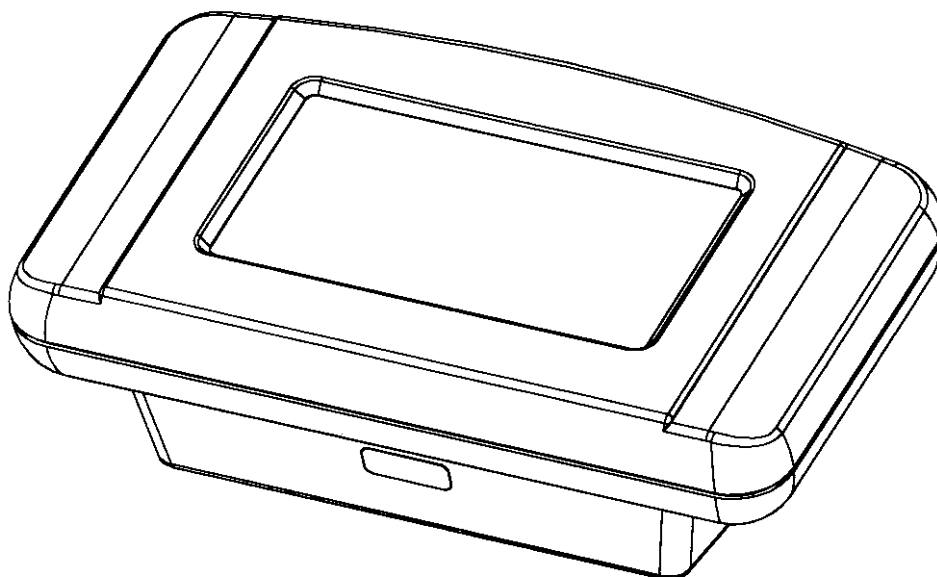

LEXICON 700t System Controller

OWNER'S GUIDE AND PROGRAMMING MANUAL



lexicon
H A Harman International Company

Test Report No. R-3158N2
FCC ID: MMU700tRF

UNPACKING AND INSPECTION

After unpacking the 700i, save all of the packing materials in case you ever need to ship the unit.

Thoroughly inspect the 700i and the packing materials for signs of damage. Report any shipment damage to the carrier at once. Report any equipment malfunctions to your dealer.

PRECAUTIONS

This equipment has been tested and found to comply with the limits for an intentional radiator pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with RSS-210 of Industry & Science Canada. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

▲ WARNING

**TO REDUCE THE RISK OF FIRE
OR ELECTRIC SHOCK, DO NOT EXPOSE THE
UNIT TO RAIN OR MOISTURE.**

▲ WARNING

**THIS UNIT CONTAINS NICKEL-CADMIUM
BATTERIES. RECYCLE OR DISPOSE OF
PROPERLY.**

SAFETY SUGGESTIONS

Read Instructions. Read all safety and operating instructions before operating the unit.

Retain Instructions. Keep the safety and operating instructions for future reference.

Heed Warnings. Adhere to all warnings on the unit and in the operating instructions.

Follow Instructions. Follow operating instructions and instructions for use.

Heat. Keep the unit away from heat sources such as radiators, heat registers, stoves, etc., including amplifiers that produce heat.

Ventilation. Make sure that the location or the position of the unit does not interfere with its proper ventilation. For example, the unit should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings, nor should it be placed in a cabinet that impedes the flow of air through the ventilation openings.

Power Sources. Connect the unit only to a power supply of the type described in the operating instructions, or as marked on the unit.

Power Cord Protection. Route power supply cords so that they are not likely to be walked on or pinched by items placed on or against them, paying particular attention to the cords at plugs, at convenient receptacles, and at the point at which they exit from the unit.

Nonuse Periods. Unplug the power supply from the outlet when the unit is to be left unused for a long period of time.

Water and Moisture. Do not use the unit near water—for example, near a sink, in a wet basement, near a swimming pool, near an open window, etc.

Object and Liquid Entry. Do not allow objects to fall or liquids to be spilled into the enclosure through openings.

Cleaning. The unit should be cleaned only as recommended by the manufacturer.

Servicing. Do not attempt any service beyond that described in the operating instructions. Refer all other service needs to qualified service personnel.

Damage Requiring Service. The unit should be serviced by qualified service personnel when:

- The power supply cord or the plug has been damaged.
- Objects have fallen or liquid has been spilled into the unit.
- The unit has been exposed to rain.
- The unit does not appear to operate normally or exhibits a marked change in performance.
- The unit has been dropped, or the enclosure damaged.

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Chapter 1: Introduction

The 700t is a programmable touchscreen computer that is designed to provide wireless control of audio/video and automation systems. Like other "universal" or "learning" remote controls, the 700t allows you to consolidate the functions of many independent infrared remote controls into one unit. However, the 700t also incorporates a unique programmable user interface, allowing it to provide a simple, intuitive, and customized interface for any system. Before using the 700t, please read and follow all instructions in this manual.

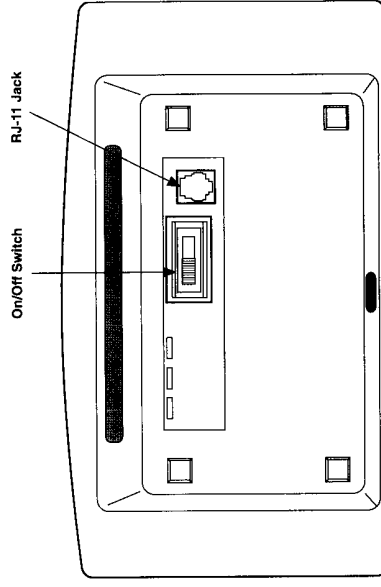
FEATURES

The 700t provides superior quality and reliability as well as these specific features:

- A replacement for all of your system's remote controls. The 700t can reproduce all of the commands of almost any other infrared remote control.
- A programmable graphic display. The 700t uses powerful Windows® based software that makes it easy to place buttons, text, graphics and symbols anywhere on the display.
- A touch-sensitive display. When you want to perform a command, simply touch the display where that command is displayed.
- A built-in rechargeable battery pack. The 700t can run continuously for several hours between charges. Because the remote is normally used only a few minutes per session, the unit typically will run for a week or more between charges. A built-in low battery indicator warns you when it's time to recharge the battery.
- A macro function. This feature allows the 700t to perform a series of commands by pressing a single button. For example, you could create a macro called "MOVIE" that turns on the TV, sets the correct channel, turns on the VCR, dims the lights, and starts playing a movie.
- Three output options for controlling your equipment: normal infrared, hard-wired infrared, and radio frequency (RF).
- Automatic power-down. The 700t turns itself off whenever it is not used for a pre-set amount of time. Touching any area of the display will turn it on again.

GETTING STARTED

The 700t is powered-up by touching any area of the display. If the 700t does not respond, make sure the switch on the bottom of the unit is not at the OFF position. Slide the switch to the ON position as indicated by the arrow.



IMPORTANT NOTES

Please read these important notes about the 700t:

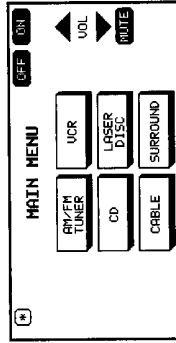
- The 700t should be placed in an area where it is around normal room temperature (between 60°F to 90°F). If the temperature is too hot, the display appears dim. If the temperature is too cold, the display appears dark and may respond slowly.
- Do not use sharp objects on the touchscreen. It is designed to operate with a touch of your finger.
- Do not let the 700t get wet. It should not be handled with wet hands or placed in an area where it could get wet.
- Do not subject the 700t to smoke, dust, or vibrations. The display may be damaged from excessive shock or vibration.
- Use only the power supply that is provided with the 700t. Using the wrong type of power supply may result in battery leakage or other damage.
- Do not disassemble the unit. The 700t contains high voltage circuits that may cause injury if contacted.

THE TOUCHSCREEN DISPLAY

The 700t touchscreen display is organized as a series of pages. A page consists of all the information displayed on the screen at one time. Normally each page contains objects (buttons, text, graphics, and symbols) that are related in some way. For instance, they may all display information necessary for controlling a particular VCR.

By default the 700t has one Main Menu page—all other pages are considered submenus. Any page can contain a button that will display any other page when selected. Normally the Main Menu page is used to display the names of the submenus (e.g., the equipment being controlled). The submenus may consist of one or more pages. The 700t will support 63 pages plus the Main Menu page, in addition to the unit's programming screens.

A representation of a programmed Main Menu page is shown below.



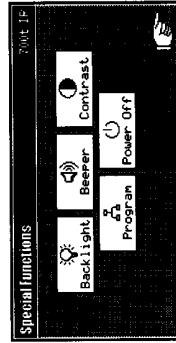
THE SPECIAL FUNCTIONS PAGE

The Special Functions page can be displayed by following these steps:

1. Place the power switch in the OFF position.
2. Press anywhere on the touch screen while turning the power switch ON.
3. Continue pressing the touch screen for about two seconds.

You can also access the special functions page by assigning a "special functions" page link to a button.

This page is used for invoking several built-in functions and entering the Program Mode.



The built-in functions include:

PROGRAM

Press this button to enter the programming mode of the 700i. If the Access Lock-Out is ON, the access passcode must be entered or the unit will remain on the Special Functions page, preventing unauthorized individuals from reprogramming the unit.

BACKLIGHT

This button displays a window which allows you to adjust the intensity of the display's backlight. Press the upper right corner of the window to close it.



BEEPER

This button displays a window which allows you to turn the audible beep on and off. Press the upper right corner of the window to close it.



CONTRAST

This button displays a window which allows you to adjust the LCD contrast. Press the upper right corner of the window to close it.



POWER OFF

This button invokes the Stand-By mode.

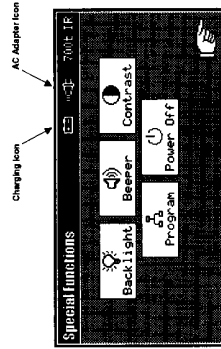
RETURN ICON (pointing finger)

Pressing the return button will return you to the page that was used to access the Special Functions. If the Special Functions page was accessed by pressing the touch panel while switching the 700i on, the return button will always return you to the Main Menu page.

BATTERY RECHARGING AND CONTROL

The following recommendations will assure the best battery performance:

1. Operate the unit until you receive a Low Battery warning. At that point, you will have approximately 10 minutes of run time remaining before the unit shuts down. Recharge the 700t for about 4½ hours. The charging icon on the Special Functions page will disappear when the battery is fully charged.



▼ **NOTE:** The 700t may feel warm while it is charging. It will return to normal temperature after the fast-charge cycle is completed.

2. After recharging is complete, disconnect the AC adapter. For best performance, operate the 700t without the charger connected.
3. If the 700t is not used for long periods of time, the capacity of the battery may be reduced. If this happens, the capacity can be restored by fully charging and fully discharging the battery several times.

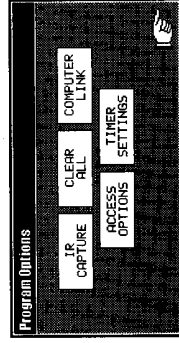
PROGRAMMING THE 700t

Programming the 700t is a three-step process:

1. Creating and linking all of the pages that will become the user interface.
2. Assigning the infrared commands from other remote controls to buttons on the 700t.
3. Creating macros.

These programming steps are accomplished by using LexiDRAW™ software (version 3.0 or later) on a PC running Windows®. Please see the software's Help system for more information.

Several program settings and functions are available on the Program Options page of the 700t. This page is displayed by pressing the PROGRAM button on the Special Functions page.



There are 6 functions available on the Program Options page:

IR CAPTURE

This function allows the 700t to learn and test infrared commands from donor remote controls. Used together with LexiDRAW's Infrared Library Manager software you can create a database of drag-and-drop infrared commands.

CLEAR ALL

▼ **WARNING:** The Clear All operation will wipe out all pages and IR commands in the 700t.

If you wish to start with a "clean slate," the Clear All option will remove all the buttons, pages, and commands from the 700t's memory. To ensure that accidental erasure doesn't occur, you must enter the security code before the memory will be erased.

If you inadvertently press the CLEAR ALL button, simply press the ENTER button on the touchscreen *without entering the passcode* and you will be returned to the Program Options page.

COMPUTER LINK

This function toggles the PC communication link ON and OFF and is used to load programming into the 700t. The programming software, available from Lexicon (part no. 021-09317 or www.lexicon.com), requires a PC running Windows 3.1 or later and a serial port. It is also possible to retrieve previously loaded programming from the 700t into the programming software.

ACCESS OPTIONS

This function is used to program a passcode into the unit and to enable or disable the PROGRAM button from the Program Options page. This allows you to limit program mode or page access to only those people that know the passcode.

TIMER SETTINGS

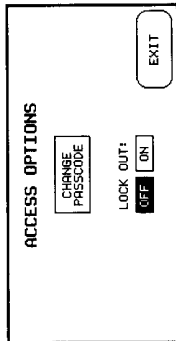
This function is used to set the 700t's stand-by and power-down timers. The stand-by timer defines the length of time the display remains on after the last time a button was pressed. During Stand-By mode, the 700t's circuits are still energized, but the 700t uses much less battery power than when it's running. The power-down timer defines the length of time the 700t's circuits remain energized after entering the Stand-By mode. During power-down, the 700t uses virtually no battery power.

RETURN ICON (pointing finger)

This option is used to return to the Special Functions page.

SETTING THE ACCESS OPTIONS

To limit access to the PROGRAM MODE button on the special functions page, select the ACCESS OPTIONS button from the Program Options page. The 700t will display the CHANGE PASSCODE and the LOCK OUT OFF and ON buttons.



Either select the desired option or press the EXIT button to cancel the operation. If the CHANGE PASSCODE button is selected, the 700t will display a keypad and prompt you to enter a passcode. The passcode can be any number, from one to four digits in length. After entering a passcode, press the ENTER button on the touchscreen. *Do not forget the passcode.* This passcode must now be used to enter the PROGRAM MODE on the Special Functions page if the LOCK OUT button is ON. You can enable or disable the need for a passcode by selecting the LOCK OUT ON or OFF buttons.

This passcode is also used for the CLEAR ALL function, and any button that is given a "Secured" property.

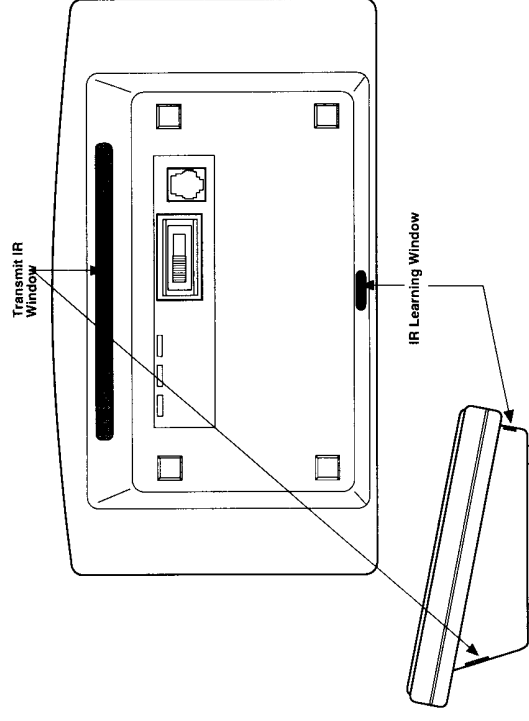
- ▼ **CAUTION:** Always use a one- to four-digit passcode. Never press the ENTER button (i.e., no passcode) when the unit prompts you for the passcode.

Chapter 2: IR Capture

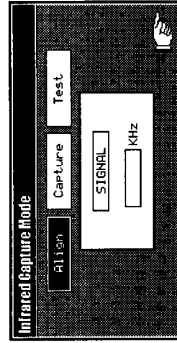
The 700t reproduces the infrared commands of other remote controls. Each of these infrared commands must be captured (i.e. learned) and placed into LexiDRAW's Command Library. This is done by using the original remote control (the donor) from a piece of equipment to teach its commands to the 700t. The 700t then transfers the captured command to the Infrared Library Manager software through its RS-232 serial port. Once a command is placed in the infrared library it never has to be captured again.

ALIGNING A REMOTE CONTROL

To ensure that a valid signal is being received, all donor remote controls must be properly aligned with the 700t's learning window. This is the small window located on the front of the unit.



The 700t has an ALIGN function to help determine the correct position in front of the learning window, and determine the modulation frequency of the donor remote's infrared signal. This function is invoked upon entering the IR CAPTURE mode or by selecting the ALIGN button while in the INFRARED CAPTURE MODE.

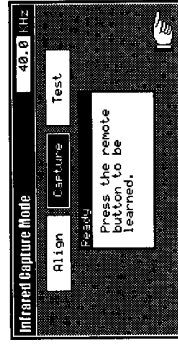


▼ **CAUTION:** The Align function determines the modulation frequency of the donor remote's infrared signal, so all donor remote controls must be aligned before being captured.

To properly align a donor remote control with the 700t, first make sure the donor remote is at the same height as the learning window. It may be necessary to place the donor remote control on a higher surface than the 700t, or vice-versa. Now press any key on the donor remote control, moving the remote back and forth in front of the learning window. The donor remote control is located at the proper distance from the 700t when the SIGNAL box is on (darkened) and the frequency read-out is stable. If the SIGNAL box is off (white), the 700t is not detecting any infrared signal.

CAPTURING INFRARED COMMANDS

Once a donor remote control is properly aligned, the 700t is ready to start capturing the IR commands and transferring them to the Infrared Library Manager Software. First, make sure the 700t is in the INFRARED CAPTURE MODE and the CAPTURE button is selected. The last frequency measured with the ALIGN function should be displayed in the upper right corner of the display.

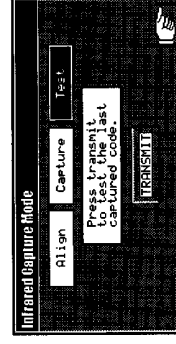


The communications cable should be connected to the 700t and the PC, and the Infrared Library Manager software should be running in Learn IR mode (see the software's Help system for more information). Now press the key on the donor remote control that transmits the command that you want the 700t to learn. Continue to hold the key down until the 700t displays O.K.

After the command has been processed, the 700t will display LEARNED. If an error message is displayed, realign the donor remote control and try again. If the command was captured properly, it will be stored in a temporary memory buffer, and transferred to the Infrared Library Manager software. The command will remain in memory (for testing) until it is overwritten by the next captured command.

TESTING INFRARED COMMANDS

After a command has been learned by the 700t, you can test it to make sure it behaves properly. This can be done by selecting the TEST button while in the INFRARED CAPTURE MODE. To test a command, point the 700t at the equipment to be controlled and press the TRANSMIT button.



If the command does not work properly, it may need to be edited or re-learned.

EDITING INFRARED COMMANDS

Most infrared commands will transmit continuously as long as the remote control key is held down. This means that either the entire command or some part of it is being repeated over and over. Some infrared receivers need a command to be repeated a certain number of times to work properly. This may be anywhere from one to twenty times. Also, some infrared receivers may *not* work properly if the command is repeated at all. This is why the Infrared Library Manager software allows you to adjust the number of command repeat times and to enable or disable continuous transmission. Please see the software's Help system for more information about editing infrared commands.

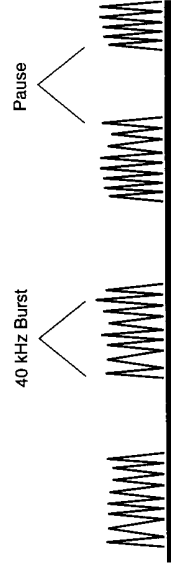
Chapter 3: IR Code Basics

There are two types of infrared codes that are commonly used for consumer electronics products: *Frequency Modulated* and *Pulsed*.

FREQUENCY MODULATION

This type of transmission modulates the IR energy at a fixed carrier frequency. The vast majority of consumer electronics remote controls use a carrier frequency around 40 kHz, although the carrier can range from 20 kHz to 455 kHz or higher. The 700t is rated to handle carrier frequencies between 20 kHz and 460 kHz.

The actual code consists of bursts of IR energy modulated at the carrier frequency, separated by pauses.



The code is defined by the length of each burst and each pause, as well as by the carrier frequency.

PULSED IR CODES

This type of transmission does not use a carrier frequency.



Pulsed codes are quite common in cable TV converter boxes.

HOW THE 700t LEARNS IR CODES

There are many different encoding schemes used for IR codes.

The burst and pause times have fixed lengths, variable lengths, or some combination of the two. To learn the code, the 700t "records" a sample of the code in a manner similar to the way a tape recorder records sound. Once a sample of the code has been taken, it is analyzed to find any repeating patterns.

Some codes continuously repeat themselves for as long as the button is pressed. Others send a code followed by a "keep alive" pattern. Some codes don't repeat at all. Any of the above types of codes can also have some sort of preamble in front of them. It is very important to capture the preamble in this type of code. The IR learning buffer of the 700t is large enough to accommodate the preamble.

When a repeating pattern is found, extra repeats are stripped off before the code is stored in memory. The number of repeats is also stored so the code can be reproduced accurately.

If the buffer was filled up during learning, it is assumed that the pattern should be repeated for as long as the key is pressed. This is common for commands such as Volume, Balance, and Scan—functions that may need to be continuously repeated. For these types of commands, SUSTAIN is set ON as the Edit IR default. If the buffer is not filled, SUSTAIN is set OFF and the repeat pattern is displayed as the REPEAT TIMES. The default REPEAT TIMES for a code with SUSTAIN ON is one. This means the repeating pattern will repeat at least one time when the button is pressed. You can of course edit this if needed, in the Edit IR mode of Infrared Library Manager software.

If the code uses a carrier frequency, that frequency is also stored with the code.

HINTS FOR LEARNING IR CODES

Always place the 700t and the donor remote control on a flat surface. You may find it necessary to elevate the donor or the 700t with a book or similar object to align them vertically. Once you have learned and tested a code from a remote, try not to move it until you have learned all the codes. If you do accidentally move either remote, you should re-align them.

It is very important to make sure the donor remote is using fresh batteries. The 700t needs a strong IR signal to properly learn a code.

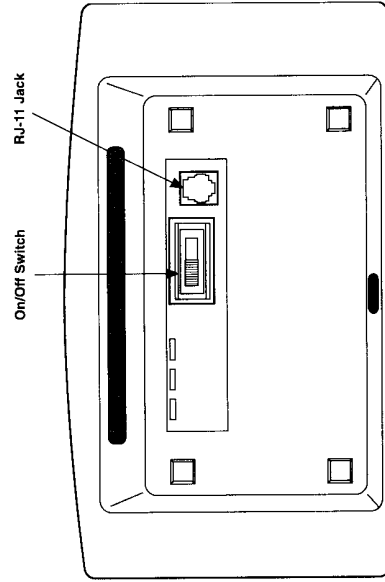
If the frequency read-out in the ALIGN mode is 0.0 kHz, then the code is a pulsed type. In this case you should transmit the commands to the 700t from the longest distance you can without getting an error message.

If you always get an error message when trying to learn a code, you should try moving the donor remote up and down or back and forth. If this does not help, try tapping the buttons on the donor instead of holding them down.

Many commands can be made more reliable if the number of repeat times is increased. This is especially true for commands assigned to buttons that are likely to be briefly "tapped" or for commands that are part of a macro. Increasing the number of repeat times increases the probability of the command "getting through." This is essentially a trade-off between increased reliability and an increase in the length of time required to transmit a command. This can take a bit of fine tuning on complicated macros.

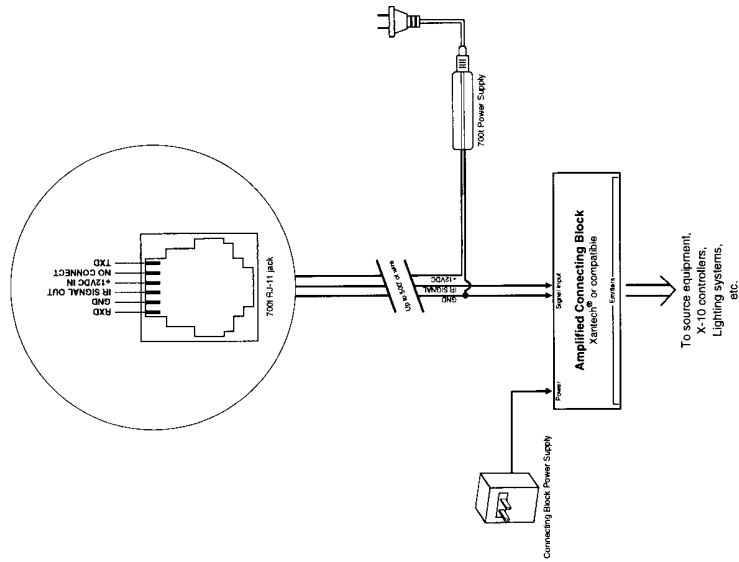
Chapter 4: Hard-Wiring the 700t

The RJ-11 jack on the bottom of the 700t provides connections for the RS-232 serial port, system power, and direct hardware IR output. The system power and direct IR outputs can be used in installations where wireless operation is not required. The direct IR output is compatible with most infrared repeating systems.



▼ **CAUTION:** If the IR SIGNAL OUT pin is used, you must also connect the 700t power supply to the +12VDC IN pin (NOT the power jack on the side of the unit). It is also recommended that you disconnect and remove the internal battery pack if the 700t is to be permanently hard-wired to power.

The IR SIGNAL OUT pin is capable of driving up to four IR emitters. More than four emitters requires the use of an amplified connecting block. The connecting block can be wired up to 500 feet away from the 700t (using #22 AWG shielded wire).



Chapter 5: Troubleshooting

DISPLAY IS DIM OR UNREADABLE.

By adjusting the LCD contrast on the Special Functions page. Try playing the LCD contrast with temperature. This can be from external variations or internal ones (battery charging). If the unit is cold, it may take a couple of hours to reach room temperature and for the LCD to stabilize.

UNIT DOES NOT RESPOND AT ALL.

Check the ON/OFF switch on the bottom of the unit. If the unit still doesn't respond, connect the AC adapter and try again.

YOU'RE STUCK.

YOU'RE STUCK. If you create a page without an exit, and if you get to that page when you are operating the 700t, you will need to reset the 700t by turning it off, then on, using the ON/OFF switch on the bottom of the unit. You will return to the Main Menu page, and none of the programming will be lost.

CONTACTING LEXICON

You can contact Lexicon at:

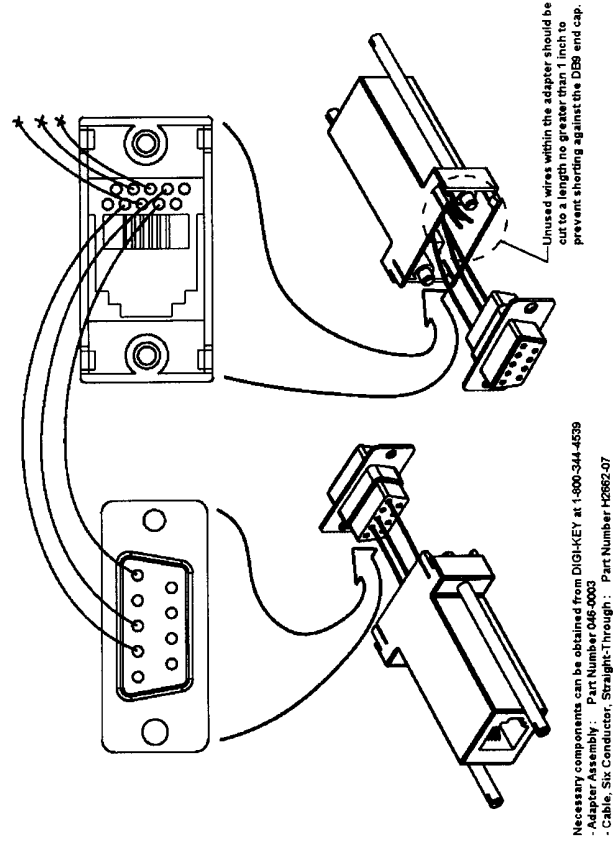
Lexicon, Inc.
3 Oak Park
Bedford MA 01730 USA
TEL (781)280-0300
FAX (781)280-0499
www.lexicon.com

Chapter 6: Specifications

Power:	Six (6) volt Ni-Cad Battery Pack
Infrared Control Range:	Thirty (30) Feet (9.0m) @ 60 Degrees
Infrared Carrier Frequency Range:	20kHz-460kHz
Radio Frequency Control Range:	Up to 100 Feet
Radio Frequency Carrier Frequency:	418MHz
Direct Hard-Wire Control Range:	500 Feet (#22 AWG shielded wire)
Display:	256 x 128 STN (Blue on Paper White)
Backlight:	Dual CFL with Three Level Brightness Control
Power Consumption:	1000 mA Maximum (Run Mode) 175 mA Maximum (Stand-by Mode) 700 μ A Maximum (Powerdown Mode)
Nominal Run Time on Full Charge:	3.5 hours (medium backlight)
Total System Memory:	128K Bytes
Communications:	PC compatible RS-232 port
Dimensions:	9" x 5.3" x 3.5" (LxWxH)
Weight:	2.4 lbs.

All specifications subject to change without notice.

Appendix A: Communications Cable Pin-Out



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