starting from the next one currently programmed for that source selection.

The Spit*FIRE* will transmit one of 4 different IR codes depending on the button-set encountered for the device being tried. Not every device in the library has a POWER button so the Spit*FIRE* will transmit one of the following codes: POWER, CH+, MUTE, or PLAY, depending on which one it encounters first for the current device.

If the Spit*FIRE* is set up to transmit IR continuously, (default state or scan-code 50h) it will transmit the test message 4 times. If it is set up to transmit IR from 1-8 times (scan-codes 51h-58h), then it will transmit the programmed number of times for each device.

After the Spit*FIRE* transmits the test message, it will wait for 2.5 seconds for the user to respond before it moves on to the next device in the library.

During the 2.5 second interval, if the user presses the PROGRAM button, the Spit*FIRE* will accept the current device and program it into the selected slot. The Spit*FIRE* will return status message with a flash-count of 3 (status byte 0xA3) to indicate that it accepted the new program.

If the user presses any other key during the 2.5-second interval, the *SpitFIRE* will cancel AutoSearch mode and the original programmed device will remain. The *SpitFIRE* will return a status message with a flash count of 0 (status byte 0xA0) to indicate that it did not accept any new programming. The *SpitFIRE* will also stop searching and return a 0 flash after it has traversed the entire library.

During AutoSearch, the *SpitFIRE* will alternately return a status code 0xF9 (AutoSearch status + transmitting IR bit) at the start of each IR burst, and 0xB9 (AutoSearch status + NOT transmitting IR bit) at the end of the burst. NOTE: The MSB of the status byte can be either 1 (key pressed) or 0 (key not pressed) depending on the last scan code received.

The status bytes returned during AutoSearch mode are the only exception to the rule that every scan code returns one and only one status byte. This exception enables the controlling program can better track the progress of the search.

To review: After the user enters SOURCE<sub>x</sub> - PROGRAM - AUTOSEARCH the *SpitFIRE* will immediately return an AutoSearch status & IR transmitting (0xF9) status, followed briefly by AutoSearch status (0xB9) status, followed by the 2.5 second guard delay. It will then repeat this sequence until one of the following occurs...

The user sends PROGRAM to accept the current code (returns 3 flashes).

The user presses any other button to cancel AutoSearch mode (returns 0 flashes).

AutoSearch cancels itself after running through all its codes (returns 0 flashes).

In the case of SOURCE1, SOURCE2, or SOURCE3, it will take about 6 minutes to go through the selected portion of the library. In the case of SOURCE4 (where the *SpitFIRE* transmits all codes), it will take about 18 minutes to traverse the entire library.

The programming sequence to AutoSearch for the code for source #1 is:

Button Function	Scancode	Status Returned
Source1 press	C1 (41 with MSB set)	1 flash
Program press	C0	2 flashes
Auto press	D9	1 flash
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, immediately issue:		
program press	C0	3 flashes

The code will be saved. The user should 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, issue any key code except AUTO.

After the *SpitFIRE* is programmed using AutoSearch, you will not know the library code number programmed. See Device Code Read-

Back to read back the programmed library code number.

### Manual Search For Correct Code

The user can manually toggle through the library one code at a time to find the correct code for a TV, VCR or Cable/Satellite. Starting from the currently selected device, the *SpitFIRE* will begin searching through that same category (TV, VCR, etc.) in the library. This is useful when the POWER button operates the user's equipment, but other buttons do not, indicating the selected code is close but not the same. Using Manual Search, the user can try all the numeric keys, play, stop, etc. to thoroughly test the selection.

The programming sequence is:

1. Manually turn on the device.
2. SOURCE (1-4)
3. PROGRAM
4. 0-0-0
5. Issue PROGRAM as needed. Each time PROGRAM is sent, the *SpitFIRE* will increment the device code.

If the current selection does not operate the equipment, you may press PROGRAM and observe 3 flashes. The *SpitFIRE* is now set up for the next consecutive device in the library. When you find the correct code, pressing the SOURCE button will save the program setting.

As with AutoSearch, SOURCE1 will scan all cable boxes and DSS receivers, SOURCE2 will scan all VCRs and DVD players, SOURCE3 will scan all TVs and SOURCE4 will scan everything.

The programming sequence to manual search the code for source #1 is:

Button Function	Scancode	Status Returned
Source1 press	C1 (41 with MSB set)	1 flash
Program press	C0	2 flashes
#0 press	80	1 flash
key release	0	button release
#0 press	80	1 flash
key release	0	button release
#0 press	80	1 flash
key release	0	button release
Program press	C0	3 flashes
Key release	0	button release
Each time PROGRAM is sent, the device code will increment. Send SOURCE1 to lock in the code.		
Source1 press	C1 (41 with MSB set)	1 flash

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

After the *SpitFIRE* is programmed using Manual Search, you will not know the library code number programmed. See Device Code Read-Back to read back the programmed library code number.

## Device Code Read-back

After the SpitFIRE is programmed with either Search mode, you will not know the resultant ISI number. To read back the current ISI number, the key sequence is as follows.

SOURCE – PROGRAM - Digit – PROGRAM

Where SOURCE is the slot that you want to read back. (41h - 44h), PROGRAM is 40h, Digit is either 1, 2, or 3 for the Hundreds, Tens, or Ones digit respectively.

The SpitFIRE will return a flash count of 0 to 9 to indicate the digit.

Example: To read the ISI number of the TV slot

TV(43h)	Return 1 flash (0xA1)
PROGRAM(40h)	Return 2 flashes (0xA2)
1 (01h)	Return 1 flash (0xA1)
PROGRAM(40h)	Return 100s digit of TV e.g. 1 flash (0xA1)
2 (02h)	Return 1 flash (0xA1)
PROGRAM(40h)	Return 10s digit of TV e.g. 2 flashes (0xA2)
3(03h)	Return 1 flash (0xA1)
PROGRAM(40h)	Return 1s digit of TV e.g. 5 flashes (0xA5)

Therefore the ISI number of the device in the TV slot is 125.

While in this mode, you can freely go between the 100s, 10s and 1s digits to recount the

flashes. To exit this mode, press a source key.

NOTE: You can program any type of device in any of the 6 slots available. For example if you have 2 VCRs you can set one up on the VCR slot and the other in the AUX slot. However, if you use Search, the VCR slot will only scan for VCRs whereas the AUX slot will scan all devices in the library.

## Punch-Through

*Availability of this feature varies depending on the type of TV, VCR, and cable box used.*

It can be very convenient to selectively transmit button codes that are not for the currently selected device. For example, when set for Cable box operation, Punch-through can permit the volume commands to adjust the television volume. Similarly, TVs generally do not have a PLAY button but VCRs do. If the last SOURCE button pressed was TV, and the user presses PLAY, punch-thru allows the SpitFIRE to press PLAY on a source that does have a PLAY button without first switching to it.

The SpitFIRE defaults to punch-thru being disabled. If a user presses a key that is not implemented on the currently active source, the SpitFIRE will return an error status (0xB3) that says that the desired button does not exist. If punch-thru is enable, the PLAY message will be transmitted on the first programmed device that has a PLAY button implemented. You will only get an error if PLAY doesn't exist on any of the programmed sources.

NOTE: If you press a button on a source that

isn't programmed yet while punch-thru is off, you will get a No-Device-Programmed Status message (0xB4). However if punch-thru is enabled, and no device has the desired button, you will get a Button-not implemented status message instead.

Punch-thru mode is toggled with scan-code 90 (5Ah).

If punch-thru is toggled ON, the *SpitFIRE* will return a 1 flash status message (0xA1).

If punch-thru mode is toggled OFF, you will get a 0 flash status message. (0xA0).

Punch-thru will be affected by learned functions. For example, if you are controlling a VCR and issue a VOL +, the volume command will normally punch-thru to the proper device. However, if you learn a new code onto the VOL+ button, it will no longer punch-thru.

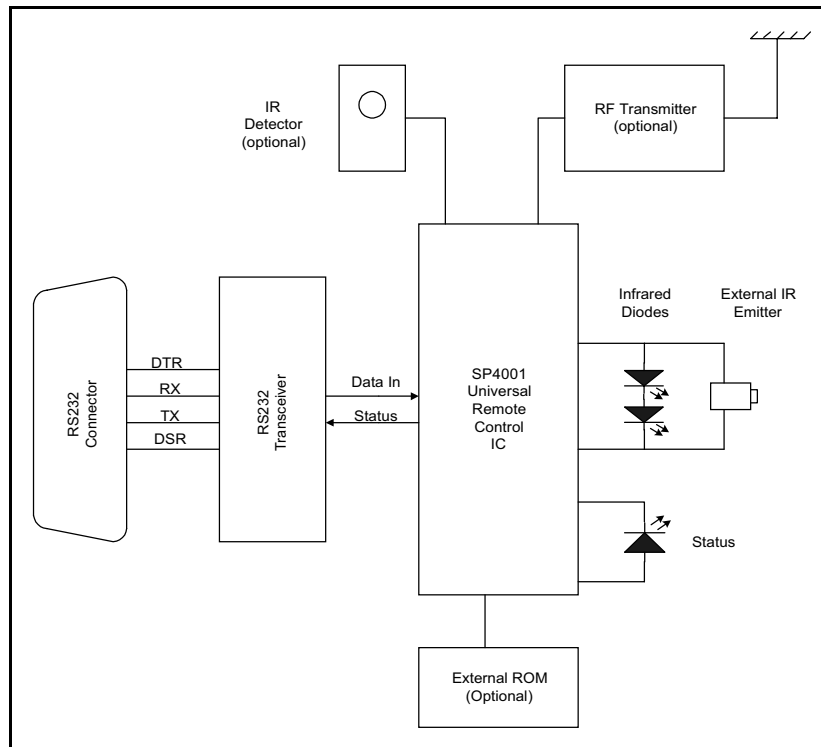
## DEVICE CODES

For a code list of supported devices and associated ISI codes, please refer to the appropriate document:

“Index of Device Codes – SpitFIRE I”

– Or –

“Index of Device Codes – SpitFIRE II.”



*SpitFIRE* Block Diagram

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