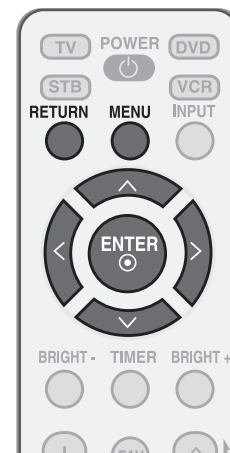


Digital Broadcasting System Captions

Choose the language you want the DTV/CADTV Captions to appear in.

Other Languages can be chosen for digital sources only if they are included on the program.

This function is only available when Caption Mode is set On.



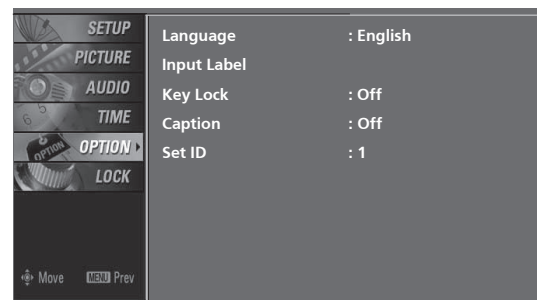
1 Press the **MENU** button and then use \wedge or \vee button to select the **OPTION** menu.

2 Press the $\>$ button and then use \wedge or \vee button to select **Caption**.

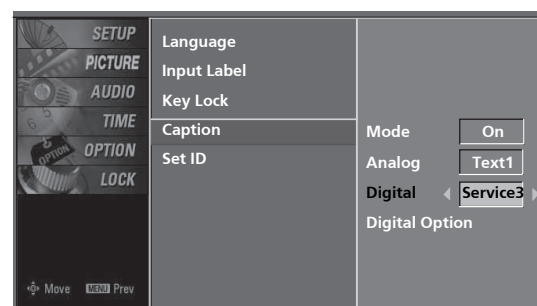
3 Press the $\>$ button and then use \wedge or \vee button to select **Digital**.

4 Use \leftarrow or \rightarrow button to select **Service1 ~ Service6**.

5 Press **RETURN** button to return to TV viewing or press **MENU** button to return to the previous menu.



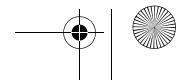
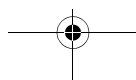
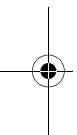
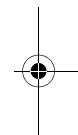
1

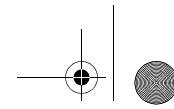


2 3 4



SOUND & LANGUAGE CONTROL





SOUND & LANGUAGE CONTROL

Caption Option

Customize the DTV/CADTV captions that appear on your screen.

This function is only available when **Caption Mode** is set **On**.

1 Press the **MENU** button and then use \wedge or \vee button to select the **OPTION** menu.

2 Press the $\>$ button and then use \wedge or \vee button to select **Caption**.

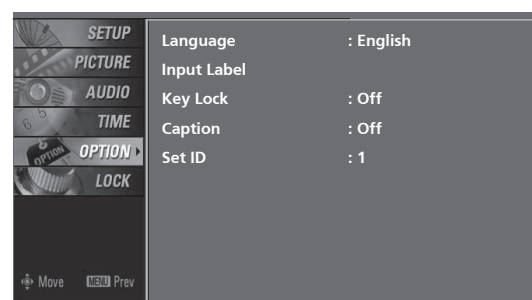
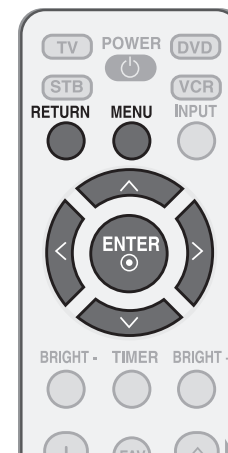
3 Press the $\>$ button and then use \wedge or \vee button to select **Digital Option**.

4 Press the $\>$ button and then use \leftarrow or \rightarrow button to select **Custom**.

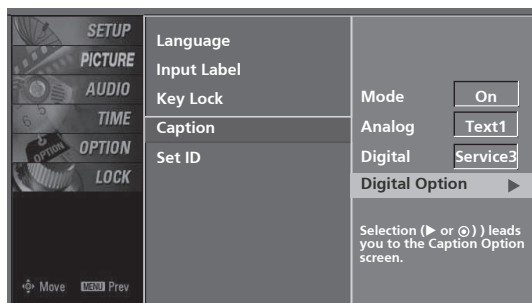
5 Use \wedge or \vee button to customize the **Style**, **Font**, etc., to your preference.
A preview icon is provided at the bottom of the screen, use it to see the caption language.

- **Size:** Set the word size.
- **Font:** Select a typeface for the text.
- **Text Color:** Choose a color for the text.
- **Text Opacity:** Specify the opacity for the text color.
- **Bg (Background) Color:** Select a background color.
- **Bg (Background) Opacity:** Select the opacity for the background color.
- **Edge Type:** Select an edge type.
- **Edge Color:** Select a color for the edges.

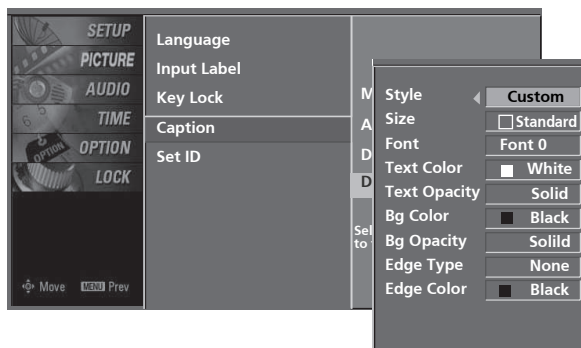
6 Press **RETURN** button to return to TV viewing or press **MENU** button to return to the previous menu.



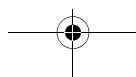
1



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4 5





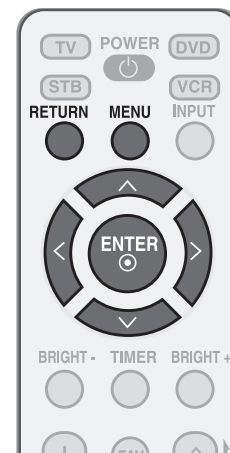
TIME SETTING

CLOCK SETTING

Auto Clock Setup

The time is set automatically from a digital channel signal. The digital channel signal includes information for the current time provided by the broadcasting station.

Set the clock manually if the current time is set incorrectly by the auto clock function.



1 Press the **MENU** button and then use \wedge or \vee button to select the **TIME** menu.

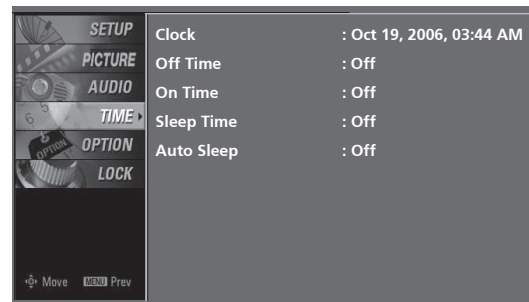
2 Press the $\>$ button and then use \wedge or \vee button to select **Clock**.

3 Press the $\>$ button and then use \wedge or \vee button to select **Auto**.

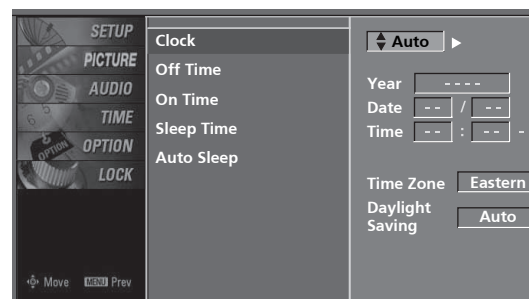
4 Press the $\>$ button and then use \wedge or \vee button to select your viewing area time zone: **Eastern, Central, Mountain, Pacific, Alaska or Hawaii**.

5 Press the $\>$ button and then use \wedge or \vee button to select **Auto, Off, On**, depending on whether or not your viewing area observes Daylight Saving time.

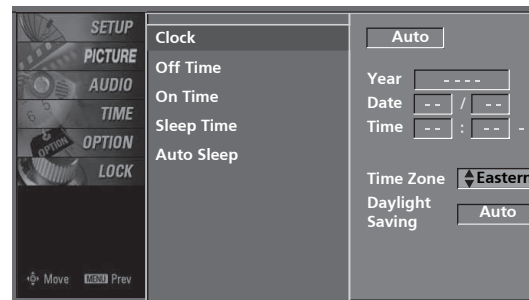
6 Press **RETURN** button to return to TV viewing or press **MENU** button to return to the previous menu.



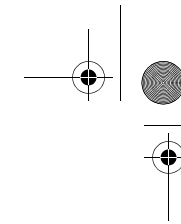
1



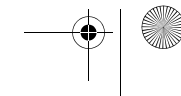
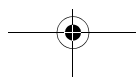
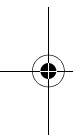
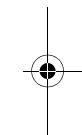
2 3

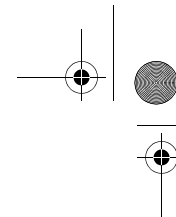


4 5



TIME SETTING

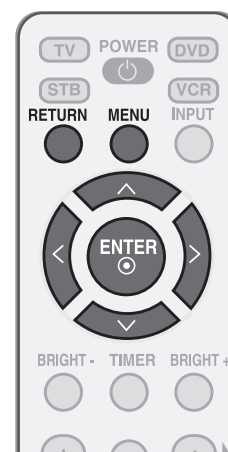




TIME SETTING

Manual Clock Setup

If the current time setting is wrong, reset the clock manually.



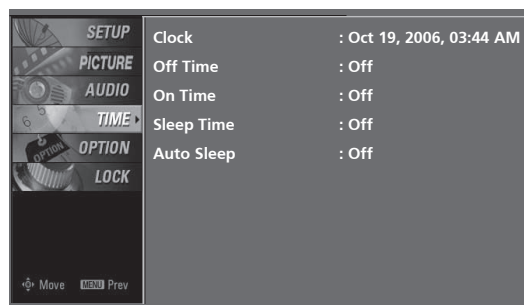
1 Press the **MENU** button and then use \wedge or \vee button to select the **TIME** menu.

2 Press the \triangleright button and then use \wedge or \vee button to select **Clock**.

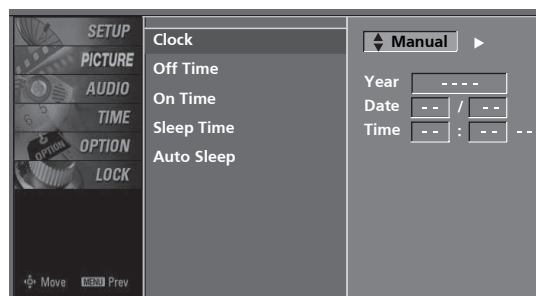
3 Press the \triangleright button and then use \wedge or \vee button to select **Manual**.

4 Press the \triangleright button and then use \langle or \triangleright button to select either the year, date, or time option. Once selected, use \wedge or \vee button to set the year, date, and time options.

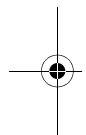
5 Press **RETURN** button to return to TV viewing or press **MENU** button to return to the previous menu.



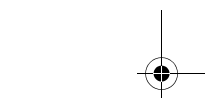
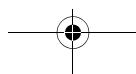
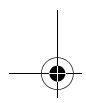
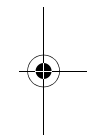
1



2 3



TIME SETTING

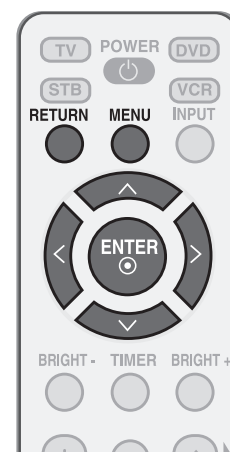




AUTO ON/OFF TIMER SETTING

This function operates only if the current time has been set. The **Off Time** function overrides the **On Time** function if they are both set to the same time.

The TV must be in standby mode for the **On Time** to work. If you do not press any button within 2 hours after the TV turns on with the **On Time** function, the TV will automatically revert to standby mode.



1 Press the **MENU** button and then use \wedge or \vee button to select the **TIME** menu.

2 Press the \triangleright button and then use \wedge or \vee button to select **Off Time** or **On Time**.

3 Press the \triangleright button and then use \wedge or \vee button to select **On**.
■ To cancel the **On/Off Time** function, select **Off**.

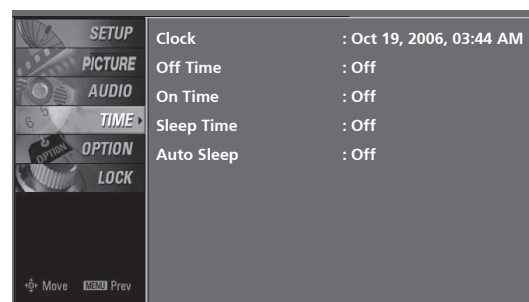
4 Press the \triangleright button and then use \wedge or \vee button to the hour.

5 Press the \triangleright button and then use \wedge or \vee button to the minutes.

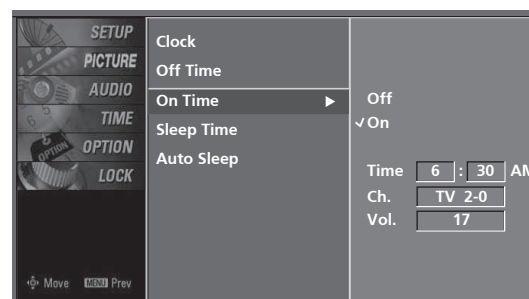
6 **Only On Time**
Press the \triangleright button and then use \wedge or \vee button to select the channel at turn-on.

Press the \triangleright button and then use \wedge or \vee button to the sound level at turn-on.

7 Press **RETURN** button to return to TV viewing or press **MENU** button to return to the previous menu.



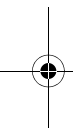
1

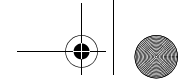


2 3 4 5 6



TIME SETTING



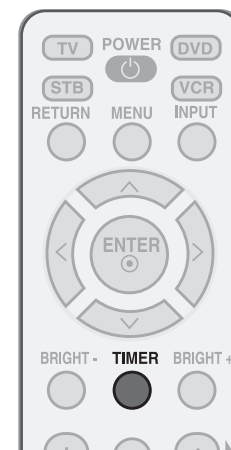


TIME SETTING



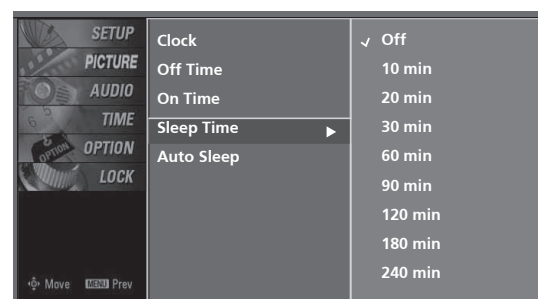
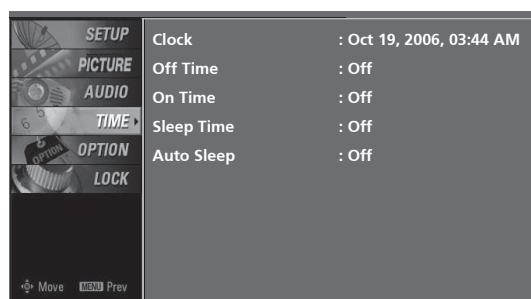
SLEEP TIME SETTING

The Sleep Time turns the TV off at the preset time.
Note that this setting is cleared when the TV is turned off.

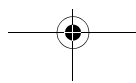
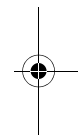
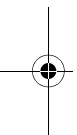


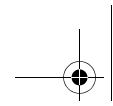
- 1 Press the **TIMER** button repeatedly to select the number of minutes. First the **Off** option appears on the screen, followed by the following sleep time options: 10, 20, 30, 60, 90, 120, 180, and 240 minutes.
- 2 When the number of minutes you want is displayed on the screen, press the **ENTER** button. The timer begins to count down from the number of minutes selected.
- 3 To check the remaining minutes before the TV turns off, press the **TIMER** button once.
- 4 To cancel the Sleep Time, press the **TIMER** button repeatedly to select **Off**.

■ You can also set up the **Sleep Time** in the **TIME** menu.



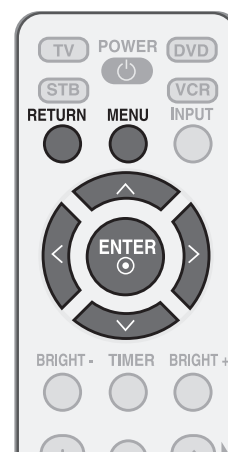
TIME SETTING





AUTO SHUT-OFF SETTING

TV will be automatically turned off, in case of no signal for 10 minutes.

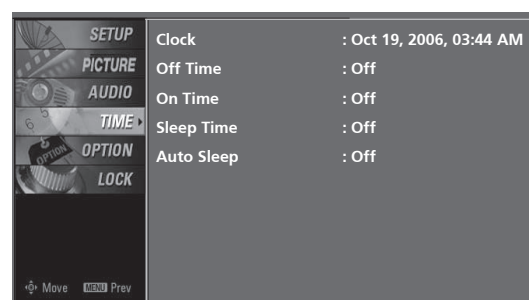


1 Press the **MENU** button and then use \wedge or \vee button to select the **TIME** menu.

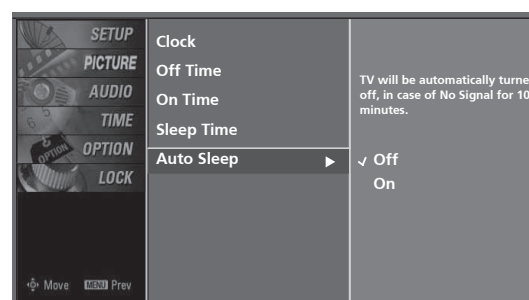
2 Press the $\>$ button and then use \wedge or \vee button to select **Auto Sleep**.

3 Press the $\>$ button and then use \wedge or \vee button to select **On** or **Off**.

4 Press **RETURN** button to return to TV viewing or press **MENU** button to return to the previous menu.



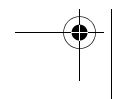
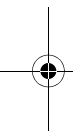
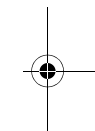
1

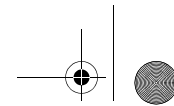


2 3



TIME SETTING





PARENTAL CONTROL / RATINGS

Parental Control can be used to block specific channels, ratings and other viewing sources.

The Parental Control Function (V-Chip) is used to block program viewing based on the ratings sent by the broadcasting station. The default setting is to allow all programs to be viewed.

Viewing can be blocked by choosing the type of the program and the categories. It is also possible to block all program viewing for a time period. To use this function, the following must be done:

1. Set ratings and categories to be blocked.
2. Specify a password.
3. Enable the lock.

V-Chip rating and categories

Rating guidelines are provided by broadcasting stations. Most television programs and television movies can be blocked by TV Rating and/or Individual Categories. Movies that have been shown at the theaters or direct-to-video movies use the Movie Rating System (MPAA) only.

Ratings for Television programs including made-for-TV movies:

- | | |
|---------------------------------------|----------------------------------|
| ■ TV-G (General audience) | ■ TV-MA (Mature audience only) |
| ■ TV-PG (Parental guidance suggested) | ■ TV-Y (All children) |
| ■ TV-14 (Parents strongly cautioned) | ■ TV-Y7 (Children 7 years older) |

SET PASSWORD & LOCK SYSTEM

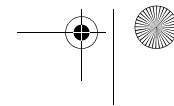
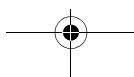
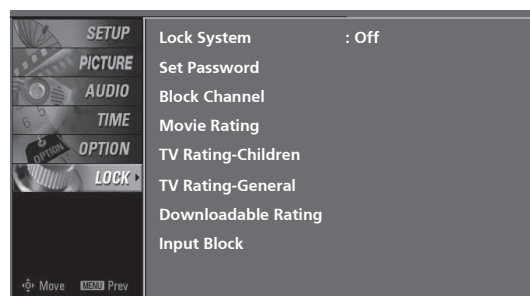
Setting up Your Password

Set up blocking schemes to block specific channels, ratings, and external viewing sources.

A password is required to gain access to this menu.

- 1 Press the **MENU** button and then use \wedge or \vee button to select the **LOCK** menu. Then, press the $\>$ button.

- Enter the password as requested.
- The TV is set up with the initial password "0-0-0-0".

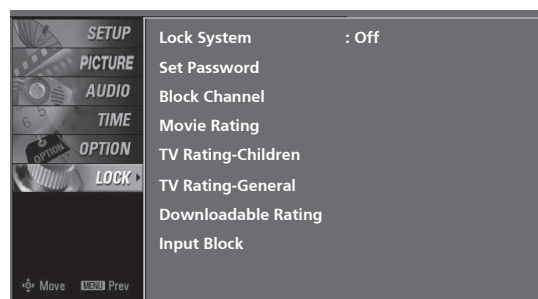




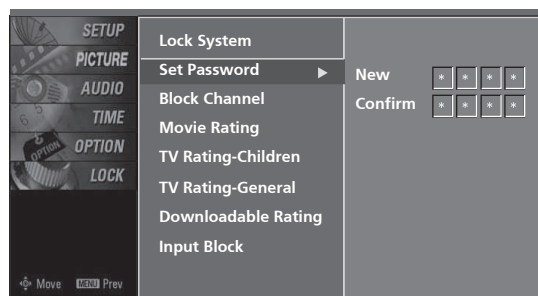
Set Password

Change the password by inputting a new password twice.

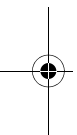
- 1 After inputting the password, use \wedge or \vee button to choose **Set Password**.
- 2 Press the $\>$ button and then choose any 4 digits for your new password.
As soon as the 4 digits are entered, re-enter the same 4 digits on the **Confirm**.
Then your changed password has been memorized.
- 3 Press **RETURN** button to return to TV viewing or press **MENU** button to return to the previous menu.



1



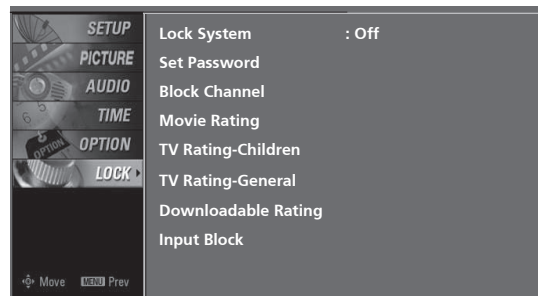
2



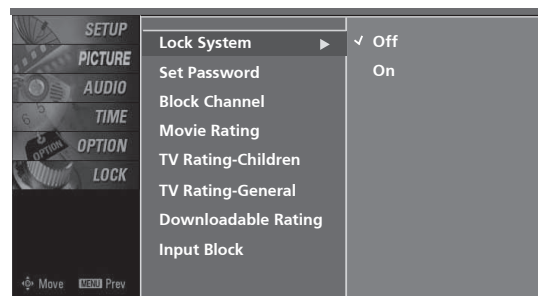
Lock System

Enables or disables the blocking scheme you set up previously.

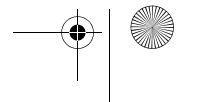
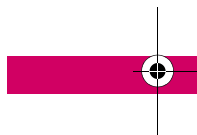
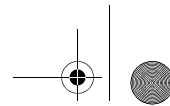
- 1 After inputting the password, use the \wedge or \vee button to choose **Lock System**.
- 2 Press the $\>$ button and then use the \wedge or \vee button to select **On** or **Off**.
 - When you select **On**, the Lock System is enable.
- 3 Press **RETURN** button to return to TV viewing or press **MENU** button to return to the previous menu.

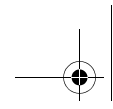


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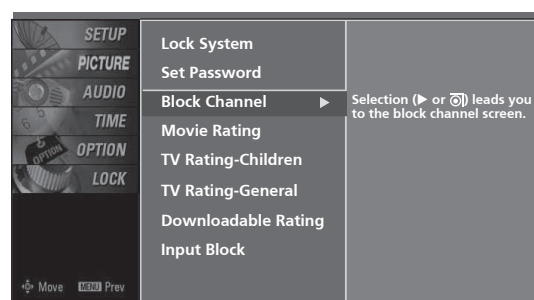


PARENTAL CONTROL / RATINGS

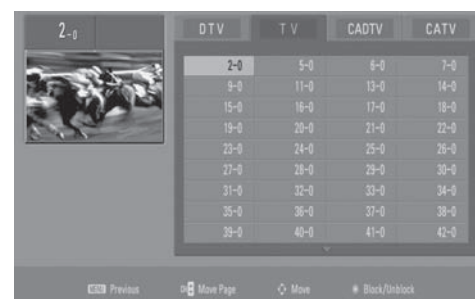
CHANNEL BLOCKING

Blocks any channels that you do not want to watch or that you do not want your children to watch.

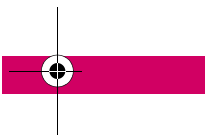
- 1 After inputting the password, use the **^** or **v** button to choose **Block Channel**.
- 2 Press the **>** button. You will now see a screen filled with channel numbers and a preview picture.
- 3 Use **^** **v** **<** **>** button to select a channel and then use the **ENTER** button to block or unblock it.
- 4 Press **RETURN** button to return to TV viewing or press **MENU** button to return to the previous menu.



1



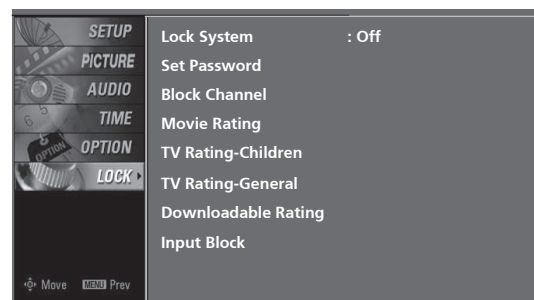
2 3



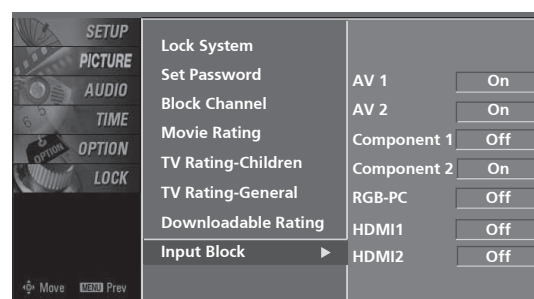
EXTERNAL INPUT BLOCKING

Enables you to block an input.

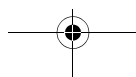
- 1 After inputting the password, use the **^** or **v** button to choose **Input Block**.
- 2 Press the **>** button and then use the **^** or **v** button select a source.
- 3 Use the **<** or **>** button to select **On** or **Off** on the each source.
- 4 Press **RETURN** button to return to TV viewing or press **MENU** button to return to the previous menu.

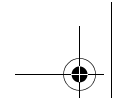


1



2 3



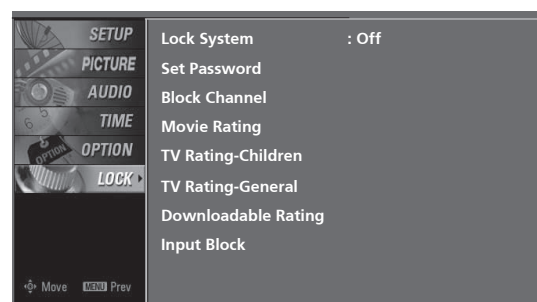


MOVIE & TV RATING

Movie Rating (MPAA)

Blocks movies according to the movie ratings limits specified, so children cannot view certain movies. You can set the ratings limit by blocking out all the movies with the ratings above a specified level. Keep in mind that the movie ratings limit only applies to movies shown on TV, not TV programs, such as soap operas.

1 After inputting the password, use the \wedge or \vee button to choose **Movie Rating**.

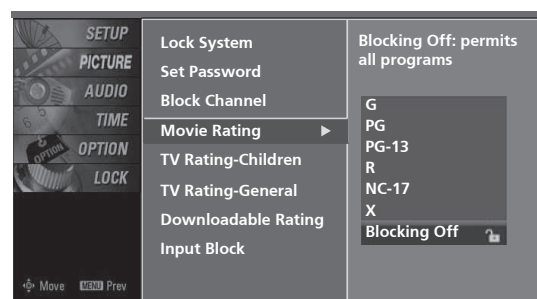


1

2 Press the $\>$ button and then use the \wedge or \vee button to select **G, PG, PG-13, R, NC-17** or **X**.

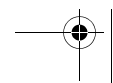
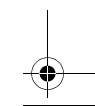
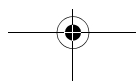
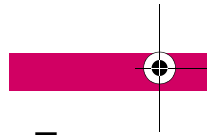
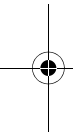
- G (General audience)
- PG (Parental guidance suggested)
- PG-13 (Parents strongly cautioned)
- R (Restricted)
- NC-17 (No one 17 and under admitted)
- X (Adult only)
- Blocking Off (Permits all programs)

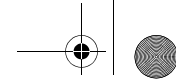
► If you set PG-13: G and PG movies will be available, PG-13, R, NC-17 and X will be blocked.



2

3 Press **RETURN** button to return to TV viewing or press **MENU** button to return to the previous menu.





PARENTAL CONTROL / RATINGS

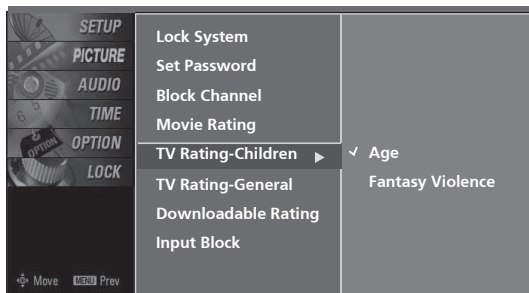
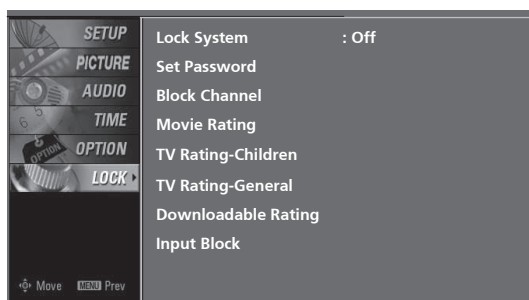
TV Rating Children

Prevents children from watching certain children's TV programs, according to the ratings limit set. The children rating does not apply to other TV programs. Unless you block certain TV programs intended for mature audiences in the TV Rating - sub menu, your children can view those programs.

- 1 After inputting the password, use the \wedge or \vee button to choose **TV Rating-Children**.

- 2 Press the $\>$ button and then use the \wedge or \vee button select **Age**, or **Fantasy Violence**.
Press the $\>$ button and then use the \wedge or \vee button select block options.
 - Age (applies to TV-Y, TV-Y7)
 - Fantasy Violence (applies to TV-Y7)

- 3 Press **RETURN** button to return to TV viewing or press **MENU** button to return to the previous menu.



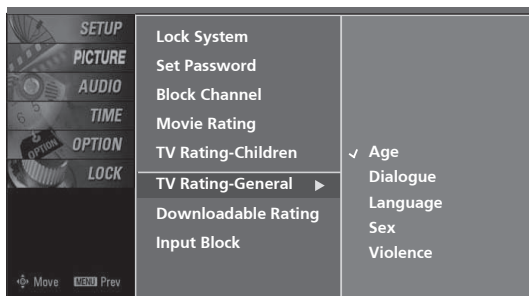
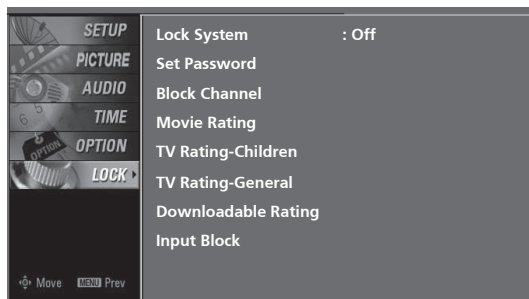
TV Rating General

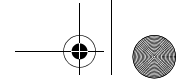
Based on the ratings, blocks certain TV programs that you and your family do not want to view.

- 1 After inputting the password, use the \wedge or \vee button to choose **TV Rating-General**.

- 2 Press the $\>$ button and then use the \wedge or \vee button to select **Age**, **Dialogue**, **Language**, **Sex** or **Violence**.
Press the $\>$ button and then use the \wedge or \vee button to select block options.
 - Age (applies to TV-G, TV-PG, TV-14, TV-MA)
 - Dialogue-sexual dialogue (applies to TV-PG, TV-14)
 - Language-adult language (applies to TV-PG, TV-14, TV-MA)
 - Sex-sexual situations (applies to TV-PG, TV-14, TV-MA)
 - Violence (applies to TV-PG, TV-14, TV-MA)

- 3 Press **RETURN** button to return to TV viewing or press **MENU** button to return to the previous menu.



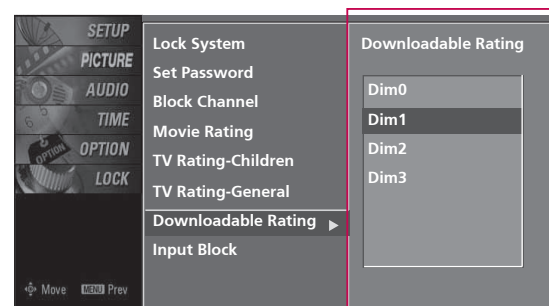
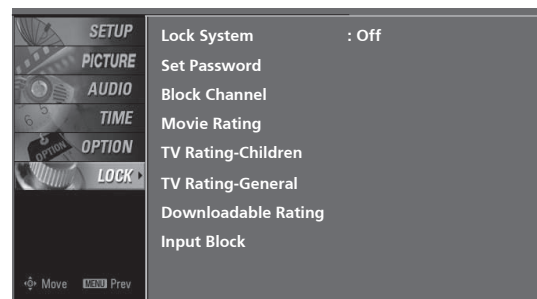


DOWNLOADABLE RATING

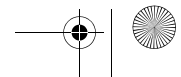
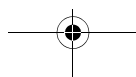
- 1 After inputting the password, use the \wedge or \vee button to choose **Downloadable Rating**.
- 2 Press the $\>$ button and then use the \wedge or \vee button to select **Dim0**, **Dim1**, **Dim2**, or **Dim3**.
- 3 Press the $\>$ button and then use the \wedge or \vee button to select **D1L1**, **D1L2**, or **D1L3**.
- 4 Press **RETURN** button to return to TV viewing or press **MENU** button to return to the previous menu.

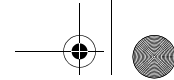
NOTE

- ▶ This function may become available in the future and will be available only for digital channels.
- ▶ This function operates only when TV has received Region5 Rating data.



- ▶ Based on rating table, your TV's OSD (On Screen Display) may differ slightly from what is shown in this manual.





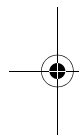
APPENDIX TROUBLESHOOTING

The operation does not work normally.

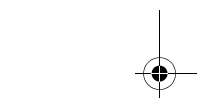
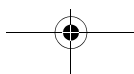
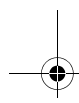
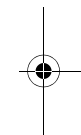
The remote control doesn't work	<ul style="list-style-type: none"> ■ Check to see if there is any object between the product and the remote control causing obstruction. Ensure you are pointing the remote control directly at the TV. ■ Ensure that the batteries are installed with correct polarity (+ to +, - to -). ■ Ensure that the correct remote operating mode is set: TV, VCR etc. ■ Install new batteries.
Power is suddenly turned off	<ul style="list-style-type: none"> ■ Is the sleep timer set? ■ Check the power control settings. Power interrupted.

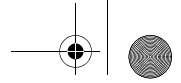
The video function does not work.

No picture & No sound	<ul style="list-style-type: none"> ■ Check whether the product is turned on. ■ Try another channel. The problem may be with the broadcast. ■ Is the power cord inserted into wall power outlet? ■ Check your antenna direction and/or location. ■ Test the wall power outlet, plug another product's power cord into the outlet where the product's power cord was plugged in.
Picture appears slowly after switching on	<ul style="list-style-type: none"> ■ This is normal, the image is muted during the product startup process. Please contact your service center, if the picture has not appeared after five minutes.
No or poor color or poor picture	<ul style="list-style-type: none"> ■ Adjust Color in menu option. ■ Keep a sufficient distance between the product and the VCR. ■ Try another channel. The problem may be with the broadcast. ■ Are the video cables installed properly? ■ Activate any function to restore the brightness of the picture.
Horizontal/vertical bars or picture shaking	<ul style="list-style-type: none"> ■ Check for local interference such as an electrical appliance or power tool.
Poor reception on some channels	<ul style="list-style-type: none"> ■ Station or cable product experiencing problems, tune to another station. ■ Station signal is weak, reorient antenna to receive weaker station. ■ Check for sources of possible interference.
Lines or streaks in pictures	<ul style="list-style-type: none"> ■ Check antenna (Change the direction of the antenna).



APPENDIX



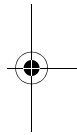
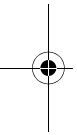


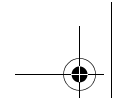
The audio function does not work.

Picture OK & No sound	<ul style="list-style-type: none"> ■ Press the VOL or VOLUME button. ■ Sound muted? Press MUTE button. ■ Try another channel. The problem may be with the broadcast. ■ Are the audio cables installed properly?
No output from one of the speakers	<ul style="list-style-type: none"> ■ Adjust Balance in menu option.
Unusual sound from inside the product	<ul style="list-style-type: none"> ■ A change in ambient humidity or temperature may result in an unusual noise when the product is turned on or off and does not indicate a fault with the product.

There is a problem in PC mode. (Only PC mode applied)

The signal is out of range	<ul style="list-style-type: none"> ■ Adjust resolution, horizontal frequency, or vertical frequency. ■ Check the input source.
Vertical bar or stripe on background & Horizontal Noise & Incorrect position	<ul style="list-style-type: none"> ■ Work the Auto configure or adjust clock, phase, or H/V position. (Option)
Screen color is unstable or single color	<ul style="list-style-type: none"> ■ Check the signal cable. ■ Reinstall the PC video card.





APPENDIX

MAINTENANCE

Early malfunctions can be prevented. Careful and regular cleaning can extend the amount of time you can enjoy your new TV.

Caution: Be sure to turn the power off and unplug the power cord before you begin any cleaning.

Cleaning the Screen

- 1 Here's a great way to keep the dust off your screen for a while. Wet a soft cloth in a mixture of lukewarm water and a little fabric softener or dish washing detergent. Wring the cloth until it's almost dry, and then use it to wipe the screen.
- 2 Make sure the excess water is off the screen, and then let it air-dry before you turn on your TV.

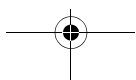
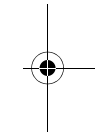
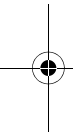
Cleaning the Cabinet

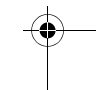
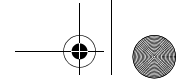
- To remove dirt or dust, wipe the cabinet with a soft, dry, lint-free cloth.
- Please be sure not to use a wet cloth.

Extended Absence

⚠ CAUTION

- ▶ If you expect to leave your TV dormant for a long time (such as a vacation), it's a good idea to unplug the power cord to protect against possible damage from lightning or power surges.

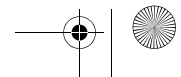
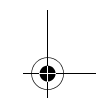
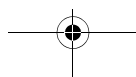
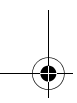
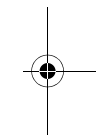
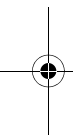


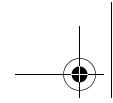


PRODUCT SPECIFICATIONS

MODELS		Z32LC6D (Z32LC6D-UK, Z32LC6D-UM)	Z37LC6D (Z37LC6D-UK, Z37LC6D-UM)
Dimensions (Width x Height x Depth)	Including stand	31.7 x 23.5 x 10.7 inches 806.4 x 598.9 x 273.9 mm	36.7 x 26.6 x 11.2 inches 934.3 x 675.9 x 285.6 mm
	Excluding stand	31.7 x 21.3 x 3.1 inches 806.4 x 542.4 x 79.0 mm	36.7 x 24.7 x 3.4 inches 934.3 x 628.5 x 88.5 mm
Weight	Including stand	29.9 pounds / 13.6 kg	41.8 pounds / 19.0 kg
	Excluding stand	26.0 pounds / 11.8 kg	37.0 pounds / 16.8 kg
Power requirement	AC100-240V ~ 50/60Hz		
Television System	NTSC-M, ATSC, 64 & 256 QAM		
Program Coverage	VHF 2-13, UHF 14-69, CATV 1-135, DTV 2-69, CADTV 1-135		
External Antenna Impedance	75 ohm		
Environment condition	Operating Temperature	32 ~ 104°F (0 ~ 40°C)	
	Operating Humidity	Less than 80%	
	Storage Temperature	-4 ~ 140°F (-20 ~ 60°C)	
	Storage Humidity	Less than 85%	

■ The specifications shown above may be changed without prior notice for quality improvement.





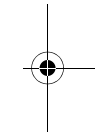
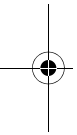
APPENDIX

PROGRAMMING THE REMOTE CONTROL

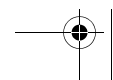
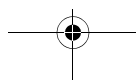
The provided universal remote control can be programmed to operate most remote-controllable devices. Note that the remote may not control all models of other brands.

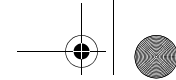
Programming a code into a remote mode

- 1** To find out whether your remote control can operate each device without programming, turn on the device (such as a VCR) and press the corresponding mode button on the remote. After that, press the **POWER** button. If the device is turned off and it responds properly the remote control need not be programmed. If not, the remote should be programmed to operate the device. The programming procedures are explained below.
- 2** Press the **MENU** and **MUTE** button continuously at the same time for two seconds; the currently selected device button is illuminated. If you don't press any button for 20 seconds, the light on the mode button will be turned off. In that case, you have to repeat from step 2.
- 3** Enter the appropriate code from the code table on the following pages. When pressing the button, the light blinks at a time. If the device turned off, the programming is successful.
- 4** Press the **MENU** button to store the code. After blinking twice, this code is stored.
- 5** Test the remote control functions to see if the device responds properly. If not, steps 2-5.



APPENDIX

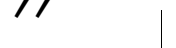


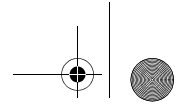


Remote Control Code

VCR

Brand	Codes	Brand	Codes	Brand	Codes
AIWA	034	MAGNAVOX	031 033 034 041	SAMSUNG	032 040 102 104
AKAI	016 043 046 124		067 068		105 107 109 112
	125 146	MARANTZ	012 031 033 067		113 115 120 122
AMPRO	072		069		125
ANAM	031 033 103	MARTA	101	SANSUI	022 043 048 135
AUDIO DYNAMICS	012 023 039 043	MATSUI	027 030	SANYO	003 007 010 014
BROKSONIC	035 037 129	MEI	031 033		102 134
CANON	028 031 033	MEMOREX	003 010 014 031	SCOTT	017 037 112 129
CAPEHART	108		033 034 053 072		131
CRAIG	003 040 135		101 102 134 139	SEARS	003 008 009 010
CURTIS MATHES	031 033 041	MGA	045 046 059		013 014 017 020
DAEWOO	005 007 010 064	MINOLTA	013 020		031 042 073 081
	065 108 110 111	MITSUBISHI	013 020 045 046	SHARP	031 054 149
	112 116 117 119		049 051 059 061	SHINTOM	024
DAYTRON	108		151	SONY	003 009 031 052
DBX	012 023 039 043	MTC	034 040		056 057 058 076
DYNATECH	034 053	MULTITECH	024 034		077 078 149
ELECTROHOME	059	NEC	012 023 039 043	SOUNDESIGN	034
EMERSON	006 017 025 027		048	STS	013
	029 031 034 035	NORDMENDE	043	SYLVANIA	031 033 034 059
	036 037 046 101	OPTONICA	053 054		067
	129 131 138 153	PANASONIC	066 070 074 083	SYMPHONIC	034
FISHER	003 008 009 010		133 140 145	TANDY	010 034
FUNAI	034	PENTAX	013 020 031 033	TATUNG	039 043
GE	031 033 063 072		063	TEAC	034 039 043
	107 109 144 147	PHILCO	031 034 067	TECHNICS	031 033 070
GO VIDEO	132 136	PHILIPS	031 033 034 054	TEKNIKA	019 031 033 034
HARMAN KARDON	012 045		067 071 101		101
HITACHI	004 018 026 034	PILOT	101	THOMAS	034
	043 063 137 150	PIONEER	013 021 048	TMK	006
INSTANTREPLAY	031 033	PORTLAND	108	TOSHIBA	008 013 042 047
JCL	031 033	PULSAR	072		059 082 112 131
JCPENNY	012 013 015 033	QUARTZ	011 014	TOTEVISION	040 101
	040 066 101	QUASAR	033 066 075 145	UNITECH	040
JENSEN	043	RCA	013 020 033 034	VECTOR RESEARCH	012
JVC	012 031 033 043		040 041 062 063	VICTOR	048
	048 050 055 060		107 109 140 144	VIDEO CONCEPTS	012 034 046
	130 150 152		145 147	VIDEOSONIC	040
KENWOOD	014 034 039 043	REALISTIC	003 008 010 014	WARDS	003 013 017 024
	047 048		031 033 034 040		031 033 034 040
LG (GOLDSTAR)	001 012 013 020		053 054 101		053 054 131
	101 106 114 123	RICO	058	YAMAHA	012 034 039 043
LLOYD	034	RUNCO	148	ZENITH	034 048 056
LXI	003 009 013 014	SALORA	014		058 072 080 101
	017 034 101 106				
MAGIN	040				





APPENDIX

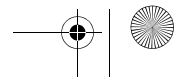
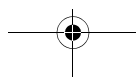
HDSTB

Brand	Codes	Brand	Codes	Brand	Codes
ALPHASTAR DSR	123	HOUSTON TRACKER	033 037 039 051	PROSAT	072
AMPLICA	050		057 104	RCA	066 106
BIRDVIEW	051 126 129	HUGHES	068	REALISTIC	043 074
CHANNEL MASTER	013 014 015 018	JANIEL	060 147	SAMSUNG	123
	036 055	JERROLD	061	SATELLITE SERVICE CO	028 035 047 057
CHAPARRAL	008 009 012 077	KATHREIN	108		085
CITOH	054	LEGEND	057	SCIENTIFIC ATLANTA	032 138
CURTIS MATHES	050 145	LG	001	SONY	103
DRAKE	005 006 007 010	LUTRON	132	STARCAST	041
	011 052 112 116	LUXOR	062 144	SUPER GUIDE	020 124 125
	141	MACOM	010 059 063 064	TEECOM	023 026 075 087
DX ANTENNA	024 046 056 076		065		088 090 107 130
ECHOSTAR	038 040 057 058	MEMOREX	057		137
	093 094 095 096	NEXTWAVE	028 124 125	TOSHIBA	002 127
	097 098 099 100	NORSAT	069 070	UNIDEN	016 025 042 043
	122	PACE SKY SATELLITE	143		044 045 048 049
ELECTRO HOME	089	PANASONIC	060 142		078 079 080 086
EUROPLUS	114	PANSAT	121		101 135 136
FUJITSU	017 021 022 027	PERSONAL CABLE	117	VIEWSTAR	115
	133 134	PHILIPS	071	WINEGARD	128 146
GENERAL INSTRUMENT	003 004 016 029	PICO	105	ZENITH	081 082 083 084
	031 059 101	PRESIDENT	019 102		091 120
HITACHI	139 140	PRIMESTAR	030 110 111		

APPENDIX

DVD

Brand	Codes	Brand	Codes	Brand	Codes
APEX DIGITAL	022	mitsubishi	002	RCA	005 006
DENON	020 014	NAD	023	SAMSUNG	011 015
GE	005 006	ONKYO	008 017	SONY	007
HARMAN KARDON	027	PANASONIC	003 009	THOMPSON	005 006
JVC	012	PHILIPS	013	TOSHIBA	019 008
LG	001 010 016 025	PIONEER	004 026	YAMAHA	009 018
MAGNAVOX	013	PROCEED	021	ZENITH	010 016 025
MARANTZ	024	PROSCAN	005 006		



IR CODES

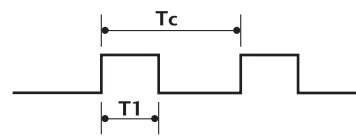
1. How to Connect

- Connect your wired remote control to the Remote Control port on the TV.

2. Remote Control IR Codes

■ Output waveform

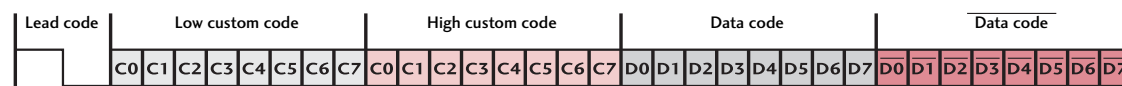
Single pulse, modulated with 37.917KHz signal at 455KHz



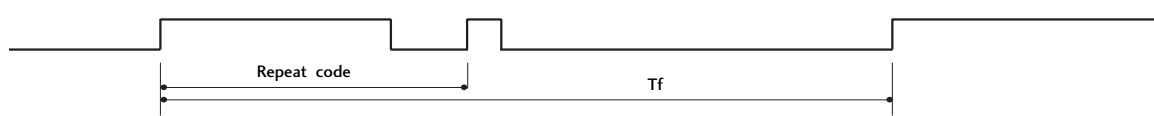
Carrier frequency
 $FCAR = 1/T_C = f_{OSC}/12$
 Duty ratio = $T_1/T_C = 1/3$

■ Configuration of frame

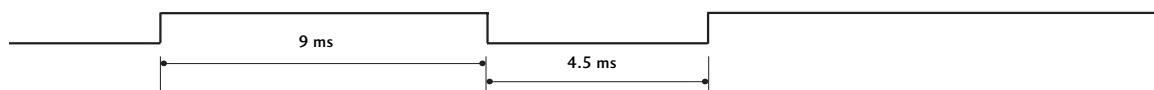
1st frame



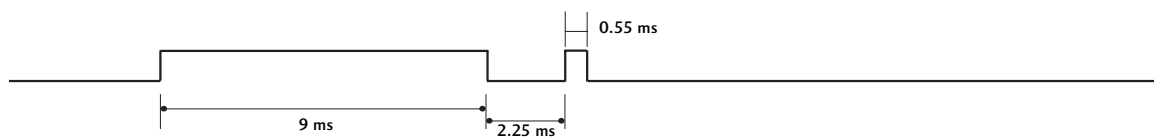
Repeat frame



■ Lead code



■ Repeat code

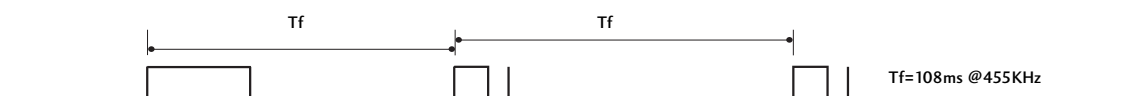


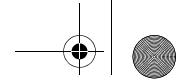
■ Bit description



■ Frame interval: T_f

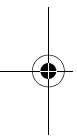
The waveform is transmitted as long as a key is depressed.



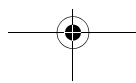
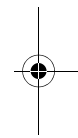


APPENDIX

Code (Hexa)	Function	Note
08	POWER	Remote control Button (Power On/Off)
43	MENU	Remote control Button
0B	INPUT	Remote control Button
10-19	Number Key 0-9	Remote control Button
4C	- (Dash)	Remote control Button
1A	FLASHBK	Remote control Button
09	MUTE	Remote control Button
02	VOL +	Remote control Button
03	VOL -	Remote control Button
00	CH ^	Remote control Button
01	CH v	Remote control Button
1E	FAV	Remote control Button
40	^	Remote control Button
41	v	Remote control Button
07	<	Remote control Button
06	>	Remote control Button
44	ENTER	Remote control Button
5B	RETURN	Remote control Button
E0	BRIGHT +	Remote control Button
E1	BRIGHT -	Remote control Button
0E	TIMER	Remote control Button
CB	ADJUST	Remote control Button
79	RATIO	Remote control Button
4D	PICTURE	Remote control Button
52	SOUND	Remote control Button
0A	SAP	Remote control Button
39	CC	Remote control Button



APPENDIX

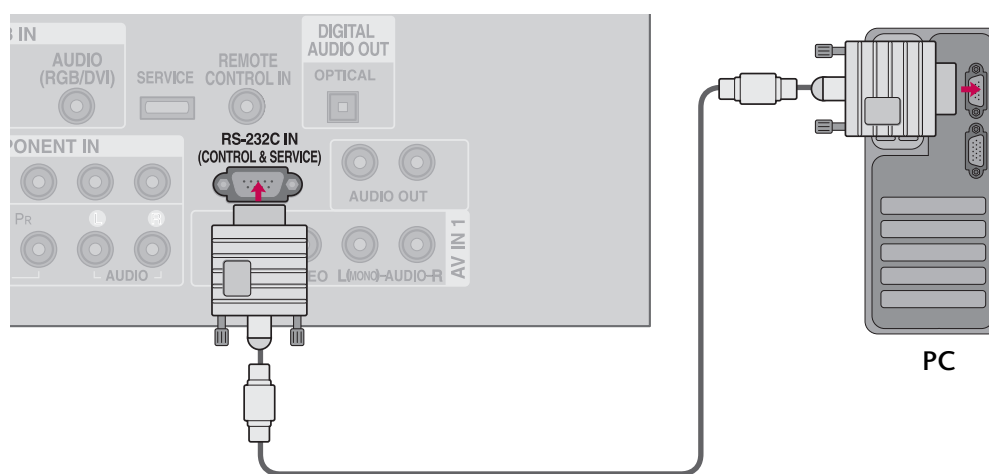


EXTERNAL CONTROL THROUGH RS-232C

The RS-232C port allows you connect the RS-232C input jack to an external control device (such as a computer or an A/V control system) to control the TV's functions externally.

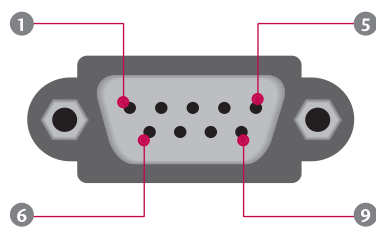
- Note: RS-232C on this unit is intended to be used with third party RS-232C control hardware and software. The instructions below are provided to help with programming software or to test functionality using telenet software.

RS-232C Setup



Type of Connector; D-Sub 9-Pin Male

No.	Pin Name
1	No connection
2	RXD (Receive data)
3	TXD (Transmit data)
4	DTR (DTE side ready)
5	GND
6	DSR (DCE side ready)
7	RTS (Ready to send)
8	CTS (Clear to send)
9	No Connection



APPENDIX

RS-232C Configurations

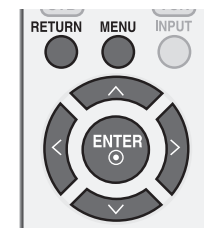
Either cable below can be used.

7-Wire Configuration (Serial female-female NULL modem cable)			
	PC	TV	
RXD	2	3	TXD
TXD	3	2	RXD
GND	5	5	GND
DTR	4	6	DSR
DSR	6	4	DTR
RTS	7	8	CTS
CTS	8	7	RTS
	D-Sub 9	D-Sub 9	

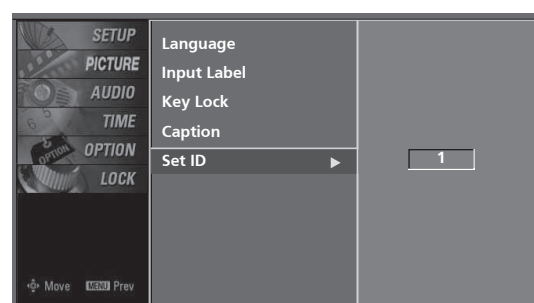
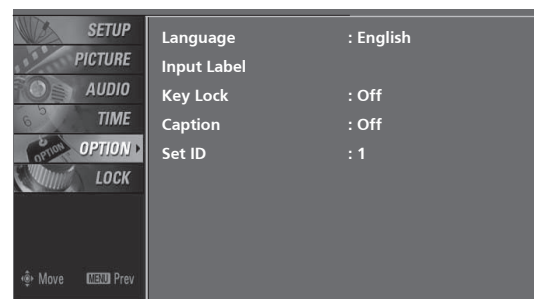
3-Wire Configurations (Not standard)			
	PC	TV	
RXD	2	3	TXD
TXD	3	2	RXD
GND	5	5	GND
DTR	4	6	DTR
DSR	6	4	DSR
RTS	7	7	RTS
CTS	8	8	CTS
	D-Sub 9	D-Sub 9	

Set ID

Use this function to specify a TV ID number.
Refer to 'Real Data Mapping1'. ▶p.85.



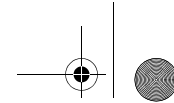
- 1 Press the **MENU** button and then use \wedge or \vee button to select the **OPTION** menu.
- 2 Press the $\>$ button and then use \wedge or \vee button to select **Set ID**.
- 3 Press the $\>$ button and then use \wedge or \vee button to adjust **Set ID** to choose the desired TV ID number. The adjustment range of Set ID is 1~99.
- 4 Press **RETURN** button to return to TV viewing or press **MENU** button to return to the previous menu.



Communication Parameters

- Baud rate: 9600 bps (UART)
- Data length: 8 bits
- Parity: None
- Stop bit: 1 bit
- Communication code: ASCII code
- Use a crossed (reverse) cable.

NOTE ▶ This product has command echo back in the RS-232C Command.



Command Reference List

	COMMAND1	COMMAND2	DATA (Hexadecimal)		COMMAND1	COMMAND2	DATA (Hexadecimal)
01. Power	k	a	0 ~ 1	15. Treble	k	r	0 ~ 64
02. Input Select	k	b	(▶ p.84)	16. Bass	k	s	0 ~ 64
03. Input Select	x	b	(▶ p.84)	17. Balance	k	t	0 ~ 64
04. Aspect Ratio	k	c	(▶ p.84)	18. Color Temperature	k	u	0 ~ 3
05. Screen Mute	k	d	0 ~ 1	19. Red Adjustment	k	v	0 ~ C8
06. Volume Mute	k	e	0 ~ 1	20. Green Adjustment	k	w	0 ~ C8
07. Volume Control	k	f	0 ~ 64	21. Blue Adjustment	k	\$	0 ~ C8
08. Contrast	k	g	0 ~ 64	23. Channel Add/Del	m	b	0 ~ 1
09. Brightness	k	h	0 ~ 64	24. Key	m	c	(▶ p.87)
10. Color	k	i	0 ~ 64	25. Back Light	m	g	0 ~ 64
11. Tint	k	j	0 ~ 64				
12. Sharpness	k	k	0 ~ 64				
13. OSD Select	k	l	0 ~ 1				
14. Remote Control Lock Mode	k	m	0 ~ 1				

	COMMAND1	COMMAND2	DATA0 (Hexadecimal)	DATA1 (Hexadecimal)	DATA2 (Hexadecimal)	DATA3 (Hexadecimal)	DATA4 (Hexadecimal)	DATA5 (Hexadecimal)
22. Channel Tuning	m	a	physical program high	major program low	major low	minor high	minor low	attribute

Transmission / Receiving Protocol

Transmission

[Command1][Command2][][Set ID][][Data][Cr]

[Command 1]: First command to control the set. (j, k, m or x)

[Command 2]: Second command to control the set.

[Set ID]: You can adjust the set ID to choose desired TV ID number in Setup menu. Adjustment range is 1 ~ 99. When selecting Set ID '0', every connected the TV is controlled. Set ID is indicated as decimal (1 ~ 99) on menu and as Hexa decimal (0x0 ~ 0x63) on transmission /receiving protocol.

[DATA]: To transmit the command data.

Transmit the 'FF' data to read status of command.

[Cr]: Carriage Return

ASCII code '0x0D'

[]: ASCII code 'space (0x20)'

* In this model, TV will not send the status during the standby mode.

OK Acknowledgement

[Command2][][Set ID][][OK][Data][x]

The TV transmits ACK (acknowledgement) based on this format when receiving normal data. At this time, if the data is data read mode, it indicates present status data. If the data is data write mode, it returns the data of the PC computer.

* In this model, TV will not send the status during the standby mode.

* Data Format

[Command 2]: Use as command.

[Set ID]: Use the small character, if set ID is 10, it will send the '0', 'a'.

[DATA]: Use the small character, if data is 0 x ab, it will send the 'a', 'b'.

[OK]: Use the large character.

Error Acknowledgement

[Command2][][Set ID][][NG][Data][x]

The TV transmits ACK (acknowledgement) based on this format when receiving abnormal data from non-viable functions or communication errors.

Data1: Illegal Code

Data2: Not supported function

Data3: Wait more time

* In this model, TV will not send the status during the standby mode.

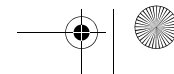
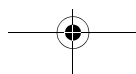
* Data Format

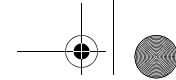
[Command 2]: Use as command.

[Set ID]: Use the small character, if set ID is 10, it will send the '0', 'a'.

[DATA]: Use the small character, if data is 0 x ab, it will send the 'a', 'b'.

[OK]: Use the large character.





APPENDIX

01. Power (Command: k a)

To control Power On/Off of the TV.

Transmission [k][a][][Set ID][][Data][Cr]

Data 0: Power Off Data 1: Power On

Acknowledgement [a][][Set ID][][OK/NG][Data][x]

* In a like manner, if other functions transmit 'FF' data based on this format, Acknowledgement data feedback presents status about each function.

* Note: In this model, TV will send the Acknowledge after power on processing completion.

There might be a time delay between command and acknowledge.

02. Input Select (Command: k b) (Main Picture Input)

To select input source for the TV.

Transmission [k][b][][Set ID][][Data][Cr]

Data 0: DTV Data 1: Analog
Data 2: AV 1 Data 3: AV 2
Data 4: Component 1 Data 5: Component 2
Data 7: RGB-PC Data 8: HDMI1
Data 9: HDMI2

Acknowledgement [b][][Set ID][][OK/NG][Data][x]

* If you select input source, we recommend "command x b".

03. Input Select (Command: x b)

To select input source for TV.

Transmission [x][b][][Set ID][][Data][Cr]

Data 00: DTV (Antenna) Data 01: DTV (Cable)
Data 10: Analog (Antenna) Data 11: Analog (Cable)
Data 20: AV 1 Data 21: AV 2
Data 40: Component 1 Data 41: Component 2
Data 60: RGB-PC Data 90: HDMI1
Data 91: HDMI2

Acknowledgement [b][][Set ID][][OK/NG][Data][x]

04. Aspect Ratio (Command: k c)

To adjust the screen format.

You can also adjust the screen format using the RATIO button on remote control or in the PICTURE menu.

Transmission [k][c][][Set ID][][Data][Cr]

Data 1: 4:3 5: Zoom 2
2: 16:9 6: Set by program
4: Zoom 1 9: Just Scan
:
Reserved

Acknowledgement [c][][Set ID][][OK/NG][Data][x]

05. Screen Mute (Command: k d)

To select screen mute on/off.

Transmission [k][d][][Set ID][][Data][Cr]

Data 0: Screen mute off (Picture on)
Data 1: Screen mute on (Picture off)

Acknowledgement [d][][Set ID][][OK/NG][Data][x]

06. Volume Mute (Command: k e)

To control volume mute on/off.

You can also adjust mute using the MUTE button on remote control.

Transmission [k][e][][Set ID][][Data][Cr]

Data 0: Volume mute on (Volume off)
Data 1: Volume mute off (Volume on)

Acknowledgement [e][][Set ID][][OK/NG][Data][x]

07. Volume Control (Command: k f)

To adjust volume.

You can also adjust volume with the volume buttons on remote control.

Transmission [k][f][][Set ID][][Data][Cr]

Data Min: 0 ~ Max: 64 (*transmit by Hexadecimal code)

* Refer to 'Real data mapping 1'. See page 85.

Acknowledgement [f][][Set ID][][OK/NG][Data][x]

08. Contrast (Command: k g)

To adjust screen contrast.

You can also adjust contrast in the PICTURE menu.

Transmission [k][g][][Set ID][][Data][Cr]

Data Min: 0 ~ Max: 64 (*transmit by Hexadecimal code)

* Refer to 'Real data mapping 1'. See page 85.

Acknowledgement [g][][Set ID][][OK/NG][Data][x]

09. Brightness (Command: k h)

To adjust screen brightness.

You can also adjust brightness in the PICTURE menu.

Transmission [k][h][][Set ID][][Data][Cr]

Data Min: 0 ~ Max: 64 (*transmit by Hexadecimal code)

* Refer to 'Real data mapping 1'. See page 85.

Acknowledgement [h][][Set ID][][OK/NG][Data][x]



**10. Color (Command: k i)**

To adjust screen color.

You can also adjust color in the PICTURE menu.

Transmission [k][i][][Set ID][][Data][Cr]

Data Min: 0 ~ Max: 64 (*transmit by Hexadecimal code)

* Refer to 'Real data mapping 1' as shown below.

Acknowledgement [i][][Set ID][][OK/NG][Data][x]

11. Tint (Command: k j)

To adjust screen tint.

You can also adjust tint in the PICTURE menu.

Transmission [k][j][][Set ID][][Data][Cr]

Data Red: 0 ~ Green: 64 (*transmit by Hexadecimal code)

* Refer to 'Real data mapping 1' as shown below.

Acknowledgement [j][][Set ID][][OK/NG][Data][x]

12. Sharpness (Command: k k)

To adjust screen sharpness.

You can also adjust sharpness in the PICTURE menu.

Transmission [k][k][][Set ID][][Data][Cr]

Data Min: 0 ~ Max: 64 (*transmit by Hexadecimal code)

* Refer to 'Real data mapping 1' as shown below.

Acknowledgement [k][][Set ID][][OK/NG][Data][x]

13. OSD Select (Command: k l)

To select OSD (On Screen Display) on/off.

Transmission [k][l][][Set ID][][Data][Cr]

Data 0: OSD off Data 1: OSD on

Acknowledgement [l][][Set ID][][OK/NG][Data][x]

14. Remote Control Lock Mode (Command: k m)

To lock the remote control and the front panel controls on the set.

Transmission [k][m][][Set ID][][Data][Cr]

Data 0: Lock off Data 1: Lock on

Acknowledgement [m][][Set ID][][OK/NG][Data][x]

If you're not using the remote control and front panel controls on the TV, use this mode. When main power is on/off, remote control lock is released.

15. Treble (Command: k r)

To adjust treble.

You can also adjust treble in the AUDIO menu.

Transmission [k][r][][Set ID][][Data][Cr]

Data Min: 0 ~ Max: 64 (*transmit by Hexadecimal code)

* Refer to 'Real data mapping 1' as shown.

Acknowledgement [r][][Set ID][][OK/NG][Data][x]

16. Bass (Command: k s)

To adjust bass.

You can also adjust bass in the AUDIO menu.

Transmission [k][s][][Set ID][][Data][Cr]

Data Min: 0 ~ Max: 64 (*transmit by Hexadecimal code)

* Refer to 'Real data mapping 1' as shown below.

Acknowledgement [s][][Set ID][][OK/NG][Data][x]

17. Balance (Command: k t)

To adjust balance.

You can also adjust balance in the AUDIO menu.

Transmission [k][t][][Set ID][][Data][Cr]

Data Min: 0 ~ Max: 64 (*transmit by Hexadecimal code)

* Refer to 'Real data mapping 1' as shown below.

Acknowledgement [t][][Set ID][][OK/NG][Data][x]

18. Color Temperature (Command: k u)

To adjust color temperature.

You can also adjust color temperature in the PICTURE menu.

Transmission [k][u][][Set ID][][Data][Cr]

Data 0: Medium 1: Cool 2: Warm 3: User

Acknowledgement [u][][Set ID][][OK/NG][Data][x]

19. Red Adjustment (Command: k v)

To adjust red in color temperature.

Transmission [k][v][][Set ID][][Data][Cr]

Data Min: 0 ~ Max: C8

* Refer to 'Real data mapping 2' as shown below.

Acknowledgement [v][][Set ID][][OK/NG][Data][x]

20. Green Adjustment (Command: k w)

To adjust green in color temperature.

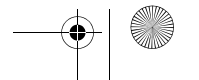
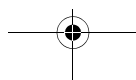
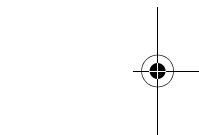
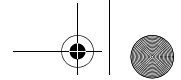
Transmission [k][w][][Set ID][][Data][Cr]

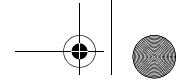
Data Min: 0 ~ Max: C8

* Refer to 'Real data mapping 2' as shown below.

Acknowledgement [w][][Set ID][][OK/NG][Data][x]

*Real data mapping 1	*Real data mapping 2
0: Step 0	0: -20
⋮	5: -19
A: Step 10 (SET ID 10)	A: -18
⋮	⋮
F: Step 15 (SET ID 15)	5F: -1
10: Step 16 (SET ID 16)	64: 0
⋮	69: +1
63: Step 99 (SET ID 99)	⋮
64: Step 100	C3: +19
	C8: +20





APPENDIX

21. Blue Adjustment (Command: k \$)

To adjust blue in color temperature.

Transmission [k][\$][][Set ID][][Data][Cr]

Data Min: 0 ~ Max: C8

* Refer to 'Real data mapping 2'. See page 85.

Acknowledgement [\$][][Set ID][][OK/NG][Data][x]

22. Channel Tuning (Command: m a)

To tune channel to following physical/major/minor number.

Transmission [m][a][][Set ID][][Data0][][Data1][][Data2][][Data3][][Data4][][Data5][Cr]

Digital channels have a Physical, Major, and Minor channel number. The Physical number is the actual digital channel number, the Major is the number that the channel should be mapped to, and the Minor is the sub-channel. Since the ATSC tuner automatically maps the channel to the Major number, the Physical number is not required when sending a command.

Data 0: Physical Channel Number

NTSC air: 02~45, NTSC cable: 01, 0E~7D

ATSC air: 01~45, ATSC cable: 01~87

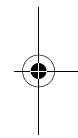
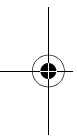
Data1 & 2: Major Channel Number

Data1: High byte Data2: Low byte

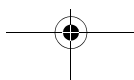
Two bytes are available for the Major and Minor, normally only the second byte is used.

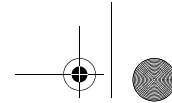
Data3 & 4: Minor Channel Number

Not needed for NTSC.



APPENDIX





Data5:	7 Main/Sub Picture	6 Two/One Part Channel	5 Using Physical Channel	4 Reserved	3	2	1	0	Step
0	Main	0 Two	0 Use	x	0	0	0	0	NTSC Air
1	Sub	1 One	1 No Use	x	0	0	0	1	NTSC Cable
				x	0	0	1	0	ATSC Air
				x	0	0	1	1	ATSC Cable_std
				x	0	1	0	0	ATSC Cable_hrc
				x	0	1	0	1	ATSC Cable_irc
				x	0	1	1	0	ATSC cable_auto
				x	0	1	1	1	Reserved
				x	x	x	x	x	...
				x	1	1	1	1	Reserved

The table above lists the binary code which must be converted to Hexadecimal before sending. For example: The binary code to tune the sub source to an NTSC cable channel is "1000 0001", which translates to "81" in Hex.

- * 7th bit: For which source do you want to change the channel.
- * 6th bit: Use a two part or one part channel. Most cases just use 0 since it's ignored when using NTSC.
- * 5th bit: Use 0 with NTSC since it can only use the physical channel number. Normally use 1 for ATSC since most times it doesn't matter what the physical number is.
- * 4th bit: Set to 0.
- * 3-0 bits: Choose signal type.
- * Tune Command Examples:
 1. Tune to the analog (NTSC) cable channel 35.
 - Data 0 = Physical of 35 = 23
 - Data 1 & 2 = No Major = 00 00
 - Data 3 & 4 = No Minor = 00 00
 - Data 5 = 0000 0001 in binary = 01
 - Total = ma 00 23 00 00 00 00 01
 2. Tune to the digital (ATSC) local channel 30-3.
 - Data 0 = Don't know Physical = 00
 - Data 1 & 2 = Major is 30 = 00 1E
 - Data 3 & 4 = Minor is 3 = 00 03
 - Data 5 = 0010 0010 in binary = 22
 - Total = ma 00 00 00 1E 00 03 22

Acknowledgement [a][][Set ID][][OK][Data0][Data1][Data2][Data3][Data4][x][a][][Set ID][][NG][Data0][x]

23. Channel Add/Del (Command: m b)

To add and delete the channels

Transmission [m][b][][Set ID][][Data][Cr]

Data 0: Channel Delete Data 1: Channel Add

Acknowledgement [b][][Set ID][][OK/NG][Data][x]

24. Key (Command: m c)

To send IR remote key code.

Transmission [m][c][][Set ID][][Data][Cr]

Data Key code: Refer to page 80.

Acknowledgement [c][][Set ID][][OK/NG][Data][x]

25. Back Light (Command: m g)

To adjust screen back light.

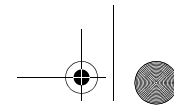
Transmission [m][g][][Set ID][][Data][Cr]

Data Min: 0 ~ Max: 64 (*transmit by Hexadecimal code)

* Refer to 'Real data mapping 1'. See page 85.

Acknowledgement [g][][Set ID][][OK/NG][Data][x]





APPENDIX

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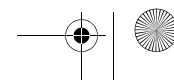
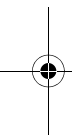
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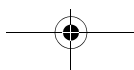
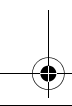
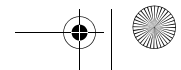
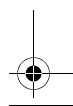
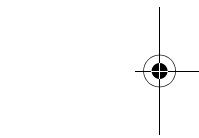
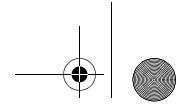
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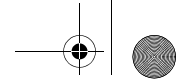
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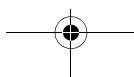
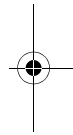
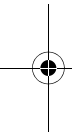
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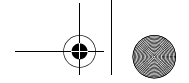
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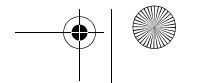
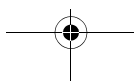
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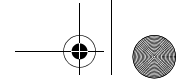
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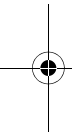
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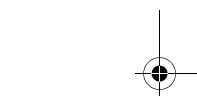
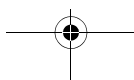
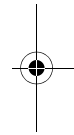
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The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this license; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the library does and what the program that uses the library does.

1. You may copy and distribute verbatim copies of the library's complete source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this license and to the absence of any warranty; and distribute a copy of this license along with the Library.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of section 1 above, provided that you also meet all of these conditions:

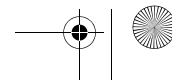
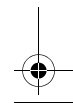
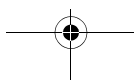
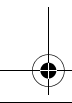
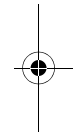
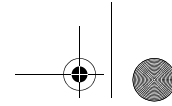
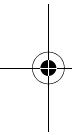
- a) The modified work must itself be a software library.
- b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.
- c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this license.
- d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

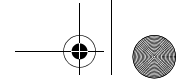
(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the library, and can be reasonably considered independent and separate works in themselves, then this license, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the library, the distribution of the whole must be on the terms of this license, whose permissions for other licenses extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the library.

In addition, mere aggregation of another work not based on the library with the library (or with a work based on the library) on a volume of a storage or distribution medium does not bring the other work under the scope of this license.





APPENDIX

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the library into a program that is not a library.

4. You may copy and distribute the library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machinereadable source code, which must be distributed under the terms of sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this license.

However, linking a "work that uses the library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the library), rather than a "work that uses the library". The executable is therefore covered by this license. Section 6 states terms for distribution of such executable.

When a "work that uses the library" uses material from a header file that is part of the library, the object code for the work may be a derivative work of the library even though the source code is not.

Whether this is true is especially significant if the work can be linked without the library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessories, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a

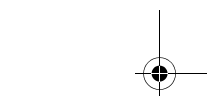
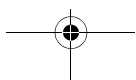
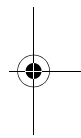
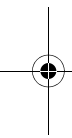
derivative work. (Executable containing this object code plus portions of the library will still fall under Section 6.)

Otherwise, if the work is a derivative of the library, you may distribute the object code for the work under the terms of Section 6. Any executable containing that work also fall under Section 6, whether or not they are linked directly with the library itself.

6. As an exception to the sections above, you may also combine or link a "work that uses the library" with the library to produce a work containing portions of the library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the library is used in it and that the Library and its use are covered by this license. You must supply a copy of this license. If the work during execution displays copyright notices, you must include the copyright notice for the library among them, as well as a reference directing the user to the copy of this license. Also, you must do one of these things:

- a) Accompany the work with the complete corresponding machine-readable source code for the library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the library and then relink to produce a modified executable containing the modified library. (It is understood that the user who changes the contents of definitions files in the library will not necessarily be able to recompile the application to use the modified definitions.)
- b) Use a suitable shared library mechanism for linking with the library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.
- c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6, above, for a charge no more than the cost of performing this distribution.
- d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.
- e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.



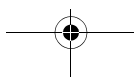


For an executable, the required form of the "work that uses the library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the library together in an executable that you distribute.

7. You may place library facilities that are a work based on the library side-by-side in a single library together with other library facilities not covered by this license, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:
 - a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the sections above.
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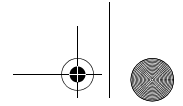
If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply, and the section as a whole is intended to apply in other circumstances.

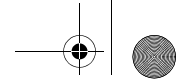
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One line to give the library's name and a brief idea of what it does.
Copyright (C) <year> <name of author>

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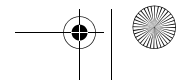
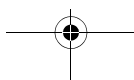
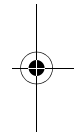
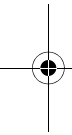
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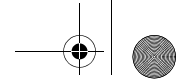
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You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the library, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the library 'Frob' (a library for tweaking knobs) written by James Random Hacker.

Signature of Ty Coon, 1 April 1990
Ty Coon, President of Vice

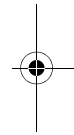
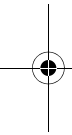




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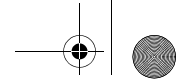
Version 1.1

- 1. Definitions.
 - 1.0.1. "Commercial use" means distribution or otherwise making the covered code available to a third party.
 - 1.1. "Contributor" means each entity that creates or contributes to the creation of modifications.
 - 1.2. "Contributor version" means the combination of the original code, prior modifications used by a contributor, and the modifications made by that particular contributor.
 - 1.3. "Covered code" means the original code or modifications or the combination of the original code and modifications, in each case including portions thereof.
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 - 1.5. "Executable" means covered code in any form other than source code.
 - 1.6. "Initial developer" means the individual or entity identified as the initial Developer in the Source Code notice required by exhibit A.
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 - A. Any addition to or deletion from the contents of a file containing original code or previous modifications.
 - B. Any new file that contains any part of the original code or previous modifications.
 - 1.10. "Original code" means source code of computer software code which is described in the source code notice required by exhibit as original code, and which, at the time of its release under this license is not already covered code governed by this license.
 - 1.10.1. "Patent claims" means any patent claim(s), now owned or hereafter acquired, including without limitation, method, process, and apparatus claims, in any patent licensable by grantor.
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APPENDIX





APPENDIX

of the original code or ii) the combination of the original code with other software or devices.

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The modifications which You create or to which you contribute are governed by the terms of this license, including without limitation section 2.2. The source code version of covered code may be distributed only under the terms of this license or a future version of this license released under section 6.1, and you must include a copy of this license with every copy of the source code you distribute.

You may not offer or impose any terms on any source code version that alters or restricts the applicable version of this license or the recipients' rights hereunder. However, you may include an additional document offering the additional rights described in section 3.5.

3.2. Availability of source code.

Any modification which you create or to which you contribute must be made available in source code form

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3.3. Description of modifications.

You must cause all covered code to which you contribute to contain a file documenting the changes You made to create that covered code and the date of any change. You must include a prominent statement that the modification is derived, directly or indirectly, from original code provided by the initial developer and including the name of the initial developer in (a) the source code, and (b) in any notice in an executable version or related documentation in which you describe the origin or ownership of the covered code.

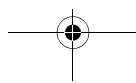
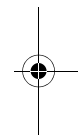
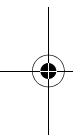
3.4. Intellectual property matters

(a) Third party claims.

If contributor has knowledge that a license under a third party's intellectual property rights is required to exercise the rights granted by such contributor under sections 2.1 or 2.2, contributor must include a text file with the source code distribution titled "LEGAL" which describes the claim and the party making the claim in sufficient detail that a recipient will know whom to contact. If contributor obtains such knowledge after the modification is made available as described in section 3.2, contributor shall promptly modify the LEGAL file in all copies contributor makes available thereafter and shall take other steps (such as notifying appropriate mailing lists or newsgroups) reasonably calculated to inform those who received the covered code that new knowledge has been obtained.

(b) Contributor APIs.

If contributor's modifications include an application programming interface and contributor has knowledge of patent licenses which are reasonably necessary to implement that API, contributor must also include this information in the LEGAL file.





(c) Representations.

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3.5. Required notices.

You must duplicate the notice in exhibit A in each file of the source code. If it is not possible to put such notice in a particular source code file due to its structure, then You must include such notice in a location (such as a relevant directory) where a user would be likely to look for such a notice. If You created one or more modification(s), you may add your name as a contributor to the notice described in exhibit A. you must also duplicate this license in any documentation for the source code where You describe recipients' rights or ownership rights relating to covered code. You may choose to offer, and to charge a fee for, warranty, support, indemnity or liability obligations to one or more recipients of covered code. However, you may do so only on your own behalf, and not on behalf of the Initial developer or any contributor. You must make it absolutely clear than any such warranty, support, indemnity or liability obligation is offered by you alone, and You hereby agree to indemnify the Initial developer and every contributor for any liability incurred by the Initial developer or such contributor as a result of warranty, support, indemnity or liability terms you offer.

3.6. Distribution of executable versions.

You may distribute covered code in executable form only if the requirements of section 3.1-3.5 have been met for that covered code, and if you include a notice stating that the source code version of the covered code is available under the terms of this license, including a description of how and where you have fulfilled the obligations of section 3.2. The notice must be conspicuously included in any notice in an executable version, related documentation or collateral in which you describe recipients' rights relating to the covered code. You may distribute the executable version of covered code or ownership rights under a license of your choice, which may contain terms different from this license, provided that you are in compliance with the terms of this license and that the license for the executable version does not attempt to limit or alter the recipient's rights in the source code version from the rights set forth in this license. If you distribute the executable version under a different license you must make it absolutely clear that any terms which differ from this license are offered by you alone, not by the Initial developer or any contributor. You hereby agree to indemnify the initial developer and every contributor for any liability incurred by the initial developer or such contributor as a result of any such terms You offer.

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5. Application of this license.

This license applies to code to which the initial developer has attached the notice in exhibit A and to related covered code.

6. Versions of the license.

6.1. New versions.

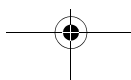
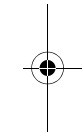
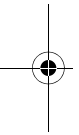
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APPENDIX

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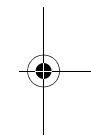
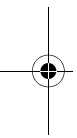
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9. LIMITATION OF LIABILITY.

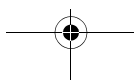
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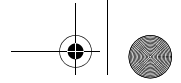
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APPENDIX





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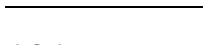
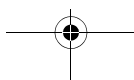
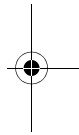
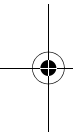
The Original Code is _____.

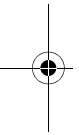
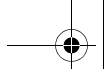
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