
OPERATING MANUAL FOR
THE *Lil'* DMXter™
SOFTWARE VERSIONS
V1.81A, C1.81A, V1.81B, V1.81C
&
ShowSaver™ Version 1.20
FOR HARDWARE DMX-1A

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INTRODUCTION

The *Lil'DMXter*^{TM 1} is a portable test set for checking DMX512 transmission and reception. (more text here)

The unit is built into a rugged water-resistant case. However the display is glass so please use reasonable common sense care.

The *Lil'DMXter* is battery operated using rechargeable batteries. Batteries can be recharged by using the built-in charger. Your *Lil'DMXter* may be used while recharging. *Lil'DMXters* shipped inside North America are shipped set to charge and operate from a 120VAC line. *Lil'DMXters* may be ordered set for 230VAC operation.

Your *Lil'DMXter* is a software based machine that uses a menu structure allowing you to step thru its features to get to the test you need to perform. Much of its operation is obvious. The purpose of this manual is to help you run it quickly, and to find the section you want easily.

ABOUT THIS SOFTWARE (readme)

This manual is both a hardware and a software manual. This manual is written for software version V1.80(A, B, C) or C1.80A.

None of the hardware that this software is designed to run on is current production. The last FD DMX-1A was shipped during 2000. This hardware was replaced by the FD DMX-1B (*Lil'DMXter*2) hardware. Any function supported on the earlier hardware can be supported on the new hardware. The new hardware supports a number of features that are NOT supportable on the older hardware. An important limitation of the DMX-1 hardware is memory size, both RAM and ROM. There isn't room for more features. In fact you may have to choose which features are important for your use of your DMX-1. If you can't choose, well, we sell the brand new *Lil'DMXter*2. This software release is designed to tie up some loose ends and provide as up to date features as possible for the users of our older units. Any future releases for this hardware will likely include only minor tweaks or bug fixes (blush - they do happen) if any software issues are found.

There are several different versions of this software. They are designated by addition of a letter to the version number. The most common version is V1.80A. If routine is not included in a version it will be noted at the top of the text describing that routine. A general list of what is in which version can be found in the release notes.

If you have used an earlier *Lil'DMXter* you may want to skip right to the software release notes. The notes for this software version are in **Section 14.11** on **page 72**.

USITT DMX512-A AND THIS SOFTWARE

In this software release certain terminology has been changed to reflect the current naming conventions commonly used to identify parameters of DMX512. These changes are embodied in the latest revision of DMX512. DMX512 is now an American National Standard. Its formal name is ANSI E1.11, Entertainment Technology - USITT DMX512-A

The terminology changes that have been made mostly involve using the term '**slot**' for what was often called a DMX 'dimmer'. In DMX512-A a slot is "a sequentially numbered framed byte in a DMX512 packet. A single Universe contains a maximum of 513 Slots, starting at slot 0. Slot 0 is the START Code. Slots 1 through 512 are data slots."

The minimum duration of the Break and the Mark After Break for transmitting devices has been lengthened in DMX512-A. This is intended to provide some breathing room between the minimum value to be sent and the minimum a receiver should correctly receive. Following these requirements will assure that minor timing errors such as crystal tolerances will not cause misoperation. All DMX receivers still **MUST** receive DMX512 sent with the minimum allowed timing.

¹ *Lil'DMXter* and **DMXter** are trademarks of Goddard Design Co.

We have chosen to use the requirements of DMX512-A as our standard default flavor. To allow receivers to be tested with a set of parameters that they **MUST** receive, our first alternate flavor is the old default Lil'DMXter DMX512-1990. Please read Section 4.8 of this manual for details.

HARDWARE VERSION DMX-1A

This manual is both a hardware and a software manual. All *Lil'DMXters* model numbers DMX-1 or DMX-1A can run the same software.

Since the *Lil'DMXter* is a stored program driven machine changing the software to the most recent version upgrades the operation of the machine to the current specification. However there have been a number of minor hardware changes over the years. Changing the software does not upgrade the hardware in any way.

This manual is written for hardware version DMX-1A. For the convenience of people owning older units reference to earlier hardware versions are listed in this manual and its appendices. However if detailed information on an older unit is needed we suggest saving your old manual. If you no longer have it you may contact us to get a copy of a manual that covers your hardware.

Hardware version DMX-1A is an AC line powered version that meets relevant **CE** requirements including relevant requirements of the Low Voltage Directive.

0.0 SAFETY WARNING

Due to failure of either the dimmers or the console, or due to a short between the DMX512 line and power cables, it is possible that a DMX512 control cable may be connected to the AC mains. If connected to the AC mains, a DMX512 cable would be carrying hazardous voltages. If any conductor of a DMX512 cable is connected to the AC mains it is possible that the metal case of the connector is also connected to the AC line. Care should always be taken when testing an installed DMX512 cable that no hazardous potentials are present.

The user should note the following:

Testing of DMX512 lines that are shorted to the AC line is hazardous and should not be attempted.

The *Lil'DMXter* does NOT indicate the presence of hazardous voltages on the DMX512 lines.

The metal frame and metal front panel parts of the *Lil'DMXter* are grounded only when the *Lil'DMXter* is being used with its 3-wire line cord plugged into a properly grounded outlet. The DMX512 lines entering the *Lil'DMXter* are isolated from the metal frame. The frame should not become 'hot' if there is AC leakage on the DMX512 lines. But do not rely on this for your safety - check that YOUR DMX512 lines are not 'hot'.

IT IS POSSIBLE THAT THE SHELL OF THE DMX512 CONNECTOR MAY BE HOT. IF THE SHELL OF THE CONNECTOR IS HOT, THEN THE METAL FRONT PANEL PARTS OF THE DMXter WILL BE HOT UNLESS THE DMXter IS GROUNDED.

If there is ANY likelihood that ANY of the DMX512 lines are 'hot' to the AC line, the case of the *Lil'DMXter* should be grounded at all times.

Simply plugging the unit into AC will achieve this end. During battery operation this can be accomplished by using the AC cord and connecting a ground wire from the ground pin of the AC cord to suitable ground. In older wooden construction building a cold water pipe ground was always considered a suitable ground. However, today there is a trend to use nonconductive pipes for water system. In steel framed buildings the building frame is normally grounded.

In today's environment the only sure ground is a properly installed three pin electrical outlet.

If your DMXter is a unit that uses an external power supply it is an earlier CE compliant unit. Please refer to the appendix for further information.

0.1 THE *Lil'*DMXter USES A RECHARGEABLE BATTERY

The *Lil'*DMXter uses a rechargeable battery. This battery has a finite life and will need to be replaced at some time. It must be replaced with another **rechargeable battery** of the correct type. Failure to do this will cause mis-operation and could cause a fire hazard. (See section 12.5 for detail on battery type and replacement.)

0.2 PRECAUTIONS THAT WILL ASSURE THE BEST OPERATION OF YOUR *Lil'*DMXter

The *Lil'*DMXter is a sensitive piece of test equipment designed to receive and decode low power digital signals even when those signals are in an electrically noisy environment. It is also a piece of theatrical field service equipment. We know that field conditions in a theatre or studio are often as close to a war zone as most of us wish to get. The *Lil'*DMXter is designed to work in this hostile environment.

One environmental threat that is always present particularly for a portable piece of equipment is static electricity or ESD. On a dry winter day a person walking across a wool carpet may easily become charged to **8 to 10 thousand volts**. Touch a piece of conductive material and a large pulse of current will flow.

The *Lil'*DMXter has been designed to deal with this fact. It's unlikely that normal ESD will damage the unit and if sensible precautions are taken ESD should not normally prevent it from operating normally.

0.1(1) Use a Blanking Plug in Unused DMX Connectors

When the unit is operating always have a plug in both the DMX OUT and the DMX IN connectors. Since the DMXter is often used with only one cable connection, the other connector should be capped with an un-wired XLR style plug. This plug must be of the metal body type and should be totally un-wired. The purpose of this plug is to prevent ESD discharge to the open connector pins. Such discharge is unlikely to harm the DMXter but it may cause mis-operation, possibly requiring power cycling to reset the unit.

0.1(2) If ESD Is Present Ground the Case

When operating in an environment where ESD discharges are likely and nonstop operation of the *Lil'*DMXter is required it is advised that the case of the *Lil'*DMXter be grounded (earthed). Simply plugging the unit into AC will achieve this end.

0.2 GETTING STARTED - QUICKLY

So you want to play **NOW**? First read the **SAFETY WARNING** above. Then go right ahead. We feel that the operation of the *Lil'*DMXter is fairly straightforward. But we would suggest that you read the following sections before you start taking our name in vain:

1.0 - 1.3 CONVENTIONS (all of it)

2.0 TURNING ON

3.0 FUNCTION MENU

4.0 TRANSMIT DMX - The most commonly used functions in **TRANSMIT** are:

4.1 ADJUSTING ONE SLOT

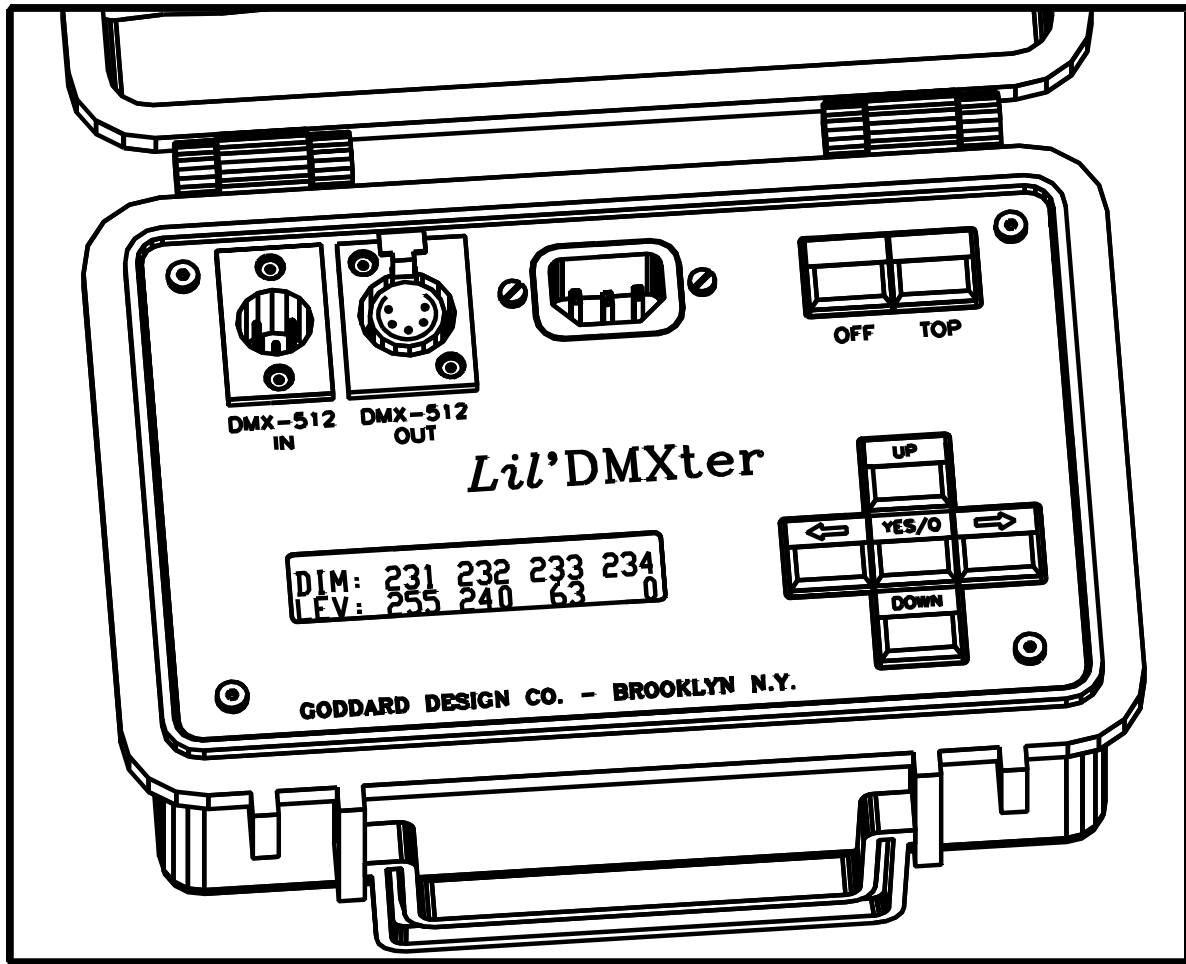
4.5 SEND/EDIT SNAPSHOT

5.0 RECEIVE DMX

5.1 VIEW LEVELS

1.0 CONVENTIONS

As with any software-based device, we have set up some conventions.



1.1 KEY CONVENTIONS

The block of five keys on the right-hand side of the unit is used for most of the operation of the unit.

1.1(1) ACTION ON KEY UP

As a rule the *Lil'DMXter* software takes action on key release not on key press. The exceptions to this rule include auto repeat functions. For brevity this manual will refer to 'press <xx> key' even when action will take place after the key is depressed and released. When we feel it is important or where confusion is possible we will lay out the key strokes in detail.

1.1(2) <YES/Q>

The blue <YES/Q> key is the 'YES' answer to queries and initiates the action that you have chosen in most cases. When the *Lil'DMXter* is performing functions where a yes/no answer would be inappropriate, there will no longer be a '?' in the display. At this point the <YES/Q> key will 'Quit' the work you have been doing and generally put you back to the point in the menu at which you entered. There are some exceptions to this rule; quitting some functions will return you to different points in the menu. These will be pointed out later in the manual.

1.1(3) <UP>, <DOWN>

<UP> and <DOWN> are used to step thru items of the menus. When setting slot levels or changing the value of a numeric parameter the *Lil'DMXter* uses the <UP> and <DOWN> keys to raise and lower the numeric values.

They also function as the 'no' to answer the queries of the menu. Pressing <DOWN> tells the *Lil'DMXter* 'no' to the current query, and advances you to the next choice. Pressing <UP> tells the *Lil'DMXter* 'no' to the current query, and backs you up to the previous choice.

1.1(3).1 **Bumping a Numeric Value to Minimum or Maximum :**

Hold the <YES/Q> button down while you press the <UP> key to jump a numeric value to maximum. Hold the <YES/Q> button down while you press the <DOWN> key to bump a numeric value to its minimum value. This will work with most but not all numeric values that are set by the <UP> and <DOWN> keys.

1.1(3).2 **Bumping a Numeric Value to Half:**

Press both the <DOWN> and <UP> then release both keys. A numeric value will be taken to its half value. This will work with most but not all numeric values that are set by the <UP> and <DOWN> keys.

1.1(3).3 **Auto-incrementing a Numeric Value:**

Many numeric values set with the <UP> and <DOWN> keys may be auto-incremented by holding down the <UP> key.. If you hold down the <DOWN> key, the values will auto-decrement towards its minimum.

1.1(4) <LEFT>, <RIGHT>

The most frequent use of the right and left arrows is changing the current slot numbers. In displays that have an underline cursor they are used to move the cursor. While they are marked with arrows, for the remainder of this manual they will be referred to as <LEFT> and <RIGHT>.

1.1(4).1 **Changing a Slot Number by One:**

To increase a slot number by one press the <RIGHT > key. To decrease a slot number press the <LEFT> key.

1.1(4).2 **Auto-increment The Slot Number:**

Hold down the <RIGHT> or <LEFT> keys to auto-increment or auto-decrement the slot numbers by one.

1.1(4).3 **Jumping the Slot Number by 10:**

Hold down the <YES/Q> key and press and release the <RIGHT> or <LEFT> key to increment or decrement the slot number by 10.

1.1(4).5 **Auto-increment the Slot Number by 10:**

Hold down <YES/Q> and then press and hold the <RIGHT> or <LEFT> keys to auto-increment or auto-decrement by 10.

1.1(4).6 **Forcing the Slot Number to Zero:**

In routines that reference a slot number pressing both the <LEFT> and <RIGHT> simultaneously will reset the slot number to one. This key combination is also used to see cue details in ShowSaver.

1.1(5) <YES/Q> As a Shift Key

There are several places in this software that use <YES/Q> as a shift key to allow one of the other four keys to access a second function or status display. When accessing a second function the <YES/Q> is pressed and held while the second key is pressed and released.

1.1(6) QUITTING <TOP> vs. <YES/Q>

When you are finished using a function and want to do something else there are two basic ways to 'Quit'. You can use either the <YES/Q> or the <TOP> keys, but the result will be somewhat different. <YES/Q>, as mentioned

above, generally puts you back to the point in the menu at which you entered. If you want to use another function within the same main menu group use <YES/Q>. Example: If you are in **VIEW LEVELS** and you next want to **VIEW PARAMETERS** press <YES/Q>, <DOWN>, <YES/Q>. But if you next want to **ADJUST ONE SLOT**, first you will have to use <YES/Q> to quit and then move to the **TO MAIN MENU?** entry and then <YES/Q> to return to the **MAIN MENU**. The key strokes are <YES/Q>, <DOWN>, <DOWN>, <YES/Q>, <UP>, <YES/Q>, <YES/Q>. It would seem to be a lot easier to hit the <TOP> and roll down the **MAIN MENU**. There is a reason why this is not always the best practice. Hitting <TOP> does not clear the termination relay in the same way as <YES/Q>. A detailed description of termination relay setting can be found in section 1.6(5).

While using <TOP> alone is seldom a problem we suggest that you get into the habit of using the following key strokes to return quickly to the **MAIN MENU**: <YES/Q>, <TOP>.

1.2 DISPLAY CONVENTIONS

There are two different purposes of the display. One is to allow you to move around the menu structure to the area you need for the test you want to perform. Here the top line of the display will generally tell you where you are in the menu, and the second line will usually ask you a question or give you a choice of actions. These displays are always in the form of a question and will contain a “?”.

The other purpose of the display is to give you information about the DMX512 system you are testing. This will be done either in one line or two line messages.

1.3 NUMBER CONVENTIONS

DMX512 uses an 8 bit binary byte to transmit slot levels, and the START Code. This allows 256 different slot levels and START Codes from 0 to 255. Most lighting consoles display these levels as 0 to 100. This means that a console with a slot set to 50 does not transmit the number 50 on the DMX512 line, but a number that is 50% of 255, i.e., 128. The normal lighting console 0 to 100 representation of slot levels is really a percent scale and will be referred to as ‘percent’ throughout this manual. Details of the percent conversion used by the DMXter can be found in section 12.7

The *Lil’*DMXter can display numbers in three formats; decimal, percent, or hexadecimal. Decimal, percent, or hexadecimal notations are available for levels. Decimal or hexadecimal notations are available for the START Code, and for the **FLICKER FINDER** compare limit. When the DMXter is set to percent mode, the START Code and the **FLICKER FINDER** compare limit will be displayed in decimal. Slot numbers and timing information are available in decimal notation only. The status may be changed by queries in the **USER SETUP OPTIONS** menu (see section 8.3).

1.3(1) Default Display Format

The default format is percent for any value that is displayable in percent. Before V1.70 the default was decimal. Any readout displayed in hex will be two hex digits ending with a lower-case ‘h’. Any readout displayed in percent will contain a % sign in the display.

2.0 TURNING ON THE *Lil'DMXter*

2.1 **WARNING: BATTERY SWITCH MUST BE ON!**

IMPORTANT OPERATIONAL NOTE:

The *Lil'DMXter* will not operate correctly if the battery is totally discharged or if the internal battery switch is off. When the unit is plugged into the AC line the unit may **appear** to operate, it may display the 'is sleeping' message but **it will not run accurately or reliably!** It will cease to operate the moment you remove the AC line.

A good indication of this problem is that the display backlite pulses, and attempts to run DOUBLE ENDED CABLE TEST will crash the DMXter, usually writing garbage to the display. You may leave the unit plugged into the AC line for 10 minutes and then try again. If the unit fails to operate the moment the AC line is removed, you can assume that you must open the unit and turn on the internal battery switch. See Section 12.3.

2.2 THE <TOP> KEY TURNS THE UNIT ON

Open the case by pressing on the front edge while undoing the latches. The display will be blank. When the unit is off, <TOP> functions as an 'ON' key. Press the <TOP> button and you will see the opening message

```
|          V180X          |  
| GODDARD DESIGN CO.    |
```

!RMG!

This message includes the software version, which is important if you need to contact the factory with any questions. This manual is written for software Version V1.80X, where the letter 'X' will be replaced with 'A', 'B', or 'C'. It is applicable for any software version that is V1.8YX. This message will last for about three seconds or until any one of the keys in the cross is pressed and released. The next display will one the messages shown below.

```
|          V1.80A          |          |          V1.80B          |  
|          SHOW1.20        |          | SHOW 1.20 SCOPE 1.00 |  
|                          |          |                          |  
|                          |          |          V1.80C          |  
|                          |          |          SHOW1.20        |
```

This message also lasts for about three seconds or until any one of the keys in the cross is pressed and released.

2.3 IF THE UNIT WILL NOT TURN ON . . .

If the unit will not turn on, but instead displays

```
          V1.80A  
MEAL PENALTY
```

Then the battery has discharged to the point that it is not capable of supporting normal operation. Plug the unit into AC so you can work and recharge at the same time; then leave the unit plugged in to complete the recharge.

If when you try to turn the unit on instead of the **MEAL PENALTY** message the display remains blank there are three possibilities:

The battery is discharged to a point that the internal battery shutdown circuit has disabled the power supply.

The internal battery switch is turned off

The battery is totally discharged.

Plug the unit into AC. If the display comes on reading `Lil' DMXter is sleeping...` then it is likely that the unit was in low battery shutdown. You may run it on AC if you need it immediately; otherwise, allow it to charge.

If after plugging the unit into the AC line the display remains blank, the user should press `<TOP>`. If the display remains blank, the battery was probably totally discharged. After allowing the unit to charge for 10 to 30 minutes, try turning the unit on again. If the unit now operates correctly on AC, the battery was totally discharged and should be allowed to charge immediately for at least six hours. As soon as the battery has at least some charge (30 minutes) the *Lil'*DMXter may be used while charging.

2.4 BYPASSING THE INITIALIZATION MESSAGE

This is a vestigial feature. Earlier versions of this software had a scrolling copyright message. The following key presses were required to bypass the message. Since many people, myself included, use these key presses as second nature we have preserved them. The overall effect is the same as if you pressed any key in the cross of buttons or waited three seconds.

Hold down the `<OFF>` key while pressing the `<TOP>` key, release the `<TOP>` key while still holding down the `<OFF>` key. During the time that you are holding the `<OFF>` key but have released the `<TOP>` key the following message will be displayed. When you release both keys, you will drop to the owner identification message or if it is not present to the power timer display.

```
|  OK, OK, I'M AWAKE  |  
| SHOW 1.20 Scope 1.00 |
```

2.5 RESETTING TO FACTORY DEFAULTS

The *Lil'*DMXter's software has a number of settable parameters or variables. The Transmit routine in particular is 'table driven'. These tables are stored in RAM memory. It is possible to set some user settable parameters to rather unusual settings. It is also possible that certain RAM parameters may be corrupted. If the internal battery switch is cycled OFF and then back ON all parameters will be reloaded from ROM. Of course all other data stored in RAM, such as **ShowSaver** cues will be lost. We provide a soft way to reset factory default values. **This method does not erase ShowSaver cues!**

To reset RAM parameters:

Press and **hold** both the `<OFF>` and the `<YES/Q>` keys. While holding the two keys press and **release** the `<TOP>` key. All internal parameters are now reset to the factory default values.

2.6 OWNER IDENTIFICATION MESSAGE (OPTIONAL)

This option is NOT available on the C1.80A software. We offer an optional internal identification message that briefly displays a message.

```
PROPERTY OF  
LITES'R'US
```

Or any two lines of 20 alphanumeric characters. If you have ordered this option, the message will last three seconds. This message may be keyed through in the same way that the version numbers can be keyed through. If your unit is not fitted with this option, this message will not be seen.

2.7 DISABLING THE AUTO POWER OFF TIMER

The unit will turn off if it hasn't registered a keystroke after 10 minutes. This is intended to conserve battery life. We strongly suggest that you make a habit of leaving the **POWER OFF** timer on. But if you are using the *Lil'*DMXter in a situation where you frequently need to walk away from the unit, you may find it best to disable this timer.

DISABLE THE AUTO
POWER OFF TIMER?

Answer yes by pressing <YES/Q> or no by pressing <UP> or <DOWN>.

2.8 TURNING OFF THE DISPLAY BACKLITE

While we think you will usually want to use the display backlite, we can see some cases when ambient light conditions would make it better if it were off. You will also marginally lengthen battery life if you turn it off. The next choice the unit gives you is

DO YOU WANT THE
BACKLITE OFF?

Answer yes by pressing <YES/Q> or no by pressing <UP> or <DOWN>.

The backlite has a timeout that will turn it off if no keystroke has been registered in about one minute. To turn it back on, press any key. Using the <LEFT> and <RIGHT> keys is appropriate here, as they will perform very few other functions but will turn the backlite on.

2.9 PRESSING <TOP> WHEN THE DMXter IS RUNNING

The **AUTO POWER OFF TIMER** and the **DISPLAY BACKLITE** queries are only displayed the first time that <TOP> is pressed after the DMXter has been off (sleeping). When the unit is running pressing <TOP> returns the DMXter to the top of the MAIN MENU to the TRANSMIT DMX512? query.

2.10 THE <OFF> KEY

The black <OFF> key is used to put the unit in 'sleep' mode. *Lil'*DMXter is, however, never truly 'off' because this switch doesn't interrupt power to the processor. (See the section on **BATTERY OPERATION** in Section 14.2 for details on battery operation and 'Turning Off the Battery'.) To turn off the battery, you must open the case. **IF YOU REALLY INSIST ON TRYING TO DO THIS BEFORE YOU READ THE SECTION, PUT DOWN THE ALLEN KEY. FIRST UNPLUG THE LIL'DMXTER FROM THE AC LINE!!!! NEVER OPERATE THE UNIT FROM THE AC LINE WHEN IT IS OUTSIDE ITS CASE. NOW, YOU WANT TO REMOVE THE SINGLE SCREW ON THE BOTTOM OF THE CASE - NOT THE FOUR SCREWS ON THE TOP OF THE FACE!!!**

3.0 MAIN MENU

The *Lil'*DMXter works on a function menu. All tests and functions of the *Lil'*DMXter are accessed by way of six MAIN MENUS. You can step thru the choices by pressing the <UP> or <DOWN> keys until you come to the function you wish to use. To select that function, press <YES/Q>. The functions you may choose from are:

TRANSMIT DMX512?	Section 4
RECEIVE DMX512?	Section 5
FLICKER FINDER?	Section 6
CABLE TESTER?	Section 7
SETUP USER OPTIONS?	Section 8
MULTI CHANNEL MODE?	Section 9
RECV SCOPE TRIGGER?	Section 15
SHOW SAVER?	Section 10

4.0 TRANSMIT DMX

TRANSMIT DMX is one of the primary diagnostic tools offered by the *Lil'*DMXter. The unit can transmit a DMX512 signal to allow you to check that the receive end of your transmission link is correctly receiving the signal.

Originally DMX512 was a standard primarily intended to communicate level information to dimmers. It had provisions for non-level or non-dimmer communications by means of a 'START Code'. For dimmer communication the START Code has a value of 0, sometimes referred to as the 'null START Code'. The default START Code setting in the *Lil'*DMXter is therefore 0.

4.0(1) If a Non-zero START Code Is Set

If you previously changed the START Code to a non-0 value, you will now be informed of this fact and given the chance to change the START Code if you wish. If you do not wish to change the START Code, press <DOWN>. Pressing <UP> will return you to the MAIN MENU. The method is identical to that explained in Section 4.10.

4.0(2) If a Non-standard 'Flavor' Is Set

The *Lil'*DMXter provides considerable control of the parameters of the transmitted DMX signal. This is required because DMX512 allows many parameters to vary over wide ranges. Our method of allowing you to select groups of preset parameters we call selecting the 'flavor'. See the discussion of flavors in Section 4.8 below. The *Lil'*DMXter's default 'flavor' setting is DMX512-A (92 μ S/12 μ S). With this setting the *Lil'*DMXter uses an 92 μ S break, an 12 μ S mark after break, transmits a level for all 512 slots, and refreshes the slots at approximately 40 times per second.

If you previously changed the 'flavor' to one other than DMX512-A (92 μ S/12 μ S) you will now be informed of this fact and given the chance to change the 'flavor' if you wish. The method is identical to that explained in Section 4.8.

4.0(3) Support for External Switches

In **ADJUST ONE SLOT**, **AUTOFADE ONE SLOT** and **ADJUST ALL SLOTS** the software supports two user provided external switches. In **ADJUST ONE SLOT**, and **AUTOFADE ONE SLOT** the switches when present and enabled duplicate the unshifted functions of the <RIGHT> and <LEFT> keys. In **ADJUST ALL SLOTS** the switches when present and enabled duplicate the unshifted functions of the <UP> and <DOWN> keys. A small pendant control or a foot switch can be used to activate these functions. This has been found to be useful by a number of customers.

To use this feature you must re-enable it by an item in the **USER SETUP OPTIONS** every time you are going to use it. (see section 8.5) It is disabled any time the <TOP> key is pressed. So after enabling this function you must leave the **USER SETUP OPTIONS** menu by way of **TO MAIN MENU?** menu item. The external switches will also be disabled whenever you leave the **TRANSMIT DMX512** menu.

Technical details needed to build your own will be found in section 13.10

4.1 ADJUSTING ONE SLOT

If you want to look at the output of one dimmer, or if you want to use the *Lil'*DMXter as a focusing remote, you want to use the first choice in the **TRANSMIT DMX512** menu.

```
TRANSMIT DMX512
ADJUST ONE SLOT?
```

If you choose **<YES/Q>**, you will get a new display reading

```
| SENDING SLOT  1 |
| TO LEVEL     0%|
```

The level may be displayed in decimal, percent or hex. This status may be changed by queries in the **USER SETUP OPTIONS** menu (see section 8.3). If percent is used, the level is followed by a % sign. If hex is used, the display will show two hex digits followed by a lower-case 'h'. Change the slot number by using the **<RIGHT>** and **<LEFT>** keys; with the default 'flavor' setting you may choose slots from 1 to 512. The slot number may be changed by any of the methods described in section 1.1(4) and summarized in the side bar on this page.

Use the **<UP>** and **<DOWN>** keys to change the level. You may use any of the key presses listed in section 1.1(3) or the side bar on this page to quickly get to the desired level.

4.2 REENTERING ADJUST ONE

If you press **<YES/Q>** to exit this routine and then press it again to re-enter you will return pointing to the last slot that you were editing. If you exit to the **MAIN MENU** you will reset the slot to one. Taking or erasing the snapshot will also reset the slot number to one. This behavior is uniform for all routines that use a slot number. This was a new feature in version 1.70.

4.3 AUTOFADING ONE SLOT

```
TRANSMIT DMX512
AUTOFADE ONE SLOT?
```

This menu item is a test that allows you to cycle slots up and down automatically. It has two modes; one cycles one slot continuously, the other cycles a slot once and then steps to the next slot. You may choose whether a slot cycles from off to full and back to off (fade UP) or cycles from full to off and returns to full (fade DOWN).

QUICK STEPPING THRU SLOTS AND LEVELS

Slot - AUTO-INCREMENT: Hold down the **<RIGHT>** or **<LEFT>** keys to auto-increment or auto-decrement the slot numbers by one.

Slot - JUMP BY 10: Hold down the **<YES/Q>** key and press the **<RIGHT>** or **<LEFT>** key to increment or decrement the slot number by 10.

Slot - AUTO-INCREMENT BY 10: Hold down **<YES/Q>** and then press and hold the **<RIGHT>** or **<LEFT>** keys to auto-increment or auto-decrement by 10.

RETURN TO Slot ONE: Press both the **<RIGHT>** and **<LEFT>** keys to return the slot number to one.

LEVEL - AUTO-INCREMENT: If you hold down the **<UP>** key, the slot levels will auto-increment towards full. If you hold down the **<DOWN>** key, the slot levels will auto-decrement towards zero.

LEVEL - BUMP TO FULL: Hold the **<YES/Q>** button down while you press the **<UP>** key to jump to full.

LEVEL - BUMP TO ZERO: Hold the **<YES/Q>** button down while you press the **<DOWN>** key to jump to 0.

LEVEL - BUMP TO HALF: Press both the **<DOWN>** and **<UP>** then release both keys - the level will to jump to 50%.

```
| AUTOFADE ONE SLOT |
|   ENABLE AUTOSTEP? |
```

If you answer **<YES/Q>** to this question you will cause the DMXter to cycle a slot once and then step to the next slot. If you answer **<DOWN>** to this question the DMXter will cycle the same slot up and down continually. After pressing either **<YES/Q>** or **<DOWN>** the display will change to read:

```
| AUTOFADE SLOT      1 |
|       TO LEVEL    0% |
```

The display will be static. The DMXter will have started to transmit. The level sent will be an unchanging zero. To start the auto fade press either **<UP>** or **<DOWN>**. Pressing **<UP>** causes the DMXter to start fading from zero up to full and then back to zero. Pressing **<DOWN>** causes the DMXter to start fading with the slot set to full, fade the slot to zero and then back up to full. If you **ENABLE AUTOSTEP** and select **<UP>**, slot 1 will fade to full and then back to zero. When it reaches zero the slot number will increment to slot 2 and the level will start fading from zero to full. If you **ENABLE AUTOSTEP** and select **<DOWN>** slot 1 will bump to full, fade to zero and then back to full. When it reaches full it will bump to zero, the slot number will increment to slot 2, slot 2 will bump to full and start fading from full to zero. In either case the DMXter will cycle through all the slots.

The **<LEFT>** and **<RIGHT>** keys operate in the same way as in **ADJUSTING ONE SLOT** above and may be used to change which slots are autofaded. If you did not **ENABLE AUTOSTEP** you must use the **<LEFT>** or **<RIGHT>** key to select the slot to autofade. Pressing **<LEFT>** or **<RIGHT>** zeros the old slot and sets the new slot to the beginning of its fade, either full or zero depending on whether we are fading **<UP>** or **<DOWN>**.

You may temporarily stop the fade by pressing **<YES/Q>** and either **<UP>** or **<DOWN>**. Pressing **<UP>** forces the slot to full; pressing **<DOWN>** forces the slot to zero. With the fade stopped, pressing either **<UP>** or **<DOWN>** will restart the fade.

The level may be displayed in decimal, percent or hex. The current status may be changed by queries in the **USER SETUP OPTIONS** menu (see section 8.3). If percent is used the level is followed by a % sign. If hex is used, the display will show two hex digits followed by a lower-case 'h'.

4.4 CLEARING THE SNAPSHOT

The *Lil'*DMXter can 'take a snapshot' of slot level information transmitted down the line, assuming you have plugged the input of the *Lil'*DMXter into the line coming from a working console. This is a useful function that we will discuss later. You may also build a snapshot slot by slot, using the *Lil'*DMXter's keys. Before doing this you may wish to clear the old snapshot.

The *Lil'*DMXter will ask you

```
TRANSMIT DMX512
CLEAR SNAPSHOT?
```

you should press **<YES/Q>** to answer yes. The unit will next ask

```
| CLEAR SNAPSHOT? |
| ARE YOU SURE?   |
```

This gives you a second chance if you didn't really mean to clear it. If you did, press **<YES/Q>** again and the unit will momentarily read

```
|      ZZAAPP!!    |
|    IT'S HISTORY! |
```

The *Lil'*DMXter will then drop thru to:

```
TRANSMIT DMX512
SEND/EDIT SNAPSHOT?
```

skipping the TAKE NEW SNAPSHOT menu item.

4.5 TAKING NEW SNAPSHOT

The *Lil'DMXter* can take the information it receives from the digital line and hold it in memory for later use. Taking a snapshot overwrites any old snapshot.

When you press <YES/Q> the top line of the display will briefly read TAKING SNAPSHOT . Assuming that there is data to be recorded, the bottom line will read briefly SNAPSHOT RECORDED . After a brief pause, the *Lil'DMXter* will drop thru to the next menu entry and the display will read

```
TRANSMIT DMX512
SEND/EDIT SNAPSHOT?
```

The snapshot function is START Code sensitive. If your DMXter is still reading TAKING SNAPSHOT for more than three seconds, and the bottom line remains blank, this means that your DMXter is receiving data with a different START Code than the one it is currently set to receive.

After 3 seconds, if no digital input is received, or if the input is not a digital form that the *Lil'DMXter* can recognize, you will see

```
NO DIGITAL INPUT
OR INPUT NOT DMX512
```

When you see this message on the display, first check to see that you have a cable plugged into the *Lil'DMXter* input connector and into the output connector of a working console.

Neither executing <TOP> nor <OFF> erases a snapshot. However, many menu items erase a snapshot.

4.5(1) Actions That Overwrite or Erase a Snapshot

The following events will overwrite a snapshot with a new snapshot:

- 1 - Taking a new snapshot, including the snapshots in **MULTI CHANNEL MODE**
- 2 - In cable test mode, using **SINGLE ENDED** cable test
- 3 - Using the **FLICKER FINDER**
- 4 - Using **VIEW LEVELS**. Whatever levels are in the table at the time one exits **VIEW LEVELS** will be preserved and may be used as a snapshot.
- 5 - **SHOW SAVER: RECORD SCENE, EDIT SCENE, and PLAYBACK SCENE**
- 6 - Using any transmit function in **MULTI CHANNEL MODE**

The following events will erase a snapshot and leave the table clear:

- 1 - **ADJUST ONE SLOT**
- 2 - **ADJUST ALL SLOTS**
- 3 - Using **CLEAR SNAPSHOT**
- 4 - Shutting down due to low battery (showing you **MEAL PENALTY**)
- 5 - If the battery is turned off by the internal battery switch

4.6 SEND/EDIT SNAPSHOT

Pressing the <YES/Q> key will start sending the entire snapshot to the slots and will display levels of four slots at a time. You can edit this as you need: use the <RIGHT> and <LEFT> keys for changing the slot numbers. Use the <UP> and <DOWN> keys for changing the level of the slot displayed in the left-most position on the display.

The levels may be displayed in decimal, percent or hex. The current status may be changed by queries in the **USER SETUP OPTIONS** menu (see section 8.3). If percent is used LEV: is changed to read LEV%. If hex is used, the display will show two hex digits followed by a lower-case 'h'.

Slot number and slot level may be set using the key presses listed in sections 1.1(3) and 1.1(4) and summarized in the side bar on page 11.

4.6(1) Searching for the next Slot with Level

SEARCHING FOR THE NEXT SLOT AT LEVEL: Press and hold the <DOWN> key while pressing and releasing <RIGHT> or <LEFT> keys to search for next higher (<RIGHT>) or lower (<LEFT>) slot with a level. The next slot with a level greater or equal to the search minimum will be displayed in the leftmost position of the display (New V1.70)

4.6(2) Re-entering Send/edit Snapshot

On exiting **SEND/EDIT SNAPSHOT** the transmitter is turned off, but the current slot number is NOT reset. Therefore you may simply press <YES/Q> again and restart exactly where you left off. This means that a finger stutter on the keys is not a disaster. You may also pause during a focus session and return to where you were. This was a new feature in V1.70 software. Previously the slot number was reset to 1 every time SEND/EDIT was entered.

If you exit to the main MAIN MENU you will reset the slot number to slot one. Taking or erasing the snapshot will also reset the slot number to one. This behavior is uniform for all routines that use a slot number.

4.6(3) Clearing the Snapshot Within Send/edit

You can set all slot levels to zero from within **SEND/EDIT SNAPSHOT**. Hold the <YES/Q> and <DOWN> keys. After about 3 seconds the display will change to read:

```
| SLT: 25 26 27 28 |  
| CLEAR SNAPSHOT? |
```

The top line of the display will not change; only the bottom line is rewritten. Release both keys. Now pressing <YES/Q> will clear all the slots, pressing <UP> or <DOWN> will return you to **SEND/EDIT SNAPSHOT**.

4.7 ADJUST ALL SLOTS

This function allows you to set all the slots to the same level at once. Use the <UP> and <DOWN> keys. If you hold down the <UP> key, the slot levels will auto-increment towards full. If you hold down the <DOWN> key, the slot levels will auto-decrement towards zero.

The level may be displayed in decimal, percent or hex. The current status may be changed by queries in the **USER SETUP OPTIONS** menu (see section 8.3). If percent is used the level is followed by a % sign. If hex is used, the display will show two hex digits followed by a lower-case 'h'.

Note that the *Lil'*DMXter will not allow you to bring all the slots to half or full at once. Many installations lack the power service to handle everything at full at once, and we don't own a piece of any fuse or circuit breaker manufacturer.

4.8 SEND FLAVOR

Although they are 'standards', there are many parameters of DMX512/1986, DMX512/1990, and DMX512-A that are permitted to vary over a wide range. These parameters may vary from product to product or even from moment to moment at the output of the same product. The Standard defines the acceptable range within which a number of parameters of the transmitted signal are permitted to vary. The *Lil'*DMXter allows you to vary 5 important parameters of the DMX512 signal. Three of these parameters may be adjusted to values that fall outside those permitted by the Standards. We provide these out-of-Standard test signals to allow sophisticated testing of DMX receivers. It should be understood that one piece of equipment's ability to operate outside the Standard does not make it inherently a 'better' piece of gear than one that does not!

While these parameters are individually variable, to simplify matters, we have provided for presets of those parameters and we have taken to referring to those presets as ‘flavors’. Therefore to choose a flavor refers to choosing a preset of parameters for the transmitted signal. The concept of flavors applies only to a transmitted signal generated by the *Lil’DMXter* and not to reception.

4.8(1) DMX512-A default flavor (New V1.80)

DMX512-A requires new transmitting devices to send at slightly less than full speed. The difference is very minor. All receiving devices must still correctly read full speed DMX. So it is perfectly valid to test a device at the old default flavor. (88µS break 8µS MAB etc.) As of V1.80 the default flavor conforms to the requirements of E1.11(DMX512-A). If this flavor is selected, you will not be queried upon entering Transmit. If you wish to use your DMXter with the old “standard” flavor, you should select DMX512/1990. With this flavor selected you will be reminded on entering the Transmit menu that you have a non-standard flavor selected. To accommodate the new default flavor, one former standard flavor has been moved to user flavor C.

There are 8 Preset ‘flavor’ choices :						
NAME	BREAK	MAB	SLOTS	IFT	IST	Updates/Sec
DMX512-A 92µs / 12µ	92µS	12µS	512	0	0	40
DMX512/1990 8µS MAB	88µS	8µS	512	0	0	40
24 SLOTS 8µS MAB	88µS	8µS	24	0	0	769
DMX512/1990 4µS MAB	88µS	4µS	512	0	0	40
24 SLOTS 4us MAB	88µS	4µS	24	0	0	771
USER A (default values)	160µS	20us	128	11	1542	14
USER B (default values)	160µS	20µS	512	1	40	29
USER C (default values)	70µS	4µS	20	0	0	921
old USER C	160µS	20us	512	2	742	16

BREAK = BREAK TIME
MAB = MARK AFTER BREAK
SLOTS = NUMBER OF SLOTS
IST = INTERSLOT TIME² (in units, each unit = 22µS)
IPT = INTERPACKET TIME (in units, each unit = 22µS)

Getting into the **SEND FLAVOR** submenu will put you at the last flavor that was set. You may step thru the choices from there. Use the <YES/Q> key to select your flavor and return to the **TRANSMIT** submenu. You will find yourself at the **ADJUST ONE SLOT** choice. This is an exception to the general rule that <YES/Q> returns you to the point from which you entered the menu.

4.8(2) Changing the User Flavors

The *Lil’DMXter* gives you three choices of ‘send flavor’ for you to define using your own parameters. When the display reads

```
SEND FLAVOR?
EDIT USER FLAVORS?
```

² Before the V1.70 manual GDC called this parameter ‘INTERBYTE time’ we have changed the name again to match DMX512-A’s wording.

and you press <YES/Q>, the next display briefly reads

```
USER FLAVOR EDITOR
USER A USER B USER C
```

4.8(3) Change Break Length

The entry routines for the next 5 parameters are a sub-menu loop. When you are done editing these parameters, you will need to go to the 6th item which reads **RETURN TO FLAVOR SELECT MENU?** This is a change in behavior from earlier versions of our software. The top line of the next display reads

```
BREAK LENGTH IN Us
```

On the second line there will be three numeric entries representing the user A, B, and C break lengths. If you wish to change values for break lengths, press the <RIGHT> or <LEFT> keys. You will see an underline cursor entering from the right or left side of the display. The arrow keys move the cursor along this line; when you are at the location where you wish to change the entry, use the <UP> and <DOWN> keys to count up or down. When you are done making changes, pressing the <YES/Q> key enters the numbers and clears the cursor. You may now use the <UP> and <DOWN> keys to step thru the next parameter submenu. If you do not wish to change break lengths, press the <UP> or <DOWN> keys to step thru the parameter submenu.

The DMX512 Standard requires that breaks be at least 88 μ S and allows for breaks as long as 1 second. The *Lil'*DMXter can transmit breaks as short as 50 μ S and as long as 49,144 μ S if the mark after break is set at 8 μ S. The total of the mark after break and the break can equal no more than 49,152 μ S, and the *Lil'*DMXter will not allow you to exceed this total.

4.8(4) Change Mark after Break Length

The next user adjustable parameter is mark after break length (MAB). Just as above for break length, use the <RIGHT> and <LEFT> keys to move the cursor across the display, and the <UP> and <DOWN> keys to increment and decrement the information. When you are done making changes, pressing the <YES/Q> key enters the numbers and clears the cursor.

DMX512/1986 defined the MAB as 4 μ S. DMX512/1990 defined the MAB as no shorter than 8 μ S and less than 1 second. The *Lil'*DMXter can transmit a mark after break as short as 3 μ S and as long as 49,064 μ S if the break is set at 88 μ S. The total of the break and the mark after break can equal no more than 49,152 μ S and the *Lil'*DMXter will not allow you to exceed this total.

4.8(5) Setting the Number of Slots

The next user adjustable parameter is number of slots. As before, use the <RIGHT> and <LEFT> keys to move the cursor across the display and the <UP> and <DOWN> keys to increment and decrement slot number. Press the <YES/Q> key to enter the information. Press the <DOWN> key to go on.

The *Lil'*DMXter may be set to transmit any number of slots from 1 to 999.

DMX512 sets a maximum number of slots at 512. No dimmer system should be expected to work correctly when receiving more than 512 slots. We provide the ability to transmit more than 512 slots as a test feature. While DMX512 does not set a minimum number of slots, setting the *Lil'*DMXter to transmit fewer than 22slots will violate the minimum break to break spacing requirements of DMX512/1990 and DMX512-A unless you properly set the interslot time or the interpacket time (see below).

4.8(6) Interslot Time

DMX512 transmits slots grouped in 'packets'. A packet starts with a break and mark after break sequence. Next the START Code is sent, followed by the slots. Each slot is transmitted as a byte. A start bit and two stop bits are added to the raw byte. Technically when the start bit and stop bits are present the byte is referred to as a 'frame'.

The frames are sent sequentially. The packet is considered to continue until the start of the next break. The Standard does not require there to be any time between frames. Many DMX512 transmitters do insert a small pause between frames. The *Lil'*DMXter does insert a very small pause between frames. This pause is approximately 4µS long. The *Lil'*DMXter takes 48µS to transmit a frame when the minimum possible time would be 44µS.

While the term 'frame' is technically correct it is common usage to refer to DMX512 as sending bytes. In fact all versions of this manual prior to V1.70 used the term INTERBYTE time to refer to the above parameter. So if INTERSLOT time sounds new that's because it is - at least in this manual.

To help simulate consoles that insert pauses and to allow testing of some early dimmer designs that may require pauses between slot frames, the *Lil'*DMXter allows you to insert an additional pause between each slot frame. The inter-frame interval may be adjusted between 0 and 15 units. Each unit represents an additional pause of 22µS (equal to ½ a frame time) added to the 4µS noted above.

4.8(7) Interpacket Time

The next user adjustable parameter is interpacket time or interpacket pause. Some early dimmers may require such a pause. The *Lil'*DMXter allows the user to insert up to an additional 65,535 units of interpacket time, each unit equal to a 22µS pause. DMX512/1990 and DMX512-A requires that a dimmer function properly with no pause between packets.

The *Lil'*DMXter inserts a very short pause of about 4µS at the end of each packet. We will consider this to be a zero unit interpacket time.

One use of the interpacket time is to allow the *Lil'*DMXter to send DMX packets with fewer than 22 slots without violating the Standard. DMX512/1990 and DMX512-A requires the break-to-break time be not less than 1196µS. With packets of fewer than 22 slots this requirement will not be met by the *Lil'*DMXter unless interpacket time is added to maintain the minimum break-to-break time requirement. Should you wish to send packets of less than 22 slots that conform to the Standard, you should add at least 2 interpacket units for each slot less than 24 that you have selected. (Yes, we mean 24. When figuring out how many units of interpacket time to use, calculate with 24 instead of 22 slots.)

4.8 RETURN TO MAIN MENU

This does exactly what you might think it does!

4.9 CHANGING THE START CODE

DMX512 is a standard primarily intended to communicate level information to dimmers. It has provisions for non-level or non-dimmer communications by means of a 'START Code'. For dimmer communication the start code has a value of 0, sometimes referred to as the 'null start code'. The default START Code setting in the *Lil'*DMXter is therefore 0. Some of this equipment uses non-0 START Codes. The *Lil'*DMXter provides you with the ability to set the START Code you need for the type of equipment you are testing.

The display will read

```
| START CODE IS 0 |  
| CHANGE IT? |
```

If you press <YES/Q> the display will read

```
| START CODE IS 0 |  
| CHANGE START CODE |
```

Press the <UP> and <DOWN> keys to change the start code to your desired setting. Pressing <UP> and <DOWN> together will cause the start code to bump to 128. Pressing <YES/Q> and <DOWN> together will return the start code to zero. When the desired value is displayed, press the <YES/Q> key to save this value. The DMXter will use this value as its START Code for both **TRANSMIT** and **RECEIVE** until it is changed again by the user. The

only exceptions are when a DMXter has had its battery turned off or when the power supply safety circuit has shut down the power supply or when the factory defaults have been restored. For details, see Section 2.5. Then it reinitializes the START Code to 0. See **MEAL PENALTY**, Section 15.2(1)

The START Code may be displayed in hex. The current status may be changed by queries in the **USER SETUP OPTIONS** menu (see section 8.3). START Codes may only be displayed in decimal or hex. If percent is selected for levels via **USER SETUP OPTIONS** START Codes will be displayed in decimal. If hex is used, the display will show two hex digits followed by a lower-case 'h'.

Exiting **CHANGE START Code** jumps you to **ADJUST ONE SLOT**.

This is an exception to the general rule that **<YES/Q>** returns you to the point at which you entered the menu.

4.9(1) MAB Accuracy Vs. START Code

If the START Code is set to 0 and the break length is less than 16mS, the mark after break should be essentially jitter-free. When you set a non-0 START Code or when the break time is longer than 16mS, regardless of START Code, we change the method of generating the mark after break. This alternate method has a maximum jitter of about 4μS. To guarantee that the generated mark after break is never less than that set by the current flavor, we offset the average value. The result is that if you set the mark after break to 8μS with a non-0 START Code, the minimum value will be 8μS ; the maximum value will be about 12μS . Most of the time, the average value will be close to 12μS . Very few packets with a mark after break as short as 8μS will be sent.

4.9 SETTING THE MINIMUM LEVEL FOR SEARCHES

```
SEARCH MIN IS    1%
CHANGE IT ?
```

In **SEND /EDIT** pressing and holding down the **<DOWN>** key and then pressing either **<LEFT>** or **<RIGHT>** will cause it to search the slot table for next higher or lower slot with a level greater or equal to the search minimum.

4.10 TRANSMIT SCOPE TRIGGER

The *Lil'*DMXter can provide an oscilloscope triggering signal synchronized to the break in the transmitted DMX512 data stream. Most users will not have any interest in this function - feel free to skip the rest of this section. For this reason, the default for this function is off.

The scope trigger menu display reads

```
SCOPE TRIGGER IS OFF
ENABLE TRIGGER?
```

Use the **<YES/Q>** key to enable it. The scope trigger will turn on and the display will read

```
SCOPE TRIGGER IS ON
DISABLE TRIGGER?
```

Each time you press the **<YES/Q>** key the display will toggle. Leave this function by using the **<UP>** or **<DOWN>** keys.

Technical details: The scope trigger is output on Pins 4 and 5 of the female connector. The signal is balanced RS485. Pin 5 goes high approximately 2μS before the falling edge of transmitted break and remains high until approximately 3.2μS after the falling edge of mark after break. If you need to trigger an oscilloscope on DMX512 sent by another transmitter, see section 14.

4.11 SENDING TEXT PACKETS

(RMG rewrite this section)

Another new feature of DMX512-A is the TEXT PACKET. Today there are many DMX512 transmitters that are not large lighting consoles. Many devices designed for embedded applications require very little user interface *once*

they are configured. However configuring or trouble shooting these devices is difficult at best. 'If only they had an LCD screen.'

!NEW TEXT!

Well now the *Lil'DMXter* and similar devices can be that screen. The V1.80 software provides two routines supporting Text Packets, this routine and a Text Packet receiving routine in the Receive Menu. This routine is a simplified version of the SEND TEXT PACKET routine designed for the *Lil'DMXter 2* software.

This routine is intended to test other Text Packet receiving devices. The Text Packet Receive routine can be used to monitor any DMX512-A devices that support this feature. It is identical to the one supported by *Lil'DMXter2* V2.30 software.

When you enter this routine a single text message is sent. The text of that message is:

```
'ESTA DMX512A TXT PACKET'
```

The display on entry will look as shown below.

```
|MS#   1 L-27  C-   3 |  
|ESTA DMX512A TXT PAC |
```

The top line tells you that this is the first message and in this case the only message. The total length of the packet is 27 slots. The first character on the right hand end of the display is in the 3rd slot. Note the 3rd slot is the first slot in which alpha-numeric characters will be sent. For details on the text format see Appendix B.

In this simplified text routine there are only two controls over this display. You may scroll left and right using the <LEFT> and <RIGHT> keys and you may jump back to the display as shown by pressing both the <LEFT> and <RIGHT> keys at once.

Technical note:

Text Messages are sent with a special START Code , 17h, and generally will not be viewable by Null START Code receiving devices. More technical details are in Appendix B.

4.12 DMX512 TEST PACKET - HEX 55

```
|TRANSMIT DMX512      |  
|SEND 55 TEST PACKET?|
```

This item sends a packet with the START Code set to hex 55 followed by 512 slots of hex 55. These packets have every other bit set. It was included in the new version of DMX512 as a test pattern. It may be useful measuring bit delay and bit distortion through DMX512 repeaters and splitters. While it will seldom be used in day to day testing of a working lighting system, when the bits hit the fan it can be very useful.

5.0 RECEIVE DMX512

Answering <YES/Q> to the RECEIVE DMX512? query puts you in the **RECEIVE** menu, the first question the user needs to answer is

```
RECEIVE DMX512
AT END OF LINE?
```

DMX512 systems may be wired as a 'daisy chain' with multiple receivers connected in series by a cable going from the console to receiver 1, another cable going from receiver 1 to receiver 2, and then on from there until all the receivers are connected in a chain. The last receiver in the chain is required to terminate the line. For more information on termination, please see Section 12.6(5).

The *Lil'*DMXter may be inserted at any point in the daisy chain. If it is inserted at the end of the daisy chain, it must terminate the DMX line. If it is inserted in the middle of the daisy chain it should be transparent passing signals from its input connector to its output connector. Your answer to the END OF LINE? question will control whether the DMXter terminates the line or not. Answering <YES/Q> will terminate the line.

5.0(1) If a Non-zero START Code Is Set

If you previously changed the START Code to a non-0 value, you will be informed of this fact and given the chance to change the START Code if you wish. The method is identical to that explained in Section 5.4.

5.1 VIEW LEVELS

Pressing the <YES/Q> key will display 4 slot numbers on the top line and their levels below. The unit allows you to step thru the levels for all of the slots displaying 4 at one time.

5.1(1) Display and Timeout Rules (update V1.80)

When the *Lil'*DMXter was first built, very few devices made regular use of Alternate START Code packets. While most DMX is still Null START Code packets, ASC packets are seen far more often. If you saw data on the screen it was likely that it was data sent in Null START Code packets. If the null packets stopped coming you would soon see a no data message.

If you are dealing with a DMX512 system that mixes Null and ASC packets it is helpful to understand the display and timeout rules.

If within 3 seconds the *Lil'*DMXter does not receive DMX512 data on **any START Code**, the display will change to

```
NO DIGITAL INPUT
OR INPUT NOT DMX512
```

When this message is displayed reception of DMX512 stops. However the buffer is not cleared. Whatever was last received is still in the buffer.

If a system that mixes Null and ASC messages stops updating the Null packets but continues to send ASC packets the 'no data message' will NOT appear. As long as some valid DMX512 packet is received every 3 seconds no time out occurs. Simply viewing the display would not indicate this.

5.1(2) <UP> Clears the Display Buffer and Restarts Receive

Pressing <UP> will restart the receive routine and will clear the receive buffer. When the key is pressed the bottom line of the display will momentarily display the word 'CLEAR'. The <UP> key can be used at any time to see if the display is being updated or is static.

5.1(3) <DOWN> Restarts the Receiver

Pressing <DOWN> restarts the receive routine and will show you the data that was in the buffer at the time the time out occurred. When the key is pressed the word 'RESTARTING' momentarily appears on the bottom line.

This is a latched display. After correcting the problem you may clear the NO DIGITAL INPUT display by restarting the **VIEW LEVELS** section. This is done either by using the **<UP>** or **<DOWN>** keys.
New text

Regardless of how many slots are being transmitted, there will always be 512 entries in the slot table. The level value for slots that are not being transmitted will be displayed as 0. If you wish to know how many slots are being transmitted, see **5.1(2) RECEIVED SLOT SUMMARY DISPLAY** below.

The levels may be displayed in decimal, percent or hex. The current status may be changed by queries in the **USER SETUP OPTIONS** menu (see section 8.3). If percent is used **LEV:** is changed to read **LEV%**. If hex is used, the display will show two hex digits followed by a lower-case 'h'.

5.1(4) Received Slot Summary Display

Hold down the **<YES/Q>** key and press **<DOWN>**. You will see the following display

```
23 OF 256 L >= 1%  
SLT: 2 TO SLT 100
```

The top line of this display tells you the total number of slots received, in the case above, 256, and the number of slots having a level greater or equal to the search minimum. In this case, 23 slots have a level greater than or equal to 1 percent.. The bottom line lists the lowest slot and the highest slot to have a level greater than or equal to the search minimum. The search minimum can be set from 0 to 255; it is set by its own menu item (see Section 5.5)

5.1(5) **<RIGHT>** and **<LEFT>** in VIEW LEVELS

AUTO-INCREMENT: Hold down the **<RIGHT>** or **<LEFT>** keys to auto-increment or auto-decrement the slot numbers by one.

JUMP BY 10: Hold down the **<YES/Q>** key and press the **<RIGHT>** or **<LEFT>** key to increment or decrement the slot number by 10.

AUTO-INCREMENT BY 10: Hold down **<YES/Q>** and then press and hold the **<RIGHT>** or **<LEFT>** keys to auto-increment or auto-decrement by 10.

SEARCH FOR NEXT SLOT AT LEVEL: Hold down the **<DOWN>** key while pressing **<RIGHT>** or **<LEFT>** to search for next the higher (**<RIGHT>**) or lower (**<LEFT>**) slot with a level greater or equal to the search minimum

RETURN TO SLOT ONE: Press both the **<RIGHT>** and **<LEFT>** keys together to return the slot number to one.

5.1(6) Data Error While Viewing Levels

If a significant data transmission error is detected, the first three characters of the second line of the display will read **ERR** instead of **LEV**. You may view the error and clear the **ERR** flag by pressing and holding **<YES/Q>** and then pressing **<UP>**. The display will be the same as the first display in **VIEW PARAMETERS**.

5.2 VIEW PARAMETERS

Whenever the *Lil'*DMXter is receiving DMX512 it checks for the following problems:

PE = PARITY ERROR
FE = FRAMING ERROR
BK = BREAK TOO SHORT (less than 88µS)
MK = MARK AFTER BREAK TOO SHORT (less than 8µS)
DMX512/1986 called for a 4µS mark. DMX512/1990 and DMX512-A requires a mark of 8µS or longer.
We flag marks of less than 8µS as a warning of possible compatibility problems.

OVFL = OVERFLOW (meaning that you have attempted to receive more than 512 slots)
 BNW = BROKEN WIRE (The probable cause is Pin 2 or 3 of your cable is open. If this reads as B?W it means that this feature is disabled. Turn it on again thru the **USER SETUP OPTION**.)

If any portion of this test returns an error the unit will show it. An error is shown by an * on the display under the error's code. The display on the left shows two errors, a short break and packet containing more than 512 slots. The display on the right is the 'no error display'.

PE FE BK MK OVFL BNW * *	PE FE BK MK OVFL BNW NO ERRORS DETECTED
---	--

Technical Note: We report a **PARITY ERROR** for any frame (byte) that does not have its first stop bit. DMX512 is a no-parity system and the 9th bit should always be high. To prevent false trips on the **BREAK TOO SHORT** and **MARK AFTER BREAK TOO SHORT** measurements, the trip point for these measurements is set as follows: a break must be measured as 87.5µS or less. A mark after break must be measured as 7.5µS or less.

The *Lil'*DMXter allows the user to look at certain parameters of the received signal in detail. Pressing the **<UP>** and **<DOWN>** keys will scroll the user thru the choices. Pressing **<DOWN>** will bring you to:

5.2(1) BREAK LENGTH

BREAK LENGTH reads out a minimum value, a maximum value and an average of the last 32 packets, all expressed in µS (or if appropriate, in milliseconds). The average value will take a few seconds to appear on the display. The *Lil'*DMXter can measure the minimum, maximum and average break length for breaks longer than 65µS . If it receives a minimum break time of less than 65µS , the minimum and maximum values will be replaced with the words **TOO SHORT**. This is to warn you that you have exceeded the measurement capability of the DMXter. The average value will still be shown but its validity should not be counted on. Break length is not **START Code** sensitive; the break length of all packets is measured regardless of the **START Code** that the packet is transmitted with.

5.2(2) MARK AFTER BREAK LENGTH

MARK AFTER BREAK LENGTH reads out a minimum value, a maximum value and an average value for Mark After Break length expressed in µS (or if appropriate, in milliseconds). The average value will take a few seconds to appear on the display. If it receives a minimum mark time of less than 3µS , the minimum and maximum values will be replaced with the words **TOO SHORT**. This is to warn you that you have exceeded the measurement capability of the DMXter. The average value will still be shown but its validity should not be counted on. **MAB** length is not **START Code** sensitive; the **MAB** length of all packets is measured regardless of the **START Code** that the packet is transmitted with.

5.2(3) List Received START Codes

The *Lil'*DMXter shows you which **START Codes** are being sent. It also reminds you which **START Code** it is currently set to receive levels from. The top line of the display will read

START CODES SET= X (where X=the current START Code)

The bottom line will read out the **START Codes** that have been received since the test was started. They will be sorted in numerical order with the lowest number to the left. If more than four **START Codes** are being received, you will see

< 0 4 58 200 > (or something similar)

The brackets indicate that you may scroll **<RIGHT>** or **<LEFT>** thru all the **START Codes** being received.

The **START Code** may be displayed in hex. The status may be changed by queries in the **USER SETUP OPTIONS** menu (see section 8.3). **START Codes** may only be displayed in decimal or hex. If percent is selected

for levels via **USER SETUP OPTIONS** START Codes will be displayed in decimal. If hex is used, the display will show two hex digits followed by a lower-case 'h'.

5.2(4) # OF SLOTS PER PACKET³

This screen reads out the minimum and maximum number of slots per packet. The START Code is not included in this count.

Warning: while the Standard does not require that the number of frames be fixed for all transmissions, if the minimum and maximum number of frames are different, you should suspect a problem. Also you should never receive more than 512 frames. This test is start code sensitive; this test reports the frame count of only those packets transmitted with the currently selected start code.

5.2(5) BREAK-TO-BREAK TIME

This screen reads out the minimum value, the maximum value and an average value. The *Lil'*DMXter can measure the minimum, maximum and average break-to-break length of a DMX512 signal where this time is 900 μ S or longer. If it receives a break-to-break time of less than 900 μ S, all three values will be removed from the display and be replaced by the words TIME LESS THAN 900 μ S. Break-to-break time is not START Code sensitive; the break-to-break time of all packets is measured regardless of the START Code that the packet is transmitted with.

The method of measuring break-to-break length on the *Lil'*DMXter causes there to be a statistical uncertainty of +/- 8 μ S on any measured value. If the DMXter is receiving a DMX512 signal from a console whose break-to-break lengths do not vary, eventually the minimum value will settle to a value 8 μ S shorter than the average while the maximum will settle to a value 8 μ S greater than the average. For consoles whose break-to-break length varies but does so in a repeatable manner, the minimum value is likely to be 8 μ S less than the true minimum while the maximum value will be 8 μ S greater than the true maximum value. For consoles that erratically produce variable break-to-break lengths it is impossible to say exactly what the results will be other than the minimum and maximum values will be within +/- 8 μ S of the ideal value. Added to this uncertainty is any inaccuracy caused by the finite accuracy of the *Lil'*DMXter's time base. The time base should be accurate to +/-75 parts per million for units with serial numbers of 908 or higher. Prior to that it should be accurate to +/-150 PPM.

5.2(6) UPDATES PER SECOND

This screen reads out the minimum, maximum and average number of DMX512 packets per second. The minimum and the maximum values are refreshed once per second. Thirty-five seconds is required for the average to appear initially. Following that, it is refreshed once per second. To leave this display, press either <UP> or <DOWN> or <YES/Q> and hold them for approximately one second. You will know that you have held the key long enough when the numbers on the bottom line of the display have been erased. This test is not START Code sensitive.

5.3 RETURN TO MAIN MENU

While many users will find using the <TOP> key to be the easiest way to get back to the function menu, using this menu item provides an advantage: if you answered <YES/Q> to the <END OF LINE?> query, the DMXter is now in a terminated mode and will not pass data. Using <RETURN TO MAIN MENU?> unterminates the DMXter; using <TOP> does not.

5.4 CHANGING THE START CODE

DMX512 is a standard primarily intended to send level information to dimmers. It has provisions for non-level or non-dimmer communications by means of a 'START Code'. For dimmer communication the START Code has a value of 0, referred to as the 'null START Code'. The default START Code setting in the *Lil'*DMXter is therefore

³ Prior to V1.70 this parameter was called **BYTE PER PACKET**. Then it was changed to **BYTES PER PACKET**. Now we are conforming to DMX512-A usage.

0. Some equipment uses non-0 START Codes. The *Lil'*DMXter provides you with the ability to set the START Code you need for the type of equipment you are testing.

The display will read

```
START CODE IS 0
CHANGE IT?
```

If you press <YES/Q> the display will read

```
START CODE IS 0
CHANGE START CODE
```

Press the <UP> and <DOWN> keys to change the START Code to your desired setting. Pressing <UP> and <DOWN> together will cause the START Code to bump to 128. Pressing <YES/Q> and <DOWN> together will return the START Code to zero. When the desired value is displayed, press the <YES/Q> key to save this value. The DMXter will use this value as its START Code for both transmit and receive until it is changed again by the user. The only exceptions are when a DMXter has had its battery turned off or when the power supply safety circuit has shut down the power supply or when the factory default values have been restored. See Section 2.5. Then it reinitializes the START Code to 0. See **MEAL PENALTY**, Section 15.2(1)

The START Code may be displayed in hex. The status may be changed by queries in the **USER SETUP OPTIONS** menu (see section 8.3). START Codes may only be displayed in decimal or hex. If percent is selected for levels via **USER SETUP OPTIONS** START Codes will be displayed in decimal. If hex is used, the display will show two hex digits followed by a lower-case 'h'.

5.5 SETTING THE MINIMUM LEVEL FOR SEARCHES

```
SEARCH MIN IS 1%
CHANGE IT ?
```

The search minimum is used by **VIEW LEVELS**. In **VIEW LEVELS** pressing and holding down the <DOWN> key and then pressing either <LEFT> or <RIGHT> will cause **VIEW LEVELS** to search the received slot table for next higher or lower slot with a level greater or equal to the search minimum. The number of slots with a level greater or equal to the search minimum is reported in the **RECEIVED SLOT SUMMARY DISPLAY**.

This menu item is used to set the search minimum. The range for the search minimum is 0 to 255. The search minimum may be displayed in decimal, percent or hex. The status may be changed by queries in the **USER SETUP OPTIONS** menu (see section 8.3). If percent is used the level is followed by a % sign. If hex is used, the display will show two hex digits followed by a lower-case 'h'.

The mechanics of changing the search minimum are the same as for changing the START Codes as described in section 5.4 above.

5.6 DMX512 PARAMETERS NOT CHECKED

BAUD RATE - The *Lil'*DMXter does not measure the baud rate of the received signal. Neither does it measure bit jitter. If the baud rate of the console is within the allowed range, the *Lil'*DMXter should properly receive the signal, but no measurements are made or reported.

SIGNAL VOLTAGE LEVELS - The *Lil'*DMXter does not measure the voltages provided on the RS485 line, specifically neither differential nor common mode voltages are evaluated to see if they fall within the RS485 specification. If the *Lil'*DMXter is reliably receiving data, it is probable that the differential signal level is adequate. Testing of common mode signals is beyond the scope of the *Lil'*DMXter and this manual. Both common mode and differential mode signals can be tested by a qualified technician using standard laboratory equipment.

INTERSLOT TIME - Current software does not check Interslot time.

INTERPACKET TIME - Current software does not check Interpacket time.

5.7 RECEIVE TEXT PACKETS

A new feature of DMX512-A is the TEXT PACKET. Today there are many DMX512 transmitters that are not large lighting consoles. Many devices designed for embedded applications require very little user interface *once they are configured*. However configuring or trouble shooting these devices is difficult at best. 'If only they had an LCD screen.'

Well, now the *Lil'DMXter* and similar devices can be that screen. The V18.0 software provides two routines supporting Text Packet - this routine and a Text Packet transmitting routine in the transmit menu. This routine can be used to monitor DMX512-A devices that support this feature.

```
|MS#   0 L-  0 C-  3 |  
| ■                                     |
```

```
|MS#   3 L-512 C-  3 |  
|Alice was beginning |
```

The displays above are what you will see on entry to this routine. The left one appears when you are not receiving text packets. On the right is what the display looks like when you are receiving a long text message. Shown is the third of the canned DMXter messages sent by V2.32 code. This message is the full packet length of 512 and we are looking at the beginning of the text. Details on required packet format are in Appendix D.

You can scroll through a message using the <LEFT> and <RIGHT> keys.

- MS#** DMX512-A allows a device to send up to 256 different text messages. They are numbered from 0 to 255.
- L-** Text message packets may have from 24 to 512 data slots, plus the START Code. (See the Appendix B) This field shows the length of the packet that is currently being transmitted.
- C-** This is the position within the packet of the character that is in the first display position on the second line of the display. As you use the <LEFT> and <RIGHT> keys to move about the display this number lets you know where you are.

5.7(1) Displayed Character

Many simple display units will not display all ASCII characters as clearly as you would expect. When you get to extended character sets used on PCs the results are very display dependent. Some displays including the one we use have provision to load what are considered 'non printing characters' with special displays. So if you see odd characters consult APPENDIX B.

Viewing the Text Packet- Moving about the Display

AUTO-INCREMENT: Hold down the <RIGHT> or <LEFT> keys to auto-increment or auto-decrement the character position by one.

JUMP BY 10: Hold down the <YES/Q> key and press the <RIGHT> or <LEFT> key to increment or decrement the character position by 10.

AUTO-INCREMENT BY 10: Hold down <YES/Q> and then press and hold the <RIGHT> or <LEFT> keys to auto-increment or auto-decrement by 10.

RETURNING TO THE FIRST CHARACTER: Press both the <RIGHT> and <LEFT> keys to return the first character which is in slot 3.

6.0 FLICKER FINDER

The *Lil'*DMXter will let you look at changing DMX512 levels in your lighting system. Running a cue causes DMX512 levels to change, of course. When your console is sitting there not running cues, the levels should be constant. Sometimes they aren't and that's not an easy problem to diagnose and troubleshoot - until now. Most of the time the flickering lamp is not caused by the console; it's the lamp, or the socket, or the dimmers. Once in a while it is the console or the DMX512 transmission line. Since all of us automatically suspect the piece of equipment we understand the least, the *Lil'*DMXter allows you to do a quick diagnosis of your console and the transmission line - and lets you get out the ladder with a heavy heart, but a clear conscience.

To use **FLICKER FINDER** you will use the DMXter to take a **SNAPSHOT** of the console's output and compare it to what the console is outputting a short time later. You can do this at the console end only, checking the console only. Or, if you have any reason to suspect the DMX512 cable, you can do it at either the console first, moving down to the dimmer end, or you can do the whole test at the dimmer end on the principle that a funky cable will not give you repeatable results. If you suspect a bad cable, we advise that you run **SINGLE ENDED CABLE TEST** first, as this will test certain cable parameters that **FLICKER FINDER** is not designed to test.

Be certain that the *Lil'*DMXter is connected to the console's output, either at the console or at the dimmer end of the control cable. Set the console to output a stable cue (important-not a chase!) Set a real cue with real levels, not every channel at 00. If you suspect one mode is 'flickering' set the console in that mode.

Upon entering the **FLICKER FINDER** submenu, the first message is

```
TAKE SNAPSHOT OF
CONSOLE 'S OUTPUT?
```

Pressing **<YES/Q>** causes it to record the snapshot.

A technical note: During the taking of the snapshot the DMX512 line is momentarily terminated. So there is a very brief moment when data is not passed thru to the DMX512 OUT connector. If the DMXter did not see a digital input, it will tell you so.

```
NO DIGITAL INPUT
OR INPUT NOT DMX512
```

After correcting the problem, press the **<DOWN>** key to try again. After the snapshot is recorded, the next display will read

```
COMPARE LIMIT IS 4
CHANGE IT?
```

The compare limit is the number of steps of change either plus or minus that are allowed before the DMXter considers that a channel is changing or flickering. Note that one step is one part in 256; not one part in 100. The default compare limit is 4, but the user may set it from 0 to 64. The *Lil'*DMXter will remember the last limit you set and only returns to the default upon hard power up, i.e., battery switch on/off or **MEAL PENALTY**. **Note** that the compare limit menu item **does not** support any of the multi key bump functions.

The compare limit may be displayed in decimal or hex. If percent is selected for levels, the compare limit will be displayed in decimal. The status may be changed by queries in the **USER SETUP OPTIONS** menu (see section 8.3). If hex is used, the display will show two hex digits followed by a lower-case 'h'.

If the previously set compare limit is satisfactory, you may bypass changing it by pressing the **<DOWN>** key. Pressing **<YES/Q>** allows you to change the compare limit in a manner similar to changing START Code. When you have set the compare limit (or bypassed setting it) you will see the following message

```
FLICKER FINDER
AT END OF LINE?
```

Is the DMXter the last DMX512 device in line or do you have a loop thru to other receivers? Answering this question starts the data comparison. The display will read

```
COMPARING INCOMING  
DATA TO REFERENCE
```

As long as no errors are detected and the battery has sufficient charge, you will continue to see this message.

When an error is detected, the message will change to

```
ERRORS DETECTED  
PRESS YES/Q TO VIEW
```

The test continues to operate with no further indication of other errors, if any. So let the test continue to run for whatever period of time you want; 15 minutes, one hour etc. Pressing <YES/Q> will show you a summary screen of the errors found.

```
3 SLOTS W/ERRORS  
FIRST: 2 LAST: 216
```

It will show you the number of slots with errors (1-512). On the second line of the display you will see FIRST and a number representing the lowest slot with errors and LAST and a number representing the highest slot with errors. To see details of the slots, press <DOWN>. You will now see a display

```
SLT: XXX ERRS: XXXXX  
L: XXX H: XXX R: XXX
```

This screen means: the number following SLT is the lowest slot with errors. The number following ERRS is how many errors accumulated for this slot; it may range from 1-65,535. The number following L is the lowest level outside the reference window that the slot went to. The number following H will equal the highest level outside the reference window. The number following R equals the reference value for this slot recorded when the snapshot was taken. It is possible for the L value to be higher than the R value if all the incoming levels are higher than the R value. Similarly it is possible for the H value to be lower than the R value if all the incoming levels are lower than the R value.

At this point pressing the <RIGHT> key will take you to an identical screen for the next slot with errors. Using the <LEFT> key will take you to the previous slot with errors. (If you are at the first slot with errors, the <LEFT> key will take you to the highest slot with errors.) Both the <LEFT> and <RIGHT> keys have auto-repeat functions. Holding the <YES/Q> key while pressing either the <RIGHT> or <LEFT> key will jump you to the last slot with errors or the first slot with errors, respectively. At any time while viewing the detailed error screens, holding the <YES/Q> and <UP> will temporarily redisplay the error summary screen.

When viewing either the summary or detailed error screens you may quit by pressing <YES/Q>. This will return you to

```
FLICKER FINDER  
TO MAIN MENU?
```

6.1 RE-ENTERING FLICKER FINDER

If you hit <YES/Q> accidentally, do not despair! You may reenter **FLICKER FINDER** at three separate points. Pressing the <DOWN> key will offer you the chance to take a new snapshot. Pressing the <DOWN> key again offers you the chance to reuse the existing snapshot. Pressing the <DOWN> key a third time offers you the chance to view previous errors. Isn't that reassuring?

```
NO ERRORS RECORDED
```

You will see this display if:

the last time **FLICKER FINDER** was run, no errors were detected,
or if **FLICKER FINDER** has not been run since the battery switch was turned on,
or if **FLICKER FINDER** has not been run since the unit went into a **MEAL PENALTY**,
or if you have run the **SHOW SAVER PLAYBACK**,
or if you have run the **MULTI CHANNEL MODE** send routines.

If during the data comparison section of the test you press **<YES/Q>** before any errors are detected you will get the following message

```
TEST SUSPENDED
TO MAIN MENU?
```

If you wish to continue the test, press **<DOWN>** or **<UP>**. Pressing **<YES/Q>** will return you to the function menu. Once errors are detected, the data comparison section of the test cannot be re-entered. Once stopped, restarting the comparison clears the error tables.

6.2 TECHNICAL NOTES ON FLICKER FINDER

Flicker finder disables the power off timer while it is comparing incoming data regardless of the user setup. The backlite is turned off and left off as well; terminating the test by using **<YES/Q>** turns it back on. During the comparison test, the only keys on the DMXter that are operational are **<YES/Q>** and **<TOP>**. The **<OFF>** key will not turn the unit off while the test is running.

If during the data comparison section of the test any slot records 65,535 errors the test will be suspended. The display will read.

```
| TEST STOPPED, ERROR |
| OVERFLOW. VIEW?   |
```

6.2(1) LOW BATTERY WARNINGS DURING FLICKER FINDER

Low battery warnings are displayed in a slightly different way during the data compare test of **FLICKER FINDER**. **FLICKER FINDER** is a very processor intense task that cannot tolerate any interruption so a special battery warning was required. When the battery discharges to the point that the *Lil'* DMXter would normally display the standard warning the display changes from the one on the left to the one on the right. This display will be latched and will not change back to the normal display even if the *Lil'* DMXter is plugged into AC power.

```
| COMPARING INCOMING |           | FLICKER FINDER |
| DATA TO REFERENCE |           | LOW BATTERY WARNING! |
```

Once the low battery warning is displayed, it will only change if errors are detected. If the errors are detected and you have a low battery warning the display will look as shown below.

```
| ERRORS DETECTED |
| LOW BATTERY WARNING! |
```

If you are an experienced DMXter user and don't remember this description from earlier manuals, you are right. But it is not a new feature, we just never documented it before.

7.0 CABLE TESTER

The *Lil'DMXter* includes a cable test feature. While DMX512 cables may be tested by a conventional cable tester for continuity, testing them for ability to pass high speed digital data is a little more complicated. DC cable testers may pass as 'good' cables that will provide unreliable operation of DMX512.

The *Lil'DMXter* can provide two modes of cable testing - double ended and single ended. Double ended is used when you have both ends of the cable at hand; what you are doing with a standard cable tester. Single ended mode is used when you are testing an installed cable, where you don't have access to both ends at one time.

7.0(1) WHICH CABLE TESTERS ARE INCLUDED IN WHICH VERSIONS.

In the past all software versions had both versions of cable test. However, we are running out of code storage memory in the *Lil'DMXter*. That was a major reason for this model being discontinued. V1.80 has introduced some very handy new features and is available in laboratory versions. To include the RECEIVE SCOPE TRIGGER software in units along with some DMX512-A routines space had to be found. Single ended cable test was considered expendable for a lab instrument.

Verison	ONE ENDED CABLE TST
V1.80A	YES
C1.80A	YES
V1.80B	NO
V1.80C	NO

7.1 DOUBLE ENDED CABLE TEST

Upon entering the cable test menu, your first choice is whether you wish to do a double ended cable test

```
CABLE TESTER  
DOUBLE ENDED?
```

Selecting **<YES/Q>** will bring you to the next question

```
CABLE TESTER  
TEST PINS 4 AND 5?
```

Yes, we know, DMX512 doesn't use pins 4 and 5 - except that some manufacturers use them for non-DMX signaling. This is how some manufacturers signal over temperature on the dimmer racks. So we give you the option of testing these pins. Our tests of pins 4 and 5 are for continuity only, and do not attempt to send digital data on these pins.

Answering **<YES/Q>** will cause the test to start in a mode that tests all five wires. Pressing the **<DOWN>** key will cause the test to start testing only pins 1,2 and 3.

Once you begin the cable test, and assuming that your cable is good, the unit will step thru its procedure. After the *DMXter* has completed one test sequence the top line of the display will change to read **CABLE GOOD!** Each time the asterisk moves, the unit has completed one complete cable test and the cable has passed. A cable test consists first of checking for ground continuity, then checking for continuity and lack of shorts on Pins 2 and 3, then optionally continuity on Pins 4 and 5. Then a packet of DMX512-like data is transmitted and checked that it is received intact. If all of the above tests are successful, we consider the cable good. We move the asterisk one place in the display and start doing the test all over again.

Testing multiple cables: If you intend to test more than one cable at a time, after testing the first cable simply unplug it from the *DMXter* without pressing any keys on the *DMXter*. One of the error messages will appear, telling you

that the 'cable' has failed. Plug the next cable to be tested into the DMXter and restart the test by pressing either the <UP> or <DOWN> keys.

In this manner you may rapidly test multiple cables.

So it failed . . . If a cable fails the continuity test, the top line of the display will read

CABLE TEST FAILED

The text on the second line will tell you which pin(s) should be checked.

P1 : * means that Pin 1 (shield) is open. If Pin 1 fails, the test terminates so you will have no way of knowing if there are problems with other pins of that cable. We suggest that in repairing the cable, you check all the pins for problems. After repairing the cable test it again.

**SOME DMX512 USERS DO NOT WIRE PIN 1 ON BOTH ENDS OF THE CABLE.
THIS CABLE TESTER WILL NOT TEST CABLES THAT DO NOT HAVE PIN 1 CONNECTED
ON BOTH ENDS.**

P2 : * means Pin 2 open or that Pin 2 is shorted to Pin 1.

P3 : * means Pin 3 is open or that Pin 3 is shorted to Pin 1.

PINS 2&3 REVERSED! Obvious, huh?

P2 : *P3 : * means that either Pins 2 and 3 are both open or they are shorted to each other.

If either Pin 2 or Pin 3 is open or shorted to ground or the other pin, the test will stop before testing Pins 4 and 5.

P4 : * means Pin 4 is open or that Pin 4 is shorted to Pin 1.

P5 : * means Pin 5 is open or that Pin 5 is shorted to Pin 1.

PINS 4&5 REVERSED! Obvious, huh?

Px : *Px : * means that either both Pins are open or the pins are shorted together.

P2 : * P3 : * P4 : * P5 : * means that either the pairs Pin 2/Pin 3 and Pin 4/Pin 5 are reversed or Pin 2 is shorted to either Pin 4 or Pin 5, and that Pin 3 is shorted to Pin 4 or Pin 5. Pin 2 is not shorted to Pin 3 or the test would have stopped already.

If the data test part of the test fails, the display will read

CABLE TEST FAILED
WON'T PASS DATA

This means that you have a fatal problem with your cable. It may pass DC but massive errors were encountered when high speed digital data was sent. This error stops the test. If you wish to try again, press the <UP> or the <DOWN> keys. If, on the other hand, occasional data errors are found which might be caused by an intermittent solder joint or a cable that is borderline for transmitting data, the top line of the display will read

DATA ERROR

Once you've found a data error, the top line will continue to read DATA ERROR. The test will continue to run and the bottom line of the display will flash a black bar for about a second each time you encounter a data error.

7.1(1) Ending Cable Test

To end cable test, press and hold the <YES/Q> key for about one second. You will know that cable test has ended when you no longer hear the clicking noise. Release the key and you will see the following message

```
TEST SUSPENDED
```

You may now use the <UP> or <DOWN> keys to restart the test. Pressing <YES/Q> will return you to

```
CABLE TESTER  
DOUBLE ENDED?
```

As in many places in the *Lil'*DMXter, the quickest way to terminate a test is by pressing <YES/Q> <TOP> . . .

7.2 SINGLE ENDED CABLE TEST

– Not included in V1.80B or V1.80C–

When you are trying to test installed DMX512 cables, you will usually be able to get to one end of the cable at a time. This is the time for SINGLE ENDED CABLE TEST.

First, go to the console end, unplug the DMX512 cable to be tested, and use a short jumper to connect between the DMX512-IN connector on the DMXter's front panel and the DMX512-OUT connector on the console. You will now use the *Lil'*DMXter to take a sample of the console's output. NOTE: The Console must be set to output a stable cue, no fades running, no chases etc. Plug the DMX512 cable under test back in and take the DMXter to the other end of the cable, where you will take another sample and the DMXter will compare the two samples. If they are the same, then your cable is regarded as good.

The first message is:

```
TAKE SNAPSHOT OF  
CONSOLE 'S OUTPUT?
```

Answer <YES/Q> and the next message reads:

```
TAKING SNAPSHOT
```

If there is digital data available, you will see almost immediately

```
SNAPSHOT RECORDED
```

After a pause of about two seconds, you will see

```
UNPLUG DMXter, PLUG  
CABLE IN CONSOLE
```

Do as it says and unplug the jumper cable. Replug the cable under test into the console. After a short time, the message will change to

```
INSERT OTHER END OF  
CABLE UNDER TEST
```

Take the DMXter to the other end of the cable under test and plug it into the other end of the cable under test, using the DMX512-IN connector on the unit. Hopefully you see the message

```
CABLE GOOD!  
THE TEST CONTINUES..
```

If not, well, that's why we have test equipment . . . But do not despair - all the pins may not have connected at the same time. Pressing either the <UP> or the <DOWN> key will cause the unit to retest the cable. If the cable fails for any reason you can always retest using this method.

If you attempt to retest and instead of getting a 'good' or 'bad' message you get

```
RETESTING CABLE
LOOKING FOR DATA
```

this means that the DMXter has seen no signal, good or bad. Either you have totally open cable, or no cable at all.

7.2(1) Restarting the Test Using an Old Snapshot

If you press <YES/Q> during a cable test you will exit back to the **SINGLE ENDED** menu item. To restart the test without taking a new snapshot do the following. Press the <YES/Q> key again, the display will now read:

```
TAKE SNAPSHOT OF
CONSOLE 'S OUTPUT?
```

Answer <DOWN> and the next message reads:

```
USE EXISTING
SNAPSHOT?
```

Answering <YES/Q> will restart the test at the point where the

```
RETESTING CABLE
LOOKING FOR DATA
```

message is displayed.

7.2(2) Error Messages in Single Ended Cable Test

Error messages:

```
CABLE BAD OR MISSING
PRESS <DOWN> TO TEST
```

This message will be seen only if you press <YES/Q> key before plugging in the second end of the cable under test. Plug in the cable under test and press <DOWN>. Pressing the <YES/Q> key a second time will cause the DMXter to return to the **SINGLE ENDED** menu entry.

```
CABLE TEST FAILED
DATA ERRORS                                See item 1, below

DATA ERRORS
PINS 2/3 REVERSED                          See item 2, below

DATA ERRORS
PINS 2/3 MAY BE OPEN                       See item 3, below
```

What errors cause **SINGLE ENDED CABLE TEST** to fail?

- 1) A gross data format error such that the DMXter can't receive the DMX512 packet will cause the test to fail. If the received level of any channel changes more than +4/-3 points from the value in the snapshot the test will fail.
- 2) We attempt to identify reversal of pins 2 and 3, but this error message should be taken as an advisory.

3) If we detect that either pin 2 or 3 is open the test fails. Why do we separately worry about an open pin when it would seem that an open pin would cause a data comparison failure? EIA485, which is the electrical standard on which DMX512 is built, has an 'interesting feature'. Under certain unpredictable circumstances it will receive data with only shield and one of the two data lines connected. This makes checking cables harder. The cable test software uses special circuitry to specifically check to see if one of the two data lines is open.

IF YOU HAVE DISABLED THE 'OPEN LINE DETECTOR IN THE **USER SETUP MENU**, YOU WILL NOT SEE THIS MESSAGE.

7.3 RETURN TO MAIN MENU

This does exactly what you might think . . . !

8.0 SETUP USER OPTIONS

The *Lil'*DMXter is intended to be versatile so we provide the opportunity for the user to set certain options that make life a little easier. These options affect more than one function or menu. The **AUTO POWER OFF TIMER** and the **DISPLAY BACKLITE** queries are only displayed the first time that <TOP> is pressed after the DMXter has been off (sleeping). So we have included both queries in the **SETUP USER OPTIONS** menu.

The entry point from the main menu is

```
MAIN MENU
SETUP USER OPTIONS?
```

8.1 POWER TIMER OPTION

If no keys have been pressed for 10 minutes, the **AUTO POWER OFF TIMER** (if enabled) turns the unit off. Depending on the current state of the timer you will see one of two displays.

```
| POWER TIMER DISABLED |           | POWER TIMER ENABLED |
|   DISABLE TIMER?   |           |   ENABLE TIMER?   |
```

Pressing <YES/Q> reverses the state of the timer and displays the appropriate message. Pressing <YES/Q> will not step you to the next menu entry; it just reverses the timer state. To step to the next menu item you will have to press <DOWN>. This will preserve the current state of the timer.

8.2 BACK-LITE OFF OPTION

The next menu item is

```
| DO YOU WANT THE   |
| BACKLITE OFF?    |
```

Answer either <YES/Q> or <UP>/<DOWN> as you choose. Leaving this menu item by way of the <UP>/<DOWN> keys will turn the backlite on. The display will step to the next (or in the case of <UP> the previous) menu item.

8.3 NUMBER FORMAT OPTION

The next menu item is the **NUMBER FORMAT OPTION**. Certain numbers may be displayed in any one of three formats: decimal (DEC) , percent (%%), or hexadecimal (HEX) Slot levels may be displayed in all three formats. Decimal or hexadecimal notations are available for the START Code and for the **FLICKER FINDER** compare limit. When the DMXter is set to percent mode the START Code and the **FLICKER FINDER** compare limit will be displayed in decimal. Slot numbers and timing information are available in decimal notation only.

DISPLAY DATA IN
DEC ▶%%%◀ HEX

The current display format is the one pointed to by the filled arrows. To set the display format use <LEFT> or <RIGHT> keys to move the filled arrows so they point to the desired selection. The format will be set to whichever format is marked when you exit by pressing either <UP>, <DOWN> or <YES/Q>. The display format setting is stored in battery backup memory and is preserved when the unit is turned off. The default for this option is percent.

8.4 OPEN LINE DETECTOR OPTION

The next menu item is either:

OPEN LINE ENABLED OR OPEN LINE DISABLED
DISABLE DETECTOR? ENABLE DETECTOR?

The choice will depend on the current setting of this option. The unit is factory set to **OPEN LINE ENABLED**. Most users will want to leave this function enabled.

What is an Open Line Detector? The **OPEN LINE DETECTOR OPTION** is a proprietary Goddard Design Co. circuit to overcome a potential problem with the parent standard of DMX512, EIA485. In EIA485 it is possible to intermittently receive data from a cable that does not have connection of all of its pins. This can throw you off when trying to track down problems. Since the chance of passing data intermittently on a cable exists the *Lil'*DMXter incorporates the **OPEN LINE DETECTOR OPTION**. This circuitry flags seemingly good data when all the pins are not connected.

There are some manufacturers and suppliers in the theatrical lighting field that have DMX512 cables that deliberately do not have pin 1 connected at both ends. Following upon majority interpretation of the DMX512 Standard this is a practice that Goddard Design Co. does not endorse. If the *Lil'*DMXter is used on these cables the **OPEN LINE DETECTOR OPTION** will provide spurious 'bad cable' readings and so we provide the option to disable it.

The following functions use the **OPEN LINE DETECTOR OPTION**:

VIEW LEVELS - it is the feature we call 'BNW' for broken wire

VIEW PARAMETERS - error summary screen where it is also called 'BNW'

SINGLE ENDED CABLE TEST - the following message indicates that the error was caused by the open line detector

DATA ERRORS
PINS 2/3 MAYBE OPEN

DOUBLE ENDED CABLE TEST - it is inherent to this test and cannot be turned off. This test will not test cables where Pin 1 is not connected at both ends.

8.5 ENABLE EXTERNAL SWITCHES

In **ADJUST ONE SLOT**, **AUTOFADE ONE SLOT** and **ADJUST ALL SLOTS** the software supports two user provided external switches. In **ADJUST ONE SLOT**, and **AUTOFADE ONE SLOT** the switches when present and enabled duplicate the unshifted functions of the <RIGHT> and <LEFT> keys. In **ADJUST ALL SLOTS** the switches when present and enabled duplicate the unshifted functions of the <UP> and <DOWN> keys.

To use this feature you must reenable it every time you are going to enter the **TRANSMIT DMX512** menu. It is disabled any time the <TOP> key is pressed. So after enabling this function you must leave the **USER SETUP OPTIONS** menu by way of **TO MAIN MENU?** menu item, conveniently pressing <YES/Q> will step you to the **TO MAIN MENU?** item. The external switches will also be disabled whenever you leave the **TRANSMIT DMX512** menu.

8.6 COPYRIGHT NOTICE

Yes, we still have a copyright notice. It just doesn't scroll anymore.
The last menu item is

```
SETUP USER OPTIONS  
TO MAIN MENU?
```

Pressing **<YES/Q>** takes you back to the function menu. Pressing **<UP>** takes you back to the previous item in the user options menu. Pressing **<DOWN>** takes you to the beginning of the user options menu.

9.0 MULTI CHANNEL MODE - MOVING LIGHT TEST SOFTWARE

– Not included in V1.80C–

The *Lil'DMXter* **MULTI CHANNEL MODE** SOFTWARE is designed to ease the testing of multi-channel DMX512 devices. Originally DMX512 was used to drive dimmers. A lighting system was made up of several dimmer racks. Each dimmer rack usually contained many dimmers, but each dimmer had the same function as any other dimmer. Today many DMX512 devices (particularly moving lights) use more than one DMX slot. Each slot of a device controls a different parameter. Keeping track of the mapping of these different parameters has made testing multi channel devices a pain - until now. You could use a large specialized moving light console or you could use reams of cheat sheets while proving how good you are at mental arithmetic.

The **MULTI CHANNEL MODE** software is a specialized transmit routine. It is different from the rest of the *Lil'DMXter* and it has its own rules.

9.1 TERMINOLOGY IN THIS SECTION

Before the introduction of the term '**slot**' this section was a terminology night mare. We had to keep straight what was a DMX 'dimmer' or 'channel' as opposed to fixture 'channel' or 'dimmer'.

- We will use the term **dimmer** to refer to something that controls a specific dimmer level.
- **Slot** will refer to a particular frame within the DMX512 packet per DMX512-A.
- The terms **fixture channel** or **channel** will refer to a relative control channel of a particular type of multi channel fixture.

9.2 SUMMARY OF THE FIXTURE PROFILING FEATURES

- You may define a fixture type using 2 to 99 fixture channels. Actually the software will let you define a fixture using only one channel, but this setting is so useless that we will not talk about it further.
- You may define the number of similar fixtures in a contiguous block. A block may contain from 1 to 99 fixtures.
- Many multi channel fixtures have an internal dimmer but some do not. For fixture types that use an external dimmer, the software allows patching of the intensity control channel to any slot.
- If the external dimmers are in contiguous blocks, a simple auto patch routine will set up the patch with the absolute minimum of key strokes.
- Some multi channel fixtures use discharge or arc style lamps. Many of these lamps may not be turned on and off at will. To make it easier to deal with these fixtures the software can define one channel as the arc lamp control channel. This channel's level will never be changed except by an explicit instruction.

9.3 USING THE FIXTURE CONFIGURATION SUBMENU

The configuration submenu is the first item that you will see upon entry to the **MULTI CHANNEL MODE**.

```
| MULTI CHANNEL MODE |  
| CONFIGURE FIXTURE? |
```

Pressing the <**YES/Q**> key will drop you into the configuration display. The first time you enter this routine the display will be as shown below.

```
| ## SZ BGN CRT      |  
| -- -- ---  --  --  |
```

If you have used this routine before, at least the first four fields will be filled in and it may look like the one shown below.

```
|## SZ BGN CRT |
|10 12 136 01 -- |
```

In either case these displays are rather cryptic. Before you start taking our name in vain please press the **<RIGHT>** key once. An underline cursor will appear under the left most character of the display. The top line of the display will change so that it now reads:

```
| NUMBER OF FIXTURES |
|10 12 136 01 -- |
```

Are things getting a little clearer? In this menu what label text is displayed is dependent on which field the cursor is in and on the content of that field.

9.3(1) The **<UP>** and **<DOWN>** Key Use in Configure Fixture

The **<UP>** and **<DOWN>** keys may be used to increment or decrement the place the cursor is under, in this case the tens place. When incrementing a parameter, overflows carry into the next higher place. When the cursor is under the most significant place displayed for a parameter, decrementing will stop when that place reaches zero. If the cursor is under a field that is not the most significant place displayed for the parameter, underflows will cause a borrow from the more significant place. A special case needs to be pointed out. If the cursor is under the most significant place and all other places are 0, decrementing of the most significant place will stop at 1, not 0.

If you press and hold either the **<UP>** or the **<DOWN>** key the value will be auto-incremented. The **<LEFT>** and **<RIGHT>** keys are used to change the place within a parameter or to move to a new parameter field. Holding the **<LEFT>** or the **<RIGHT>** keys will cause the cursor to auto step across the display.

9.3(2) **[##]** Setting the Number of Fixtures in the Block

The leftmost two places on the display are used to set the number of fixtures in a contiguous block. That is what **'##'** is shorthand for. The allowed range for this parameter is 1 to 99.

9.3(3) **[SiZe]** Setting the Number of Channels per Fixture

Now move the cursor to the **'SZ'** or size field. The top line will change to read: CHANNELS PER FIXTURE The software will allow you to enter a fixture having from 1 to 99 channels.

9.3(4) **[BGN]** Setting the Starting Slot Number

Moving the cursor into the **'BGN'** or 'Beginning field' changes the top line to read: STARTING SLOT #. The block of fixtures will start at the slot entered in this field. Any valid slot may be used if the block of fixtures will fit without extending past slot 512.

9.3(5) Range Checking

The values entered into the first three fields are range checked as entered. The *Lil'DMXter* does not allow you to set up a system with ninety-nine fixtures, each requiring ninety-nine channels, starting at slot 200. Range checking is done as you enter. The rule is the number of fixtures times the number channels per fixture plus the starting slot minus one must be 512 or less.

9.3(6) Out of Range Behavior

If you are increasing either the 'number' or **'SiZe'** fields and the **'BeGiNning'** field resets to 1 you have attempted to create an impossible system. Once you have entered the first two fields you may increase the slot to the maximum that will work. Likewise if all the fields freeze, you have tried to build an impossible system.

9.3(7) [CRT] Setting the Current Fixture

The next field is labeled 'CRT' in shorthand and dynamically labeled CURRENT FIXTURE IS. The number entered in this field selects one fixture as the current fixture. The current fixture is the one that you can edit with SEND/EDIT routines. This field is limited to a number that is less than or equal to the number of fixtures in the block.

Why do I care what the current fixture is now? Will you let me change the current fixture in the edit routine? Yes you will get to change this value elsewhere, and much of the time you will not bother to enter a value here. Sometimes it will be handy to set up the first fixture to be tested here. There are two common uses for setting the current fixture by way of this field. One is to set the fixture whose dimmer you wish to patch. The other is to set the slots from which the default fixture look is recorded. More details of this use can be found in section 9.8.

9.3(8) Selecting the Dimmer Mode

We hope you understand the first four fields. As practice at this point would you please enter the values shown below. We will be using these settings to explain the next sections.

```
|## SZ BGN CRT      |  
|15 6 93 13 --     |
```

Move the cursor under the first dash. The display changes to:

```
| SELECT DIMMER MODE |  
|15 6 93 13 _-      |
```

Press the <UP> key. Again the display changes.

```
|ARC LAMP ON CHANNEL |  
|15 6 93 13 A      |
```

The 'ARC' mode is selected. We will explain the details below. Now press the <UP> key again. Now the display reads.

```
|LAMP ON DIMMER NUMBR|  
|15 6 93 13 D --- |
```

The manual or patch review mode has been selected. Again the details are below. If you press <UP> again you'll find yourself in the AUTOPATCH Mode. The display will read

```
|AUTOPATCH START @ SL|  
|15 6 93 1 DA --- |
```

Pressing <UP> again will put you back to the 'SELECT DIMMER MODE' display.

9.3(8).1 Setting the Arc Mode

Press the <UP> key until an 'A' is displayed.

```
|ARC LAMP ON CHANNEL |  
|15 6 93 13 A      |
```

Move the cursor all the way to the rightmost place on the display. Press the <UP> key. You will be allowed to enter any number up to the number of channels you have defined for the fixture, here 6. If the fixture you are defining uses a light source that cannot be switched on and off at will, having that light source's control channel protected from changes made by the restore features of this software is desirable. See section 9.6 for details of these functions. The

fixture channel defined by the setting of this field will be handled in a special manner on all fixtures. If the ARC lamp is controlled by channel 6 of our fixture, your display would now look like this:

```
| ARC LAMP ON CHANNEL |
| 15 6 93 13 A      6 |
```

9.3(8).2 Setting or Viewing a Patch

Let us go back and set the current fixture to 1 and then move to the 'A' field. Press the <UP> key twice and the display will now read:

```
| AUTOPATCH START @ DM |
| 15 6 93 1 DA  --- |
```

We are now in AUTOPATCH mode. Many 'fixtures' are made up of a DMX dimmer and some sort of automated fixture. It can be as simple as a PAR can and a color scroller. It can be a two-axis mirror module that mounts to the front of a standard theatrical instrument, or it can be a complete robotic lighting fixture that controls every parameter of the lamp except it requires an external dimmer. Consider a fixture with pan, tilt, color wheel one, color wheel two, and beam spread channels. This five-channel fixture will require a sixth channel to handle intensity. We are going to continue with the imaginary fixture we have already entered.

9.3(8).3 Entering an Autopatch

```
| AUTOPATCH START @ SL |
| 15 6 93 1 DA  200 |
```

You can enter any valid slot in the fields under 'SL'. I have chosen 200 because the fixture we entered takes all the channels from 93 to 182. Whatever number you enter will be the first channel of a contiguous block of slots used to dim the fixtures. So if you leave the display as shown above you will have defined channels 200 - 214 as the dimmer for our 15 fixtures. To check this move the cursor back to the 'CRT' field. Change the current fixture. Note that the dimmer number displayed in last field changes. The display below shows the patch for fixture 12.

```
| CURRENT FIXTURE IS |
| 15 6 93 12 DA  212 |
```

Let us assume that the dimmer pack we are using ends at 211 and the next dimmer pack can only be addressed by tens. So we wish fixture 13 to be patched to dimmer 220. To do this move the cursor back to the 'SL' fields and enter 220. Go back to the 'CRT' fields and check the results.

9.3(8).4 Rules for Autopatching

You must change something to cause a patch to be entered. Simply moving the cursor into the field changes nothing.

Patches are calculated as the numbers are entered. If you enter 300 and then move the cursor to the ones place incrementing from 0 to 5, a patch will be calculated starting 300, then 301, then 302, . . . and finally for 305. The effective patch is the one left when you move the cursor out of 'SL' fields. Patches take effect the next time you use SEND/EDIT FIXTURE.

If you try to patch dimmers to channels greater than 512 you will be given a warning message:

```
| AUTOPATCH STOPPED |
| MORE THAN 512 DMRS |
```

Fixtures that would have been patched to nonexistent channels will be left with their old value. If you have been incrementing the dimmer number, the 'old value' will be the last valid patch. It is therefore easy to end with several dimmers patched to DMX channel 512.

Other than checking that the patch does not extend beyond DMX slot 512 patches are not bounds checked. You may patch a fixture's dimmer to a DMX channel used by another fixture for a different parameter.

If you wish to autopatch several blocks, patch the one for the lowest fixture number first. Do the autopatch before any manual patching.

9.8(3).5 Manual Patching of External Dimmers

If you want to have absolute control of the patch, you may enter it slot by slot. The rule is autopatch the straightforward channels first and then go back and change the channels with odd patch assignments.

When the top line of the display reads, LAMP ON SLOT NUMBER you may enter a patch for that fixture. Two points to remember are:

An autopatch will overwrite a manual patch on any fixture equal to or greater than the starting fixture of the autopatch.

Patches are not bounds checked. If you enter a stupid patch you will get one.

Well, six pages later we are done with the entries that go on one 20-character display. So let's move on. Press and release the <YES/Q> key and then press the <DOWN> key.

9.4 SELECTING THE INITIAL FIXTURE STATE

```
| INITIALIZE FXTRS TO |  
| SNPSHT►DFault◄ZERO |
```

Whenever the **SEND/EDIT FIXTURE** routine turns on the DMX512 transmitter, the block of slots used by the configured fixtures are initialized. By this we mean that all these DMX slots have a predetermined value written to them. Note that we said that the fixtures will be initialized when the transmitter is turned on. Unlike other *Lil'DMXter* transmit routines the actual DMX512 transmitter is not simply turned off when the edit display is exited. We will explain this in detail below in section 9.10.S. The *Lil'DMXter* gives you three options on what values will be written to these channels.

SNPSHT stands for SNAPSHOT. This is the same snapshot sent by the standard Transmit DMX512 routine. If you have a moving light console that has a standard test cue you may start with all the fixtures set to this look by taking a snapshot of that look and configuring the software for **SNPSHT**.

DFault stands for DEFAULT. We allow the recording of a standard look or a default fixture look. This look may be the fixture pointing straight down, in white, the iris fully open, no effect enabled. If this option is selected, all fixtures will be set to values stored for this default fixture. Recording the default is explained in section 9.13. Editing the default is explained in section 9.8.

ZERO means that all slots that are used by the configured fixtures will be set to 00.

If the above settings are changed, the fixtures will be initialized to the new settings the next time the SEND/EDIT FIXTURES routine is entered.

9.5 SETTING WHAT VALUES A FIXTURE WILL BE RETURNED TO

```
| RETURN FIXTURE TO |  
| ►RESTORE◄DFLT ASIS |
```

In MULTI CHANNEL MODE only one fixture is edited at once. That fixture is the current fixture. When you are done editing one fixture, you may move on to the next higher or lower numbered fixture. When you do, the current fixture is deselected, becoming the previous fixture. This menu controls what happens to the values that are being sent to the current fixture when it is deselected.

RESTORE When a fixture is selected as the current fixture the values of the slots are saved. If RETURN is set to RESTORE these values are written back to the slots when the fixture is deselected. If you wish to return the fixtures

to the SNAPSHOT you must use this setting. This is the only setting that will preserve the SNAPSHOT for future use.

DFLT When the current fixture is deselected the stored default fixture is copied to the slots for that fixture.

ASIS When the current fixture is deselected the edited values are left in the slots for that fixture.

9.6 MOVE DATA TO NEXT FIXTURE?

```
| MOVE DATA > NXT FXTR |
|   ►YES◄ NO             |
```

This should be obvious. Do you wish to copy the edited look to the next fixture or not?

Well, you have now configured your fixture. The next menu item will get you out of the configure submenu so you can go and enter a default fixture. **Isn't this fun? Ok Now press <YES/Q>.**

```
| CONFIGURE FIXTURE |
| BACK TO MULTI MENU? |
```

9.8 SENT/EDIT THE DEFAULT FIXTURE

The default fixture is a way of setting up a neutral or standard position for every fixture. Its values are usually chosen to be a good jumping off point for testing the functioning of the fixture. A common default is to point the fixture straight down, in white. You may enter the default either by recording it from another console or by entering it from the keyboard. This section describes how to enter it. You may enter the number blind if you choose, or you may edit the default by viewing it connected to one fixture. The way you select which fixture the default drives is by setting the current fixture. The current fixture may be selected in two places. It may be selected in the configuration display as described in section 9.3 or it may be selected in the SEND/EDIT FIXTURE routine. See section 9.9. The current fixture **cannot** be set in this routine.

Press the **<Down>** key twice

```
| MULTI CHANNEL MODE |
| SEND/EDIT DEFAULT? |

| FX C  1  2  3  4 |
| df L  0  0  0  0 |
```

You will note that you are now in what looks like a normal *Lil'DMXter* SEND/EDIT window. 'FX' stands for **FiXture**. The 'df' stands for default. As you move around using the **<LEFT>** and **<RIGHT>** keys, you will notice that the top row of numbers only goes up to 6. That's because we are working with a fixture defined as having six channels. Also notice that fixture channel 6 is marked D 6. That's because this channel is patched to an external dimmer. Let us enter a few values. The values we will enter will not be real values but ones that are good for seeing the effect of this feature later in this section. Set channel 1 to 2, set channel 2 to 4, set channel 3 to 6, set channel 4 to 8, set channel 5 to 10, and set channel D 6 to 200.

9.8.S Actions That Turn on and off the DMX512 Transmitter

Actions That turn ON the DMX512 transmitter

- 1) Entering the SEND/EDIT FIXTURE routine.
- 2) Entering SEND/EDIT DEFAULT routine

Actions that turn OFF the transmitter

- 1) Pressing the **<TOP>** key.
- 2) Pressing **<YES/Q>** to the following menu item

```
| MULTI CHANNEL MODE |
| TURN OFF DMX XMTR? |
```

- 3) Using the **TO MAIN MENU?** menu item. This is the preferred way to exit Multi Channel Mode.

9.8.1 EDITING AIDS

The <UP> and <DOWN> keys function as they do in other SEND/EDIT windows. To jump to 50% press and release both the <UP> and the <DOWN> keys **at the same time**.

Pressing and holding the <YES/Q> while pressing and releasing the <LEFT> or <RIGHT> keys will cause the channel display to jump by ten channels. This function is also found in our normal SEND/EDIT window, but these key presses are used for a different function in SEND/EDIT FIXTURE window described in section 9.9.

When you are done editing, the display should look like the ones shown below.

```
| FX C D 6 1 2 3 |
| df L 200 2 4 6 |
```

Press <YES/Q>. Which display you see next will depend on what setting was chosen for the INITIALIZE FXTRS TO menu item. If default was chosen then you will be given the option of sending the default to the fixtures now. That display is shown below. If either of the other settings was chosen, you will return to the menu item that lets you SEND/EDIT a fixture.

```
| INITIALIZE FIXTRS TO |
| NEW DEFAULT?       |
```

If you want to initialize all the fixtures to the default that you just edited, press <YES/Q> now. You have just left a transmit routine, but unlike other *Lil'*DMXter transmit routines the DMX transmitter is still on. Nothing on stage should have changed unless you answered <YES/Q> to the above question. If you enter the SEND/EDIT FIXTURE routine, nothing will change. Initialization only takes place when the transmitter is turned on and it is already on.

9.9 TESTING THE FIXTURES - SEND/EDIT FIXTURE

```
| MULTI CHANNEL MODE |
| SENT/EDIT FIXTURE? |
```

Finally it is time to test some fixtures. What happens when you press the <YES/Q> key is dependent on how you have configured the fixture and what you were doing before. See the sidebar on the previous page for details.

```
| FX C 1 2 3 4 |
| 1 L 2 4 6 8 |
```

This is the edit fixture display. 'FX' stands for fixture, the number below it is the number of the fixture currently under test, now fixture 1. The values shown for channels are the ones entered for the default in section 9.8. As you move around using the <LEFT>

9.8.S1 Initialization Rules - When will the Fixtures Initialize?

When the SEND/EDIT menu is entered the fixtures are initialized to the values set in the configuration menu if any of the following are true.

- 1) The DMX transmitter is OFF.
- 2) The Initialization mode has been changed since the last time SEND/EDIT has been run.
- 3) If a snapshot has been taken since the last time SEND/EDIT has been run.

If the initialization mode is set to **DEFAULT** and you have just edited the default fixture you will be asked if you wish to send the new default to the fixtures. Answering <YES/Q> will cause the fixtures to be immediately initialized.

1) **RESTORE** When a fixture is selected as the current fixture the values of the DMX channels are saved. If RETURN is set to RESTORE these values are written back to the DMX channels when the fixture is deselected. If you wish to return the fixtures to the SNAPSHOT you must use this setting. This is the only setting that will preserve the SNAPSHOT for future use.

2) **DFLT** When the current fixture is deselected the stored default fixture look is copied to the DMX channel for that fixture.

3) **ASIS** When the current fixture is deselected the edit values are left in the DMX channels for that fixture.

and <RIGHT> keys, you will notice that the top row of numbers only go up to 6. That's because we are working with a fixture defined as having six channels. Also notice that fixture channel 6 is marked S 6. That's because this channel is patched to an external dimmer. Using the <LEFT> and <RIGHT> keys you are confined to editing one fixture. The <UP> and <DOWN> keys function as they do in other SEND/EDIT windows.

To jump to 50% press and release both the <UP> and the <DOWN> keys **at the same time**.

9.9(1) Changing Fixture Number in Send/edit Using <YES/Q> <LEFT> or <YES/Q> <RIGHT>

When you wish to test or edit another fixture press <YES/Q> <RIGHT> if you wish to move to the next higher number fixture. If you wish to move to the next lower number fixture press <YES/Q> <LEFT>. As with most two key press combinations in the *Lil'DMXter* you first press and hold the <YES/Q> key and then press and release the other key. Then you release the <YES/Q> key. As you do this the number under FX will change, showing which fixture you are now editing. If you are editing fixture fifteen of a block of fifteen and you press <YES/Q> <RIGHT> you will be returned to editing fixture one.

9.9(2) What Values Are Left in a Deselected Fixture?

What will happen to the value presently in the fixture you just deselected depends on which setting you selected in the RESTORE menu. Your options are repeated in the side bar on this page.

9.9(3) What Values Will Be in the Channels of the Newly Selected Fixture?

If you selected MOVE DATA > NXT FXTR ►YES◄ then the values that were in the old fixture will be copied to the new fixture. If you selected ►NO◄ values that were in the fixture will be left there. These values may be in the default fixture, or they may come from the snapshot, they can be left over from a previous edit, or they may even be all zeros.

9.9(4) Difference in the Setting of Values to Arc Light Channels

If you have configured one channel of a fixture as an ARC channel, it will have its own rules. It will set to an initial value just like any other fixture. It may be edited the same as any other fixture. But when you move from fixture to fixture Arc channels will be left at current value. No restore takes place. Further regardless of the setting in the MOVE DATA menu item data is never moved into an Arc lamp channel.

9.9(5) Displaying Absolute DMX Slot Numbers

It is very useful not to need to worry what DMX slot the iris of fixture 13 is on. Still it may be useful to know sometimes, if only to fix the patch on the console that seems to be the only thing that is wrong.

To display the DMX512 slot number press and hold both the <LEFT> and <RIGHT> keys. The fixture channel number will be replaced by the slots. If a dimmer channel (one marked with a D) displays 'NP' in this mode, no patch was entered for this fixture's dimmer. While you may set a level for this channel, this level is NOT sent to the DMX line.

Most of the following menu items are self explanatory. Our explanations will be brief.

9.10 CLEARING THE SNAPSHOT

```
| MULTI CHANNEL MODE |  
| CLEAR SNAPSHOT?   |
```

What this function does is pretty self evident, but why you might wish to use it may not be. If you have the fixtures configured to initialize to the default fixture **only**, the DMX channels that are used by the configured fixtures will be set to known values. All other channels will be left with whatever happens to be in the DMX transmit table. If this is left over garbage from yesterday your stage may look 'interesting'.

9.11 CLEARING THE DEFAULT

```
| MULTI CHANNEL MODE |  
| CLEAR DEFAULT? |
```

9.12 TAKING A NEW SNAPSHOT

```
| MULTI CHANNEL MODE |  
| TAKE NEW SNAPSHOT ? |
```

Taking a new snapshot does the same thing that it does in the normal transmit menu. The snapshot is simply left in the DMX table. Any routine that changes the values in the DMX table modifies the snapshot. The one exception to this rule is when the multi channel software is set to restore a fixture to its original look on exiting. Then the restore function repairs the snapshot.

The snapshot function is START Code sensitive. If your DMXter is still reading TAKING SNAPSHOT for more than three seconds, and the bottom line remains blank, this means that your DMXter is receiving data with a different START Code than the one it is currently set to receive. After 3 seconds, if no digital input is received, or if the input is not a digital form that the *Li'*DMXter can recognize, you will see

```
NO DIGITAL INPUT  
OR INPUT NOT DMX512
```

9.12(1) DMX Line Mode During a Snapshot

Taking a snapshot momentarily switches on the DMX receiver. Switching on the receiver momentarily turns off the transmitter. If the transmitter was on before the snapshot was taken, it will be turned back on afterward. The line termination does not change while the snapshot is taken. This switching is glitch-free and the result is that the new snapshot will be sent to all DMX channels.

9.12(2) Initialization after Taking a Snapshot

While taking a snapshot does not leave the transmitter off it sets a flag so that the next time SEND/EDIT FIXTURES is entered the fixtures will be initialized.

9.13 TAKING A NEW DEFAULT

```
| MULTI CHANNEL MODE |  
| TAKE NEW DEFAULT? |
```

Taking a new default fixture look records the values being sent by another console to one fixture. These values are then moved to a special memory area. The fixture whose values are used is the current fixture. Taking a default also records a new snapshot. The transmitter switching and initialization behaviors of this function are the same as those of the snapshot function. See sections 9.12.1 and 9.12.2.

9.14 CLEARING THE PATCH TABLE

```
| MULTI CHANNEL MODE |  
| CLEAR PATCH TABLE? |
```

9.15 TURNING OFF THE DMX512 TRANSMITTER

```
| MULTI CHANNEL MODE |  
| TURN OFF DMX XMTR? |
```

One powerful feature of the Multi Channel Mode software is that the DMX512 transmitter can be left running. On the other hand leaving the transmitter on is a good way to drain the battery. This menu item lets you save the battery.

It can also be used to reinitializing the fixtures. The fixtures are initialized when the transmitter is turned on. If the transmitter is **ON**, executing this item turns it **OFF**. The software then returns you to the SEND/EDIT FIXTURE? menu item. Pressing **<YES/Q>** again will activate the Send/Edit routine, turning on the transmitter and initializing the fixtures. If you are on the TURN OFF DMX XMTR? menu item, pressing **<YES/Q>** twice initializes the fixtures.

9.16 BACK TO THE MAIN MENU

```
| MULTI CHANNEL MODE |  
| TO MAIN MENU? |
```

This is the orderly way out of the Multi Channel Mode menu. Exiting by this route turns off the transmitter and sets the DMX line back to its pass through (unterminated) state. If you exit by pressing the **<TOP>** key the transmitter will be turned off but the DMX line will be left in its blocking or terminated mode.

9.17 MULTI CHANNEL MODE - TECHNICAL DETAILS

9.17(1) DMX512 LINE MODE AND MULTI CHANNEL MODE

Multi Channel mode is a transmit mode. There is no requirement that DMX512 transmitters be terminated with the characteristic line impedance - the last DMX512 receiver must be terminated with characteristic line impedance. The *Lil'*DMXter has two line termination modes; pass through and terminated. In the pass through mode the input connector is passively connected to the output connector. It is the default mode of the *Lil'*DMXter. In the terminated mode the input connector is terminated. The input connector is disconnected from the output connector. To assure that only the *Lil'*DMXter is driving the line all modes that transmit data switch into the terminated mode. We do this to break the pass through, not because of the line termination.

Entering the Multi Channel mode menu does not change the line termination. Normally you will be in the pass through mode. Turning on the transmitter by either SEND/EDIT routine will terminate the line and break the pass through mode. Leaving these routines does not turn the transmitter off and so does not non-terminate the line. The following actions will switch the *Lil'*DMXter back to pass through mode.

- 1) Turning OFF DMX XMTR
- 2) Exiting by the TO MAIN MENU item

9.17(2) Multi-Channel Mode & Number Format

Channel levels are displayed in the current number format as set in **USER OPTIONS** All other numbers are displayed in decimal.

9.17(3) Transmit Flavor for Multi Channel Mode

Multi Channel Mode uses the current transmit flavor setting with one modification. Entering either SEND/EDIT DEFAULT or SEND/EDIT FIXTURE sets the slot count to 512. You may select the other flavor setting in the normal manner but MULTI CHANNEL MODE always sends 512 slots.

9.17(4) Which START Code Is Used by Multi Channel Mode?

Whatever START Code the *Lil'*DMXter is set on entry to MULTI CHANNEL MODE is the one that will be used for all transmit and receive functions. We doubt that you will ever wish to use this mode with a non zero START Code but if you did you could. If you have set your *Lil'*DMXter to a non zero START Code and try to use this function it is not likely to work as you expect.

10.0 SHOW SAVER™

– Not included in V1.80B– IF **SHOW SAVER** DOES NOT APPEAR IN THE MAIN MENU, YOU SHOULD SKIP THE REST OF THIS SECTION. This section is written for SHOW SAVER Software version V1.10 It is applicable to any software version that is V1.1x.

And now for something completely different . . . The *Lil'*DMXter is a piece of test equipment meant to help you troubleshoot your console and dimmers. The **SHOW SAVER™**, feature is intended to help your show if your console develops an attitude at a bad time.

Uses of **SHOW SAVER**

There are many occasions in setting up and in testing a lighting system where it is useful to have several defined lighting looks available to switch between. Also, when testing or servicing certain DMX controlled apparatus, such as color changers, it is often useful to cycle thru a few different settings. **SHOW SAVER** adds to your *Lil'*DMXter the ability to record and save up to eight looks. These looks differ from the **SNAPSHOT** in that they are not overwritten when the DMXter is used to perform its usual diagnostic tasks. A number of functions overwrite the **SNAPSHOT**. A list of these functions can be found in section 4.5(1).

And should some forklift operator cut your DMX cable, having a source of lighting cues small enough to heft in one hand could be very useful (no, not to brain the klutz with!). Seriously though, while we do not wish you to view the DMXter as a lighting console, **SHOW SAVER** is intended to serve as a backup when disaster strikes. Remember that this capability is useful only if you learn to use it before you need it, and you make a practice of using it during show setup!

SHOW SAVER has the following features:

- Records eight looks or scenes.
- Provides a permanent blackout scene.
- Each scene may be given a recorded fade time of between 0 and 30 seconds.
- Each scene may be given an alphanumeric name of up to 16 characters long.
- **SHOW SAVER** allows you to edit the dimmer levels, the fade time and the alphanumeric name of the scenes.
- Scenes maybe edited blind or live onstage.
- **MONITOR MODE** 'monitors' the DMX transmission and holds the last transmission for fast stage restore.
- In playback **SHOW SAVER** allows you to sequence thru the eight scenes in any order using the prerecorded fade times.
- A bump-to-next-scene feature is also provided.
- A Grand Master level control is provided.

10.0(1) **ShowSaver**, Conventions and Structure

SHOW SAVER has two major subsections. The first section records or edits the stored scenes. The second section plays back scenes. The sections are separate, except that they share a common entry point. It is not expected that a user will switch back and forth between record and playback, so once you enter the **PLAYBACK SCENE** section the only exit takes you to the **MAIN MENU**.

SHOW SAVER has a convention that is peculiar to it. The <LEFT> and <RIGHT> keys are used to increment or decrement the current scene number. The routines that record or edit scenes share a common user interface. It is described in detail in sections 10.3(1) thru 10.3(4).

10.0(2) Selecting Playback or Record

The entry point for **SHOW SAVER** is

```
MAIN MENU
  SHOW SAVER?
```

The first choice we give you in the menu is to playback the previously stored scenes.

```
  SHOW SAVER
  PLAYBACK SCENE?
```

This may seem a little out of order, but think about it - your stage is in total darkness when it shouldn't be. How many menu items would you want to go thru to get light on the stage?

10.1 PLAYBACK

PLAYBACK SCENE is the only method to sequence thru the recorded scenes. Its operation is designed to be simple and we hope obvious, since you may not be at your calmest when using it. The behavior of **PLAYBACK** depends on whether you are connected to a transmitting source of DMX512 when you press the **<YES/Q>** key. If you are connected to a transmitting source of DMX512, you will enter **MONITOR** mode. If the DMXter does not see valid DMX512 within 1/4 second, it enters **PLAYBACK**. **MONITOR** is a useful mode of operation, but probably you should learn about **PLAYBACK** first. We'll tell you about **MONITOR** now, but you might consider skipping over it for now.

To enter **PLAYBACK** in any form, you must have scenes recorded. Otherwise, when you press **<YES/Q>** you will be told

```
  SHOW SAVER
NO SCENES RECORDED
```

This message is displayed briefly. If you see it, you will have to skip to section 10.4 to learn how to enter scenes.

10.2 DMX MONITOR MODE

The purpose of **MONITOR** mode is to attempt to preserve the last valid DMX transmission in case of disaster. The concept is that this will help you to make a smooth transition to the scenes stored in the DMXter. Remember that unless you have stored some scenes in the DMXter, this is useless to you.

The DMXter must be daisy-chained between the console and the first dimmer rack. The console must be turned on and transmitting valid DMX512 to the dimmers. Select the **SHOW SAVER** menu and select **PLAYBACK SCENES?.** If the DMXter detects valid data, you will see the following display:

```
|STAGE:  °k  GM: 100%|
|AUTO START ON FAIL ?|
```

In the field following **STAGE:** you will see a small 'ok' chasing rapidly. This indicates valid DMX reception. At this point the DMXter is not affecting what you see onstage. If you do nothing or if you press **<DOWN>** the DMXter will inform you of a failure but will not automatically turn on its transmitter. Pressing **<YES/Q>** will enable the DMXter to start transmitting automatically on a failure of the console's DMX. Pressing either key will change the display to the following.

```
|STAGE:  °k  GM: 100%|
|NEXT:  1    TIME:  3|
```

While the DMXter is in monitor mode the **<RIGHT>** and **<LEFT>** keys are active and you may preset the scene you wish to go to following the 'OK' scene in the event of a failure.

10.2(1) When the Monitor Mode Detects a Failure

If you have had the DMXter in monitor mode for more than a minute, the display backlite will have timed out. If the DMXter fails to detect valid DMX for one second, it holds the last valid transmission it received, turns on the display backlite and the display changes to one of the displays below.

```
[If auto start disabled]
| STAGE: FAIL GM: 100% |
| NEXT:  °_k  TIME:  0 |
```

```
[If auto start enabled]
| STAGE:  °_k °_k °_k GM: 100% |
| NEXT:   1  TIME:   0 |
```

This is meant to get your attention, assuming that what is happening to the lights on stage hasn't. If you enabled auto start the display on the right will be shown. If not the display to the left is shown.

10.2(2) If Auto Start Is Disabled

The DMXter is not yet transmitting and we presume your console isn't either. If the console has stopped transmitting what you are seeing on stage now depends on your dimmers; **certain types will hold the last transmission for considerable time before fading to black, while others will dump immediately.** Your console is still connected to your dimmers via the DMX line, if you can still run cues the problem must have been transitory. On the other hand if your console is still transmitting, but erratically, you may get 'disco dimmers'. Now you have two choices (three really, if you count turning it all off and going out for coffee and then calling the shop . . .)

Choice 1 - Retest the DMX512 line: press the <UP> or <DOWN> keys, this will cause the DMXter to retest the incoming DMX line. If valid DMX512 has returned the unit will return to monitoring the line. If on testing the line the DMXter does not find valid DMX it will go into **SHOW SAVER** playback just as if you pressed <YES/Q>.

Choice 2 - Go to playback: press <YES/Q>. This will transmit the last stored transmission to the stage. We can not guarantee that this look is not corrupt. It all depends on how the console failed. . . The display will read

```
STAGE:  °_k °_k °_k GM: 100%
NEXT:   1  TIME:  3
```

The stored scene will bump to the stage. If your dimmers were holding level, you may see little change. If they were black . . .

During the time between 'FAIL' appearing and pressing the <YES/Q> key to start transmission, the following apply:

- The console is still connected to the dimmers
- The DMXter is neither receiving nor transmitting
- <OFF> and <TOP> serve their normal functions

10.2(3) If Auto Start Is Enabled

If you selected auto start on failure the DMXter turns on its transmitter and sends the last look seen on stage to the dimmers. We cannot guarantee that this look is not corrupt. It all depends on how the console failed. . . The display will be the same seen above when you started the DMXter transmitting by pressing <YES/Q>.

```
STAGE:  °_k °_k °_k GM: 100%
NEXT:   1  TIME:  3
```

10.2(3) Now That You Are in Play Back Mode . . .

The scene in the **NEXT** field will be the lowest recorded scene unless you preset a scene while the DMXter was in monitor mode. You are now in **PLAYBACK** and the rules apply. See below. Once you fade to another scene, the 'emergency' scene is gone.

10.3 ABOUT PLAYBACK

The following are several things that you should keep in mind when using **PLAYBACK SCENE**.

This is a self-contained routine. Once you enter it the only exit is back to the **OK, OK I'M AWAKE** message that one sees if one bypasses the copyright message.

When you press **<YES/Q>** entering **PLAYBACK**, if the DMXter does not detect valid DMX within 1/4 second, the transmitter is turned on and the **BLACKOUT** scene is transmitted. Therefore, if any dimmers were on, they will be taken to black. To get lights up you must select a previously stored scene and press **<YES/Q>**. This will start a cross fade into that scene.

Entering **PLAYBACK** disables the auto power timer so that you do not have to worry about the DMXter turning itself off on you. But you must consider the fact that it could run out of battery charge. In **PLAYBACK** the transmitter is always on, hence the drain on the battery is high. A DMXter that is to be used as a back up must be kept well charged. If the battery discharges to the point where the safety circuit shuts down the power supply, all stored scenes will be lost. You will not lose scenes if only the low battery warning is displayed. But while this warning is displayed the transmission of slots to the stage stops. With most dimmers this will not cause a visible blink, but this is not guaranteed. Keep your DMXter well charged and if you are going to use it to drive dimmers for an extended period, plug it into AC.

The DMXter will seamlessly switch back and forth between battery and line operation, so you may plug it in while running. For more information on battery charging and battery operating times, see section 10.

If you are not in **MONITOR** mode, the **<OFF>** and the **<TOP>** keys have special uses in **PLAYBACK**. The **<OFF>** does not turn off the DMXter, and the **<TOP>** does not cause you to exit **SHOW SAVER**. Their special uses are explained below.

10.3(1) The Playback Display

Below is the Playback display as it may look when you enter **PLAYBACK SCENE** for the first time. When you enter **PLAYBACK** the stage will be in blackout and the **NEXT:** scene will set to the lowest numbered scene that has been recorded, usually scene one.

```
STAGE: BLK  GM: 100%
NEXT: 1     TIME: 10
```

There are four fields in the display. They are:

STAGE: Shows which scene is being transmitted to the receivers. Scenes are 1 thru 8 and BLK, which stands for **BLACKOUT**.

GM: Shows the current setting of the Grand Master. It may be set from 0% to 100 %.

NEXT: Shows the scene that will be faded to the next time the cross fade is started. The user may select the scene number in this field with the **<LEFT>** or **<RIGHT>** keys.

TIME: Shows the recorded fade time into the next scene.

While a cross-fade is underway the display will change. The **TIME:** field changes to read **XFADE:** and starts to count down the fade.

```
STAGE: BLK  GM: 100%
NEXT: 1     XFADE: 9
```

10.3(2) Keys Used in Playback

The seven keys all have functions in Playback. The following list is a quick summary of their playback uses.

<RIGHT>	Increments the scene number
<LEFT>	Decrements the scene number
<YES/Q>	1) Starts a cross fade into the next scene, 2) exits 'onstage' edit mode
<UP>	Raises grand master level
<DOWN>	Lowers grand master level
<YES/Q> <UP>	Bumps to next scene
<YES/Q> <DOWN>	Bumps to blackout scene
<LEFT> <RIGHT>	View summary screen (Press and hold)
<OFF>	Toggles the 'onstage' edit mode
<TOP>	Shows a warning message, but does NOT exit Playback
<OFF> <TOP>	Exits playback to OK, OK I'M AWAKE

10.3(3) The Cross Fader

The cross fader executes a dipless cross fade between the scene in the **STAGE:** field and the scene in the **NEXT:** field. The cross fade starts when the <YES/Q> key is pressed and released. During a fade holding down the <YES/Q> key will cause the fade to stop temporarily. The time remaining in a fade is shown in the **XFADE:** field. At any time pressing and holding the <YES/Q> key and pressing the <UP> key will cause a bump to the next scene.

During a cross fade pressing <YES/Q> <DOWN> does not cause a bump to black, unless the next scene is BLK (a blackout). The following keys are also locked out during a fade; <LEFT>, <RIGHT>, and <OFF>.

10.3(4) The Grand Master

The grand master is operated by the <UP> and <DOWN> keys. If one of these keys is held, it auto repeats. The value changes in 1% steps. The Grand Master is 'last in line' affecting stage value - if the Grand Master is set at 80%, a dimmer entered at 100% appears onstage at 80%.

10.3(5) The Onstage Editor

If you need to change the levels of a few slots while in **PLAYBACK SCENE** you can do so by using the onstage editor. Pressing <OFF> will change the display to the same display seen in **SEND/EDIT SNAPSHOT**. The present **STAGE:** scene will be loaded and slot levels may be changed in the same way they are in **SEND/EDIT SNAPSHOT**. You exit the editor by pressing either <OFF> or <YES/Q>.

- These changes take place on stage immediately as you enter them.
- The levels seen on stage will be the levels shown in the display as proportionally mastered by the Grand Master.
- The changes are made only to the **STAGE:** scene and are temporary. The next scene faded to will be unmodified and the changes will not be present when you return to the scene you modified.
- All the key combinations available in **SEND/EDIT** will work here. So you may use such functions as 'search for next channel with level' and 'bump to half'.
- Remember that the Grand Master value affects the actual dimmer level seen onstage.
- When you are running with a modified scene you are warned of this fact by the addition of a * to the **STAGE:** scene number. (example below)

```
STAGE: 2*   GM: 100%
NEXT: 3     TIME: 10
```

10.3(6) Playback Summary Display

If you would like to see a summary screen of the **NEXT:** scene, hold down both the <LEFT> and <RIGHT> keys simultaneously. An example of a summary display is shown below. The top line starts with S : x, where 'x' is the

current scene number. The rest of the top line displays the scene name, if any. The second line lists the number of slots with levels equal or greater than 1%, and the first and last such slot.

```
S:2 THIS SCENE NAME
 10 SLTS   3 TO 510
```

10.3(7) Technical Information about Playback

WARNING: entering PLAYBACK erases the FLICKER FINDER error tables.

PLAYBACK including **MONITOR** receives and transmits data only on START Code 0. This is the normal 'dimmer' START Code. In most systems, START Code 0 is used for all show data. Most moving lights will operate on START Code 0. START Code 0 is often referred to as the Null START Code. Using **PLAYBACK** sets the START Code to 0. This setting remains when you exit **SHOW SAVER**. **PLAYBACK** transmission characteristics are set by a special 'flavor'. If you need information on what we mean by a DMX 'flavor', see section 4.8. The flavor we use for playback is the same as the default setting of the **USER C** flavor. This flavor is permanent and will not change if you make changes to **USER C**.

PLAYBACK FLAVOR USED FOR SHOW SAVER

BREAK LENGTH	MAB	SLOTS	INTER FRAME TIME	INTER PACKET TIME	UPDATE RATE
160µS	20µS	512	44µS EC	16324µS EC	16 HZ

10.4 SHOW SAVER START CODE & LINE TERMINATION

The receive and edit routines of **SHOW SAVER** temporarily change the START Code to which the DMXter is set to the 'dimmer' START Code of 0. Exiting **SHOW SAVER** by way of the **TO MAIN MENU?** menu item will restore the START Code to the value you were using beforehand. Pressing **<TOP>** to exit **SHOW SAVER** will leave the START Code set to 0. REMEMBER THAT PLAYBACK PERMANENTLY CHANGES THE START Code TO 0. IF YOU WANT TO RETURN TO A NON-0 START Code, YOU WILL HAVE TO RESET IT.

The subject of line termination is important but we'll try and spare you the gory details. DMX512 uses a balanced terminated transmission line. All DMX lines should have one and only one termination impedance at the RECEIVER end of the line. The DMXter can either terminate a line or bridge the line. When bridging the line the DMXter passes the data from its IN connector to its OUT connector. We refer to this mode as pass thru mode. If you have plugged in the DMXter after the last dimmer rack, it is important that you respond **<YES/Q>** to

```
SHOW SAVER
AT END OF LINE?
```

This response terminates the line. An unterminated DMX512 line may cause faulty reception by all devices connected to it. This is particularly true with cable runs of greater than 250 feet. Answering **<YES/Q>** will cause the DMXter to keep the DMX512 line terminated until you exit back to the **MAIN MENU**, using the **TO MAIN MENU?** query. Pressing **<TOP>** to exit **SHOW SAVER** will leave the line terminated until some other operation unterminates it.

Normally you will probably record new scenes with the DMXter physically near the console. You will also often wish to see the scenes you have recorded on stage. We believe the most common method of using the unit will be daisy-chained (between the console output and the receivers) - so most of the time you will want to answer 'No' to the termination question using the **<DOWN>** key.

If you do answer <YES/Q> to the termination query, you will see the message

```
ARE YOU SURE?  
STAGE WILL BLACKOUT!
```

This tells you that if your dimmers are plugged into the output of the DMXter, they will blackout. If the DMXter is the last thing in line, there will be no change.

10.5 RECORDING SCENES

SHOW SAVER's scenes can be recorded from the output of any DMX512 console in the same manner as **TAKING A SNAPSHOT**. They may also be entered slot by slot (painfully!). If you wish to do this, please see **EDITING SCENES** Section 10.7 below.

An important difference between the DMXter and most lighting consoles is that the DMXter deals in slots, not in channels. To translate a cue sheet to the DMXter will require some thought (and an accurate copy of any softpatch). This is another reason why it is usually easiest to record from the console.

So then, connect the DMXter to the output of your console. Normally you will do this by daisy-chaining with your dimmers so you can see on stage what you're recording. Set the console to output a look you want to save which need not be a cue.

The entrance message for recording a scene is, appropriately

```
SHOW SAVER  
RECORD SCENE?
```

10.5(1) The Scene Select Display

When you press the <YES/Q> key, you will see

```
RECORD SCENE?                RECORD SCENE?  
>1< 2 3 4 5 6 7 8    or    ▶1◀ 2 3 4 5 6 7 8
```

The numbers 1 thru 8 are the eight scenes that **SHOW SAVER** can store. A set of brackets points to the currently selected scene. Solid brackets enclose a recorded scene; open brackets enclose a cleared scene. To select the scene, use the <LEFT> <RIGHT> keys to move the brackets to enclose the desired scene. If you would like to see a summary screen for a particular scene, hold down both the <LEFT> and <RIGHT> keys simultaneously. An example of a summary display is shown below. The top line starts with S : x , where 'x' is the current scene number. The rest of the top line displays the scene name, if any. The second line lists the number of slots with levels equal or greater than 1%, the first and last such slot.

```
S:2 THIS SCENE NAME  
10 SLTS 3 TO 510
```

These conventions will be used any time you see a display of this type.

10.5(2) Taking the Snapshot

Press <YES/Q> to record. If nothing was previously recorded in the scene, the screen message will display briefly **TAKING SNAPSHOT**.

If the scene had been previously recorded, you will see the warning **OVERWRITE SCENE 1 ?** with the second line displaying the alphanumeric name of the old scene. If you do wish to overwrite the scene, answer <YES/Q> here. If not, use <DOWN> to cancel the operation.

10.5(3) Naming the Scene

After recording the scene, the screen will read

```
EDIT SCENE NAME?
```

The second line of the display provides space for a sixteen character alphanumeric name. If you have overwritten an old scene, the old scene name will be in the display. If you have recorded to a cleared scene this line will normally be blank until you enter the name. The exception is if the scene recorded had no slots with levels equal to or greater than 1% (4 hex) - the scene will automatically be named **BLACKOUT**.

To edit a scene name, first press **<YES/Q>**. The cursor will appear at the first space of the name on the second line. Each press of the **<UP>** key will step you thru first the numbers 0-9, then the alphabet. Pressing the **<DOWN>** key steps you thru the same sequence backwards. When you have the right character, use the **<RIGHT>** and **<LEFT>** arrow keys to move the cursor. When editing an old name, you may clear a space by pressing **<UP>** and **<DOWN>** simultaneously and releasing them. To clear from the cursor to the end of the line, press **<UP>**, **<DOWN>** and **<RIGHT>** simultaneously. (Look, it's the only three key press in the unit, ok?!) When you like the name, press **<YES/Q>**.

10.5(4) Setting the Fade Time

The next screen message is

```
FADE TIME IS    3 S
CHANGE IT?
```

This display tells you the fade time in seconds. If 'S' appears, the time shown is the default fade time. The default fade time is shipped set to three seconds. The default may be changed; see Section 10.6 below. If you wish to set a different fade time, press **<YES/Q>** and the display will change to

```
FADE TIME IS    3
CHANGING FADE TIME
```

Fade time may be set from 0 to 30 seconds using the **<UP>** and **<DOWN>** keys. It is important to note that setting a fade time of 3 is different from having a default time of 3. A scene for which you have set a fade time of 3 will always have a fade time of 3 (until you edit that time in that scene) while a scene with a default time of 3 will change when the value for the default time is changed. Pressing **<YES/Q>** removes the default and substitutes a recorded value. To return to the default value, press **<YES/Q>** and **<DOWN>**. Exiting the fade time editor puts you back to the

```
RECORD SCENE?
▶1◀ 2 3 4 5 6 7 8 display.
```

To reach the next menu item, press **<DOWN>**.

10.6 CLEARING OLD RECORDED SCENES

```
SHOW SAVER
CLEAR SCENE?
```

Pressing **<YES/Q>** will get you to this display

```
CLEAR SCENE?
▶1◀ 2 3 4 5 6 7 8
```

The conventions for manipulating this display are the same as for recording scenes. Place the brackets around the scene you wish to clear and press **<YES/Q>**. You will see

```
CLEAR SCENE X ? followed on the second line by the scene name
```

If you mean it, press <YES/Q> one more time.

10.7 EDITING RECORDED SCENES

```
SHOW SAVER
EDIT SCENE?
```

Pressing <YES/Q> will get you to this display

```
EDIT SCENE?
▶1◀ 2 3 4 5 6 7 8
```

The conventions for manipulating this display are the same as for recording scenes. Place the brackets around the scene you wish to edit and press <YES/Q>. You will see

```
LIVE MODE          or          BLIND MODE
EDIT SCENE BLIND?  EDIT SCENE LIVE?
```

If the DMXter is at the end of the line this question is irrelevant. If you are connected to dimmers then you have the choice of seeing the scene as you are editing it or leaving the DMXter in the pass thru mode and editing blind. If the present mode is correct press <DOWN>. If you wish to change the edit mode press <YES/Q>. Each time you press <YES/Q> the edit mode and display will toggle to the other state.

When you press <DOWN> you will enter the edit slot screen. This display is exactly the same as the **SEND/EDIT SNAPSHOT** display, see section 4.6 if you are not familiar with it. When you have adjusted all the slots you wish to change press <YES/Q> to exit. Next you will be given a chance to edit the scene name, followed by a chance to edit the fade time. The methods used are the same as those used by **RECORDING SCENES**, above.

10.8 CHANGING THE DEFAULT FADE TIME

```
FADE TIME IS    x
CHANGE DEFAULT TIME?
```

The default fade time is used as the fade time for the permanent blackout scene and for all scenes that do not have individual fade times recorded. The default fade time is shipped set to three seconds. It may be set from 0 to 30 seconds using the <UP> and <DOWN> keys. Once set it will retain its new value until reset or the DMXter's battery is discharged or turned off. Press <YES/Q> when you have the default fade time you want. Exiting the fade time editor puts you back to the <RECORD SCENE?> menu.

10.9 RETURNING TO THE MAIN MENU

```
SHOW SAVER
TO MAIN MENU?
```

TO MAIN MENU? entries appear in all DMXter menus. But they are often ignored by users who habitually use the <TOP> key as the fastest way out of a menu. There are reasons to use **TO MAIN MENU?** to exit **SHOW SAVER**, as leaving by this method will clear the line termination, if it was set. Exiting by <TOP> will leave it set.

10.10 PLAYBACK SCENE?

This is where you will be given another chance to playback scenes if you did not choose to do so upon entry. If you scroll thru the **SHOW SAVER** menu more than once this is where you will find the playback query.

10.11 GETTING A SUMMARY OF THE SCENES

```
SHOW SAVER
SCENE SUMMARY?
```


This last menu in **SHOW SAVER** is another way to get a scene summary. If you enter this routine you will see the following display

```
SCENE SUMMARY
▶1◀ 2 3 4 5 6 7 8
```

Now you could get a summary display by pressing both the **<LEFT>** and the **<RIGHT>** keys, but that display is only shown as long as you hold both keys. If instead you press **<YES/Q>** you will get a latched summary display, as per the example below

```
S:2 THIS SCENE NAME
10 SLTS 1 TO 512
```

If you wish to view a summary for another scene you may increment or decrement the scene number using either the **<UP>** and **<DOWN>** keys or the **<LEFT>** and **<RIGHT>** keys. NOTE: When incrementing or decrementing cleared scenes are skipped.

11.0 THE **CE** MARK

The European Union has established certain requirements that most electronic equipment must conform to if they are used within the EU. It has established testing methods to determine that a unit does conform. Units that do conform may carry the '**CE**mark'.



11.1 CE MARKED *Lil'*DMXters

The *Lil'*DMXter (Part DMX-1A) is now CE marked. It is operationally identical to non marked units previously shipped.

11.2 IDENTIFYING CE CONFORMING *Lil'*DMXters

You may easily identify if *Lil'*DMXter is a CE unit.

- 1) Only CE units carry the CE mark.
- 2) Model number is FD DMX-1A or FD DMX-1CE

If the model number is FD DMX-1CE the unit is an earlier CE unit. Please read the Appendix for information on these units.

11.3 CE Declaration of Conformity

Goddard Design Company does declare that the following equipment meets the requirements of the EMC Directive 89/336/EEC and relevant requirement of the Low Voltage Directive. Note that only *Lil'DMXter* model number **FD DMX-1A** is covered by this declaration.

This unit was certified for emissions under EN55022 as class A ITE device.

This unit was certified for immunity under EN50082-1.

This unit was certified for electrical safety under EN 6101-1 A2 1995

The certification was issued on the 31 of May 1999.

Robert M Goddard
Head of Electronic Design
Goddard Design Co.

12.0 CARE AND FEEDING OF THE BATTERY

The *Lil'*DMXter may be powered either from the AC line or from its own internal rechargeable battery. When the DMXter is plugged into an AC line, it will both draw its operating power from the AC line and recharge its internal battery.

We expect that many users are going to find battery operation to be most convenient when troubleshooting equipment in the theater, and will prefer line operation in the shop.

12.1 CHARGING

The *Lil'*DMXter is shipped charged. We recommend that you charge the unit for an additional 12 hours soon after receipt. Most of the charging occurs during the first few hours of being plugged in. For example, after about six hours, the unit is about 70% charged. Within about 12 hours the unit is 90% charged, but it will take in excess of 24 hours total to fully recharge the batteries. If you need to use a DMXter that is fully discharged, it is acceptable to give it 2-3 hours of charge, enough to make it usable. But make a general rule of charging the unit fully, at least for 12 hours. We also recommend that the unit be given a monthly 'equalizing charge' lasting 24 to 36 hours.

The problem with a lot of battery powered equipment is that to get good battery life one has to follow a complicated regimen, which usually has little to do with how you wish to use the equipment. We have tried to design the DMXter to be 'understanding' of your needs. You can short cycle the batteries in the DMXter when you need to; that is, run it partway down and charge it back up fully. You may leave it plugged into AC for several days at a time without injury; however, if you plan to use the unit in a shop or other setting where it would be more convenient to keep it plugged in, see below for the recommended modifications to facilitate this.

12.2 LOW BATTERY WARNINGS / POWER MANAGEMENT

Surprise! The *Lil'*DMXter (like most battery-powered equipment) has a low battery warning. When it needs a charge, but before it's truly critical, it will give you the following message.

LOW BATTERY WARNING!
PLEASE FEED ME!

This message is displayed about every thirty seconds and lasts for about five seconds. While this message is displayed, the user interface is disabled. Obviously you can't view received levels and functions such as **CABLE TEST** and **AUTOFADE ONE SLOT** pause momentarily. The actual transmit routines continue to run. The low battery warning does not cause any interruption of the data sent to the slots. A low battery warning should not cause the **VIEW PARAMETERS** routines to display a glitch in the displayed values.⁴

The amount of time/charge left in the battery is dependent on the function you are performing. **CABLE TEST** and **TRANSMIT** consume the most power. While you can continue to operate off batteries for 10, 20, maybe 30 more minutes, you should start thinking about the nearest AC outlet. As soon as you have plugged the unit in, you can continue your work on AC operation. The unit will also start to charge.

12.2(1) Meal Penalty

If you have been seeing the **LOW BATTERY WARNING** message for some time, the unit will at some point shut down. When the battery voltage drops low enough, the power supply is disconnected from the computer. This function is necessary to protect the battery. The display will go blank. Usually after a pause the battery voltage will

⁴ Before V1.70 of the *Lil'*DMXter software a low battery warning caused all other functions to cease for the duration of this message.

recover enough that the power supply shut down circuit will turn the battery back on. The *Lil'DMXter* will display the message

Lil'DMXter V2.00
MEAL PENALTY

This display will last for about 30 seconds. It means that the *Lil'DMXter* power supply had shut down and that while it is now on there is not enough charge to operate the *Lil'DMXter*. Attempts to turn the unit on using the <TOP> key will redisplay the **MEAL PENALTY** message. If they produce no results (display stays blank) the power supply shut down circuit is still engaged.

12.3 TURNING OFF THE BATTERY

If you plan to leave the *Lil'DMXter* unplugged for more than 2 months at a time, you will prolong battery life by turning off the battery. This will prevent the battery from going into deep discharge. Leaving a battery in deep discharge for any length of time greatly decreases battery life. To turn off the battery, you will need to access the battery switch inside the case.

**FIRST UNPLUG THE *Lil'DMXter* FROM THE AC LINE!!!!
NEVER OPERATE THE UNIT FROM THE AC LINE WHEN IT IS
OUTSIDE ITS CASE.**

To remove the unit from the case, DO NOT USE THE FOUR SCREWS ON THE FRONT PANEL. USE THE ONE SCREW ON THE BOTTOM OF THE CASE. The unit will drop out of the open case into your hand (or the floor if you're a klutz about this . . . remember that the display is glass!) Place the uncased unit on a table with the legends facing away from you. Look for a switch mounted to the base plate next to the right-hand spacer. The 'on' position is the switch toward the spacer; the 'off' position is the switch away from the spacer. Put the *Lil'DMXter* back into its case and put the bottom screw back in loosely. This will help remind you to check the battery switch before you next try to use the unit. We also recommend that you tag the unit as further reminder.

Note that when the unit is turned back on, if it has enough charge to operate, you will momentarily see the message *Lil'DMXter* is sleeping.

12.4 BATTERY OPERATING TIME

Approximate operating time on a fully charged battery:	
Shelf life between charges	20 days Maximum
Receiving	30 hours
Transmitting	12 hours
Running Cable test	6 hours

Units with serial numbers of 942 or higher should have a longer 'shelf life between charges'. **The fast way to destroy your battery is to let the DMXter sit on the shelf discharged!** It is very difficult to damage the battery by over charging a DMXter. Nor do you always to have charge a DMXter fully. But do not let it sit with a dead battery for extended periods of time.

12.5 BATTERY REPLACEMENT

When it is time to replace the rechargeable battery, it must be replaced by a part that matches specifications of the original battery. Non rechargeable types must not be used. The original battery is a 6.3 volt 1.3 amp-hour battery. The chemistry is a gelled electrolyte lead acid battery.

Replacing the battery shall only be done by a qualified service technician or other SKILLED PERSON.

**FIRST UNPLUG THE *Lil'*DMXter FROM THE AC LINE!!!!
NEVER OPERATE THE UNIT FROM THE AC LINE WHEN IT IS
OUTSIDE ITS CASE.**

To remove the unit from the case, DO NOT USE THE FOUR SCREWS ON THE FRONT PANEL. USE THE ONE SCREW ON THE BOTTOM OF THE CASE. The unit will drop out of the open case into your hand (or the floor if you're a klutz about this . . . remember that the display is glass!)

Now turn **off** the battery switch. In current production units the off position of the battery switch is shown on the label mounted to the top panel support. Or you may use the following instructions. Place the uncased unit on a table with the legends facing away from you. Look for a switch mounted to the base plate next to the right-hand spacer. The 'on' position is the switch toward the spacer. The 'off' position is the switch away from the spacer.

Now remove the four screws in the front panel to enter the battery area.

The battery is held in place by a metal pressure plate fastened by two machine screws. It is connected by two push-on connectors. The positive lead is the red wire, the negative is the black lead. Getting the battery polarized correctly is very important. When reinstalling the pressure plate make sure that it is tight enough to hold the battery securely but is not tightened to the point that it could crack the battery case. The machine screws do not bottom out and the pressure plate does not touch the threaded spacers into which the screws are threaded

At the time this manual was written the following batteries were known to be useable replacements

Panasonic	type LCR6V1.3P (no longer made this number for reference only)
Sentry Battery	type PM612

Batteries are available for online purchase on our Web site www.goddarddesign.com.

12.6 MODIFICATION FOR CONTINUOUS LINE OPERATION

If you plan to use the unit plugged into AC on a continuous basis, you may wish to make a simple modification to the unit to prolong battery life. As above, remove the unit from the case. Place the unit on a table with the Goddard Design Co. logo on the left. Approximately in the center of the open side of the end toward you, you will see a flat cable connector. Below it, on the other side of the PC board is the shunt. Pull this straight down, using your fingernail, to remove it. This removes the trickle charger; the unit will work just the same without it. Do hold onto the shunt you have removed in case you use the unit in a field situation in the future. The unit will certainly work on battery operation without the shunt.

Units shipped after April of 1997 (serial 1775 or greater) do not have the above-mentioned shunt. Experience has shown the trickle charge to be unnecessary and it was removed. This shunt will be found on DMX PS printed circuit boards through etch revision R3 and is missing on all later etch revisions.

12.6(1) WE RECOMMEND DISABLING THE TRICKLE CHARGER

It is Goddard Design's feeling that the trickle charger provides little benefit to most users. We now recommend that most users will get better battery life with this feature disabled and will experience little increase in the amount of time needed to fully charge the battery. On the other hand we expect that the improvement in battery life will be minimal so we do not see this as an important change for most users.

13.0 Lil'DMXter TECHNICAL DISCUSSION

The following are discussions of a few items of interest that we couldn't find a better place to put

13.1 Lil'DMXter MAINTENANCE

Other than cleaning, the Lil'DMXter requires no on going maintenance. However the rechargeable battery has only a finite life and will need replacing. The time between replacements depends on the use of the unit. Improper use can greatly shorten battery life. Please read section12 for details of battery care and replacement.

13.01 CLEANING

The exterior of the Lil'DMXter may be wiped cleaned with a soft damp rag. The rag may be moistened with any mild water based cleaner. The unit shall not be immersed. If any water enters the unit, time must be allowed for the interior to dry fully before the unit is operated.

13.2 SPECIFICATION TABLES

TRANSMITTED DMX512 PARAMETERS				
FUNCTION	DEFAULT	MINIMUM	MAXIMUM	RESOLUTION
BAUD RATE	250,000			as per DMX512
BREAK LENGTH	88µS	50µS	49144µS (1)	1µS
MARK AFTER BREAK	8µS	3µS	49064µS (2)	1µS
INTERSLOT MARK TIME	4µS	4µS	330µS	22µS
INTERPACKET MARK TIME	4µS	4µS	1.442SEC	22µS
SLOTS TRANSMITTED	512	1	999	1
UPDATE RATE	40	.594(3)	5200(4)	NA
START Codes Sent	0	ANY	START	CODE

(1) Maximum with MAB set to 8µS

(2) Maximum with break set to 88µS

(1 or 2) The Total of break and MAB cannot exceed 49152µS .

(3) 512 slots, 49,144us break, 8µS mark, 334µS IBT(15 units), 1.454 second IPT (65535 units)

(4) 1 slot, 88us break, 8us MAB

RECEIVED DMX512 PARAMETERS			
FUNCTION	MINIMUM	MAXIMUM	NOTES
BAUD RATE	250,000		as per DMX512
BREAK LENGTH	65 μ S	-	
MAB LENGTH	3 μ S	-	
NUMBER OF SLOTS	1	512	OVFL reported for over 512 slots
BREAK-BREAK TIME	170 μ S	3 SEC.	

ACCURACY		
PARAMETER	ACCURACY	NOTES
TIMEBASE & BAUD RATE ACCURACY	+/- 75 PPM	0 - 70 Degrees C, by design, not tested in production
TRANSMITTED BREAK JITTER	NEGLIGIBLE	Timebase jitter is the major source of break jitter
TRANSMITTED MAB JITTER	NEGLIGIBLE	START Code = 0 BREAK + MAB less than 16.380 MSEC
TRANSMITTED MAB JITTER	+/- 4 μ S	NON-ZERO START Code or BREAK + MAB time greater than 16,380MS
SLOT FRAME JITTER	Text Moved Here: 3 +/- 2 μ S	
SCOPE TRIGGER TO BREAK JITTER	NEGLIGIBLE	Timebase jitter is the major source of jitter
RERC'D BRK,MAB ACCURACY	+/- 250nS +/- 75PPM (1)	Sum of both errors, rounded as needed for display
REC'D BREAK TO BREAK	+/-8 μ S	See section 5.2(5)

End Of Moved Text

INPUT & OUTPUT VOLTAGE AND CURRENT LIMITS		
	VOLTAGE OR CURRENT	NOTES
DMX512-OUT PINS 2&3 MAX VOLTS MAX CURRENT	+20VDC, -12VDC(2) +/- 100 MA	Withstanding voltage & current
DMX512-IN PINS 2&3(1) MAX VOLTS MAX CURRENT	+50VDC, -30VDC +/-7 MA	Withstanding voltage & current
PIN 4&5 IN or OUT	+/-70 VDC	SCOPE TRIGGER - OFF DOUBLE ENDED CABLE TEST - OFF
PIN 4&5 OUT	+15 VDC, -5 VDC +/-100 MA	SCOPE TRIGGER - ON

(1) In terminated modes, in unterminated modes DMX512-OUT limits apply.

OPERATIONAL ENVIRONMENT LIMITS			
PARAMETER	RANGE		NOTES
Text Moved Here: 4 AC Line Voltage Required North American Units	85 - 135 VAC 100 - 135 VAC	100mA	- To operate - To charge fully (1)
AC Line Voltage Required Europe & Other 230 volt locations	170 - 270 VAC 200 - 270 VAC	50mA	- To operate - To charge fully (1)
AC Line Frequency Required	~50-60Hz		For either voltage option
Humidity	0%to-95%		Non-condensing
Altitude	0 to 1900 meters		
Temperature	End Of Moved Text Text Moved Here: 5 0 to 40 Degrees Celsius		

(1) At line voltages below 110 (220) volts charging time will increase markedly. At 100(200) volts charging time will be nearly double the 120(230) volt time.

13.3 IEC POWER INLET AND LINE CORD SETS

An IEC appliance inlet connector is mounted in the top center of the front panel. This connector is used regardless of the voltage setting or the local AC mains plug requirements. Units shipped to North America will be provided with a standard US cord set. Units purchased from dealers outside of North America will be provided with the proper local AC mains cord set by their dealer. Goddard Design will stock a limited number of different AC mains cords sets for units purchased directly. However if the proper one is not available, it will be the responsibility of the purchaser to obtain it locally.

13.4 POWER SUPPLY VOLTAGE SETTINGS

The *Lil'*DMXter may be ordered set to operate from one of two AC mains supply voltages ranges

- 1) 120VAC nominal for North America and where this voltage is used.

2) 230VAC nominal for most of the rest of the world.

The *Lil'DMXter* is designed to be operated from a very wide range of supply voltages. Details are given in the specification tables in section 16.2. Therefore, units shipped set for 230VAC may be operated from nominal supply voltages of 220, 230, or 240 VAC. In most cases units shipped set for 120VAC may be operated from the 100 VAC supply found in Japan, but recharging may take longer than normal.

Changing between the two voltage ranges is NOT an operator function. If a unit must be reset please return it to the factory or have a qualified service technician or other SKILLED PERSON contact the factory for instructions.

13.5 REPLACEMENT FUSES

There is a fuse in the AC line voltage circuit. It is mounted to the bottom of the power supply printed circuit card. This fuse should never blow in normal operation. Even overloads or shorts to the low voltage supply should be limited by electronic means.

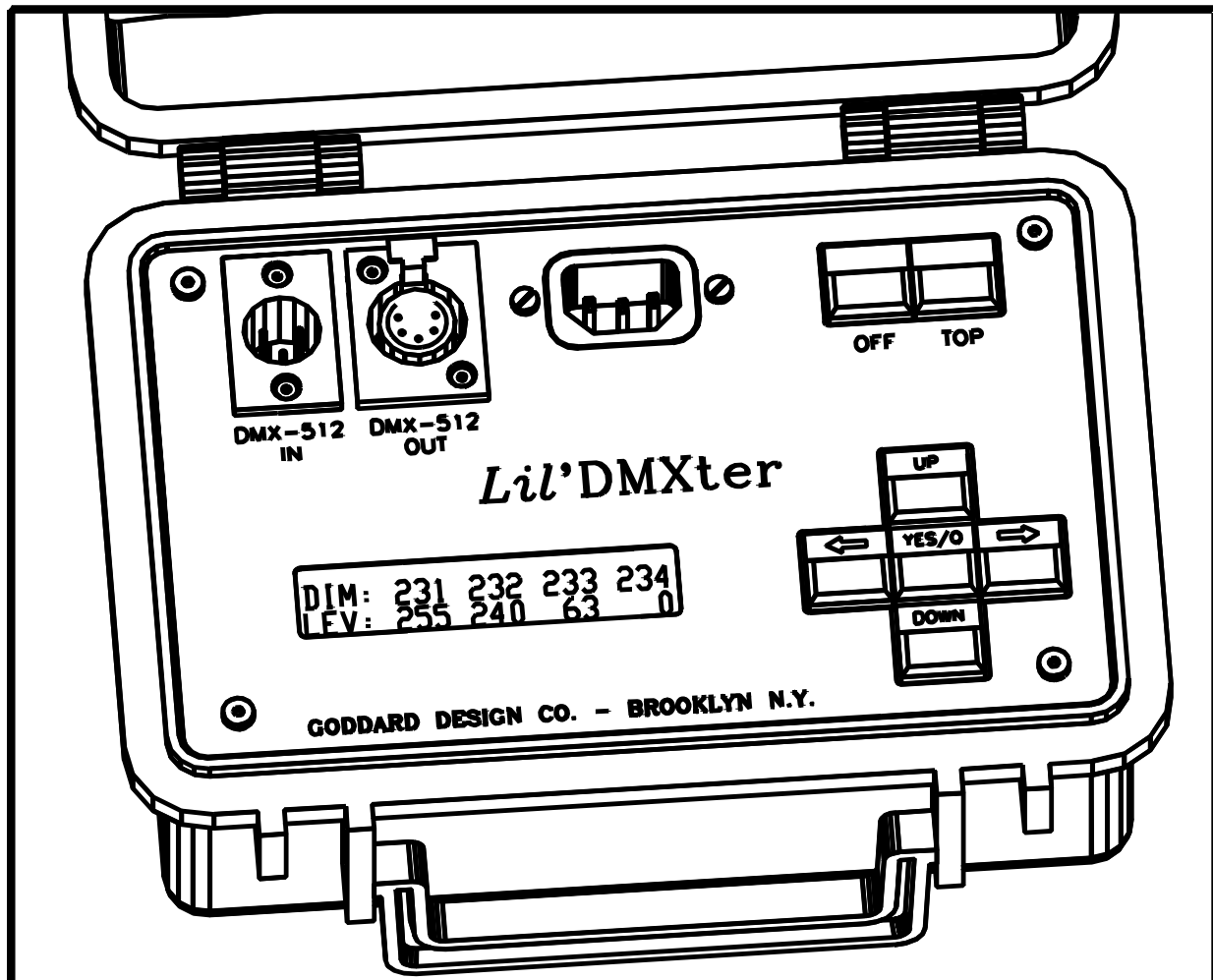
The failure of this fuse may well mean that there has been a major failure in the power supply. It is not advisable to replace this fuse without a complete retest of the power supply. If this fuse blows, the unit should be returned to the factory or dealer for service. But since we are required to list replacement fuses, here they are:

120 volt type: 5x20mm 125mA slow blow - UL/CSA 248-14 (10,000A @ 125V)

Example: Bussman GMD.125

230 volt type: 5x20mm, 50 mA, slow blow- medium break (IEC127-2 sheet 6)

Example: Wickmann 196 0050 00



13.6 CONNECTOR FUNCTIONS AND CONNECTOR WIRING

13.6(1) DMX-in

The Male 5 pin connector is the DMX 512 input connector. It is used for all DMX512 receive functions. Pins 2 and 3 of the DMX IN connector are always wired to a differential line receiver. This line receiver consists of a standard EIA485 receiver chip protected by a transient and over voltage protection network. Pin 1 is the signal common and shield. It must be connected through to the signal common of the device under test for accurate results.

13.6(2) DMX-out

The Male 5 pin connector is the DMX 512 output connector. It is used for all DMX512 transmit functions. Pins 2 and 3 of the DMX OUT connector are always wired to a DMX512 line driver. The line driver consists of an EIA485 transmitter and a protection network.

13.6(3) Topology for DMX Terminate & DMX Pass Through Modes

If the DMXter is in a terminated mode, Pins 2 and 3 of the DMX IN connector are loaded by a 100 ohm half-watt termination resistor and there is no connection between Pins 2 and 3 of the INPUT connector and Pins 2 and 3 of the OUTPUT connector. If the DMXter is in unterminated mode, the termination resistor is removed and Pins 2 and 3 of the INPUT connector are connected to Pins 2 and 3 of the OUTPUT connector. In the unterminated mode the DMXter can passively transfer a DMX signal from its IN connector to its OUT connector so that the *Lil'*DMXter may be put in line between a console and the receivers transparently. The switching from terminated to unterminated mode is done by a magnetically latched relay. The advantage of using a latched relay is that the DMXter maintains its state even when off. If you place the DMXter on a cable after the last dimmer rack, you will wish to terminate the line by answering <YES/Q> to the 'AT END OF LINE?' question in **RECEIVE DMX512**. If the *Lil'*DMXter turns off while sitting at the end of the line, it would be embarrassing if it removed the line termination - but it won't. Similarly, if the *Lil'*DMXter is placed between the console and the receivers, it will stay in the Pass-Thru mode when turned off.

13.6(4) Uses of Pins 4 & 5

Pins 4 and 5 of the DMX connector are reserved for future standards use. There have been a number of non standard uses of pins 4 and 5. The *Lil'*DMXter does not test any of these non standard uses but it passively connects DMX-in 4,5 to DMX-out 4,5. Further we use pins 4 and 5 to test DMX cables and to provided three features. They are, a transmit scope trigger (section 4.12); allowing the installation of external switches to duplicate the <LEFT> and <RIGHT> keys, (section 13.10); and controlling the external hardware for our receive scope trigger option (section 14).

Input and Output Connector Functions					
PIN #	DMX512 IN		DMX512 OUT		NOTES
1	Shield & Common		Shield & common		connect to signal common of DUT
2	EIA485 DATA -		EIA485 DATA -		DMX512 data pair
3	EIA485 DATA +		EIA485 DATA +		
4	Spare -, Right switch	Input circuit not EIA485	spare -, Scope trigger		DMXter can cable check this pair
5	Spare +, Left switch		Spare +, Scope trigger		

13.6(5) Functions that Cause the DMXter to Terminate the Line

1- In **RECEIVE DMX512** and in **FLICKER FINDER** answering <YES/Q> to the **AT END OF LINE?** question.

2- Any function that transmits data - if exited in a normal fashion, unterminates the line on exit, but note that exiting a function via <TOP> is not a normal exit and will leave the line terminated

3- **SINGLE ENDED CABLE TEST** terminates the line - the condition on exit is the same as in **TRANSMIT**

4- **DOUBLE ENDED CABLE TEST** terminates the line - the condition on exit is the same as in **TRANSMIT**

13.7 THE PERCENT SCALE

We have included a percent display mode in the *Lil'*DMXter for the convenience of having a display that approximates the display seen on your lighting console. The percent display mode should not be expected to exactly match any particular console, and should not be used if it is important to know the actual level that you are receiving. It should not be assumed that a *Lil'*DMXter transmitting 45% percent will transmit the same code as your light console set to '45'.

DMX512 uses an 8 bit binary byte to represent a dimmer level, this means 256 possible levels, 0 to 255. Theatrical lighting has long used a 10 point scale, which with the advent of the digital control consoles became a 101 point scale, 0 to 100. There is no integer factor to convert 101 to 256. Therefore an integer conversion between these scales will be approximate. There is no universal agreement on exactly how the rounding should be done. The discrepancies manufacturer to manufacturer are seldom of great import in theatrical lighting although they are of some import when DMX512 is used to drive other devices, such as color scrollers.

Technical note: The conversions from percent to decimal and decimal to percent in the *Lil'*DMXter are all table driven. When the *Lil'*DMXter is set to the percent mode more than one received code will be displayed as the same percent value. For example 7Fh, 80h, and 81h are all displayed as 50%. The full receive conversion table is listed below.

The RAM slot table always stores slot levels in 8 bit binary. Conversion is done when a number is displayed. Hence snapshot is re-transmitted exactly as it was received. While 7Fh and 81h are both displayed as 50% they will be stored and re-transmitted as different levels. **BUT** when the *Lil'*DMXter is in percent mode you can only enter one value for each percent step. To find the exact values see the transmit conversion table listed below.

There is an exception to the rule that changing display mode does not change data. The display resolution of hex and decimal is finer than that of percent. This means that there are two or three values of hex and decimal that are nominally displayed as 50%. If the DMXter has been set to hex and you have been searching for slots set to 80h (nominally 50%) and you switch the unit to percent, you would expect to find all slots displayed with a value of 50% or greater. Hence we change the search value from 80h to 7Fh so that all slots displayed as 50% are included. On changing from hex or decimal to percent, all search values are corrected so that all slots displayed as set to the same percent will be found.

13.8 PERCENT TABLES

%	REC'D	XMIT	%	REC'D	XMIT	%	REC'D	XMIT
0	00-02	00	34	57-58	58	68	AD-AF	AF
1	03-05	05	35	59-5B	5B	69	B0-B1	B1
2	06-07	07	36	5C-5D	5D	70	B2-B4	B4
3	08-0A	0A	37	5E-60	60	71	B5-B6	B6
4	0B-0C	0C	38	61-62	62	72	B7-B9	B9
5	0D-0F	0F	39	63-65	65	73	BA-BB	BB
6	10-11	11	40	66-68	68	74	BC-BE	BE
7	12-14	14	41	69-6A	6A	75	BF-C0	C0
8	15-16	16	42	6B-6D	6D	76	C1-C3	C3
9	17-19	19	43	6E-6F	6F	77	C4-C5	C5
10	1A-1B	1B	44	70-72	72	78	C6-C8	C8
11	1C-1E	1E	45	73-74	74	79	C9-CB	CB
12	1F-20	20	46	75-77	77	80	CC-CD	CD
13	21-23	23	47	78-79	79	81	CE-DO	DO
14	24-26	26	48	7A-7C	7C	82	D1-D2	D2
15	27-28	28	49	7D-7E	7E	83	D3-D5	D5
16	29-2B	2B	50	7F-81	81	84	D6-D7	D7
17	2C-2D	2D	51	82-83	83	85	D8-DA	DA
18	2E-30	30	52	84-86	86	86	DB-DC	DC
19	31-32	32	53	87-89	89	87	DD-DF	DF
20	33-35	35	54	8A-8B	8B	88	E0-E1	E1
21	36-37	37	55	8C-8E	8E	89	E2-E4	E4
22	38-3A	3A	56	8F-90	90	90	E5-E6	E6
23	3B-3C	3C	57	91-93	93	91	E7-E9	E9
24	3D-3F	3F	58	94-95	95	92	EA-EC	EC
25	40-41	41	59	96-98	98	93	ED-EE	EE
26	42-44	44	60	99-9A	9A	94	EF-F1	F1
27	45-47	47	61	9B-9D	9D	95	F2-F3	F3
28	48-49	49	62	9E-9F	9F	96	F4-F6	F6
29	4A-4C	4C	63	A0-A2	A2	97	F7-F8	F8
30	4D-4E	4E	64	A3-A4	A4	98	F9-FB	FB
31	4F-51	51	65	A5-A7	A7	99	FC-FD	FD
32	52-53	53	66	A8-AA	AA	100	FE-FF	FF
33	54-56	56	67	AB-AC	AC			

13.9 STANDARDS - DMX512, EIA485

Detailed discussion of DMX512 is beyond the scope of this manual. We would recommend that persons wishing to know more consult a good book discussing asynchronous serial communications in computers.

The electrical standard on which DMX512 is based is EIA485A. Many textbooks and catalogs discuss the features of this standard. It was issued by:

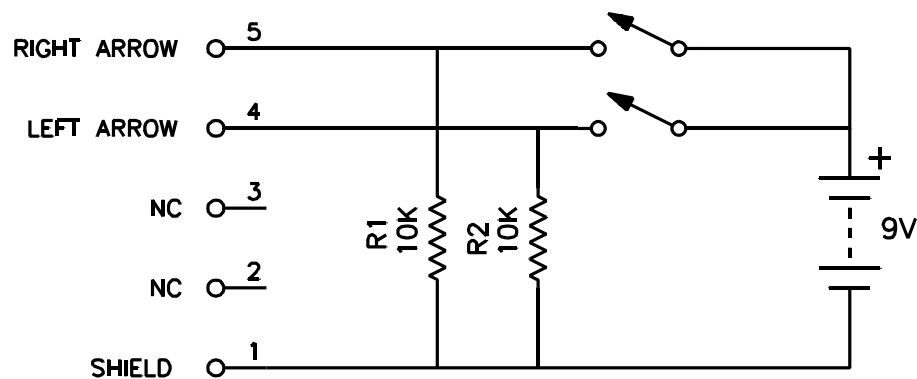
Electronics Industries Alliance
2500 Wilson Boulevard
Arlington, VA 22201-3834 USA
ph: +1-703-907-7500
website: <http://www.eia.org/>

Copies of this standard may be obtained from the
Global Engineering Documents
15 Inverness Way East
Englewood, CO 80112 USA
ph: +1-800-854-7179 fax: +1-303-397-2740
website: <http://global.ihs.com/>

Copies of the E1.11 USITT DMX512-A -- Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories Can be obtained from:	
Electronic Copies: The ESTA Foundation Phone: +1-212-244-1421 Fax: +1-212-244-1502 Online Store - http://www.estafoundation.org/pubs.htm American National Standards Institute Online Store - http://webstore.ansi.org/ansidocstore/	Printed Copies: The ESTA Foundation Phone: +1-212-244-1421 Fax: +1-212-244-1502 Online Store (** Discounts offered to ESTA Members) USITT Phone: +1-315-463-6463 Fax: +1-315-463-6525 Online Store - http://www.usitt.org PLASA Phone: +44 (0)1323 410 335 Fax +44 (0)1323 646 905 Online Store - http://www.lsionline.co.uk/books/result.asp?cat=Standards
Members of USITT and ESTA can get a discount by purchasing them from the organization they belong to.	

There is a book we recommend - **Recommended Practice for DMX512, A guide for users and installers**, By **Adam Bennette** This "little white book" is the **best** user's guide for DMX512. It is a joint venture of PLASA (UK) and USITT (USA) and was reviewed by DMX512 equipment manufacturers worldwide. We highly recommend it.

13.10 BUILDING AN EXTERNAL SWITCH ADAPTOR



ADJUST ONE SLOT, AUTOFADE ONE SLOT and ADJUST ALL SLOTS. The software supports two user provided external switches. A small pendant control or a foot switch can be used to activate these functions. At present Goddard Design does not sell these switches. But you can build your own.

Any two mechanically suitable normally open momentary switches may be used. They should be wired to a female 5 pin DMX connector (Switchcraft A5F) as shown in the above schematic. A power source of 5 volt DC to 10 volts DC is required. The two 10 K resistors constitute the bulk of the power drain on the power source. A 9 volt radio battery should last as long as its shelf life.

13.11 RELEASE NOTES & SOFTWARE, VERSION HISTORY

V0.90 - V0.95 Beta test versions

V1.01 is the first production software version.

V1.40 This software added the following features

- 1) A 0 to 100 percent scale option was added for slot levels.
- 2) The user options menu was reworked to accommodate switching between the three display formats, decimal, percent, and hex.
- 3) AUTOFADE ONE SLOT was added to transmit.
- 4) The following were added to receive: search for next slot at level, a slot summary display, and a new menu item added to set the search minimum.
- 5) FLICKER FINDER may now run with the line either terminated or unterminated.

V1.40 Bugs Swatted:

The power off timer had a bug that caused it to be re-enabled every time <TOP> was pressed even though the user would have assumed this was not the case.

There was a bug in TAKE SNAPSHOT that caused multiple copies of the received slot data to be recorded in the slot table when a snapshot was taken of a console outputting fewer than 512 slot levels. SNAPSHOT continued to record slot levels until 512 levels were in the table.

Other minor code tweaking was done. The only one worth mentioning is; in VIEW PARAMETERS the displayed label 'MARK LENGTH' has been changed to 'MAB LENGTH'.

V1.50 This software was made compatible with **SHOW SAVER**. In the User Setup Menu, the **POWER TIMER DISABLE/ENABLE** query was clarified. Provision was made for optional owner identification within the turn on message display. In **RECEIVE DMX512, MEASURE PARAMETERS** the return points for the measurement routines have been changed to be consistent. The USER C 'flavor' was changed to match that used by the **SHOW SAVER** software. Considerable internal housekeeping was performed.

V1.60 **RECEIVE SCOPE TRIGGER** was added as an option. Again most of the other changes are internal. Much of the menu code is now handled by a table driven 'menu engine'. Interrupt code may now be RAM

resident and reloaded at will. The only notable user interface changes are in **SHOW SAVER's** monitor mode, plus the addition of the external switches to **TRANSMIT DMX512**.

Bugs Swatted: V1.01 **SHOW SAVER** did not change the status of the termination relay on entry to monitor mode. If the last use of the DMXter had been as a receiver at the end of DMX line, the termination relay would stay terminated. While the line would be monitored no DMX512 would pass through to the slots. Playback worked correctly. In V1.10 of **SHOW SAVER** when entering the monitor mode the line is always unterminated so that data is passed through to the slots.

End Of Moved Text

V1.61C This was the first version to support the Colortran protocol. It was only released in CMX-DMX version.

V1.62C This version corrected a bug that occasionally caused some of the RAM variables to be corrupted when switching from DMX to CMX or back. It also was only released for CMX-DMX units.

A feature to allow the user to reset all RAM variables from the front panel was included.

V1.63 - V1.63C This version is available in both a Colortran and a non-Colortran version. An internal change was made to correct a problem that caused earlier Colortran code to be CPU lot code sensitive. No lot sensitivity has been seen in non-Colortran units. The change was made to all code.

V1.73 - C1.73

A) The major new feature of this version is the **MULTI CHANNEL MODE**. This feature is designed to ease the testing of multi channel fixtures. We suggest that users old and new read all of section 9.

B) The scrolling copyright message has been removed. The static version and personal identification fields can be keyed through.

C) Other significant changes that the user will notice are in the **TRANSMIT DMX512** menu.

1) Bumping a slot level to 50% is now possible. This is done by pressing and releasing both the **<UP>** and the **<DOWN>** keys. In general this key combination will set most values to their mid scale value.

The following changes cause the *Lil'* DMXter software to more nearly match the software written for the MiniDMXter.

2) In **SEND/EDIT** it is now possible to skip to the next slot set to a level greater than the search value. This function mirrors a feature that has long been part of the **RECEIVE** routine.

3) Another 'Mini' like change is that exiting **SEND/EDIT** by pressing **<YES/Q>** does not reset the slot number to 1. Hence if you are viewing slot 321 and your finger stutters on the **<YES/Q>** key pressing it again will put you back at slot 321, not back at slot 1 as happened with prior versions of the software. This feature is also available in all routines that use a slot number.

4) A means to reset the slot number to one at any time has been added to all routines that use a slot number. The key press to do this is **<RIGHT>** and **<LEFT>** together.

5) A method of clearing the transmit table without leaving **SEND/EDIT** has also been included.

D) The menu item in **USER OPTIONS** for selection of the number format now is the same as the one used in the MiniDMXter. The default display type is now percent. We have made one DMX512 terminology change. **INTERBYTE** time is now called **INTERSLOT** time. This change reflects the usage in the Standard.

E) The low battery warning code has been changed. The new code allows background tasks, such as DMX512 transmit, to continue to run during the warning message. User interface related tasks still pause during the message.

F) One optional routine has been removed. As of this writing the **RECEIVE SCOPE TRIGGER** is not order-able as part of V1.70. This routine is still order-able but it will be supplied with the rest of V1.63 or V1.63C which is still supported. The **TRANSMIT SCOPE TRIGGER** is still provided standard on all units.

As usual many internal modifications to the code have been made. Hopefully the user will never need to know anything about them.

V1.75 We continue to violate all our naming rules.

Manuals are normally issued for major revisions. Major revisions are normally considered ones that are ones where the number after the decimal point is changed, such as versions V1.5x, V1.6x, V1.7x

Version 1.75 is primarily a bug fix and internal change revision. No major functional changes have been made. However, certain terminology has been changed to reflect the current naming conventions commonly used to identify parameters of DMX512. These changes are embodied in the proposed revision of DMX512. After the revision DMX512 will be an American National Standard. Its formal name will be; ANSI E1.11, Entertainment Technology - USITT DMX512-A

The terminology changes that have been made all involve using the term ‘slot’ for what was often called a DMX ‘dimmer’. In draft DMX512-A a slot is “a sequentially numbered framed byte in a DMX512 packet. A single Universe contains a maximum of 513 Slots, starting at slot 0. Slot 0 is the START Code. Slots 1 through 512 are data slots.”

MENU	OLD TERM	NEW TERM
VIEW LEVELS? - SEND/EDIT SNAPSHOT? - ShowSaver Edit Scene -	DIM: 1 2 . . . LEV% 100 75 . . .	SLT: 1 2 . . . LEV% 100 75 . . .
EDIT USER FLAVORS?	INTERFRAME TIME	INTERSLOT TIME
VIEW PARAMETERS?	BYTES PER PACKET	SLOTS PER PACKET
CHANGE SEND FLAVOR?	24 DIMMERS 8uS MAB	24 SLOTS 8uS MAB
	70uS BK 4uS MAB 20D	70uS BK 4uS MAB 20S
EDIT USER FLAVOR?	NUMBER OF DIMMERS	NUMBER OF SLOTS
	INTERFRAME TIME	INTERSLOT TIME
RCVR	BYTE TRIGGER	SLOT TRIGGER
SCOPE TRIGGER?		
FLICKER FINDER?	xx DIMMERS W/ERRORS	xx SLOTS W/ERRORS
	DIM: x ERRS: xxx	SLT: x ERRS: xxx
MULTI CHANNEL CONFIGURE FIXTURES?	STARTING CHANNEL #	STARTING SLOT #
	LAMP ON DIMMER NUMBR	LAMP ON SLOT NUMBER
	MORE THAN 512 DMRS	MORE THAN 512 SLOTS

For ease of use the term ‘Dimmer’ is still kept for three routines. These routines are; **ADJUST ONE DIMMER, AUTOFADE ONE DIMMER** and **ADJUST ALL DIMMERS**

V1.76 V1.76 fixed a bug in the START Code display in VIEW PARAMETERS. that caused a 'extra' start code displayed after code 255 in when more than four codes were displayed. It also fixed a bug in Receive Scope Trigger that caused Find Next with level to fail - but since scope trigger was not released with this version no one saw this change.

V1.77 In ShowSaver monitor mode the entrance to QUICK_SUM display is commented out to remove a nasty bug that causes crashes. Very few copies of 1.75-1.76 were shipped. While a lot of V1.77 were.

V1.80 This version

While we may very well release future updates for the original *Lil'DMXter* (FD DMX-1x) the code will be reasonably stable from here on. This update is considered as tying up loose ends. There are several reasons for this.

- The last **version 1** hardware shipped in early 2000.
- The EPROM is full. There is no room for large new blocks of software.
- Future versions of DMX512 will require hardware not designed into this hardware.

We changed our default transmit flavor to conform to the slightly expanded requirements of DMX512-A, making our former default flavor (DMX512/1990) into the first alternate you may choose.

We dropped the Scope Trigger code from version V1.70 because of code storage space limits. However, we have had a number of requests to bring out a version with otherwise up to date code which includes **Receive Scope Trigger**. So V1.80 is going to be available in several different versions to meet various requirements. The user can pick which routines meet their requirements.

It should be noted that to fit **Receive Scope Trigger** and some new E1.11 routines requires dropping other routines, one of which is **Single Ended Cable Test**. In most cases the same function can be achieved by using **Flicker Finder**.

V180A Includes:

ShowSaver, Multi Channel Mode, the new E1.11 routines and all standard DMXter features except for **Receive Scope Trigger**.

C180A

This version is V180A with support for the Colortran protocol. This version requires special hardware. The optional user ID string at boot up is not available on Colortran units.

V180B Includes:

Receive Scope Trigger, Multi Channel Mode, the new E1.11 routines and all standard DMXter features except for **Single Ended Cable Test** and **ShowSaver**.

V180C Includes:

Receive Scope Trigger, ShowSaver, the new E1.11 routines and all standard DMXter features except for **Single Ended Cable Test** and **Multi Channel Mode**.

Common features of these versions.

Lingering references to “dimmer” when we mean ‘slot’ have been removed. Certain text messages have been made briefer; the sign-on version number being the most visible of these changes. We feel that readability hasn’t suffered - in fact it should have improved and it saves EPROM space.

Routines to send the Hex 55 test messages and a canned E1.11 formatted text message have been added. The Hex55 message is identical to that fitted on DMXter2 software version 2.30 up. The text message routine is a simplified version of the one fitted on the DMXter2.

A routine to receive and display E1.11 text messages identical to the one fitted on the DMXter2 version 2.30 up is included. DMX text messages are used by a number of manufacturers, including Goddard Design, to provide setup and operational informational output on products with limited user interfaces

When the DMXter was first sold, DMX512 was about Null START Code packets; alternate START Code messages were a curiosity. If a data stream of mixed Null and ASC messages is being received, it is not obvious if it has updated the Null packet. The NO DATA timeout only times out if NO packets of any start code are received. With our old software it was not possible to easily tell if packets currently being displayed had been updated. We found this to be annoying when using the DMXter to test multi-START Code DMX. So we have added a small change to **VIEW LEVELS** in the receive menu.

Now, in **VIEW LEVELS**, pressing the <DOWN> key will clear the buffer as well as restart reception if that is needed. Pressing the <UP> simply restarts reception as it always has.

This version swatted a bug that caused the VIEW LEVELS summary screen to report incorrectly how many slots were in a packet if that packet had either 255 or 511 slots. It also swatted one that caused **view captured levels in receive scope trigger** not to find slots higher than 199..

Additional changes were made to **ADJUST ONE DIMMER, AUTOFADE ONE DIMMER** and **ADJUST ALL DIMMERS**. All were now changed from **DIMMER** to **'SLOT'**.

Compared to V1.70, V1.80 has a new release of our **ShowSaver** software. The primary change is a more flexible monitor mode. The new monitor mode will allow the DMXter to take control automatically in the event of a failure. The older version notified the user of a failure and saved the last look on stage but it did not start to transmit that look without operator intervention.

13.12 VERIFYING SYSTEM TIMEBASE ACCURACY

The *Lil'DMXter* has a highly accurate crystal timebase, but it is not traceable to a certified calibration standard. For normal DMX512 testing and evaluation, the stock accuracy of the crystal should be more than adequate. If you have any need or desire to know the absolute accuracy of your particular DMXter, continue reading. If not, skip the rest of this section as it will only serve to confuse matters!

To verify the actual accuracy of the system timebase, it is necessary to measure the operating frequency of the microprocessor. To do this will require a frequency counter capable of measuring 2.6666666 Mhz with an accuracy of better than 20 PPM.

**FIRST UNPLUG THE *Lil'DMXter* FROM THE AC LINE!!!!
NEVER OPERATE THE UNIT FROM THE AC LINE WHEN IT IS
OUTSIDE ITS CASE.**

OK, so now take the unit apart. Start by removing the single screw in the back of the case (careful as the unit will drop on the floor if you are clumsy). Remove from case. Next remove the four screws in the corners of the front panel. The unit will separate into two pieces connected by a ribbon cable and a twisted pair.

Turn the DMXter on, it must be on battery power only, not connected to AC. Leave the unit in either of the first two menu items:

DO YOU WANT THE
BACKLITE OFF?

or

DISABLE THE AUTO
POWER OFF TIMER?

Your MUST enter either of these menu items by turning on the DMXter. Entering them by way of the **SETUP USER OPTIONS?** menu is not the same as far as this test is concerned!

Next find the 40 pin microprocessor. The signal that needs to be examined is on pin 30. This signal is called ALE. The frequency of the crystal is the frequency of this pin multiplied by six. The nominal crystal frequency is 16 Mhz. Therefore the frequency appearing on this pin should be 2.666666 Mhz. The deviation from the nominal crystal frequency can be used to calculate the correction factor that would have to be applied to all time measurements and settings for this particular DMXter.

A side note: Do not try to measure the frequency of the crystal directly with any normal probe system as the additional capacitance of the probe and counter will detune the crystal oscillator and result in extremely inaccurate readings.

14.0 THE RECEIVE SCOPE TRIGGER OPTION

– Not included in V1.80A –

The Receive Scope Trigger software is designed for detailed trouble shooting of DMX512 systems and for debugging of new designs. It is not generally needed by show electricians. With Scope Trigger it is possible to trigger an oscilloscope from certain important points within the DMX data stream. Proper use of this feature requires a detailed knowledge of DMX512 and the use of an oscilloscope. While executing Scope Trigger function the DMXter cannot otherwise receive or analyze DMX512.

This feature consists of two parts, a software module and an optional external printed circuit card. (type number STC1A) Neither is of any use without the other.

14.0(1) Receive Scope Trigger Hardware

The STC1A card provides needed additional hardware to implement Scope Trigger.

Its features include:

- * The TTL level trigger signal is on a BNC connector. It is switchable to either a hardware trigger circuit or the software 'arming' signal.
- * The TTL level DMX512 data signal is on a BNC connector.
- * A delay line in the data output allows viewing of the triggering event.
- * EIA485 DMX512 repeater with ability to optionally invert the data. This driver may be disabled to conserve battery life.
- * A self contained, low drain, battery power supply with low battery warning LED.

Functionally the card converts the EIA485 DMX512 signal to a TTL signal. This signal is passed to one input of an 'exclusive or gate' where it is buffered or inverted depending on the state of a control line from the DMXter. The control line from the DMXter is connected to the other input of the EXOR gate. The output of EXOR is connected to the clock input of a S latch. The S input of this latch is held high. The DMXter provides an 'Arm' signal which is connected to the reset line of the S latch. The DMXter sets the control line to the EXOR gate depending on whether the next trigger is to be on a rising or falling edge of the DMX line. The latch is held in reset until just before a triggering event is expected. It is then released; the next transition of the proper polarity on the DMX line will cause the trigger. After the DMXter software knows the trigger event has passed it resets the S latch. The arm signal from the DMXter is sometimes also a useful Scope Trigger so it is selectable as the trigger output.

The triggering event to trigger out delay of this hardware is about 25nS. When enabled, the data delay line will add about 75nS of delay to the TTL data output. This should allow the leading edge of the triggering event.

As well as the general resources of the microprocessor and its UART the Scope Trigger uses certain hardware counters and timers available in this processor to produce highly accurate programmable delays.

14.0(2) Receive Scope Trigger Software

The behavior of Receive Scope Trigger is totally controlled by special software. The Scope Trigger user interface has fewer user warnings and error traps than the general DMXter code. This is because of both the nature of the code and the type of user we expect to use this code. Specifically there is no '**NO DIGITAL INPUT OR INPUT NOT DMX512**' message in Scope Trigger. Also if DMX data stops while the Scope Trigger is waiting for some important event to take place the software will patiently wait there until the event happens. Depending where in the code you are this may cause the user interface to freeze. To regain user interface control, restart the DMX data or exit by way of <TOP>.

14.1 TRIGGER ON THE START OF THE BREAK

OVERVIEW

This routine allows you to trigger a scope on the start of DMX512 break. You will only get a stable trigger on DMX512 transmitters that send packets containing a consistent number of Frames. This routine should work on the vast majority of current production transmitters.

The DMXter arms the trigger card during the stop bits of the last slot of the previous packet. The Scope Trigger card produces a rising trigger when it detects the next falling edge. In a properly formatted DMX data stream that edge will be the beginning of the break. The trigger should be taken from the gated output of the card. This routine is equally useful with either analog or digital storage scopes.

INTERFACE

The entry point is | START OF BREAK? |. On entering you will see the following display

```
START OF BREAK
UNSTABLE SLT:
```

If no DMX512 is being received, this display will be steady. If you are receiving DMX512 the number of slots in the packet will appear in the DIM field, and if the number of dimmers in each packet is stable the UNSTABLE field changes to STABLE. Trigger generation starts after the DMXter determines that the number of slots is stable. A stable display of a console sending 504 slots is

```
START OF BREAK
STABLE SLT: 504
```

If the transmitter should switch to a different packet size the STABLE field will momentarily change to UNSTABLE, the number in the SLT field will change and the display will change back to STABLE. The UNSTABLE-STABLE field is one shot so even a single packet with a different slot count should be observable. If the transmitter is intermingling packets of different lengths, the field will stay showing UNSTABLE. The algorithm used for this trigger mode does not work with changing packet lengths. Note: If you totally lose DMX512 the display will not change, it just acts as if the packet was being sent very slowly. But you should be able to figure it out, you do have a scope connected to the line, don't you?

ALGORITHM DETAILS

The software requires that three packets have the same number of frames for the packet length to be considered stable. The arm signal goes high 2.5µS - 2.9µS into the first stop bit of the last frame of the packet. The trigger will be generated on the next falling edge. Obviously no break qualification is possible.

14.2 TRIGGER ON THE END OF THE BREAK

OVERVIEW

This routine is designed to trigger a scope at the end of a break that lasted at least as long as a minimum time set by the user. When the DMXter detects a frame with a framing error that it believes to be a break, it times from the leading edge of that frame: if when the amount of time set by the user has passed we are still in break the trigger card is armed. The next rising edge of the DMX line will produce a rising trigger on the BNC connector. On analog scopes this is useful for observing the Mark After Break. Additionally on DSO's you may use this routine to observe breaks that cannot be reliably viewed with the routine of 14.1 above. This routine should be reasonably well behaved on most transmitters with either type of scope.

INTERFACE

The entry point is |END BREAK/START MAB?|. On entering you will see the following display

```
END BREAK/START MAB
TRIG ARM AT 65 uS
```

Note the cursor under the 6; you may move it using the <RIGHT> and <LEFT> keys. Whichever number or space the cursor is under may be edited using the <UP> and <DOWN> keys. If the cursor is under the one's place the <UP> key will increment the number by one with a carry to the ten's place if needed. If the cursor is under the ten's place the <UP> key will increment the number by ten with a carry to the hundred's place if needed. Pressing the <DOWN> key will decrement the proper place; if an underflow occurs the number will be set to 65µS. The default value for the arm delay is 65µS. Any value up to 16383 µS may be selected. Once you have selected a value it will be saved as long as battery power is maintained. All trigger modes other than TRIGGER ON THE START OF THE BREAK use the arm delay and share the same value for it.

ALGORITHM DETAILS

To be considered a possible break a frame must be missing both stop bits, and the data slot must be zero. The line must stay low until the time set by the user has passed. Then the break is considered valid and the arm signal is set. The time is measured from the falling edge at the start of the break. The trigger will be generated by the rising edge. To allow for worst case latency in the break time the timer is offset by a small amount. This latency has a certain amount of jitter. On most packets if the trigger is set to arm at 65µS the arm signal will actually go high 63.5µS after the leading edge of the break. Generally this will mean that the break is one micro second shorter than the maximum setting that gives a break trigger. If the break starts to be displayed as the delay is decreased from 90 to 89 µS the true break length is 88µS.

14.3 TRIGGER ON THE BEGINNING OF THE START CODE

OVERVIEW

This routine is designed to trigger a scope at the beginning of the START Code if the break has lasted at least as long as a minimum set by the user. When the DMXter detects a break it times from the leading edge of that break; when the amount of time set by the user has passed the trigger card is armed. The next falling edge of the DMX line will produce a rising trigger on the BNC connector. This is useful for observing the START Code and as a general trigger at the beginning of a packet.

INTERFACE

The entry point is |BEGIN OF START CODE?. On entering you will see the following display

```
BEGIN OF START CODE
TRIG ARM AT 65 uS
```

The interface behavior is identical to that for **END BREAK/START MAB**.

ALGORITHM DETAILS

Other than generating a trigger on the falling edge this routine is identical to **thErigger on the End of the Break**.

14.4 SLOT TRIGGER

OVERVIEW

The SLOT TRIGGER routine is actually a number of powerful trigger routines selectable from a bar menu. The main thrust of these routines is to allow you to trigger on any slot in a DMX512 packet. The trigger is generated when the 'AND' of three conditionals is true. An important thing to keep in mind is that the trigger is generated only AFTER a slot in the DMX packet has satisfied all of the conditions.

The qualifiers for the START Code are: equal(=), not equal(≠), or don't care (----).

For slot number they are: equal(=), or don't care, (----).

For slot level they are: equal(=), greater than (>), less than (<), not equal(≠), or don't care (----).

Getting these routines to do what you want will require careful understanding of what they do. Unlike the other trigger routines all of these routines cause the receiver to read the DMX data and store it in the slot table. All of these routines will run in either a continuous mode or a single shot mode. In the continuous mode a trigger is generated every time the condition is met; in the single shot mode only one trigger is generated. In the continuous mode all packets are written to the slot table; in the single shot mode reception stops at the end of the first packet that satisfies the conditional trigger.

INTERFACE

The entry point is SLOT TRIGGER?|. On entering you will see the following display

```
MIN BREAK IS 65uS
CHANGE IT?
```

This allows you to set the shortest break that may be received for a packet to be further analyzed. After you have changed the break or bypassed doing so you will enter the main bar menu.

```
STCD SLT LEV CAPT
_---- = 1 ---- CONT
```

14.4(1) Triggering after a Slot

These are the default settings and this is the most common mode of operation. These settings cause a trigger to be generated on every packet, regardless of START Code, after slot 1. On an analog scope or DSO set to view post trigger you will see the start bit of slot **2**.

The slot number may be set from 0 to 512. To set the slot number move the underline cursor with the **<RIGHT>** and **<LEFT>** keys. Place the cursor under the digit you wish to change. If the cursor is under the one's place the **<UP>** key will increment the number by one with a carry to the ten's place if needed. If the cursor is under the tens, place the **<UP>** key will increment the number by ten with a carry to the hundred's place if needed. Pressing the **<DOWN>** key will decrement the proper place; if an underflow occurs the number will roll over to the highest allowed number, in the case of slot 512.

If you want to view slot 1 set the number to 0. Setting the number equal to the number of slots sent will cause a trigger on the start of the break of the next packet. The reason we display the slot that causes the trigger and not the slot that will be viewed is so that we may have consistency with the rest of the slot trigger modes. If one is looking at the next slot the trigger will almost always be taken from the gated trigger signal from the BNC connector. If you are using a DSO to look backward in time at the slot that caused the trigger you may find that the arm signal gives less jitter. The difference between these two signals is that the Arm signal is precisely delayed from the start bit of the arming slot, while the gated trigger is synchronous with an edge in the next slot.

TIMING DETAILS

With the START Code and the level entries set to 'don't care' the delay from the rising edge of the stop bit of the triggering frame to the generation of the arm signal is 3µS.

14.4(2) Trigger on Packets with START Code 'x'

STCD stands for START Code. Setting the cursor under any one of the STCD spaces and pressing **<UP>** will cause the START Code to come out of 'don't care'. On entry the START Code will be set to the DMXter present START Code setting, generally

```
STCD SLT  LEV  CAPT
=  0  =  1  ---- CONT
```

Now the trigger will be generated only for packets that have a zero START Code. Any slot number may be selected, but there are timing limitations on triggering on slot zero in this mode that mean that for general viewing it is better to start with slot 1. See the timing details below.

The allowed qualifiers for a START Code are equal and not equal. The latter may well be used with the single shot mode (**ARM**) to capture suspect corruptions of the START Code.

Try placing the **SLT** field into the 'don't care' state. Do this by placing the cursor under the = sign and pressing either **<UP>** or **<DOWN>** keys. You will note that **LEV** field comes out of 'don't care'. Only one of the **SLT** or **LEV** fields may be in 'don't care' at the same time.

TIMING DETAILS

The delay from the rising edge of the stop bit of the triggering frame to the generation of the arm signal depends on which slot generates the trigger. If we are triggering on slot 1 through 512, the delay is 3µS.

If the trigger is set to **SLT** the delay is 11.6 µS. On an analog scope you may lose part of the first slot after the trigger depending on the amount of interslot time in the packet. You will lose less if you switch to triggering on the arm signal.

14.4(3) Triggering If Any Slot Is at Level 'X'

Leave the **SLT** field in the 'don't care' state, select the START Code value you want, including 'don't care'. The setting of the START Code will determine which packets will be checked for levels. This mode is novel in that multiple triggers may be generated by a single DMX packet. Each slot is evaluated and a trigger is generated whenever the qualified level is matched. The qualifiers for levels are: equal (=), not equal (≠), level greater than (>), and level less than (<).

This is a mode where the fact that a trigger occurred may be all you wish to know so consider using the single shot mode. If multiple triggers occurred you may be more interested in where they were than what the data was. You might consider viewing the trigger signals directly. Certain timing restrictions also must be pointed out. (Yeah, we wish we didn't have them too.)

TIMING DETAILS

The delay from rising edge of the stop bit of the triggering frame to the generation of the arm signal with the level check set for = or ≠ is 16.8µS. If the level check is set for < or > the delay is 17.6µS.

14.4(4) Triggering Slot 'X' Is at Level 'Y'

If you enable both the **SLT** and the **LEV** fields at once the trigger will be generated after the indicated slot if it meets the level restrictions.

14.4(5) Using the One Shot Mode

The single shot mode is controlled by the last field. Placing the cursor under any one of the bottom line spaces beneath **CAPT** and pressing either <UP> or <DOWN> will change the **CONT** flag to **ARM**. This flag will stay showing **ARM** until the trigger conditions are met then it changes to **TRIP**. At that time a single trigger is generated and the packet containing the trigger is preserved in the slot table. At this point you may wish to temporarily leave the **SLOT TRIGGER** to view the captured levels. You may do this by pressing <YES/Q> <DOWN> <YES/Q>. You may return to the **SLOT TRIGGER** without losing your setup with the one exception that the **TRIP** flag will be replaced by the **CONT** flag.

14.4(6) USING HEX NUMBERS IN RECEIVE SCOPE TRIGGER

If the DMXter is set to display in hexadecimal the **START** Code and slot levels will be displayed as a two-digit hex number followed by a lowercase 'h'.

14.5 VIEW CAPTURED LEVELS

OVERVIEW

This routine allows you to view data stored in memory by the **SLOT TRIGGER** software above. The data that will be displayed is the last packet received. If you have not run **SLOT TRIGGER** since you entered the Receive Scope Trigger menu the data in the slot table will be whatever was left from the last time transmit or receive functions of the DMXter were used. The only Scope Trigger routine that writes slot level to the slot table is **SLOT TRIGGER**.

INTERFACE

The entry point is |VIEW CAPTURED LEVEL?|. The interface for this routine is the same as **VIEW LEVELS**.

14.6 FRAMING ERROR TRIGGER

OVERVIEW

The **FRAMING ERROR TRIGGER** has a dual nature. If either or both of the two stop bits are missing from a frame and the data slot is not zero, a trigger is generated. No further time qualification is required. If both of the stop bits are missing, the data slot is zero, and the line goes high (marking) before the time set by the user, a trigger is generated. The trigger pulse is generated when the time delay expires. In many ways this is the inverse of the minimum break qualification routines (above) that require that a break lasts at least as long as the time set by the user for a trigger to be generated.

INTERFACE

The entry point is |FRAME ERROR TRIGGER?|. On entering you will see the following display

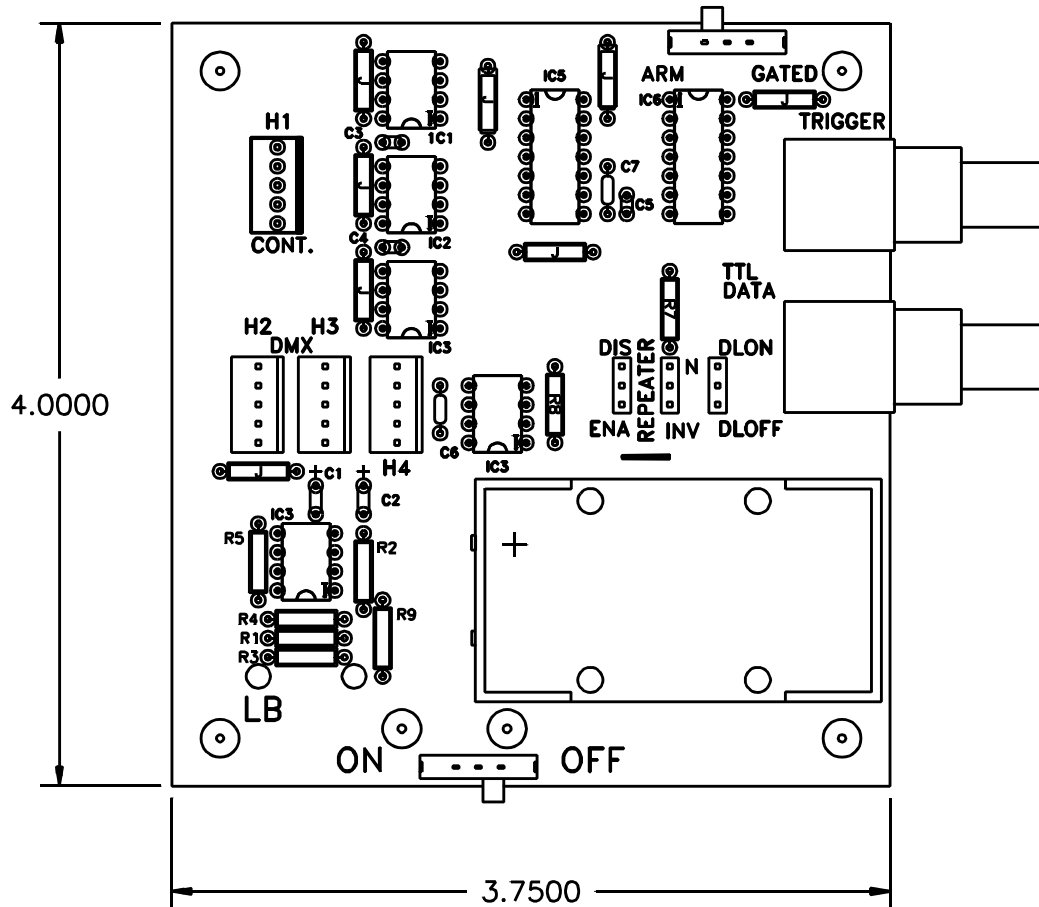
```
FRAME ERROR TRIGGER
ERROR <      65 uS
```

This routine has a number of uses tracking down glitches on a DMX512 line. Another use is to generate a trigger signal a precise time after the start of a DMX packet.

For normal use the gated trigger output produces a pulse with the needed accuracy. Using the arm signal may produce slightly more predictable timing. The framing error trigger is output about 4 μ S after the timer runs out. The trigger output is a short positive going pulse lasting approximately 2.5 μ S.

14.7 FURTHER HARDWARE DETAILS

Header Connections:



H1, Control: This header carries the Scope Trigger control signals from the *Lil'DMXter* to the STC1A card. It should be wired to an A5M connector plugged into the **DMX-512 OUT** connector on the Scope Trigger *Lil'DMXter*. All header to 5 pin cables should be wired one for one.

- 1 Shield
- 2 - Arm
- 3 + Arm
- 4 - Phase
- 5 + Phase

H2 - H3, DMX512 Data: Headers H2 and H3 are wired in parallel. H2 should be wired to the DMX source under test. H3 should be wired to an A5F connector plugged into the **DMX-512 IN** connector on the Scope Trigger Lil'DMXter.

- 1 Shield
- 2 - DMX
- 3 +DMX
- 4 - Aux.
- 5 + Aux.

H4 Repeater: This connector is the output of the DMX repeater. In Scope Trigger mode the DMXter always terminates the DMX512 line. Hence if you need to simultaneously use the DMX signal under test and cannot tolerate double line termination you will need to use the built in repeater. The repeater is controlled by two sets of programming jumpers. The **DISable - ENA**able jumper block controls whether the repeater is enabled or tri-stated. The **Normal - IN**verted jumper block controls whether the data is passed normally or inverted. This repeater is shipped disabled since its use shortens battery life. The scope card draws only about three to 4 MA. Driving a terminated DMX line draws about 25 MA additional.

- 1 Shield
- 2 Repeater out -
- 3 Repeater out +
- 4 Aux. - (jumped to H3-4)
- 5 Aux. + (jumped to H3-5)

The Delay line: The jumpers block marked **DLON - DLOFF** controls whether a deliberate delay of about 75nS is introduced into the DMX data output on the BNC connector. Units are shipped with this delay enabled.

Getting The ARM Signal:

On the current version of the Scope Trigger card (STC1A R2) a switch on the edge of the card near the trigger BNC connector selects whether the **GATED** trigger or the **ARM** signal is available on the BNC connector.

15.0 COLORTRAN PROTOCOL OPTION

– Included only in C1.80A –

If you ordered your *Lil'*DMXter1 with an option that allows it to send and receive Colortran's proprietary digital protocol you will run this version. This protocol is usually referred to as CMX. It is the parent protocol on which DMX512 was based. The primary difference between CMX and DMX512 is that CMX uses a baud rate of 153.6K while DMX512 uses a baud rate of 250K. **A side note: the baud rate of CMX has often erroneously been listed as 156K.**

This option should be of great use to anyone servicing Colortran systems that use this protocol. All of the *Lil'*DMXter's features now support CMX, but certain differences must be taken into account.

This option should be retrofitable to all existing DMXters. But we will require that all units be returned to the factory to be retrofitted with additional hardware.

15.1 HOW TO IDENTIFY CMX EQUIPPED DMXTERS

A *Lil'*DMXter fitted with this option is identified by a 'C' in the software version number. The first version of the software to support CMX is version C1.61.

15.2 *Lil'*DMXter's NAMING CONVENTIONS FOR THE CMX PROTOCOL

The *Lil'*DMXter's software uses either 'COLORTRAN' or 'CTN' in its display messages to identify the CMX protocol. The reason for this is that at a quick glance CMX and DMX are easily confused in the block letter character set of the LCD display. This naming change is done only for clarity.

15.3 SELECTING THE CMX PROTOCOL

The primary standard of units fitted with this option is still DMX512. Units so fitted must be switched via software to Colortran mode. Once switched they will stay that way until switched back or until the power-up defaults are restored.

There are two methods of changing the unit to Colortran mode. One is by way of a new switch in the **USER SETUP OPTIONS** menu. This is a bidirectional switch which will offer the user whichever standard the unit is not currently set for. If the unit is set for DMX512 the display will read:

```
DATA IS DMX
SET FOR COLORTRAN?
```

The other method is a new 'flavor' in the **TRANSMIT DMX512, SEND FLAVOR** submenu.

```
SEND FLAVOR?
CMX 153.6k
```

The following should be noted: While DMX512 flavors only affect transmitted DMX, the **COLORTRAN CMX 153.6k** flavor sets the DMXter to transmit and receive CMX. Also there is only one transmit flavor available for CMX. The values for this flavor are listed below.

15.3 HOW TO TELL IF A DMXter IS SET TO CMX PROTOCOL

If you have pressed <TOP> the DMXter is sitting on the Transmit menu; the display will be changed if the unit is set to CMX.

```
|      MAIN MENU      |
| TRANSMIT CTX?     |
```

The Receive menu item also changes to:

```
|      MAIN MENU      |
| RECEIVE CTX?       |
```

The displays for other **MAIN MENU** items do not change when the protocol is switched. But all of these functions will now support Colortran protocol.

15.4 CHANGES TO TRANSMIT MENU ITEMS

Any Transmit menu item that has a first line that normally reads TRANSMIT DMX512 will change to read TRANSMIT CTX.

The SEND/EDIT SNAPSHOT routine display matrix is changed. The first example below is a possible display of a *Lil'* DMXter without the CMX option.

```
SLT:  1  2  3  4
LEV:  98 FF 50  0
```

The following examples are for units fitted with the CMX option. When the protocol is set to DMX512 the display will be as shown below. The field that used to read LEV is changed to read DMX to indicate the current protocol setting.

```
SLT:  1  2  3  4
DMX  98 FF 50  0
```

When the protocol is set to CMX the display will be as shown below. The field that used to read LEV is changed to read CTN to indicate the current protocol setting.

```
SLT:  1  2  3  4
CTN:  98 FF 50  0
```

15.4(1) The Change Send Flavor Submenu & CMX

```
TRANSMIT COLORTRAN
CHANGE SEND FLAVOR?
```

This menu item has only one useful function while a DMXter is set to CMX protocol. It allows you to return the DMXter to DMX512 protocol. Pressing <YES/Q> will display the following:

```
SEND FLAVOR?
CMX 153.6k
```

Using the <UP> or <DOWN> keys to move to another flavor and accepting that flavor by pressing the <YES/Q> will cause the START Code to be set to 0 and that **DMX** flavor to become the current flavor. The flavor editor may be used while the unit is in CMX mode but you are editing **DMX flavors**!

15.4(2) Changing the START Code While in CMX Mode

The submenu item that allows the DMXter to set the START Code to non null values is available when the unit is in CMX mode. It is left active to keep the unit's behavior as similar as possible in both protocol modes. We know of no valid CMX use where the START Code is anything but a null. Therefore we doubt that you will ever need this feature in CMX.

Note that whenever the protocol is changed either from DMX to CMX or CMX to DMX, the START Code is reset to a null (zero) value.

15.5 CHANGES TO RECEIVE MENU ITEMS

Any Transmit menu item that has a first line that normally reads RECEIVE DMX512 will change to read RECEIVE CTN.

The VIEW LEVELS routine display matrix has been changed in the same way as the SEND/EDIT SNAPSHOT display. The LEV characters have been replaced by CTN.

15.5(1) **WARNING:** View Parameters Works Differently in CMX

The following parameter measurement routines require a correction factor to give a valid reading when your Lil'DMXter is set to Colotran CMX mode;

BREAK LENGTH IN uS , MAB LENGTH IN uS , BREAK TO BREAK IN uS, and any of the above when calibrated in milliseconds.

All of the parameter measurements that are currently supported in DMX are also supported for CMX. But the current software does not provide a reading directly in engineering units for the routines listed above. A correct reading can be obtained by multiplying the displayed reading by a conversion factor. The factor (to 4 places) is 1.6276. It is derived by dividing 250K by 153.6K.

The following routines work the same way in either DMX or CMX;

The error summary display, START CODES, SLOTS PER PACKETS, and UPDATES PER SECOND.

15.6 COLOTRAN CMX TIMINGS, AND GDC'S CMX FLAVOR

The following section gives in tabular form some of the important timing information for CMX.

CMX Baud Rate	153.6 Kilo Baud
CMX Bit Time	6.5104 Micro Seconds
CMX Frame Time	71.615 Micro Seconds
Correction Factor For View Parameters	Multiply Reading By 1.6276

The following table has two uses. One it lists the values that Goddard Design uses when sending CMX protocol. These values are found in the column labeled 'DMXter CMX'. The second use is to demonstrate the use of the correction factor when measuring other CMX transmitters. The example assumes you have two CMX equipped DMXters and that you use one to measure the other. The raw parameter measured is shown in the column labelled 'Raw Value Measured'. After applying the correction factor you should get the value listed in the column labeled 'Corrected Reading'.

Parameter	DMXter CMX	Corrected Reading	Raw Value Measured
BREAK	214.8 μ S	213-215 μ S	131-132 μ S
MAB	19.53 μ S	19.5 μ S	12 μ S
Break to Break	40316 μ S	40307-40324 μ S (1)	24765 - 24778 μ S (1)
Slots Per Packet	512	512 (2)	512
Update Rate	25	24-25 (2)	24-24

Notes:

- 1) These values are typical of minimum and maximum values, raw and corrected. A typical raw rolling average value will be approximately 24770.
- 2) These values require NO correction.

15.7 CMX FLICKER FINDER

The CMX version has the same display and is operationally identical to the DMX version. The test is run at the CMX baud rate.

15.8 CMX CABLE TESTER

The CMX version is operationally and display identical to the DMX version. The test is run at the CMX baud rate. This means that some cables may pass the CMX data test that would fail the DMX data test. This is appropriate since CMX makes lower demands of its cable.

15.9 CMX SHOW SAVER

The operation of CMX Show Saver is identical to the DMX version. The only display difference is that when editing levels the LEV characters are changed to CTN as they are in SEND EDIT.

Since changing protocols does not change any recorded Show Saver looks it is possible to record looks from a console set to one protocol, say DMX512, and then switch protocol to the other to play them back. This could get you out of a very tight spot someday.

If the DMXter is set to enter DMX (CMX) Monitor mode and receives data sent on the protocol that it is not set for, it will act just as if it saw no data at all. No additional indication of a problem is given.

16.0 FCC PART 15 STATEMENT

This device complies with Part 15 of FCC Rules.

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.

16.1 **WARNING:**

YOU MUST CORRECT ANY HARMFUL INTERFERENCE CAUSED BY THIS DEVICE.

This device is professional test equipment and as such it is not intended for residential use.

If this device causes harmful interference it is the responsibility of the user to take action to eliminate this harmful interference. And if necessary discontinue use of this device in the environment where the interference occurred.

17.0 WARRANTY

The GODDARD DESIGN CO. warrants each unit it manufactures to be free from defects in material and workmanship under normal use and service for the period of 1 year from date of purchase. This warranty extends only to the original purchaser. This warranty shall not apply to fuses, disposable batteries (rechargeable type batteries are warranted for 90-days), or any product or parts which have been subject to misuse, neglect, accident or abnormal conditions of operations.

In the event of failure of a product covered by this warranty, GODDARD DESIGN CO. will repair a unit returned to us within 1 year of the original purchase provided the warrantor's examination discloses to its satisfaction that the product was defective. The warrantor may, at its option, replace the product in lieu of repair. With regard to any unit returned within 1 year of the original purchase said repairs or replacement will be made without charge. If the failure has been caused by misuse, neglect, accident or abnormal conditions of operation, repairs will be billed at a nominal cost. In such case, an estimate will be submitted before work is started, if requested.

THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS OR ADEQUACY FOR ANY PARTICULAR PURPOSE OR USE. GODDARD DESIGN CO. SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES WHETHER IN CONTRACT, TORT OR OTHERWISE.

If any failure occurs, the following steps should be taken:

- 1 Notify the GODDARD DESIGN CO. giving full details of the difficulty, and include the serial number. On receipt of this information service data or shipping instructions will be forwarded to you.

- 2 On receipt of the shipping instructions, forward the unit, shipping prepaid. Repairs will be made at the GODDARD DESIGN CO. and the unit returned, shipping prepaid.

All shipments to GODDARD DESIGN CO. should be made via United Parcel Service or similar 'best way' carrier prepaid. The unit should be properly packed either in its original container, or if in a substitute container, in one that is rigid and of adequate size to allow for suitable packing padding to protect the unit from shock.

The unit should be thoroughly inspected immediately upon original delivery to purchaser. All material in the container should be checked against the enclosed packing list. The manufacturer will not be responsible for shortages against the packing sheet unless notified immediately. If the unit is damaged in any way, a claim should be filed with the carrier immediately. Final claim and negotiations with the carrier must be completed by the customer.

None of the following sections are not relevant to part number DMX-1A. They are included for reference of people owning older product. Note the sections carry their original section number except that the number is prefixed with an 'A'.

A0.0 SAFETY WARNINGS

A0.01 GROUNDING OF OLD STYLE CE UNITS

If your DMXter is a CE unit that uses an external power supply, you will have to ground the unit to a suitable ground by connecting a grounded wire to the provided thumbscrew grounding lug on the front panel.

The following sections are reproduced from our V170 manual for DMX-1 for serial numbers before number 2xyz. They describe difference between our normal product and units that ran on an external power supply. Units with the external power supply were certified for conformance to the EMC directive but were not required to be tested under the Low Voltage Directive. Note that these units bear a special part number DMX-1CE. All new product that carries a CE mark is labeled as DMX-1A. Product shipped to North America and Europe is now identical except the AC line voltage setting.

A1.1 CE MARKED *Lil'*DMXters

The *Lil'*DMXter is now available CE marked. As of this time CE marked units are a separate product. While operationally they are nearly identical to our standard product there are several minor differences that need to be pointed out.

A11.2 IDENTIFYING CE CONFORMING *Lil'*DMXters

You may easily identify if your *Lil'*DMXter is a CE unit.

- 1) Only CE units carry the CE mark.
- 2) Model number is FD DMX-1CE
- 3) Our standard *Lil'*DMXters have a 3-pin IEC power inlet connector at the center of the top edge of the front panel. In the same location CE *Lil'*DMXters have 2.5 mm low voltage DC power connector and a thumbscrew grounding post.

A11.3 OPERATIONAL DIFFERENCES OF CE *Lil'*DMXters

The most important difference is that CE *Lil'*DMXters use an external power supply. The external power supply both charges the internal battery and allows operation directly from the AC mains. Since the power supply is external, the DMXter is no longer set for either 120 or 230 volt operation. That choice is made by selection of the proper external power supply.

There are two operational differences that result from the change to a CE power supply.

- 1) The CE *Lil'*DMXter may be operated from the AC mains with the internal battery switch OFF. This may well be an advantage in those places where only AC operation is needed. Turning off the internal battery switch when battery operation is not needed will increase the life of the battery. With our standard product it is necessary for the internal battery switch to be ON and for a working battery to be present for correct operation of the unit even from the AC mains.
- 2) The use of a double insulated external power supply removes the ground terminal provided by the AC cord. So the metal frame of the *Lil'*DMXter is no longer grounded during AC operation. Normally this is fine. But in those place where grounding is desired for either shielding or electrical reasons, the user must connect a properly grounded cable to the *Lil'*DMXter. A thumbscrew grounding post is provided for this purpose.

APPENDIX B TEXT MESSAGES LISTINGS

```

** TEXT PACKETS
** The purpose of the ASC text packet is to allow equipment to
** send diagnostic information formatted for display.
** The START Code is 17h
** Packet length 3 thru 512
** (However for timing reasons most packets will be padded to a
** minimum of 24 data slots.)
** Slot allocation is as follows:
**     slot 0: START Code 17h
**     Slot 1: Page number of one of the possible 256 text pages.
**     Slot 2: Characters per Line.
**           This Indicates the number of characters per line that the
**           transmitting device has used for the purposes of formatting
**           the text. A slot value of zero indicates ignore this field.
**     Slots 3-512: ASCII text
**           All characters are allowed and where a DMX512 text viewer
**           is capable, it shall display the data using the ISO/IEC 646
**           standard character set.
**     A slot value of zero (ASCII Null) shall terminate the ASCII string.
**     Slots transmitted after this null terminator up to the reset sequence
**     shall be ignored.

```

Text packets sent by the Lil'DMXter are canned in ROM. The only the text to be sent is stored so that is what is listed in the pseudo code below. We allow for 8 messages however only 6 are provided by V2.30. Only one is sent in V1.80

Details of t Lil'DMXter format are:

Slot 1 is set to 00h thru 08h to identify the current message.

Slot 2 is always sent as 00h.

Slot 3-511 are sent as ASCII text as required. After the last ASCII character is sent, a Null will be sent. If fewer than 25 slots are sent. The packet will be padded out to 25 slots by whatever garbage is the transmit buffer. These characters should be ignored.

Slot 512 if sent will always be a Null.

In the listings below the text to be sent is delimited with single quotes (').

The text packet at label TEXT_MS is sent by V1.80 software as message 1

```

;text packet strings
;
;           1           2           3           4
TEXT_MS0:  |1234567890123456789012345678901234567890
;
DB        'Lil DMXTER V2.30'
TEXT_MS1:  DB        'COPYRIGHT GDC 2003'
TEXT_MS2:  DB        'ESTA DMX512A TXT PACKET'
TEXT_MS3:  *
*         |           1           2           3           4
*         |1234567890123456789012345678901234567890
DB        'Alice was beginning to get very tired of'
DB        ' sitting by her sister on the bank, and '
DB        'of having nothing to do: once or twice s'
DB        'he had peeped into the book her sister w'
DB        'as reading, but it had no pictures or co'
DB        'nversations in it, "and what is the use '
DB        'of a book," thought Alice, "without pict'
DB        'ures or conversations?" So she was cons'
DB        'idering, in her own mind (as well as she'
DB        ' could, for the hot day made her feel ve'
DB        'ry sleepy and stupid), whether the pleas'
DB        'ure of making a daisy-chain would be wor'
DB        'th the trouble of getting up '

```

Message 4 below is most of the common punctuation listed in numerical order. Some display may not provide readable results with all of these characters.

TEXT_MS4:

DB	021	;	!	(exclamation mark)
DB	022	;	"	(double quote)
DB	023	;	#	(number sign)
DB	024	;	\$	(dollar sign)
DB	025	;	%	(percent)
DB	026	;	&	(ampersand)
DB	027	;	`	(single quote)
DB	028	;	((left/opening parenthesis)
DB	029	;)	(right/closing parenthesis)
DB	02A	;	*	(asterisk)
DB	02B	;	+	(plus)
DB	02C	;	,	(comma)
DB	02D	;	-	(minus or dash)
DB	02E	;	.	(dot)
DB	02F	;	/	(forward sl
DB	03A	;	:	(colon)
DB	03B	;	;	(semi-colon)
DB	03C	;	<	(less than)
DB	03D	;	=	(equal sign)
DB	03E	;	>	(greater than)
DB	03F	;	?	(question mark)
DB	040	;	@	(AT symbol)
DB	05B	;	[(left/opening bracket)
DB	05C	;	\	(back slash)
DB	05D	;]	(right/closing bracket)
DB	05E	;	^	(caret/cirumflex)
DB	05F	;	_	(underscore)
DB	060	;		
DB	07B	;	{	(left/opening brace)
DB	07C	;		(vertical bar)
DB	07D	;	}	(right/closing brace)
DB	07E	;	~	(tilde)

Messages 5 thru 7 are the same. The use some of the common formatting ASCII characters. Many LCD displays do not interperate these characters as a dumb terminal would. Some displays, including the Lil'DMXter allow custom characters to mapped to these and other 'unused' codes. Care should be taken when choosing non alphanumeric characters.

TEXT_MS5:

TEXT_MS6:

TEXT_MS7:

DB	'<BS>'
DB	07h
DB	'<TAB>'
DB	09h
DB	'<LF>'
DB	0Ah
DB	'<CR>'
DB	0Dh ; END OF TEXT STRING

APPENDIX D LOOK UP REFERENCE

Not really an index, this is an aid to help the user look up items of interest.

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