ZIR-232 Low-Level Serial Communications Protocol Document

PN #1700075 Revision C

09 April 2004

Oxmoor Corporation, LLC

Abstract

This document describes:

- The basic operation of the ZIR-232 Device Commander module
- ZR-98 Serial Port Communication Requirements

Document Purpose & Confidentiality

This document describes the low-level engineering interface to the router. Future router firmware versions will support a different, more verbose, command interface. While this document may be distributed outside of Oxmoor Engineering for the purpose of integration with 3rd party control systems, it remains the **confidential property of Oxmoor Corporation, LLC and should be not duplicated or distributed without the permission of Oxmoor Corporation**.

This document is updated as new firmware is released. At present, this document is not under document control. Commands herein are subject to change with each firmware release.

Overview

The ZIR-232 provides the following functionality:

- Universal IR Code Library
- Independent and Global IR Code Drivers
- RS-232C Control Port
- Learning Mode
- Ability to "snag" codes for web sharing in Hex and Binary formats
- Allow user to import web shared codes in Hex and Binary formats
- Macro playback capability

The ZIR-232 architecture is relatively simple. It has a MSP430F149 microprocessor that handles serial communication between it and the ZR-98 MotherBrain, communicates with the Universal Electronics IR Blaster IC, and also handles an RS-232C port for external device control.
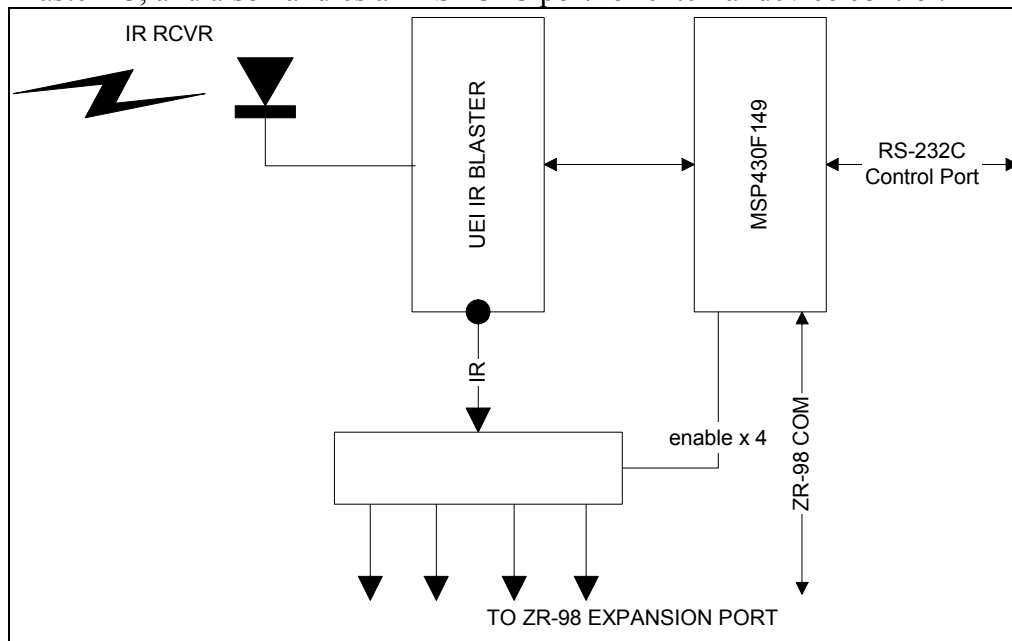
The MSP430F149 contains 60 kB of Flash memory and is used for storing a lookup table for IR Codes that are indexed by tokens sent from the ZAC-60. This offloads the storage requirements from the ZR-98 MotherBrain to the ZIR-232's micro. It also minimizes storage and code requirements for the ZAC-60.

The UEI IR Blaster IC contains an extensive library of IR codes for various manufacturers. IR codes may be generated by:

- Sending it a manufacturer code, device code and a key code
- Sending it an IR Pattern
- Commanding it to generate a learned code stored in EEPROM

The IR output of the UEI IC drives four tri-stateable buffers under the direct control of the MSP430F149. The output of these buffers drives four discrete inputs of the Xilinx EARS2003 IC on the ZR-98. These inputs are internally linked to the four ZIM Input Port IR Output lines for Port 1-2, 3-4, 5-6, and 7-8. Output enable parameters are embedded in the command sent from the ZR-98, i.e., "0 = all", "1 = port 1-2", etc.

Most commands to the ZIR-232 originate from the ZAC-60's, but commands from the ZR-98's serial port may also be routed to the ZIR-232. In addition to IR control, strings may be sent out the ZIR-232's serial port to control external devices.
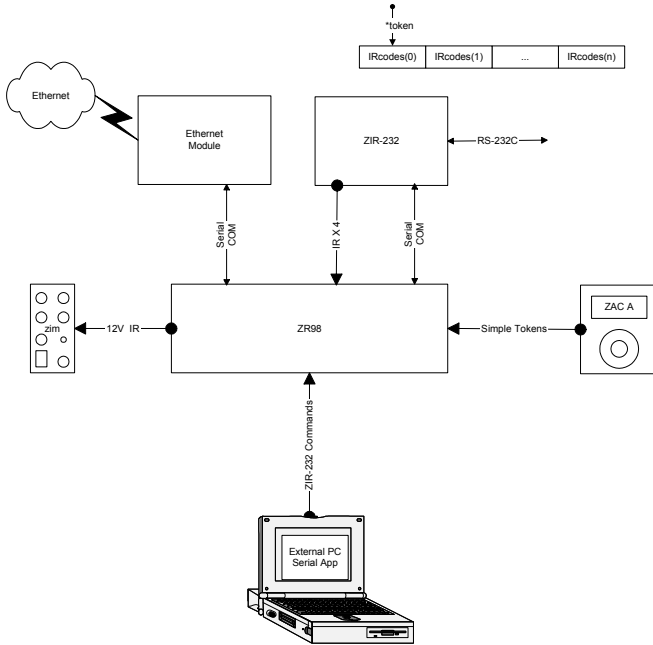
Expansion Bay Protocol

Commands sent to an Expansion Bay Device have a thin Expansion Bay Header. This allows the ZR-98 to properly route the commands to the appropriate Bay. The commands has the following format:

~E<ModuleBay><Commands>

<ModuleBay>	'A' – 'D' inclusive. Indicates the expansion bay to which the module is attached.
<Commands>	Device specific commands.

For example, a Version command to the ZIR-232 would look like: "~EIR1V"

ZIR-232 Command Protocol

All commands are prefixed with "~EX".

Basic Commands

Basic commands are commonly used commands used in most expansion modules.

V	Returns the part number, software version, and hardware version. The syntax of the the reply is:: #ID <PN>,<Name>,<Version> Where <PN> is the part number, <Name> is the human-readable name for the device, and <Version> is a human-readable identifying the version of the software and hardware.
VA	Returns both the MSP430F149 Firmware version and UEI IR Blaster version.

Immediate Commands

Immediate commands perform specific functions and include variable parameters with the command. They are intended to originate from an external PC via the ZR-98 serial port to allow the user to test various IR codes. Once the user has determined the correct codes, the commands below are stored into macros and are executed on token commands from ZAC's or serially connected control systems. Immediate commands always begin with 'I'.

Command	Description	Parameters	Return
ISK	IR SendKey	DeviceType(1) DeviceNum(4) Keycode(2) KeyFlag(1) IRCode(1)	#IRUC <n> Where <n> is a return status code, as shown in the table below.
IDD	DownloadDeviceToE2	DeviceType(1) DeviceNum(4) DownloadData(n)	None. Command not implemented.
IED	DeleteDownloadCode	DeviceType(1) DeviceNum(4)	None. Command not implemented.
ILS	IR LearnAndSave	LearnCodeID(4)	#IRUC <n> Where <n> is a return status code, as shown in the table below.
IDL	IR DeleteLearnedCode	LearnCodeID(4)	#IRUC <n> Where <n> is a return status code, as shown in the table below.
IMR	IR MasterReset	ResetLevel(1)	#IRUC <n> Where <n> is a return status code, as shown in the table below.
ISP	IR SendIrPattern	Executor(4) KeyFlag(1) PrefixAndData(n)	None. Command not implemented.
ILC	IR ListAllUpgradeCode		None. Command not implemented.
ILU	IR LearnAndUpload	LearnCodeID(4)	#IRUD <XX> Where <XX> is an ascii-encoded hex byte. Up to 10 hex bytes, separated by spaces may be returned in each #IRUD command. After all data is sent, an #IRUF command will be transmitted.

Return Status Code

Status	Message
0	Success
1	Invalid Device Code
2	Invalid Device Type
3	invalid Key Code
4	Bad EEPROM
5	Out of Memory
6	Invalid LearnCodeID
7	Data Packet Format Error
8	Download ID already Existed

The status codes are returned as the first parameter after #IRUC replies. See the Immediate Commands table above to determine which commands send #IRUC replies.

Debugging Commands

Debugging commands are commands which are not used during the end-user application of the module. They are usually sent during the manufacturing test process, or for custom configuration and installation purposes. Debugging Commands always begin with 'D'.

Command	Parameters	Description	Return
DA DB DC DD	Value(1)	**Set/Clear IR enable** lines for ZIM ports 'A'-'D' inclusive. <Value> must be '1' or '0'. A '1' will set the enable line. Once the enable line is set, all immediate commands which result in the transmission of IR will sent IR to the indicated ZIM port.	#IREN <ZIM><Value> For example, if : ~EADA1 is sent, #IREN A1 is returned.
DL	None	**Execute serial loopback test.** This command starts a loopback test on the serial connector located on the ZIR-232 module. A loopback cable must be connected for this test to pass.	#IRLP PASS or #IRLP FAIL
DFR	Index(n)	**Read SACRED-ID byte.** Reads a value from the 16-byte SACRED-ID space of the module. Index is an integer from 0-15 inclusive in base-10 format. If the index is out of range, a BAD PARAM reply will be	#IRFR <Index>:<Value> or #IRFR BAD PARAM

Command	Parameters	Description	Return
		transmitted. The value of the SACRED-ID byte will be 0-255.	
DFW	Index(n) Value(n)	**Write SACRED-ID byte.** Writes a value to the SACRED-ID space of the module. Index must be 0-15 inclusive. Value must be 0-255 inclusive. A value can only be set once after manufacturing of the unit. If another attempt is made, an #IRFW DENIED reply is sent.	#IRFW <Index>:<Value> or #IRFW BAD PARAM or #IRFW DENIED
DSP	Mode(1)	Set passthrough mode. The valid modes are: 0 : *Normal operation.* 1 : *MB Mode*. Every byte received on the ZIR-232's serial port is sent directly to motherbrain. 2: *UEI Mode*. Every byte received on the ZIR-232's serial port is sent directly to the UEI chip. 3: *AS-MB Mode*. Every byte received on the ZIR-232's serial port is treated as if it came from Motherbrain instead.	#IRSP <Mode>

Control Commands

Control commands are the commands which are used in the normal end-user operation of the ZIR-232 module. With the exception of the serial transmit commands, these commands require that a valid set of command data has been downloaded to the ZIR-232 module via the ZON Config application. Control commands always begin with 'C'.

Command	*Parameters*	*Description*	*Return*
CD	Value(n)	**Delay.** Forces the ZIR-232 to delay Value milliseconds. During this delay, no interrupts are processed and the ZIR-232 is effectively 'paused'. This is normally used during script playback.	#IRCD <Value>
CA	ActionCode(n)	**Do Action.** Forces the ZIR-232 to carry out the events or scripts associated with the specified ActionCode. ActionCode must be 0-65535. If there is no action associated with the code sent, a	#IRCA <ActionCode> or #IRCA BAD PARAM

		BAD PARAM reply will be returned. The reply is sent as soon as this command is received, not when the action is finished processing.	
CP	ScriptIndex(n)	**Play Script.** Forces the ZIR-232 to executed the script stored at ScriptIndex in the script table.	#IRCP <Script Index> or #IRCP BAD PARAM
CS	String(n)	**Send Serial.** Forces the ZIR-232 to transmit the specified String out its serial port. This command does not support the transmission of NULL characters.	#IRCS
CW	Timeout(n) Target(n)	**Wait For.** Pauses the execution of the ZIR-232 until the string Target arrives at the serial port or Timeout milliseconds elapses. *Not implemented in current firmware.*	#IRCW
CR	BaudRate(n) Parity(1) StopBits(1) StartBits(1)	**Set Serial Parameters.** This sets the serial parameters for the ZIR-232's serial port. *Not implemented in current firmware.*	#IRCR

Miscellaneous Commands

Command	*Parameters*	*Description*	*Return*
R	StartAddress(x) Count(n)	**Raw Memory Read.** Returns Count bytes of memory from the ZIR-232's address space starting at StartAddress. Note that StartAddress must be a hexadecimal value and Count is a base-10 value. Count must be <=16.	#RM <Data> Where<Data> is a list of ascii-encoded hex byte separated by spaces.
LC	None	**Flash Load – Command Area.** Initiates flash mode communications to load the IR command area.	See Flash Mode in Oxmoor Document #1700070
LM	None	**Flash Load – Main Code Area.** Initiates flash mode communications to load the main code area.	See Flash Mode in Oxmoor Document #1700070

Device Type Table

Device Type	Device Name	Letter Representation
0	TV	T
1	Cable	C
2	Video Accessory	N
3	Satellite/DSS	S
4	VCR	V
5	Laser Disk	L
6	Digital Video Disk	Y
7	Tuner	R
8	Amplifier	A
9	Compact Disk	D
10	Home Control	H
11-31	Reserved	

IR Send Key

IR Send Key – Transmits the IR command to a particular device mimicking a keypress. This command is useful if you have a device that is listed in the

ISK	Parameters	Sample Data
Input:	<DeviceType> (2 byte) <DeviceNum> (4) <Keycode> (2) <KeyFlag> (2) <IRCode> (2)	"06" "0533" "01" "40" "00"
Return:	Status	

1. DeviceType   See Device Type Table
2. DeviceNum   A four digit number which identifies a set of IR functions to control a device. See Appendix B
3. KeyCode   See *Appendix C. KeyCode Table*
4. KeyFlag   Type of the function to be executed
   "40" - KeyFlag.7=1 - macro on
   "20" - KeyFlag.6=1 - IRCode used instead of KeyCode
   "10" - KeyFlag.5=1 - Learned Code
5. IRCode   Infrared hex code (KeyFlag.6=1), or
        LearnCodeId (KeyFlag.5=1) if learned code is stored in internal EEPROM

Status   See *Return Status Code Table*

Example: Sony   DVD   Power   Key   =   ~EIR1ISK060533014000

IR SendIrPattern

Transmit IR according to the given IR code and executor

16	Parameters	Sample Data
Input:	RcdLength(1), 10h, Executor (2), KeyFlag(1), PrefixAndData(n)	08h, 10h, 01h, 08h, 5Eh, F3h, 73h, FCh //Exec273, Repeat function, prefix 1:5Eh, prefix2:F3h, data1:73h, data2:FCh
Return:	RcdLength(1), Status(1)	01h, 00h

1. Executor   Executor number or LearnCodeId (when KeyFlag.5=1)
2. Key Flag   Type of function to be executed
    KeyFlag.7=1 – Macro mode playback
    KeyFlag.5=1 – Stored Learned Code (stored EEPROM) function Playback
    KeyFlag.4=1 – Attached LearnedCode (PrefixAndData(n)) function playback
    KeyFlag.3=1 – Repeat function playback (CH+/-, Vol+/-, REW, FDW)
    KeyFlag.2=1 – RECORD key function playback
    KeyFlag.1=1 – Volume key function playback (VOL+/-, Mute)
    Key Flag.0=1 – POWER key function playback
3. PrefixAndData(n)   Prefixes and data bytes or LearnedData (when KeyFlag .4=1)

IR DownLoadDeviceToE2

Downloads a new device into EEPROM.

IDD	Parameters	Sample Data
Input:	DeviceType(1) DeviceNum(4) DownloadData(n)	
Return:	Status(1)	"0"

    1. Download Data(n) format:
        Size_of_DownloadData(1) (EXCLUDE ITSELF)
        Exec_Offset(1)
            = 0, if no Exec is attached
            >= 3, Exec_offset
        DeviceTypeNum_HiExecFlag(2)
            bit15..bit12   : DeviceType (0:TV, 1:CBL, ...)
            bit11   : =1- if Exec# > 255
            bit10..bit0   : Id#
        Id Data(x)
        Exec Data(y)

IR LearnAndSave

Learns new IR Code and maps to the given learnCodeId and saves learnedData to EEPROM. For the IR learner feature, the host has to reference each learned function with an identification number. The learned code can be retrieved via SendKey command with the KeyFlag.5 set to 1 and IRCode set to LearnCodeId number.

ILS	Parameters	Sample Data
Input:	LearnCodeID(4)	"03A4"
Return:	Status(1)	"0"

IR DeleteLearnedCode

    Deletes a learned function on a given learnCodeId. This is used to delete a learned function from E2.

IDL	Parameters	Sample Data
Input:	LearnCodeID(4)	
Return:	Status(1)	"0"

IR MasterReset

Clears memory depending on the given level.

IMR	Parameters	Sample Data
Input:	ResetLevel(1)	"1"
Return:	Status(1)	"0"

     1. ResetLevel: 1 – Clear all upgrade codes
                                    2 – Clear Learned codes
                                    3 – Clear both upgrade and learning codes.

     Example: "~EAIRIMR3"

IR ListAllUpgradeCode

Returns all upgraded Ids which been downloaded into EEPROM.

ILC	Parameters	Sample Data
Input:	RcdLength(1), 11h	01h, 11h
Return:	RcdLength(1), Status(1), #OfIDs(1), Data(n)	08h, 00h, 03h, 00h, 2Fh, 04h, 3Ch, 01h, 03h // 3 Ids: T0047, V0060, C0003

     1. #OfIds   Number of Ids
     2. Data(n)   DeviceTypeNum array means 2 bytes per Id. For example, if #OfIds is 3, there are 3*2=6 bytes for Data string.

IR LearnAndUpload

Learns new IR Code and maps to the given learnCodeId and return learnedData back. This can be used when there is no E2 and the host has captured the learned code.

ILU	Parameters	Sample Data
Input:	<learnCodeId> (4)	"1234"
Return:	RcdLength(1), Status(1), learnedData(n)	

Setup, Programming and Execution Commands

These commands allow the user to store IR commands that may be indexed with the token commands. All requests are treated as macros. Single commands are simply one-line macros.

Command	Description	Parameters	Return
SPRM	Set Serial Parameters	databits(1) parity(1) stopbits(1)	Status

Appendix B - Device Codes

BRAND SETUP CODE LIST FOR GENERIC IR BLASTER 2002: US AUG. 28,2002

SETUP CODES FOR AMPLIFIERS

```
GE                            0078
Harman/Kardon                 0892
JVC                           0331
Left Coast                    0892
Marantz                       0892
Optimus                       0395
Philips                       0892
Polk Audio                    0892
Realistic                     0395
Soundesign                    0078
Victor                        0331
Wards                         0078
Yamaha                        0354
```


SETUP CODES FOR CABLE

```
ABC                           0003, 0008, 0014, 0017
Americast                     0899
Bell & Howell                 0014
Bell South                    0899
Director                      0476
General Instrument            0476, 0003, 0276, 0810
GoldStar                      0144
Hamlin                        0009, 0273
Jerrold                       0476, 0003, 0276, 0012, 0014, 0810
Memorex                       0000
Motorola                      0476, 1106, 0276, 0810
Pace                          0237
Panasonic                     0000, 0107
Paragon                       0000
Philips                       0305, 0317
Pioneer                       0877, 0144, 0533, 1877
Pulsar                        0000
Quasar                        0000
Regal                         0273, 0279
Runco                         0000
Samsung                       0144
Scientific Atlanta            0877, 0008, 0017, 0477, 1877
Sony                          1006
Starcom                       0003
Supercable                    0276
Tocom                         0012
Torx                          0003
Toshiba                       0000
Zenith                        0000, 0525, 0899
```


SETUP CODES FOR CD PLAYERS

```
Aiwa                          0157
```

```
California Audio Labs            0029
Carver                          0157, 0179
Classic                         1297
DKK                             0000
DMX Electronics                 0157
Denon                           0873
Emerson                         0305
Fisher                          0179
GPX                             1296
Genexxa                         0032, 0305
Harman/Kardon                   0157, 0173
Hitachi                         0032
JVC                             0072, 1294
Kenwood                         0681, 0826, 0626, 0028, 0037
Koss                            1317
Krell                           0157
LXI                             0305
Linn                            0157
MCS                             0029
Magnavox                        0157, 0305
Marantz                         0626, 0029, 0157
Miro                            0000
Mission                         0157
NSM                             0157
Onkyo                           0868
Optimus                         1063, 0000, 0032, 0037, 0179, 0305
Panasonic                       0029
Philips                         0626, 0157
Pioneer                         1063, 1062, 0032, 0305
Polk Audio                      0157
Proton                          0157
QED                             0157
Quasar                          0029
RCA                             1062, 0032, 0179, 0305
Realistic                       0179
Rotel                           0157
SAE                             0157
Sansui                          0157, 0305
Sanyo                           0179
Scott                           0305
Sears                           0305
Sharp                           0861, 0037
Sherwood                        1067
Sonic Frontiers                 0157
Sony                            0490, 0000, 0100
TDK                             1208
Technics                        0029
Victor                          0072
Wards                           0157
Yamaha                          0888, 1292


SETUP CODES FOR HOME AUTOMATION

Audio Access                    0154
Cableshare                      0537
Comfortex                       0400
Da-Lite                         0780
```

```
Elero                          0434
Evergo                         0059
GE                             0240
Gewa                           0095
Holmes                         1215
Hunter Douglas                 0433
Lightolier                     0184, 1204, 1205, 1206
LiteTouch                      0084
Lutron                         0597, 0318, 1239, 1597
One For All                    0167
RadioShack                     0240
Russound                       1232, 1233
Sanyo                          0336
Security System                0167
Somfy                          0780
Universal X10                  0167
X10                            0167


SETUP CODES FOR LASER DISK

Aiwa                           0203
Denon                          0059, 0172
Funai                          0203
Mitsubishi                     0059
NAD                            0059
Optimus                        0059
Panasonic                      0204
Pioneer                        0059
Quasar                         0204
Realistic                      0203
Sony                           0193, 0201
Technics                       0204


SETUP CODES FOR MISC AUDIO

Aiwa                           0010, 0159
Jerrold                        0520, 0459
Scientific Atlanta             0460
Sony                           0010, 0159
Starcom                        0459


SETUP CODES FOR VIDEO

AOL                            1061
Magnavox                       1818
Mitsubishi                     1002
Panasonic                      1120
Philips                        1818, 1061
Pioneer                        1010
Princeton                      0113, 0295
Samsung                        1190, 1204
Sensory Science                1126
Sharp                          1010
Sony                           0850
```

```
SETUP CODES FOR RECEIVERS

ADC                             0531
Aiwa                            1089, 1405, 0158, 1388
Alco                            1390
Anam                            1609
Apex Digital                    1257
Audiotronic                     1189
Audiovox                        1390
Bose                            1229
Capetronic                      0531
Carver                          1089, 1189
Denon                           1104, 1160, 1360
JBL                             1306
JVC                             0074
KLH                             1390
Kenwood                         1313, 1027, 1570, 1569, 0027
Koss                            1366
MCS                             0039
Magnavox                        1089, 1189, 0531
Marantz                         1089, 1189, 0039
Musicmagic                      1089
Onkyo                           0135, 0842, 1298
Optimus                         1023, 0531
Panasonic                       1518, 0039, 1288
Philips                         1089, 1189, 1269, 1283
Pioneer                         1023, 0014, 0531
Proscan                         1254
Quasar                          0039
RCA                             1023, 1254, 0531, 1390, 1609
Samsung                         1295
Sansui                          1089
Sherwood                        1653
Sony                            1058, 1258, 1158, 0158
Stereophonics                   1023
Sunfire                         1313
Technics                        1308, 1309, 1518, 0039
Thorens                         1189
Venturer                        1390
Victor                          0074
Wards                           0014, 0158
Yamaha                          0176, 1176



SETUP CODES FOR SATELLITE

AlphaStar                       0772
Chaparral                       0216
Crossdigital                    1109
Echostar                        1005, 0775
Expressvu                       0775
GE                              0566
GOI                             0775
General Instrument              0869
HTS                             0775
Hitachi                         0819
Hughes Network Systems          1142, 0749, 1749
```

```
JVC                             0775
Magnavox                        0724, 0722
Memorex                         0724
Mitsubishi                      0749
Motorola                        0869
Next Level                      0869
Panasonic                       0247, 0701
Paysat                          0724
Philips                         1142, 0749, 0724, 1076, 0722, 1749
Proscan                         0392
RCA                             0392, 0566, 0855, 0143
RadioShack                      0869
Samsung                         1109
Sony                            0639
Star Choice                     0869
Toshiba                         0749, 0790, 1749
Uniden                          0724, 0722
Zenith                          0856, 1856


SETUP CODES FOR TELEVISION

AOC                             0030, 0019
Admiral                         0093, 0463
Advent                          0761
Aiko                            0092
Aiwa                            0701
Akai                            0030
Alaron                          0179
America Action                  0180
Ampro                           0751
Anam                            0180
Apex Digital                    0748, 0765, 0767
Audiovox                        0451, 0180, 0092, 0623
Baysonic                        0180
Belcor                          0019
Bell & Howell                   0154, 0016
Bradford                        0180
Brockwood                       0019
Broksonic                       0236, 0463
CXC                             0180
Candle                          0030, 0056
Carnivale                       0030
Carver                          0054
Celebrity                       0000
Changhong                       0765
Cineral                         0451, 0092
Citizen                         0060, 0030, 0056, 0092
Concerto                        0056
Contec                          0180
Craig                           0180
Crosley                         0054
Crown                           0180
Curtis Mathes                   0047, 0054, 0154, 0051, 0451, 0093, 0060, 0030,
                                0145, 0056, 0016, 0166, 0466, 0702, 0747, 1147,
                                1347
Daewoo                          0451, 0019, 0092, 0623
Daytron                         0019
```

Denon	0145
Dumont	0017, 0019
Dwin	0720, 0774
Electroband	0000
Emerson	0154, 0236, 0463, 0180, 0178, 0019, 0179, 0623
Envision	0030
Fisher	0154
Fujitsu	0179, 0683
Funai	0180, 0179, 0171
Futuretech	0180
GE	0047, 0051, 0451, 0093, 0178, 0021, 0747, 1147, 1347
Gibralter	0017, 0030, 0019
GoldStar	0030, 0178, 0019, 0056
Gradiente	0053, 0056
Grunpy	0180, 0179
Hallmark	0178
Harley Davidson	0179
Harman/Kardon	0054
Harvard	0180
Havermy	0093
Hitachi	0145, 0056, 0016
Infinity	0054
Inteq	0017
JBL	0054
JCB	0000
JVC	0053
KEC	0180
KTV	0180, 0030
Kenwood	0030, 0019
Konka	0628, 0632, 0638, 0703, 0707
LG	0056
LXI	0047, 0054, 0154, 0156, 0178, 0747
Logik	0016
Luxman	0056
MGA	0150, 0030, 0178, 0019
MTC	0060, 0030, 0019, 0056
Magnavox	0054, 0030, 0179, 1254, 1454
Majestic	0016
Marantz	0054, 0030
Matsushita	0250
Megatron	0178, 0145
Memorex	0154, 0250, 0463, 0150, 0178, 0179, 0056, 0016
Midland	0047, 0017, 0051, 0747
Minutz	0021
Mitsubishi	0093, 0150, 0178, 0019
Motorola	0093
Multitech	0180
NAD	0156, 0178, 0166
NEC	0030, 0019, 0056
NTC	0092
Nikko	0030, 0178, 0092
Onwa	0180
Optimus	0154, 0250, 0166
Optonica	0093
Orion	0236, 0463, 0179
Panasonic	0250, 0051
Penney	0047, 0156, 0051, 0060, 0030, 0178, 0021, 0019,

```
                                  0056, 0747, 1347
Philco                            0054, 0463, 0030, 0145, 0019
Philips                           0054, 1454
Pilot                             0030, 0019
Pioneer                           0166, 0679
Portland                          0019, 0092
Princeton                         0717
Prism                             0051
Proscan                           0047, 0747
Proton                            0178, 0466
Pulsar                            0017, 0019
Quasar                            0250, 0051
RCA                               0047, 0051, 0093, 0019, 0090, 0679, 0747, 1047,
                                  1147, 1247, 1347, 1447
RadioShack                        0047, 0154, 0180, 0030, 0178, 0019, 0056, 0747
Realistic                         0154, 0180, 0030, 0178, 0019, 0056
Runco                             0017, 0030, 0603
SSS                               0180, 0019
Sampo                             0030
Samsung                           0060, 0030, 0178, 0019, 0056, 0702, 0766
Sansei                            0451
Sansui                            0463
Sanyo                             0154
Scimitsu                          0019
Scotch                            0178
Scott                             0236, 0180, 0178, 0019, 0179
Sears                             0047, 0054, 0154, 0156, 0178, 0179, 0056, 0171,
                                  0747
Semivox                           0180
Semp                              0156
Sharp                             0093, 0688, 0689
Shogun                            0019
Signature                         0016
Sony                              0000, 1100
Soundesign                        0180, 0178, 0179
Squareview                        0171
Starlite                          0180
Supreme                           0000
Sylvania                          0054, 0030, 0171
Symphonic                         0180, 0171
TMK                               0178, 0056
TNCi                              0017
Tandy                             0093
Technics                          0250, 0051
Technol Ace                       0179
Techwood                          0051, 0056
Teknika                           0054, 0180, 0150, 0060, 0019, 0179, 0056, 0016,
                                  0092
Telefunken                        0056, 0702
Toshiba                           0154, 0156, 0060, 1256
Vector Research                   0030
Victor                            0053
Vidikron                          0054
Vidtech                           0178, 0019
Wards                             0054, 0030, 0178, 0021, 0019, 0179, 0056, 0016
Waycon                            0156
White Westinghouse                0463, 0623
Yamaha                            0030, 0019, 0769
```

```
Zenith                           0017, 0463, 0016, 0092


SETUP CODES FOR VCR

Admiral                          0048, 0209
Adventura                        0000
Aiko                             0278
Aiwa                             0037, 0000
Akai                             0041
America Action                   0278
American High                    0035
Asha                             0240
Audiovox                         0037
Beaumark                         0240
Bell & Howell                    0104
Broksonic                        0184, 0121, 0209, 0002, 0479, 1479
CCE                              0072, 0278
Calix                            0037
Canon                            0035
Carver                           0081
Cineral                          0278
Citizen                          0037, 0278, 1278
Colt                             0072
Craig                            0037, 0047, 0240, 0072
Curtis Mathes                    0060, 0035, 0162, 0041, 0760, 1035
Cybernex                         0240
Daewoo                           0045, 0278, 1278
Denon                            0042
Dynatech                         0000
Electrohome                      0037
Electrophonic                    0037
Emerex                           0032
Emerson                          0037, 0184, 0000, 0121, 0043, 0209, 0002, 0278,
                                 0479, 1278, 1479
Fisher                           0047, 0104
Fuji                             0035
Funai                            0000
GE                               0060, 0035, 0048, 0240, 0760, 0807, 1035, 1060
Garrard                          0000
Go Video                         0432
GoldStar                         0037, 0038, 1237
Gradiente                        0000
HI-Q                             0047
Harley Davidson                  0000
Harman/Kardon                    0081, 0038
Harwood                          0072
Hitachi                          0000, 0042, 0041
Hughes Network Systems           0042
JVC                              0067, 0041
Jensen                           0041
KEC                              0037, 0278
KLH                              0072
Kenwood                          0067, 0041, 0038
Kodak                            0035, 0037
LXI                              0037
Lloyd's                          0000
Logik                            0072
```

```
MEI                             0035
MGA                             0240, 0043
MGN Technology                  0240
MTC                             0240, 0000
Magnasonic                      0278, 1278
Magnavox                        0035, 0039, 0081, 0000, 0149, 0563, 1781
Magnin                          0240
Marantz                         0035, 0081
Marta                           0037
Matsushita                      0035, 0162, 0454
Memorex                         0035, 0162, 0037, 0048, 0039, 0047, 0240, 0000,
                                0104, 0209, 0454, 0479, 1037, 1162, 1237, 1262
Minolta                         0042
Mitsubishi                      0048, 0067, 0043, 0807
Motorola                        0035, 0048
Multitech                       0000, 0072
NEC                             0104, 0067, 0041, 0038
Nikko                           0037
Noblex                          0240
Olympus                         0035
Optimus                         1062, 0162, 0037, 0048, 0104, 0432, 0454, 1048,
                                1162, 1262
Orion                           0184, 0209, 0002, 0479, 1479
Panasonic                       1062, 0035, 0162, 0225, 0454, 0616, 1035, 1162,
                                1262
Penney                          0035, 0037, 0240, 0042, 0038, 1035, 1237
Pentax                          0042
Philco                          0035, 0209, 0479
Philips                         0035, 0081, 0618, 1081, 1181
Pilot                           0037
Pioneer                         0067
Polk Audio                      0081
Profitronic                     0240
Proscan                         0060, 0760, 1060
Protec                          0072
Pulsar                          0039
Quasar                          0035, 0162, 0454, 1035, 1162
RCA                             0060, 0035, 0048, 0240, 0042, 0149, 0760, 0807,
                                1035, 1060
RadioShack                      0000, 1037
Radix                           0037
Randex                          0037
Realistic                       0035, 0037, 0048, 0047, 0000, 0104
ReplayTV                        0614, 0616
Runco                           0039
STS                             0042
Samsung                         0240, 0045
Sanky                           0048, 0039
Sansui                          0000, 0067, 0209, 0041, 0479, 1479
Sanyo                           0047, 0240, 0104
Scott                           0184, 0045, 0121, 0043
Sears                           0035, 0037, 0047, 0000, 0042, 0104, 1237
Semp                            0045
Sharp                           0048, 0807, 0848
Shintom                         0072
Shogun                          0240
Singer                          0072
Sonic Blue                      0614
```

```
Sony                         0035, 0032, 0000, 0636, 1032, 1232
Sylvania                     0035, 0081, 0000, 0043, 1781
Symphonic                    0000
TMK                          0240
Tatung                       0041
Teac                         0000, 0041
Technics                     0035, 0162
Teknika                      0035, 0037, 0000
Thomas                       0000
Tivo                         0618, 0636
Toshiba                      0045, 0043, 0845
Totevision                   0037, 0240
Unitech                      0240
Vector                       0045
Vector Research              0038
Video Concepts               0045
Videomagic                   0037
Videosonic                   0240
Villain                      0000
Wards                        0060, 0035, 0048, 0047, 0081, 0240, 0000, 0042,
                             0072, 0149, 0760
White Westinghouse           0209, 0072, 0278, 1278
XR-1000                      0035, 0000, 0072
Yamaha                       0038
Zenith                       0039, 0000, 0209, 0479, 1479


SETUP CODES FOR DIGITAL VIDEO DISC

Aiwa                         0641
Apex Digital                 0672, 0755, 0794, 0795, 0796, 0797, 0830
Blue Parade                  0571
Broksonic                    0695
Daewoo                       0784
Denon                        0490, 0634
Emerson                      0591
Enterprise                   0591
Fisher                       0670
GE                           0522
Go Video                     0715, 0783
Gradiente                    0651
Harman/Kardon                0582, 0702
Hitachi                      0573, 0664
Hiteker                      0672
JBL                          0702
JVC                          0558, 0623, 0867
Kenwood                      0534, 0682
Konka                        0711, 0719, 0720, 0721
Koss                         0651
Lasonic                      0798
Magnavox                     0503, 0675
Malata                       0782
Marantz                      0539
Microsoft                    0522
Mitsubishi                   0521
Onkyo                        0503, 0627
Oritron                      0651
Panasonic                    0490, 0632
```

```
Philips                        0503, 0539, 0646, 0854
Pioneer                        0525, 0571, 0632
Princeton                      0674
Proscan                        0522
RCA                            0522, 0571, 0822, 1022
Rowa                           0823
Sampo                          0698
Samsung                        0573, 0820
Sansui                         0695
Sanyo                          0670
Sharp                          0630
Sherwood                       0633
Sony                           0533, 1533
Sylvania                       0821
Technics                       0490
Techwood                       0692
Theta Digital                  0571
Toshiba                        0503, 0695, 1045
Urban Concepts                 0503
Yamaha                         0490, 0545, 0817
Zenith                         0503, 0591
```

The following key chart shows the full key functionality for the **North American Market.**

Key #	STANDARD KEY LABELS & PHYSICAL KEY GROUPS	TV (HDTV)	CABLE	DSS/SAT (DSS/PVR)	VCR / PVR (VCR/TV)	DVD (DVD/TV)	RECEIVER (HT Tuner/DVD)	CD (CDR / MD)
1	POWER	Power On/Off	Power On/Off	Power On/Off	Power On/Off	Power On/Off	Power On/Off	Power On/Off
2	POWER ON	On, Power On/Off	On, Power On/Off	On, Power On/Off	On, Power On/Off	On, Power On/Off	On, Power On/Off	On, Power On/Off
3	POWER OFF	Off, Power On/Off	Off, Power On/Off	Off, Power On/Off	Off, Power On/Off	Off, Power On/Off	Off, Power On/Off	Off, Power On/Off
4	CHANNEL UP	FUTURE PICK	Channel Up	Channel Up	Channel Up	Channel Up	Preset Up	FUTURE PICK
5	CHANNEL DOWN	FUTURE PICK	Channel Down	Channel Down	Channel Down	Channel Down	Preset Down	FUTURE PICK
6	VOLUME UP	Volume Up	Volume Up	Volume Up	Volume Up	Volume Up	Volume Up	Volume Up
7	VOLUME DOWN	Volume Down	Volume Down	Volume Down	Volume Down	Volume Down	Volume Down	Volume Down
8	MUTE	Mute	Mute	Mute	Mute	Mute	Mute	Mute
9	DIGIT 1	Digit 1	Digit 1	Digit 1	Digit 1	Digit 1, Track 1	Digit 1	Digit 1, Track 1, Disc 1
10	DIGIT 2	Digit 2	Digit 2	Digit 2	Digit 2	Digit 2, Track 2	Digit 2	Digit 2, Track 2, Disc 2
11	DIGIT 3	Digit 3	Digit 3	Digit 3	Digit 3	Digit 3, Track 3	Digit 3	Digit 3, Track 3, Disc 3
12	DIGIT 4	Digit 4	Digit 4	Digit 4	Digit 4	Digit 4, Track 4	Digit 4	Digit 4, Track 4, Disc 4
13	DIGIT 5	Digit 5	Digit 5	Digit 5	Digit 5	Digit 5, Track 5	Digit 5	Digit 5, Track 5, Disc 5
14	DIGIT 6	Digit 6	Digit 6	Digit 6	Digit 6	Digit 6, Track 6	Digit 6	Digit 6, Track 6, Disc 6
15	DIGIT 7	Digit 7	Digit 7	Digit 7	Digit 7	Digit 7, Track 7	Digit 7	Digit 7, Track 7, Disc 7
16	DIGIT 8	Digit 8	Digit 8	Digit 8	Digit 8	Digit 8, Track 8	Digit 8	Digit 8, Track 8, Disc 8
17	DIGIT 9	Digit 9	Digit 9	Digit 9	Digit 9	Digit 9, Track 9	Digit 9	Digit 9, Track 9, Disc 9
18	DIGIT 0	Digit 0	Digit 0	Digit 0	Digit 0	Digit 0, Track 10	Digit 0	Digit 0, Track 10,Disc 10
19	CHANNEL ENTER	Channel Enter	Channel Enter	Channel Enter	Channel Enter	Channel Enter	5.1, Prologic,	Set
20	+100	+100	+100	+100	+100	+100, +10	Band, FM/AM,	+10, +100
21	LAST CHANNEL	Last Channel	Last Channel	Last Channel	Last Channel	Last Channel, Repeat	Repeat	Repeat
22	INPUT	TV/Video	Bypass, A/B	TV/DSS/SAT	TV/VCR	TV/DVD, Input Select	DVD/Tuner, Input Select	CD/CDR/MD, Input Select
23	EXTERNAL	External Antenna	External AV Source	External AV Source	Input Select	External AV Source	External AV Source	External AV Source
24	PLAY	FUTURE PICK	Play	Play	Play	Play	Play	Play
25	STOP	FUTURE PICK	Stop	Stop	Stop	Stop	Stop	Stop
26	PAUSE	FUTURE PICK	Pause	Pause	Pause	Pause	Pause	Pause
27	REWIND	FUTURE PICK	Rewind	Rewind	Rewind	Rewind	Rewind	Rewind
28	FAST FORWARD	FUTURE PICK	Fast Forward	Fast Forward	Fast Forward	Fast Forward	Fast Forward	Fast Forward
29	RECORD	FUTURE PICK	Record	Record	Record	Record	Record	Record
30	SKIP FWD	FUTURE PICK	Quick Skip, Advance	Quick Advance, Skip	Quick Skip, Advance; Index/Tracking Up	Chapter/Skip Up	Skip Up	Skip Up

Key #	STANDARD KEY LABELS & PHYSICAL KEY GROUPS	TV (HDTV)	CABLE	DSS/SAT (DSS/PVR)	VCR / PVR (VCR/TV)	DVD (DVD/TV)	RECEIVER (HT Tuner/DVD)	CD (CDR / MD)
31	SKIP REVERSE	FUTURE PICK	Instant Replay	Instant Replay	Instant Replay; Index/Tracking Down	Chapter/Skip Down	Skip Down	Skip Down
32	LIVE	FUTURE PICK	Return to Live	Return to Live	Return to Live, Auto Tracking	Intro, Search, Scan	Intro, Search, Scan	Intro, Search, Scan
33	SOURCE MENU	Menu (Picture)	Menu, Settings	Menu (PVR,Tivo)	Menu (PVR,Tivo)	Disk Menu	Disk Menu, Menu	Disk, Edit
34	DEVICE MENU	Menu (Audio)	PPV (Wink)	Menu (DTV)	Menu	Setup Menu	Menu	Menu, Program
35	GUIDE	Guide	Guide	Guide	Guide, VCR+, Program	Title	Title	Group, Magazine
36	EXIT	Exit, Cancel	Exit, Cancel	Exit, Cancel	Exit, Cancel	Exit, Cancel, Return	Exit, Cancel, Return	Exit, Cancel
37	BACK	Back	Back	Back	Clear	Clear	Clear	Track, Clear
38	CURSOR UP	Menu Up, Adjust Up	Menu Up	Menu Up	Menu Up	Menu Up	Menu Up, Adjust Up	Menu Up
39	CURSOR DOWN	Menu Down, Adjust Down	Menu Down	Menu Down	Menu Down	Menu Down	Menu Down, Adjust Down	Menu Down
40	CURSOR LEFT	Menu Left	Menu Left	Menu Left	Menu Left	Menu Left	Menu Left	Menu Left
41	CURSOR RIGHT	Menu Right	Menu Right	Menu Right	Menu Right	Menu Right	Menu Right	Menu Right
42	MENU SELECT	Menu Select	Menu Select	Menu Select	Menu Select	Menu Select	Menu Select, Continue	Menu Select, Continue
43	PAGE UP	Adjust Up	Page Up	Page Up, Thumbs Up	Thumbs Up	Disk Skip, Disk Up	Adjust Up	Disk Skip, Disk Up
44	PAGE DOWN	Adjust Down	Page Down	Page Down, Thumbs Down	Thumbs Down	Disk Down	Adjust Down	Disk Down
45	FAVORITE	Favorite	Favorite	Favorite	Replay Zones, Index Mark	Mark	Mark	Finalize, Index
46	DISPLAY	Display, OSD, Info	Info, Display, OSD	Info, Display, OSD	Display, OSD, Info	Display, OSD, Info	Display, OSD, Info	Display, OSD, Info
47	FORMAT	Format, Wide, 16:9, Aspect	Help	Format, Wide, 16:9, Aspect	Record Speed	Format, Wide, Zoom, Aspect	Format, Wide, Zoom, Aspect	Future Pick
48	SAP	SAP, CC	Day Up	Alt Audio, Audio, Language, CC	SAP, CC	Subtitle, CC	Subtitle, CC	Future Pick
49	SURROUND	Surround On/Off	Day Down	Future Pick	Future Pick	Audio, Language	Surround Mode, Surround On/Off, Audio, Language	Future Pick
50	SLOW	Future Pick	Future Pick	Slow	Slow	Slow	Slow,	Future Pick
51	DELIMITER	Delimiter	Delimiter	Delimiter	Open/Close, Eject	Open/Close, Eject	Open/Close, Eject	Open/Close, Eject
52	RANDOM	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	RANDOM	Random
53	PIP ON	PIP ON	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick
54	PIP OFF	PIP OFF	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick
55	PIP FREEZE	PIP Freeze	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick
56	PIP SWAP	PIP Swap	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick
57	PIP MOVE	PIP Move	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick
58	PIP INPUT	PIP Input	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick
59	PIP CHANNEL UP	PIP Channel Up	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick
60	PIP CHANNEL DOWN	PIP Channel Down	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick
61	PIP MULTI	PIP Multi	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick

Key #	STANDARD KEY LABELS & PHYSICAL KEY GROUPS	TV (HDTV)	CABLE	DSS/SAT (DSS/PVR)	VCR / PVR (VCR/TV)	DVD (DVD/TV)	RECEIVER (HT Tuner/DVD)	CD (CDR / MD)
62	DISCREET INPUT 1	VID1, Video, TVp1	A, VID 1, VIDEO, TVp1	VID1, Video, TVp1	VID1, Video, TVp1	VID1, Video, TVp1	CD	CD
63	DISCREET INPUT 2	VID2, TVp2	B, VID2, TVp2	VID2, TVp2	VID2, TVp2	VID2, TVp2	TUNER	TUNER
64	DISCREET INPUT 3	VID3, TVp3	C, VID3, TVp3	VID3, TVp3	VID3, TVp3	VID3, TVp3	DVD, LD	DVD, LD
65	DISCREET INPUT 4	VID4, TVp4	VID4, TVp4	VID4, TVp4	VID4, TVp4	VID4, TVp4	TAPE, MD	TAPE, MD
66	DISCREET INPUT 5	VID5, AV1, VCR, BNC	VID5, AV1, VCR, BNC	VID5, AV1, VCR, BNC	VID5, AV1, VCR, BNC	VID5, AV1, VCR, BNC	VCR, VID1	VCR, VID1
67	DISCREET INPUT 6	VID6, AV2, VDP, DVD,DVI	VID6, AV2, VDP, DVD,DVI	VID6, AV2, VDP, DVD,DVI	VID6, AV2, VDP, DVD,DVI	VID6, AV2, VDP, DVD,DVI	TV, VID2	TV, VID2
68	DISCREET INPUT 7	TV, COMPONENT	TV, COMPONENT	TV, COMPONENT	TV, COMPONENT	TV, COMPONENT	LD, VID3	LD, VID3
69	DISCREET INPUT 8	CAB, SAT, S-VIDEO	CAB, SAT, S-VIDEO	CAB, SAT, S-VIDEO	CAB, SAT, S-VIDEO	CAB, SAT, S-VIDEO	AUX, VID4	AUX, VID4
70	DISCREET INPUT 9	AV, TUNER	AV, TUNER	AV, TUNER	AV, TUNER	AV, TUNER	DAT, CABLE	DAT, CABLE
71	DISCREET INPUT 10	AUX, RGB	AUX, RGB	AUX, RGB	AUX, RGB	AUX, RGB	PHONO,SAT	PHONO,SAT
72	FUTURE PICK 1	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick
73	FUTURE PICK 2	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick
74	FUTURE PICK 3	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick
75	FUTURE PICK 4	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick
76	FUTURE PICK 5	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick
77	FUTURE PICK 6	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick
78	FUTURE PICK 7	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick
79	FUTURE PICK 8	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick
80	FUTURE PICK 9	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick
81	FUTURE PICK 10	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick	Future Pick

The following key chart shows the full key functionality for **North America Market.**

Note 1: If function is picked but device ID does not contain that function, then no IR will be picked, therefore the function will not exist for that particular device ID. These key location will be available for re-pick

ZoN Audio   Page 31 of 35   12 April 2004

Key #	STANDARD KEY LABELS & PHYSICAL KEY GROUPS	HOME (HVAC) (Lighting) (Blinds)	VIDEO ACCESSORY (HDTV Decoder)	LASER DISK (LD, VCD) (Karaoke)	AMPLIFIER & MISC. AUDIO
1	POWER	Power On/Off	Power On/Off	Power On/Off	Power On/Off
2	POWER ON	On, Power On/Off	On, Power On/Off	On, Power On/Off	On, Power On/Off
3	POWER OFF	Off, Power On/Off	Off, Power On/Off	Off, Power On/Off	Off, Power On/Off
4	CHANNEL UP	Bright, Raise, Up	Channel Up	Future Pick	Preset Up
5	CHANNEL DOWN	Dim, Lower, Down	Channel Down	Future Pick	Preset Down
6	VOLUME UP	Volume Up	Volume Up	Volume Up	Volume Up
7	VOLUME DOWN	Volume Down	Volume Down	Volume Down	Volume Down
8	MUTE	Mute	Mute	Mute	Mute
9	DIGIT 1	Digit 1	Digit 1	Digit 1	Digit 1
10	DIGIT 2	Digit 2	Digit 2	Digit 2	Digit 2
11	DIGIT 3	Digit 3	Digit 3	Digit 3	Digit 3
12	DIGIT 4	Digit 4	Digit 4	Digit 4	Digit 4
13	DIGIT 5	Digit 5	Digit 5	Digit 5	Digit 5
14	DIGIT 6	Digit 6	Digit 6	Digit 6	Digit 6
15	DIGIT 7	Digit 7	Digit 7	Digit 7	Digit 7
16	DIGIT 8	Digit 8	Digit 8	Digit 8	Digit 8
17	DIGIT 9	Digit 9	Digit 9	Digit 9	Digit 9
18	DIGIT 0	Digit 0	Digit 0	Digit 0	Digit 0
19	CHANNEL ENTER	Future Pick	Channel Enter	Future Pick	5.1, Prologic,
20	+100	Future Pick	+100, +10	+10	Band, FM/AM,
21	LAST CHANNEL	Future Pick	Last Channel	Repeat	Repeat
22	INPUT	Home, Source	TV/Video, DTV	TV/LD, Input Select	Bypass, Input Select
23	EXTERNAL	External Source	External Antenna, Web	External AV Source, CDV, VCD, Karaoke	External AV Source
24	PLAY	Play	Play,	Play	Play
25	STOP	Stop	Stop,	Stop	Stop
26	PAUSE	Pause	Pause,	Pause	Pause
27	REWIND	Rewind, Close	Rewind,	Rewind	Rewind
28	FAST FORWARD	Fast Forward, Open	F.Forward,	Fast Forward	Fast Forward
29	RECORD	Record	Record	Future Pick	Record
30	SKIP FWD	Future Pick	Skip Up, Next,	Chapter/Skip Up	Skip Up
31	SKIP REVERSE	Future Pick	Skip Down, Previous	Chapter/Skip Down	Skip Down
32	LIVE	Future Pick	Future Pick	Intro, Search, Scan	Intro, Search, Scan
33	SOURCE MENU	Menu	Menu, Home	Menu, Program	Menu, Program

ZoN Audio

	STANDARD KEY LABELS & PHYSICAL KEY GROUPS	HOME (HVAC) (Lighting) (Blinds)	VIDEO ACCESSORY (HDTV Decoder)	LASER DISK (LD, VCD) (Karaoke)	AMPLIFIER & MISC. AUDIO
34	DEVICE MENU	Future Pick	Setup, Program, Options	Future Pick	Future Pick
35	GUIDE	Future Pick	Guide, View	Future Pick	Future Pick
36	EXIT	Exit, Cancel	Exit, Cancel, Go	Exit, Cancel	Exit, Cancel
37	BACK	Future Pick	Back	Future Pick	Clear
38	CURSOR UP	Menu Up, Mode	Menu Up	Menu Up	Menu Up, Adjust Up
39	CURSOR DOWN	Menu Down, Timer	Menu Down	Menu Down	Menu Down, Adjust Down
40	CURSOR LEFT	Menu Left, Oscillate	Menu Left	Menu Left	Menu Left
41	CURSOR RIGHT	Menu Right, Speed	Menu Right	Menu Right	Menu Right
Key #	STANDARD KEY LABELS & PHYSICAL KEY GROUPS	HOME (HVAC) (Lighting) (Blinds)	VIDEO ACCESSORY (HDTV Decoder)	LASER DISK (LD, VCD) (Karaoke)	AMPLIFIER & MISC. AUDIO
42	MENU SELECT	Menu Select, Light	Menu Select	Menu Select	Menu Select, Continue
43	PAGE UP	Future Pick	Page Up, Scroll Up	Disk Skip, Disk Up	Adjust Up
44	PAGE DOWN	Future Pick	Page Dn, Scroll Dn	Disk Down	Adjust Down
45	FAVORITE	Future Pick	Favorites	Mark	Future Pick
46	DISPLAY	Future Pick	Info, Display, OSD	Display, OSD, Info	Display, OSD, Info
47	FORMAT	Future Pick	Format, Wide, 16:9, Aspect	Future Pick	Future Pick
48	SAP	Future Pick	Language, MTS	Subtitle, CC	Future Pick
49	SURROUND	Future Pick	Future Pick	Audio	Surround Mode, Surround On/Off, Audio, Language
50	SLOW	All On	Future Pick	Slow	Future Pick
51	DELIMITER	All Off	Future Pick	Open/Close, Eject	Future Pick
52	RANDOM	Future Pick	Future Pick	Future Pick	Future Pick
53	PIP ON	Future Pick	PIP ON	Future Pick	Future Pick
54	PIP OFF	Future Pick	PIP OFF	Future Pick	Future Pick
55	PIP FREEZE	Future Pick	PIP FREEZE	Future Pick	Future Pick
56	PIP SWAP	Future Pick	PIP SWAP	Future Pick	Future Pick
57	PIP MOVE	Future Pick	PIP MOVE	Future Pick	Future Pick
58	PIP INPUT	Future Pick	PIP INPUT	Future Pick	Future Pick
59	PIP CHANNEL UP	Future Pick	PIP CHANNEL UP	Future Pick	Future Pick
60	PIP CHANNEL DOWN	Future Pick	PIP CHANNEL DOWN	Future Pick	Future Pick
61	PIP MULTI	Future Pick	PIP MULTI	Future Pick	Future Pick
62	DISCREET INPUT 1	Source/Scene 1	VID1, VIDEO, TVp1	VID1, Video TVp1	CD
63	DISCREET INPUT 2	Source/Scene 2	VID2, TVp2	VID2, TVp2	TUNER
64	DISCREET INPUT 3	Source/Scene 3	VID3, TVp3	VID3, TVp3	DVD, LD
65	DISCREET INPUT 4	Source/Scene 4	VID4, TVp4	VID4, TVp4	TAPE, MD
66	DISCREET INPUT 5	Source/Scene 5	VID5, AV1, VCR, BNC	VID5, AV1, VCR, BNC	VCR, VID1
67	DISCREET INPUT 6	Source/Scene 6	VID6, AV2, VDP, DVD,DVI	VID6, AV2, VDP, DVD,DVI	TV, VID2
68	DISCREET INPUT 7	Source/Scene 7	TV, COMPONENT	TV, COMPONENT	LD, VID3
69	DISCREET INPUT 8	Source/Scene 8	CAB, SAT, S-VIDEO	CAB, SAT, S-VIDEO	AUX, VID4
70	DISCREET INPUT 9	Source/Scene 9	AV, TUNER	AV, TUNER	DAT, CABLE
71	DISCREET INPUT 10	Source/Scene10	AUX, RGB	AUX, RGB	PHONO,SAT
72	FUTURE PICK 1	Future Pick	Future Pick	Future Pick	Future Pick
73	FUTURE PICK 2	Future Pick	Future Pick	Future Pick	Future Pick

ZoN Audio   12 April 2004

74	FUTURE PICK 3	Future Pick	Future Pick	Future Pick	Future Pick
75	FUTURE PICK 4	Future Pick	Future Pick	Future Pick	Future Pick
76	FUTURE PICK 5	Future Pick	Future Pick	Future Pick	Future Pick
77	FUTURE PICK 6	Future Pick	Future Pick	Future Pick	Future Pick
78	FUTURE PICK 7	Future Pick	Future Pick	Future Pick	Future Pick
79	FUTURE PICK 8	Future Pick	Future Pick	Future Pick	Future Pick
80	FUTURE PICK 9	Future Pick	Future Pick	Future Pick	Future Pick
81	FUTURE PICK 10	Future Pick	Future Pick	Future Pick	Future Pick

The following key chart shows the full key functionality for **North America Market.**

Note 1: If function is picked but device ID does not contain that function, then no IR will be picked, therefore the function will not exist for that particular device ID. These key location will be available for re-pick